Attachment C

WindPRO Overview Reports and Calendars (Initial Analysis)

Project:
11052 Buckeye Wind II SFA_3-GE_1100m

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3/1/2012 12:18 PM/2.7.490

SHADOW - Main Result

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
280	307	482	420	473	385	412	385	596	797	832	727

W	WNW	NW	NNW	Sum
858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: 11052 contours.wpo (2)
Obstacles not used in calculation
Eye height: 1.5 m
Grid resolution: 10 m

WTGs

	UTM NAD83 Zone: 17				WTG type						
	East	North	Z	Row data/Description	Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	RPM
	UTM NAD83 Zone: 17		[m]					[kW]	[m]	[m]	[RPM]
71	279,368	4,445,092	360.8	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
72	277,985	4,446,737	380.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
73	276,767	4,447,605	399.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
74	276,919	4,447,310	395.2	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
75	276,272	4,447,236	402.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
76	276,392	4,446,951	400.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
77	276,558	4,446,666	396.2	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
78	279,498	4,440,175	352.5	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
79	278,190	4,442,124	383.9	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
80	278,158	4,441,799	390.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
81	274,913	4,446,038	390.1	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
82	275,069	4,445,768	395.5	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
83	275,215	4,445,504	400.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
84	276,290	4,442,736	379.6	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
85	275,852	4,442,363	375.3	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
86	276,329	4,441,802	384.9	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
87	273,127	4,446,337	368.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
88	276,592	4,438,677	390.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
89	275,778	4,438,425	380.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
90	278,236	4,441,453	390.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
91	281,835	4,443,472	341.3	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
92	281,137	4,443,883	347.8	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
93	280,804	4,444,251	350.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
94	281,156	4,441,420	350.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
95	282,198	4,441,581	340.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0

To be continued on next page...

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...continued from previous page

	UTM NAD83 Zone: 17 East	North	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	RPM
	UTM NAD83 Zone: 17		[m]					[kW]	[m]	[m]	[RPM]
96	282,065	4,442,739	347.1	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
97	276,789	4,442,289	381.2	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
98	276,034	4,442,154	380.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
99	276,489	4,442,477	379.4	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
100	280,316	4,446,937	360.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
101	280,472	4,445,042	351.6	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
105	275,340	4,446,427	400.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
106	275,561	4,446,153	400.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
107	274,088	4,445,876	388.2	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
108	275,300	4,445,175	395.3	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
109	275,088	4,444,675	390.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
110	272,661	4,447,412	358.7	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
112	275,073	4,442,766	370.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
113	275,193	4,442,396	367.4	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
114	279,563	4,439,098	342.9	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
115	276,812	4,445,897	387.5	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
116	276,801	4,446,428	390.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
117	277,119	4,447,042	390.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
118	275,271	4,441,707	366.2	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
119	275,266	4,442,026	367.1	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
122	268,302	4,438,216	348.7	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
123	268,534	4,437,137	342.9	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
125	267,824	4,438,274	350.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
126	280,855	4,447,117	350.4	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
127	280,863	4,445,374	350.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
128	282,108	4,440,994	335.2	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
129	280,479	4,446,456	360.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
130	282,325	4,442,257	340.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
131	277,665	4,441,538	390.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
132	278,636	4,438,180	350.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
133	272,570	4,446,003	355.5	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0

Shadow receptor-Input

No.	UTM NAD83 Zone: 17 East	North	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
			[m]	[m]	[m]	[m]	[°]	[°]	
1.1	281,116	4,442,110	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
2.1	281,235	4,442,108	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3.1	281,278	4,442,110	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
4.1	281,347	4,442,107	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
5.1	281,480	4,442,145	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6.1	281,180	4,442,455	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
7.1	281,138	4,442,434	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8.1	281,109	4,442,393	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9.1	281,057	4,442,337	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
13	278,006	4,438,802	364.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
14	277,992	4,438,751	361.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
16	279,523	4,438,426	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
18	279,769	4,438,510	341.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
19	279,934	4,438,626	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m

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UTM NAD83 Zone: 17

No.	East	North	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode
20	280,046	4,438,714	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
22	280,517	4,439,354	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
23	280,354	4,439,346	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
24	280,490	4,439,321	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
28	280,344	4,439,262	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
29	280,434	4,439,133	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
30	280,359	4,439,214	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
31	280,364	4,439,085	343.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
32	280,331	4,439,047	346.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
33	280,397	4,439,013	344.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
34	280,433	4,439,020	341.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
35	280,570	4,439,069	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
40	280,243	4,439,304	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
41	280,212	4,439,268	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
42	280,192	4,439,229	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
43	280,183	4,439,192	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
44	280,201	4,439,158	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
45	280,205	4,439,114	340.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
46	280,247	4,438,989	342.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
47	280,280	4,439,188	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
48	280,284	4,439,107	341.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
49	280,269	4,439,243	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
50	280,295	4,439,025	347.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
54	280,286	4,439,154	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
55	280,214	4,439,073	341.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
57	279,234	4,439,617	351.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
58	279,135	4,439,596	357.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
61	279,771	4,439,603	346.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
62	280,392	4,439,190	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
63	280,593	4,439,405	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
66	279,004	4,439,444	356.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
67	278,949	4,439,490	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
68	278,856	4,439,482	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
69	278,806	4,439,592	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
70	278,003	4,439,028	372.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
85	278,094	4,439,063	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
86	276,708	4,439,654	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
87	276,731	4,439,676	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
88	276,673	4,439,691	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
89	276,278	4,439,261	386.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
90	276,256	4,439,220	388.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
91	276,256	4,439,179	389.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
92	276,254	4,439,136	386.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
93	276,003	4,439,235	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
94	275,893	4,439,174	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
95	275,846	4,439,173	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
96	275,797	4,439,201	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
97	275,507	4,438,951	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
98	275,504	4,438,990	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
99	275,481	4,439,109	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
100	275,467	4,439,374	370.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m

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UTM NAD83 Zone: 17

No.	East	North	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode
106	275,484	4,439,423	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
107	275,460	4,439,007	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
108	275,440	4,438,977	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
109	275,831	4,439,103	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
110	276,015	4,439,084	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
111	276,074	4,439,081	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
112	276,023	4,439,158	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
113	275,477	4,439,036	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
114	275,569	4,439,246	375.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
115	275,477	4,439,151	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
116	276,181	4,439,195	389.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
209	276,773	4,439,707	390.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
237	279,807	4,439,728	347.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
241	280,706	4,440,827	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
244	280,680	4,440,718	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
245	280,455	4,441,143	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
246	279,076	4,441,058	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
248	278,713	4,440,951	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
249	279,385	4,441,169	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
250	278,771	4,440,951	382.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
252	278,606	4,440,944	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
256	278,392	4,440,907	382.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
257	278,132	4,440,817	389.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
261	277,345	4,440,549	395.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
262	277,339	4,440,756	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
265	275,419	4,440,912	365.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
269	275,082	4,440,880	362.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
270	274,804	4,440,996	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
271	274,762	4,440,992	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
272	274,714	4,440,995	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
273	274,668	4,441,010	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
274	274,740	4,441,082	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
275	274,605	4,441,092	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
276	274,596	4,440,973	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
333	274,692	4,441,496	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
334	274,543	4,441,621	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
335	274,646	4,441,944	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
336	275,885	4,441,522	376.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
339	277,415	4,441,801	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
340	277,368	4,441,802	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
341	277,278	4,441,852	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
342	277,272	4,441,798	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
343	277,386	4,441,735	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
344	277,453	4,441,790	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
348	277,409	4,441,768	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
350	279,234	4,441,728	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
356	280,300	4,441,348	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
357	280,330	4,441,320	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
358	280,350	4,441,284	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
370	280,790	4,442,442	350.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
373	278,970	4,442,374	375.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"

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Project:
11052 Buckeye Wind II SFA_3-GE_1100m

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m

...continued from previous page

UTM NAD83 Zone: 17

No.	East	North	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode
374	278,992	4,442,343	374.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
375	279,019	4,442,382	373.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
376	278,908	4,442,386	377.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
377	278,883	4,442,367	378.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
378	278,823	4,442,574	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
379	278,227	4,442,573	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
380	278,283	4,442,543	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
381	279,083	4,442,213	378.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
382	279,089	4,442,256	372.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
383	279,050	4,442,251	373.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
384	277,958	4,442,644	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
385	277,771	4,442,635	381.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
386	277,816	4,442,636	380.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
387	277,640	4,442,655	380.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
388	277,482	4,442,607	387.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
389	277,613	4,442,622	381.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
390	277,883	4,442,486	382.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
391	277,298	4,442,334	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
392	277,662	4,442,615	381.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
393	277,772	4,442,695	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
394	277,442	4,442,626	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
395	277,316	4,442,381	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
396	277,392	4,442,293	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
397	277,375	4,442,210	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
400	275,488	4,442,760	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
401	275,447	4,442,761	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
402	275,404	4,442,794	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
403	275,418	4,442,729	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
404	275,448	4,442,695	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
405	275,430	4,442,663	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
406	274,741	4,442,652	364.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
407	274,720	4,442,606	363.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
408	274,670	4,442,135	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
410	274,603	4,442,172	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
411	274,606	4,442,229	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
412	274,621	4,442,326	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
413	274,628	4,442,374	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
414	274,588	4,442,383	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
415	274,541	4,442,387	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
416	274,463	4,442,433	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
417	274,423	4,442,352	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
418	274,499	4,442,396	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
419	274,558	4,442,331	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
421	274,493	4,442,342	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
462	274,060	4,443,167	385.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
464	274,337	4,443,163	372.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
465	274,835	4,443,147	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
466	274,859	4,443,172	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
467	274,860	4,443,121	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
468	274,701	4,442,898	369.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
469	274,683	4,442,849	368.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"

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11052 Buckeye Wind II SFA_3-GE_1100m

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m

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UTM NAD83 Zone: 17

No.	East	North	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode
470	274,665	4,442,826	367.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
471	274,672	4,442,883	369.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
472	274,315	4,443,129	372.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
473	274,232	4,443,349	382.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
477	274,775	4,443,222	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
478	276,374	4,443,191	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
479	276,426	4,443,229	370.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
480	276,065	4,443,432	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
484	275,854	4,443,233	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
500	280,381	4,443,100	361.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
501	280,446	4,443,052	361.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
504	279,905	4,443,695	360.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
505	279,892	4,443,643	362.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
506	279,876	4,444,000	353.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
507	279,938	4,443,648	361.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
530	275,708	4,444,114	376.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
531	275,387	4,443,958	379.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
532	275,639	4,443,932	373.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
533	275,734	4,444,017	374.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
534	275,448	4,443,868	376.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
535	275,156	4,443,797	376.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
536	275,115	4,443,800	376.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
541	274,515	4,443,934	388.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
543	274,515	4,443,902	386.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
557	272,398	4,444,951	359.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
559	272,241	4,445,045	355.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
560	272,363	4,445,106	358.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
561	272,286	4,445,104	356.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
562	272,210	4,445,100	354.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
563	272,116	4,445,145	351.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
564	272,285	4,444,971	357.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
565	272,382	4,445,015	359.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
566	272,481	4,444,992	364.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
567	272,576	4,445,018	364.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
568	272,449	4,445,172	366.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
569	272,366	4,445,172	359.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
570	272,568	4,445,100	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
573	274,681	4,444,963	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
575	274,731	4,444,518	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
579	275,489	4,444,690	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
581	275,654	4,445,023	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
591	276,940	4,444,810	376.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
597	277,149	4,445,063	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
598	277,145	4,445,008	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
603	277,023	4,445,061	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
605	279,653	4,444,391	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
606	279,849	4,444,382	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
607	279,914	4,444,381	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
608	279,909	4,444,439	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
609	279,815	4,444,413	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
611	279,698	4,444,815	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"

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Project:
11052 Buckeye Wind II SFA_3-GE_1100m

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m

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UTM NAD83 Zone: 17

No.	East	North	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode
612	280,847	4,444,735	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
613	280,822	4,444,732	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
614	281,367	4,444,768	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
615	280,826	4,444,785	348.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
616	280,775	4,444,963	348.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
617	281,235	4,444,648	349.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
618	281,564	4,444,838	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
619	281,570	4,444,876	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
620	281,608	4,444,850	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
621	281,622	4,444,873	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
622	281,678	4,444,319	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
623	281,703	4,444,362	340.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
624	281,531	4,444,802	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
626	280,782	4,445,693	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
627	280,841	4,445,731	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
629	280,085	4,445,496	363.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
630	280,004	4,445,643	366.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
639	279,464	4,445,838	374.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
641	279,675	4,445,649	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
646	277,251	4,445,166	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
647	277,210	4,445,252	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
652	276,853	4,445,391	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
655	276,833	4,445,125	380.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
656	275,931	4,445,875	392.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
658	275,621	4,445,255	391.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
662	274,637	4,445,617	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
672	273,339	4,445,785	379.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
677	272,578	4,445,436	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
680	272,232	4,445,397	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
681	272,160	4,445,330	353.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
682	272,155	4,445,378	354.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
683	272,301	4,445,394	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
684	272,266	4,445,195	356.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
685	272,187	4,445,204	353.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
686	272,361	4,445,401	365.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
687	272,526	4,445,451	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
688	272,241	4,445,271	355.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
693	272,318	4,445,288	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
694	272,117	4,445,426	350.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
714	273,675	4,445,958	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
717	274,670	4,446,475	390.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
719	274,593	4,446,352	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
720	274,535	4,446,597	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
725	275,043	4,446,592	398.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
726	275,769	4,446,580	408.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
727	275,731	4,446,508	404.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
728	275,983	4,446,665	400.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
729	275,969	4,446,698	401.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
730	275,893	4,446,644	403.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
732	277,485	4,446,339	382.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
733	277,193	4,446,189	385.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"

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Project:
11052 Buckeye Wind II SFA_3-GE_1100m

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Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Main Result

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m

...continued from previous page

UTM NAD83 Zone: 17

No.	East	North	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode
734	277,172	4,446,206	385.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
736	277,422	4,446,104	381.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
739	277,597	4,446,632	382.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
741	278,455	4,446,519	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
742	278,554	4,446,158	379.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
743	278,559	4,446,129	379.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
746	279,804	4,446,667	364.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
747	279,797	4,446,294	367.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
748	279,791	4,446,405	366.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
749	279,791	4,446,371	367.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
750	279,800	4,446,215	367.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
752	279,874	4,446,107	369.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
754	279,834	4,446,023	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
755	279,818	4,445,954	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
763	273,012	4,447,192	368.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
767	273,048	4,446,838	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
775	274,231	4,446,715	383.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
776	274,645	4,446,992	384.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
777	274,674	4,447,036	388.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
778	274,638	4,447,026	387.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
779	274,583	4,447,012	386.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
784	275,372	4,447,048	403.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
785	275,351	4,447,076	401.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
786	275,380	4,447,071	402.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
787	275,406	4,447,081	401.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
788	275,221	4,446,761	400.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
789	275,797	4,446,704	406.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
790	275,432	4,447,049	403.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
791	275,495	4,447,335	398.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
792	275,475	4,447,290	399.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
793	275,948	4,447,105	400.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
794	275,977	4,447,091	400.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
795	275,910	4,446,752	404.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
797	277,513	4,446,761	383.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
799	277,669	4,447,012	389.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
800	277,658	4,447,407	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
803	278,426	4,447,194	382.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
804	278,434	4,447,362	381.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
805	278,184	4,447,352	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
806	278,361	4,446,989	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
807	278,374	4,446,889	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
811	279,810	4,447,006	362.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
812	279,892	4,447,076	361.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
816	278,370	4,447,478	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
820	277,744	4,447,859	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
821	277,736	4,447,768	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
822	277,700	4,447,681	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
823	277,675	4,447,654	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
824	277,717	4,447,529	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
825	277,713	4,447,609	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
826	277,268	4,447,767	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"

To be continued on next page...

Project:
11052 Buckeye Wind II SFA_3-GE_1100m

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Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Main Result

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m

...continued from previous page

UTM NAD83 Zone: 17

No.	East	North	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode
827	277,190	4,447,786	390.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
828	277,230	4,447,763	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
829	277,107	4,448,098	392.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
830	277,078	4,448,080	392.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
831	277,556	4,448,182	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
832	277,465	4,447,419	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
833	277,475	4,447,400	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
834	277,469	4,447,449	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
835	276,856	4,448,052	396.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
836	276,717	4,448,099	399.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
837	276,658	4,448,089	400.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
838	276,423	4,448,046	401.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
839	276,350	4,448,040	403.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
841	276,098	4,447,997	407.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
842	276,191	4,447,990	408.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
844	276,268	4,447,675	402.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
845	276,285	4,447,646	402.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
846	276,311	4,447,648	402.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
847	276,341	4,447,670	401.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
848	275,810	4,447,856	401.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
849	276,351	4,447,569	401.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
850	275,708	4,447,645	404.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
851	275,735	4,447,653	410.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
852	275,582	4,447,820	400.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
854	275,679	4,447,899	400.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
855	275,710	4,447,922	400.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
856	275,690	4,447,938	400.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
857	275,578	4,447,763	400.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
858	275,567	4,447,747	400.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
859	275,362	4,447,777	400.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
890	273,739	4,447,470	379.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
926	277,310	4,448,236	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
932	277,303	4,448,189	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3051	275,037	4,438,340	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3052	275,101	4,438,332	370.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3053	275,232	4,438,267	375.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3054	275,254	4,438,225	377.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3055	275,247	4,438,203	378.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3056	275,208	4,438,164	378.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3057	275,231	4,438,149	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3063	276,308	4,438,200	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3067	279,409	4,438,231	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3068	279,531	4,438,304	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3069	279,564	4,438,340	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3071	279,600	4,438,375	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3072	279,671	4,438,425	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3073	279,719	4,438,473	341.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3086	280,580	4,439,036	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3088	280,209	4,438,974	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3089	280,224	4,439,027	342.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3090	279,794	4,438,644	341.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"

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Project:
11052 Buckeye Wind II SFA_3-GE_1100m

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Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Main Result

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m

...continued from previous page

UTM NAD83 Zone: 17

No.	East	North	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode
3091	278,099	4,438,866	367.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3092	276,125	4,438,860	380.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3093	276,249	4,439,068	382.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3094	276,263	4,439,019	383.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3095	276,092	4,438,831	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3096	276,060	4,438,791	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3097	276,105	4,438,767	380.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3098	275,788	4,439,120	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3099	275,509	4,439,139	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3100	275,071	4,438,861	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3105	275,978	4,439,078	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3106	280,417	4,439,353	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3107	280,410	4,439,268	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3108	280,457	4,439,294	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3109	280,555	4,439,246	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3115	280,508	4,439,236	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3132	276,280	4,439,352	382.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3133	276,271	4,439,304	384.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3134	276,114	4,439,127	382.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3135	275,906	4,439,153	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3139	275,679	4,439,499	370.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3149	275,398	4,439,308	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3150	275,411	4,439,184	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3151	275,379	4,439,400	369.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3152	275,454	4,439,411	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3153	275,571	4,439,215	375.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3172	276,840	4,439,702	391.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3173	276,888	4,439,673	392.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3182	278,455	4,440,126	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3185	278,696	4,439,632	364.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3186	278,906	4,439,954	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3202	277,318	4,440,654	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3208	278,586	4,441,011	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3209	278,482	4,440,939	380.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3210	278,794	4,440,960	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3212	280,379	4,441,239	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3213	279,518	4,441,244	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3214	279,153	4,441,115	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3218	275,467	4,441,329	366.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3219	274,723	4,441,301	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3220	274,747	4,441,395	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3221	274,632	4,441,312	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3222	274,623	4,441,278	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3223	274,726	4,441,259	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3224	274,710	4,441,211	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3225	274,619	4,441,223	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3226	274,612	4,441,176	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3227	274,706	4,441,164	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3228	274,569	4,441,136	366.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3238	274,765	4,442,591	363.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3239	277,325	4,442,499	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"

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Project:
11052 Buckeye Wind II SFA_3-GE_1100m

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m

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UTM NAD83 Zone: 17

No.	East	North	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode
3240	277,271	4,442,514	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3241	277,831	4,442,454	383.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3242	278,127	4,442,598	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3243	278,723	4,442,565	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3244	278,761	4,442,521	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3246	279,223	4,442,234	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3247	278,928	4,442,145	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3248	278,944	4,442,241	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3256	280,488	4,442,258	359.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3258	280,814	4,442,130	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3264	278,008	4,442,806	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3265	277,915	4,442,716	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3266	277,880	4,442,716	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3267	277,825	4,442,693	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3268	277,811	4,442,782	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3269	277,149	4,443,000	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3270	277,142	4,442,913	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3271	277,182	4,442,744	382.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3272	277,220	4,442,742	383.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3273	277,319	4,442,852	381.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3274	277,370	4,442,975	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3289	274,785	4,443,354	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3290	274,771	4,443,303	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3292	277,215	4,443,322	373.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3301	277,215	4,443,241	375.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3303	277,427	4,443,131	376.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3304	277,116	4,443,149	377.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3305	277,133	4,443,172	377.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3330	275,588	4,444,127	377.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3331	275,394	4,444,041	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3343	278,592	4,444,550	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3345	278,517	4,445,089	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3346	278,706	4,444,957	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3347	278,610	4,444,818	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3348	278,457	4,444,754	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3349	278,460	4,444,723	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3350	278,492	4,444,631	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3351	278,461	4,444,590	367.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3352	278,383	4,445,037	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3364	277,006	4,445,017	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3368	272,376	4,444,963	358.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3369	272,317	4,445,030	357.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3370	272,211	4,445,339	356.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3371	272,197	4,445,157	353.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3372	272,290	4,445,158	356.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3373	272,456	4,445,220	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3380	275,601	4,445,395	394.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3384	278,275	4,445,152	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3385	278,295	4,445,169	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3386	278,342	4,445,144	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3387	278,387	4,445,179	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"

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11052 Buckeye Wind II SFA_3-GE_1100m

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m

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UTM NAD83 Zone: 17

No.	East	North	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode
3388	278,438	4,445,213	370.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3389	278,418	4,445,328	371.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3390	278,525	4,445,162	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3391	278,888	4,445,460	372.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3396	279,740	4,445,639	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3397	279,872	4,445,593	369.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3398	279,864	4,445,621	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3402	271,885	4,445,794	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3417	272,870	4,446,213	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3419	273,815	4,446,343	379.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3420	274,466	4,446,601	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3421	274,600	4,446,589	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3424	276,029	4,446,658	399.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3425	279,751	4,446,137	369.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3426	279,786	4,446,250	368.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3427	279,796	4,446,577	365.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3428	279,786	4,446,490	366.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3429	280,369	4,446,608	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3430	279,793	4,446,714	363.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3431	279,798	4,446,799	361.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3432	279,798	4,446,854	361.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3434	279,399	4,446,849	376.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3436	279,534	4,447,087	372.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3439	278,973	4,446,935	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3441	278,344	4,446,973	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3442	275,978	4,446,725	400.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3443	275,400	4,446,855	404.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3444	275,350	4,446,823	402.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3445	274,681	4,447,003	386.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3446	274,322	4,446,849	385.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3452	271,665	4,447,583	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3461	275,528	4,447,690	400.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3463	276,000	4,447,952	403.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3464	276,044	4,447,977	405.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3465	277,192	4,448,105	390.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3466	277,761	4,447,949	391.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3482	279,694	4,447,785	368.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3483	279,751	4,447,677	368.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3484	279,815	4,447,584	367.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3516	277,440	4,448,227	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3517	277,233	4,448,498	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3519	277,261	4,448,586	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3520	276,852	4,448,247	396.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3521	276,898	4,448,162	396.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3524	275,719	4,448,136	400.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3525	276,516	4,448,292	407.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
4519	276,203	4,438,343	388.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
4535	275,486	4,437,685	348.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
4544	275,166	4,437,913	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
4545	275,177	4,437,930	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
4546	275,313	4,437,950	375.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"

To be continued on next page...

Project:
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SHADOW - Main Result

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m

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UTM NAD83 Zone: 17

No.	East	North	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode
4550	275,176	4,437,981	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
4551	275,336	4,438,007	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
4552	275,184	4,438,040	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
4555	275,080	4,437,912	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
4563	274,915	4,437,985	378.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
4564	275,068	4,437,951	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
4565	275,230	4,438,089	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
4566	276,120	4,438,907	380.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
4658	275,384	4,444,135	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
4666	278,737	4,442,300	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
4686	277,867	4,438,002	352.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
4687	278,143	4,437,925	346.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
4688	278,236	4,437,790	341.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
4689	278,207	4,437,822	343.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
4691	278,213	4,437,700	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
4692	278,227	4,437,741	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
4693	278,233	4,437,624	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
4695	278,342	4,437,407	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
4716	278,484	4,437,265	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
4717	278,531	4,437,260	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
5249	268,697	4,439,093	349.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
5273	269,041	4,438,963	346.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
5274	268,861	4,438,763	347.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
5277	269,023	4,438,110	344.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
5289	268,591	4,437,500	343.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
5291	268,925	4,437,777	343.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
5293	269,086	4,437,640	342.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
5454	268,881	4,436,752	340.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
5455	268,910	4,436,482	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
5459	268,935	4,436,666	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
5460	268,920	4,436,682	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
5461	268,899	4,436,420	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
5463	268,259	4,436,248	342.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
5467	267,812	4,436,633	349.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6088	279,373	4,437,668	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6091	279,492	4,437,696	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6099	281,128	4,440,723	349.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6100	281,178	4,440,759	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6101	281,212	4,440,835	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6103	281,265	4,440,832	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6105	280,962	4,440,502	345.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6106	280,995	4,440,466	345.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6107	281,024	4,440,424	344.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6108	281,043	4,440,422	344.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6109	281,060	4,440,388	344.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6110	281,006	4,440,346	343.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6124	281,115	4,440,367	344.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6129	281,386	4,440,171	345.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6130	281,418	4,440,205	346.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6139	281,094	4,444,393	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6140	281,543	4,444,111	340.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m

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No.	East	North	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
	UTM NAD83 Zone: 17								
			[m]	[m]	[m]	[m]	[°]	[°]	
6141	281,598	4,444,089	340.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6142	281,602	4,444,310	341.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6143	281,822	4,443,936	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6144	281,812	4,443,903	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6145	281,829	4,443,894	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6146	281,878	4,443,856	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6147	281,823	4,443,863	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6148	281,859	4,443,890	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6149	281,851	4,443,851	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6150	281,766	4,443,918	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6151	281,932	4,443,753	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6152	282,173	4,443,508	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6153	282,210	4,443,474	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6154	281,877	4,443,118	342.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6159	281,255	4,442,664	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6160	281,350	4,442,691	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6161	281,337	4,442,682	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6162	281,334	4,442,731	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6163	281,395	4,442,821	349.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6164	281,406	4,442,821	349.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6165	281,458	4,442,796	349.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6166	281,277	4,442,634	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6167	281,153	4,442,124	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6168	281,158	4,442,103	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6169	281,311	4,442,007	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6170	281,324	4,441,990	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6171	281,508	4,441,913	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6172	281,532	4,441,937	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6173	281,609	4,442,197	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6174	281,625	4,442,183	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6175	281,782	4,441,201	342.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6176	281,688	4,441,142	342.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6177	281,671	4,441,076	340.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6178	281,653	4,441,127	341.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6179	281,640	4,441,091	341.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6180	281,652	4,441,089	341.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6181	281,625	4,441,107	342.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6532	282,524	4,443,209	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6533	282,456	4,443,201	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6534	282,573	4,443,057	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6535	282,701	4,442,912	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6536	282,740	4,442,877	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6537	282,739	4,442,824	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6538	282,006	4,442,134	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6540	282,915	4,442,491	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6541	283,061	4,442,433	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6542	282,977	4,442,441	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6543	283,041	4,442,441	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6544	282,929	4,442,408	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6545	283,076	4,442,378	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6546	283,176	4,442,453	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"

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Project:
11052 Buckeye Wind II SFA_3-GE_1100m

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m

...continued from previous page

UTM NAD83 Zone: 17

No.	East	North	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode
6547	283,259	4,442,361	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6548	283,146	4,442,275	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6549	283,235	4,442,217	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6550	283,275	4,442,251	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6551	283,303	4,442,352	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6552	283,357	4,442,431	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6553	283,093	4,442,128	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6554	283,133	4,442,164	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6555	283,241	4,442,193	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6556	283,308	4,442,104	335.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6557	283,266	4,442,077	336.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6558	283,076	4,442,071	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6559	282,994	4,442,059	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6560	282,966	4,442,089	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6562	282,990	4,441,770	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6563	282,964	4,441,727	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6564	282,595	4,441,003	330.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6565	282,583	4,440,990	330.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6566	282,528	4,440,984	330.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6567	282,688	4,441,056	330.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6568	282,697	4,441,043	330.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6569	282,880	4,441,197	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6570	282,868	4,441,163	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6571	282,839	4,441,167	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6572	282,081	4,440,595	334.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6573	282,059	4,440,611	335.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6574	282,121	4,440,556	333.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6584	268,898	4,436,887	340.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6897	266,868	4,438,751	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6902	267,151	4,438,819	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6904	266,840	4,438,760	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6907	266,886	4,438,752	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6908	267,055	4,438,639	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6909	267,024	4,438,727	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6910	267,007	4,438,731	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6911	267,030	4,438,774	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6912	267,151	4,438,739	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6913	267,114	4,438,755	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6914	267,326	4,438,754	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6915	267,315	4,438,756	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6916	267,344	4,438,767	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6917	267,367	4,438,760	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6918	267,354	4,438,725	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6919	267,346	4,438,740	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6920	267,359	4,438,748	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6921	267,305	4,438,602	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6922	267,291	4,438,595	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6923	267,266	4,438,563	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6924	267,306	4,438,563	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6925	267,292	4,438,552	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6926	267,286	4,438,525	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"

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Project:
11052 Buckeye Wind II SFA_3-GE_1100m

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m

...continued from previous page

UTM NAD83 Zone: 17

No.	East	North	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode
6927	267,242	4,438,601	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6955	267,599	4,436,587	349.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6957	267,642	4,436,597	349.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
7615	282,422	4,441,965	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
7769	279,887	4,447,850	364.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
7777	268,217	4,437,523	345.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
7786	268,556	4,437,479	343.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
7787	268,604	4,437,610	344.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
7808	280,266	4,440,978	356.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
7816	274,675	4,445,472	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
7825	275,516	4,445,853	400.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8042	268,879	4,436,906	340.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8054	278,347	4,437,439	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8056	278,345	4,437,456	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8058	278,317	4,437,411	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8086	279,068	4,438,121	346.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8087	279,077	4,438,104	345.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8088	279,094	4,438,095	345.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8089	279,119	4,438,031	346.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8090	279,156	4,437,929	344.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8158	278,466	4,440,140	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8168	278,109	4,440,930	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8169	278,109	4,440,919	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8170	277,345	4,440,564	394.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8214	274,730	4,441,101	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8215	274,687	4,441,497	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8216	274,675	4,441,503	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8217	274,786	4,441,526	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8224	274,559	4,441,798	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8225	274,544	4,441,811	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8226	274,502	4,441,762	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8227	274,556	4,441,713	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8228	274,548	4,441,670	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8229	274,536	4,441,656	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8244	279,164	4,441,155	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8245	278,925	4,441,009	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8247	278,960	4,440,995	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8248	279,373	4,441,163	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8323	280,883	4,445,972	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8324	281,010	4,445,919	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8325	281,022	4,445,907	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8326	280,944	4,445,846	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8334	280,260	4,445,537	359.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8335	279,905	4,445,455	368.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8342	279,790	4,446,440	366.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8343	279,807	4,447,339	365.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8345	279,810	4,447,496	367.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8348	279,688	4,445,878	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8351	274,616	4,445,718	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8352	274,625	4,445,716	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8353	274,644	4,445,726	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"

To be continued on next page...

Project:
11052 Buckeye Wind II SFA_3-GE_1100m

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m

...continued from previous page

UTM NAD83 Zone: 17

No.	East	North	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode
8354	274,638	4,445,718	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8355	274,600	4,445,730	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8356	274,605	4,445,721	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8370	278,347	4,446,989	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8371	278,433	4,447,260	387.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8373	278,432	4,447,401	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8377	278,169	4,447,369	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8378	277,909	4,447,326	385.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8383	277,728	4,447,169	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8384	277,646	4,447,190	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8386	277,463	4,447,234	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8414	272,179	4,445,293	353.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9324	268,925	4,437,790	343.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9329	267,618	4,438,890	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9330	267,627	4,438,901	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9331	267,721	4,438,963	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9341	267,901	4,439,125	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9342	267,894	4,439,135	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9420	275,070	4,440,877	361.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9443	274,593	4,442,079	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9459	274,260	4,443,080	372.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9501	278,680	4,437,611	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9502	278,757	4,437,585	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9509	276,699	4,437,674	345.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9510	276,708	4,437,643	344.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9511	276,674	4,437,614	343.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9513	275,873	4,437,637	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9514	275,888	4,437,633	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9540	274,937	4,437,751	379.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9541	274,933	4,437,770	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9543	275,026	4,437,745	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9544	275,005	4,437,807	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9548	275,061	4,437,836	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9549	275,109	4,437,828	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9550	275,100	4,437,838	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9551	275,165	4,437,842	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9552	275,197	4,437,839	379.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9553	275,238	4,437,830	376.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9557	275,309	4,437,826	370.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9558	275,351	4,437,825	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9559	275,418	4,437,798	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9560	275,356	4,437,761	362.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9569	275,614	4,437,790	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9570	275,930	4,437,803	346.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9571	276,145	4,437,865	356.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9572	276,082	4,437,854	349.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9576	276,618	4,438,088	365.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9577	276,761	4,437,846	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9585	279,130	4,437,809	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9586	279,126	4,437,847	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9587	279,198	4,437,764	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"

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Project:
11052 Buckeye Wind II SFA_3-GE_1100m

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Calculated:
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SHADOW - Main Result

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m

...continued from previous page

UTM NAD83 Zone: 17

No.	East	North	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode
9588	279,190	4,437,691	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9589	278,987	4,437,628	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9605	277,950	4,438,487	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9606	278,131	4,438,426	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9607	278,120	4,438,335	356.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9608	278,151	4,438,255	350.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9609	278,245	4,438,477	353.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9616	280,267	4,439,734	342.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9617	280,366	4,439,508	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9618	280,333	4,439,533	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9619	280,171	4,439,589	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9625	279,402	4,439,603	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9626	279,501	4,439,616	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9627	279,501	4,439,405	349.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9628	279,507	4,439,479	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9633	278,739	4,439,597	361.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9671	278,655	4,439,725	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9672	278,704	4,439,755	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9673	278,734	4,439,743	369.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9674	278,777	4,439,789	367.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9679	279,296	4,439,758	352.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9688	278,625	4,440,178	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9709	277,502	4,440,875	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9710	277,690	4,441,067	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9712	277,849	4,440,827	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9713	277,711	4,440,836	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9714	277,862	4,440,818	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9724	280,134	4,441,600	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9725	280,162	4,441,661	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9726	280,205	4,441,704	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9727	280,249	4,441,701	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9728	280,310	4,441,746	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9729	280,360	4,441,765	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9730	280,502	4,441,678	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9731	280,434	4,441,717	359.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9736	280,656	4,441,864	353.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9737	280,388	4,441,861	358.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9738	280,638	4,441,665	358.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9747	280,148	4,441,783	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9748	280,155	4,441,838	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9749	280,254	4,441,879	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9758	277,283	4,441,567	387.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9759	277,411	4,441,311	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9816	276,671	4,448,102	400.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9818	275,529	4,447,707	400.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9823	275,460	4,447,562	398.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9997	271,566	4,446,275	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9998	271,690	4,446,353	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9999	271,764	4,446,207	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10005	271,919	4,446,088	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10008	271,863	4,446,312	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"

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Project:
11052 Buckeye Wind II SFA_3-GE_1100m

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m

...continued from previous page

UTM NAD83 Zone: 17

No.	East	North	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode
10013	271,785	4,446,689	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10014	271,795	4,446,625	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10015	271,783	4,446,579	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10016	271,802	4,446,519	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10017	272,404	4,445,340	363.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10018	272,398	4,445,235	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10021	272,468	4,445,350	364.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10026	272,664	4,445,581	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10027	272,901	4,445,646	370.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10028	272,974	4,445,517	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10029	273,021	4,445,580	379.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10035	273,007	4,445,636	375.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10036	273,048	4,445,660	379.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10037	273,102	4,445,673	379.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10041	273,389	4,445,832	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10042	273,522	4,445,827	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10043	273,632	4,445,876	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10045	274,267	4,446,585	384.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10046	274,205	4,446,587	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10047	274,260	4,446,531	385.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10055	274,845	4,445,400	394.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10056	274,798	4,445,323	392.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10062	274,649	4,445,225	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10064	274,353	4,443,533	383.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10097	275,748	4,443,989	373.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10098	274,847	4,443,757	378.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10102	274,825	4,443,651	376.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10103	274,823	4,443,612	376.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10104	276,826	4,442,907	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10110	276,897	4,442,793	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10111	277,066	4,442,798	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10133	277,163	4,444,881	376.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10134	277,282	4,444,931	376.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10135	277,177	4,445,142	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10152	279,655	4,445,581	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10153	279,465	4,445,539	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10159	279,242	4,445,581	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10163	279,854	4,445,358	367.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10164	279,907	4,445,069	363.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10168	281,070	4,445,633	348.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10176	281,210	4,446,015	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10177	281,430	4,446,259	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10191	279,781	4,446,090	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10202	279,796	4,447,003	362.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10203	279,521	4,447,093	373.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10206	277,674	4,446,991	388.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10280	274,629	4,445,707	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10281	275,034	4,440,934	361.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10308	276,737	4,441,822	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10311	277,284	4,441,992	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"

Project:
11052 Buckeye Wind II SFA_3-GE_1100m

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m

Calculation Results

Shadow receptor

	Shadow, worst case			Shadow, expected values
No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
1.1	0:00	0	0:00	0:00
2.1	9:29	38	0:22	2:13
3.1	19:23	75	0:23	5:35
4.1	24:36	87	0:25	6:56
5.1	39:43	102	0:29	12:00
6.1	18:52	56	0:27	7:26
7.1	17:09	54	0:26	6:45
8.1	18:22	61	0:25	7:17
9.1	22:12	80	0:24	8:56
13	0:00	0	0:00	0:00
14	14:57	42	0:26	4:15
16	11:50	35	0:26	3:56
18	0:00	0	0:00	0:00
19	0:00	0	0:00	0:00
20	0:00	0	0:00	0:00
22	10:09	32	0:25	3:22
23	14:51	40	0:29	4:57
24	10:42	33	0:25	3:34
28	15:07	39	0:30	5:03
29	12:24	35	0:28	4:20
30	14:33	38	0:30	4:58
31	14:49	38	0:30	5:17
32	16:33	41	0:31	5:59
33	14:14	38	0:29	5:09
34	12:50	37	0:27	4:39
35	9:12	31	0:24	3:16
40	19:42	45	0:34	6:35
41	21:22	46	0:36	7:09
42	22:41	47	0:37	7:40
43	23:33	49	0:38	8:07
44	22:29	47	0:37	7:51
45	22:42	47	0:37	8:07
46	22:20	49	0:35	7:57
47	17:49	42	0:33	6:09
48	18:07	43	0:33	6:27
49	18:08	42	0:33	6:06
50	18:40	44	0:33	6:46
54	17:39	41	0:33	6:10
55	22:48	49	0:37	8:15
57	0:00	0	0:00	0:00
58	0:00	0	0:00	0:00
61	0:00	0	0:00	0:00
62	13:28	37	0:29	4:40
63	8:33	31	0:23	2:50
66	33:39	71	0:38	7:51
67	29:35	74	0:35	6:46
68	18:35	52	0:31	4:35
69	20:13	71	0:27	4:37
70	0:00	0	0:00	0:00
85	0:00	0	0:00	0:00

To be continued on next page...

Project:
11052 Buckeye Wind II SFA_3-GE_1100m

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m

...continued from previous page

No.	Shadow, worst case: Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow, expected values: Shadow hours per year [h/year]
86	0:00	0	0:00	0:00
87	0:00	0	0:00	0:00
88	0:00	0	0:00	0:00
89	0:00	0	0:00	0:00
90	0:00	0	0:00	0:00
91	0:00	0	0:00	0:00
92	0:00	0	0:00	0:00
93	18:40	48	0:29	5:14
94	29:07	86	0:29	6:57
95	21:02	58	0:28	4:43
96	18:39	55	0:26	4:10
97	0:00	0	0:00	0:00
98	0:00	0	0:00	0:00
99	0:00	0	0:00	0:00
100	0:00	0	0:00	0:00
106	0:00	0	0:00	0:00
107	0:00	0	0:00	0:00
108	0:00	0	0:00	0:00
109	16:47	46	0:29	4:10
110	34:07	78	0:36	7:50
111	48:30	92	0:38	12:00
112	37:08	74	0:34	9:38
113	0:00	0	0:00	0:00
114	0:00	0	0:00	0:00
115	0:00	0	0:00	0:00
116	0:00	0	0:00	0:00
209	0:00	0	0:00	0:00
237	0:00	0	0:00	0:00
241	0:00	0	0:00	0:00
244	0:00	0	0:00	0:00
245	40:29	82	0:34	16:20
246	28:49	70	0:28	10:40
248	0:00	0	0:00	0:00
249	0:00	0	0:00	0:00
250	0:00	0	0:00	0:00
252	0:00	0	0:00	0:00
256	0:00	0	0:00	0:00
257	0:00	0	0:00	0:00
261	0:00	0	0:00	0:00
262	0:00	0	0:00	0:00
265	0:00	0	0:00	0:00
269	0:00	0	0:00	0:00
270	0:00	0	0:00	0:00
271	0:00	0	0:00	0:00
272	0:00	0	0:00	0:00
273	0:00	0	0:00	0:00
274	0:00	0	0:00	0:00
275	0:00	0	0:00	0:00
276	0:00	0	0:00	0:00
333	50:07	82	0:42	20:12
334	20:31	49	0:33	7:37

To be continued on next page...

Project:
11052 Buckeye Wind II SFA_3-GE_1100m

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US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

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3/1/2012 12:18 PM/2.7.490

SHADOW - Main Result

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m

...continued from previous page

	Shadow, worst case			Shadow, expected values
No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
335	51:25	105	0:39	17:52
336	34:14	69	0:38	12:28
339	179:42	265	1:08	53:13
340	170:04	271	1:01	50:37
341	121:03	227	0:50	34:49
342	107:28	209	0:57	32:19
343	150:05	224	1:25	44:42
344	180:13	241	1:15	52:02
348	188:31	263	1:12	55:04
350	17:46	61	0:24	6:10
356	13:15	38	0:28	4:55
357	14:50	42	0:29	5:30
358	16:36	44	0:30	6:11
370	0:00	0	0:00	0:00
373	39:17	104	0:29	12:10
374	40:27	111	0:29	12:08
375	37:46	105	0:28	11:31
376	35:18	93	0:32	11:21
377	38:14	95	0:33	12:18
378	36:13	74	0:33	10:23
379	0:00	0	0:00	0:00
380	0:00	0	0:00	0:00
381	23:37	72	0:27	7:28
382	23:50	74	0:27	7:12
383	26:01	77	0:28	7:49
384	0:00	0	0:00	0:00
385	9:32	33	0:24	3:07
386	8:26	31	0:22	2:47
387	31:45	86	0:30	9:09
388	56:54	142	0:46	15:18
389	46:10	104	0:34	12:52
390	46:54	66	0:51	12:23
391	87:55	216	0:51	28:49
392	40:12	96	0:35	11:31
393	10:01	35	0:23	2:58
394	57:51	128	0:57	15:09
395	88:59	226	0:59	28:21
396	71:36	172	0:39	22:20
397	73:22	161	0:48	24:30
400	141:15	173	1:23	45:43
401	142:19	190	1:24	46:11
402	133:13	160	1:33	44:05
403	187:38	217	1:17	60:34
404	251:28	289	1:40	78:38
405	298:09	302	1:43	93:40
406	118:48	152	1:08	42:14
407	58:27	103	0:46	20:06
408	66:09	161	0:39	18:53
410	93:59	197	0:41	31:13
411	108:57	223	0:41	36:53
412	64:34	145	0:42	21:48

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Project:
11052 Buckeye Wind II SFA_3-GE_1100m

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m

...continued from previous page

	Shadow, worst case			Shadow, expected values
No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
413	54:42	112	0:42	17:49
414	47:32	102	0:39	15:30
415	45:22	118	0:37	14:49
416	37:34	110	0:33	11:49
417	52:37	144	0:31	16:13
418	44:45	122	0:34	14:25
419	60:59	145	0:37	19:58
421	56:52	143	0:34	18:04
462	7:15	32	0:21	2:13
464	17:50	47	0:29	4:30
465	8:02	25	0:24	2:21
466	0:00	0	0:00	0:00
467	19:58	40	0:38	5:37
468	72:32	115	0:59	22:45
469	93:02	143	0:58	28:30
470	97:49	154	0:56	29:45
471	77:38	127	0:55	23:51
472	16:19	44	0:29	4:35
473	20:12	74	0:25	4:57
477	0:00	0	0:00	0:00
478	0:00	0	0:00	0:00
479	0:00	0	0:00	0:00
480	0:00	0	0:00	0:00
484	34:32	86	0:30	9:24
500	0:00	0	0:00	0:00
501	0:00	0	0:00	0:00
504	0:00	0	0:00	0:00
505	0:00	0	0:00	0:00
506	14:26	45	0:26	5:36
507	0:00	0	0:00	0:00
530	0:00	0	0:00	0:00
531	0:00	0	0:00	0:00
532	0:00	0	0:00	0:00
533	0:00	0	0:00	0:00
534	0:00	0	0:00	0:00
535	0:00	0	0:00	0:00
536	0:00	0	0:00	0:00
541	0:00	0	0:00	0:00
543	0:00	0	0:00	0:00
557	0:00	0	0:00	0:00
559	0:00	0	0:00	0:00
560	0:00	0	0:00	0:00
561	0:00	0	0:00	0:00
562	0:00	0	0:00	0:00
563	0:00	0	0:00	0:00
564	0:00	0	0:00	0:00
565	0:00	0	0:00	0:00
566	0:00	0	0:00	0:00
567	0:00	0	0:00	0:00
568	0:00	0	0:00	0:00
569	0:00	0	0:00	0:00

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Project:
11052 Buckeye Wind II SFA_3-GE_1100m

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m

...continued from previous page

	Shadow, worst case			Shadow, expected values
No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
570	0:00	0	0:00	0:00
573	109:27	186	0:49	34:06
575	36:07	55	0:49	14:44
579	57:33	78	0:58	20:55
581	107:08	167	1:02	35:44
591	0:00	0	0:00	0:00
597	0:00	0	0:00	0:00
598	0:00	0	0:00	0:00
603	0:00	0	0:00	0:00
605	0:00	0	0:00	0:00
606	9:52	31	0:25	3:19
607	0:00	0	0:00	0:00
608	0:00	0	0:00	0:00
609	9:01	30	0:24	2:59
611	21:07	58	0:31	8:16
612	0:00	0	0:00	0:00
613	0:00	0	0:00	0:00
614	27:15	81	0:27	9:26
615	0:00	0	0:00	0:00
616	136:50	122	1:16	50:49
617	60:58	122	0:42	20:17
618	17:30	48	0:27	5:27
619	9:00	34	0:20	2:55
620	18:48	52	0:26	5:46
621	15:18	46	0:24	4:48
622	48:35	102	0:37	14:58
623	36:16	87	0:33	11:33
624	32:08	88	0:29	10:14
626	0:00	0	0:00	0:00
627	0:00	0	0:00	0:00
629	41:32	117	0:31	11:55
630	15:50	59	0:27	5:04
639	0:00	0	0:00	0:00
641	20:23	58	0:25	5:26
646	0:00	0	0:00	0:00
647	0:00	0	0:00	0:00
652	0:00	0	0:00	0:00
655	0:00	0	0:00	0:00
656	54:33	136	0:42	17:38
658	77:28	89	1:08	27:10
662	162:21	200	1:37	57:11
672	35:41	63	0:53	13:04
677	0:00	0	0:00	0:00
680	0:00	0	0:00	0:00
681	0:00	0	0:00	0:00
682	0:00	0	0:00	0:00
683	0:00	0	0:00	0:00
684	0:00	0	0:00	0:00
685	0:00	0	0:00	0:00
686	0:00	0	0:00	0:00
687	0:00	0	0:00	0:00

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Project:
11052 Buckeye Wind II SFA_3-GE_1100m

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m

...continued from previous page

	Shadow, worst case			Shadow, expected values
No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
688	0:00	0	0:00	0:00
693	0:00	0	0:00	0:00
694	0:00	0	0:00	0:00
714	49:51	70	0:55	16:49
717	32:12	80	0:35	10:55
719	116:30	171	1:19	32:59
720	13:48	37	0:29	4:29
725	124:02	172	1:08	35:03
726	90:25	195	0:52	29:53
727	97:06	184	1:12	32:23
728	65:03	122	0:51	22:20
729	63:36	124	0:45	21:02
730	62:19	126	0:41	21:11
732	73:58	181	0:35	23:51
733	76:55	103	0:52	21:22
734	71:46	92	0:53	20:15
736	49:03	104	0:37	17:23
739	122:50	178	1:02	47:27
741	50:47	75	0:49	18:49
742	0:00	0	0:00	0:00
743	0:00	0	0:00	0:00
746	23:20	63	0:34	7:41
747	27:56	61	0:35	10:44
748	21:51	48	0:35	8:07
749	23:01	51	0:35	8:33
750	45:34	92	0:35	18:16
752	0:00	0	0:00	0:00
754	0:00	0	0:00	0:00
755	0:00	0	0:00	0:00
763	0:00	0	0:00	0:00
767	0:00	0	0:00	0:00
775	0:00	0	0:00	0:00
776	28:48	68	0:29	7:32
777	16:03	45	0:26	4:32
778	22:36	56	0:28	6:08
779	27:32	70	0:27	7:06
784	22:33	71	0:27	8:12
785	21:06	67	0:26	7:34
786	22:52	71	0:27	8:15
787	24:14	71	0:28	8:43
788	0:00	0	0:00	0:00
789	119:24	238	0:46	39:26
790	26:48	78	0:29	9:48
791	26:35	75	0:30	8:34
792	25:23	71	0:30	8:27
793	146:14	256	1:00	48:39
794	107:14	218	0:53	32:15
795	113:59	223	0:48	38:45
797	72:35	138	0:50	24:41
799	182:54	261	1:23	54:27
800	80:14	173	0:39	24:28

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Project:
11052 Buckeye Wind II SFA_3-GE_1100m

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m

...continued from previous page

	Shadow, worst case			Shadow, expected values
No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
803	4:06	20	0:16	1:22
804	0:00	0	0:00	0:00
805	0:00	0	0:00	0:00
806	79:26	120	0:54	21:56
807	54:40	76	0:56	18:21
811	69:41	143	0:46	22:06
812	55:33	102	0:52	18:18
816	0:00	0	0:00	0:00
820	35:51	102	0:26	10:46
821	28:21	85	0:27	8:00
822	27:41	78	0:29	8:29
823	11:25	34	0:26	3:59
824	48:53	127	0:32	16:01
825	25:47	75	0:29	8:40
826	34:09	59	0:45	11:32
827	63:51	129	0:51	19:49
828	52:47	110	0:48	16:41
829	0:00	0	0:00	0:00
830	0:00	0	0:00	0:00
831	21:46	57	0:27	6:34
832	82:05	161	0:42	27:41
833	96:14	176	0:48	31:46
834	61:28	136	0:42	21:10
835	0:00	0	0:00	0:00
836	0:00	0	0:00	0:00
837	0:00	0	0:00	0:00
838	4:11	19	0:17	1:15
839	27:18	52	0:39	7:32
841	33:14	94	0:32	8:24
842	35:37	80	0:36	8:10
844	79:12	175	0:47	23:20
845	84:51	185	0:48	25:45
846	92:16	186	0:51	28:00
847	97:59	181	0:54	29:02
848	9:28	32	0:25	2:59
849	117:43	227	0:57	38:43
850	43:55	92	0:36	10:44
851	53:36	113	0:38	14:14
852	22:14	56	0:29	6:04
854	0:00	0	0:00	0:00
855	0:00	0	0:00	0:00
856	0:00	0	0:00	0:00
857	31:45	74	0:30	8:07
858	31:50	82	0:30	7:54
859	12:49	44	0:24	2:55
890	5:47	27	0:19	2:01
926	0:00	0	0:00	0:00
932	0:00	0	0:00	0:00
3051	19:46	48	0:32	7:20
3052	24:39	54	0:36	9:14
3053	63:55	104	0:44	25:25

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Project:
11052 Buckeye Wind II SFA_3-GE_1100m

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m

...continued from previous page

	Shadow, worst case			Shadow, expected values
No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
3054	51:10	78	0:46	20:40
3055	40:08	67	0:43	16:17
3056	26:12	54	0:36	10:41
3057	10:08	32	0:24	4:09
3063	0:00	0	0:00	0:00
3067	15:25	39	0:31	5:24
3068	11:30	34	0:27	3:56
3069	10:41	33	0:26	3:36
3071	10:00	32	0:25	3:19
3072	8:39	30	0:23	2:52
3073	0:00	0	0:00	0:00
3086	9:00	30	0:23	3:14
3088	26:08	55	0:37	9:17
3089	23:12	50	0:36	8:24
3090	0:00	0	0:00	0:00
3091	0:00	0	0:00	0:00
3092	37:08	61	0:47	11:40
3093	41:50	64	0:47	11:07
3094	66:15	86	0:54	16:54
3095	33:26	58	0:45	10:46
3096	46:19	92	0:43	15:03
3097	82:54	126	0:51	26:04
3098	15:12	44	0:27	3:47
3099	0:00	0	0:00	0:00
3100	20:25	53	0:30	4:43
3105	27:09	62	0:34	6:12
3106	12:52	36	0:27	4:17
3107	12:50	35	0:28	4:17
3108	11:30	33	0:27	3:49
3109	9:08	30	0:24	3:05
3115	10:13	31	0:25	3:28
3132	0:00	0	0:00	0:00
3133	0:00	0	0:00	0:00
3134	37:31	68	0:39	9:56
3135	26:12	70	0:30	6:00
3139	0:00	0	0:00	0:00
3149	0:00	0	0:00	0:00
3150	0:00	0	0:00	0:00
3151	0:00	0	0:00	0:00
3152	0:00	0	0:00	0:00
3153	0:00	0	0:00	0:00
3172	0:00	0	0:00	0:00
3173	0:00	0	0:00	0:00
3182	6:07	28	0:19	2:16
3185	12:15	50	0:23	2:44
3186	52:45	91	0:41	21:13
3202	0:00	0	0:00	0:00
3208	10:01	38	0:20	3:41
3209	0:00	0	0:00	0:00
3210	0:00	0	0:00	0:00
3212	19:48	50	0:31	7:34

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Project:
11052 Buckeye Wind II SFA_3-GE_1100m

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m

...continued from previous page

	Shadow, worst case			Shadow, expected values
No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
3213	0:00	0	0:00	0:00
3214	17:31	53	0:26	6:25
3218	0:00	0	0:00	0:00
3219	0:00	0	0:00	0:00
3220	0:00	0	0:00	0:00
3221	0:00	0	0:00	0:00
3222	0:00	0	0:00	0:00
3223	0:00	0	0:00	0:00
3224	0:00	0	0:00	0:00
3225	0:00	0	0:00	0:00
3226	0:00	0	0:00	0:00
3227	0:00	0	0:00	0:00
3228	0:00	0	0:00	0:00
3238	43:55	68	0:50	13:28
3239	76:47	168	1:07	24:36
3240	74:55	142	1:09	23:49
3241	78:53	123	0:52	20:31
3242	0:00	0	0:00	0:00
3243	32:21	62	0:37	9:40
3244	44:50	86	0:37	12:31
3246	8:44	29	0:23	3:01
3247	33:46	87	0:32	11:00
3248	35:17	94	0:31	10:22
3256	0:00	0	0:00	0:00
3258	0:00	0	0:00	0:00
3264	0:00	0	0:00	0:00
3265	0:00	0	0:00	0:00
3266	0:00	0	0:00	0:00
3267	0:00	0	0:00	0:00
3268	0:00	0	0:00	0:00
3269	32:14	87	0:29	10:18
3270	50:03	115	0:33	14:43
3271	31:27	82	0:33	10:26
3272	31:25	94	0:31	10:32
3273	22:51	71	0:27	6:58
3274	16:13	55	0:25	4:06
3289	0:00	0	0:00	0:00
3290	0:00	0	0:00	0:00
3292	21:33	70	0:24	6:06
3301	14:06	48	0:24	3:32
3303	0:00	0	0:00	0:00
3304	15:58	47	0:27	4:10
3305	15:42	46	0:26	4:02
3330	0:00	0	0:00	0:00
3331	0:00	0	0:00	0:00
3343	0:00	0	0:00	0:00
3345	12:54	38	0:28	4:41
3346	27:38	59	0:36	10:28
3347	37:02	91	0:32	14:50
3348	21:09	70	0:26	8:26
3349	27:01	79	0:26	10:54

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Project:
11052 Buckeye Wind II SFA_3-GE_1100m

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m

...continued from previous page

	Shadow, worst case			Shadow, expected values
No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
3350	5:32	33	0:13	2:15
3351	0:00	0	0:00	0:00
3352	9:20	32	0:24	3:28
3364	0:00	0	0:00	0:00
3368	0:00	0	0:00	0:00
3369	0:00	0	0:00	0:00
3370	0:00	0	0:00	0:00
3371	0:00	0	0:00	0:00
3372	0:00	0	0:00	0:00
3373	0:00	0	0:00	0:00
3380	212:24	248	1:05	69:39
3384	6:40	28	0:21	2:17
3385	7:06	29	0:22	2:26
3386	8:01	30	0:23	2:47
3387	8:45	30	0:24	3:00
3388	9:48	33	0:25	3:18
3389	9:03	32	0:24	2:51
3390	12:38	37	0:28	4:21
3391	55:29	92	0:42	13:51
3396	18:02	49	0:27	5:01
3397	18:13	66	0:23	5:29
3398	10:08	48	0:22	3:10
3402	41:57	100	0:35	16:40
3417	130:54	157	1:07	38:48
3419	19:35	44	0:35	6:57
3420	11:52	34	0:27	3:51
3421	26:34	74	0:31	8:16
3424	69:38	119	0:57	24:12
3425	31:33	69	0:33	12:48
3426	32:30	75	0:35	12:46
3427	19:26	44	0:34	6:25
3428	19:46	44	0:34	7:01
3429	275:32	171	1:56	72:10
3430	59:36	112	0:44	22:20
3431	88:58	160	0:47	32:35
3432	75:49	131	1:05	25:34
3434	10:32	36	0:26	3:55
3436	14:09	38	0:30	4:36
3439	9:05	31	0:24	3:01
3441	79:02	120	0:56	21:48
3442	64:11	127	0:45	20:35
3443	35:57	101	0:27	14:15
3444	31:36	95	0:26	12:31
3445	24:07	58	0:30	6:32
3446	0:00	0	0:00	0:00
3452	9:15	30	0:24	3:03
3461	19:16	52	0:29	4:24
3463	15:34	42	0:29	4:31
3464	36:36	102	0:31	9:46
3465	0:00	0	0:00	0:00
3466	0:00	0	0:00	0:00

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Project:
11052 Buckeye Wind II SFA_3-GE_1100m

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m

...continued from previous page

	Shadow, worst case			Shadow, expected values
No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
3482	0:00	0	0:00	0:00
3483	0:00	0	0:00	0:00
3484	0:00	0	0:00	0:00
3516	0:00	0	0:00	0:00
3517	0:00	0	0:00	0:00
3519	0:00	0	0:00	0:00
3520	0:00	0	0:00	0:00
3521	0:00	0	0:00	0:00
3524	0:00	0	0:00	0:00
3525	0:00	0	0:00	0:00
4519	66:27	94	0:55	23:57
4535	0:00	0	0:00	0:00
4544	0:00	0	0:00	0:00
4545	0:00	0	0:00	0:00
4546	0:00	0	0:00	0:00
4550	0:00	0	0:00	0:00
4551	0:00	0	0:00	0:00
4552	0:00	0	0:00	0:00
4555	0:00	0	0:00	0:00
4563	8:37	35	0:18	3:31
4564	0:00	0	0:00	0:00
4565	0:00	0	0:00	0:00
4566	36:33	63	0:45	10:57
4658	0:00	0	0:00	0:00
4666	49:41	103	0:41	16:13
4686	21:15	53	0:32	8:08
4687	0:44	8	0:07	0:18
4688	0:00	0	0:00	0:00
4689	0:00	0	0:00	0:00
4691	0:00	0	0:00	0:00
4692	0:00	0	0:00	0:00
4693	0:00	0	0:00	0:00
4695	0:00	0	0:00	0:00
4716	0:00	0	0:00	0:00
4717	0:00	0	0:00	0:00
5249	0:00	0	0:00	0:00
5273	0:00	0	0:00	0:00
5274	0:00	0	0:00	0:00
5277	19:52	48	0:33	7:06
5289	0:00	0	0:00	0:00
5291	0:00	0	0:00	0:00
5293	9:15	32	0:22	3:01
5454	0:00	0	0:00	0:00
5455	0:00	0	0:00	0:00
5459	0:00	0	0:00	0:00
5460	0:00	0	0:00	0:00
5461	0:00	0	0:00	0:00
5463	0:00	0	0:00	0:00
5467	0:00	0	0:00	0:00
6088	0:00	0	0:00	0:00
6091	12:08	40	0:23	4:28

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11052 Buckeye Wind II SFA_3-GE_1100m

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m

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	Shadow, worst case			Shadow, expected values
No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
6099	11:11	41	0:24	4:20
6100	12:16	42	0:25	4:43
6101	12:18	40	0:27	4:33
6103	14:43	44	0:29	5:30
6105	0:00	0	0:00	0:00
6106	0:00	0	0:00	0:00
6107	0:00	0	0:00	0:00
6108	0:00	0	0:00	0:00
6109	0:00	0	0:00	0:00
6110	0:00	0	0:00	0:00
6124	0:00	0	0:00	0:00
6129	0:00	0	0:00	0:00
6130	0:00	0	0:00	0:00
6139	89:29	99	1:11	29:15
6140	72:56	130	0:52	22:40
6141	57:28	110	0:47	19:06
6142	44:13	94	0:38	14:07
6143	31:01	82	0:35	11:02
6144	33:02	86	0:35	11:54
6145	31:49	85	0:34	11:29
6146	17:29	42	0:32	6:19
6147	33:52	92	0:35	12:19
6148	18:06	43	0:33	6:28
6149	18:55	44	0:33	6:51
6150	37:34	93	0:38	13:31
6151	60:18	94	1:02	18:39
6152	76:25	88	1:07	27:38
6153	67:32	86	1:01	24:40
6154	0:00	0	0:00	0:00
6159	15:51	42	0:30	5:53
6160	28:38	79	0:33	9:53
6161	27:41	80	0:33	9:37
6162	26:58	78	0:33	9:02
6163	31:55	93	0:35	9:31
6164	33:10	94	0:36	9:52
6165	39:10	101	0:39	11:51
6166	17:24	44	0:31	6:27
6167	0:00	0	0:00	0:00
6168	0:00	0	0:00	0:00
6169	21:15	77	0:25	6:52
6170	22:12	77	0:25	7:20
6171	49:46	122	0:32	17:37
6172	55:24	132	0:33	19:01
6173	20:03	46	0:34	7:27
6174	21:26	48	0:34	7:57
6175	123:39	203	1:02	37:15
6176	72:05	121	0:53	24:14
6177	45:47	67	0:53	15:19
6178	40:55	63	0:50	13:12
6179	39:50	64	0:49	13:07
6180	41:59	65	0:50	13:51

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11052 Buckeye Wind II SFA_3-GE_1100m

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m

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	Shadow, worst case			Shadow, expected values
No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
6181	37:20	62	0:48	12:12
6532	48:08	128	0:34	17:28
6533	46:50	84	0:38	17:21
6534	58:56	128	0:41	17:14
6535	21:58	48	0:36	7:22
6536	19:43	44	0:35	6:40
6537	20:01	44	0:35	6:56
6538	78:28	82	1:10	31:42
6540	43:12	100	0:38	14:40
6541	28:37	80	0:32	9:54
6542	36:31	92	0:35	12:42
6543	30:12	81	0:33	10:27
6544	44:50	107	0:38	15:43
6545	28:49	83	0:32	10:09
6546	12:46	36	0:28	4:15
6547	10:26	32	0:26	3:35
6548	13:59	38	0:29	4:55
6549	11:27	34	0:26	4:06
6550	10:21	32	0:25	3:38
6551	9:23	31	0:24	3:15
6552	8:09	29	0:23	2:44
6553	38:22	120	0:31	12:00
6554	15:29	40	0:30	5:36
6555	11:23	34	0:26	4:07
6556	10:31	34	0:25	3:45
6557	11:50	36	0:26	4:10
6558	36:02	102	0:32	11:17
6559	51:47	136	0:36	16:36
6560	58:33	133	0:37	19:03
6562	14:35	39	0:30	4:51
6563	15:38	39	0:31	5:15
6564	39:33	64	0:48	14:21
6565	42:13	66	0:49	15:22
6566	54:59	77	0:55	20:05
6567	26:53	52	0:40	9:25
6568	26:11	50	0:40	9:15
6569	31:26	84	0:30	11:05
6570	15:46	39	0:31	5:15
6571	17:09	42	0:32	5:43
6572	0:00	0	0:00	0:00
6573	0:00	0	0:00	0:00
6574	0:00	0	0:00	0:00
6584	0:00	0	0:00	0:00
6897	10:05	36	0:23	2:38
6902	28:40	66	0:30	7:35
6904	9:26	35	0:23	2:29
6907	10:42	38	0:24	2:45
6908	15:49	43	0:29	4:29
6909	15:38	45	0:27	3:43
6910	14:59	45	0:27	3:35
6911	17:47	52	0:27	3:59

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Project:
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SHADOW - Main Result

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m

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	Shadow, worst case			Shadow, expected values
No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
6912	29:19	78	0:31	6:50
6913	25:23	70	0:29	5:48
6914	26:40	54	0:36	7:19
6915	27:48	56	0:36	7:34
6916	17:45	44	0:30	5:03
6917	27:22	82	0:30	7:11
6918	43:48	100	0:39	11:29
6919	38:48	94	0:37	10:12
6920	33:52	90	0:34	8:57
6921	44:17	86	0:42	11:14
6922	41:10	80	0:43	10:45
6923	36:19	66	0:48	10:23
6924	41:54	74	0:50	11:34
6925	39:22	69	0:51	11:17
6926	38:01	61	0:56	11:27
6927	27:21	58	0:37	7:06
6955	0:00	0	0:00	0:00
6957	0:00	0	0:00	0:00
7615	0:00	0	0:00	0:00
7769	0:00	0	0:00	0:00
7777	29:59	52	0:43	8:14
7786	0:00	0	0:00	0:00
7787	0:00	0	0:00	0:00
7808	12:11	46	0:20	4:59
7816	58:51	114	0:44	20:03
7825	115:11	195	0:51	38:56
8042	0:00	0	0:00	0:00
8054	0:00	0	0:00	0:00
8056	0:00	0	0:00	0:00
8058	0:00	0	0:00	0:00
8086	59:17	86	0:54	21:35
8087	60:17	89	0:53	21:51
8088	56:16	87	0:52	20:20
8089	74:56	114	0:49	27:48
8090	39:35	67	0:43	14:39
8158	6:19	29	0:19	2:19
8168	0:00	0	0:00	0:00
8169	0:00	0	0:00	0:00
8170	0:00	0	0:00	0:00
8214	0:00	0	0:00	0:00
8215	50:54	84	0:41	20:30
8216	52:56	89	0:41	21:15
8217	53:35	78	0:49	21:38
8224	59:58	138	0:34	22:50
8225	49:22	120	0:34	18:28
8226	53:22	130	0:32	20:34
8227	46:08	104	0:33	17:58
8228	30:12	80	0:33	11:37
8229	26:26	73	0:32	10:05
8244	14:51	45	0:26	5:25
8245	0:00	0	0:00	0:00

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m

...continued from previous page

	Shadow, worst case			Shadow, expected values
No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
8247	0:00	0	0:00	0:00
8248	0:00	0	0:00	0:00
8323	0:00	0	0:00	0:00
8324	0:00	0	0:00	0:00
8325	0:00	0	0:00	0:00
8326	0:00	0	0:00	0:00
8334	38:07	93	0:38	11:25
8335	101:16	121	1:16	27:25
8342	20:57	46	0:35	7:43
8343	55:48	114	0:40	14:30
8345	0:00	0	0:00	0:00
8348	0:00	0	0:00	0:00
8351	184:14	265	1:32	64:24
8352	184:19	262	1:35	64:28
8353	178:22	261	1:37	62:32
8354	182:00	260	1:36	63:42
8355	179:31	268	1:28	62:43
8356	185:11	267	1:30	64:47
8370	85:32	119	0:55	23:46
8371	0:00	0	0:00	0:00
8373	0:00	0	0:00	0:00
8377	8:28	30	0:22	2:49
8378	24:46	73	0:29	8:21
8383	64:55	172	0:38	23:01
8384	80:07	177	0:43	28:24
8386	167:22	263	1:00	53:20
8414	0:00	0	0:00	0:00
9324	0:00	0	0:00	0:00
9329	0:00	0	0:00	0:00
9330	0:00	0	0:00	0:00
9331	0:00	0	0:00	0:00
9341	0:00	0	0:00	0:00
9342	0:00	0	0:00	0:00
9420	0:00	0	0:00	0:00
9443	40:58	95	0:35	12:29
9459	13:38	38	0:28	4:13
9501	0:00	0	0:00	0:00
9502	0:00	0	0:00	0:00
9509	0:00	0	0:00	0:00
9510	0:00	0	0:00	0:00
9511	0:00	0	0:00	0:00
9513	0:00	0	0:00	0:00
9514	0:00	0	0:00	0:00
9540	0:00	0	0:00	0:00
9541	0:00	0	0:00	0:00
9543	0:00	0	0:00	0:00
9544	0:00	0	0:00	0:00
9548	0:00	0	0:00	0:00
9549	0:00	0	0:00	0:00
9550	0:00	0	0:00	0:00
9551	0:00	0	0:00	0:00

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Project:
11052 Buckeye Wind II SFA_3-GE_1100m

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m

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	Shadow, worst case			Shadow, expected values
No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
9552	0:00	0	0:00	0:00
9553	0:00	0	0:00	0:00
9557	0:00	0	0:00	0:00
9558	0:00	0	0:00	0:00
9559	0:00	0	0:00	0:00
9560	0:00	0	0:00	0:00
9569	0:00	0	0:00	0:00
9570	0:00	0	0:00	0:00
9571	0:00	0	0:00	0:00
9572	0:00	0	0:00	0:00
9576	25:22	74	0:28	9:20
9577	0:00	0	0:00	0:00
9585	0:00	0	0:00	0:00
9586	0:00	0	0:00	0:00
9587	0:00	0	0:00	0:00
9588	0:00	0	0:00	0:00
9589	0:00	0	0:00	0:00
9605	19:15	46	0:33	5:38
9606	34:46	62	0:43	9:59
9607	32:19	56	0:44	10:20
9608	38:00	62	0:48	12:58
9609	74:06	112	0:50	18:17
9616	9:12	33	0:21	3:23
9617	17:12	48	0:28	4:28
9618	20:46	56	0:28	5:15
9619	24:07	54	0:32	7:22
9625	0:00	0	0:00	0:00
9626	0:00	0	0:00	0:00
9627	0:00	0	0:00	0:00
9628	0:00	0	0:00	0:00
9633	13:57	52	0:25	3:09
9671	4:48	33	0:12	1:57
9672	20:58	86	0:21	6:34
9673	14:59	48	0:22	4:09
9674	6:01	35	0:15	2:26
9679	0:00	0	0:00	0:00
9688	9:50	34	0:25	3:32
9709	0:00	0	0:00	0:00
9710	0:00	0	0:00	0:00
9712	0:00	0	0:00	0:00
9713	0:00	0	0:00	0:00
9714	0:00	0	0:00	0:00
9724	7:38	30	0:22	2:29
9725	8:06	30	0:23	2:34
9726	9:03	33	0:24	2:50
9727	10:08	34	0:25	3:10
9728	11:52	36	0:27	3:40
9729	13:58	41	0:28	4:08
9730	20:51	47	0:34	6:26
9731	17:10	44	0:31	5:13
9736	37:54	68	0:39	10:00

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11052 Buckeye Wind II SFA_3-GE_1100m

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m

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	Shadow, worst case			Shadow, expected values
No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
9737	16:58	50	0:28	3:57
9738	32:46	60	0:42	9:33
9747	7:49	32	0:22	2:25
9748	7:59	32	0:22	2:23
9749	10:45	39	0:24	2:44
9758	100:57	138	1:09	36:35
9759	16:39	44	0:29	6:13
9816	0:00	0	0:00	0:00
9818	20:14	55	0:28	4:33
9823	13:50	38	0:28	4:16
9997	8:55	30	0:23	2:49
9998	11:45	35	0:26	3:37
9999	13:44	37	0:29	4:23
10005	21:34	46	0:36	7:22
10008	17:50	44	0:31	5:24
10013	11:22	38	0:22	3:16
10014	22:43	60	0:26	6:06
10015	27:04	74	0:27	6:50
10016	21:11	62	0:27	4:48
10017	0:00	0	0:00	0:00
10018	0:00	0	0:00	0:00
10021	0:00	0	0:00	0:00
10026	0:00	0	0:00	0:00
10027	0:00	0	0:00	0:00
10028	0:00	0	0:00	0:00
10029	0:00	0	0:00	0:00
10035	0:00	0	0:00	0:00
10036	10:38	36	0:23	3:59
10037	21:33	74	0:25	8:00
10041	33:59	53	0:57	12:22
10042	42:07	62	1:04	15:33
10043	54:12	73	1:08	19:57
10045	35:29	90	0:31	10:00
10046	30:28	74	0:29	7:49
10047	43:20	108	0:31	11:36
10055	135:12	167	1:04	49:32
10056	64:37	112	0:45	23:25
10062	29:44	75	0:36	10:55
10064	0:00	0	0:00	0:00
10097	0:00	0	0:00	0:00
10098	0:00	0	0:00	0:00
10102	0:00	0	0:00	0:00
10103	0:00	0	0:00	0:00
10104	30:37	56	0:42	10:17
10110	96:02	143	0:53	28:51
10111	48:00	107	0:38	14:00
10133	0:00	0	0:00	0:00
10134	0:00	0	0:00	0:00
10135	0:00	0	0:00	0:00
10152	17:30	73	0:25	4:03
10153	0:00	0	0:00	0:00

To be continued on next page...

Project:
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SHADOW - Main Result

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m

...continued from previous page

	Shadow, worst case			Shadow, expected values
No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
10159	0:00	0	0:00	0:00
10163	75:07	110	1:18	21:10
10164	76:38	117	1:24	28:04
10168	99:48	94	1:15	27:44
10176	0:00	0	0:00	0:00
10177	11:42	37	0:25	4:07
10191	8:30	33	0:19	3:28
10202	69:21	143	0:45	21:50
10203	13:33	38	0:29	4:23
10206	194:53	265	1:22	57:45
10280	191:26	260	1:35	67:03
10281	0:00	0	0:00	0:00
10308	107:00	188	0:57	38:33
10311	66:23	183	0:48	21:14

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
71	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (58)	295:20	94:43
72	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (59)	460:59	149:52
73	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (60)	431:28	143:02
74	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (61)	303:58	97:03
75	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (62)	231:23	75:58
76	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (63)	139:36	49:57
77	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (64)	188:26	60:59
78	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (65)	80:31	31:38
79	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (66)	375:00	116:10
80	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (67)	213:09	65:18
81	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (68)	183:22	52:05
82	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (69)	193:43	71:51
83	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (70)	361:02	129:52
84	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (71)	189:35	62:48
85	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (72)	118:55	31:24
86	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (73)	90:10	32:12
87	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (74)	34:04	12:53
88	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (75)	231:26	64:21
89	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (76)	281:45	99:54
90	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (77)	123:44	41:50
91	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (78)	214:48	75:22
92	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (79)	177:52	56:46
93	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (80)	233:57	77:56
94	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (81)	261:08	88:57
95	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (82)	142:46	41:14
96	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (83)	232:12	79:52
97	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (84)	168:59	55:57
98	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (85)	89:33	28:56
99	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (86)	223:02	68:55
100	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (87)	265:01	91:50
101	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (88)	316:34	108:55
105	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (89)	338:02	104:04

To be continued on next page...

Project:
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SHADOW - Main Result

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m

...continued from previous page

No.	Name	Worst case [h/year]	Expected [h/year]
106	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (90)	97:17	30:04
107	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (91)	243:06	88:53
108	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (92)	454:07	147:19
109	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (93)	191:59	60:09
110	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (94)	15:01	5:04
112	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (95)	526:12	183:12
113	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (96)	357:02	113:32
114	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (97)	228:29	70:45
115	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (98)	149:42	44:20
116	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (99)	162:33	51:52
117	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (100)	281:22	86:41
118	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (101)	255:17	85:41
119	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (102)	192:44	68:04
122	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (103)	51:52	15:51
123	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (104)	39:13	11:14
125	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (105)	128:19	34:02
126	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (109)	30:45	11:08
127	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (106)	165:56	50:31
128	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (107)	281:41	91:08
129	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (108)	526:08	157:48
130	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (110)	306:10	110:28
131	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (111)	327:42	92:58
132	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (112)	399:36	132:11
133	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (113)	299:33	93:30

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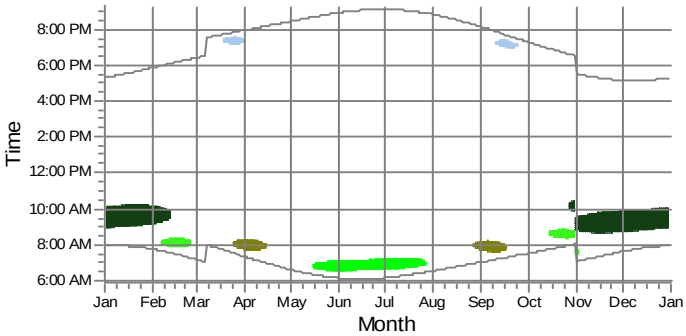
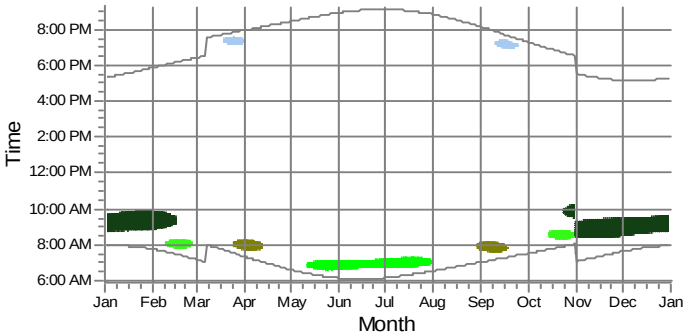
SHADOW - Calendar, graphical

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m

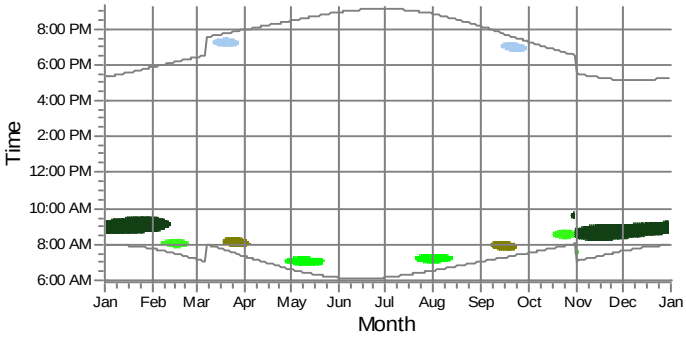
339: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5529)



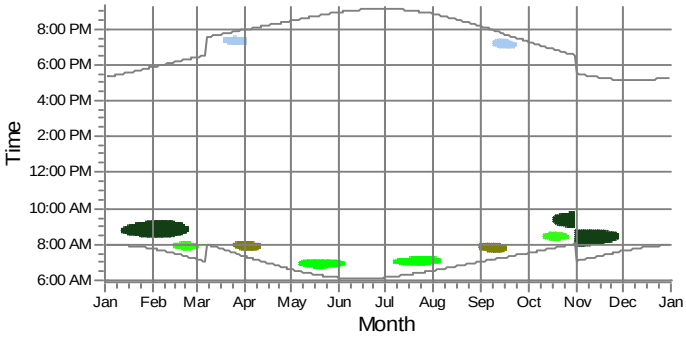
340: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5530)



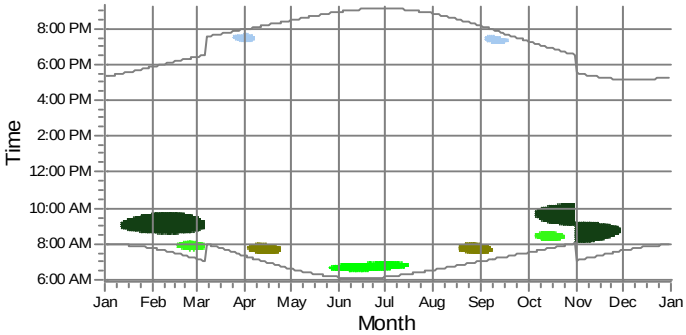
341: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5531)



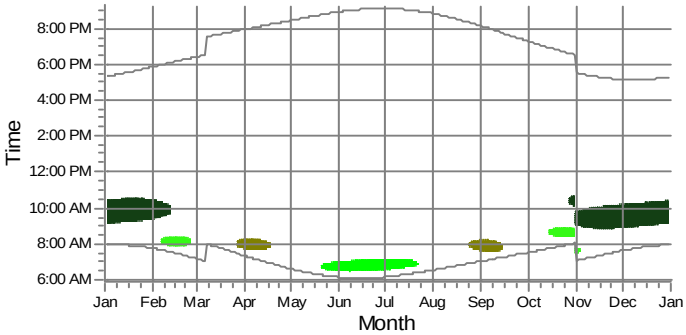
342: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5532)



343: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5533)



344: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5534)



WTGs

79: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (66)
80: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (67)
86: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (73)
90: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (77)
131: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (111)

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SHADOW - Calendar, graphical

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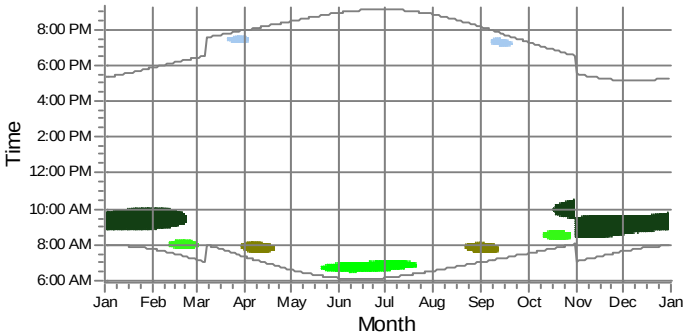
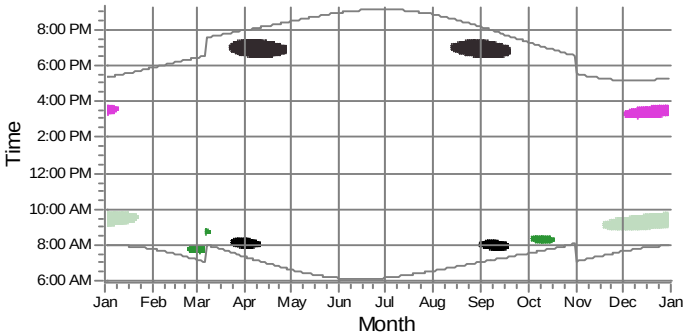
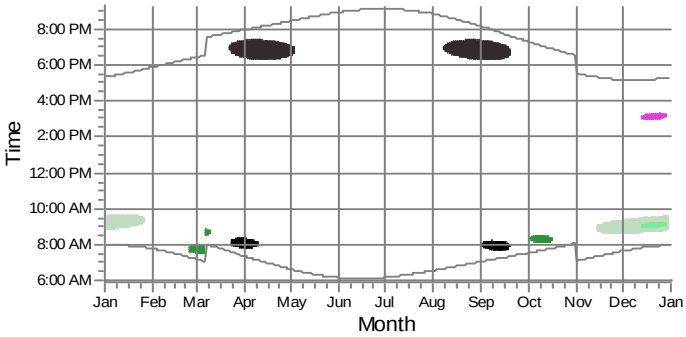
348: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5535)



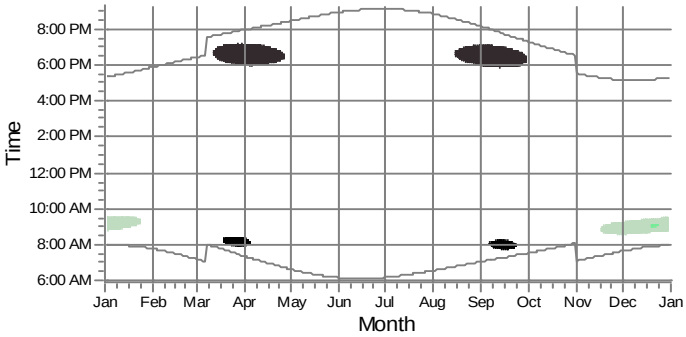
400: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5566)



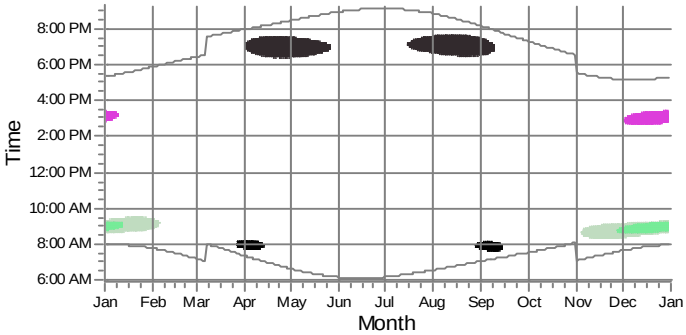
401: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5567)



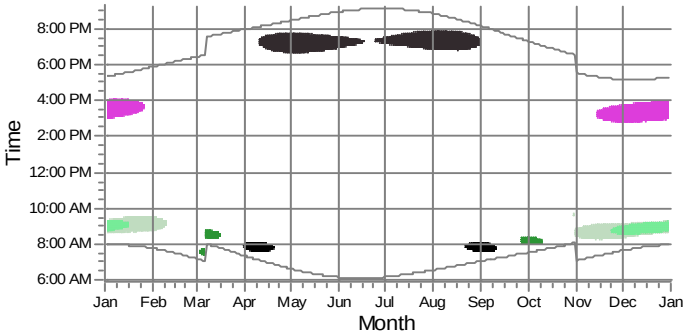
402: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5568)



403: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5569)



404: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5570)



WTGs

79: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (66)
80: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (67)
84: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (71)
85: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (72)
86: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (73)
90: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (77)
98: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (85)
99: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (86)
112: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (95)
113: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (96)
131: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (111)

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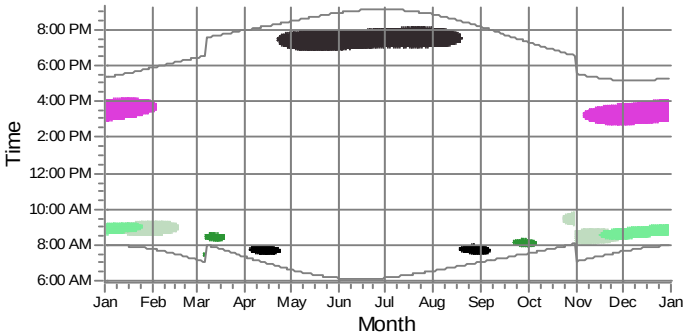
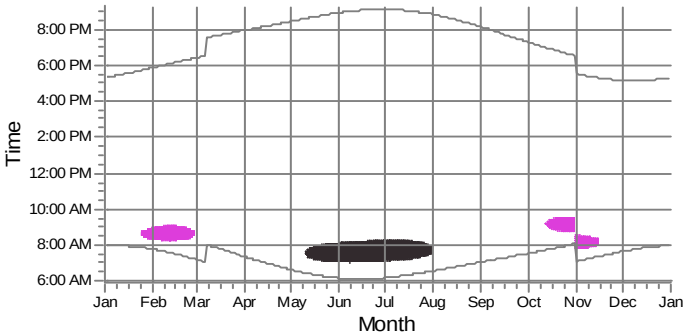
SHADOW - Calendar, graphical

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m

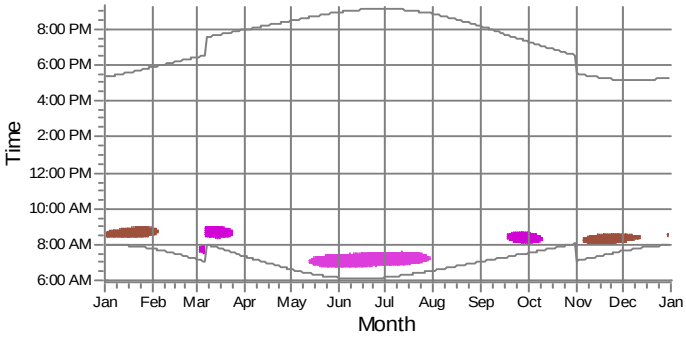
405: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5571)



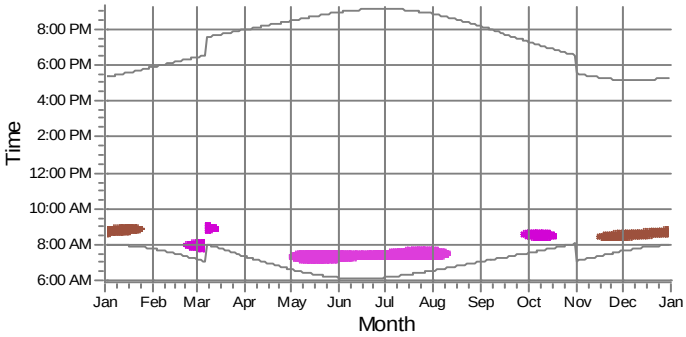
406: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5572)



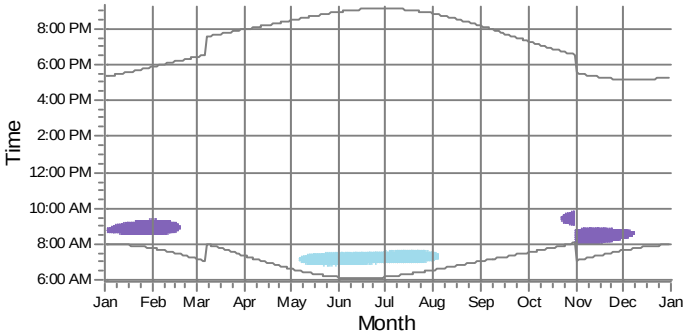
410: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5575)



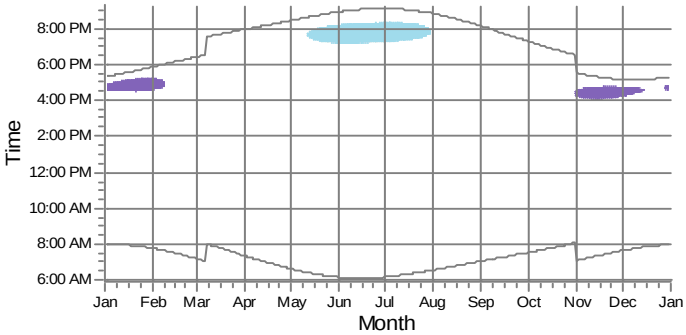
411: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5576)



573: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5630)



581: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5633)



WTGs

- 84: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (71)
- 85: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (72)
- 98: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (85)
- 99: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (86)
- 108: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (92)
- 109: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (93)
- 112: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (95)
- 113: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (96)
- 118: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (101)
- 119: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (102)

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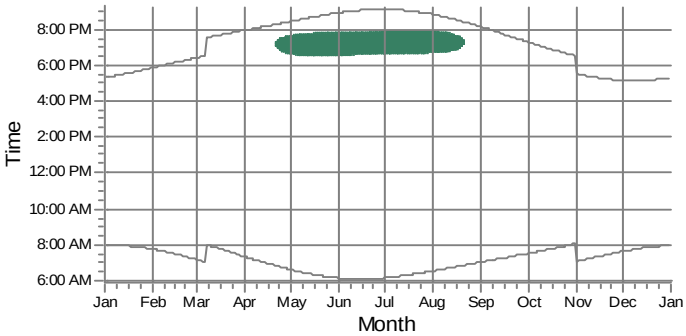
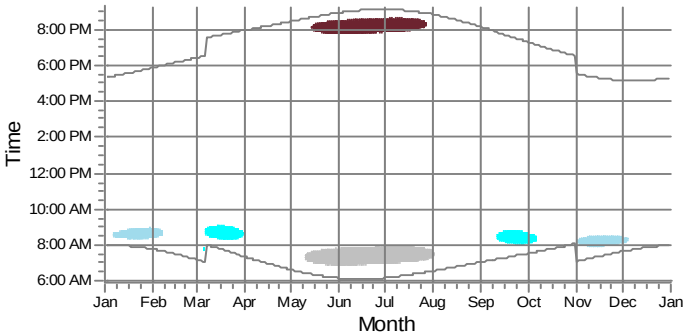
SHADOW - Calendar, graphical

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m

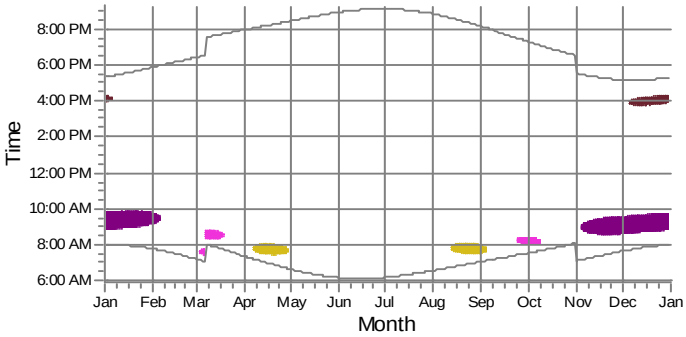
616: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5648)



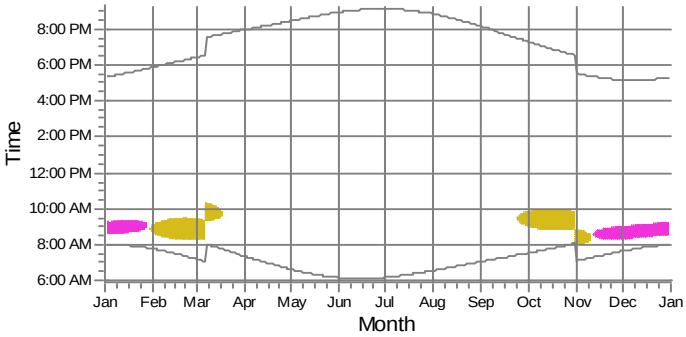
662: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5669)



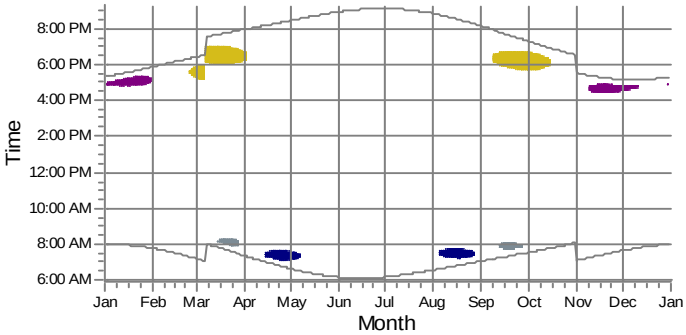
719: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5685)



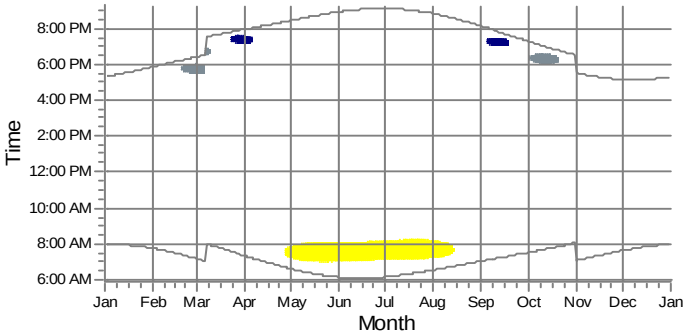
725: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5687)



727: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5689)



739: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5697)



WTGs

- 72: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (59)
- 77: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (64)
- 81: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (68)
- 82: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (69)
- 83: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (70)
- 101: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (88)
- 105: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (89)
- 106: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (90)
- 107: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (91)
- 108: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (92)
- 116: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (99)

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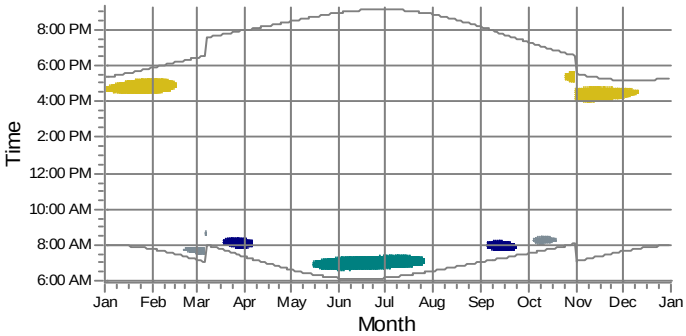
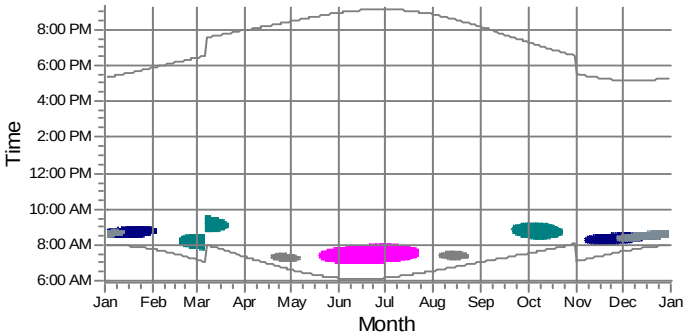
SHADOW - Calendar, graphical

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m

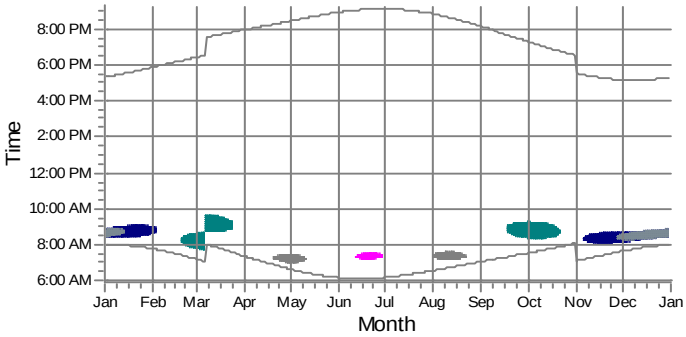
789: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5721)



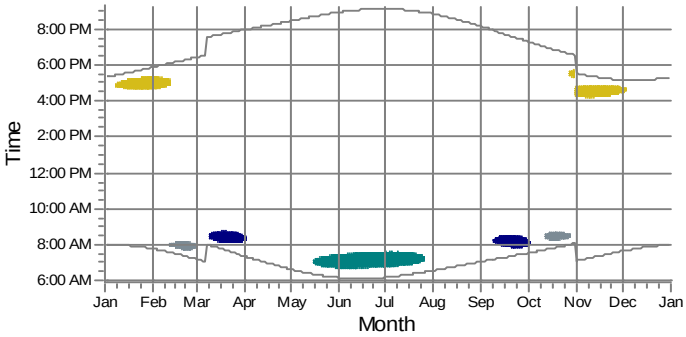
793: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5725)



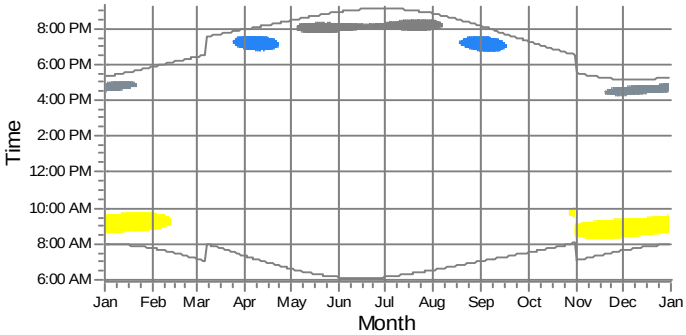
794: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5726)



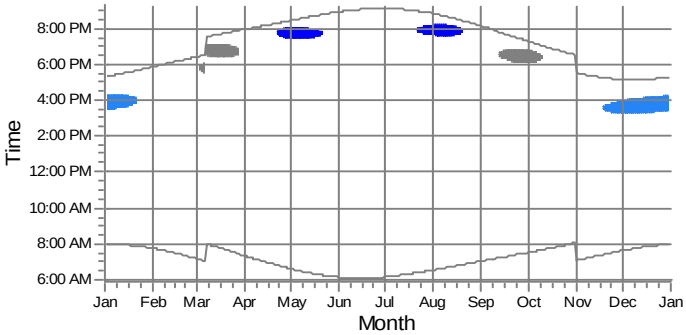
795: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5727)



799: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5729)



833: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5752)



WTGs

72: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (59)
73: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (60)
74: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (61)
75: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (62)
76: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (63)
77: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (64)
105: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (89)
116: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (99)
117: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (100)

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SHADOW - Calendar, graphical

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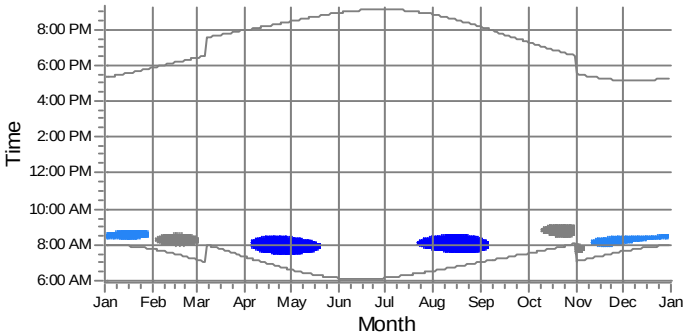
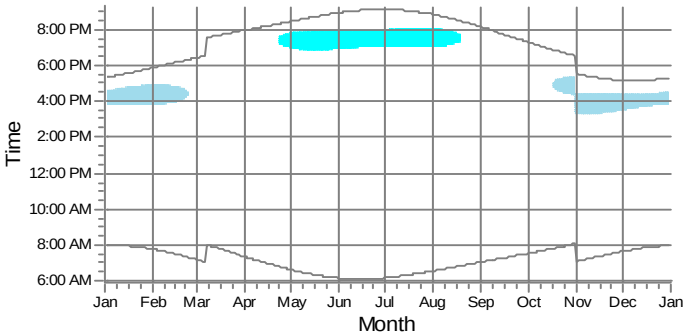
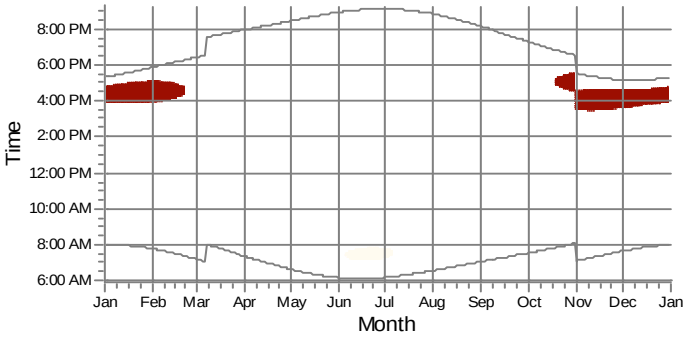
849: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5766)



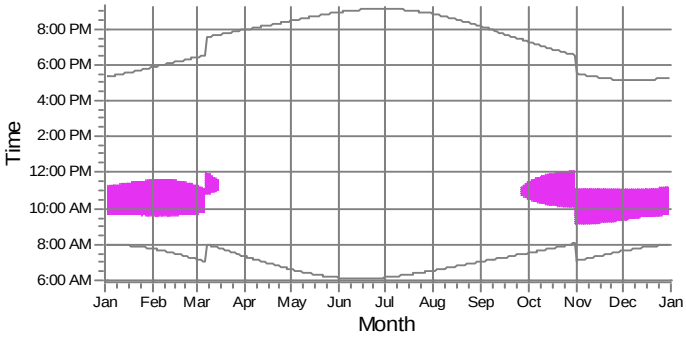
3380: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5894)



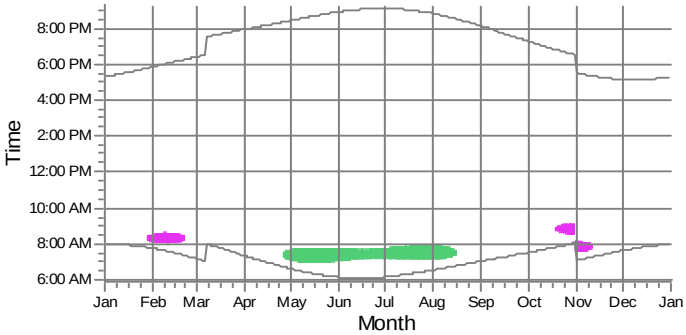
3417: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5907)



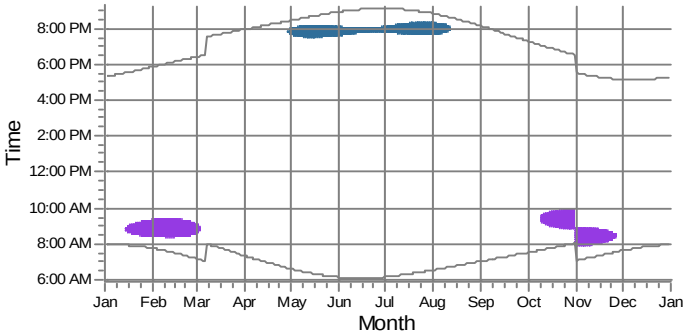
3429: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5916)



3431: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5918)



6175: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6031)



WTGs

73: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (60)
74: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (61)
83: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (70)
87: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (74)
94: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (81)
100: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (87)
108: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (92)
117: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (100)
128: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (107)
129: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (108)
133: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (113)

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SHADOW - Calendar, graphical

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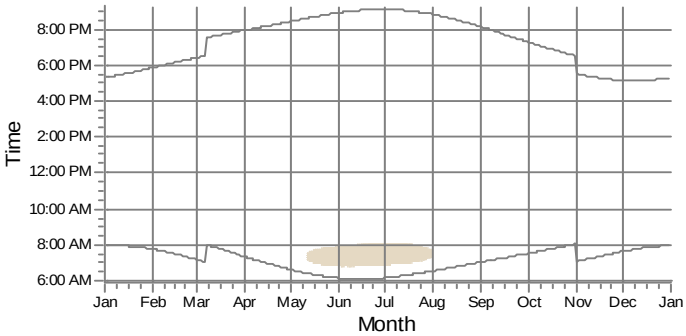
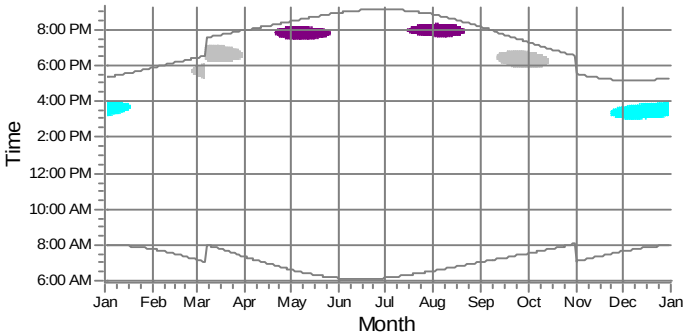
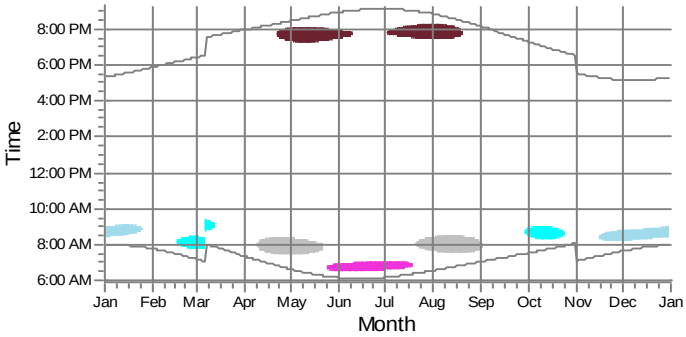
6538: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6044)



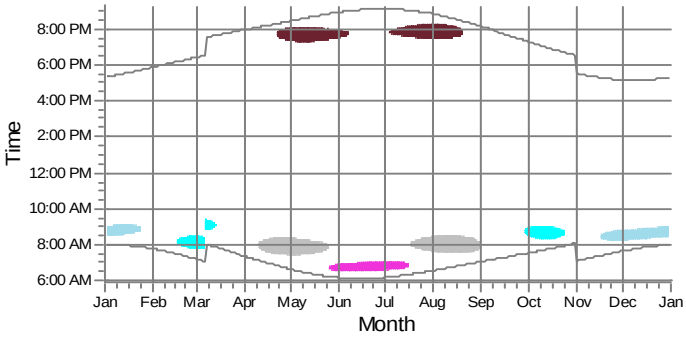
7825: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6113)



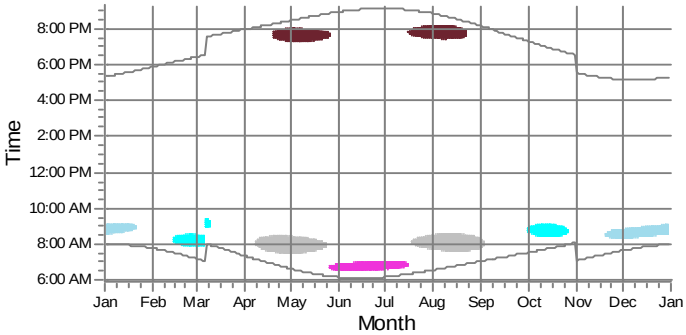
8351: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6151)



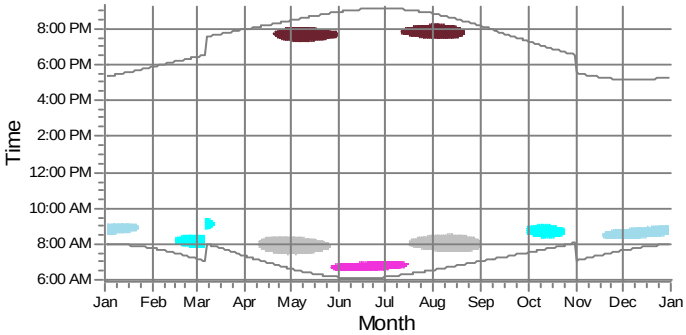
8352: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6152)



8353: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6153)



8354: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6154)



WTGs

81: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (68)
82: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (69)
83: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (70)
106: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (90)
107: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (91)
108: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (92)
130: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (110)

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SHADOW - Calendar, graphical

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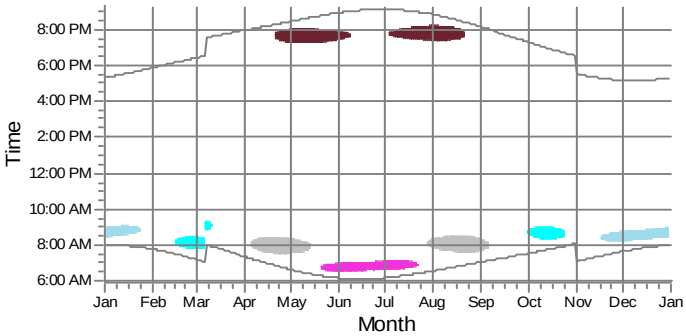
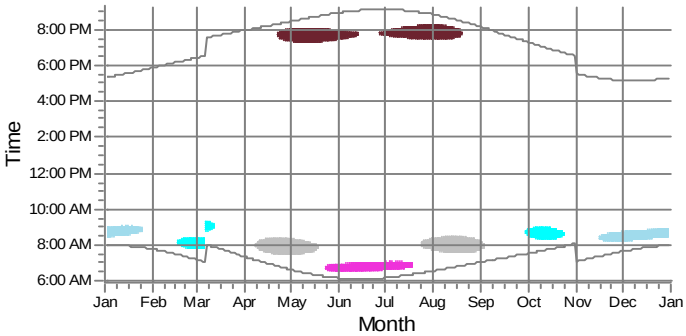
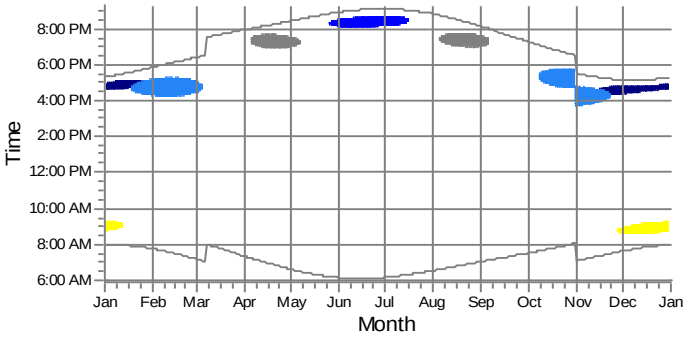
8355: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6155)



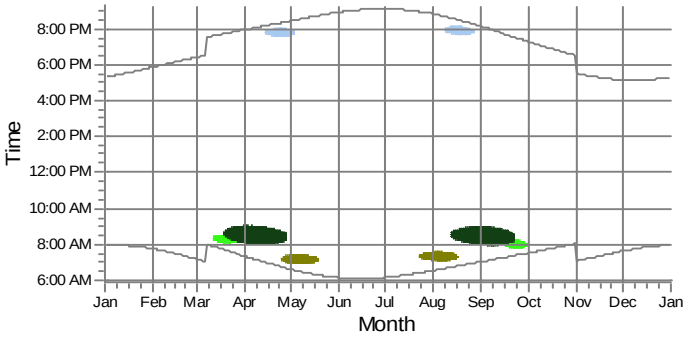
8356: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6156)



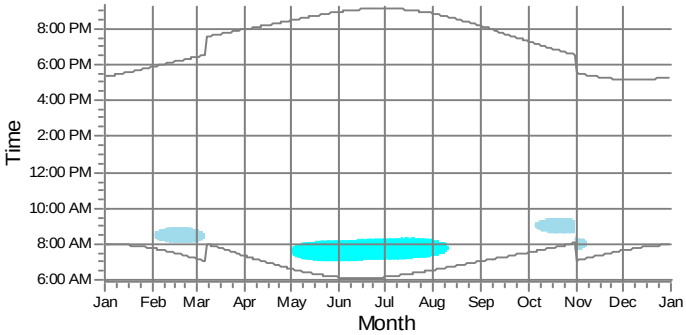
8386: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6164)



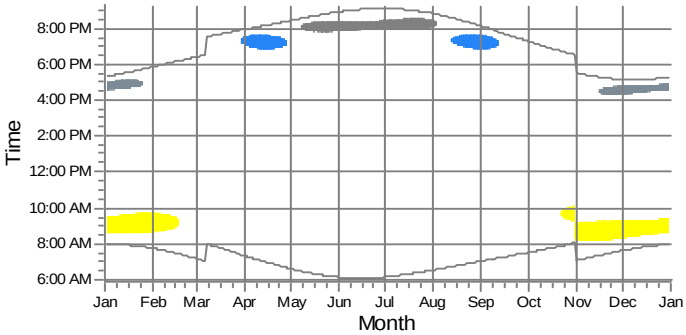
9758: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6246)



10055: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6276)



10206: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6301)



WTGs

72: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (59)
73: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (60)
74: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (61)
77: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (64)
80: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (67)
82: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (69)
83: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (70)
86: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (73)
90: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (77)
106: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (90)
107: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (91)
108: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (92)
116: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (99)
117: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (100)
131: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (111)

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SHADOW - Calendar, graphical

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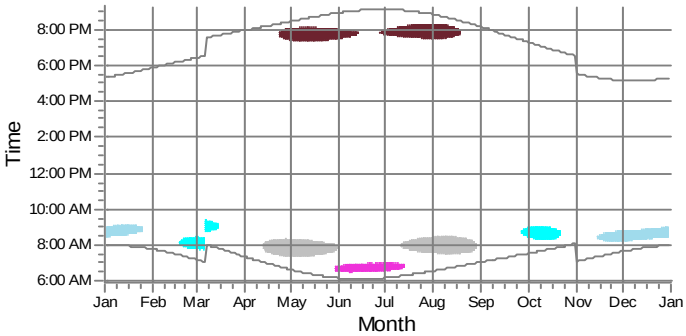
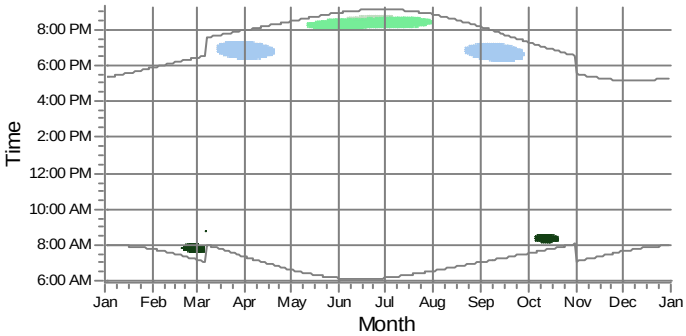
10280: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6302)



10308: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6304)



WTGs

82: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (69)
83: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (70)
85: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (72)
86: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (73)
98: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (85)
106: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (90)
107: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (91)
108: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (92)
131: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (111)

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SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 339 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5529)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:55 (131)	07:44		09:08 (131)	07:10			07:20		07:42 (80)	06:36			06:08		06:31 (79)
	17:20	66	10:01 (131)	17:53	58	10:06 (131)	18:26			19:59	35	19:22 (86)	20:28			20:57	30	07:01 (79)
2	07:57		08:55 (131)	07:43		09:09 (131)	07:08			07:19		07:41 (80)	06:35			06:08		06:31 (79)
	17:21	66	10:01 (131)	17:54	56	10:05 (131)	18:27			20:00	31	08:12 (80)	20:29			20:58	30	07:01 (79)
3	07:57		08:56 (131)	07:43		09:10 (131)	07:07			07:17		07:41 (80)	06:33			06:07		06:31 (79)
	17:21	66	10:02 (131)	17:56	54	10:04 (131)	18:28			20:00	32	08:13 (80)	20:30			20:58	31	07:02 (79)
4	07:57		08:56 (131)	07:42		09:11 (131)	07:05			07:15		07:40 (80)	06:32			06:07		06:31 (79)
	17:22	66	10:02 (131)	17:57	52	10:03 (131)	18:29			20:01	32	08:12 (80)	20:31			20:59	30	07:01 (79)
5	07:57		08:56 (131)	07:40		09:12 (131)	07:03			07:14		07:39 (80)	06:31			06:07		06:31 (79)
	17:23	67	10:03 (131)	17:58	50	10:02 (131)	18:30			20:02	32	08:11 (80)	20:32			21:00	31	07:02 (79)
6	07:57		08:57 (131)	07:39		09:13 (131)	07:02			07:12		07:40 (80)	06:30			06:06		06:32 (79)
	17:24	66	10:03 (131)	17:59	48	10:01 (131)	18:32			20:03	32	08:12 (80)	20:33			21:00	30	07:02 (79)
7	07:57		08:57 (131)	07:38		09:15 (131)	07:00			07:11		07:39 (80)	06:29			06:06		06:32 (79)
	17:25	67	10:04 (131)	18:00	45	10:00 (131)	18:33			20:04	31	08:10 (80)	20:34			21:01	31	07:03 (79)
8	07:57		08:58 (131)	07:37		07:58 (90)	07:59			07:09		07:40 (80)	06:27			06:06		06:32 (79)
	17:26	67	10:05 (131)	18:02	53	09:59 (131)	19:34			20:05	30	08:10 (80)	20:35			21:02	30	07:02 (79)
9	07:57		08:58 (131)	07:36		07:56 (90)	07:57			07:07		07:40 (80)	06:26			06:06		06:32 (79)
	17:27	67	10:05 (131)	18:03	54	09:57 (131)	19:35			20:06	29	08:09 (80)	20:36			21:02	30	07:02 (79)
10	07:57		08:58 (131)	07:35		07:55 (90)	07:56			07:06		07:41 (80)	06:25			06:06		06:32 (79)
	17:28	67	10:05 (131)	18:04	53	09:55 (131)	19:36			20:07	27	08:08 (80)	20:37			21:03	31	07:03 (79)
11	07:57		08:58 (131)	07:34		07:53 (90)	07:54			07:04		07:41 (80)	06:24			06:05		06:33 (79)
	17:29	68	10:06 (131)	18:05	51	09:52 (131)	19:37			20:08	26	08:07 (80)	20:38			21:03	30	07:03 (79)
12	07:57		08:59 (131)	07:33		07:52 (90)	07:53			07:03		07:42 (80)	06:23			06:05		06:33 (79)
	17:30	68	10:07 (131)	18:06	48	09:49 (131)	19:38			20:09	23	08:05 (80)	20:39			21:04	30	07:03 (79)
13	07:56		08:59 (131)	07:31		07:51 (90)	07:51			07:01		07:43 (80)	06:22			06:05		06:33 (79)
	17:31	67	10:06 (131)	18:08	42	09:45 (131)	19:39			20:10	20	08:03 (80)	20:40			21:04	30	07:03 (79)
14	07:56		08:59 (131)	07:30		07:51 (90)	07:49			07:00		07:45 (80)	06:21			06:05		06:34 (79)
	17:32	68	10:07 (131)	18:09	26	08:17 (90)	19:40			20:11	15	08:00 (80)	20:41			21:05	29	07:03 (79)
15	07:56		09:00 (131)	07:29		07:50 (90)	07:48			06:58		07:48 (80)	06:20			06:05		06:34 (79)
	17:33	68	10:08 (131)	18:10	26	08:16 (90)	19:41			20:12	9	07:57 (80)	20:42			21:05	30	07:04 (79)
16	07:55		09:00 (131)	07:28		07:50 (90)	07:46			06:57			06:19		06:40 (79)	06:05		06:34 (79)
	17:34	68	10:08 (131)	18:11	27	08:17 (90)	19:42			20:13			20:43	9	06:49 (79)	21:06	30	07:04 (79)
17	07:55		09:01 (131)	07:26		07:50 (90)	07:45			06:55			06:18		06:39 (79)	06:05		06:34 (79)
	17:36	67	10:08 (131)	18:12	27	08:17 (90)	19:43			20:14			20:44	13	06:52 (79)	21:06	30	07:04 (79)
18	07:54		09:01 (131)	07:25		07:49 (90)	07:43			06:54			06:17		06:38 (79)	06:05		06:34 (79)
	17:37	67	10:08 (131)	18:14	27	08:16 (90)	19:44			20:15			20:45	16	06:54 (79)	21:06	30	07:04 (79)
19	07:54		09:02 (131)	07:24		07:50 (90)	07:41		19:18 (86)	06:52			06:17		06:37 (79)	06:05		06:34 (79)
	17:38	67	10:09 (131)	18:15	26	08:16 (90)	19:45	6	19:24 (86)	20:16			20:46	18	06:55 (79)	21:07	30	07:04 (79)
20	07:53		09:02 (131)	07:22		07:50 (90)	07:40		19:16 (86)	06:51			06:16		06:36 (79)	06:06		06:34 (79)
	17:39	67	10:09 (131)	18:16	26	08:16 (90)	19:46	9	19:25 (86)	20:17			20:47	19	06:55 (79)	21:07	30	07:04 (79)
21	07:53		09:02 (131)	07:21		07:50 (90)	07:38		19:14 (86)	06:49			06:15		06:35 (79)	06:06		06:35 (79)
	17:40	66	10:08 (131)	18:17	25	08:15 (90)	19:47	13	19:27 (86)	20:18			20:48	21	06:56 (79)	21:07	30	07:05 (79)
22	07:52		09:03 (131)	07:20		07:51 (90)	07:36		19:13 (86)	06:48			06:14		06:35 (79)	06:06		06:35 (79)
	17:41	66	10:09 (131)	18:18	23	08:14 (90)	19:48	14	19:27 (86)	20:19			20:49	22	06:57 (79)	21:07	30	07:05 (79)
23	07:52		09:03 (131)	07:18		07:52 (90)	07:35		19:11 (86)	06:46			06:13		06:34 (79)	06:06		06:35 (79)
	17:42	66	10:09 (131)	18:19	21	08:13 (90)	19:49	17	19:28 (86)	20:20			20:49	24	06:58 (79)	21:08	30	07:05 (79)
24	07:51		09:03 (131)	07:17		07:54 (90)	07:33		19:11 (86)	06:45			06:13		06:33 (79)	06:06		06:35 (79)
	17:44	66	10:09 (131)	18:20	18	08:12 (90)	19:50	19	19:30 (86)	20:21			20:50	25	06:58 (79)	21:08	30	07:05 (79)
25	07:50		09:03 (131)	07:15		07:56 (90)	07:32		19:11 (86)	06:44			06:12		06:33 (79)	06:07		06:36 (79)
	17:45	65	10:08 (131)	18:22	14	08:10 (90)	19:51	19	19:30 (86)	20:22			20:51	26	06:59 (79)	21:08	30	07:06 (79)
26	07:49		09:05 (131)	07:14		07:59 (90)	07:30		07:54 (80)	06:42			06:11		06:32 (79)	06:07		06:36 (79)
	17:46	64	10:09 (131)	18:23	7	08:06 (90)	19:53	32	19:32 (86)	20:23			20:52	27	06:59 (79)	21:08	30	07:06 (79)
27	07:49		09:05 (131)	07:12			07:28		07:50 (80)	06:41			06:11		06:32 (79)	06:07		06:36 (79)
	17:47	64	10:09 (131)	18:24			19:54	38	19:32 (86)	20:24			20:53	28	07:00 (79)	21:08	30	07:06 (79)
28	07:48		09:06 (131)	07:11			07:27		07:48 (80)	06:40			06:10		06:31 (79)	06:08		06:37 (79)
	17:48	62	10:08 (131)	18:25			19:55	41	19:30 (86)	20:25			20:54	29	07:00 (79)	21:08	29	07:06 (79)
29	07:47		09:06 (131)				07:25		07:46 (80)	06:38			06:10		06:31 (79)	06:08		06:36 (79)
	17:50	62	10:08 (131)				19:56	43	19:30 (86)	20:26			20:54	30	07:01 (79)	21:08	30	07:06 (79)
30	07:46		09:07 (131)				07:23		07:44 (80)	06:37			06:09		06:31 (79)	06:09		06:37 (79)
	17:51	60	10:07 (131)				19:57	43	19:28 (86)	20:27			20:55	30	07:01 (79)	21:08	30	07:07 (79)
31	07:45		09:07 (131)				07:22		07:43 (80)				06:09		06:31 (79)			
	17:52	59	10:06 (131)				19:58	40	19:25 (86)				20:56	30	07:01 (79)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		2040			957			334			404			367			902	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.61			0.62			0.66			0.66			0.68			0.68	
Total reduction		0.22			0.26			0.29			0.34			0.38			0.41	
Total, real		442			246			97			135			139			367	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 2

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 339 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5529)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:37 (79)	06:32			07:02		07:40 (80)	07:31			07:03		07:24 (90)	07:37		08:40 (131)
	21:08	30	07:07 (79)	20:51			20:09	26	08:06 (80)	19:18			17:33	53	09:24 (131)	17:10	68	09:48 (131)
2	06:10		06:38 (79)	06:33			07:03		07:39 (80)	07:32			07:05		07:26 (90)	07:38		08:41 (131)
	21:08	30	07:08 (79)	20:50			20:08	27	08:06 (80)	19:17			17:32	54	09:27 (131)	17:10	67	09:48 (131)
3	06:10		06:37 (79)	06:34			07:04		07:38 (80)	07:33			07:06		07:28 (90)	07:39		08:41 (131)
	21:08	30	07:07 (79)	20:49			20:06	29	08:07 (80)	19:15			17:31	53	09:29 (131)	17:10	68	09:49 (131)
4	06:11		06:38 (79)	06:35			07:05		07:37 (80)	07:34			07:07		08:44 (131)	07:40		08:42 (131)
	21:08	30	07:08 (79)	20:48			20:05	30	08:07 (80)	19:14			17:30	46	09:30 (131)	17:10	67	09:49 (131)
5	06:11		06:37 (79)	06:36			07:06		07:36 (80)	07:35			07:08		08:43 (131)	07:41		08:42 (131)
	21:08	31	07:08 (79)	20:46			20:03	32	08:08 (80)	19:12			17:29	48	09:31 (131)	17:09	67	09:49 (131)
6	06:12		06:38 (79)	06:37			07:07		07:36 (80)	07:36			07:09		08:42 (131)	07:42		08:43 (131)
	21:07	30	07:08 (79)	20:45			20:01	32	08:08 (80)	19:10			17:28	50	09:32 (131)	17:09	67	09:50 (131)
7	06:12		06:38 (79)	06:38			07:08		07:36 (80)	07:37			07:10		08:42 (131)	07:43		08:43 (131)
	21:07	30	07:08 (79)	20:44			20:00	31	08:07 (80)	19:09			17:27	52	09:34 (131)	17:09	67	09:50 (131)
8	06:13		06:38 (79)	06:39			07:09		07:34 (80)	07:38			07:11		08:41 (131)	07:44		08:44 (131)
	21:07	31	07:09 (79)	20:43			19:56	32	08:06 (80)	19:07			17:25	54	09:35 (131)	17:09	66	09:50 (131)
9	06:14		06:39 (79)	06:40			07:09		07:34 (80)	07:39			07:13		08:40 (131)	07:45		08:45 (131)
	21:07	30	07:09 (79)	20:42			19:55	32	08:06 (80)	19:06			17:24	56	09:36 (131)	17:09	66	09:51 (131)
10	06:14		06:38 (79)	06:41			07:10		07:34 (80)	07:40			07:14		08:39 (131)	07:46		08:45 (131)
	21:06	31	07:09 (79)	20:41			19:53	31	08:05 (80)	19:04			17:23	58	09:37 (131)	17:09	66	09:51 (131)
11	06:15		06:39 (79)	06:42			07:11		07:34 (80)	07:41			07:15		08:39 (131)	07:46		08:45 (131)
	21:06	30	07:09 (79)	20:39			19:52	34	19:14 (86)	19:03			17:23	59	09:38 (131)	17:09	66	09:51 (131)
12	06:16		06:39 (79)	06:43			07:12		07:35 (80)	07:42			07:16		08:38 (131)	07:47		08:46 (131)
	21:05	31	07:10 (79)	20:38			19:50	40	19:17 (86)	19:01			17:22	61	09:39 (131)	17:10	65	09:51 (131)
13	06:16		06:39 (79)	06:44			07:13		07:35 (80)	07:43			07:17		08:38 (131)	07:48		08:47 (131)
	21:05	30	07:09 (79)	20:37			19:48	42	19:19 (86)	18:59			17:21	62	09:40 (131)	17:10	65	09:52 (131)
14	06:17		06:39 (79)	06:45			07:14		07:36 (80)	07:44			07:18		08:37 (131)	07:49		08:47 (131)
	21:05	30	07:09 (79)	20:35			19:47	43	19:20 (86)	18:58			17:20	63	09:40 (131)	17:10	66	09:53 (131)
15	06:18		06:40 (79)	06:46			07:15		07:37 (80)	07:45			07:20		08:38 (131)	07:50		08:47 (131)
	21:04	29	07:09 (79)	20:34			19:45	42	19:21 (86)	18:56			17:19	64	09:42 (131)	17:10	65	09:52 (131)
16	06:19		06:40 (79)	06:47			07:16		07:39 (80)	07:46		08:29 (90)	07:21		08:38 (131)	07:50		08:48 (131)
	21:03	29	07:09 (79)	20:33			19:43	39	19:21 (86)	18:55	11	08:40 (90)	17:18	64	09:42 (131)	17:10	65	09:53 (131)
17	06:19		06:41 (79)	06:48			07:17		07:42 (80)	07:47		08:27 (90)	07:22		08:37 (131)	07:51		08:49 (131)
	21:03	28	07:09 (79)	20:31			19:42	33	19:20 (86)	18:53	15	08:42 (90)	17:17	65	09:42 (131)	17:11	65	09:54 (131)
18	06:20		06:42 (79)	06:49			07:18		18:59 (86)	07:48		08:25 (90)	07:23		08:37 (131)	07:52		08:49 (131)
	21:02	27	07:09 (79)	20:30			19:40	20	19:19 (86)	18:52	19	08:44 (90)	17:17	66	09:43 (131)	17:11	65	09:54 (131)
19	06:21		06:43 (79)	06:49			07:19		18:59 (86)	07:49		08:23 (90)	07:24		08:37 (131)	07:52		08:50 (131)
	21:02	26	07:09 (79)	20:29			19:38	18	19:17 (86)	18:51	22	08:45 (90)	17:16	66	09:43 (131)	17:11	64	09:54 (131)
20	06:22		06:44 (79)	06:50			07:20		18:58 (86)	07:50		08:22 (90)	07:25		08:38 (131)	07:53		08:50 (131)
	21:01	24	07:08 (79)	20:27			19:37	17	19:15 (86)	18:49	23	08:45 (90)	17:15	66	09:44 (131)	17:12	64	09:54 (131)
21	06:23		06:44 (79)	06:51			07:21		18:58 (86)	07:51		08:21 (90)	07:26		08:38 (131)	07:53		08:51 (131)
	21:00	23	07:07 (79)	20:26			19:35	15	19:13 (86)	18:48	25	08:46 (90)	17:15	66	09:44 (131)	17:12	64	09:55 (131)
22	06:23		06:45 (79)	06:52			07:22		18:58 (86)	07:52		08:20 (90)	07:28		08:38 (131)	07:54		08:51 (131)
	21:00	22	07:07 (79)	20:24			19:33	13	19:11 (86)	18:46	26	08:46 (90)	17:14	67	09:45 (131)	17:13	64	09:55 (131)
23	06:24		06:46 (79)	06:53			07:23		18:59 (86)	07:53		08:20 (90)	07:29		08:38 (131)	07:54		08:52 (131)
	20:59	20	07:06 (79)	20:23			19:32	11	19:10 (86)	18:45	27	08:47 (90)	17:14	67	09:45 (131)	17:13	64	09:56 (131)
24	06:25		06:47 (79)	06:54			07:24		19:01 (86)	07:54		08:20 (90)	07:30		08:38 (131)	07:55		08:52 (131)
	20:58	19	07:06 (79)	20:21			19:30	7	19:08 (86)	18:44	27	08:47 (90)	17:13	67	09:45 (131)	17:14	64	09:56 (131)
25	06:26		06:48 (79)	06:55			07:25		19:05 (86)	07:56		08:20 (90)	07:31		08:38 (131)	07:55		08:53 (131)
	20:57	17	07:05 (79)	20:20			19:28	2	19:06 (86)	18:42	27	08:47 (90)	17:12	67	09:45 (131)	17:14	64	09:57 (131)
26	06:27		06:49 (79)	06:56			07:26			07:57		08:19 (90)	07:32		08:39 (131)	07:56		08:53 (131)
	20:56	15	07:04 (79)	20:18			19:27			18:41	27	08:46 (90)	17:12	68	09:47 (131)	17:15	65	09:58 (131)
27	06:28		06:49 (79)	06:57			07:27			07:58		08:19 (90)	07:33		08:39 (131)	07:56		08:53 (131)
	20:55	12	07:01 (79)	20:17			19:25			18:40	27	08:46 (90)	17:12	68	09:47 (131)	17:16	65	09:58 (131)
28	06:29		06:52 (79)	06:58		07:49 (80)	07:28			07:59		08:20 (90)	07:34		08:40 (131)	07:56		08:54 (131)
	20:55	6	06:58 (79)	20:15	10	07:59 (80)	19:23			18:38	28	10:07 (131)	17:11	67	09:47 (131)	17:16	65	09:59 (131)
29	06:30			06:59		07:45 (80)	07:29			08:00		08:21 (90)	07:35		08:40 (131)	07:56		08:54 (131)
	20:54			20:14	17	08:02 (80)	19:22			18:37	43	10:16 (131)	17:11	67	09:47 (131)	17:17	65	09:59 (131)
30	06:31			07:00		07:43 (80)	07:30			08:01		08:22 (90)	07:36		08:40 (131)	07:57		08:55 (131)
	20:53			20:12	20	08:03 (80)	19:20			18:36	49	10:20 (131)	17:10	68	09:48 (131)	17:18	65	10:00 (131)
31	06:31			07:01		07:41 (80)				08:02		08:23 (90)				07:57		08:55 (131)
	20:52			20:11	24	08:05 (80)				18:34	51	10:22 (131)				17:19	65	10:00 (131)
Potential sun hours	456			426			374			346			300			291		
Total, worst case		721			71			678			447			1832			2029	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.68			0.66			0.66			0.62			0.61			0.61	
Total reduction		0.41			0.39			0.40			0.35			0.22			0.30	
Total, real		293			28			272			155			409			611	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 3

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
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Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 340 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5530)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:43 (131)	07:44		08:49 (131)	07:10			07:20		07:42 (80)	06:36			06:08		06:34 (79)
	17:20	52	09:35 (131)	17:53	59	09:48 (131)	18:26			19:59	39	19:24 (86)	20:28			20:57	28	07:02 (79)
2	07:57		08:43 (131)	07:43		08:50 (131)	07:08			07:19		07:41 (80)	06:35			06:08		06:35 (79)
	17:21	53	09:36 (131)	17:54	57	09:47 (131)	18:27			20:00	29	08:10 (80)	20:29			20:58	28	07:03 (79)
3	07:57		08:43 (131)	07:43		08:51 (131)	07:07			07:17		07:41 (80)	06:33			06:07		06:35 (79)
	17:21	53	09:36 (131)	17:56	56	09:47 (131)	18:28			20:00	30	08:11 (80)	20:30			20:58	28	07:03 (79)
4	07:57		08:44 (131)	07:42		08:51 (131)	07:05			07:15		07:40 (80)	06:32			06:07		06:35 (79)
	17:22	53	09:37 (131)	17:57	56	09:47 (131)	18:29			20:01	30	08:10 (80)	20:31			20:59	27	07:02 (79)
5	07:57		08:44 (131)	07:40		08:52 (131)	07:03			07:14		07:39 (80)	06:31			06:07		06:36 (79)
	17:23	54	09:38 (131)	17:58	54	09:46 (131)	18:30			20:02	30	08:09 (80)	20:32			21:00	27	07:03 (79)
6	07:57		08:44 (131)	07:39		08:53 (131)	07:02			07:12		07:40 (80)	06:30			06:06		06:36 (79)
	17:24	55	09:39 (131)	17:59	52	09:45 (131)	18:32			20:03	29	08:09 (80)	20:33			21:00	27	07:03 (79)
7	07:57		08:44 (131)	07:38		08:54 (131)	07:00			07:11		07:40 (80)	06:29			06:06		06:37 (79)
	17:25	56	09:40 (131)	18:00	51	09:45 (131)	18:33			20:04	28	08:08 (80)	20:34			21:01	26	07:03 (79)
8	07:57		08:45 (131)	07:37		08:55 (131)	07:59			07:09		07:41 (80)	06:27			06:06		06:36 (79)
	17:26	55	09:40 (131)	18:02	49	09:44 (131)	19:34			20:05	27	08:08 (80)	20:35			21:02	26	07:02 (79)
9	07:57		08:45 (131)	07:36		08:56 (131)	07:57			07:07		07:41 (80)	06:26			06:06		06:37 (79)
	17:27	56	09:41 (131)	18:03	47	09:43 (131)	19:35			20:06	25	08:06 (80)	20:36			21:02	25	07:02 (79)
10	07:57		08:44 (131)	07:35		07:56 (90)	07:56			07:06		07:42 (80)	06:25			06:06		06:37 (79)
	17:28	57	09:41 (131)	18:04	53	09:42 (131)	19:36			20:07	23	08:05 (80)	20:37			21:03	25	07:02 (79)
11	07:57		08:45 (131)	07:34		07:53 (90)	07:54			07:04		07:42 (80)	06:24			06:05		06:38 (79)
	17:29	57	09:42 (131)	18:05	55	09:40 (131)	19:37			20:08	21	08:03 (80)	20:38			21:03	25	07:03 (79)
12	07:57		08:45 (131)	07:33		07:52 (90)	07:53			07:03		07:44 (80)	06:23		06:43 (79)	06:05		06:38 (79)
	17:30	58	09:43 (131)	18:06	55	09:38 (131)	19:38			20:09	17	08:01 (80)	20:39	9	06:52 (79)	21:04	25	07:03 (79)
13	07:56		08:45 (131)	07:31		07:51 (90)	07:51			07:01		07:46 (80)	06:22		06:42 (79)	06:05		06:39 (79)
	17:31	58	09:43 (131)	18:08	55	09:37 (131)	19:39			20:10	12	07:58 (80)	20:40	12	06:54 (79)	21:04	24	07:03 (79)
14	07:56		08:45 (131)	07:30		07:50 (90)	07:49			07:00			06:21		06:41 (79)	06:05		06:39 (79)
	17:32	59	09:44 (131)	18:09	53	09:35 (131)	19:40			20:11			20:41	15	06:56 (79)	21:05	24	07:03 (79)
15	07:56		08:46 (131)	07:29		07:48 (90)	07:48			06:58			06:20		06:40 (79)	06:05		06:40 (79)
	17:33	59	09:45 (131)	18:10	50	09:32 (131)	19:41			20:12			20:42	17	06:57 (79)	21:05	23	07:03 (79)
16	07:55		08:45 (131)	07:28		07:47 (90)	07:46			06:57			06:19		06:39 (79)	06:05		06:40 (79)
	17:34	60	09:45 (131)	18:11	46	09:29 (131)	19:42			20:13			20:43	19	06:58 (79)	21:06	23	07:03 (79)
17	07:55		08:46 (131)	07:26		07:47 (90)	07:45			06:55			06:18		06:39 (79)	06:05		06:40 (79)
	17:36	60	09:46 (131)	18:12	35	09:24 (131)	19:43			20:14			20:44	20	06:59 (79)	21:06	23	07:03 (79)
18	07:54		08:46 (131)	07:25		07:46 (90)	07:43			06:54			06:17		06:38 (79)	06:05		06:40 (79)
	17:37	60	09:46 (131)	18:14	26	08:12 (90)	19:44			20:15			20:45	22	07:00 (79)	21:06	23	07:03 (79)
19	07:54		08:46 (131)	07:24		07:46 (90)	07:41		19:17 (86)	06:52			06:17		06:37 (79)	06:05		06:40 (79)
	17:38	61	09:47 (131)	18:15	26	08:12 (90)	19:45	7	19:24 (86)	20:16			20:46	23	07:00 (79)	21:07	23	07:03 (79)
20	07:53		08:46 (131)	07:22		07:47 (90)	07:40		19:14 (86)	06:51			06:16		06:36 (79)	06:06		06:40 (79)
	17:39	61	09:47 (131)	18:16	25	08:12 (90)	19:46	11	19:25 (86)	20:17			20:47	24	07:00 (79)	21:07	23	07:03 (79)
21	07:53		08:46 (131)	07:21		07:46 (90)	07:38		19:13 (86)	06:49			06:15		06:35 (79)	06:06		06:41 (79)
	17:40	61	09:47 (131)	18:17	25	08:11 (90)	19:47	14	19:27 (86)	20:18			20:48	26	07:01 (79)	21:07	23	07:04 (79)
22	07:52		08:47 (131)	07:20		07:47 (90)	07:36		19:11 (86)	06:48			06:14		06:35 (79)	06:06		06:41 (79)
	17:41	61	09:48 (131)	18:18	24	08:11 (90)	19:48	16	19:27 (86)	20:19			20:49	27	07:02 (79)	21:07	23	07:04 (79)
23	07:52		08:47 (131)	07:18		07:47 (90)	07:35		19:10 (86)	06:46			06:13		06:34 (79)	06:06		06:41 (79)
	17:42	61	09:48 (131)	18:19	23	08:10 (90)	19:49	18	19:28 (86)	20:20			20:49	28	07:02 (79)	21:08	23	07:04 (79)
24	07:51		08:47 (131)	07:17		07:49 (90)	07:33		19:10 (86)	06:45			06:13		06:33 (79)	06:06		06:41 (79)
	17:44	61	09:48 (131)	18:20	20	08:09 (90)	19:50	20	19:30 (86)	20:21			20:50	28	07:01 (79)	21:08	23	07:04 (79)
25	07:50		08:47 (131)	07:15		07:50 (90)	07:32		19:09 (86)	06:44			06:12		06:34 (79)	06:07		06:42 (79)
	17:45	61	09:48 (131)	18:22	18	08:08 (90)	19:51	21	19:30 (86)	20:22			20:51	28	07:02 (79)	21:08	23	07:05 (79)
26	07:49		08:48 (131)	07:14		07:51 (90)	07:30		07:52 (80)	06:42			06:11		06:33 (79)	06:07		06:42 (79)
	17:46	61	09:49 (131)	18:23	15	08:06 (90)	19:53	35	19:32 (86)	20:23			20:52	29	07:02 (79)	21:08	23	07:05 (79)
27	07:49		08:48 (131)	07:12		07:55 (90)	07:28		07:49 (80)	06:41			06:11		06:34 (79)	06:07		06:42 (79)
	17:47	61	09:49 (131)	18:24	8	08:03 (90)	19:54	40	19:31 (86)	20:24			20:53	29	07:03 (79)	21:08	23	07:05 (79)
28	07:48		08:48 (131)	07:11			07:27		07:46 (80)	06:40			06:10		06:33 (79)	06:08		06:42 (79)
	17:48	61	09:49 (131)	18:25			19:55	43	19:30 (86)	20:25			20:54	29	07:02 (79)	21:08	24	07:06 (79)
29	07:47		08:48 (131)				07:25		07:45 (80)	06:38			06:10		06:34 (79)	06:08		06:42 (79)
	17:50	61	09:49 (131)				19:56	44	19:30 (86)	20:26			20:54	29	07:03 (79)	21:08	24	07:06 (79)
30	07:46		08:49 (131)				07:23		07:44 (80)	06:37			06:09		06:34 (79)	06:09		06:43 (79)
	17:51	59	09:48 (131)				19:57	44	19:28 (86)	20:27			20:55	28	07:02 (79)	21:08	24	07:07 (79)
31	07:45		08:49 (131)				07:22		07:42 (80)				06:09		06:34 (79)			
	17:52	59	09:48 (131)				19:58	43	19:26 (86)				20:56	29	07:03 (79)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		1804			1093			356			340			471			736	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.61			0.62			0.66			0.66			0.68			0.68	
Total reduction		0.22			0.26			0.29			0.34			0.38			0.41	
Total, real		392			280			103			114			179			299	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 4

Licensed user:
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217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 340 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5530)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:42 (79)	06:32		06:55 (79)	07:02		07:41 (80)	07:31			07:03		07:25 (90)	07:37		08:27 (131)
	21:08	25	07:07 (79)	20:51	6	07:01 (79)	20:09	21	08:02 (80)	19:18			17:33	52	09:11 (131)	17:10	57	09:24 (131)
2	06:10		06:43 (79)	06:33			07:03		07:40 (80)	07:32			07:05		08:26 (131)	07:38		08:27 (131)
	21:08	25	07:08 (79)	20:50			20:08	23	08:03 (80)	19:17			17:32	47	09:13 (131)	17:10	57	09:24 (131)
3	06:10		06:42 (79)	06:34			07:04		07:39 (80)	07:33			07:06		08:24 (131)	07:39		08:28 (131)
	21:08	25	07:07 (79)	20:49			20:06	25	08:04 (80)	19:15			17:31	50	09:14 (131)	17:10	56	09:24 (131)
4	06:11		06:43 (79)	06:35			07:05		07:38 (80)	07:34			07:07		08:23 (131)	07:40		08:29 (131)
	21:08	25	07:08 (79)	20:48			20:05	27	08:05 (80)	19:14			17:30	52	09:15 (131)	17:10	55	09:24 (131)
5	06:11		06:42 (79)	06:36			07:06		07:37 (80)	07:35			07:08		08:23 (131)	07:41		08:29 (131)
	21:08	26	07:08 (79)	20:46			20:03	28	08:05 (80)	19:12			17:29	52	09:15 (131)	17:09	56	09:25 (131)
6	06:12		06:43 (79)	06:37			07:07		07:36 (80)	07:36			07:09		08:22 (131)	07:42		08:30 (131)
	21:07	26	07:09 (79)	20:45			20:01	29	08:05 (80)	19:10			17:28	54	09:16 (131)	17:09	55	09:25 (131)
7	06:12		06:42 (79)	06:38			07:08		07:35 (80)	07:37			07:10		08:22 (131)	07:43		08:31 (131)
	21:07	27	07:09 (79)	20:44			20:00	30	08:05 (80)	19:09			17:27	56	09:18 (131)	17:09	54	09:25 (131)
8	06:13		06:42 (79)	06:39			07:09		07:34 (80)	07:38			07:11		08:21 (131)	07:44		08:32 (131)
	21:07	27	07:09 (79)	20:43			19:56	30	08:04 (80)	19:07			17:25	57	09:18 (131)	17:09	53	09:25 (131)
9	06:14		06:43 (79)	06:40			07:09		07:34 (80)	07:39			07:13		08:21 (131)	07:45		08:32 (131)
	21:07	27	07:10 (79)	20:42			19:55	30	08:04 (80)	19:06			17:24	57	09:18 (131)	17:09	54	09:26 (131)
10	06:14		06:42 (79)	06:41			07:10		07:34 (80)	07:40			07:14		08:20 (131)	07:46		08:33 (131)
	21:06	28	07:10 (79)	20:41			19:53	29	08:03 (80)	19:04			17:23	59	09:19 (131)	17:09	53	09:26 (131)
11	06:15		06:42 (79)	06:42			07:11		07:34 (80)	07:41			07:15		08:21 (131)	07:46		08:33 (131)
	21:06	28	07:10 (79)	20:39			19:52	39	19:16 (86)	19:03			17:23	59	09:20 (131)	17:09	52	09:25 (131)
12	06:16		06:43 (79)	06:43			07:12		07:34 (80)	07:42			07:16		08:21 (131)	07:47		08:34 (131)
	21:05	28	07:11 (79)	20:38			19:50	42	19:18 (86)	19:01			17:22	59	09:20 (131)	17:10	52	09:26 (131)
13	06:16		06:42 (79)	06:44			07:13		07:35 (80)	07:43			07:17		08:20 (131)	07:48		08:35 (131)
	21:05	29	07:11 (79)	20:37			19:48	43	19:19 (86)	18:59			17:21	60	09:20 (131)	17:10	51	09:26 (131)
14	06:17		06:42 (79)	06:45			07:14		07:35 (80)	07:44			07:18		08:20 (131)	07:49		08:36 (131)
	21:05	29	07:11 (79)	20:35			19:47	45	19:20 (86)	18:58			17:20	61	09:21 (131)	17:10	51	09:27 (131)
15	06:18		06:43 (79)	06:46			07:15		07:36 (80)	07:45		08:26 (90)	07:20		08:21 (131)	07:50		08:36 (131)
	21:04	29	07:12 (79)	20:34			19:45	43	19:20 (86)	18:56	11	08:37 (90)	17:19	61	09:22 (131)	17:10	50	09:26 (131)
16	06:19		06:42 (79)	06:47			07:16		07:38 (80)	07:46		08:23 (90)	07:21		08:21 (131)	07:50		08:37 (131)
	21:03	29	07:11 (79)	20:33			19:43	41	19:21 (86)	18:55	16	08:39 (90)	17:18	61	09:22 (131)	17:10	50	09:27 (131)
17	06:19		06:43 (79)	06:48			07:17		07:40 (80)	07:47		08:21 (90)	07:22		08:21 (131)	07:51		08:37 (131)
	21:03	28	07:11 (79)	20:31			19:42	36	19:20 (86)	18:53	19	08:40 (90)	17:17	61	09:22 (131)	17:11	51	09:28 (131)
18	06:20		06:43 (79)	06:49			07:18		07:44 (80)	07:48		08:20 (90)	07:23		08:21 (131)	07:52		08:37 (131)
	21:02	29	07:12 (79)	20:30			19:40	26	19:19 (86)	18:52	21	08:41 (90)	17:17	61	09:22 (131)	17:11	50	09:27 (131)
19	06:21		06:43 (79)	06:49			07:19		18:57 (86)	07:49		08:19 (90)	07:24		08:21 (131)	07:52		08:38 (131)
	21:02	29	07:12 (79)	20:29			19:38	20	19:17 (86)	18:51	23	08:42 (90)	17:16	61	09:22 (131)	17:11	50	09:28 (131)
20	06:22		06:44 (79)	06:50			07:20		18:56 (86)	07:50		08:18 (90)	07:25		08:22 (131)	07:53		08:38 (131)
	21:01	28	07:12 (79)	20:27			19:37	19	19:15 (86)	18:49	24	08:42 (90)	17:15	61	09:23 (131)	17:12	50	09:28 (131)
21	06:23		06:44 (79)	06:51			07:21		18:57 (86)	07:51		08:17 (90)	07:26		08:22 (131)	07:53		08:39 (131)
	21:00	27	07:11 (79)	20:26			19:35	16	19:13 (86)	18:48	25	08:42 (90)	17:15	61	09:23 (131)	17:12	50	09:29 (131)
22	06:23		06:45 (79)	06:52			07:22		18:57 (86)	07:52		08:16 (90)	07:28		08:22 (131)	07:54		08:39 (131)
	21:00	26	07:11 (79)	20:24			19:33	14	19:11 (86)	18:46	26	08:42 (90)	17:14	61	09:23 (131)	17:13	50	09:29 (131)
23	06:24		06:46 (79)	06:53			07:23		18:58 (86)	07:53		08:17 (90)	07:29		08:22 (131)	07:54		08:40 (131)
	20:59	25	07:11 (79)	20:23			19:32	12	19:10 (86)	18:45	26	08:43 (90)	17:14	61	09:23 (131)	17:13	50	09:30 (131)
24	06:25		06:47 (79)	06:54			07:24		19:00 (86)	07:54		08:17 (90)	07:30		08:23 (131)	07:55		08:40 (131)
	20:58	24	07:11 (79)	20:21			19:30	8	19:08 (86)	18:44	26	08:43 (90)	17:13	60	09:23 (131)	17:14	50	09:30 (131)
25	06:26		06:48 (79)	06:55			07:25		19:03 (86)	07:56		08:17 (90)	07:31		08:23 (131)	07:55		08:41 (131)
	20:57	23	07:11 (79)	20:20			19:28	3	19:06 (86)	18:42	38	09:55 (131)	17:12	60	09:23 (131)	17:14	50	09:31 (131)
26	06:27		06:49 (79)	06:56			07:26			07:57		08:17 (90)	07:32		08:24 (131)	07:56		08:41 (131)
	20:56	21	07:10 (79)	20:18			19:27			18:41	46	09:59 (131)	17:12	60	09:24 (131)	17:15	50	09:31 (131)
27	06:28		06:49 (79)	06:57			07:27			07:58		08:18 (90)	07:33		08:25 (131)	07:56		08:42 (131)
	20:55	20	07:09 (79)	20:17			19:25			18:40	51	10:02 (131)	17:12	59	09:24 (131)	17:16	50	09:32 (131)
28	06:29		06:50 (79)	06:58			07:28			07:59		08:19 (90)	07:34		08:25 (131)	07:56		08:43 (131)
	20:55	18	07:08 (79)	20:15			19:23			18:38	52	10:04 (131)	17:11	59	09:24 (131)	17:16	50	09:33 (131)
29	06:30		06:51 (79)	06:59			07:29			08:00		08:21 (90)	07:35		08:26 (131)	07:56		08:43 (131)
	20:54	16	07:07 (79)	20:14			19:22			18:37	54	10:07 (131)	17:11	58	09:24 (131)	17:17	50	09:33 (131)
30	06:31		06:52 (79)	07:00		07:46 (80)	07:30			08:01		08:22 (90)	07:36		08:26 (131)	07:57		08:43 (131)
	20:53	14	07:06 (79)	20:12	12	07:58 (80)	19:20			18:36	56	10:09 (131)	17:10	58	09:24 (131)	17:18	51	09:34 (131)
31	06:31		06:53 (79)	07:01		07:43 (80)				08:02		08:23 (90)				07:57		08:43 (131)
	20:52	11	07:04 (79)	20:11	18	08:01 (80)				18:34	56	10:10 (131)				17:19	51	09:34 (131)
Potential sun hours	456			426			374			346			300			291		
Total, worst case		772			36			679			570			1738			1609	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.68			0.67			0.66			0.62			0.61			0.61	
Total reduction		0.41			0.40			0.40			0.35			0.22			0.30	
Total, real		314			14			272			197			388			485	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 341 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5531)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:33 (131)	07:44		08:40 (131)	07:10			07:20		07:51 (80)	06:36		06:55 (79)	06:08		
	17:20	40	09:13 (131)	17:53	45	09:25 (131)	18:26			19:59	22	08:13 (80)	20:28	13	07:08 (79)	20:57		
2	07:57		08:33 (131)	07:43		08:41 (131)	07:08			07:19		07:51 (80)	06:35		06:54 (79)	06:08		
	17:21	41	09:14 (131)	17:54	44	09:25 (131)	18:27			20:00	20	08:11 (80)	20:29	16	07:10 (79)	20:58		
3	07:57		08:34 (131)	07:43		08:42 (131)	07:07			07:17		07:53 (80)	06:33		06:53 (79)	06:07		
	17:21	41	09:15 (131)	17:56	42	09:24 (131)	18:28			20:00	17	08:10 (80)	20:30	18	07:11 (79)	20:58		
4	07:57		08:34 (131)	07:42		08:43 (131)	07:05			07:15		07:55 (80)	06:32		06:52 (79)	06:07		
	17:22	41	09:15 (131)	17:57	40	09:23 (131)	18:29			20:01	12	08:07 (80)	20:31	19	07:11 (79)	20:59		
5	07:57		08:34 (131)	07:40		08:44 (131)	07:03			07:14		07:59 (80)	06:31		06:50 (79)	06:07		
	17:23	42	09:16 (131)	17:58	39	09:23 (131)	18:30			20:02	2	08:01 (80)	20:32	21	07:11 (79)	21:00		
6	07:57		08:34 (131)	07:39		08:45 (131)	07:02			07:12			06:30		06:49 (79)	06:06		
	17:24	43	09:17 (131)	17:59	37	09:22 (131)	18:32			20:03			20:33	23	07:12 (79)	21:00		
7	07:57		08:34 (131)	07:38		08:47 (131)	07:00			07:11			06:29		06:48 (79)	06:06		
	17:25	44	09:18 (131)	18:00	34	09:21 (131)	18:33			20:04			20:34	24	07:12 (79)	21:01		
8	07:57		08:35 (131)	07:37		07:57 (90)	07:59			07:09			06:27		06:47 (79)	06:06		
	17:26	44	09:19 (131)	18:02	37	09:19 (131)	19:34			20:05			20:35	25	07:12 (79)	21:02		
9	07:57		08:35 (131)	07:36		07:56 (90)	07:57			07:07			06:26		06:46 (79)	06:06		
	17:27	45	09:20 (131)	18:03	38	09:18 (131)	19:35			20:06			20:36	26	07:12 (79)	21:02		
10	07:57		08:34 (131)	07:35		07:55 (90)	07:56			07:06			06:25		06:46 (79)	06:06		
	17:28	46	09:20 (131)	18:04	36	09:16 (131)	19:36			20:07			20:37	26	07:12 (79)	21:03		
11	07:57		08:35 (131)	07:34		07:53 (90)	07:54			07:04			06:24		06:46 (79)	06:05		
	17:29	46	09:21 (131)	18:05	32	09:12 (131)	19:37			20:08			20:38	26	07:12 (79)	21:03		
12	07:57		08:35 (131)	07:33		07:52 (90)	07:53			07:03			06:23		06:46 (79)	06:05		
	17:30	46	09:21 (131)	18:06	25	09:07 (131)	19:38			20:09			20:39	26	07:12 (79)	21:04		
13	07:56		08:34 (131)	07:31		07:51 (90)	07:51		19:11 (86)	07:01			06:22		06:46 (79)	06:05		
	17:31	47	09:21 (131)	18:08	20	08:11 (90)	19:39	7	19:18 (86)	20:10			20:40	25	07:11 (79)	21:04		
14	07:56		08:35 (131)	07:30		07:50 (90)	07:49		19:07 (86)	07:00			06:21		06:47 (79)	06:05		
	17:32	47	09:22 (131)	18:09	21	08:11 (90)	19:40	12	19:19 (86)	20:11			20:41	24	07:11 (79)	21:05		
15	07:56		08:36 (131)	07:29		07:48 (90)	07:48		19:06 (86)	06:58			06:20		06:47 (79)	06:05		
	17:33	47	09:23 (131)	18:10	23	08:11 (90)	19:41	15	19:21 (86)	20:12			20:42	23	07:10 (79)	21:05		
16	07:55		08:35 (131)	07:28		07:48 (90)	07:46		19:04 (86)	06:57			06:19		06:47 (79)	06:05		
	17:34	48	09:23 (131)	18:11	23	08:11 (90)	19:42	17	19:21 (86)	20:13			20:43	23	07:10 (79)	21:06		
17	07:55		08:36 (131)	07:26		07:48 (90)	07:45		19:03 (86)	06:55			06:18		06:49 (79)	06:05		
	17:36	49	09:25 (131)	18:12	23	08:11 (90)	19:43	19	19:22 (86)	20:14			20:44	21	07:10 (79)	21:06		
18	07:54		08:35 (131)	07:25		07:48 (90)	07:43		19:02 (86)	06:54			06:17		06:50 (79)	06:05		
	17:37	50	09:25 (131)	18:14	23	08:11 (90)	19:44	22	19:24 (86)	20:15			20:45	19	07:09 (79)	21:06		
19	07:54		08:36 (131)	07:24		07:48 (90)	07:41		08:03 (80)	06:52			06:17		06:50 (79)	06:05		
	17:38	50	09:26 (131)	18:15	22	08:10 (90)	19:45	29	19:24 (86)	20:16			20:46	18	07:08 (79)	21:07		
20	07:53		08:36 (131)	07:22		07:49 (90)	07:40		07:58 (80)	06:51			06:16		06:51 (79)	06:06		
	17:39	50	09:26 (131)	18:16	21	08:10 (90)	19:46	39	19:25 (86)	20:17			20:47	16	07:07 (79)	21:07		
21	07:53		08:36 (131)	07:21		07:50 (90)	07:38		07:57 (80)	06:49			06:15		06:52 (79)	06:06		
	17:40	49	09:25 (131)	18:17	18	08:08 (90)	19:47	43	19:26 (86)	20:18			20:48	13	07:05 (79)	21:07		
22	07:52		08:37 (131)	07:20		07:51 (90)	07:36		07:55 (80)	06:48			06:14		06:55 (79)	06:06		
	17:41	49	09:26 (131)	18:18	16	08:07 (90)	19:48	46	19:25 (86)	20:19			20:49	9	07:04 (79)	21:07		
23	07:52		08:37 (131)	07:18		07:52 (90)	07:35		07:53 (80)	06:46			06:13		06:59 (79)	06:06		
	17:42	49	09:26 (131)	18:19	13	08:05 (90)	19:49	47	19:24 (86)	20:20			20:49	2	07:00 (79)	21:08		
24	07:51		08:37 (131)	07:17		07:56 (90)	07:33		07:52 (80)	06:45			06:13			06:06		
	17:44	49	09:26 (131)	18:20	6	08:02 (90)	19:50	47	19:23 (86)	20:21			20:50			21:08		
25	07:50		08:37 (131)	07:15			07:32		07:51 (80)	06:44			06:12			06:07		
	17:45	49	09:26 (131)	18:22			19:52	47	19:22 (86)	20:22			20:51			21:08		
26	07:49		08:38 (131)	07:14			07:30		07:51 (80)	06:42			06:11			06:07		
	17:46	49	09:27 (131)	18:23			19:53	45	19:21 (86)	20:23			20:52			21:08		
27	07:49		08:38 (131)	07:12			07:28		07:50 (80)	06:41			06:11			06:07		
	17:47	49	09:27 (131)	18:24			19:54	41	19:18 (86)	20:24			20:53			21:08		
28	07:48		08:39 (131)	07:11			07:27		07:49 (80)	06:40			06:10			06:08		
	17:48	48	09:27 (131)	18:25			19:55	34	19:14 (86)	20:25			20:54			21:08		
29	07:47		08:39 (131)				07:25		07:50 (80)	06:38		06:58 (79)	06:10			06:08		
	17:50	47	09:26 (131)				19:56	26	08:16 (80)	20:26	6	07:04 (79)	20:54			21:08		
30	07:46		08:39 (131)				07:23		07:50 (80)	06:37		06:56 (79)	06:09			06:09		
	17:51	47	09:26 (131)				19:57	25	08:15 (80)	20:27	10	07:06 (79)	20:55			21:08		
31	07:45		08:40 (131)				07:22		07:50 (80)				06:09					
	17:52	46	09:26 (131)				19:58	24	08:14 (80)				20:56					
Potential sun hours	300			299			370			397			446			449		
Total, worst case		1438			678			585			89			456				
Sun reduction		0.36			0.42			0.44			0.51			0.56				
Oper. time red.		1.00			1.00			1.00			1.00			1.00				
Wind dir. red.		0.61			0.62			0.66			0.66			0.68				
Total reduction		0.22			0.26			0.29			0.33			0.38				
Total, real		312			174			169			30			172				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 6

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 341 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5531)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09			06:32		06:57 (79)	07:02			07:31			07:03		07:24 (90)	07:37		08:17 (131)
	21:08			20:51	25	07:22 (79)	20:09			19:18			17:33	36	08:45 (131)	17:10	46	09:03 (131)
2	06:10			06:33		06:57 (79)	07:03			07:32			07:05		07:26 (90)	07:38		08:17 (131)
	21:08			20:50	26	07:23 (79)	20:08			19:17			17:32	37	08:48 (131)	17:10	46	09:03 (131)
3	06:10			06:34		06:57 (79)	07:04			07:33			07:06		07:27 (90)	07:39		08:18 (131)
	21:08			20:49	26	07:23 (79)	20:06			19:15			17:31	36	08:49 (131)	17:10	45	09:03 (131)
4	06:11			06:35		06:57 (79)	07:05			07:34			07:07		08:16 (131)	07:40		08:19 (131)
	21:08			20:48	26	07:23 (79)	20:05			19:14			17:30	35	08:51 (131)	17:10	44	09:03 (131)
5	06:11			06:36		06:57 (79)	07:06			07:35			07:08		08:15 (131)	07:41		08:19 (131)
	21:08			20:46	25	07:22 (79)	20:03			19:12			17:29	37	08:52 (131)	17:09	44	09:03 (131)
6	06:12			06:37		06:58 (79)	07:07			07:36			07:09		08:14 (131)	07:42		08:20 (131)
	21:07			20:45	23	07:21 (79)	20:01			19:10			17:28	39	08:53 (131)	17:09	43	09:03 (131)
7	06:12			06:38		06:59 (79)	07:08			07:37			07:10		08:14 (131)	07:43		08:21 (131)
	21:07			20:44	22	07:21 (79)	20:00			19:09			17:27	40	08:54 (131)	17:09	42	09:03 (131)
8	06:13			06:39		07:00 (79)	07:09		07:49 (80)	07:38			07:11		08:13 (131)	07:44		08:22 (131)
	21:07			20:43	21	07:21 (79)	19:56	12	08:01 (80)	19:07			17:25	42	08:55 (131)	17:09	41	09:03 (131)
9	06:14			06:40		07:01 (79)	07:09		07:46 (80)	07:39			07:13		08:12 (131)	07:45		08:23 (131)
	21:07			20:42	19	07:20 (79)	19:55	17	08:03 (80)	19:06			17:24	44	08:56 (131)	17:09	41	09:04 (131)
10	06:14			06:41		07:02 (79)	07:10		07:45 (80)	07:40			07:14		08:11 (131)	07:46		08:23 (131)
	21:06			20:41	17	07:19 (79)	19:53	19	08:04 (80)	19:04			17:23	45	08:56 (131)	17:09	41	09:04 (131)
11	06:15			06:42		07:03 (79)	07:11		07:43 (80)	07:41			07:15		08:12 (131)	07:46		08:23 (131)
	21:06			20:39	15	07:18 (79)	19:52	22	08:05 (80)	19:03			17:23	46	08:58 (131)	17:09	40	09:03 (131)
12	06:16			06:43		07:04 (79)	07:12		07:42 (80)	07:42			07:16		08:11 (131)	07:47		08:24 (131)
	21:05			20:38	12	07:16 (79)	19:50	24	08:06 (80)	19:01			17:22	47	08:58 (131)	17:10	40	09:04 (131)
13	06:16			06:44		07:05 (79)	07:13		07:41 (80)	07:43			07:17		08:11 (131)	07:48		08:25 (131)
	21:05			20:37	9	07:14 (79)	19:48	25	08:06 (80)	18:59			17:21	47	08:58 (131)	17:10	39	09:04 (131)
14	06:17			06:45		07:06 (79)	07:14		07:40 (80)	07:44			07:18		08:10 (131)	07:49		08:26 (131)
	21:05			20:35	5	07:11 (79)	19:47	27	08:07 (80)	18:58			17:20	49	08:59 (131)	17:10	39	09:05 (131)
15	06:18			06:46			07:15		07:40 (80)	07:45			07:20		08:11 (131)	07:50		08:26 (131)
	21:04			20:34			19:45	31	19:03 (86)	18:56			17:19	49	09:00 (131)	17:10	38	09:04 (131)
16	06:19			06:47			07:16		07:39 (80)	07:46			07:21		08:11 (131)	07:50		08:27 (131)
	21:03			20:33			19:43	40	19:07 (86)	18:55			17:18	49	09:00 (131)	17:10	38	09:05 (131)
17	06:19			06:48			07:17		07:39 (80)	07:47			07:22		08:11 (131)	07:51		08:28 (131)
	21:03			20:31			19:42	44	19:09 (86)	18:53			17:17	49	09:00 (131)	17:11	37	09:05 (131)
18	06:20			06:49			07:18		07:39 (80)	07:48		08:26 (90)	07:23		08:11 (131)	07:52		08:28 (131)
	21:02			20:30			19:40	46	19:10 (86)	18:52	9	08:35 (90)	17:17	49	09:00 (131)	17:11	37	09:05 (131)
19	06:21			06:49			07:19		07:39 (80)	07:49		08:23 (90)	07:24		08:11 (131)	07:52		08:29 (131)
	21:02			20:29			19:38	47	19:10 (86)	18:51	14	08:37 (90)	17:16	49	09:00 (131)	17:11	37	09:06 (131)
20	06:22			06:50			07:20		07:39 (80)	07:50		08:21 (90)	07:25		08:12 (131)	07:53		08:29 (131)
	21:01			20:27			19:37	46	19:10 (86)	18:49	17	08:38 (90)	17:15	49	09:01 (131)	17:12	37	09:06 (131)
21	06:23		07:06 (79)	06:51			07:21		07:40 (80)	07:51		08:20 (90)	07:26		08:12 (131)	07:53		08:30 (131)
	21:00	6	07:12 (79)	20:26			19:35	45	19:10 (86)	18:48	19	08:39 (90)	17:15	49	09:01 (131)	17:12	37	09:07 (131)
22	06:23		07:04 (79)	06:52			07:22		07:41 (80)	07:52		08:19 (90)	07:28		08:12 (131)	07:54		08:30 (131)
	21:00	10	07:14 (79)	20:24			19:33	44	19:10 (86)	18:46	21	08:40 (90)	17:14	50	09:02 (131)	17:13	37	09:07 (131)
23	06:24		07:02 (79)	06:53			07:23		07:42 (80)	07:53		08:19 (90)	07:29		08:12 (131)	07:54		08:31 (131)
	20:59	14	07:16 (79)	20:23			19:32	40	19:10 (86)	18:45	22	08:41 (90)	17:14	50	09:02 (131)	17:13	37	09:08 (131)
24	06:25		07:01 (79)	06:54			07:24		07:45 (80)	07:54		08:18 (90)	07:30		08:13 (131)	07:55		08:31 (131)
	20:58	17	07:18 (79)	20:21			19:30	32	19:08 (86)	18:44	23	08:41 (90)	17:13	49	09:02 (131)	17:14	37	09:08 (131)
25	06:26		07:00 (79)	06:55			07:25		18:45 (86)	07:56		08:18 (90)	07:31		08:13 (131)	07:55		08:32 (131)
	20:57	19	07:19 (79)	20:20			19:28	21	19:06 (86)	18:42	23	08:41 (90)	17:12	49	09:02 (131)	17:15	37	09:09 (131)
26	06:27		07:00 (79)	06:56			07:26		18:45 (86)	07:57		08:18 (90)	07:32		08:14 (131)	07:56		08:32 (131)
	20:56	20	07:20 (79)	20:18			19:27	20	19:05 (86)	18:41	23	08:41 (90)	17:12	49	09:03 (131)	17:15	37	09:09 (131)
27	06:28		06:58 (79)	06:57			07:27		18:45 (86)	07:58		08:18 (90)	07:33		08:15 (131)	07:56		08:32 (131)
	20:55	22	07:20 (79)	20:17			19:25	18	19:03 (86)	18:40	23	08:41 (90)	17:12	48	09:03 (131)	17:16	38	09:10 (131)
28	06:29		06:58 (79)	06:58			07:28		18:46 (86)	07:59		08:19 (90)	07:34		08:15 (131)	07:56		08:33 (131)
	20:55	23	07:21 (79)	20:15			19:23	16	19:02 (86)	18:38	21	08:40 (90)	17:11	48	09:03 (131)	17:16	38	09:11 (131)
29	06:30		06:57 (79)	06:59			07:29		18:47 (86)	08:00		08:21 (90)	07:35		08:16 (131)	07:56		08:33 (131)
	20:54	24	07:21 (79)	20:14			19:22	13	19:00 (86)	18:37	19	08:40 (90)	17:11	47	09:03 (131)	17:17	38	09:11 (131)
30	06:31		06:57 (79)	07:00			07:30		18:49 (86)	08:01		08:22 (90)	07:36		08:16 (131)	07:57		08:33 (131)
	20:53	25	07:22 (79)	20:12			19:20	9	18:58 (86)	18:36	27	09:38 (131)	17:10	47	09:03 (131)	17:18	39	09:12 (131)
31	06:31		06:57 (79)	07:01						08:02		08:23 (90)				07:57		08:33 (131)
	20:52	25	07:22 (79)	20:11						18:34	33	09:42 (131)				17:19	39	09:12 (131)
Potential sun hours	456			426			374			346			300			291		
Total, worst case	205			271			658			294			1360			1229		
Sun reduction	0.60			0.60			0.61			0.56			0.37			0.50		
Oper. time red.	1.00			1.00			1.00			1.00			1.00			1.00		
Wind dir. red.	0.68			0.68			0.66			0.63			0.61			0.61		
Total reduction	0.40			0.40			0.40			0.35			0.22			0.30		
Total, real	83			109			263			103			304			371		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 7

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
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Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 342 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5532)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57			07:44		08:23 (131)	07:10		07:45 (90)	07:20		07:40 (80)	06:36			06:08		06:44 (79)
	17:20			17:53	50	09:13 (131)	18:26	12	07:57 (90)	19:59	45	19:27 (86)	20:28			20:57	15	06:59 (79)
2	07:57			07:43		08:23 (131)	07:08		07:48 (90)	07:19		07:39 (80)	06:35			06:08		06:45 (79)
	17:21			17:54	50	09:13 (131)	18:27	4	07:52 (90)	20:00	43	19:25 (86)	20:29			20:58	14	06:59 (79)
3	07:57			07:43		08:23 (131)	07:07			07:17		07:39 (80)	06:33			06:07		06:47 (79)
	17:21			17:56	51	09:14 (131)	18:28			20:00	38	19:23 (86)	20:30			20:58	11	06:58 (79)
4	07:57			07:42		08:23 (131)	07:05			07:15		07:39 (80)	06:32			06:07		06:47 (79)
	17:22			17:57	51	09:14 (131)	18:29			20:01	26	08:05 (80)	20:31			20:59	10	06:57 (79)
5	07:57			07:40		08:23 (131)	07:03			07:14		07:38 (80)	06:31			06:07		06:49 (79)
	17:23			17:58	51	09:14 (131)	18:30			20:02	26	08:04 (80)	20:32			21:00	7	06:56 (79)
6	07:57			07:39		08:23 (131)	07:02			07:12		07:39 (80)	06:30			06:06		
	17:24			17:59	51	09:14 (131)	18:32			20:03	25	08:04 (80)	20:33			21:00		
7	07:57			07:38		08:23 (131)	07:00			07:11		07:39 (80)	06:29		06:48 (79)	06:06		
	17:25			18:00	51	09:14 (131)	18:33			20:04	24	08:03 (80)	20:34	8	06:56 (79)	21:01		
8	07:57			07:37		08:24 (131)	07:59			07:09		07:40 (80)	06:27		06:47 (79)	06:06		
	17:26			18:02	51	09:15 (131)	19:34			20:05	22	08:02 (80)	20:35	11	06:58 (79)	21:02		
9	07:57			07:36		08:24 (131)	07:57			07:07		07:40 (80)	06:26		06:46 (79)	06:06		
	17:27			18:03	51	09:15 (131)	19:35			20:06	20	08:00 (80)	20:36	13	06:59 (79)	21:02		
10	07:57			07:35		08:24 (131)	07:56			07:06		07:42 (80)	06:25		06:45 (79)	06:06		
	17:28			18:04	51	09:15 (131)	19:36			20:07	17	07:59 (80)	20:37	16	07:01 (79)	21:03		
11	07:57			07:34		08:24 (131)	07:54			07:04		07:44 (80)	06:24		06:44 (79)	06:05		
	17:29			18:05	49	09:13 (131)	19:37			20:08	12	07:56 (80)	20:38	17	07:01 (79)	21:03		
12	07:57			07:33		08:25 (131)	07:53			07:03		07:48 (80)	06:23		06:43 (79)	06:05		
	17:30			18:06	48	09:13 (131)	19:38			20:09	3	07:51 (80)	20:39	19	07:02 (79)	21:04		
13	07:56		08:38 (131)	07:31		08:25 (131)	07:51			07:01			06:22		06:42 (79)	06:05		
	17:31	10	08:48 (131)	18:08	48	09:13 (131)	19:39			20:10			20:40	20	07:02 (79)	21:04		
14	07:56		08:36 (131)	07:30		08:26 (131)	07:49			07:00			06:21		06:41 (79)	06:05		
	17:32	16	08:52 (131)	18:09	47	09:13 (131)	19:40			20:11			20:41	22	07:03 (79)	21:05		
15	07:56		08:34 (131)	07:29		07:48 (90)	07:48			06:58			06:20		06:40 (79)	06:05		
	17:33	20	08:54 (131)	18:10	54	09:11 (131)	19:41			20:12			20:42	23	07:03 (79)	21:05		
16	07:55		08:32 (131)	07:28		07:47 (90)	07:46			06:57			06:19		06:39 (79)	06:05		
	17:34	24	08:56 (131)	18:11	55	09:10 (131)	19:42			20:13			20:43	24	07:03 (79)	21:06		
17	07:55		08:32 (131)	07:26		07:46 (90)	07:45			06:55			06:18		06:39 (79)	06:05		
	17:36	26	08:58 (131)	18:12	57	09:10 (131)	19:43			20:14			20:44	25	07:04 (79)	21:06		
18	07:54		08:30 (131)	07:25		07:44 (90)	07:43			06:54			06:17		06:38 (79)	06:05		
	17:37	29	08:59 (131)	18:14	56	09:08 (131)	19:44			20:15			20:45	26	07:04 (79)	21:06		
19	07:54		08:30 (131)	07:24		07:43 (90)	07:41		19:18 (86)	06:52			06:17		06:38 (79)	06:05		
	17:38	32	09:02 (131)	18:15	56	09:07 (131)	19:45	6	19:24 (86)	20:16			20:46	26	07:04 (79)	21:07		
20	07:53		08:29 (131)	07:22		07:42 (90)	07:40		19:14 (86)	06:51			06:16		06:38 (79)	06:06		
	17:39	34	09:03 (131)	18:16	54	09:05 (131)	19:46	11	19:25 (86)	20:17			20:47	25	07:03 (79)	21:07		
21	07:53		08:28 (131)	07:21		07:40 (90)	07:38		19:13 (86)	06:49			06:15		06:38 (79)	06:06		
	17:40	35	09:03 (131)	18:17	53	09:03 (131)	19:47	14	19:27 (86)	20:18			20:48	25	07:03 (79)	21:07		
22	07:52		08:28 (131)	07:20		07:40 (90)	07:36		19:10 (86)	06:48			06:14		06:39 (79)	06:06		
	17:41	37	09:05 (131)	18:18	49	09:01 (131)	19:48	17	19:27 (86)	20:19			20:49	25	07:04 (79)	21:07		
23	07:52		08:27 (131)	07:18		07:39 (90)	07:35		19:09 (86)	06:46			06:13		06:39 (79)	06:06		
	17:42	39	09:06 (131)	18:19	44	08:57 (131)	19:49	19	19:28 (86)	20:20			20:49	24	07:03 (79)	21:08		
24	07:51		08:26 (131)	07:17		07:40 (90)	07:33		19:08 (86)	06:45			06:13		06:39 (79)	06:06		
	17:44	41	09:07 (131)	18:20	34	08:53 (131)	19:50	22	19:30 (86)	20:21			20:50	23	07:02 (79)	21:08		
25	07:50		08:25 (131)	07:15		07:41 (90)	07:32		19:07 (86)	06:44			06:12		06:40 (79)	06:07		
	17:45	43	09:08 (131)	18:22	22	08:03 (90)	19:52	23	19:30 (86)	20:22			20:51	23	07:03 (79)	21:08		
26	07:49		08:26 (131)	07:14		07:41 (90)	07:30		07:51 (80)	06:42			06:11		06:40 (79)	06:07		
	17:46	43	09:09 (131)	18:23	20	08:01 (90)	19:53	34	19:32 (86)	20:23			20:52	22	07:02 (79)	21:08		
27	07:49		08:25 (131)	07:12		07:42 (90)	07:28		07:47 (80)	06:41			06:11		06:41 (79)	06:07		
	17:47	45	09:10 (131)	18:24	19	08:01 (90)	19:54	40	19:32 (86)	20:24			20:53	21	07:02 (79)	21:08		
28	07:48		08:25 (131)	07:11		07:43 (90)	07:27		07:45 (80)	06:40			06:10		06:41 (79)	06:08		
	17:48	46	09:11 (131)	18:25	16	07:59 (90)	19:55	43	19:31 (86)	20:25			20:54	20	07:01 (79)	21:08		
29	07:47		08:24 (131)				07:25		07:44 (80)	06:38			06:10		06:42 (79)	06:08		
	17:50	47	09:11 (131)				19:56	45	19:31 (86)	20:26			20:54	19	07:01 (79)	21:08		
30	07:46		08:24 (131)				07:23		07:42 (80)	06:37			06:09		06:42 (79)	06:09		
	17:51	48	09:12 (131)				19:57	46	19:30 (86)	20:27			20:55	18	07:00 (79)	21:08		
31	07:45		08:23 (131)				07:22		07:40 (80)				06:09		06:44 (79)			
	17:52	49	09:12 (131)				19:58	46	19:28 (86)				20:56	16	07:00 (79)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		664			1289			382			301			511			57	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.60			0.61			0.66			0.66			0.68			0.68	
Total reduction		0.21			0.25			0.29			0.34			0.38			0.41	
Total, real		143			327			110			101			193			23	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 8

Licensed user:
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US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 342 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5532)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December
1	06:09			06:32		06:54 (79)	07:02		07:42 (80)	07:31			07:03		07:53 (131)	07:37
	21:08			20:51	18	07:12 (79)	20:09	13	07:55 (80)	19:18			17:33	50	08:43 (131)	17:10
2	06:10			06:33		06:55 (79)	07:03		07:40 (80)	07:32			07:05		07:54 (131)	07:38
	21:08			20:50	17	07:12 (79)	20:08	17	07:57 (80)	19:17			17:32	50	08:44 (131)	17:10
3	06:10			06:34		06:56 (79)	07:04		07:38 (80)	07:33			07:06		07:53 (131)	07:39
	21:08			20:49	15	07:11 (79)	20:06	20	07:58 (80)	19:15			17:31	51	08:44 (131)	17:10
4	06:11			06:35		06:57 (79)	07:05		07:37 (80)	07:34			07:07		07:53 (131)	07:40
	21:08			20:48	13	07:10 (79)	20:05	22	07:59 (80)	19:14			17:30	51	08:44 (131)	17:10
5	06:11			06:36		06:57 (79)	07:06		07:36 (80)	07:35			07:08		07:53 (131)	07:41
	21:08			20:46	10	07:07 (79)	20:03	24	08:00 (80)	19:12			17:29	51	08:44 (131)	17:09
6	06:12			06:37		06:58 (79)	07:07		07:35 (80)	07:36			07:09		07:53 (131)	07:42
	21:07			20:45	7	07:05 (79)	20:01	25	08:00 (80)	19:10			17:28	51	08:44 (131)	17:09
7	06:12		06:56 (79)	06:38			07:08		07:34 (80)	07:37			07:10		07:54 (131)	07:43
	21:07	5	07:01 (79)	20:44			20:00	26	08:00 (80)	19:09			17:27	51	08:45 (131)	17:09
8	06:13		06:55 (79)	06:39			07:09		07:33 (80)	07:38			07:11		07:54 (131)	07:44
	21:07	8	07:03 (79)	20:43			19:56	26	07:59 (80)	19:07			17:25	50	08:44 (131)	17:09
9	06:14		06:54 (79)	06:40			07:09		07:32 (80)	07:39			07:13		07:54 (131)	07:45
	21:07	11	07:05 (79)	20:42			19:55	38	19:16 (86)	19:06			17:24	50	08:44 (131)	17:09
10	06:14		06:53 (79)	06:41			07:10		07:32 (80)	07:40			07:14		07:54 (131)	07:46
	21:06	13	07:06 (79)	20:41			19:53	42	19:18 (86)	19:04			17:23	50	08:44 (131)	17:09
11	06:15		06:52 (79)	06:42			07:11		07:32 (80)	07:41			07:15		07:55 (131)	07:46
	21:06	15	07:07 (79)	20:39			19:52	44	19:19 (86)	19:03			17:23	49	08:44 (131)	17:09
12	06:16		06:52 (79)	06:43			07:12		07:32 (80)	07:42		08:19 (90)	07:16		07:56 (131)	07:47
	21:05	16	07:08 (79)	20:38			19:50	47	19:20 (86)	19:01	9	08:28 (90)	17:22	48	08:44 (131)	17:10
13	06:16		06:51 (79)	06:44			07:13		07:33 (80)	07:43		08:16 (90)	07:17		07:56 (131)	07:48
	21:05	17	07:08 (79)	20:37			19:48	47	19:21 (86)	18:59	14	08:30 (90)	17:21	47	08:43 (131)	17:10
14	06:17		06:51 (79)	06:45			07:14		07:34 (80)	07:44		08:14 (90)	07:18		07:56 (131)	07:49
	21:05	18	07:09 (79)	20:35			19:47	45	19:21 (86)	18:58	18	08:32 (90)	17:20	47	08:43 (131)	17:10
15	06:18		06:51 (79)	06:46			07:15		07:35 (80)	07:45		08:14 (90)	07:20		07:58 (131)	07:50
	21:04	19	07:10 (79)	20:34			19:45	43	19:21 (86)	18:56	20	08:34 (90)	17:19	45	08:43 (131)	17:10
16	06:19		06:49 (79)	06:47			07:16		07:36 (80)	07:46		08:13 (90)	07:21		07:59 (131)	07:50
	21:03	21	07:10 (79)	20:33			19:43	41	19:21 (86)	18:55	21	08:34 (90)	17:18	43	08:42 (131)	17:10
17	06:19		06:49 (79)	06:48			07:17		07:38 (80)	07:47		08:12 (90)	07:22		07:59 (131)	07:51
	21:03	22	07:11 (79)	20:31			19:42	35	19:20 (86)	18:53	22	08:34 (90)	17:17	43	08:42 (131)	17:11
18	06:20		06:49 (79)	06:49			07:18		18:56 (86)	07:48		08:11 (90)	07:23		08:00 (131)	07:52
	21:02	23	07:12 (79)	20:30			19:40	23	19:19 (86)	18:52	38	09:27 (131)	17:17	41	08:41 (131)	17:11
19	06:21		06:49 (79)	06:49			07:19		18:56 (86)	07:49		08:11 (90)	07:24		08:01 (131)	07:52
	21:02	24	07:13 (79)	20:29			19:38	21	19:17 (86)	18:51	45	09:30 (131)	17:16	39	08:40 (131)	17:11
20	06:22		06:49 (79)	06:50			07:20		18:55 (86)	07:50		08:10 (90)	07:25		08:03 (131)	07:53
	21:01	24	07:13 (79)	20:27			19:37	20	19:15 (86)	18:49	51	09:32 (131)	17:15	37	08:40 (131)	17:12
21	06:23		06:48 (79)	06:51			07:21		18:56 (86)	07:51		08:11 (90)	07:26		08:04 (131)	07:53
	21:00	25	07:13 (79)	20:26			19:35	17	19:13 (86)	18:48	53	09:34 (131)	17:15	35	08:39 (131)	17:12
22	06:23		06:48 (79)	06:52			07:22		18:56 (86)	07:52		08:12 (90)	07:28		08:05 (131)	07:54
	21:00	25	07:13 (79)	20:24			19:33	15	19:11 (86)	18:46	56	09:36 (131)	17:14	34	08:39 (131)	17:13
23	06:24		06:48 (79)	06:53			07:23		18:58 (86)	07:53		08:14 (90)	07:29		08:06 (131)	07:54
	20:59	26	07:14 (79)	20:23			19:32	12	19:10 (86)	18:45	57	09:38 (131)	17:14	32	08:38 (131)	17:13
24	06:25		06:48 (79)	06:54			07:24		19:00 (86)	07:54		08:15 (90)	07:30		08:07 (131)	07:55
	20:58	26	07:14 (79)	20:21			19:30	8	19:08 (86)	18:44	57	09:39 (131)	17:13	29	08:36 (131)	17:14
25	06:26		06:48 (79)	06:55			07:25			07:56		08:16 (90)	07:31		08:09 (131)	07:55
	20:57	26	07:14 (79)	20:20			19:28			18:42	56	09:40 (131)	17:12	26	08:35 (131)	17:15
26	06:27		06:49 (79)	06:56			07:26			07:57		08:17 (90)	07:32		08:11 (131)	07:56
	20:56	25	07:14 (79)	20:18			19:27			18:41	54	09:40 (131)	17:12	24	08:35 (131)	17:15
27	06:28		06:49 (79)	06:57			07:27			07:58		08:18 (90)	07:33		08:13 (131)	07:56
	20:55	25	07:14 (79)	20:17			19:25			18:40	53	09:41 (131)	17:12	21	08:34 (131)	17:16
28	06:29		06:50 (79)	06:58			07:28			07:59		08:55 (131)	07:34		08:16 (131)	07:56
	20:55	24	07:14 (79)	20:15			19:23			18:38	46	09:41 (131)	17:11	16	08:32 (131)	17:16
29	06:30		06:51 (79)	06:59			07:29			08:00		08:55 (131)	07:35		08:18 (131)	07:56
	20:54	22	07:13 (79)	20:14			19:22			18:37	48	09:43 (131)	17:11	11	08:29 (131)	17:17
30	06:31		06:52 (79)	07:00			07:30			08:01		08:54 (131)	07:36			07:57
	20:53	21	07:13 (79)	20:12			19:20			18:36	49	09:43 (131)	17:10			17:18
31	06:31		06:53 (79)	07:01		07:47 (80)				08:02		08:54 (131)				07:57
	20:52	20	07:13 (79)	20:11	4	07:51 (80)				18:34	49	09:43 (131)				17:19
Potential sun hours	456			426			374			346			300			291
Total, worst case		501			84			671			816			1172		
Sun reduction		0.60			0.60			0.61			0.56			0.37		
Oper. time red.		1.00			1.00			1.00			1.00			1.00		
Wind dir. red.		0.68			0.68			0.66			0.61			0.60		
Total reduction		0.41			0.41			0.40			0.34			0.22		
Total, real		203			34			269			278			259		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 9

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 343 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5533)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57			07:44		08:34 (131)	07:10		07:37 (90)	07:20		19:17 (86)	06:36			06:08		06:29 (79)
	17:20			17:53	62	09:36 (131)	18:26	71	09:26 (131)	19:59	21	19:38 (86)	20:28			20:57	16	06:45 (79)
2	07:57			07:43		08:33 (131)	07:08		07:37 (90)	07:19		19:17 (86)	06:35			06:08		06:29 (79)
	17:21			17:54	64	09:37 (131)	18:27	67	09:24 (131)	20:00	21	19:38 (86)	20:29			20:58	17	06:46 (79)
3	07:57			07:43		08:33 (131)	07:07		07:38 (90)	07:17		19:17 (86)	06:33			06:07		06:29 (79)
	17:21			17:56	64	09:37 (131)	18:28	61	09:22 (131)	20:00	22	19:39 (86)	20:30			20:58	18	06:47 (79)
4	07:57			07:42		08:33 (131)	07:05		07:38 (90)	07:15		07:42 (80)	06:32			06:07		06:28 (79)
	17:22			17:57	65	09:38 (131)	18:29	55	09:19 (131)	20:01	23	19:38 (86)	20:31			20:59	19	06:47 (79)
5	07:57			07:40		08:32 (131)	07:03		07:40 (90)	07:14		07:35 (80)	06:31			06:07		06:28 (79)
	17:23			17:58	66	09:38 (131)	18:30	45	09:16 (131)	20:02	33	19:36 (86)	20:32			21:00	20	06:48 (79)
6	07:57			07:39		08:32 (131)	07:02		07:42 (90)	07:12		07:33 (80)	06:30			06:06		06:28 (79)
	17:24			17:59	67	09:39 (131)	18:32	35	09:12 (131)	20:03	37	19:36 (86)	20:33			21:00	20	06:48 (79)
7	07:57			07:38		08:32 (131)	07:00		07:46 (90)	07:11		07:31 (80)	06:29			06:06		06:28 (79)
	17:25			18:00	67	09:39 (131)	18:33	12	09:05 (131)	20:04	36	19:33 (86)	20:34			21:01	21	06:49 (79)
8	07:57			07:37		08:32 (131)	07:59			07:09		07:30 (80)	06:27			06:06		06:27 (79)
	17:26			18:02	68	09:40 (131)	19:34			20:05	33	19:31 (86)	20:35			21:02	22	06:49 (79)
9	07:57			07:36		08:32 (131)	07:57			07:07		07:28 (80)	06:26			06:06		06:27 (79)
	17:27			18:03	68	09:40 (131)	19:35			20:06	27	07:55 (80)	20:36			21:02	22	06:49 (79)
10	07:57			07:35		08:32 (131)	07:56			07:06		07:27 (80)	06:25			06:06		06:27 (79)
	17:28			18:04	68	09:40 (131)	19:36			20:07	29	07:56 (80)	20:37			21:03	23	06:50 (79)
11	07:57			07:34		08:31 (131)	07:54			07:04		07:26 (80)	06:24			06:05		06:27 (79)
	17:29			18:05	69	09:40 (131)	19:37			20:08	29	07:55 (80)	20:38			21:03	23	06:50 (79)
12	07:57		08:54 (131)	07:33		08:31 (131)	07:53			07:03		07:25 (80)	06:23			06:05		06:27 (79)
	17:30	11	09:05 (131)	18:06	69	09:40 (131)	19:38			20:09	30	07:55 (80)	20:39			21:04	24	06:51 (79)
13	07:56		08:51 (131)	07:31		08:32 (131)	07:51			07:01		07:25 (80)	06:22			06:05		06:27 (79)
	17:31	18	09:09 (131)	18:08	68	09:40 (131)	19:39			20:10	30	07:55 (80)	20:40			21:04	24	06:51 (79)
14	07:56		08:49 (131)	07:30		08:32 (131)	07:49			07:00		07:24 (80)	06:21			06:05		06:27 (79)
	17:32	23	09:12 (131)	18:09	68	09:40 (131)	19:40			20:11	31	07:55 (80)	20:41			21:05	25	06:52 (79)
15	07:56		08:48 (131)	07:29		08:31 (131)	07:48			06:58		07:24 (80)	06:20			06:05		06:27 (79)
	17:33	27	09:15 (131)	18:10	68	09:39 (131)	19:41			20:12	31	07:55 (80)	20:42			21:05	25	06:52 (79)
16	07:55		08:46 (131)	07:28		08:32 (131)	07:46			06:57		07:24 (80)	06:19			06:05		06:27 (79)
	17:34	30	09:16 (131)	18:11	67	09:39 (131)	19:42			20:13	30	07:54 (80)	20:43			21:06	25	06:52 (79)
17	07:55		08:45 (131)	07:26		08:32 (131)	07:45			06:55		07:24 (80)	06:18			06:05		06:27 (79)
	17:36	34	09:19 (131)	18:12	67	09:39 (131)	19:43			20:14	30	07:54 (80)	20:44			21:06	25	06:52 (79)
18	07:54		08:44 (131)	07:25		07:45 (90)	07:43			06:54		07:25 (80)	06:17			06:05		06:27 (79)
	17:37	36	09:20 (131)	18:14	76	09:38 (131)	19:44			20:15	29	07:54 (80)	20:45			21:06	25	06:52 (79)
19	07:54		08:43 (131)	07:24		07:43 (90)	07:41			06:52		07:24 (80)	06:17			06:05		06:27 (79)
	17:38	39	09:22 (131)	18:15	80	09:38 (131)	19:45			20:16	28	07:52 (80)	20:46			21:07	25	06:52 (79)
20	07:53		08:42 (131)	07:22		07:42 (90)	07:40			06:51		07:25 (80)	06:16			06:06		06:27 (79)
	17:39	41	09:23 (131)	18:16	82	09:37 (131)	19:46			20:17	27	07:52 (80)	20:47			21:07	26	06:53 (79)
21	07:53		08:41 (131)	07:21		07:40 (90)	07:38			06:49		07:26 (80)	06:15			06:06		06:28 (79)
	17:40	43	09:24 (131)	18:17	84	09:36 (131)	19:47			20:18	24	07:50 (80)	20:48			21:07	26	06:54 (79)
22	07:52		08:40 (131)	07:20		07:39 (90)	07:36			06:48		07:27 (80)	06:14			06:06		06:28 (79)
	17:41	46	09:26 (131)	18:18	85	09:36 (131)	19:48			20:19	22	07:49 (80)	20:49			21:07	26	06:54 (79)
23	07:52		08:39 (131)	07:18		07:37 (90)	07:35			06:46		07:28 (80)	06:13			06:06		06:28 (79)
	17:42	48	09:27 (131)	18:19	85	09:34 (131)	19:49			20:20	18	07:46 (80)	20:49			21:08	25	06:53 (79)
24	07:51		08:38 (131)	07:17		07:37 (90)	07:33			06:45		07:30 (80)	06:13			06:06		06:28 (79)
	17:44	50	09:28 (131)	18:20	84	09:33 (131)	19:50			20:21	14	07:44 (80)	20:50			21:08	25	06:53 (79)
25	07:50		08:37 (131)	07:15		07:37 (90)	07:32			06:44		07:33 (80)	06:12			06:07		06:29 (79)
	17:45	52	09:29 (131)	18:22	84	09:33 (131)	19:51			20:22	8	07:41 (80)	20:51			21:08	25	06:54 (79)
26	07:49		08:37 (131)	07:14		07:36 (90)	07:30		19:25 (86)	06:42			06:11			06:07		06:29 (79)
	17:46	54	09:31 (131)	18:23	82	09:31 (131)	19:53	7	19:32 (86)	20:23			20:52			21:08	25	06:54 (79)
27	07:49		08:37 (131)	07:12		07:37 (90)	07:28		19:22 (86)	06:41			06:11		06:34 (79)	06:07		06:29 (79)
	17:47	55	09:32 (131)	18:24	78	09:30 (131)	19:54	11	19:33 (86)	20:24			20:53	3	06:37 (79)	21:08	25	06:54 (79)
28	07:48		08:36 (131)	07:11		07:36 (90)	07:27		19:20 (86)	06:40			06:10		06:31 (79)	06:08		06:30 (79)
	17:48	57	09:33 (131)	18:25	75	09:27 (131)	19:55	13	19:33 (86)	20:25			20:54	9	06:40 (79)	21:08	25	06:55 (79)
29	07:47		08:35 (131)				07:25		19:20 (86)	06:38			06:10		06:31 (79)	06:08		06:30 (79)
	17:50	59	09:34 (131)				19:56	15	19:35 (86)	20:26			20:54	11	06:42 (79)	21:08	24	06:54 (79)
30	07:46		08:35 (131)				07:23		19:18 (86)	06:37			06:09		06:30 (79)	06:09		06:31 (79)
	17:51	60	09:35 (131)				19:57	17	19:35 (86)	20:27			20:55	13	06:43 (79)	21:08	24	06:55 (79)
31	07:45		08:34 (131)				07:22		19:17 (86)				06:09		06:30 (79)			
	17:52	61	09:35 (131)				19:58	19	19:36 (86)				20:56	14	06:44 (79)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		844			2030			428			663			50			695	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.60			0.61			0.62			0.66			0.68			0.68	
Total reduction		0.22			0.25			0.27			0.34			0.38			0.41	
Total, real		182			514			116			223			19			283	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 10

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 343 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5533)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December
1	06:09		06:31 (79)	06:32			07:02		07:25 (80)	07:31			07:03		08:01 (131)	07:37
	21:08	24	06:55 (79)	20:51			20:09	29	07:54 (80)	19:18			17:33	68	09:09 (131)	17:10
2	06:10		06:32 (79)	06:33			07:03		07:25 (80)	07:32			07:05		08:02 (131)	07:38
	21:08	23	06:55 (79)	20:50			20:08	29	07:54 (80)	19:17			17:32	68	09:10 (131)	17:10
3	06:10		06:32 (79)	06:34			07:04		07:26 (80)	07:33			07:06		08:02 (131)	07:39
	21:08	23	06:55 (79)	20:49			20:06	27	07:53 (80)	19:15			17:31	68	09:10 (131)	17:10
4	06:11		06:33 (79)	06:35			07:05		07:27 (80)	07:34			07:07		08:02 (131)	07:40
	21:08	22	06:55 (79)	20:48			20:05	33	19:28 (86)	19:14			17:30	67	09:09 (131)	17:10
5	06:11		06:33 (79)	06:36			07:06		07:28 (80)	07:35			07:08		08:02 (131)	07:41
	21:08	21	06:54 (79)	20:46			20:03	36	19:30 (86)	19:12			17:29	67	09:09 (131)	17:09
6	06:12		06:34 (79)	06:37			07:07		07:29 (80)	07:36			07:09		08:02 (131)	07:42
	21:07	21	06:55 (79)	20:45			20:01	37	19:32 (86)	19:10			17:28	66	09:08 (131)	17:09
7	06:12		06:34 (79)	06:38			07:08		07:31 (80)	07:37		08:19 (90)	07:10		08:04 (131)	07:43
	21:07	20	06:54 (79)	20:44			20:00	33	19:32 (86)	19:09	27	09:45 (131)	17:27	65	09:09 (131)	17:09
8	06:13		06:35 (79)	06:39			07:09		07:35 (80)	07:38		08:16 (90)	07:11		08:04 (131)	07:44
	21:07	19	06:54 (79)	20:43			19:56	25	19:32 (86)	19:07	40	09:49 (131)	17:25	64	09:08 (131)	17:09
9	06:14		06:36 (79)	06:40			07:09		19:10 (86)	07:39		08:14 (90)	07:13		08:04 (131)	07:45
	21:07	18	06:54 (79)	20:42			19:55	22	19:32 (86)	19:06	50	09:52 (131)	17:24	64	09:08 (131)	17:09
10	06:14		06:36 (79)	06:41			07:10		19:10 (86)	07:40		08:12 (90)	07:14		08:05 (131)	07:46
	21:06	17	06:53 (79)	20:41			19:53	21	19:31 (86)	19:04	58	09:54 (131)	17:23	62	09:07 (131)	17:09
11	06:15		06:37 (79)	06:42			07:11		19:09 (86)	07:41		08:11 (90)	07:15		08:06 (131)	07:46
	21:06	16	06:53 (79)	20:39			19:52	21	19:30 (86)	19:03	63	09:56 (131)	17:23	61	09:07 (131)	17:09
12	06:16		06:38 (79)	06:43			07:12		19:09 (86)	07:42		08:10 (90)	07:16		08:07 (131)	07:47
	21:05	15	06:53 (79)	20:38			19:50	19	19:28 (86)	19:01	69	09:58 (131)	17:22	59	09:06 (131)	17:10
13	06:16		06:38 (79)	06:44			07:13		19:09 (86)	07:43		08:09 (90)	07:17		08:07 (131)	07:48
	21:05	14	06:52 (79)	20:37			19:48	18	19:27 (86)	18:59	73	09:59 (131)	17:21	59	09:06 (131)	17:10
14	06:17		06:39 (79)	06:45			07:14		19:10 (86)	07:44		08:08 (90)	07:18		08:08 (131)	07:49
	21:05	12	06:51 (79)	20:35			19:47	15	19:25 (86)	18:58	78	10:01 (131)	17:20	57	09:05 (131)	17:10
15	06:18		06:40 (79)	06:46			07:15		19:10 (86)	07:45		08:09 (90)	07:20		08:10 (131)	07:49
	21:04	10	06:50 (79)	20:34			19:45	14	19:24 (86)	18:56	80	10:03 (131)	17:19	55	09:05 (131)	17:10
16	06:19		06:40 (79)	06:47			07:16		19:11 (86)	07:46		08:09 (90)	07:21		08:10 (131)	07:50
	21:03	7	06:47 (79)	20:33			19:43	11	19:22 (86)	18:55	81	10:04 (131)	17:18	54	09:04 (131)	17:10
17	06:19			06:48			07:17		19:13 (86)	07:47		08:09 (90)	07:22		08:11 (131)	07:51
	21:03			20:31			19:42	7	19:20 (86)	18:53	84	10:05 (131)	17:17	52	09:03 (131)	17:11
18	06:20			06:49		07:38 (80)	07:18		19:17 (86)	07:48		08:09 (90)	07:23		08:12 (131)	07:52
	21:02			20:30	10	07:48 (80)	19:40	2	19:19 (86)	18:52	84	10:05 (131)	17:17	50	09:02 (131)	17:11
19	06:21			06:49		07:35 (80)	07:19			07:49		08:09 (90)	07:24		08:13 (131)	07:52
	21:02			20:29	16	07:51 (80)	19:38			18:51	85	10:06 (131)	17:16	48	09:01 (131)	17:11
20	06:22			06:50		07:33 (80)	07:20			07:50		08:10 (90)	07:25		08:15 (131)	07:53
	21:01			20:27	19	07:52 (80)	19:37			18:49	84	10:06 (131)	17:15	46	09:01 (131)	17:12
21	06:23			06:51		07:32 (80)	07:21			07:51		08:11 (90)	07:26		08:17 (131)	07:53
	21:00			20:26	22	07:54 (80)	19:35			18:48	83	10:07 (131)	17:15	43	09:00 (131)	17:12
22	06:23			06:52		07:30 (80)	07:22			07:52		08:12 (90)	07:28		08:18 (131)	07:54
	21:00			20:24	25	07:55 (80)	19:33			18:46	81	10:07 (131)	17:14	41	08:59 (131)	17:13
23	06:24			06:53		07:29 (80)	07:23			07:53		08:14 (90)	07:29		08:19 (131)	07:54
	20:59			20:23	27	07:56 (80)	19:32			18:45	80	10:09 (131)	17:14	39	08:58 (131)	17:13
24	06:25			06:54		07:28 (80)	07:24			07:54		08:17 (90)	07:30		08:21 (131)	07:55
	20:58			20:21	28	07:56 (80)	19:30			18:44	74	10:09 (131)	17:13	36	08:57 (131)	17:14
25	06:26			06:55		07:27 (80)	07:25			07:56		09:02 (131)	07:31		08:22 (131)	07:55
	20:57			20:20	30	07:57 (80)	19:28			18:42	67	10:09 (131)	17:12	34	08:56 (131)	17:15
26	06:27			06:56		07:27 (80)	07:26			07:57		09:02 (131)	07:32		08:25 (131)	07:56
	20:56			20:18	30	07:57 (80)	19:27			18:41	67	10:09 (131)	17:12	30	08:55 (131)	17:15
27	06:28			06:57		07:26 (80)	07:27			07:58		09:01 (131)	07:33		08:27 (131)	07:56
	20:55			20:17	31	07:57 (80)	19:25			18:40	68	10:09 (131)	17:12	27	08:54 (131)	17:16
28	06:29			06:58		07:25 (80)	07:28			07:59		09:01 (131)	07:34		08:29 (131)	07:56
	20:55			20:15	31	07:56 (80)	19:23			18:38	68	10:09 (131)	17:11	23	08:52 (131)	17:16
29	06:30			06:59		07:25 (80)	07:29			08:00		09:01 (131)	07:35		08:32 (131)	07:56
	20:54			20:14	31	07:56 (80)	19:22			18:37	69	10:10 (131)	17:11	18	08:50 (131)	17:17
30	06:31			07:00		07:25 (80)	07:30			08:01		09:01 (131)	07:36		08:35 (131)	07:57
	20:53			20:12	30	07:55 (80)	19:20			18:36	69	10:10 (131)	17:10	12	08:47 (131)	17:18
31	06:31			07:01		07:25 (80)				08:02		09:01 (131)				07:57
	20:52			20:11	30	07:55 (80)				18:34	69	10:10 (131)				17:19
Potential sun hours	456			426			374			346			300			291
Total, worst case		282			360			399			1751			1503		
Sun reduction		0.60			0.60			0.61			0.56			0.37		
Oper. time red.		1.00			1.00			1.00			1.00			1.00		
Wind dir. red.		0.68			0.67			0.66			0.61			0.60		
Total reduction		0.41			0.40			0.40			0.34			0.22		
Total, real		115			143			160			594			333		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 11

Licensed user:
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217 Montgomery St.
US-SYRACUSE, NY 13202
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Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 344 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5534)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		09:07 (131)	07:44		09:21 (131)	07:10			07:20		07:42 (80)	06:36			06:08		06:29 (79)
	17:20	73	10:20 (131)	17:53	62	10:23 (131)	18:26			19:59	28	08:10 (80)	20:28			20:57	26	06:55 (79)
2	07:57		09:07 (131)	07:43		09:22 (131)	07:08			07:19		07:41 (80)	06:35			06:08		06:29 (79)
	17:21	74	10:21 (131)	17:54	60	10:22 (131)	18:27			20:00	29	08:10 (80)	20:29			20:58	27	06:56 (79)
3	07:57		09:07 (131)	07:43		09:23 (131)	07:07			07:17		07:40 (80)	06:33			06:07		06:29 (79)
	17:21	74	10:21 (131)	17:56	58	10:21 (131)	18:28			20:00	31	08:11 (80)	20:30			20:58	28	06:57 (79)
4	07:57		09:08 (131)	07:42		09:25 (131)	07:05			07:15		07:39 (80)	06:32			06:07		06:28 (79)
	17:22	74	10:22 (131)	17:57	55	10:20 (131)	18:29			20:01	32	08:11 (80)	20:31			20:59	29	06:57 (79)
5	07:57		09:08 (131)	07:40		09:26 (131)	07:03			07:14		07:38 (80)	06:31			06:07		06:28 (79)
	17:23	74	10:22 (131)	17:58	53	10:19 (131)	18:30			20:02	33	08:11 (80)	20:32			21:00	29	06:57 (79)
6	07:57		09:09 (131)	07:39		09:27 (131)	07:02			07:12		07:38 (80)	06:30			06:06		06:28 (79)
	17:24	74	10:23 (131)	17:59	50	10:17 (131)	18:32			20:03	33	08:11 (80)	20:33			21:00	30	06:58 (79)
7	07:57		09:09 (131)	07:38		08:01 (90)	07:00			07:11		07:37 (80)	06:29			06:06		06:28 (79)
	17:25	74	10:23 (131)	18:00	55	10:16 (131)	18:33			20:04	34	08:11 (80)	20:34			21:01	30	06:58 (79)
8	07:57		09:10 (131)	07:37		07:58 (90)	07:59			07:09		07:37 (80)	06:27			06:06		06:27 (79)
	17:26	74	10:24 (131)	18:02	58	10:14 (131)	19:34			20:05	34	08:11 (80)	20:35			21:02	31	06:58 (79)
9	07:57		09:10 (131)	07:36		07:56 (90)	07:57			07:07		07:37 (80)	06:26			06:06		06:28 (79)
	17:27	75	10:25 (131)	18:03	58	10:12 (131)	19:35			20:06	33	08:10 (80)	20:36			21:02	30	06:58 (79)
10	07:57		09:10 (131)	07:35		07:55 (90)	07:56			07:06		07:37 (80)	06:25			06:06		06:28 (79)
	17:28	74	10:24 (131)	18:04	57	10:10 (131)	19:36			20:07	33	08:10 (80)	20:37			21:03	31	06:59 (79)
11	07:57		09:10 (131)	07:34		07:53 (90)	07:54			07:04		07:37 (80)	06:24			06:05		06:28 (79)
	17:29	75	10:25 (131)	18:05	54	10:07 (131)	19:37			20:08	32	08:09 (80)	20:38			21:03	31	06:59 (79)
12	07:57		09:11 (131)	07:33		07:53 (90)	07:53			07:03		07:37 (80)	06:23			06:05		06:28 (79)
	17:30	75	10:26 (131)	18:06	49	10:04 (131)	19:38			20:09	30	08:07 (80)	20:39			21:04	31	06:59 (79)
13	07:56		09:11 (131)	07:31		07:52 (90)	07:51			07:01		07:38 (80)	06:22			06:05		06:28 (79)
	17:31	74	10:25 (131)	18:08	41	09:59 (131)	19:39			20:10	29	08:07 (80)	20:40			21:04	32	07:00 (79)
14	07:56		09:12 (131)	07:30		07:52 (90)	07:49			07:00		07:38 (80)	06:21			06:05		06:29 (79)
	17:32	74	10:26 (131)	18:09	27	08:19 (90)	19:40			20:11	27	08:05 (80)	20:41			21:05	31	07:00 (79)
15	07:56		09:12 (131)	07:29		07:51 (90)	07:48			06:58		07:40 (80)	06:20			06:05		06:29 (79)
	17:33	75	10:27 (131)	18:10	28	08:19 (90)	19:41			20:12	24	08:04 (80)	20:42			21:05	31	07:00 (79)
16	07:55		09:12 (131)	07:28		07:51 (90)	07:46			06:57		07:40 (80)	06:19			06:05		06:29 (79)
	17:34	74	10:26 (131)	18:11	28	08:19 (90)	19:42			20:13	22	08:02 (80)	20:43			21:06	31	07:00 (79)
17	07:55		09:13 (131)	07:26		07:51 (90)	07:45			06:55		07:43 (80)	06:18			06:05		06:29 (79)
	17:36	74	10:27 (131)	18:12	28	08:19 (90)	19:43			20:14	17	08:00 (80)	20:44			21:06	32	07:01 (79)
18	07:54		09:13 (131)	07:25		07:50 (90)	07:43			06:54		07:46 (80)	06:17			06:05		06:29 (79)
	17:37	74	10:27 (131)	18:14	29	08:19 (90)	19:44			20:15	11	07:57 (80)	20:45			21:06	32	07:01 (79)
19	07:54		09:14 (131)	07:24		07:51 (90)	07:41			06:52			06:17			06:05		06:29 (79)
	17:38	73	10:27 (131)	18:15	28	08:19 (90)	19:45			20:16			20:46			21:07	32	07:01 (79)
20	07:53		09:14 (131)	07:22		07:52 (90)	07:40			06:51			06:16			06:06		06:29 (79)
	17:39	73	10:27 (131)	18:16	27	08:19 (90)	19:46			20:17			20:47			21:07	32	07:01 (79)
21	07:53		09:14 (131)	07:21		07:51 (90)	07:38			06:49			06:15			06:06		06:30 (79)
	17:40	73	10:27 (131)	18:17	26	08:17 (90)	19:47			20:18			20:48			21:07	32	07:02 (79)
22	07:52		09:16 (131)	07:20		07:53 (90)	07:36			06:48			06:14		06:37 (79)	06:06		06:30 (79)
	17:41	71	10:27 (131)	18:18	24	08:17 (90)	19:48			20:19			20:49	8	06:45 (79)	21:07	32	07:02 (79)
23	07:52		09:16 (131)	07:18		07:53 (90)	07:35			06:46			06:13		06:34 (79)	06:06		06:30 (79)
	17:42	71	10:27 (131)	18:19	22	08:15 (90)	19:49			20:20			20:49	13	06:47 (79)	21:08	32	07:02 (79)
24	07:51		09:16 (131)	07:17		07:55 (90)	07:33			06:45			06:13		06:33 (79)	06:06		06:30 (79)
	17:44	70	10:26 (131)	18:20	19	08:14 (90)	19:50			20:21			20:50	15	06:48 (79)	21:08	32	07:02 (79)
25	07:50		09:16 (131)	07:15		07:57 (90)	07:32			06:44			06:12		06:33 (79)	06:07		06:31 (79)
	17:45	70	10:26 (131)	18:22	15	08:12 (90)	19:51			20:22			20:51	17	06:50 (79)	21:08	32	07:03 (79)
26	07:49		09:18 (131)	07:14		07:59 (90)	07:30			06:42			06:11		06:32 (79)	06:07		06:31 (79)
	17:46	69	10:27 (131)	18:23	10	08:09 (90)	19:53			20:23			20:52	19	06:51 (79)	21:08	31	07:02 (79)
27	07:49		09:18 (131)	07:12			07:28			06:41			06:11		06:32 (79)	06:07		06:31 (79)
	17:47	68	10:26 (131)	18:24			19:54			20:24			20:53	20	06:52 (79)	21:08	31	07:02 (79)
28	07:48		09:19 (131)	07:11			07:27		07:51 (80)	06:40			06:10		06:31 (79)	06:08		06:32 (79)
	17:48	66	10:25 (131)	18:25			19:55	12	08:03 (80)	20:25			20:54	22	06:53 (79)	21:08	31	07:03 (79)
29	07:47		09:19 (131)				07:25		07:48 (80)	06:38			06:10		06:31 (79)	06:08		06:31 (79)
	17:50	66	10:25 (131)				19:56	19	08:07 (80)	20:26			20:54	23	06:54 (79)	21:08	32	07:03 (79)
30	07:46		09:20 (131)				07:23		07:46 (80)	06:37			06:09		06:30 (79)	06:09		06:32 (79)
	17:51	64	10:24 (131)				19:57	22	08:08 (80)	20:27			20:55	24	06:54 (79)	21:08	32	07:04 (79)
31	07:45		09:21 (131)				07:22		07:43 (80)				06:09		06:30 (79)			
	17:52	62	10:23 (131)				19:58	26	08:09 (80)				20:56	25	06:55 (79)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		2231			1021			79			512			186			923	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.60			0.61			0.66			0.66			0.68			0.68	
Total reduction		0.22			0.26			0.29			0.34			0.38			0.41	
Total, real		481			261			23			172			71			376	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 12

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
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Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 344 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5534)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:32 (79)	06:32			07:02		07:36 (80)	07:31			07:03		07:24 (90)	07:37		08:52 (131)
	21:08	31	07:03 (79)	20:51			20:09	32	08:08 (80)	19:18			17:33	57	09:40 (131)	17:10	75	10:07 (131)
2	06:10		06:33 (79)	06:33			07:03		07:35 (80)	07:32			07:05		07:26 (90)	07:38		08:53 (131)
	21:08	31	07:04 (79)	20:50			20:08	33	08:08 (80)	19:17			17:32	59	09:43 (131)	17:10	74	10:07 (131)
3	06:10		06:33 (79)	06:34			07:04		07:35 (80)	07:33			07:06		07:28 (90)	07:39		08:53 (131)
	21:08	30	07:03 (79)	20:49			20:06	33	08:08 (80)	19:15			17:31	57	09:44 (131)	17:10	75	10:08 (131)
4	06:11		06:33 (79)	06:35			07:05		07:34 (80)	07:34			07:07		07:31 (90)	07:40		08:54 (131)
	21:08	31	07:04 (79)	20:48			20:05	34	08:08 (80)	19:14			17:30	55	09:46 (131)	17:10	74	10:08 (131)
5	06:11		06:33 (79)	06:36			07:06		07:34 (80)	07:35			07:08		08:57 (131)	07:41		08:54 (131)
	21:08	31	07:04 (79)	20:46			20:03	34	08:08 (80)	19:12			17:29	50	09:47 (131)	17:09	74	10:08 (131)
6	06:12		06:34 (79)	06:37			07:07		07:34 (80)	07:36			07:09		08:55 (131)	07:42		08:55 (131)
	21:07	30	07:04 (79)	20:45			20:01	34	08:08 (80)	19:10			17:28	54	09:49 (131)	17:09	74	10:09 (131)
7	06:12		06:34 (79)	06:38			07:08		07:34 (80)	07:37			07:10		08:55 (131)	07:43		08:55 (131)
	21:07	29	07:03 (79)	20:44			20:00	33	08:07 (80)	19:09			17:27	56	09:51 (131)	17:09	74	10:09 (131)
8	06:13		06:35 (79)	06:39			07:09		07:33 (80)	07:38			07:11		08:54 (131)	07:44		08:56 (131)
	21:07	29	07:04 (79)	20:43			19:56	32	08:05 (80)	19:07			17:25	58	09:52 (131)	17:09	74	10:10 (131)
9	06:14		06:36 (79)	06:40			07:09		07:33 (80)	07:39			07:13		08:53 (131)	07:45		08:56 (131)
	21:07	28	07:04 (79)	20:42			19:55	32	08:05 (80)	19:06			17:24	60	09:53 (131)	17:09	74	10:10 (131)
10	06:14		06:36 (79)	06:41			07:10		07:34 (80)	07:40			07:14		08:52 (131)	07:46		08:57 (131)
	21:06	27	07:03 (79)	20:41			19:53	30	08:04 (80)	19:04			17:23	62	09:54 (131)	17:09	74	10:11 (131)
11	06:15		06:37 (79)	06:42			07:11		07:34 (80)	07:41			07:15		08:53 (131)	07:46		08:57 (131)
	21:06	27	07:04 (79)	20:39			19:52	29	08:03 (80)	19:03			17:23	62	09:55 (131)	17:09	73	10:10 (131)
12	06:16		06:38 (79)	06:43			07:12		07:35 (80)	07:42			07:16		08:52 (131)	07:47		08:57 (131)
	21:05	26	07:04 (79)	20:38			19:50	26	08:01 (80)	19:01			17:22	64	09:56 (131)	17:10	74	10:11 (131)
13	06:16		06:38 (79)	06:44			07:13		07:36 (80)	07:43			07:17		08:51 (131)	07:48		08:58 (131)
	21:05	25	07:03 (79)	20:37			19:48	23	07:59 (80)	18:59			17:21	66	09:57 (131)	17:10	74	10:12 (131)
14	06:17		06:39 (79)	06:45			07:14		07:38 (80)	07:44			07:18		08:51 (131)	07:49		08:59 (131)
	21:05	24	07:03 (79)	20:35			19:47	19	07:57 (80)	18:58			17:20	66	09:57 (131)	17:10	73	10:12 (131)
15	06:18		06:40 (79)	06:46			07:15		07:41 (80)	07:45		08:36 (90)	07:20		08:51 (131)	07:49		08:59 (131)
	21:04	22	07:02 (79)	20:34			19:45	13	07:54 (80)	18:56	2	08:38 (90)	17:19	68	09:59 (131)	17:10	73	10:12 (131)
16	06:19		06:40 (79)	06:47			07:16			07:46		08:30 (90)	07:21		08:51 (131)	07:50		08:59 (131)
	21:03	21	07:01 (79)	20:33			19:43			18:55	13	08:43 (90)	17:18	69	10:00 (131)	17:10	74	10:13 (131)
17	06:19		06:41 (79)	06:48			07:17			07:47		08:27 (90)	07:22		08:50 (131)	07:51		09:00 (131)
	21:03	20	07:01 (79)	20:31			19:42			18:53	18	08:45 (90)	17:17	70	10:00 (131)	17:11	74	10:14 (131)
18	06:20		06:42 (79)	06:49			07:18			07:48		08:26 (90)	07:23		08:50 (131)	07:52		09:00 (131)
	21:02	18	07:00 (79)	20:30			19:40			18:52	20	08:46 (90)	17:17	70	10:00 (131)	17:11	73	10:13 (131)
19	06:21		06:43 (79)	06:49			07:19			07:49		08:24 (90)	07:24		08:50 (131)	07:52		09:01 (131)
	21:02	16	06:59 (79)	20:29			19:38			18:51	23	08:47 (90)	17:16	71	10:01 (131)	17:11	73	10:14 (131)
20	06:22		06:44 (79)	06:50			07:20			07:50		08:23 (90)	07:25		08:51 (131)	07:53		09:01 (131)
	21:01	14	06:58 (79)	20:27			19:37			18:49	25	08:48 (90)	17:15	71	10:02 (131)	17:12	73	10:14 (131)
21	06:23		06:45 (79)	06:51			07:21			07:51		08:22 (90)	07:26		08:50 (131)	07:53		09:02 (131)
	21:00	11	06:56 (79)	20:26			19:35			18:48	26	08:48 (90)	17:15	73	10:03 (131)	17:12	73	10:15 (131)
22	06:23		06:49 (79)	06:52			07:22			07:52		08:21 (90)	07:28		08:50 (131)	07:54		09:02 (131)
	21:00	3	06:52 (79)	20:24			19:33			18:46	27	08:48 (90)	17:14	73	10:03 (131)	17:13	73	10:15 (131)
23	06:24			06:53			07:23			07:53		08:21 (90)	07:29		08:50 (131)	07:54		09:03 (131)
	20:59			20:23			19:32			18:45	28	08:49 (90)	17:14	73	10:03 (131)	17:13	73	10:16 (131)
24	06:25			06:54			07:24			07:54		08:21 (90)	07:30		08:50 (131)	07:55		09:03 (131)
	20:58			20:21			19:30			18:43	28	08:49 (90)	17:13	74	10:04 (131)	17:14	73	10:16 (131)
25	06:26			06:55		07:48 (80)	07:25			07:56		08:21 (90)	07:31		08:50 (131)	07:55		09:04 (131)
	20:57			20:20	12	08:00 (80)	19:28			18:42	28	08:49 (90)	17:12	74	10:04 (131)	17:14	73	10:17 (131)
26	06:27			06:56		07:45 (80)	07:26			07:57		08:21 (90)	07:32		08:51 (131)	07:56		09:04 (131)
	20:56			20:18	18	08:03 (80)	19:27			18:41	28	08:49 (90)	17:12	74	10:05 (131)	17:15	74	10:18 (131)
27	06:28			06:57		07:43 (80)	07:27			07:58		08:21 (90)	07:33		08:52 (131)	07:56		09:04 (131)
	20:55			20:17	22	08:05 (80)	19:25			18:40	27	08:48 (90)	17:12	74	10:06 (131)	17:16	74	10:18 (131)
28	06:29			06:58		07:40 (80)	07:28			07:59		08:21 (90)	07:34		08:52 (131)	07:56		09:05 (131)
	20:55			20:15	25	08:05 (80)	19:23			18:38	27	08:48 (90)	17:11	74	10:06 (131)	17:16	74	10:19 (131)
29	06:30			06:59		07:39 (80)	07:29			08:00		08:22 (90)	07:35		08:52 (131)	07:56		09:06 (131)
	20:54			20:14	27	08:06 (80)	19:22			18:37	44	10:30 (131)	17:11	74	10:06 (131)	17:17	73	10:19 (131)
30	06:31			07:00		07:38 (80)	07:30			08:01		08:22 (90)	07:36		08:52 (131)	07:57		09:06 (131)
	20:53			20:12	29	08:07 (80)	19:20			18:36	51	10:34 (131)	17:10	75	10:07 (131)	17:18	74	10:20 (131)
31	06:31			07:01		07:37 (80)				08:02		08:23 (90)				07:57		09:06 (131)
	20:52			20:11	30	08:07 (80)				18:34	55	10:37 (131)				17:19	74	10:20 (131)
Potential sun hours	456			426			374			346			300			291		
Total, worst case		524			163			437			470			1983			2284	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.68			0.66			0.66			0.62			0.60			0.60	
Total reduction		0.41			0.40			0.40			0.35			0.22			0.30	
Total, real		213			64			176			163			440			684	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 13

Licensed user:
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US-SYRACUSE, NY 13202
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Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 348 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5535)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:48 (131)	07:44		08:50 (131)	07:10		07:49 (90)	07:20		07:42 (80)	06:36			06:08		06:29 (79)
	17:20	54	09:42 (131)	17:53	70	10:00 (131)	18:26	15	08:04 (90)	19:59	37	19:34 (86)	20:28			20:57	24	06:53 (79)
2	07:57		08:49 (131)	07:43		08:51 (131)	07:08		07:51 (90)	07:19		07:39 (80)	06:35			06:08		06:29 (79)
	17:21	54	09:43 (131)	17:54	69	10:00 (131)	18:27	9	08:00 (90)	20:00	39	19:32 (86)	20:29			20:58	25	06:54 (79)
3	07:57		08:49 (131)	07:43		08:51 (131)	07:07			07:17		07:38 (80)	06:33			06:07		06:29 (79)
	17:21	55	09:44 (131)	17:56	68	09:59 (131)	18:28			20:00	38	19:31 (86)	20:30			20:58	26	06:55 (79)
4	07:57		08:49 (131)	07:42		08:51 (131)	07:05			07:15		07:36 (80)	06:32			06:07		06:28 (79)
	17:22	56	09:45 (131)	17:57	68	09:59 (131)	18:29			20:01	37	19:28 (86)	20:31			20:59	26	06:54 (79)
5	07:57		08:49 (131)	07:40		08:52 (131)	07:03			07:14		07:35 (80)	06:31			06:07		06:28 (79)
	17:23	56	09:45 (131)	17:58	67	09:59 (131)	18:30			20:02	28	08:03 (80)	20:32			21:00	27	06:55 (79)
6	07:57		08:49 (131)	07:39		08:52 (131)	07:02			07:12		07:34 (80)	06:30			06:06		06:28 (79)
	17:24	57	09:46 (131)	17:59	67	09:59 (131)	18:32			20:03	30	08:04 (80)	20:33			21:00	27	06:55 (79)
7	07:57		08:49 (131)	07:38		08:53 (131)	07:00			07:11		07:33 (80)	06:29			06:06		06:28 (79)
	17:25	58	09:47 (131)	18:00	65	09:58 (131)	18:33			20:04	31	08:04 (80)	20:34			21:01	28	06:56 (79)
8	07:57		08:49 (131)	07:37		08:53 (131)	07:59			07:09		07:33 (80)	06:27			06:06		06:27 (79)
	17:26	59	09:48 (131)	18:02	65	09:58 (131)	19:34			20:05	31	08:04 (80)	20:35			21:02	29	06:56 (79)
9	07:57		08:50 (131)	07:36		08:54 (131)	07:57			07:07		07:32 (80)	06:26			06:06		06:27 (79)
	17:27	59	09:49 (131)	18:03	64	09:58 (131)	19:35			20:06	32	08:04 (80)	20:36			21:02	29	06:56 (79)
10	07:57		08:49 (131)	07:35		08:55 (131)	07:56			07:06		07:32 (80)	06:25			06:06		06:27 (79)
	17:28	60	09:49 (131)	18:04	62	09:57 (131)	19:36			20:07	32	08:04 (80)	20:37			21:03	29	06:56 (79)
11	07:57		08:49 (131)	07:34		08:55 (131)	07:54			07:04		07:32 (80)	06:24			06:05		06:27 (79)
	17:29	61	09:50 (131)	18:05	61	09:56 (131)	19:37			20:08	31	08:03 (80)	20:38			21:03	30	06:57 (79)
12	07:57		08:50 (131)	07:33		07:56 (90)	07:53			07:03		07:31 (80)	06:23			06:05		06:27 (79)
	17:30	61	09:51 (131)	18:06	62	09:55 (131)	19:38			20:09	31	08:02 (80)	20:39			21:04	30	06:57 (79)
13	07:56		08:49 (131)	07:31		07:52 (90)	07:51			07:01		07:32 (80)	06:22			06:05		06:28 (79)
	17:31	62	09:51 (131)	18:08	69	09:54 (131)	19:39			20:10	30	08:02 (80)	20:40			21:04	29	06:57 (79)
14	07:56		08:49 (131)	07:30		07:50 (90)	07:49			07:00		07:31 (80)	06:21			06:05		06:28 (79)
	17:32	64	09:53 (131)	18:09	71	09:53 (131)	19:40			20:11	30	08:01 (80)	20:41			21:05	30	06:58 (79)
15	07:56		08:50 (131)	07:29		07:48 (90)	07:48			06:58		07:32 (80)	06:20			06:05		06:28 (79)
	17:33	64	09:54 (131)	18:10	72	09:51 (131)	19:41			20:12	28	08:00 (80)	20:42			21:05	30	06:58 (79)
16	07:55		08:49 (131)	07:28		07:47 (90)	07:46			06:57		07:33 (80)	06:19			06:05		06:28 (79)
	17:34	65	09:54 (131)	18:11	72	09:50 (131)	19:42			20:13	25	07:58 (80)	20:43			21:06	30	06:58 (79)
17	07:55		08:50 (131)	07:26		07:46 (90)	07:45			06:55		07:34 (80)	06:18			06:05		06:28 (79)
	17:36	65	09:55 (131)	18:12	72	09:49 (131)	19:43			20:14	23	07:57 (80)	20:44			21:06	30	06:58 (79)
18	07:54		08:49 (131)	07:25		07:44 (90)	07:43			06:54		07:36 (80)	06:17			06:05		06:28 (79)
	17:37	66	09:55 (131)	18:14	71	09:47 (131)	19:44			20:15	20	07:56 (80)	20:45			21:06	30	06:58 (79)
19	07:54		08:50 (131)	07:24		07:44 (90)	07:41			06:52		07:37 (80)	06:17			06:05		06:28 (79)
	17:38	66	09:56 (131)	18:15	68	09:45 (131)	19:45			20:16	17	07:54 (80)	20:46			21:07	30	06:58 (79)
20	07:53		08:49 (131)	07:22		07:44 (90)	07:40			06:51		07:39 (80)	06:16			06:06		06:28 (79)
	17:39	68	09:57 (131)	18:16	64	09:43 (131)	19:46			20:17	12	07:51 (80)	20:47			21:07	30	06:58 (79)
21	07:53		08:49 (131)	07:21		07:43 (90)	07:38			06:49			06:15			06:06		06:29 (79)
	17:40	68	09:57 (131)	18:17	61	09:40 (131)	19:47			20:18			20:48			21:07	30	06:59 (79)
22	07:52		08:50 (131)	07:20		07:44 (90)	07:36		19:23 (86)	06:48			06:14		06:37 (79)	06:06		06:29 (79)
	17:41	68	09:58 (131)	18:18	54	09:37 (131)	19:48	4	19:27 (86)	20:19			20:49	5	06:42 (79)	21:07	30	06:59 (79)
23	07:52		08:49 (131)	07:18		07:43 (90)	07:35		19:20 (86)	06:46			06:13		06:34 (79)	06:06		06:29 (79)
	17:42	69	09:58 (131)	18:19	46	09:32 (131)	19:49	8	19:28 (86)	20:20			20:49	11	06:45 (79)	21:08	30	06:59 (79)
24	07:51		08:49 (131)	07:17		07:44 (90)	07:33		19:18 (86)	06:45			06:13		06:33 (79)	06:06		06:29 (79)
	17:44	69	09:58 (131)	18:20	26	08:10 (90)	19:50	12	19:30 (86)	20:21			20:50	13	06:46 (79)	21:08	30	06:59 (79)
25	07:50		08:49 (131)	07:15		07:45 (90)	07:32		19:16 (86)	06:44			06:12		06:33 (79)	06:07		06:30 (79)
	17:45	69	09:58 (131)	18:22	25	08:10 (90)	19:51	14	19:30 (86)	20:22			20:51	15	06:48 (79)	21:08	30	07:00 (79)
26	07:49		08:50 (131)	07:14		07:45 (90)	07:30		19:16 (86)	06:42			06:11		06:32 (79)	06:07		06:30 (79)
	17:46	69	09:59 (131)	18:23	23	08:08 (90)	19:53	16	19:32 (86)	20:23			20:52	17	06:49 (79)	21:08	30	07:00 (79)
27	07:49		08:50 (131)	07:12		07:46 (90)	07:28		19:15 (86)	06:41			06:11		06:32 (79)	06:07		06:30 (79)
	17:47	69	09:59 (131)	18:24	22	08:08 (90)	19:54	18	19:33 (86)	20:24			20:53	18	06:50 (79)	21:08	30	07:00 (79)
28	07:48		08:50 (131)	07:11		07:47 (90)	07:27		19:14 (86)	06:40			06:10		06:31 (79)	06:08		06:31 (79)
	17:48	70	10:00 (131)	18:25	19	08:06 (90)	19:55	19	19:33 (86)	20:25			20:54	20	06:51 (79)	21:08	30	07:01 (79)
29	07:47		08:50 (131)				07:25		19:14 (86)	06:38			06:10		06:31 (79)	06:08		06:31 (79)
	17:50	70	10:00 (131)				19:56	21	19:35 (86)	20:26			20:54	21	06:52 (79)	21:08	29	07:00 (79)
30	07:46		08:50 (131)				07:23		19:14 (86)	06:37			06:09		06:30 (79)	06:09		06:32 (79)
	17:51	70	10:00 (131)				19:57	21	19:35 (86)	20:27			20:55	22	06:52 (79)	21:08	29	07:01 (79)
31	07:45		08:50 (131)				07:22		07:45 (80)				06:09		06:30 (79)			
	17:52	70	10:00 (131)				19:58	32	19:34 (86)				20:56	23	06:53 (79)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		1971			1623			189			582			165			867	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.61			0.61			0.66			0.66			0.68			0.68	
Total reduction		0.22			0.26			0.29			0.34			0.38			0.41	
Total, real		429			415			54			196			63			353	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 14

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 348 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5535)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:31 (79)	06:32			07:02		07:31 (80)	07:31			07:03		08:24 (131)	07:37		08:31 (131)
	21:08	30	07:01 (79)	20:51			20:09	31	08:02 (80)	19:18			17:33	62	09:26 (131)	17:10	61	09:32 (131)
2	06:10		06:32 (79)	06:33			07:03		07:30 (80)	07:32			07:05		08:24 (131)	07:38		08:32 (131)
	21:08	30	07:02 (79)	20:50			20:08	32	08:02 (80)	19:17			17:32	64	09:28 (131)	17:10	60	09:32 (131)
3	06:10		06:32 (79)	06:34			07:04		07:30 (80)	07:33			07:06		08:23 (131)	07:39		08:33 (131)
	21:08	29	07:01 (79)	20:49			20:06	32	08:02 (80)	19:15			17:31	65	09:28 (131)	17:10	59	09:32 (131)
4	06:11		06:33 (79)	06:35			07:05		07:30 (80)	07:34			07:07		08:23 (131)	07:40		08:33 (131)
	21:08	29	07:02 (79)	20:48			20:05	31	08:01 (80)	19:14			17:30	65	09:28 (131)	17:10	59	09:32 (131)
5	06:11		06:33 (79)	06:36			07:06		07:30 (80)	07:35			07:08		08:22 (131)	07:41		08:34 (131)
	21:08	28	07:01 (79)	20:46			20:03	31	08:01 (80)	19:12			17:29	67	09:29 (131)	17:09	58	09:32 (131)
6	06:12		06:34 (79)	06:37			07:07		07:30 (80)	07:36			07:09		08:22 (131)	07:42		08:35 (131)
	21:07	28	07:02 (79)	20:45			20:01	30	08:00 (80)	19:10			17:28	67	09:29 (131)	17:09	57	09:32 (131)
7	06:12		06:34 (79)	06:38			07:08		07:31 (80)	07:37			07:10		08:22 (131)	07:43		08:36 (131)
	21:07	27	07:01 (79)	20:44			20:00	28	07:59 (80)	19:09			17:27	68	09:30 (131)	17:09	57	09:33 (131)
8	06:13		06:35 (79)	06:39			07:09		07:30 (80)	07:38			07:11		08:22 (131)	07:44		08:37 (131)
	21:07	27	07:02 (79)	20:43			19:56	37	19:22 (86)	19:07			17:25	68	09:30 (131)	17:09	56	09:33 (131)
9	06:14		06:36 (79)	06:40			07:09		07:31 (80)	07:39			07:13		08:22 (131)	07:45		08:38 (131)
	21:07	26	07:02 (79)	20:42			19:55	39	19:24 (86)	19:06			17:24	68	09:30 (131)	17:09	55	09:33 (131)
10	06:14		06:36 (79)	06:41			07:10		07:32 (80)	07:40			07:14		08:21 (131)	07:46		08:39 (131)
	21:06	25	07:01 (79)	20:41			19:53	39	19:25 (86)	19:04			17:23	70	09:31 (131)	17:09	54	09:33 (131)
11	06:15		06:37 (79)	06:42			07:11		07:34 (80)	07:41			07:15		08:22 (131)	07:46		08:38 (131)
	21:06	24	07:01 (79)	20:39			19:52	37	19:26 (86)	19:03			17:23	70	09:32 (131)	17:09	54	09:32 (131)
12	06:16		06:38 (79)	06:43			07:12		07:36 (80)	07:42		08:23 (90)	07:16		08:22 (131)	07:47		08:39 (131)
	21:05	23	07:01 (79)	20:38			19:50	33	19:26 (86)	19:01	12	08:35 (90)	17:22	70	09:32 (131)	17:10	54	09:33 (131)
13	06:16		06:38 (79)	06:44			07:13		19:05 (86)	07:43		08:21 (90)	07:17		08:22 (131)	07:48		08:40 (131)
	21:05	22	07:00 (79)	20:37			19:48	21	19:26 (86)	18:59	16	08:37 (90)	17:21	70	09:32 (131)	17:10	53	09:33 (131)
14	06:17		06:39 (79)	06:45			07:14		19:04 (86)	07:44		08:19 (90)	07:18		08:22 (131)	07:49		08:41 (131)
	21:05	21	07:00 (79)	20:35			19:47	21	19:25 (86)	18:58	20	08:39 (90)	17:20	69	09:31 (131)	17:10	53	09:34 (131)
15	06:18		06:40 (79)	06:46			07:15		19:04 (86)	07:45		08:18 (90)	07:20		08:23 (131)	07:49		08:41 (131)
	21:04	20	07:00 (79)	20:34			19:45	20	19:24 (86)	18:56	23	08:41 (90)	17:19	69	09:32 (131)	17:10	52	09:33 (131)
16	06:19		06:40 (79)	06:47			07:16		19:04 (86)	07:46		08:17 (90)	07:21		08:23 (131)	07:50		08:42 (131)
	21:03	19	06:59 (79)	20:33			19:43	18	19:22 (86)	18:55	24	08:41 (90)	17:18	69	09:32 (131)	17:10	52	09:34 (131)
17	06:19		06:41 (79)	06:48			07:17		19:04 (86)	07:47		08:16 (90)	07:22		08:23 (131)	07:51		08:43 (131)
	21:03	18	06:59 (79)	20:31			19:42	16	19:20 (86)	18:53	26	08:42 (90)	17:17	69	09:32 (131)	17:11	51	09:34 (131)
18	06:20		06:42 (79)	06:49			07:18		19:05 (86)	07:48		08:15 (90)	07:23		08:23 (131)	07:52		08:43 (131)
	21:02	16	06:58 (79)	20:30			19:40	14	19:19 (86)	18:52	38	10:00 (131)	17:17	69	09:32 (131)	17:11	51	09:34 (131)
19	06:21		06:43 (79)	06:49			07:19		19:05 (86)	07:49		08:15 (90)	07:24		08:23 (131)	07:52		08:44 (131)
	21:02	14	06:57 (79)	20:29			19:38	12	19:17 (86)	18:51	48	10:05 (131)	17:16	69	09:32 (131)	17:11	51	09:35 (131)
20	06:22		06:44 (79)	06:50			07:20		19:05 (86)	07:50		08:14 (90)	07:25		08:25 (131)	07:53		08:44 (131)
	21:01	12	06:56 (79)	20:27			19:37	10	19:15 (86)	18:49	57	10:09 (131)	17:15	68	09:33 (131)	17:12	51	09:35 (131)
21	06:23		06:44 (79)	06:51			07:21		19:08 (86)	07:51		08:14 (90)	07:26		08:25 (131)	07:53		08:45 (131)
	21:00	9	06:53 (79)	20:26			19:35	5	19:13 (86)	18:48	61	10:11 (131)	17:15	68	09:33 (131)	17:12	51	09:36 (131)
22	06:23			06:52			07:22			07:52		08:14 (90)	07:28		08:25 (131)	07:54		08:45 (131)
	21:00			20:24			19:33			18:46	65	10:13 (131)	17:14	68	09:33 (131)	17:13	51	09:36 (131)
23	06:24			06:53		07:43 (80)	07:23			07:53		08:15 (90)	07:29		08:26 (131)	07:54		08:46 (131)
	20:59			20:23	12	07:55 (80)	19:32			18:45	68	10:16 (131)	17:14	66	09:32 (131)	17:13	51	09:37 (131)
24	06:25			06:54		07:40 (80)	07:24			07:54		08:15 (90)	07:30		08:26 (131)	07:55		08:46 (131)
	20:58			20:21	18	07:58 (80)	19:30			18:44	71	10:18 (131)	17:13	66	09:32 (131)	17:14	51	09:37 (131)
25	06:26			06:55		07:38 (80)	07:25			07:56		08:16 (90)	07:31		08:27 (131)	07:55		08:47 (131)
	20:57			20:20	21	07:59 (80)	19:28			18:42	72	10:19 (131)	17:12	65	09:32 (131)	17:14	51	09:38 (131)
26	06:27			06:56		07:37 (80)	07:26			07:57		08:17 (90)	07:32		08:28 (131)	07:56		08:47 (131)
	20:56			20:18	23	08:00 (80)	19:27			18:41	72	10:20 (131)	17:12	65	09:33 (131)	17:15	51	09:38 (131)
27	06:28			06:57		07:35 (80)	07:27			07:58		08:18 (90)	07:33		08:29 (131)	07:56		08:47 (131)
	20:55			20:17	26	08:01 (80)	19:25			18:40	71	10:21 (131)	17:12	64	09:33 (131)	17:16	52	09:39 (131)
28	06:29			06:58		07:33 (80)	07:28			07:59		08:19 (90)	07:34		08:29 (131)	07:56		08:48 (131)
	20:55			20:15	28	08:01 (80)	19:23			18:38	72	10:22 (131)	17:11	64	09:33 (131)	17:16	52	09:40 (131)
29	06:30			06:59		07:32 (80)	07:29			08:00		08:22 (90)	07:35		08:30 (131)	07:56		08:48 (131)
	20:54			20:14	30	08:02 (80)	19:22			18:37	69	10:24 (131)	17:11	63	09:33 (131)	17:17	53	09:41 (131)
30	06:31			07:00		07:32 (80)	07:30			08:01		09:25 (131)	07:36		08:31 (131)	07:57		08:48 (131)
	20:53			20:12	30	08:02 (80)	19:20			18:36	60	10:25 (131)	17:10	61	09:32 (131)	17:18	53	09:41 (131)
31	06:31			07:01		07:31 (80)				08:02		09:24 (131)				07:57		08:48 (131)
	20:52			20:11	31	08:02 (80)				18:34	62	10:26 (131)				17:19	54	09:42 (131)
Potential sun hours	456			426			374			346			300			291		
Total, worst case		477			219			537			1007			2006			1668	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.68			0.67			0.66			0.62			0.61			0.61	
Total reduction		0.41			0.40			0.40			0.34			0.22			0.30	
Total, real		194			87			216			346			448			504	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 15

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 400 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5566)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May	June
1	07:57		08:58 (85)	07:45			07:10		07:30 (99)	07:20		07:47 (84)	06:36	06:08
	17:20	76	15:42 (113)	17:53			18:26	23	07:53 (99)	19:59	79	19:21 (112)	20:28	20:57
2	07:57		08:58 (85)	07:44			07:08		07:30 (99)	07:19		07:46 (84)	06:35	06:08
	17:21	75	15:42 (113)	17:54			18:27	22	07:52 (99)	20:00	81	19:21 (112)	20:29	20:58
3	07:58		08:59 (85)	07:43			07:07		07:30 (99)	07:17		07:47 (84)	06:33	06:07
	17:21	73	15:42 (113)	17:56			18:28	23	07:53 (99)	20:00	82	19:22 (112)	20:30	20:58
4	07:58		09:00 (85)	07:42			07:05		07:29 (99)	07:15		07:46 (84)	06:32	06:07
	17:22	70	15:42 (113)	17:57			18:29	23	07:52 (99)	20:01	83	19:22 (112)	20:31	20:59
5	07:58		09:00 (85)	07:41			07:04		07:30 (99)	07:14		07:46 (84)	06:31	06:07
	17:23	69	15:41 (113)	17:58			18:31	22	07:52 (99)	20:02	82	19:21 (112)	20:32	21:00
6	07:58		09:01 (85)	07:40			07:02		07:30 (99)	07:12		07:47 (84)	06:30	06:06
	17:24	66	15:41 (113)	17:59			18:32	21	07:51 (99)	20:03	81	19:22 (112)	20:33	21:00
7	07:58		09:02 (85)	07:38			07:00		07:30 (99)	07:11		07:47 (84)	06:29	06:06
	17:25	63	15:40 (113)	18:01			18:33	19	07:49 (99)	20:04	81	19:22 (112)	20:34	21:01
8	07:57		09:03 (85)	07:37			07:59		08:32 (99)	07:09		07:48 (84)	06:27	06:06
	17:26	60	15:39 (113)	18:02			19:34	16	08:48 (99)	20:05	79	19:22 (112)	20:35	21:02
9	07:57		09:04 (85)	07:36			07:57		08:33 (99)	07:07		07:49 (84)	06:26	06:06
	17:27	55	15:38 (113)	18:03			19:35	13	08:46 (99)	20:06	76	19:22 (112)	20:36	21:02
10	07:57		09:04 (85)	07:35			07:56		08:37 (99)	07:06		07:51 (84)	06:25	06:06
	17:28	48	15:35 (113)	18:04			19:36	6	08:43 (99)	20:07	72	19:22 (112)	20:37	21:03
11	07:57		09:05 (85)	07:34			07:54			07:04		07:53 (84)	06:24	06:05
	17:29	39	09:44 (85)	18:05			19:37			20:08	66	19:21 (112)	20:38	21:03
12	07:57		09:06 (85)	07:33			07:53			07:03		18:26 (112)	06:23	06:05
	17:30	38	09:44 (85)	18:07			19:38			20:09	55	19:21 (112)	20:39	21:04
13	07:56		09:06 (85)	07:32			07:51			07:01		18:26 (112)	06:22	06:05
	17:31	38	09:44 (85)	18:08			19:39			20:10	54	19:20 (112)	20:40	21:04
14	07:56		09:08 (85)	07:30			07:49			07:00		18:25 (112)	06:21	06:05
	17:32	36	09:44 (85)	18:09			19:40			20:11	54	19:19 (112)	20:41	21:05
15	07:56		09:09 (85)	07:29			07:48			06:58		18:26 (112)	06:20	06:05
	17:33	35	09:44 (85)	18:10			19:41			20:12	53	19:19 (112)	20:42	21:05
16	07:55		09:10 (85)	07:28			07:46			06:57		18:27 (112)	06:19	06:05
	17:34	33	09:43 (85)	18:11			19:42			20:13	52	19:19 (112)	20:43	21:06
17	07:55		09:11 (85)	07:26			07:45			06:55		18:27 (112)	06:18	06:05
	17:36	32	09:43 (85)	18:12			19:43			20:14	50	19:17 (112)	20:44	21:06
18	07:54		09:12 (85)	07:25			07:43			06:54		18:27 (112)	06:18	06:05
	17:37	29	09:41 (85)	18:14			19:44			20:15	50	19:17 (112)	20:45	21:06
19	07:54		09:14 (85)	07:24			07:41			06:52		18:27 (112)	06:17	06:05
	17:38	27	09:41 (85)	18:15			19:45			20:16	49	19:16 (112)	20:46	21:07
20	07:53		09:15 (85)	07:22			07:40			06:51		18:29 (112)	06:16	06:06
	17:39	24	09:39 (85)	18:16			19:46			20:17	46	19:15 (112)	20:47	21:07
21	07:53		09:17 (85)	07:21			07:38			06:49		18:29 (112)	06:15	06:06
	17:40	20	09:37 (85)	18:17			19:47			20:18	44	19:13 (112)	20:48	21:07
22	07:52		09:20 (85)	07:20			07:36			06:48		18:30 (112)	06:14	06:06
	17:41	16	09:36 (85)	18:18			19:49			20:19	42	19:12 (112)	20:49	21:08
23	07:52		09:24 (85)	07:18			07:35		18:52 (112)	06:47		18:32 (112)	06:14	06:06
	17:42	8	09:32 (85)	18:19			19:50	14	19:06 (112)	20:20	39	19:11 (112)	20:50	21:08
24	07:51			07:17		07:37 (99)	07:33		07:59 (84)	06:45		18:32 (112)	06:13	06:07
	17:44			18:20	10	07:47 (99)	19:51	33	19:10 (112)	20:21	37	19:09 (112)	20:50	21:08
25	07:50			07:15		07:35 (99)	07:32		07:55 (84)	06:44		18:34 (112)	06:12	06:07
	17:45			18:22	14	07:49 (99)	19:52	46	19:12 (112)	20:22	34	19:08 (112)	20:51	21:08
26	07:50			07:14		07:33 (99)	07:30		07:54 (84)	06:42		18:36 (112)	06:11	06:07
	17:46			18:23	17	07:50 (99)	19:53	54	19:15 (112)	20:23	30	19:06 (112)	20:52	21:08
27	07:49			07:13		07:32 (99)	07:28		07:52 (84)	06:41		18:37 (112)	06:11	06:08
	17:47			18:24	20	07:52 (99)	19:54	60	19:16 (112)	20:24	27	19:04 (112)	20:53	21:08
28	07:48			07:11		07:31 (99)	07:27		07:50 (84)	06:40		18:40 (112)	06:10	06:08
	17:48			18:25	21	07:52 (99)	19:55	66	19:17 (112)	20:25	21	19:01 (112)	20:54	21:08
29	07:47						07:25		07:49 (84)	06:38		18:43 (112)	06:10	06:08
	17:50						19:56	71	19:19 (112)	20:26	15	18:58 (112)	20:55	21:08
30	07:46						07:23		07:48 (84)	06:37			06:09	06:09
	17:51						19:57	74	19:19 (112)	20:27			20:55	21:08
31	07:45						07:22		07:47 (84)				06:09	
	17:52						19:58	77	19:20 (112)				20:56	
Potential sun hours	300			299			370			397			446	449
Total, worst case		1030			82			683			1614			
Sun reduction		0.36			0.42			0.44			0.51			
Oper. time red.		1.00			1.00			1.00			1.00			
Wind dir. red.		0.62			0.63			0.65			0.66			
Total reduction		0.22			0.27			0.29			0.34			
Total, real		229			22			196			542			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 16

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 400 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5566)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July	August			September			October			November			December		
1	06:09	06:32			07:02		07:52 (84)	07:31			07:04			07:37		08:47 (85)
	21:08	20:51			20:09	66	19:20 (112)	19:19			17:33			17:10	39	09:26 (85)
2	06:10	06:33			07:03		07:49 (84)	07:32			07:05			07:38		08:47 (85)
	21:08	20:50			20:08	72	19:20 (112)	19:17			17:32			17:10	47	15:17 (113)
3	06:10	06:34			07:04		07:47 (84)	07:33			07:06			07:39		08:47 (85)
	21:08	20:49			20:06	76	19:20 (112)	19:15			17:31			17:10	55	15:21 (113)
4	06:11	06:35			07:05		07:45 (84)	07:34		08:12 (99)	07:07			07:40		08:47 (85)
	21:08	20:48			20:05	79	19:19 (112)	19:14	10	08:22 (99)	17:30			17:10	59	15:23 (113)
5	06:11	06:36			07:06		07:44 (84)	07:35		08:09 (99)	07:08			07:41		08:47 (85)
	21:08	20:47			20:03	81	19:19 (112)	19:12	15	08:24 (99)	17:29			17:10	62	15:25 (113)
6	06:12	06:37			07:07		07:43 (84)	07:36		08:07 (99)	07:09			07:42		08:47 (85)
	21:08	20:45			20:01	81	19:18 (112)	19:10	18	08:25 (99)	17:28			17:09	66	15:27 (113)
7	06:12	06:38			07:08		07:42 (84)	07:37		08:06 (99)	07:10			07:43		08:47 (85)
	21:07	20:44			20:00	83	19:18 (112)	19:09	20	08:26 (99)	17:27			17:09	69	15:28 (113)
8	06:13	06:39			07:09		07:41 (84)	07:38		08:05 (99)	07:12			07:44		08:48 (85)
	21:07	20:43			19:57	83	19:17 (112)	19:07	21	08:26 (99)	17:26			17:09	71	15:30 (113)
9	06:14	06:40			07:10		07:40 (84)	07:39		08:04 (99)	07:13			07:45		08:48 (85)
	21:07	20:42			19:55	81	19:15 (112)	19:06	22	08:26 (99)	17:25			17:09	73	15:31 (113)
10	06:14	06:41			07:10		07:39 (84)	07:40		08:04 (99)	07:14			07:46		08:48 (85)
	21:06	20:41			19:53	81	19:14 (112)	19:04	22	08:26 (99)	17:24			17:09	75	15:32 (113)
11	06:15	06:42			07:11		07:39 (84)	07:41		08:03 (99)	07:15			07:47		08:49 (85)
	21:06	20:39			19:52	80	19:13 (112)	19:03	23	08:26 (99)	17:23			17:09	76	15:33 (113)
12	06:16	06:43			07:12		07:39 (84)	07:42		08:03 (99)	07:16			07:47		08:48 (85)
	21:06	20:38			19:50	77	19:12 (112)	19:01	23	08:26 (99)	17:22			17:10	79	15:34 (113)
13	06:16	06:44		18:56 (112)	07:13		07:39 (84)	07:43		08:03 (99)	07:17			07:48		08:49 (85)
	21:05	20:37	5	19:01 (112)	19:48	75	19:11 (112)	19:00	22	08:25 (99)	17:21			17:10	78	15:35 (113)
14	06:17	06:45		18:50 (112)	07:14		07:39 (84)	07:44		08:04 (99)	07:19			07:49		08:50 (85)
	21:05	20:36	17	19:07 (112)	19:47	72	19:09 (112)	18:58	21	08:25 (99)	17:20			17:10	79	15:36 (113)
15	06:18	06:46		18:47 (112)	07:15		07:40 (84)	07:45		08:05 (99)	07:20			07:50		08:50 (85)
	21:04	20:34	23	19:10 (112)	19:45	68	19:08 (112)	18:56	19	08:24 (99)	17:19			17:10	81	15:37 (113)
16	06:19	06:47		18:44 (112)	07:16		07:41 (84)	07:46		08:06 (99)	07:21			07:50		08:50 (85)
	21:04	20:33	28	19:12 (112)	19:43	61	19:06 (112)	18:55	16	08:22 (99)	17:18			17:10	81	15:37 (113)
17	06:19	06:48		18:41 (112)	07:17		07:42 (84)	07:47		08:07 (99)	07:22			07:51		08:51 (85)
	21:03	20:32	32	19:13 (112)	19:42	56	19:04 (112)	18:54	13	08:20 (99)	17:18			17:11	82	15:38 (113)
18	06:20	06:49		18:39 (112)	07:18		07:43 (84)	07:48		08:10 (99)	07:23			07:52		08:51 (85)
	21:02	20:30	35	19:14 (112)	19:40	48	19:01 (112)	18:52	7	08:17 (99)	17:17			17:11	82	15:38 (113)
19	06:21	06:50		18:38 (112)	07:19		07:45 (84)	07:49			07:24		08:59 (85)	07:52		08:51 (85)
	21:02	20:29	37	19:15 (112)	19:38	38	18:58 (112)	18:51			17:16	8	09:07 (85)	17:12	83	15:39 (113)
20	06:22	06:51		18:36 (112)	07:20		18:37 (112)	07:50			07:25		08:55 (85)	07:53		08:52 (85)
	21:01	20:27	40	19:16 (112)	19:37	17	18:54 (112)	18:49			17:15	16	09:11 (85)	17:12	82	15:40 (113)
21	06:23	06:51		18:35 (112)	07:21			07:51			07:27		08:53 (85)	07:53		08:52 (85)
	21:00	20:26	42	19:17 (112)	19:35			18:48			17:15	20	09:13 (85)	17:12	83	15:40 (113)
22	06:24	06:52		18:33 (112)	07:22			07:52			07:28		08:51 (85)	07:54		08:53 (85)
	21:00	20:24	45	19:18 (112)	19:33			18:46			17:14	24	09:15 (85)	17:13	83	15:41 (113)
23	06:24	06:53		18:32 (112)	07:23			07:53			07:29		08:50 (85)	07:54		08:53 (85)
	20:59	20:23	47	19:19 (112)	19:32			18:45			17:14	27	09:17 (85)	17:13	82	15:41 (113)
24	06:25	06:54		18:31 (112)	07:24			07:55			07:30		08:49 (85)	07:55		08:53 (85)
	20:58	20:22	49	19:20 (112)	19:30			18:44			17:13	29	09:18 (85)	17:14	83	15:41 (113)
25	06:26	06:55		18:30 (112)	07:25			07:56			07:31		08:49 (85)	07:55		08:55 (85)
	20:57	20:20	50	19:20 (112)	19:28			18:42			17:13	32	09:21 (85)	17:15	82	15:42 (113)
26	06:27	06:56		18:29 (112)	07:26			07:57			07:32		08:49 (85)	07:56		08:55 (85)
	20:56	20:19	51	19:20 (112)	19:27			18:41			17:12	33	09:22 (85)	17:15	82	15:42 (113)
27	06:28	06:57		18:28 (112)	07:27			07:58			07:33		08:48 (85)	07:56		08:55 (85)
	20:56	20:17	53	19:21 (112)	19:25			18:40			17:12	35	09:23 (85)	17:16	81	15:42 (113)
28	06:29	06:58		18:28 (112)	07:28			07:59			07:34		08:48 (85)	07:56		08:56 (85)
	20:55	20:16	53	19:21 (112)	19:23			18:38			17:11	36	09:24 (85)	17:17	81	15:43 (113)
29	06:30	06:59		18:26 (112)	07:29			08:00			07:35		08:47 (85)	07:57		08:57 (85)
	20:54	20:14	54	19:20 (112)	19:22			18:37			17:11	38	09:25 (85)	17:17	79	15:43 (113)
30	06:31	07:00		18:25 (112)	07:30			08:01			07:36		08:47 (85)	07:57		08:57 (85)
	20:53	20:12	55	19:20 (112)	19:20			18:36			17:11	38	09:25 (85)	17:18	79	15:43 (113)
31	06:32	07:01		18:25 (112)				08:02						07:57		08:57 (85)
	20:52	20:11	55	19:20 (112)				18:35						17:19	78	15:43 (113)
Potential sun hours	456	426			374			346			300			291		
Total, worst case			771				1375			272			336			2312
Sun reduction			0.60				0.61			0.56			0.37			0.50
Oper. time red.			1.00				1.00			1.00			1.00			1.00
Wind dir. red.			0.66				0.66			0.63			0.61			0.63
Total reduction			0.40				0.40			0.35			0.22			0.31
Total, real			305				552			96			75			726

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 17

Licensed user:
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Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 401 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5567)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:46 (85)	07:45			07:10		07:29 (99)	07:20		07:47 (84)	06:36		18:30 (112)	06:08		
	17:20	45	09:31 (85)	17:53			18:26	21	07:50 (99)	19:59	81	19:18 (112)	20:28	31	19:01 (112)	20:57		
2	07:57		08:47 (85)	07:44			07:08		07:28 (99)	07:19		07:46 (84)	06:35		18:32 (112)	06:08		
	17:21	44	09:31 (85)	17:54			18:27	22	07:50 (99)	20:00	83	19:18 (112)	20:29	27	18:59 (112)	20:58		
3	07:58		08:47 (85)	07:43			07:07		07:28 (99)	07:17		07:46 (84)	06:33		18:35 (112)	06:07		
	17:21	45	09:32 (85)	17:56			18:28	22	07:50 (99)	20:00	84	19:19 (112)	20:30	22	18:57 (112)	20:58		
4	07:58		08:48 (85)	07:42			07:05		07:28 (99)	07:15		07:46 (84)	06:32		18:38 (112)	06:07		
	17:22	44	09:32 (85)	17:57			18:29	22	07:50 (99)	20:01	84	19:19 (112)	20:31	15	18:53 (112)	20:59		
5	07:58		08:48 (85)	07:41			07:04		07:28 (99)	07:14		07:46 (84)	06:31			06:07		
	17:23	45	09:33 (85)	17:58			18:31	22	07:50 (99)	20:02	84	19:19 (112)	20:32			21:00		
6	07:58		08:49 (85)	07:40			07:02		07:28 (99)	07:12		07:47 (84)	06:30			06:06		
	17:24	44	09:33 (85)	17:59			18:32	21	07:49 (99)	20:03	84	19:20 (112)	20:33			21:00		
7	07:58		08:50 (85)	07:38			07:00		07:28 (99)	07:11		07:47 (84)	06:29			06:06		
	17:25	43	09:33 (85)	18:01			18:33	19	07:47 (99)	20:04	82	19:19 (112)	20:34			21:01		
8	07:57		08:50 (85)	07:37			07:59		08:29 (99)	07:09		07:49 (84)	06:27			06:06		
	17:26	44	09:34 (85)	18:02			19:34	17	08:46 (99)	20:05	80	19:20 (112)	20:35			21:02		
9	07:57		08:51 (85)	07:36			07:57		08:30 (99)	07:07		07:50 (84)	06:26			06:06		
	17:27	43	09:34 (85)	18:03			19:35	14	08:44 (99)	20:06	77	19:20 (112)	20:36			21:02		
10	07:57		08:51 (85)	07:35			07:56		08:33 (99)	07:06		07:54 (84)	06:25			06:06		
	17:28	43	09:34 (85)	18:04			19:36	9	08:42 (99)	20:07	69	19:20 (112)	20:37			21:03		
11	07:57		08:52 (85)	07:34			07:54			07:04		18:18 (112)	06:24			06:05		
	17:29	42	09:34 (85)	18:05			19:37			20:08	61	19:19 (112)	20:38			21:03		
12	07:57		08:53 (85)	07:33			07:53			07:03		18:18 (112)	06:23			06:05		
	17:30	42	09:35 (85)	18:07			19:38			20:09	62	19:20 (112)	20:39			21:04		
13	07:56		08:53 (85)	07:32			07:51			07:01		18:18 (112)	06:22			06:05		
	17:31	41	09:34 (85)	18:08			19:39			20:10	61	19:19 (112)	20:40			21:04		
14	07:56		08:54 (85)	07:30			07:49			07:00		18:17 (112)	06:21			06:05		
	17:32	40	09:34 (85)	18:09			19:40			20:11	61	19:18 (112)	20:41			21:05		
15	07:56		08:55 (85)	07:29			07:48			06:58		18:18 (112)	06:20			06:05		
	17:33	40	09:35 (85)	18:10			19:41			20:12	60	19:18 (112)	20:42			21:05		
16	07:55		08:55 (85)	07:28			07:46			06:57		18:18 (112)	06:19			06:05		
	17:34	39	09:34 (85)	18:11			19:42			20:13	60	19:18 (112)	20:43			21:06		
17	07:55		08:57 (85)	07:26			07:45			06:55		18:18 (112)	06:18			06:05		
	17:36	37	09:34 (85)	18:12			19:43			20:14	59	19:17 (112)	20:44			21:06		
18	07:54		08:57 (85)	07:25			07:43			06:54		18:19 (112)	06:18			06:05		
	17:37	37	09:34 (85)	18:14			19:44			20:15	58	19:17 (112)	20:45			21:06		
19	07:54		08:59 (85)	07:24			07:41			06:52		18:18 (112)	06:17			06:06		
	17:38	35	09:34 (85)	18:15			19:45			20:16	58	19:16 (112)	20:46			21:07		
20	07:53		08:59 (85)	07:22			07:40			06:51		18:19 (112)	06:16			06:06		
	17:39	34	09:33 (85)	18:16			19:46			20:17	56	19:15 (112)	20:47			21:07		
21	07:53		09:00 (85)	07:21			07:38			06:49		18:19 (112)	06:15			06:06		
	17:40	32	09:32 (85)	18:17			19:47			20:18	55	19:14 (112)	20:48			21:07		
22	07:52		09:02 (85)	07:20			07:36			06:48		18:20 (112)	06:14			06:06		
	17:41	30	09:32 (85)	18:18			19:49			20:19	53	19:13 (112)	20:49			21:08		
23	07:52		09:03 (85)	07:18			07:35		18:48 (112)	06:47		18:21 (112)	06:14			06:06		
	17:42	28	09:31 (85)	18:19			19:50	12	19:00 (112)	20:20	52	19:13 (112)	20:50			21:08		
24	07:51		09:04 (85)	07:17			07:33		07:57 (84)	06:45		18:21 (112)	06:13			06:07		
	17:44	25	09:29 (85)	18:20			19:51	35	19:05 (112)	20:21	50	19:11 (112)	20:50			21:08		
25	07:50		09:07 (85)	07:15		07:35 (99)	07:32		07:54 (84)	06:44		18:22 (112)	06:12			06:07		
	17:45	21	09:28 (85)	18:22	10	07:45 (99)	19:52	47	19:08 (112)	20:22	48	19:10 (112)	20:51			21:08		
26	07:50		09:09 (85)	07:14		07:33 (99)	07:30		07:53 (84)	06:42		18:24 (112)	06:11			06:07		
	17:46	17	09:26 (85)	18:23	14	07:47 (99)	19:53	55	19:11 (112)	20:23	46	19:10 (112)	20:52			21:08		
27	07:49		09:12 (85)	07:13		07:32 (99)	07:28		07:51 (84)	06:41		18:24 (112)	06:11			06:08		
	17:47	11	09:23 (85)	18:24	17	07:49 (99)	19:54	62	19:12 (112)	20:24	44	19:08 (112)	20:53			21:08		
28	07:48			07:11		07:30 (99)	07:27		07:49 (84)	06:40		18:25 (112)	06:10			06:08		
	17:48			18:25	19	07:49 (99)	19:55	67	19:13 (112)	20:25	42	19:07 (112)	20:54			21:08		
29	07:47						07:25		07:49 (84)	06:38		18:27 (112)	06:10			06:08		
	17:50						19:56	71	19:15 (112)	20:26	38	19:05 (112)	20:55			21:08		
30	07:46						07:23		07:47 (84)	06:37		18:28 (112)	06:09			06:09		
	17:51						19:57	77	19:16 (112)	20:27	35	19:03 (112)	20:55			21:08		
31	07:45						07:22		07:47 (84)				06:09					
	17:52						19:58	78	19:17 (112)				20:56					
Potential sun hours	300			299			370			397			446			449		
Total, worst case		991			60			693			1867			95				
Sun reduction		0.36			0.42			0.44			0.51			0.56				
Oper. time red.		1.00			1.00			1.00			1.00			1.00				
Wind dir. red.		0.61			0.63			0.65			0.66			0.66				
Total reduction		0.22			0.27			0.29			0.34			0.37				
Total, real		216			16			198			627			35				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 18

Licensed user:
EDR
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US-SYRACUSE, NY 13202
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Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 401 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5567)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July	August		September			October			November			December		
1	06:09	06:32		07:02		18:17 (112)	07:31			07:04			07:37		08:34 (85)
	21:08	20:51		20:09	61	19:18 (112)	19:19			17:33			17:10	42	09:16 (85)
2	06:10	06:33		07:03		07:52 (84)	07:32			07:05			07:38		08:34 (85)
	21:08	20:50		20:08	69	19:18 (112)	19:17			17:32			17:10	43	09:17 (85)
3	06:10	06:34		07:04		07:48 (84)	07:33		08:13 (99)	07:06			07:39		08:34 (85)
	21:08	20:49		20:06	77	19:18 (112)	19:15	5	08:18 (99)	17:31			17:10	43	09:17 (85)
4	06:11	06:35		07:05		07:46 (84)	07:34		08:09 (99)	07:07			07:40		08:34 (85)
	21:08	20:48		20:05	80	19:17 (112)	19:14	12	08:21 (99)	17:30			17:10	44	09:18 (85)
5	06:11	06:36		07:06		07:44 (84)	07:35		08:07 (99)	07:08			07:41		08:35 (85)
	21:08	20:47		20:03	82	19:16 (112)	19:12	15	08:22 (99)	17:29			17:10	44	09:19 (85)
6	06:12	06:37		07:07		07:43 (84)	07:36		08:05 (99)	07:09			07:42		08:35 (85)
	21:08	20:45		20:01	84	19:16 (112)	19:10	18	08:23 (99)	17:28			17:09	44	09:19 (85)
7	06:12	06:38		07:08		07:42 (84)	07:37		08:04 (99)	07:10			07:43		08:35 (85)
	21:07	20:44		20:00	84	19:15 (112)	19:09	20	08:24 (99)	17:27			17:09	45	09:20 (85)
8	06:13	06:39		07:09		07:41 (84)	07:38		08:03 (99)	07:12			07:44		08:36 (85)
	21:07	20:43	7	19:57	84	19:14 (112)	19:07	21	08:24 (99)	17:26			17:09	44	09:20 (85)
9	06:14	06:40		07:10		07:40 (84)	07:39		08:02 (99)	07:13			07:45		08:36 (85)
	21:07	20:42	17	19:55	83	19:12 (112)	19:06	22	08:24 (99)	17:25			17:09	45	09:21 (85)
10	06:14	06:41		07:10		07:39 (84)	07:40		08:02 (99)	07:14			07:46		08:37 (85)
	21:06	20:41	24	19:53	83	19:11 (112)	19:04	22	08:24 (99)	17:24			17:09	45	09:22 (85)
11	06:15	06:42		07:11		07:39 (84)	07:41		08:02 (99)	07:15			07:47		08:37 (85)
	21:06	20:39	28	19:52	81	19:10 (112)	19:03	22	08:24 (99)	17:23			17:09	45	09:22 (85)
12	06:16	06:43		07:12		07:38 (84)	07:42		08:02 (99)	07:16			07:47		08:37 (85)
	21:06	20:38	32	19:50	79	19:09 (112)	19:01	21	08:23 (99)	17:22			17:10	45	09:22 (85)
13	06:16	06:44		07:13		07:38 (84)	07:43		08:02 (99)	07:17			07:48		08:38 (85)
	21:05	20:37	36	19:48	77	19:07 (112)	19:00	20	08:22 (99)	17:21			17:10	45	09:23 (85)
14	06:17	06:45		07:14		07:39 (84)	07:44		08:04 (99)	07:19			07:49		08:38 (85)
	21:05	20:36	39	19:47	73	19:06 (112)	18:58	18	08:22 (99)	17:20			17:10	48	15:03 (113)
15	06:18	06:46		07:15		07:39 (84)	07:45		08:05 (99)	07:20		08:45 (85)	07:50		08:39 (85)
	21:04	20:34	42	19:45	68	19:04 (112)	18:56	15	08:20 (99)	17:19	11	08:56 (85)	17:10	53	15:06 (113)
16	06:19	06:47		07:16		07:40 (84)	07:46		08:06 (99)	07:21		08:42 (85)	07:50		08:39 (85)
	21:04	20:33	45	19:43	63	19:02 (112)	18:55	12	08:18 (99)	17:18	17	08:59 (85)	17:10	56	15:08 (113)
17	06:19	06:48		07:17		07:41 (84)	07:47		08:08 (99)	07:22		08:40 (85)	07:51		08:40 (85)
	21:03	20:32	47	19:42	57	19:00 (112)	18:54	7	08:15 (99)	17:18	21	09:01 (85)	17:11	57	15:09 (113)
18	06:20	06:49		07:18		07:42 (84)	07:48			07:23		08:38 (85)	07:52		08:40 (85)
	21:02	20:30	48	19:40	49	18:57 (112)	18:52			17:17	25	09:03 (85)	17:11	59	15:10 (113)
19	06:21	06:50		07:19		07:44 (84)	07:49			07:24		08:38 (85)	07:52		08:40 (85)
	21:02	20:29	50	19:38	37	18:53 (112)	18:51			17:16	28	09:06 (85)	17:12	60	15:11 (113)
20	06:22	06:51		07:20		07:49 (84)	07:50			07:25		08:37 (85)	07:53		08:41 (85)
	21:01	20:27	52	19:37	17	18:48 (112)	18:49			17:15	30	09:07 (85)	17:12	60	15:12 (113)
21	06:23	06:51		07:21			07:51			07:27		08:36 (85)	07:53		08:41 (85)
	21:00	20:26	53	19:35			18:48			17:15	32	09:08 (85)	17:12	60	15:12 (113)
22	06:24	06:52		07:22			07:52			07:28		08:35 (85)	07:54		08:42 (85)
	21:00	20:24	55	19:33			18:46			17:14	34	09:09 (85)	17:13	60	15:13 (113)
23	06:24	06:53		07:23			07:53			07:29		08:35 (85)	07:54		08:42 (85)
	20:59	20:23	56	19:32			18:45			17:14	35	09:10 (85)	17:13	60	15:13 (113)
24	06:25	06:54		07:24			07:55			07:30		08:34 (85)	07:55		08:42 (85)
	20:58	20:22	58	19:30			18:44			17:13	37	09:11 (85)	17:14	60	15:13 (113)
25	06:26	06:55		07:25			07:56			07:31		08:35 (85)	07:55		08:44 (85)
	20:57	20:20	59	19:28			18:42			17:13	37	09:12 (85)	17:15	59	15:14 (113)
26	06:27	06:56		07:26			07:57			07:32		08:34 (85)	07:56		08:44 (85)
	20:56	20:19	59	19:27			18:41			17:12	39	09:13 (85)	17:15	58	15:13 (113)
27	06:28	06:57		07:27			07:58			07:33		08:34 (85)	07:56		08:44 (85)
	20:56	20:17	60	19:25			18:40			17:12	40	09:14 (85)	17:16	57	15:13 (113)
28	06:29	06:58		07:28			07:59			07:34		08:34 (85)	07:56		08:45 (85)
	20:55	20:16	61	19:23			18:38			17:11	40	09:14 (85)	17:17	54	15:13 (113)
29	06:30	06:59		07:29			08:00			07:35		08:34 (85)	07:57		08:45 (85)
	20:54	20:14	61	19:22			18:37			17:11	41	09:15 (85)	17:17	50	15:11 (113)
30	06:31	07:00		07:30			08:01			07:36		08:34 (85)	07:57		08:46 (85)
	20:53	20:12	61	19:20			18:36			17:11	42	09:16 (85)	17:18	44	09:30 (85)
31	06:32	07:01		17:17 (112)			08:02						07:57		08:46 (85)
	20:52	20:11	62	19:19 (112)			18:35						17:19	45	09:31 (85)
Potential sun hours	456	426			374		346			300			291		
Total, worst case			1112			1388			250			509			1574
Sun reduction			0.60			0.61			0.56			0.37			0.50
Oper. time red.			1.00			1.00			1.00			1.00			1.00
Wind dir. red.			0.66			0.66			0.63			0.61			0.61
Total reduction			0.40			0.40			0.35			0.22			0.31
Total, real			439			557			88			114			481

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 19

Licensed user:
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Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 402 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5568)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February	March			April			May	June
1	07:57		08:44 (85)	07:45	07:10			07:20		07:53 (84)	06:36	06:08
	17:20	41	09:25 (85)	17:53	18:26			19:59	90	19:06 (112)	20:28	20:57
2	07:57		08:45 (85)	07:44	07:08			07:19		07:54 (84)	06:35	06:08
	17:21	40	09:25 (85)	17:54	18:27			20:00	88	19:06 (112)	20:29	20:58
3	07:58		08:45 (85)	07:43	07:07			07:17		07:55 (84)	06:33	06:07
	17:21	40	09:25 (85)	17:56	18:28			20:00	86	19:06 (112)	20:30	20:58
4	07:58		08:46 (85)	07:42	07:05			07:15		07:57 (84)	06:32	06:07
	17:22	40	09:26 (85)	17:57	18:29			20:01	81	19:06 (112)	20:31	20:59
5	07:58		08:46 (85)	07:41	07:04			07:14		08:00 (84)	06:31	06:07
	17:23	40	09:26 (85)	17:58	18:31			20:02	74	19:05 (112)	20:32	21:00
6	07:58		08:47 (85)	07:40	07:02			07:12		17:58 (112)	06:30	06:06
	17:24	40	09:27 (85)	17:59	18:32			20:03	67	19:05 (112)	20:33	21:00
7	07:58		08:48 (85)	07:38	07:00			07:11		17:57 (112)	06:29	06:06
	17:25	39	09:27 (85)	18:01	18:33			20:04	67	19:04 (112)	20:34	21:01
8	07:57		08:48 (85)	07:37	07:59			07:09		17:58 (112)	06:27	06:06
	17:26	39	09:27 (85)	18:02	19:34			20:05	66	19:04 (112)	20:35	21:02
9	07:57		08:49 (85)	07:36	07:57			07:07		17:58 (112)	06:26	06:06
	17:27	39	09:28 (85)	18:03	19:35			20:06	65	19:03 (112)	20:36	21:02
10	07:57		08:49 (85)	07:35	07:56			07:06		17:59 (112)	06:25	06:06
	17:28	38	09:27 (85)	18:04	19:36			20:07	64	19:03 (112)	20:37	21:03
11	07:57		08:50 (85)	07:34	07:54			07:04		17:59 (112)	06:24	06:05
	17:29	37	09:27 (85)	18:05	19:37			20:08	63	19:02 (112)	20:38	21:03
12	07:57		08:51 (85)	07:33	07:53			07:03		18:00 (112)	06:23	06:05
	17:30	37	09:28 (85)	18:07	19:38			20:09	62	19:02 (112)	20:39	21:04
13	07:56		08:52 (85)	07:32	07:51		18:32 (112)	07:01		18:00 (112)	06:22	06:05
	17:31	36	09:28 (85)	18:08	19:39	12	18:44 (112)	20:10	60	19:00 (112)	20:40	21:04
14	07:56		08:52 (85)	07:30	07:49		18:25 (112)	07:00		18:01 (112)	06:21	06:05
	17:32	35	09:27 (85)	18:09	19:40	24	18:49 (112)	20:11	59	19:00 (112)	20:41	21:05
15	07:56		08:54 (85)	07:29	07:48		18:22 (112)	06:58		18:01 (112)	06:20	06:05
	17:33	34	09:28 (85)	18:10	19:41	31	18:53 (112)	20:12	57	18:58 (112)	20:42	21:05
16	07:55		08:54 (85)	07:28	07:46		18:18 (112)	06:57		18:02 (112)	06:19	06:05
	17:34	33	09:27 (85)	18:11	19:42	37	18:55 (112)	20:13	56	18:58 (112)	20:43	21:06
17	07:55		08:56 (85)	07:26	07:45		18:15 (112)	06:55		18:02 (112)	06:18	06:05
	17:36	31	09:27 (85)	18:12	19:43	42	18:57 (112)	20:14	54	18:56 (112)	20:44	21:06
18	07:54		08:56 (85)	07:25	07:43		18:14 (112)	06:54		18:04 (112)	06:18	06:05
	17:37	30	09:26 (85)	18:14	19:44	45	18:59 (112)	20:15	51	18:55 (112)	20:45	21:06
19	07:54		08:58 (85)	07:24	07:41		18:12 (112)	06:52		18:04 (112)	06:17	06:06
	17:38	28	09:26 (85)	18:15	19:45	48	19:00 (112)	20:16	49	18:53 (112)	20:46	21:07
20	07:53		08:59 (85)	07:22	07:40		08:03 (84)	06:51		18:06 (112)	06:16	06:06
	17:39	26	09:25 (85)	18:16	19:46	64	19:02 (112)	20:17	46	18:52 (112)	20:47	21:07
21	07:53		09:00 (85)	07:21	07:38		08:00 (84)	06:49		18:07 (112)	06:15	06:06
	17:40	23	09:23 (85)	18:17	19:47	72	19:03 (112)	20:18	43	18:50 (112)	20:48	21:07
22	07:52		09:02 (85)	07:20	07:36		07:58 (84)	06:48		18:08 (112)	06:14	06:06
	17:41	21	09:23 (85)	18:18	19:49	76	19:03 (112)	20:19	41	18:49 (112)	20:49	21:08
23	07:52		09:04 (85)	07:18	07:35		07:57 (84)	06:47		18:10 (112)	06:14	06:06
	17:42	17	09:21 (85)	18:19	19:50	80	19:04 (112)	20:20	37	18:47 (112)	20:50	21:08
24	07:51		09:07 (85)	07:17	07:33		07:55 (84)	06:45		18:12 (112)	06:13	06:07
	17:44	11	09:18 (85)	18:20	19:51	85	19:05 (112)	20:21	32	18:44 (112)	20:50	21:08
25	07:50			07:15	07:32		07:54 (84)	06:44		18:14 (112)	06:12	06:07
	17:45			18:22	19:52	87	19:05 (112)	20:22	28	18:42 (112)	20:51	21:08
26	07:50			07:14	07:30		07:54 (84)	06:42		18:18 (112)	06:11	06:07
	17:46			18:23	19:53	89	19:06 (112)	20:23	21	18:39 (112)	20:52	21:08
27	07:49			07:13	07:28		07:53 (84)	06:41		18:21 (112)	06:11	06:08
	17:47			18:24	19:54	91	19:06 (112)	20:24	13	18:34 (112)	20:53	21:08
28	07:48			07:11	07:27		07:52 (84)	06:40			06:10	06:08
	17:48			18:25	19:55	93	19:06 (112)	20:25			20:54	21:08
29	07:47				07:25		07:53 (84)	06:38			06:10	06:08
	17:50				19:56	93	19:07 (112)	20:26			20:55	21:08
30	07:46				07:23		07:52 (84)	06:37			06:09	06:09
	17:51				19:57	93	19:06 (112)	20:27			20:55	21:08
31	07:45				07:22		07:53 (84)				06:09	
	17:52				19:58	92	19:07 (112)				20:56	
Potential sun hours	300			299	370			397			446	449
Total, worst case		795				1254			1520			
Sun reduction		0.36				0.44			0.51			
Oper. time red.		1.00				1.00			1.00			
Wind dir. red.		0.61				0.66			0.67			
Total reduction		0.22				0.29			0.34			
Total, real		173				365			515			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 20

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 402 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5568)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July	August			September			October	November			December		
1	06:09	06:32			07:02		17:58 (112)	07:31	07:04			07:37		08:32 (85)
	21:08	20:51			20:09	63	19:01 (112)	19:19	17:33			17:10	37	09:09 (85)
2	06:10	06:33			07:03		17:57 (112)	07:32	07:05			07:38		08:32 (85)
	21:08	20:50			20:08	64	19:01 (112)	19:17	17:32			17:10	38	09:10 (85)
3	06:10	06:34			07:04		17:56 (112)	07:33	07:06			07:39		08:32 (85)
	21:08	20:49			20:06	65	19:01 (112)	19:15	17:31			17:10	39	09:11 (85)
4	06:11	06:35			07:05		17:55 (112)	07:34	07:07			07:40		08:32 (85)
	21:08	20:48			20:05	66	19:01 (112)	19:14	17:30			17:10	39	09:11 (85)
5	06:11	06:36			07:06		17:55 (112)	07:35	07:08			07:41		08:33 (85)
	21:08	20:47			20:03	66	19:01 (112)	19:12	17:29			17:10	39	09:12 (85)
6	06:12	06:37			07:07		17:54 (112)	07:36	07:09			07:42		08:33 (85)
	21:08	20:45			20:01	67	19:01 (112)	19:10	17:28			17:09	40	09:13 (85)
7	06:12	06:38			07:08		07:56 (84)	07:37	07:10			07:43		08:33 (85)
	21:07	20:44			20:00	74	19:01 (112)	19:09	17:27			17:09	40	09:13 (85)
8	06:13	06:39			07:09		07:52 (84)	07:38	07:12			07:44		08:34 (85)
	21:07	20:43			19:57	81	19:01 (112)	19:07	17:26			17:09	40	09:14 (85)
9	06:14	06:40			07:10		07:49 (84)	07:39	07:13			07:45		08:34 (85)
	21:07	20:42			19:55	85	18:59 (112)	19:06	17:25			17:09	41	09:15 (85)
10	06:14	06:41			07:10		07:47 (84)	07:40	07:14			07:46		08:35 (85)
	21:06	20:41			19:53	88	18:59 (112)	19:04	17:24			17:09	40	09:15 (85)
11	06:15	06:42			07:11		07:45 (84)	07:41	07:15			07:47		08:35 (85)
	21:06	20:39			19:52	91	18:59 (112)	19:03	17:23			17:09	41	09:16 (85)
12	06:16	06:43			07:12		07:44 (84)	07:42	07:16			07:47		08:35 (85)
	21:06	20:38			19:50	92	18:58 (112)	19:01	17:22			17:10	41	09:16 (85)
13	06:16	06:44			07:13		07:44 (84)	07:43	07:17			07:48		08:35 (85)
	21:05	20:37			19:48	92	18:58 (112)	19:00	17:21			17:10	41	09:16 (85)
14	06:17	06:45			07:14		07:43 (84)	07:44	07:19			07:49		08:36 (85)
	21:05	20:36			19:47	93	18:57 (112)	18:58	17:20			17:10	41	09:17 (85)
15	06:18	06:46			07:15		07:42 (84)	07:45	07:20			07:50		08:37 (85)
	21:04	20:34			19:45	92	18:56 (112)	18:56	17:19			17:10	41	09:18 (85)
16	06:19	06:47		18:28 (112)	07:16		07:42 (84)	07:46	07:21			07:50		08:37 (85)
	21:04	20:33	15	18:43 (112)	19:43	91	18:55 (112)	18:55	17:18			17:10	41	09:18 (85)
17	06:19	06:48		18:23 (112)	07:17		07:42 (84)	07:47	07:22			07:51		08:37 (85)
	21:03	20:32	23	18:46 (112)	19:42	89	18:54 (112)	18:54	17:18			17:11	41	09:18 (85)
18	06:20	06:49		18:20 (112)	07:18		07:42 (84)	07:48	07:23		08:41 (85)	07:52		08:37 (85)
	21:02	20:30	29	18:49 (112)	19:40	88	18:53 (112)	18:52	17:17	11	08:52 (85)	07:11	41	09:18 (85)
19	06:21	06:50		18:17 (112)	07:19		07:42 (84)	07:49	07:24		08:39 (85)	07:52		08:38 (85)
	21:02	20:29	34	18:51 (112)	19:38	85	18:52 (112)	18:51	17:16	17	08:56 (85)	07:12	41	09:19 (85)
20	06:22	06:51		18:15 (112)	07:20		07:43 (84)	07:50	07:25		08:37 (85)	07:53		08:39 (85)
	21:01	20:27	37	18:52 (112)	19:37	82	18:51 (112)	18:49	17:15	21	08:58 (85)	07:12	41	09:20 (85)
21	06:23	06:51		18:13 (112)	07:21		07:43 (84)	07:51	07:27		08:36 (85)	07:53		08:39 (85)
	21:00	20:26	41	18:54 (112)	19:35	77	18:49 (112)	18:48	17:15	23	08:59 (85)	07:12	41	09:20 (85)
22	06:24	06:52		18:11 (112)	07:22		07:44 (84)	07:52	07:28		08:35 (85)	07:54		08:40 (85)
	21:00	20:24	44	18:55 (112)	19:33	72	18:47 (112)	18:46	17:14	26	09:01 (85)	07:13	41	09:21 (85)
23	06:24	06:53		18:09 (112)	07:23		07:46 (84)	07:53	07:29		08:34 (85)	07:54		08:40 (85)
	20:59	20:23	47	18:56 (112)	19:32	66	18:46 (112)	18:45	17:14	28	09:02 (85)	07:13	41	09:21 (85)
24	06:25	06:54		18:08 (112)	07:24		07:49 (84)	07:55	07:30		08:33 (85)	07:55		08:40 (85)
	20:58	20:22	49	18:57 (112)	19:30	56	18:44 (112)	18:44	17:13	30	09:03 (85)	07:14	41	09:21 (85)
25	06:26	06:55		18:07 (112)	07:25		17:56 (112)	07:56	07:31		08:34 (85)	07:55		08:41 (85)
	20:57	20:20	51	18:58 (112)	19:28	46	18:42 (112)	18:42	17:13	31	09:05 (85)	07:15	41	09:22 (85)
26	06:27	06:56		18:05 (112)	07:26		17:57 (112)	07:57	07:32		08:33 (85)	07:56		08:41 (85)
	20:56	20:19	54	18:59 (112)	19:27	43	18:40 (112)	18:41	17:12	33	09:06 (85)	07:15	41	09:22 (85)
27	06:28	06:57		18:04 (112)	07:27		17:59 (112)	07:58	07:33		08:33 (85)	07:56		08:41 (85)
	20:56	20:17	56	19:00 (112)	19:25	38	18:37 (112)	18:40	17:12	34	09:07 (85)	07:16	42	09:23 (85)
28	06:29	06:58		18:03 (112)	07:28		18:01 (112)	07:59	07:34		08:33 (85)	07:56		08:43 (85)
	20:55	20:16	57	19:00 (112)	19:23	34	18:35 (112)	18:38	17:11	34	09:07 (85)	07:17	41	09:24 (85)
29	06:30	06:59		18:01 (112)	07:29		18:04 (112)	08:00	07:35		08:32 (85)	07:57		08:43 (85)
	20:54	20:14	59	19:00 (112)	19:22	27	18:31 (112)	18:37	17:11	36	09:08 (85)	07:17	41	09:24 (85)
30	06:31	07:00		18:00 (112)	07:30		18:08 (112)	08:01	07:36		08:32 (85)	07:57		08:43 (85)
	20:53	20:12	60	19:00 (112)	19:20	18	18:26 (112)	18:36	17:11	37	09:09 (85)	07:18	41	09:24 (85)
31	06:32	07:01		17:59 (112)				08:02				07:57		08:44 (85)
	20:52	20:11	62	19:01 (112)				18:35				17:19	40	09:24 (85)
Potential sun hours	456	426			374			346	300			291		
Total, worst case			718				2091				361			1254
Sun reduction			0.60				0.61				0.37			0.50
Oper. time red.			1.00				1.00				1.00			1.00
Wind dir. red.			0.67				0.67				0.61			0.61
Total reduction			0.40				0.40				0.22			0.30
Total, real			286				845				81			380

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 21

Licensed user:
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US-SYRACUSE, NY 13202
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Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 403 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5569)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June
1	07:57		08:35 (85)	07:45		08:49 (85)	07:10			07:20		07:42 (84)	06:36		18:22 (112)	06:08
	17:20	74	15:21 (113)	17:53	30	09:19 (85)	18:26			19:59	25	08:07 (84)	20:28	65	19:27 (112)	20:57
2	07:57		08:35 (85)	07:44		08:51 (85)	07:08			07:19		07:41 (84)	06:35		18:23 (112)	06:08
	17:21	73	15:21 (113)	17:54	28	09:19 (85)	18:27			20:00	26	08:07 (84)	20:29	64	19:27 (112)	20:58
3	07:58		08:35 (85)	07:43		08:52 (85)	07:07			07:17		07:41 (84)	06:33		18:23 (112)	06:07
	17:21	72	15:20 (113)	17:56	24	09:16 (85)	18:28			20:00	45	19:10 (112)	20:30	63	19:26 (112)	20:58
4	07:58		08:35 (85)	07:42		08:54 (85)	07:05			07:15		07:40 (84)	06:32		18:24 (112)	06:07
	17:22	71	15:20 (113)	17:57	21	09:15 (85)	18:29			20:01	54	19:13 (112)	20:31	62	19:26 (112)	20:59
5	07:58		08:36 (85)	07:41		08:57 (85)	07:04			07:14		07:39 (84)	06:31		18:23 (112)	06:07
	17:23	68	15:19 (113)	17:58	15	09:12 (85)	18:31			20:02	61	19:16 (112)	20:32	62	19:25 (112)	21:00
6	07:58		08:36 (85)	07:40		09:04 (85)	07:02			07:12		07:39 (84)	06:30		18:24 (112)	06:06
	17:24	67	15:19 (113)	17:59	2	09:05 (85)	18:32			20:03	65	19:18 (112)	20:33	60	19:24 (112)	21:00
7	07:58		08:36 (85)	07:38			07:00			07:11		07:39 (84)	06:29		18:25 (112)	06:06
	17:25	65	15:18 (113)	18:01			18:33			20:04	69	19:20 (112)	20:34	59	19:24 (112)	21:01
8	07:57		08:37 (85)	07:37			07:59			07:09		07:40 (84)	06:27		18:25 (112)	06:06
	17:26	61	15:17 (113)	18:02			19:34			20:05	71	19:22 (112)	20:35	58	19:23 (112)	21:02
9	07:57		08:37 (85)	07:36			07:57			07:07		07:39 (84)	06:26		18:26 (112)	06:06
	17:27	58	15:16 (113)	18:03			19:35			20:06	74	19:23 (112)	20:36	57	19:23 (112)	21:02
10	07:57		08:37 (85)	07:35			07:56			07:06		07:40 (84)	06:25		18:27 (112)	06:06
	17:28	49	15:11 (113)	18:04			19:36			20:07	74	19:24 (112)	20:37	55	19:22 (112)	21:03
11	07:57		08:37 (85)	07:34			07:54			07:04		07:41 (84)	06:24		18:27 (112)	06:05
	17:29	44	09:21 (85)	18:05			19:37			20:08	74	19:25 (112)	20:38	54	19:21 (112)	21:03
12	07:57		08:38 (85)	07:33			07:53			07:03		07:43 (84)	06:23		18:28 (112)	06:05
	17:30	43	09:21 (85)	18:07			19:38			20:09	73	19:26 (112)	20:39	52	19:20 (112)	21:04
13	07:56		08:37 (85)	07:32			07:51			07:01		07:44 (84)	06:22		18:29 (112)	06:05
	17:31	44	09:21 (85)	18:08			19:39			20:10	71	19:26 (112)	20:40	51	19:20 (112)	21:04
14	07:56		08:38 (85)	07:30			07:49			07:00		07:48 (84)	06:21		18:30 (112)	06:05
	17:32	44	09:22 (85)	18:09			19:40			20:11	65	19:27 (112)	20:41	49	19:19 (112)	21:05
15	07:56		08:39 (85)	07:29			07:48			06:58		18:26 (112)	06:20		18:31 (112)	06:05
	17:33	44	09:23 (85)	18:10			19:41			20:12	61	19:27 (112)	20:42	47	19:18 (112)	21:05
16	07:55		08:39 (85)	07:28			07:46			06:57		18:26 (112)	06:19		18:31 (112)	06:05
	17:34	44	09:23 (85)	18:11			19:42			20:13	62	19:28 (112)	20:43	46	19:17 (112)	21:06
17	07:55		08:39 (85)	07:26			07:45			06:55		18:25 (112)	06:18		18:33 (112)	06:05
	17:36	45	09:24 (85)	18:12			19:43			20:14	63	19:28 (112)	20:44	44	19:17 (112)	21:06
18	07:54		08:39 (85)	07:25			07:43			06:54		18:25 (112)	06:18		18:34 (112)	06:05
	17:37	44	09:23 (85)	18:14			19:44			20:15	64	19:29 (112)	20:45	41	19:15 (112)	21:06
19	07:54		08:40 (85)	07:24			07:41			06:52		18:23 (112)	06:17		18:35 (112)	06:06
	17:38	44	09:24 (85)	18:15			19:45			20:16	65	19:28 (112)	20:46	39	19:14 (112)	21:07
20	07:53		08:40 (85)	07:22			07:40			06:51		18:23 (112)	06:16		18:36 (112)	06:06
	17:39	44	09:24 (85)	18:16			19:46			20:17	66	19:29 (112)	20:47	37	19:13 (112)	21:07
21	07:53		08:40 (85)	07:21			07:38			06:49		18:22 (112)	06:15		18:38 (112)	06:06
	17:40	44	09:24 (85)	18:17			19:47			20:18	66	19:28 (112)	20:48	34	19:12 (112)	21:07
22	07:52		08:41 (85)	07:20			07:36			06:48		18:22 (112)	06:14		18:39 (112)	06:06
	17:41	43	09:24 (85)	18:18			19:49			20:19	67	19:29 (112)	20:49	32	19:11 (112)	21:08
23	07:52		08:42 (85)	07:18			07:35			06:47		18:23 (112)	06:14		18:41 (112)	06:06
	17:42	42	09:24 (85)	18:19			19:50			20:20	66	19:29 (112)	20:50	28	19:09 (112)	21:08
24	07:51		08:42 (85)	07:17			07:33			06:45		18:22 (112)	06:13		18:43 (112)	06:07
	17:44	42	09:24 (85)	18:20			19:51			20:21	66	19:28 (112)	20:50	25	19:08 (112)	21:08
25	07:50		08:43 (85)	07:15			07:32			06:44		18:22 (112)	06:12		18:45 (112)	06:07
	17:45	41	09:24 (85)	18:22			19:52			20:22	67	19:29 (112)	20:51	21	19:06 (112)	21:08
26	07:50		08:44 (85)	07:14			07:30			06:42		18:22 (112)	06:11		18:47 (112)	06:07
	17:46	40	09:24 (85)	18:23			19:53			20:23	67	19:29 (112)	20:52	17	19:04 (112)	21:08
27	07:49		08:44 (85)	07:13			07:28			06:41		18:22 (112)	06:11		18:50 (112)	06:08
	17:47	39	09:23 (85)	18:24			19:54			20:24	66	19:28 (112)	20:53	11	19:01 (112)	21:08
28	07:48		08:45 (85)	07:11			07:27		07:50 (84)	06:40		18:22 (112)	06:10			06:08
	17:48	38	09:23 (85)	18:25			19:55	11	08:01 (84)	20:25	66	19:28 (112)	20:54			21:08
29	07:47		08:46 (85)				07:25		07:47 (84)	06:38		18:22 (112)	06:10			06:08
	17:50	36	09:22 (85)				19:56	17	08:04 (84)	20:26	66	19:28 (112)	20:55			21:08
30	07:46		08:47 (85)				07:23		07:45 (84)	06:37		18:22 (112)	06:09			06:09
	17:51	34	09:21 (85)				19:57	20	08:05 (84)	20:27	65	19:27 (112)	20:55			21:08
31	07:45		08:48 (85)				07:22		07:44 (84)				06:09			
	17:52	32	09:20 (85)				19:58	22	08:06 (84)				20:56			
Potential sun hours	300			299			370			397			446			449
Total, worst case		1529			120			70			1890			1233		
Sun reduction		0.36			0.42			0.44			0.51			0.56		
Oper. time red.		1.00			1.00			1.00			1.00			1.00		
Wind dir. red.		0.61			0.61			0.66			0.65			0.65		
Total reduction		0.22			0.25			0.29			0.33			0.36		
Total, real		337			30			20			626			447		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 22

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
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Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 403 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5569)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October	November			December		
1	06:09			06:32		18:38 (112)	07:02		07:40 (84)	07:31	07:04			07:37		08:19 (85)
	21:08			20:51	53	19:31 (112)	20:09	74	19:24 (112)	19:19	17:33			17:10	44	09:03 (85)
2	06:10			06:33		18:38 (112)	07:03		07:38 (84)	07:32	07:05			07:38		08:20 (85)
	21:08			20:50	54	19:32 (112)	20:08	74	19:22 (112)	19:17	17:32			17:10	49	14:54 (113)
3	06:10			06:34		18:37 (112)	07:04		07:37 (84)	07:33	07:06			07:39		08:20 (85)
	21:08			20:49	56	19:33 (112)	20:06	74	19:21 (112)	19:15	17:31			17:10	57	14:58 (113)
4	06:11			06:35		18:36 (112)	07:05		07:37 (84)	07:34	07:07			07:40		08:21 (85)
	21:08			20:48	57	19:33 (112)	20:05	71	19:19 (112)	19:14	17:30			17:10	61	15:01 (113)
5	06:11			06:36		18:36 (112)	07:06		07:36 (84)	07:35	07:08		08:32 (85)	07:41		08:21 (85)
	21:08			20:47	58	19:34 (112)	20:03	69	19:17 (112)	19:12	17:29	5	08:37 (85)	17:10	65	15:03 (113)
6	06:12			06:37		18:34 (112)	07:07		07:35 (84)	07:36	07:09		08:28 (85)	07:42		08:22 (85)
	21:08			20:45	60	19:34 (112)	20:01	66	19:15 (112)	19:10	17:28	15	08:43 (85)	17:09	67	15:05 (113)
7	06:12			06:38		18:33 (112)	07:08		07:35 (84)	07:37	07:10		08:25 (85)	07:43		08:23 (85)
	21:07			20:44	61	19:34 (112)	20:00	61	19:12 (112)	19:09	17:27	21	08:46 (85)	17:09	68	15:06 (113)
8	06:13			06:39		18:33 (112)	07:09		07:35 (84)	07:38	07:12		08:23 (85)	07:44		08:23 (85)
	21:07			20:43	61	19:34 (112)	19:57	55	19:09 (112)	19:07	17:26	25	08:48 (85)	17:09	70	15:08 (113)
9	06:14			06:40		18:32 (112)	07:10		07:34 (84)	07:39	07:13		08:21 (85)	07:45		08:24 (85)
	21:07			20:42	63	19:35 (112)	19:55	45	19:03 (112)	19:06	17:25	28	08:49 (85)	17:09	72	15:09 (113)
10	06:14			06:41		18:32 (112)	07:10		07:34 (84)	07:40	07:14		08:20 (85)	07:46		08:25 (85)
	21:06			20:41	63	19:35 (112)	19:53	26	08:00 (84)	19:04	17:24	30	08:50 (85)	17:09	72	15:10 (113)
11	06:15			06:42		18:31 (112)	07:11		07:34 (84)	07:41	07:15		08:20 (85)	07:47		08:26 (85)
	21:06			20:39	64	19:35 (112)	19:52	25	07:59 (84)	19:03	17:23	32	08:52 (85)	17:09	74	15:12 (113)
12	06:16			06:43		18:31 (112)	07:12		07:35 (84)	07:42	07:16		08:19 (85)	07:47		08:25 (85)
	21:06			20:38	64	19:35 (112)	19:50	23	07:58 (84)	19:01	17:22	34	08:53 (85)	17:10	75	15:12 (113)
13	06:16			06:44		18:30 (112)	07:13		07:36 (84)	07:43	07:17		08:18 (85)	07:48		08:26 (85)
	21:05			20:37	66	19:36 (112)	19:48	20	07:56 (84)	19:00	17:21	36	08:54 (85)	17:10	76	15:13 (113)
14	06:17			06:45		18:30 (112)	07:14		07:37 (84)	07:44	07:19		08:17 (85)	07:49		08:27 (85)
	21:05			20:36	66	19:36 (112)	19:47	17	07:54 (84)	18:58	17:20	38	08:55 (85)	17:10	76	15:14 (113)
15	06:18			06:46		18:30 (112)	07:15		07:39 (84)	07:45	07:20		08:17 (85)	07:50		08:28 (85)
	21:04			20:34	66	19:36 (112)	19:45	13	07:52 (84)	18:56	17:19	39	08:56 (85)	17:10	76	15:15 (113)
16	06:19		19:02 (112)	06:47		18:29 (112)	07:16			07:46	07:21		08:17 (85)	07:50		08:28 (85)
	21:04	6	19:08 (112)	20:33	67	19:36 (112)	19:43			18:55	17:18	40	08:57 (85)	17:10	77	15:15 (113)
17	06:19		18:57 (112)	06:48		18:28 (112)	07:17			07:47	07:22		08:16 (85)	07:51		08:29 (85)
	21:03	15	19:12 (112)	20:32	67	19:35 (112)	19:42			18:54	17:18	41	08:57 (85)	17:11	76	15:16 (113)
18	06:20		18:55 (112)	06:49		18:28 (112)	07:18			07:48	07:23		08:16 (85)	07:52		08:29 (85)
	21:02	20	19:15 (112)	20:30	66	19:34 (112)	19:40			18:52	17:17	42	08:58 (85)	17:11	77	15:16 (113)
19	06:21		18:53 (112)	06:50		18:27 (112)	07:19			07:49	07:24		08:17 (85)	07:52		08:30 (85)
	21:02	24	19:17 (112)	20:29	67	19:34 (112)	19:38			18:51	17:16	42	08:59 (85)	17:12	77	15:17 (113)
20	06:22		18:52 (112)	06:51		18:27 (112)	07:20			07:50	07:25		08:16 (85)	07:53		08:31 (85)
	21:01	27	19:19 (112)	20:27	67	19:34 (112)	19:37			18:49	17:15	43	08:59 (85)	17:12	77	15:18 (113)
21	06:23		18:50 (112)	06:51		18:27 (112)	07:21			07:51	07:27		08:16 (85)	07:53		08:31 (85)
	21:00	30	19:20 (112)	20:26	67	19:34 (112)	19:35			18:48	17:15	44	09:00 (85)	17:12	77	15:18 (113)
22	06:24		18:48 (112)	06:52		18:27 (112)	07:22			07:52	07:28		08:16 (85)	07:54		08:32 (85)
	21:00	33	19:21 (112)	20:24	66	19:33 (112)	19:33			18:46	17:14	44	09:00 (85)	17:13	77	15:19 (113)
23	06:24		18:47 (112)	06:53		18:27 (112)	07:23			07:53	07:29		08:16 (85)	07:54		08:32 (85)
	20:59	36	19:23 (112)	20:23	66	19:33 (112)	19:32			18:45	17:14	44	09:00 (85)	17:13	77	15:19 (113)
24	06:25		18:46 (112)	06:54		18:27 (112)	07:24			07:55	07:30		08:16 (85)	07:55		08:32 (85)
	20:58	38	19:24 (112)	20:22	65	19:32 (112)	19:30			18:44	17:13	44	09:00 (85)	17:14	77	15:19 (113)
25	06:26		18:45 (112)	06:55		18:27 (112)	07:25			07:56	07:31		08:17 (85)	07:55		08:33 (85)
	20:57	40	19:25 (112)	20:20	65	19:32 (112)	19:28			18:42	17:13	45	09:02 (85)	17:15	77	15:20 (113)
26	06:27		18:44 (112)	06:56		18:28 (112)	07:26			07:57	07:32		08:18 (85)	07:56		08:33 (85)
	20:56	43	19:27 (112)	20:19	63	19:31 (112)	19:27			18:41	17:12	44	09:02 (85)	17:15	77	15:20 (113)
27	06:28		18:43 (112)	06:57		18:28 (112)	07:27			07:58	07:33		08:18 (85)	07:56		08:33 (85)
	20:56	45	19:28 (112)	20:17	62	19:30 (112)	19:25			18:40	17:12	44	09:02 (85)	17:16	76	15:20 (113)
28	06:29		18:42 (112)	06:58		18:28 (112)	07:28			07:59	07:34		08:18 (85)	07:56		08:34 (85)
	20:55	46	19:28 (112)	20:16	61	19:29 (112)	19:23			18:38	17:11	44	09:02 (85)	17:17	77	15:21 (113)
29	06:30		18:41 (112)	06:59		07:47 (84)	07:29			08:00	07:35		08:18 (85)	07:57		08:34 (85)
	20:54	48	19:29 (112)	20:14	66	19:27 (112)	19:22			18:37	17:11	44	09:02 (85)	17:17	76	15:21 (113)
30	06:31		18:40 (112)	07:00		07:44 (84)	07:30			08:01	07:36		08:19 (85)	07:57		08:34 (85)
	20:53	50	19:30 (112)	20:12	71	19:26 (112)	19:20			18:36	17:11	43	09:02 (85)	17:18	76	15:21 (113)
31	06:32		18:39 (112)	07:01		07:42 (84)				08:02				07:57		08:34 (85)
	20:52	52	19:31 (112)	20:11	73	19:25 (112)				18:35				17:19	75	15:21 (113)
Potential sun hours	456			426			374			346	300			291		
Total, worst case		553			1971			713				951			2228	
Sun reduction		0.60			0.60			0.61				0.37			0.50	
Oper. time red.		1.00			1.00			1.00				1.00			1.00	
Wind dir. red.		0.65			0.65			0.66				0.61			0.63	
Total reduction		0.39			0.39			0.40				0.22			0.31	
Total, real		215			766			284				213			696	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 23

Licensed user:
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US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 404 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5570)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:36 (85)	07:45		08:43 (85)	07:10			07:20		07:48 (84)	06:36		18:39 (112)	06:08		18:54 (112)
	17:20	99	15:57 (113)	17:53	42	09:25 (85)	18:26			19:59	2	07:50 (84)	20:28	62	19:41 (112)	20:57	35	19:29 (112)
2	07:57		08:36 (85)	07:44		08:44 (85)	07:08			07:19		07:42 (84)	06:35		18:39 (112)	06:08		18:55 (112)
	17:21	98	15:57 (113)	17:54	40	09:24 (85)	18:27			20:00	13	07:55 (84)	20:29	62	19:41 (112)	20:58	33	19:28 (112)
3	07:58		08:36 (85)	07:43		08:45 (85)	07:07			07:17		07:40 (84)	06:33		18:39 (112)	06:07		18:56 (112)
	17:21	98	15:57 (113)	17:56	39	09:24 (85)	18:28			20:00	18	07:58 (84)	20:30	62	19:41 (112)	20:58	32	19:28 (112)
4	07:58		08:36 (85)	07:42		08:46 (85)	07:05		07:24 (99)	07:15		07:38 (84)	06:32		18:39 (112)	06:07		18:57 (112)
	17:22	99	15:57 (113)	17:57	37	09:23 (85)	18:29	11	07:35 (99)	20:01	21	07:59 (84)	20:31	62	19:41 (112)	20:59	30	19:27 (112)
5	07:58		08:36 (85)	07:41		08:47 (85)	07:04		07:23 (99)	07:14		07:36 (84)	06:31		18:38 (112)	06:07		18:58 (112)
	17:23	100	15:58 (113)	17:58	35	09:22 (85)	18:31	15	07:38 (99)	20:02	23	07:59 (84)	20:32	62	19:40 (112)	21:00	28	19:26 (112)
6	07:58		08:36 (85)	07:40		08:49 (85)	07:02		07:21 (99)	07:12		07:35 (84)	06:30		18:38 (112)	06:06		18:59 (112)
	17:24	99	15:58 (113)	17:59	32	09:21 (85)	18:32	18	07:39 (99)	20:03	25	08:00 (84)	20:33	62	19:40 (112)	21:00	27	19:26 (112)
7	07:58		08:37 (85)	07:38		08:51 (85)	07:00		07:19 (99)	07:11		07:34 (84)	06:29		18:39 (112)	06:06		19:01 (112)
	17:25	98	15:58 (113)	18:01	28	09:19 (85)	18:33	20	07:39 (99)	20:04	26	08:00 (84)	20:34	61	19:40 (112)	21:01	24	19:25 (112)
8	07:57		08:37 (85)	07:37		08:52 (85)	07:59		08:19 (99)	07:09		07:33 (84)	06:27		18:39 (112)	06:06		19:01 (112)
	17:26	99	15:59 (113)	18:02	26	09:18 (85)	19:34	21	08:40 (99)	20:05	28	08:01 (84)	20:35	61	19:40 (112)	21:02	23	19:24 (112)
9	07:57		08:37 (85)	07:36		08:55 (85)	07:57		08:18 (99)	07:07		07:32 (84)	06:26		18:39 (112)	06:06		19:02 (112)
	17:27	99	15:59 (113)	18:03	21	09:16 (85)	19:35	22	08:40 (99)	20:06	28	08:00 (84)	20:36	61	19:40 (112)	21:02	21	19:23 (112)
10	07:57		08:37 (85)	07:35		08:58 (85)	07:56		08:18 (99)	07:06		07:33 (84)	06:25		18:39 (112)	06:06		19:03 (112)
	17:28	98	15:58 (113)	18:04	14	09:12 (85)	19:36	22	08:40 (99)	20:07	28	08:01 (84)	20:37	60	19:39 (112)	21:03	20	19:23 (112)
11	07:57		08:37 (85)	07:34			07:54		08:17 (99)	07:04		07:32 (84)	06:24		18:40 (112)	06:05		19:04 (112)
	17:29	98	15:58 (113)	18:05			19:37	22	08:39 (99)	20:08	28	08:00 (84)	20:38	59	19:39 (112)	21:03	18	19:22 (112)
12	07:57		08:37 (85)	07:33			07:53		08:18 (99)	07:03		07:32 (84)	06:23		18:40 (112)	06:05		19:06 (112)
	17:30	99	15:59 (113)	18:07			19:38	21	08:39 (99)	20:09	46	19:23 (112)	20:39	59	19:39 (112)	21:04	16	19:22 (112)
13	07:56		08:37 (85)	07:32			07:51		08:18 (99)	07:01		07:32 (84)	06:22		18:40 (112)	06:05		19:07 (112)
	17:31	98	15:58 (113)	18:08			19:39	20	08:38 (99)	20:10	53	19:26 (112)	20:40	58	19:38 (112)	21:04	14	19:21 (112)
14	07:56		08:37 (85)	07:30			07:49		08:18 (99)	07:00		07:32 (84)	06:21		18:41 (112)	06:05		19:08 (112)
	17:32	97	15:58 (113)	18:09			19:40	19	08:37 (99)	20:11	57	19:28 (112)	20:41	57	19:38 (112)	21:05	12	19:20 (112)
15	07:56		08:38 (85)	07:29			07:48		08:19 (99)	06:58		07:33 (84)	06:20		18:41 (112)	06:05		19:09 (112)
	17:33	96	15:58 (113)	18:10			19:41	17	08:36 (99)	20:12	60	19:31 (112)	20:42	57	19:38 (112)	21:05	10	19:19 (112)
16	07:55		08:38 (85)	07:28			07:46		08:20 (99)	06:57		07:34 (84)	06:19		18:41 (112)	06:05		19:10 (112)
	17:34	95	15:58 (113)	18:11			19:42	13	08:33 (99)	20:13	62	19:33 (112)	20:43	56	19:37 (112)	21:06	8	19:18 (112)
17	07:55		08:38 (85)	07:26			07:45		08:23 (99)	06:55		07:34 (84)	06:18		18:43 (112)	06:05		19:12 (112)
	17:36	94	15:58 (113)	18:12			19:43	7	08:30 (99)	20:14	63	19:34 (112)	20:44	54	19:37 (112)	21:06	5	19:17 (112)
18	07:54		08:38 (85)	07:25			07:43			06:54		07:36 (84)	06:18		18:43 (112)	06:05		19:13 (112)
	17:37	93	15:57 (113)	18:14			19:44			20:15	63	19:35 (112)	20:45	54	19:37 (112)	21:06	3	19:16 (112)
19	07:54		08:39 (85)	07:24			07:41			06:52		07:37 (84)	06:17		18:44 (112)	06:06		
	17:38	91	15:57 (113)	18:15			19:45			20:16	62	19:36 (112)	20:46	52	19:36 (112)	21:07		
20	07:53		08:38 (85)	07:22			07:40			06:51		07:42 (84)	06:16		18:44 (112)	06:06		
	17:39	90	15:56 (113)	18:16			19:46			20:17	55	19:37 (112)	20:47	51	19:35 (112)	21:07		
21	07:53		08:38 (85)	07:21			07:38			06:49		18:45 (112)	06:15		18:45 (112)	06:06		
	17:40	87	15:55 (113)	18:17			19:47			20:18	52	19:37 (112)	20:48	51	19:36 (112)	21:07		
22	07:52		08:39 (85)	07:20			07:36			06:48		18:44 (112)	06:14		18:46 (112)	06:06		
	17:41	84	15:54 (113)	18:18			19:49			20:19	54	19:38 (112)	20:49	49	19:35 (112)	21:08		
23	07:52		08:39 (85)	07:18			07:35			06:47		18:44 (112)	06:14		18:46 (112)	06:06		
	17:42	81	15:53 (113)	18:19			19:50			20:20	55	19:39 (112)	20:50	48	19:34 (112)	21:08		
24	07:51		08:39 (85)	07:17			07:33			06:45		18:42 (112)	06:13		18:48 (112)	06:07		
	17:44	76	15:51 (113)	18:20			19:51			20:21	57	19:39 (112)	20:50	46	19:34 (112)	21:08		
25	07:50		08:40 (85)	07:15			07:32			06:44		18:42 (112)	06:12		18:48 (112)	06:07		19:14 (112)
	17:45	72	15:50 (113)	18:22			19:52			20:22	58	19:40 (112)	20:51	45	19:33 (112)	21:08	5	19:19 (112)
26	07:50		08:41 (85)	07:14			07:30			06:42		18:41 (112)	06:11		18:48 (112)	06:07		19:13 (112)
	17:46	66	15:48 (113)	18:23			19:53			20:23	59	19:40 (112)	20:52	44	19:32 (112)	21:08	7	19:20 (112)
27	07:49		08:41 (85)	07:13			07:28			06:41		18:40 (112)	06:11		18:50 (112)	06:08		19:13 (112)
	17:47	57	15:43 (113)	18:24			19:54			20:24	60	19:40 (112)	20:53	42	19:32 (112)	21:08	9	19:22 (112)
28	07:48		08:41 (85)	07:11			07:27			06:40		18:40 (112)	06:10		18:50 (112)	06:08		19:12 (112)
	17:48	46	09:27 (85)	18:25			19:55			20:25	60	19:40 (112)	20:54	41	19:31 (112)	21:08	11	19:23 (112)
29	07:47		08:42 (85)				07:25			06:38		18:40 (112)	06:10		18:52 (112)	06:08		19:10 (112)
	17:50	44	09:26 (85)				19:56			20:26	61	19:41 (112)	20:55	39	19:31 (112)	21:08	14	19:24 (112)
30	07:46		08:42 (85)				07:23			06:37		18:39 (112)	06:09		18:52 (112)	06:09		19:10 (112)
	17:51	44	09:26 (85)				19:57			20:27	61	19:40 (112)	20:55	38	19:30 (112)	21:08	15	19:25 (112)
31	07:45		08:43 (85)				07:22						06:09		18:53 (112)			
	17:52	43	09:26 (85)				19:58						20:56	37	19:30 (112)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		2638			314			248			1338			1652			420	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.64			0.61			0.63			0.64			0.64			0.64	
Total reduction		0.23			0.25			0.28			0.33			0.36			0.38	
Total, real		604			80			69			440			587			160	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 24

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 404 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5570)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		19:09 (112)	06:32		18:50 (112)	07:02		07:31 (84)	07:31		07:57 (99)	07:04		08:26 (85)	07:37		08:19 (85)
	21:08	17	19:26 (112)	20:51	60	19:50 (112)	20:09	28	07:59 (84)	19:19	21	08:18 (99)	17:33	16	08:42 (85)	17:10	98	15:40 (113)
2	06:10		19:09 (112)	06:33		18:50 (112)	07:03		07:31 (84)	07:32		07:56 (99)	07:05		08:24 (85)	07:38		08:20 (85)
	21:08	19	19:28 (112)	20:50	60	19:50 (112)	20:08	28	07:59 (84)	19:17	22	08:18 (99)	17:32	22	08:46 (85)	17:10	98	15:41 (113)
3	06:10		19:08 (112)	06:34		18:50 (112)	07:04		07:30 (84)	07:33		07:55 (99)	07:06		08:22 (85)	07:39		08:20 (85)
	21:08	20	19:28 (112)	20:49	60	19:50 (112)	20:06	28	07:58 (84)	19:15	23	08:18 (99)	17:31	26	08:48 (85)	17:10	99	15:42 (113)
4	06:11		19:07 (112)	06:35		18:50 (112)	07:05		07:30 (84)	07:34		07:55 (99)	07:07		08:20 (85)	07:40		08:21 (85)
	21:08	23	19:30 (112)	20:48	60	19:50 (112)	20:05	28	07:58 (84)	19:14	22	08:17 (99)	17:30	29	08:49 (85)	17:10	99	15:43 (113)
5	06:11		19:06 (112)	06:36		18:49 (112)	07:06		07:31 (84)	07:35		07:55 (99)	07:08		08:19 (85)	07:41		08:22 (85)
	21:08	24	19:30 (112)	20:47	62	19:51 (112)	20:03	26	07:57 (84)	19:12	22	08:17 (99)	17:29	32	08:51 (85)	17:10	98	15:43 (113)
6	06:12		19:06 (112)	06:37		18:48 (112)	07:07		07:31 (84)	07:36		07:55 (99)	07:09		08:18 (85)	07:42		08:22 (85)
	21:08	26	19:32 (112)	20:45	62	19:50 (112)	20:01	25	07:56 (84)	19:10	21	08:16 (99)	17:28	35	08:53 (85)	17:09	99	15:44 (113)
7	06:12		19:05 (112)	06:38		18:48 (112)	07:08		07:32 (84)	07:37		07:56 (99)	07:10		08:17 (85)	07:43		08:23 (85)
	21:07	27	19:32 (112)	20:44	62	19:50 (112)	20:00	23	07:55 (84)	19:09	19	08:15 (99)	17:27	37	08:54 (85)	17:09	100	15:45 (113)
8	06:13		19:04 (112)	06:39		18:48 (112)	07:09		07:33 (84)	07:38		07:57 (99)	07:12		08:16 (85)	07:44		08:24 (85)
	21:07	29	19:33 (112)	20:43	62	19:50 (112)	19:57	21	07:54 (84)	19:07	16	08:13 (99)	17:26	39	08:55 (85)	17:09	99	15:45 (113)
9	06:14		19:04 (112)	06:40		18:48 (112)	07:10		07:33 (84)	07:39		07:58 (99)	07:13		08:15 (85)	07:45		08:25 (85)
	21:07	31	19:35 (112)	20:42	62	19:50 (112)	19:55	18	07:51 (84)	19:06	13	08:11 (99)	17:25	40	08:55 (85)	17:09	98	15:46 (113)
10	06:14		19:03 (112)	06:41		18:48 (112)	07:10		07:35 (84)	07:40		08:00 (99)	07:14		08:14 (85)	07:46		08:26 (85)
	21:06	32	19:35 (112)	20:41	62	19:50 (112)	19:53	13	07:48 (84)	19:04	8	08:08 (99)	17:24	42	08:56 (85)	17:09	98	15:47 (113)
11	06:15		19:02 (112)	06:42		18:48 (112)	07:11		07:39 (84)	07:41			07:15		08:15 (85)	07:47		08:27 (85)
	21:06	34	19:36 (112)	20:39	61	19:49 (112)	19:52	5	07:44 (84)	19:03			17:23	42	08:57 (85)	17:09	99	15:48 (113)
12	06:16		19:02 (112)	06:43		18:48 (112)	07:12			07:42			07:16		08:14 (85)	07:47		08:26 (85)
	21:06	36	19:38 (112)	20:38	61	19:49 (112)	19:50			19:01			17:22	44	08:58 (85)	17:10	98	15:47 (113)
13	06:16		19:01 (112)	06:44		18:48 (112)	07:13			07:43			07:17		08:14 (85)	07:48		08:27 (85)
	21:05	37	19:38 (112)	20:37	61	19:49 (112)	19:48			19:00			17:21	44	08:58 (85)	17:10	99	15:48 (113)
14	06:17		19:00 (112)	06:45		18:48 (112)	07:14			07:44			07:19		08:13 (85)	07:49		08:28 (85)
	21:05	39	19:39 (112)	20:36	61	19:49 (112)	19:47			18:58			17:20	46	08:59 (85)	17:10	98	15:49 (113)
15	06:18		19:00 (112)	06:46		18:48 (112)	07:15			07:45			07:20		08:14 (85)	07:50		08:29 (85)
	21:04	40	19:40 (112)	20:34	60	19:48 (112)	19:45			18:56			17:19	58	15:17 (113)	17:10	98	15:50 (113)
16	06:19		18:59 (112)	06:47		18:48 (112)	07:16			07:46			07:21		08:14 (85)	07:50		08:29 (85)
	21:04	42	19:41 (112)	20:33	60	19:48 (112)	19:43			18:55			17:18	66	15:21 (113)	17:10	98	15:50 (113)
17	06:19		18:58 (112)	06:48		18:47 (112)	07:17			07:47			07:22		08:13 (85)	07:51		08:30 (85)
	21:03	43	19:41 (112)	20:32	59	19:46 (112)	19:42			18:54			17:18	72	15:23 (113)	17:11	98	15:51 (113)
18	06:20		18:58 (112)	06:49		18:48 (112)	07:18			07:48			07:23		08:13 (85)	07:52		08:30 (85)
	21:02	44	19:42 (112)	20:30	57	19:45 (112)	19:40			18:52			17:17	76	15:25 (113)	17:11	97	15:50 (113)
19	06:21		18:57 (112)	06:50		18:48 (112)	07:19			07:49			07:24		08:14 (85)	07:52		08:31 (85)
	21:02	46	19:43 (112)	20:29	57	19:45 (112)	19:38			18:51			17:16	81	15:28 (113)	17:12	96	15:51 (113)
20	06:22		18:57 (112)	06:51		18:48 (112)	07:20			07:50			07:25		08:14 (85)	07:53		08:32 (85)
	21:01	47	19:44 (112)	20:27	56	19:44 (112)	19:37			18:49			17:15	84	15:29 (113)	17:12	96	15:52 (113)
21	06:23		18:56 (112)	06:51		18:49 (112)	07:21			07:51			07:27		08:14 (85)	07:53		08:32 (85)
	21:00	48	19:44 (112)	20:26	54	19:43 (112)	19:35			18:48			17:15	87	15:31 (113)	17:12	96	15:52 (113)
22	06:24		18:55 (112)	06:52		18:50 (112)	07:22			07:52			07:28		08:14 (85)	07:54		08:33 (85)
	21:00	50	19:45 (112)	20:24	52	19:42 (112)	19:33			18:46			17:14	90	15:32 (113)	17:13	96	15:53 (113)
23	06:24		18:55 (112)	06:53		07:45 (84)	07:23			07:53			07:29		08:15 (85)	07:54		08:33 (85)
	20:59	51	19:46 (112)	20:23	57	19:41 (112)	19:32			18:45			17:14	91	15:33 (113)	17:13	96	15:53 (113)
24	06:25		18:54 (112)	06:54		07:41 (84)	07:24			07:55			07:30		08:15 (85)	07:55		08:33 (85)
	20:58	52	19:46 (112)	20:22	61	19:39 (112)	19:30			18:44			17:13	93	15:34 (113)	17:14	96	15:53 (113)
25	06:26		18:54 (112)	06:55		07:39 (84)	07:25			07:56			07:31		08:16 (85)	07:55		08:34 (85)
	20:57	53	19:47 (112)	20:20	63	19:38 (112)	19:28			18:42			17:13	94	15:36 (113)	17:15	96	15:54 (113)
26	06:27		18:54 (112)	06:56		07:37 (84)	07:26			07:57			07:32		08:17 (85)	07:56		08:34 (85)
	20:56	54	19:48 (112)	20:19	62	19:36 (112)	19:27			18:41			17:12	95	15:37 (113)	17:15	97	15:54 (113)
27	06:28		18:53 (112)	06:57		07:35 (84)	07:27		08:03 (99)	07:58			07:33		08:17 (85)	07:56		08:34 (85)
	20:56	55	19:48 (112)	20:17	62	19:34 (112)	19:25	11	08:14 (99)	18:40			17:12	96	15:37 (113)	17:16	98	15:55 (113)
28	06:29		18:52 (112)	06:58		07:34 (84)	07:28		08:00 (99)	07:59			07:34		08:17 (85)	07:56		08:35 (85)
	20:55	56	19:48 (112)	20:16	60	19:32 (112)	19:23	16	08:16 (99)	18:38			17:11	97	15:38 (113)	17:17	97	15:56 (113)
29	06:30		18:51 (112)	06:59		07:32 (84)	07:29		07:59 (99)	08:00			07:35		08:18 (85)	07:57		08:35 (85)
	20:54	57	19:48 (112)	20:14	58	19:29 (112)	19:22	18	08:17 (99)	18:37			17:11	97	15:39 (113)	17:17	98	15:56 (113)
30	06:31		18:51 (112)	07:00		07:32 (84)	07:30		07:57 (99)	08:01			07:36		08:18 (85)	07:57		08:35 (85)
	20:53	58	19:49 (112)	20:12	53	19:26 (112)	19:20	20	08:17 (99)	18:36			17:11	99	15:40 (113)	17:18	98	15:56 (113)
31	06:32		18:51 (112)	07:01		07:31 (84)				08:02		09:33 (85)				07:57		08:35 (85)
	20:52	58	19:49 (112)	20:11	46	19:22 (112)				18:35	3	09:36 (85)				17:19	98	15:56 (113)
Potential sun hours	456			426			374			346			300			291		
Total, worst case		1248			1833			308			190			1870			3029	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.64			0.64			0.66			0.63			0.63			0.64	
Total reduction		0.38			0.38			0.40			0.35			0.23			0.32	
Total, real		475			702			124			67			434			976	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

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Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 405 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5571)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:32 (98)	07:45		08:29 (85)	07:10			07:20			06:36		18:57 (112)	06:08		18:51 (112)
	17:20	102	16:02 (113)	17:53	80	15:56 (113)	18:26			19:59			20:28	49	19:46 (112)	20:57	63	19:54 (112)
2	07:57		08:32 (98)	07:44		08:29 (85)	07:08			07:19			06:35		18:56 (112)	06:08		18:52 (112)
	17:21	101	16:02 (113)	17:54	76	15:54 (113)	18:27			20:00			20:29	51	19:47 (112)	20:58	62	19:54 (112)
3	07:58		08:32 (98)	07:43		08:29 (85)	07:07			07:17			06:33		18:55 (112)	06:07		18:52 (112)
	17:21	103	16:03 (113)	17:56	69	15:51 (113)	18:28			20:00			20:30	53	19:48 (112)	20:58	63	19:55 (112)
4	07:58		08:33 (98)	07:42		08:30 (85)	07:05			07:15			06:32		18:54 (112)	06:07		18:52 (112)
	17:22	101	16:03 (113)	17:57	59	15:47 (113)	18:29			20:01			20:31	55	19:49 (112)	20:59	62	19:54 (112)
5	07:58		08:33 (98)	07:41		08:30 (85)	07:04			07:14		07:40 (84)	06:31		18:53 (112)	06:07		18:53 (112)
	17:23	102	16:04 (113)	17:58	46	09:16 (85)	18:31			20:02	3	07:43 (84)	20:32	56	19:49 (112)	21:00	61	19:54 (112)
6	07:58		08:34 (98)	07:40		08:30 (85)	07:02			07:12		07:36 (84)	06:30		18:52 (112)	06:06		18:53 (112)
	17:24	101	16:04 (113)	17:59	46	09:16 (85)	18:32			20:03	12	07:48 (84)	20:33	57	19:49 (112)	21:00	62	19:55 (112)
7	07:58		08:34 (98)	07:38		08:31 (85)	07:00		07:20 (99)	07:11		07:32 (84)	06:29		18:51 (112)	06:06		18:54 (112)
	17:25	101	16:04 (113)	18:01	45	09:16 (85)	18:33	7	07:27 (99)	20:04	18	07:50 (84)	20:34	59	19:50 (112)	21:01	61	19:55 (112)
8	07:57		08:35 (98)	07:37		08:32 (85)	07:59		08:18 (99)	07:09		07:31 (84)	06:27		18:51 (112)	06:06		18:53 (112)
	17:26	100	16:05 (113)	18:02	43	09:15 (85)	19:34	13	08:31 (99)	20:05	21	07:52 (84)	20:35	60	19:51 (112)	21:02	61	19:54 (112)
9	07:57		08:36 (98)	07:36		08:33 (85)	07:57		08:16 (99)	07:07		07:29 (84)	06:26		18:50 (112)	06:06		18:54 (112)
	17:27	99	16:05 (113)	18:03	42	09:15 (85)	19:35	16	08:32 (99)	20:06	23	07:52 (84)	20:36	61	19:51 (112)	21:02	60	19:54 (112)
10	07:57		08:35 (85)	07:35		08:33 (85)	07:56		08:15 (99)	07:06		07:29 (84)	06:25		18:50 (112)	06:06		18:54 (112)
	17:28	100	16:05 (113)	18:04	41	09:14 (85)	19:36	18	08:33 (99)	20:07	24	07:53 (84)	20:37	62	19:52 (112)	21:03	61	19:55 (112)
11	07:57		08:34 (85)	07:34		08:34 (85)	07:54		08:13 (99)	07:04		07:27 (84)	06:24		18:50 (112)	06:05		18:55 (112)
	17:29	101	16:05 (113)	18:05	40	09:14 (85)	19:37	21	08:34 (99)	20:08	26	07:53 (84)	20:38	62	19:52 (112)	21:03	60	19:55 (112)
12	07:57		08:34 (85)	07:33		08:35 (85)	07:53		08:13 (99)	07:03		07:27 (84)	06:23		18:49 (112)	06:05		18:55 (112)
	17:30	101	16:06 (113)	18:07	37	09:12 (85)	19:38	21	08:34 (99)	20:09	27	07:54 (84)	20:39	63	19:52 (112)	21:04	60	19:55 (112)
13	07:56		08:33 (85)	07:32		08:36 (85)	07:51		08:12 (99)	07:01		07:26 (84)	06:22		18:49 (112)	06:05		18:56 (112)
	17:31	101	16:05 (113)	18:08	35	09:11 (85)	19:39	22	08:34 (99)	20:10	27	07:53 (84)	20:40	63	19:52 (112)	21:04	59	19:55 (112)
14	07:56		08:33 (85)	07:30		08:38 (85)	07:49		08:11 (99)	07:00		07:26 (84)	06:21		18:49 (112)	06:05		18:56 (112)
	17:32	101	16:06 (113)	18:09	32	09:10 (85)	19:40	22	08:33 (99)	20:11	28	07:54 (84)	20:41	64	19:53 (112)	21:05	59	19:55 (112)
15	07:56		08:33 (85)	07:29		08:39 (85)	07:48		08:12 (99)	06:58		07:25 (84)	06:20		18:49 (112)	06:05		18:56 (112)
	17:33	100	16:06 (113)	18:10	29	09:08 (85)	19:41	21	08:33 (99)	20:12	28	07:53 (84)	20:42	64	19:53 (112)	21:05	59	19:55 (112)
16	07:55		08:32 (85)	07:28		08:40 (85)	07:46		08:12 (99)	06:57		07:26 (84)	06:19		18:48 (112)	06:05		18:57 (112)
	17:34	100	16:06 (113)	18:11	26	09:06 (85)	19:42	20	08:32 (99)	20:13	27	07:53 (84)	20:43	65	19:53 (112)	21:06	58	19:55 (112)
17	07:55		08:32 (85)	07:26		08:43 (85)	07:45		08:12 (99)	06:55		07:25 (84)	06:18		18:49 (112)	06:05		18:57 (112)
	17:36	99	16:06 (113)	18:12	20	09:03 (85)	19:43	19	08:31 (99)	20:14	27	07:52 (84)	20:44	65	19:54 (112)	21:06	58	19:55 (112)
18	07:54		08:31 (85)	07:25		08:47 (85)	07:43		08:13 (99)	06:54		07:26 (84)	06:18		18:49 (112)	06:05		18:57 (112)
	17:37	100	16:06 (113)	18:14	13	09:00 (85)	19:44	17	08:30 (99)	20:15	25	07:51 (84)	20:45	65	19:54 (112)	21:06	59	19:56 (112)
19	07:54		08:31 (85)	07:24			07:41		08:14 (99)	06:52		07:26 (84)	06:17		18:49 (112)	06:06		18:57 (112)
	17:38	99	16:06 (113)	18:15			19:45	14	08:28 (99)	20:16	24	07:50 (84)	20:46	65	19:54 (112)	21:07	59	19:56 (112)
20	07:53		08:30 (85)	07:22			07:40		08:16 (99)	06:51		07:27 (84)	06:16		18:49 (112)	06:06		18:58 (112)
	17:39	101	16:06 (113)	18:16			19:46	9	08:25 (99)	20:17	22	07:49 (84)	20:47	65	19:54 (112)	21:07	59	19:57 (112)
21	07:53		08:30 (85)	07:21			07:38			06:49		07:27 (84)	06:15		18:49 (112)	06:06		18:58 (112)
	17:40	99	16:05 (113)	18:17			19:47			20:18	20	07:47 (84)	20:48	65	19:54 (112)	21:07	59	19:57 (112)
22	07:52		08:30 (85)	07:20			07:36			06:48		07:29 (84)	06:14		18:49 (112)	06:06		18:58 (112)
	17:41	99	16:05 (113)	18:18			19:49			20:19	17	07:46 (84)	20:49	65	19:54 (112)	21:08	59	19:57 (112)
23	07:52		08:30 (85)	07:18			07:35			06:47		07:31 (84)	06:14		18:49 (112)	06:06		18:58 (112)
	17:42	98	16:05 (113)	18:19			19:50			20:20	22	19:28 (112)	20:50	65	19:54 (112)	21:08	59	19:57 (112)
24	07:51		08:29 (85)	07:17			07:33			06:45		07:34 (84)	06:13		18:50 (112)	06:07		18:59 (112)
	17:44	99	16:04 (113)	18:20			19:51			20:21	26	19:33 (112)	20:50	65	19:55 (112)	21:08	59	19:58 (112)
25	07:50		08:30 (85)	07:15			07:32			06:44		19:09 (112)	06:12		18:50 (112)	06:07		18:59 (112)
	17:45	97	16:04 (113)	18:22			19:52			20:22	27	19:36 (112)	20:51	64	19:54 (112)	21:08	59	19:58 (112)
26	07:50		08:29 (85)	07:14			07:30			06:42		19:06 (112)	06:12		18:49 (112)	06:07		18:59 (112)
	17:46	96	16:03 (113)	18:23			19:53			20:23	33	19:39 (112)	20:52	65	19:54 (112)	21:08	58	19:57 (112)
27	07:49		08:29 (85)	07:13			07:28			06:41		19:03 (112)	06:11		18:50 (112)	06:08		18:59 (112)
	17:47	95	16:03 (113)	18:24			19:54			20:24	37	19:40 (112)	20:53	64	19:54 (112)	21:08	59	19:58 (112)
28	07:48		08:29 (85)	07:11			07:27			06:40		19:02 (112)	06:10		18:50 (112)	06:08		18:59 (112)
	17:48	93	16:02 (113)	18:25			19:55			20:25	40	19:42 (112)	20:54	64	19:54 (112)	21:08	59	19:58 (112)
29	07:47		08:29 (85)				07:25			06:38		19:00 (112)	06:10		18:51 (112)	06:08		18:59 (112)
	17:50	89	16:00 (113)				19:56			20:26	44	19:44 (112)	20:55	64	19:55 (112)	21:08	59	19:58 (112)
30	07:46		08:29 (85)				07:23			06:37		18:58 (112)	06:09		18:51 (112)	06:09		18:59 (112)
	17:51	87	15:59 (113)				19:57			20:27	46	19:44 (112)	20:55	63	19:54 (112)	21:08	60	19:59 (112)
31	07:45		08:29 (85)				07:22						06:09		18:51 (112)			
	17:52	84	15:58 (113)				19:58						20:56	64	19:55 (112)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		3049			779			240			674			1912			1796	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.65			0.61			0.64			0.65			0.63			0.63	
Total reduction		0.23			0.26			0.28			0.33			0.36			0.38	
Total, real		709			200			67			225			680			684	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 26

Licensed user:
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US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 405 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5571)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		18:59 (112)	06:32		19:00 (112)	07:02		07:26 (84)	07:31		07:51 (99)	07:04		08:02 (85)	07:37		08:16 (85)
	21:08	60	19:59 (112)	20:51	63	20:03 (112)	20:09	26	07:52 (84)	19:19	22	08:13 (99)	17:33	41	08:43 (85)	17:10	101	15:47 (113)
2	06:10		19:00 (112)	06:33		19:00 (112)	07:03		07:27 (84)	07:32		07:51 (99)	07:05		08:02 (85)	07:38		08:18 (85)
	21:08	60	20:00 (112)	20:50	62	20:02 (112)	20:08	24	07:51 (84)	19:17	21	08:12 (99)	17:32	43	08:45 (85)	17:10	100	15:48 (113)
3	06:10		18:59 (112)	06:34		19:01 (112)	07:04		07:27 (84)	07:33		07:52 (99)	07:06		08:01 (85)	07:39		08:19 (85)
	21:08	60	19:59 (112)	20:49	61	20:02 (112)	20:06	23	07:50 (84)	19:15	19	08:11 (99)	17:31	44	08:45 (85)	17:10	99	15:48 (113)
4	06:11		19:00 (112)	06:35		19:01 (112)	07:05		07:28 (84)	07:34		07:53 (99)	07:07		08:01 (85)	07:40		08:19 (98)
	21:08	60	20:00 (112)	20:48	61	20:02 (112)	20:05	21	07:49 (84)	19:14	17	08:10 (99)	17:30	44	08:45 (85)	17:10	100	15:49 (113)
5	06:11		18:59 (112)	06:36		19:02 (112)	07:06		07:29 (84)	07:35		07:54 (99)	07:08		08:00 (85)	07:41		08:19 (98)
	21:08	61	20:00 (112)	20:47	59	20:01 (112)	20:03	18	07:47 (84)	19:12	14	08:08 (99)	17:29	46	08:46 (85)	17:10	101	15:49 (113)
6	06:12		19:00 (112)	06:37		19:01 (112)	07:07		07:31 (84)	07:36		07:55 (99)	07:09		08:01 (85)	07:42		08:20 (98)
	21:08	61	20:01 (112)	20:45	58	19:59 (112)	20:01	14	07:45 (84)	19:10	11	08:06 (99)	17:28	46	08:47 (85)	17:09	101	15:50 (113)
7	06:12		18:59 (112)	06:38		19:02 (112)	07:08		07:36 (84)	07:37			07:10		08:00 (85)	07:43		08:20 (98)
	21:07	62	20:01 (112)	20:44	57	19:59 (112)	20:00	4	07:40 (84)	19:09			17:27	62	15:19 (113)	17:09	102	15:51 (113)
8	06:13		18:59 (112)	06:39		19:02 (112)	07:09			07:38			07:12		08:00 (85)	07:44		08:21 (98)
	21:07	62	20:01 (112)	20:43	56	19:58 (112)	19:57			19:07			17:26	71	15:23 (113)	17:09	101	15:51 (113)
9	06:14		19:00 (112)	06:40		19:03 (112)	07:10			07:39			07:13		08:00 (85)	07:45		08:21 (98)
	21:07	62	20:02 (112)	20:42	54	19:57 (112)	19:55			19:06			17:25	76	15:25 (113)	17:09	103	15:52 (113)
10	06:14		18:59 (112)	06:41		19:04 (112)	07:10			07:40			07:14		08:00 (85)	07:46		08:22 (98)
	21:06	63	20:02 (112)	20:41	52	19:56 (112)	19:53			19:04			17:24	80	15:27 (113)	17:09	101	15:52 (113)
11	06:15		18:59 (112)	06:42		19:05 (112)	07:11			07:41			07:15		08:01 (85)	07:47		08:23 (98)
	21:06	63	20:02 (112)	20:39	50	19:55 (112)	19:52			19:03			17:23	85	15:30 (113)	17:09	102	15:53 (113)
12	06:16		19:00 (112)	06:43		19:06 (112)	07:12			07:42			07:16		08:01 (85)	07:47		08:22 (98)
	21:06	63	20:03 (112)	20:38	48	19:54 (112)	19:50			19:01			17:22	88	15:31 (113)	17:10	103	15:53 (113)
13	06:16		18:59 (112)	06:44		19:07 (112)	07:13			07:43			07:17		08:01 (85)	07:48		08:23 (98)
	21:05	63	20:02 (112)	20:37	46	19:53 (112)	19:48			19:00			17:21	89	15:32 (113)	17:10	101	15:53 (113)
14	06:17		18:59 (112)	06:45		19:08 (112)	07:14			07:44			07:19		08:01 (85)	07:49		08:24 (98)
	21:05	64	20:03 (112)	20:36	43	19:51 (112)	19:47			18:58			17:20	93	15:34 (113)	17:10	102	15:54 (113)
15	06:18		18:59 (112)	06:46		19:10 (112)	07:15			07:45			07:20		08:02 (85)	07:50		08:24 (98)
	21:04	64	20:03 (112)	20:34	40	19:50 (112)	19:45			18:56			17:19	95	15:36 (113)	17:10	103	15:55 (113)
16	06:19		19:00 (112)	06:47		19:12 (112)	07:16			07:46			07:21		08:02 (85)	07:50		08:24 (98)
	21:04	64	20:04 (112)	20:33	36	19:48 (112)	19:43			18:55			17:18	97	15:36 (113)	17:10	102	15:55 (113)
17	06:19		18:59 (112)	06:48		19:13 (112)	07:17			07:47			07:22		08:03 (85)	07:51		08:25 (98)
	21:03	64	20:03 (112)	20:32	31	19:44 (112)	19:42			18:54			17:18	97	15:37 (113)	17:11	102	15:56 (113)
18	06:20		18:59 (112)	06:49		19:15 (112)	07:18			07:48			07:23		08:03 (85)	07:52		08:25 (98)
	21:02	65	20:04 (112)	20:30	27	19:42 (112)	19:40			18:52			17:17	99	15:38 (113)	17:11	102	15:55 (113)
19	06:21		18:59 (112)	06:50		07:39 (84)	07:19			07:49			07:24		08:05 (85)	07:52		08:26 (98)
	21:02	65	20:04 (112)	20:29	26	19:38 (112)	19:38			18:51			17:16	98	15:40 (113)	17:12	102	15:56 (113)
20	06:22		18:59 (112)	06:51		07:36 (84)	07:20			07:50			07:25		08:05 (85)	07:53		08:27 (98)
	21:01	65	20:04 (112)	20:27	17	19:30 (112)	19:37			18:49			17:15	99	15:40 (113)	17:12	102	15:57 (113)
21	06:23		18:59 (112)	06:51		07:34 (84)	07:21			07:51			07:27		08:06 (85)	07:53		08:27 (98)
	21:00	65	20:04 (112)	20:26	17	07:51 (84)	19:35			18:48			17:15	99	15:41 (113)	17:12	102	15:57 (113)
22	06:24		18:59 (112)	06:52		07:32 (84)	07:22			07:52			07:28		08:06 (85)	07:54		08:28 (98)
	21:00	65	20:04 (112)	20:24	20	07:52 (84)	19:33			18:46			17:14	101	15:42 (113)	17:13	102	15:58 (113)
23	06:24		18:59 (112)	06:53		07:31 (84)	07:23		08:01 (99)	07:53			07:29		08:07 (85)	07:54		08:28 (98)
	20:59	65	20:04 (112)	20:23	22	07:53 (84)	19:32	7	08:08 (99)	18:45			17:14	99	15:42 (113)	17:13	102	15:58 (113)
24	06:25		18:59 (112)	06:54		07:30 (84)	07:24		07:58 (99)	07:55		09:15 (85)	07:30		08:08 (85)	07:55		08:28 (98)
	20:58	65	20:04 (112)	20:22	24	07:54 (84)	19:30	13	08:11 (99)	18:44	16	09:31 (85)	17:13	99	15:43 (113)	17:14	102	15:58 (113)
25	06:26		18:59 (112)	06:55		07:29 (84)	07:25		07:56 (99)	07:56		09:12 (85)	07:31		08:10 (85)	07:55		08:29 (98)
	20:57	65	20:04 (112)	20:20	25	07:54 (84)	19:28	16	08:12 (99)	18:42	22	09:34 (85)	17:13	99	15:44 (113)	17:15	102	15:59 (113)
26	06:27		19:00 (112)	06:56		07:28 (84)	07:26		07:54 (99)	07:57		09:10 (85)	07:32		08:11 (85)	07:56		08:29 (98)
	20:56	64	20:04 (112)	20:19	27	07:55 (84)	19:27	19	08:13 (99)	18:41	26	09:36 (85)	17:12	100	15:45 (113)	17:15	103	16:00 (113)
27	06:28		19:00 (112)	06:57		07:28 (84)	07:27		07:53 (99)	07:58		09:08 (85)	07:33		08:12 (85)	07:56		08:29 (98)
	20:56	64	20:04 (112)	20:17	27	07:55 (84)	19:25	21	08:14 (99)	18:40	29	09:37 (85)	17:12	100	15:45 (113)	17:16	102	16:00 (113)
28	06:29		18:59 (112)	06:58		07:27 (84)	07:28		07:52 (99)	07:59		09:07 (85)	07:34		08:13 (85)	07:56		08:30 (98)
	20:55	64	20:03 (112)	20:16	28	07:55 (84)	19:23	22	08:14 (99)	18:38	33	09:40 (85)	17:11	101	15:46 (113)	17:17	102	16:01 (113)
29	06:30		18:59 (112)	06:59		07:26 (84)	07:29		07:52 (99)	08:00		09:05 (85)	07:35		08:14 (85)	07:57		08:31 (98)
	20:54	64	20:03 (112)	20:14	28	07:54 (84)	19:22	22	08:14 (99)	18:37	36	09:41 (85)	17:11	101	15:46 (113)	17:17	102	16:01 (113)
30	06:31		19:00 (112)	07:00		07:26 (84)	07:30		07:51 (99)	08:01		09:04 (85)	07:36		08:15 (85)	07:57		08:31 (98)
	20:53	63	20:03 (112)	20:12	27	07:53 (84)	19:20	23	08:14 (99)	18:36	38	09:42 (85)	17:11	101	15:47 (113)	17:18	101	16:01 (113)
31	06:32		19:00 (112)	07:01		07:26 (84)				08:02		09:03 (85)				07:57		08:31 (98)
	20:52	63	20:03 (112)	20:11	27	07:53 (84)				18:35	40	09:43 (85)				17:19	102	16:02 (113)
Potential sun hours	456			426			374			346			300			291		
Total, worst case		1958			1219			273			344			2493			3152	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.63			0.64			0.65			0.61			0.64			0.65	
Total reduction		0.38			0.39			0.40			0.34			0.24			0.33	
Total, real		746			470			109			118			588			1025	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 27

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 406 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5572)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March	April	May			June		
1	07:57			07:45		08:18 (113)	07:10	07:20	06:36			06:08		06:59 (112)
	17:20			17:53	34	08:52 (113)	18:26	19:59	20:28			20:57	62	08:01 (112)
2	07:57			07:44		08:17 (113)	07:08	07:19	06:35			06:08		06:59 (112)
	17:21			17:54	36	08:53 (113)	18:27	20:00	20:29			20:58	63	08:02 (112)
3	07:58			07:43		08:16 (113)	07:07	07:17	06:33			06:07		06:59 (112)
	17:22			17:56	38	08:54 (113)	18:28	20:00	20:30			20:58	64	08:03 (112)
4	07:58			07:42		08:15 (113)	07:05	07:15	06:32			06:07		06:59 (112)
	17:22			17:57	39	08:54 (113)	18:29	20:01	20:31			20:59	64	08:03 (112)
5	07:58			07:41		08:14 (113)	07:04	07:14	06:31			06:07		06:59 (112)
	17:23			17:58	41	08:55 (113)	18:31	20:02	20:32			21:00	64	08:03 (112)
6	07:58			07:40		08:14 (113)	07:02	07:12	06:30			06:06		06:59 (112)
	17:24			17:59	42	08:56 (113)	18:32	20:03	20:33			21:00	65	08:04 (112)
7	07:58			07:39		08:13 (113)	07:01	07:11	06:29			06:06		06:59 (112)
	17:25			18:01	44	08:57 (113)	18:33	20:04	20:34			21:01	65	08:04 (112)
8	07:57			07:37		08:13 (113)	07:59	07:09	06:28			06:06		06:58 (112)
	17:26			18:02	44	08:57 (113)	19:34	20:05	20:35			21:02	66	08:04 (112)
9	07:57			07:36		08:13 (113)	07:57	07:08	06:26			06:06		06:59 (112)
	17:27			18:03	45	08:58 (113)	19:35	20:06	20:36			21:02	65	08:04 (112)
10	07:57			07:35		08:13 (113)	07:56	07:06	06:25			06:06		06:59 (112)
	17:28			18:04	45	08:58 (113)	19:36	20:07	20:37			21:03	66	08:05 (112)
11	07:57			07:34		08:13 (113)	07:54	07:04	06:24		07:25 (112)	06:05		06:59 (112)
	17:29			18:05	46	08:59 (113)	19:37	20:08	20:38	9	07:34 (112)	21:03	66	08:05 (112)
12	07:57			07:33		08:12 (113)	07:53	07:03	06:23		07:19 (112)	06:05		06:59 (112)
	17:30			18:07	46	08:58 (113)	19:38	20:09	20:39	20	07:39 (112)	21:04	67	08:06 (112)
13	07:56			07:32		08:12 (113)	07:51	07:01	06:22		07:16 (112)	06:05		06:59 (112)
	17:31			18:08	46	08:58 (113)	19:39	20:10	20:40	26	07:42 (112)	21:04	67	08:06 (112)
14	07:56			07:30		08:13 (113)	07:49	07:00	06:21		07:14 (112)	06:05		06:59 (112)
	17:32			18:09	46	08:59 (113)	19:40	20:11	20:41	31	07:45 (112)	21:05	67	08:06 (112)
15	07:56			07:29		08:13 (113)	07:48	06:58	06:20		07:12 (112)	06:05		06:59 (112)
	17:33			18:10	46	08:59 (113)	19:41	20:12	20:42	35	07:47 (112)	21:05	68	08:07 (112)
16	07:55			07:28		08:13 (113)	07:46	06:57	06:19		07:11 (112)	06:05		06:59 (112)
	17:35			18:11	45	08:58 (113)	19:42	20:13	20:43	38	07:49 (112)	21:06	68	08:07 (112)
17	07:55			07:27		08:13 (113)	07:45	06:55	06:18		07:09 (112)	06:05		07:00 (112)
	17:36			18:12	45	08:58 (113)	19:43	20:14	20:44	41	07:50 (112)	21:06	67	08:07 (112)
18	07:54			07:25		08:14 (113)	07:43	06:54	06:18		07:08 (112)	06:05		07:00 (112)
	17:37			18:14	43	08:57 (113)	19:44	20:15	20:45	43	07:51 (112)	21:06	67	08:07 (112)
19	07:54			07:24		08:14 (113)	07:41	06:52	06:17		07:06 (112)	06:06		07:00 (112)
	17:38			18:15	42	08:56 (113)	19:45	20:16	20:46	46	07:52 (112)	21:07	67	08:07 (112)
20	07:53			07:23		08:15 (113)	07:40	06:51	06:16		07:05 (112)	06:06		07:01 (112)
	17:39			18:16	41	08:56 (113)	19:46	20:17	20:47	48	07:53 (112)	21:07	67	08:08 (112)
21	07:53			07:21		08:15 (113)	07:38	06:49	06:15		07:05 (112)	06:06		07:01 (112)
	17:40			18:17	39	08:54 (113)	19:48	20:18	20:48	50	07:55 (112)	21:07	67	08:08 (112)
22	07:52			07:20		08:16 (113)	07:37	06:48	06:14		07:04 (112)	06:06		07:01 (112)
	17:41			18:18	37	08:53 (113)	19:49	20:19	20:49	52	07:56 (112)	21:08	67	08:08 (112)
23	07:52			07:18		08:17 (113)	07:35	06:47	06:14		07:03 (112)	06:06		07:01 (112)
	17:43			18:19	36	08:53 (113)	19:50	20:20	20:50	53	07:56 (112)	21:08	67	08:08 (112)
24	07:51			07:17		08:18 (113)	07:33	06:45	06:13		07:03 (112)	06:07		07:02 (112)
	17:44			18:21	32	08:50 (113)	19:51	20:21	20:50	55	07:58 (112)	21:08	67	08:09 (112)
25	07:50			07:16		08:20 (113)	07:32	06:44	06:12		07:02 (112)	06:07		07:02 (112)
	17:45			18:22	29	08:49 (113)	19:52	20:22	20:51	56	07:58 (112)	21:08	67	08:09 (112)
26	07:50		08:27 (113)	07:14		08:21 (113)	07:30	06:42	06:12		07:01 (112)	06:07		07:01 (112)
	17:46	13	08:40 (113)	18:23	25	08:46 (113)	19:53	20:23	20:52	57	07:58 (112)	21:08	68	08:09 (112)
27	07:49		08:24 (113)	07:13		08:24 (113)	07:28	06:41	06:11		07:01 (112)	06:08		07:02 (112)
	17:47	19	08:43 (113)	18:24	20	08:44 (113)	19:54	20:24	20:53	58	07:59 (112)	21:08	68	08:10 (112)
28	07:48		08:22 (113)	07:11		08:27 (113)	07:27	06:40	06:10		07:00 (112)	06:08		07:02 (112)
	17:48	23	08:45 (113)	18:25	13	08:40 (113)	19:55	20:25	20:54	59	07:59 (112)	21:08	67	08:09 (112)
29	07:47		08:21 (113)				07:25	06:38	06:10		07:00 (112)	06:08		07:02 (112)
	17:50	26	08:47 (113)				19:56	20:26	20:55	61	08:01 (112)	21:08	67	08:09 (112)
30	07:46		08:19 (113)				07:23	06:37	06:09		07:00 (112)	06:09		07:03 (112)
	17:51	30	08:49 (113)				19:57	20:27	20:55	60	08:00 (112)	21:08	67	08:10 (112)
31	07:45		08:18 (113)				07:22		06:09		07:00 (112)			
	17:52	32	08:50 (113)				19:58		20:56	61	08:01 (112)			
Potential sun hours	300			299			370	397	446			449		
Total, worst case		143			1085					959			1987	
Sun reduction		0.36			0.42					0.56			0.60	
Oper. time red.		1.00			1.00					1.00			1.00	
Wind dir. red.		0.61			0.61					0.68			0.68	
Total reduction		0.22			0.26					0.38			0.41	
Total, real		31			278					363			806	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 28

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 406 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5572)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September	October			November			December
1	06:09		07:03 (112)	06:32		07:32 (112)	07:02	07:31			07:04		07:42 (113)	07:37
	21:08	66	08:09 (112)	20:51	16	07:48 (112)	20:09	19:19			17:33	45	08:27 (113)	17:10
2	06:10		07:04 (112)	06:33			07:03	07:32			07:05		07:43 (113)	07:38
	21:08	66	08:10 (112)	20:50			20:08	19:17			17:32	45	08:28 (113)	17:10
3	06:10		07:04 (112)	06:34			07:04	07:33			07:06		07:43 (113)	07:39
	21:08	66	08:10 (112)	20:49			20:06	19:15			17:31	44	08:27 (113)	17:10
4	06:11		07:04 (112)	06:35			07:05	07:34			07:07		07:43 (113)	07:40
	21:08	66	08:10 (112)	20:48			20:05	19:14			17:30	44	08:27 (113)	17:10
5	06:11		07:04 (112)	06:36			07:06	07:35			07:08		07:44 (113)	07:41
	21:08	66	08:10 (112)	20:47			20:03	19:12			17:29	42	08:26 (113)	17:10
6	06:12		07:05 (112)	06:37			07:07	07:36			07:09		07:45 (113)	07:42
	21:08	65	08:10 (112)	20:45			20:01	19:11			17:28	41	08:26 (113)	17:09
7	06:12		07:05 (112)	06:38			07:08	07:37			07:10		07:46 (113)	07:43
	21:07	65	08:10 (112)	20:44			20:00	19:09			17:27	39	08:25 (113)	17:09
8	06:13		07:06 (112)	06:39			07:09	07:38			07:12		07:46 (113)	07:44
	21:07	64	08:10 (112)	20:43			19:57	19:07			17:26	38	08:24 (113)	17:09
9	06:14		07:06 (112)	06:40			07:10	07:39			07:13		07:47 (113)	07:45
	21:07	64	08:10 (112)	20:42			19:55	19:06			17:25	36	08:23 (113)	17:09
10	06:14		07:06 (112)	06:41			07:11	07:40			07:14		07:49 (113)	07:46
	21:06	63	08:09 (112)	20:41			19:53	19:04			17:24	34	08:23 (113)	17:09
11	06:15		07:07 (112)	06:42			07:11	07:41			07:15		07:50 (113)	07:47
	21:06	63	08:10 (112)	20:39			19:52	19:03			17:23	32	08:22 (113)	17:10
12	06:16		07:08 (112)	06:43			07:12	07:42			07:16		07:51 (113)	07:47
	21:06	62	08:10 (112)	20:38			19:50	19:01			17:22	29	08:20 (113)	17:10
13	06:16		07:08 (112)	06:44			07:13	07:43		09:05 (113)	07:17		07:53 (113)	07:48
	21:05	61	08:09 (112)	20:37			19:48	19:00	4	09:09 (113)	17:21	26	08:19 (113)	17:10
14	06:17		07:09 (112)	06:45			07:14	07:44		08:58 (113)	07:19		07:54 (113)	07:49
	21:05	60	08:09 (112)	20:36			19:47	18:58	17	09:15 (113)	17:20	23	08:17 (113)	17:10
15	06:18		07:09 (112)	06:46			07:15	07:45		08:55 (113)	07:20		07:57 (113)	07:50
	21:04	60	08:09 (112)	20:34			19:45	18:57	23	09:18 (113)	17:19	19	08:16 (113)	17:10
16	06:19		07:10 (112)	06:47			07:16	07:46		08:53 (113)	07:21		08:00 (113)	07:50
	21:04	59	08:09 (112)	20:33			19:43	18:55	27	09:20 (113)	17:18	13	08:13 (113)	17:11
17	06:19		07:10 (112)	06:48			07:17	07:47		08:51 (113)	07:22			07:51
	21:03	58	08:08 (112)	20:32			19:42	18:54	30	09:21 (113)	17:18			17:11
18	06:20		07:11 (112)	06:49			07:18	07:48		08:49 (113)	07:23			07:52
	21:02	57	08:08 (112)	20:30			19:40	18:52	34	09:23 (113)	17:17			17:11
19	06:21		07:12 (112)	06:50			07:19	07:49		08:47 (113)	07:24			07:52
	21:02	55	08:07 (112)	20:29			19:38	18:51	37	09:24 (113)	17:16			17:12
20	06:22		07:13 (112)	06:51			07:20	07:50		08:46 (113)	07:25			07:53
	21:01	54	08:07 (112)	20:27			19:37	18:49	38	09:24 (113)	17:15			17:12
21	06:23		07:14 (112)	06:51			07:21	07:51		08:45 (113)	07:27			07:53
	21:00	52	08:06 (112)	20:26			19:35	18:48	40	09:25 (113)	17:15			17:12
22	06:24		07:14 (112)	06:52			07:22	07:52		08:45 (113)	07:28			07:54
	21:00	51	08:05 (112)	20:25			19:33	18:46	42	09:27 (113)	17:14			17:13
23	06:24		07:15 (112)	06:53			07:23	07:53		08:44 (113)	07:29			07:54
	20:59	49	08:04 (112)	20:23			19:32	18:45	43	09:27 (113)	17:14			17:13
24	06:25		07:16 (112)	06:54			07:24	07:55		08:43 (113)	07:30			07:55
	20:58	48	08:04 (112)	20:22			19:30	18:44	44	09:27 (113)	17:13			17:14
25	06:26		07:18 (112)	06:55			07:25	07:56		08:43 (113)	07:31			07:55
	20:57	45	08:03 (112)	20:20			19:28	18:42	44	09:27 (113)	17:13			17:15
26	06:27		07:19 (112)	06:56			07:26	07:57		08:42 (113)	07:32			07:56
	20:56	43	08:02 (112)	20:19			19:27	18:41	45	09:27 (113)	17:12			17:15
27	06:28		07:20 (112)	06:57			07:27	07:58		08:42 (113)	07:33			07:56
	20:56	40	08:00 (112)	20:17			19:25	18:40	45	09:27 (113)	17:12			17:16
28	06:29		07:21 (112)	06:58			07:28	07:59		08:42 (113)	07:34			07:56
	20:55	37	07:58 (112)	20:16			19:23	18:38	46	09:28 (113)	17:11			17:17
29	06:30		07:23 (112)	06:59			07:29	08:00		08:42 (113)	07:35			07:57
	20:54	33	07:56 (112)	20:14			19:22	18:37	46	09:28 (113)	17:11			17:17
30	06:31		07:25 (112)	07:00			07:30	08:01		08:42 (113)	07:36			07:57
	20:53	29	07:54 (112)	20:13			19:20	18:36	46	09:28 (113)	17:11			17:18
31	06:32		07:28 (112)	07:01				08:02		08:42 (113)				07:57
	20:52	24	07:52 (112)	20:11				18:35	46	09:28 (113)				17:19
Potential sun hours	456			426			374	346			300			291
Total, worst case		1691			16				697			550		
Sun reduction		0.60			0.60				0.56			0.37		
Oper. time red.		1.00			1.00				1.00			1.00		
Wind dir. red.		0.68			0.68				0.61			0.61		
Total reduction		0.41			0.41				0.34			0.23		
Total, real		686			6				238			124		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 29

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
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Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 410 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5575)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April	May			June		
1	07:57		08:25 (118)	07:45		08:29 (118)	07:10			07:20	06:36			06:08		06:42 (113)
	17:20	9	08:34 (118)	17:53	23	08:52 (118)	18:26			19:59	20:28			20:57	39	07:21 (113)
2	07:57		08:24 (118)	07:44		08:30 (118)	07:08			07:19	06:35			06:08		06:42 (113)
	17:21	12	08:36 (118)	17:55	21	08:51 (118)	18:27			20:00	20:29			20:58	40	07:22 (113)
3	07:58		08:24 (118)	07:43		08:32 (118)	07:07			07:17	06:33			06:08		06:43 (113)
	17:22	13	08:37 (118)	17:56	17	08:49 (118)	18:28			20:00	20:30			20:58	39	07:22 (113)
4	07:58		08:23 (118)	07:42		08:34 (118)	07:05		07:33 (119)	07:15	06:32			06:07		06:42 (113)
	17:22	15	08:38 (118)	17:57	12	08:46 (118)	18:29	14	07:47 (119)	20:01	20:31			20:59	40	07:22 (113)
5	07:58		08:23 (118)	07:41		08:38 (118)	07:04		07:31 (119)	07:14	06:31			06:07		06:42 (113)
	17:23	17	08:40 (118)	17:58	4	08:42 (118)	18:31	20	07:51 (119)	20:02	20:32			21:00	40	07:22 (113)
6	07:58		08:23 (118)	07:40			07:02		07:28 (119)	07:12	06:30			06:07		06:43 (113)
	17:24	18	08:41 (118)	17:59			18:32	24	07:52 (119)	20:03	20:33			21:00	40	07:23 (113)
7	07:58		08:23 (118)	07:39			07:01		07:27 (119)	07:11	06:29			06:06		06:43 (113)
	17:25	19	08:42 (118)	18:01			18:33	27	07:54 (119)	20:04	20:34			21:01	40	07:23 (113)
8	07:57		08:23 (118)	07:37			07:59		08:25 (119)	07:09	06:28			06:06		06:43 (113)
	17:26	20	08:43 (118)	18:02			19:34	29	08:54 (119)	20:05	20:35			21:02	41	07:24 (113)
9	07:57		08:23 (118)	07:36			07:57		08:24 (119)	07:08	06:26			06:06		06:43 (113)
	17:27	22	08:45 (118)	18:03			19:35	31	08:55 (119)	20:06	20:36			21:02	40	07:23 (113)
10	07:57		08:22 (118)	07:35			07:56		08:23 (119)	07:06	06:25			06:06		06:43 (113)
	17:28	23	08:45 (118)	18:04			19:36	33	08:56 (119)	20:07	20:37			21:03	40	07:23 (113)
11	07:57		08:22 (118)	07:34			07:54		08:22 (119)	07:04	06:24			06:06		06:43 (113)
	17:29	24	08:46 (118)	18:05			19:37	33	08:55 (119)	20:08	20:38			21:03	41	07:24 (113)
12	07:57		08:22 (118)	07:33			07:53		08:22 (119)	07:03	06:23			06:05		06:43 (113)
	17:30	25	08:47 (118)	18:07			19:38	34	08:56 (119)	20:09	20:39			21:04	41	07:24 (113)
13	07:56		08:22 (118)	07:32			07:51		08:21 (119)	07:01	06:22			06:05		06:44 (113)
	17:31	26	08:48 (118)	18:08			19:39	35	08:56 (119)	20:10	20:40			21:04	40	07:24 (113)
14	07:56		08:22 (118)	07:30			07:49		08:20 (119)	07:00	06:21		06:56 (113)	06:05		06:44 (113)
	17:32	27	08:49 (118)	18:09			19:40	35	08:55 (119)	20:11	20:41	8	07:04 (113)	21:05	40	07:24 (113)
15	07:56		08:22 (118)	07:29			07:48		08:21 (119)	06:58	06:20		06:53 (113)	06:05		06:44 (113)
	17:33	28	08:50 (118)	18:10			19:41	34	08:55 (119)	20:12	20:42	15	07:08 (113)	21:05	40	07:24 (113)
16	07:55		08:21 (118)	07:28			07:46		08:20 (119)	06:57	06:19		06:51 (113)	06:05		06:44 (113)
	17:35	29	08:50 (118)	18:11			19:42	34	08:54 (119)	20:13	20:43	20	07:11 (113)	21:06	41	07:25 (113)
17	07:55		08:22 (118)	07:27			07:45		08:20 (119)	06:55	06:18		06:50 (113)	06:05		06:44 (113)
	17:36	29	08:51 (118)	18:12			19:43	33	08:53 (119)	20:14	20:44	22	07:12 (113)	21:06	41	07:25 (113)
18	07:54		08:21 (118)	07:25			07:43		08:21 (119)	06:54	06:18		06:48 (113)	06:05		06:44 (113)
	17:37	30	08:51 (118)	18:14			19:44	32	08:53 (119)	20:15	20:45	25	07:13 (113)	21:06	41	07:25 (113)
19	07:54		08:22 (118)	07:24			07:41		08:21 (119)	06:52	06:17		06:47 (113)	06:06		06:45 (113)
	17:38	30	08:52 (118)	18:15			19:45	31	08:52 (119)	20:16	20:46	27	07:14 (113)	21:07	40	07:25 (113)
20	07:53		08:22 (118)	07:23			07:40		08:22 (119)	06:51	06:16		06:46 (113)	06:06		06:46 (113)
	17:39	30	08:52 (118)	18:16			19:46	29	08:51 (119)	20:17	20:47	29	07:15 (113)	21:07	40	07:26 (113)
21	07:53		08:22 (118)	07:21			07:38		08:23 (119)	06:49	06:15		06:46 (113)	06:06		06:46 (113)
	17:40	30	08:52 (118)	18:17			19:48	26	08:49 (119)	20:18	20:48	30	07:16 (113)	21:07	40	07:26 (113)
22	07:52		08:23 (118)	07:20			07:37		08:23 (119)	06:48	06:14		06:45 (113)	06:06		06:46 (113)
	17:41	30	08:53 (118)	18:18			19:49	24	08:47 (119)	20:19	20:49	32	07:17 (113)	21:08	40	07:26 (113)
23	07:52		08:23 (118)	07:18			07:35		08:26 (119)	06:47	06:14		06:44 (113)	06:06		06:46 (113)
	17:43	30	08:53 (118)	18:19			19:50	20	08:46 (119)	20:20	20:50	33	07:17 (113)	21:08	40	07:26 (113)
24	07:51		08:23 (118)	07:17			07:33		08:27 (119)	06:45	06:13		06:44 (113)	06:07		06:47 (113)
	17:44	30	08:53 (118)	18:21			19:51	15	08:42 (119)	20:21	20:50	35	07:19 (113)	21:08	40	07:27 (113)
25	07:50		08:24 (118)	07:16			07:32		08:32 (119)	06:44	06:12		06:43 (113)	06:07		06:46 (113)
	17:45	30	08:54 (118)	18:22			19:52	5	08:37 (119)	20:22	20:51	36	07:19 (113)	21:08	41	07:27 (113)
26	07:50		08:24 (118)	07:14			07:30			06:42	06:12		06:43 (113)	06:07		06:46 (113)
	17:46	30	08:54 (118)	18:23			19:53			20:23	20:52	36	07:19 (113)	21:08	41	07:27 (113)
27	07:49		08:24 (118)	07:13			07:28			06:41	06:11		06:43 (113)	06:08		06:47 (113)
	17:47	30	08:54 (118)	18:24			19:54			20:24	20:53	37	07:20 (113)	21:08	40	07:27 (113)
28	07:48		08:25 (118)	07:11			07:27			06:40	06:10		06:42 (113)	06:08		06:47 (113)
	17:48	28	08:53 (118)	18:25			19:55			20:25	20:54	38	07:20 (113)	21:08	40	07:27 (113)
29	07:47		08:25 (118)				07:25			06:38	06:10		06:43 (113)	06:08		06:47 (113)
	17:50	28	08:53 (118)				19:56			20:26	20:55	38	07:21 (113)	21:08	40	07:27 (113)
30	07:46		08:26 (118)				07:24			06:37	06:09		06:42 (113)	06:09		06:48 (113)
	17:51	26	08:52 (118)				19:57			20:27	20:55	38	07:20 (113)	21:08	40	07:28 (113)
31	07:45		08:27 (118)				07:22				06:09		06:42 (113)			
	17:52	25	08:52 (118)				19:58				20:56	39	07:21 (113)			
Potential sun hours	300			299			370			397	446			449		
Total, worst case		763			77			598				538			1206	
Sun reduction		0.36			0.42			0.44				0.56			0.60	
Oper. time red.		1.00			1.00			1.00				1.00			1.00	
Wind dir. red.		0.60			0.60			0.63				0.68			0.68	
Total reduction		0.21			0.25			0.28				0.38			0.41	
Total, real		164			19			165				204			489	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 30

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 410 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5575)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August		September			October			November			December		
1	06:09		06:47 (113)	06:32		07:02			07:31		08:01 (119)	07:04			07:37		08:04 (118)
	21:08	41	07:28 (113)	20:51		20:09			19:19	34	08:35 (119)	17:33			17:10	24	08:28 (118)
2	06:10		06:48 (113)	06:33		07:03			07:32		08:01 (119)	07:05			07:38		08:05 (118)
	21:08	40	07:28 (113)	20:50		20:08			19:17	33	08:34 (119)	17:32			17:10	23	08:28 (118)
3	06:10		06:48 (113)	06:34		07:04			07:33		08:01 (119)	07:06			07:39		08:06 (118)
	21:08	40	07:28 (113)	20:49		20:06			19:15	32	08:33 (119)	17:31			17:10	22	08:28 (118)
4	06:11		06:48 (113)	06:35		07:05			07:34		08:01 (119)	07:07			07:40		08:07 (118)
	21:08	41	07:29 (113)	20:48		20:05			19:14	31	08:32 (119)	17:30			17:10	20	08:27 (118)
5	06:11		06:48 (113)	06:36		07:06			07:35		08:02 (119)	07:08			07:41		08:08 (118)
	21:08	40	07:28 (113)	20:47		20:03			19:12	29	08:31 (119)	17:29			17:10	19	08:27 (118)
6	06:12		06:49 (113)	06:37		07:07			07:36		08:02 (119)	07:09		08:08 (118)	07:42		08:09 (118)
	21:08	40	07:29 (113)	20:45		20:01			19:11	28	08:30 (119)	17:28	6	08:14 (118)	17:09	18	08:27 (118)
7	06:13		06:49 (113)	06:38		07:08			07:37		08:03 (119)	07:10		08:04 (118)	07:43		08:10 (118)
	21:07	40	07:29 (113)	20:44		20:00			19:09	25	08:28 (119)	17:27	13	08:17 (118)	17:09	17	08:27 (118)
8	06:13		06:49 (113)	06:39		07:09			07:38		08:05 (119)	07:12		08:02 (118)	07:44		08:11 (118)
	21:07	40	07:29 (113)	20:43		19:57			19:07	21	08:26 (119)	17:26	17	08:19 (118)	17:09	15	08:26 (118)
9	06:14		06:50 (113)	06:40		07:10			07:39		08:07 (119)	07:13		08:00 (118)	07:45		08:13 (118)
	21:07	39	07:29 (113)	20:42		19:55			19:06	17	08:24 (119)	17:25	21	08:21 (118)	17:09	13	08:26 (118)
10	06:14		06:49 (113)	06:41		07:11			07:40		08:10 (119)	07:14		08:00 (118)	07:46		08:14 (118)
	21:06	40	07:29 (113)	20:41		19:53			19:04	10	08:20 (119)	17:24	23	08:23 (118)	17:09	12	08:26 (118)
11	06:15		06:50 (113)	06:42		07:11			07:41			07:15		07:59 (118)	07:47		08:16 (118)
	21:06	39	07:29 (113)	20:39		19:52			19:03			17:23	25	08:24 (118)	17:10	9	08:25 (118)
12	06:16		06:51 (113)	06:43		07:12			07:42			07:16		07:58 (118)	07:47		08:17 (118)
	21:06	39	07:30 (113)	20:38		19:50			19:01			17:22	26	08:24 (118)	17:10	7	08:24 (118)
13	06:17		06:50 (113)	06:44		07:13			07:43			07:17		07:57 (118)	07:48		08:19 (118)
	21:05	39	07:29 (113)	20:37		19:48			19:00			17:21	28	08:25 (118)	17:10	4	08:23 (118)
14	06:17		06:51 (113)	06:45		07:14			07:44			07:19		07:57 (118)	07:49		
	21:05	38	07:29 (113)	20:36		19:47			18:58			17:20	28	08:25 (118)	17:10		
15	06:18		06:52 (113)	06:46		07:15			07:45			07:20		07:57 (118)	07:50		
	21:04	37	07:29 (113)	20:34		19:45			18:57			17:19	30	08:27 (118)	17:10		
16	06:19		06:52 (113)	06:47		07:16			07:46			07:21		07:57 (118)	07:50		
	21:04	37	07:29 (113)	20:33		19:43			18:55			17:18	30	08:27 (118)	17:11		
17	06:20		06:52 (113)	06:48		07:17			07:47			07:22		07:57 (118)	07:51		
	21:03	36	07:28 (113)	20:32		19:42			18:54			17:18	30	08:27 (118)	17:11		
18	06:20		06:53 (113)	06:49		07:18			07:48			07:23		07:57 (118)	07:52		
	21:02	35	07:28 (113)	20:30		19:40			18:52			17:17	30	08:27 (118)	17:11		
19	06:21		06:53 (113)	06:50		07:19		08:15 (119)	07:49			07:24		07:58 (118)	07:52		
	21:02	35	07:28 (113)	20:29		19:38	14	08:29 (119)	18:51			17:16	30	08:28 (118)	17:12		
20	06:22		06:54 (113)	06:51		07:20		08:12 (119)	07:50			07:25		07:58 (118)	07:53		
	21:01	34	07:28 (113)	20:27		19:37	19	08:31 (119)	18:49			17:15	30	08:28 (118)	17:12		
21	06:23		06:55 (113)	06:52		07:21		08:10 (119)	07:51			07:27		07:58 (118)	07:53		
	21:00	33	07:28 (113)	20:26		19:35	23	08:33 (119)	18:48			17:15	30	08:28 (118)	17:12		
22	06:24		06:55 (113)	06:52		07:22		08:07 (119)	07:52			07:28		07:58 (118)	07:54		
	21:00	31	07:26 (113)	20:25		19:33	26	08:33 (119)	18:46			17:14	30	08:28 (118)	17:13		
23	06:24		06:56 (113)	06:53		07:23		08:06 (119)	07:53			07:29		07:58 (118)	07:54		
	20:59	30	07:26 (113)	20:23		19:32	28	08:34 (119)	18:45			17:14	30	08:28 (118)	17:13		
24	06:25		06:57 (113)	06:54		07:24		08:05 (119)	07:55			07:30		07:59 (118)	07:55		
	20:58	28	07:25 (113)	20:22		19:30	30	08:35 (119)	18:44			17:13	29	08:28 (118)	17:14		
25	06:26		06:58 (113)	06:55		07:25		08:04 (119)	07:56			07:31		08:00 (118)	07:55		
	20:57	26	07:24 (113)	20:20		19:28	31	08:35 (119)	18:42			17:13	29	08:29 (118)	17:15		
26	06:27		06:59 (113)	06:56		07:26		08:03 (119)	07:57			07:32		08:00 (118)	07:56		
	20:56	24	07:23 (113)	20:19		19:27	33	08:36 (119)	18:41			17:12	29	08:29 (118)	17:15		
27	06:28		07:01 (113)	06:57		07:27		08:02 (119)	07:58			07:33		08:01 (118)	07:56		
	20:56	21	07:22 (113)	20:17		19:25	34	08:36 (119)	18:40			17:12	28	08:29 (118)	17:16		
28	06:29		07:02 (113)	06:58		07:28		08:01 (119)	07:59			07:34		08:02 (118)	07:56		
	20:55	17	07:19 (113)	20:16		19:23	35	08:36 (119)	18:38			17:11	27	08:29 (118)	17:17		
29	06:30		07:04 (113)	06:59		07:29		08:01 (119)	08:00			07:35		08:02 (118)	07:57		
	20:54	13	07:17 (113)	20:14		19:22	35	08:36 (119)	18:37			17:11	27	08:29 (118)	17:17		
30	06:31		07:10 (113)	07:00		07:30		08:01 (119)	08:01			07:36		08:03 (118)	07:57		
	20:53	2	07:12 (113)	20:13		19:20	34	08:35 (119)	18:36			17:11	25	08:28 (118)	17:18		
31	06:32			07:01					08:02						07:57		08:26 (118)
	20:52			20:11					18:35						17:19	6	08:32 (118)
Potential sun hours	456			426		374			346			300			291		
Total, worst case		995					342			260			651			209	
Sun reduction		0.60					0.61			0.56			0.37			0.50	
Oper. time red.		1.00					1.00			1.00			1.00			1.00	
Wind dir. red.		0.68					0.63			0.63			0.60			0.60	
Total reduction		0.41					0.38			0.35			0.22			0.30	
Total, real		404					131			91			144			62	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 31

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
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Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 411 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5576)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April	May			June		
1	07:57		08:25 (118)	07:45			07:10		07:37 (119)	07:20	06:36		07:09 (113)	06:08		06:58 (113)
	17:20	29	08:54 (118)	17:53			18:26	32	08:09 (119)	19:59	20:28	14	07:23 (113)	20:57	35	07:33 (113)
2	07:57		08:25 (118)	07:44			07:08		07:36 (119)	07:19	06:35		07:06 (113)	06:08		06:59 (113)
	17:21	29	08:54 (118)	17:55			18:27	33	08:09 (119)	20:00	20:29	19	07:25 (113)	20:58	34	07:33 (113)
3	07:58		08:25 (118)	07:43			07:07		07:36 (119)	07:17	06:33		07:04 (113)	06:07		07:00 (113)
	17:22	30	08:55 (118)	17:56			18:28	34	08:10 (119)	20:00	20:30	24	07:28 (113)	20:58	33	07:33 (113)
4	07:58		08:26 (118)	07:42			07:05		07:35 (119)	07:15	06:32		07:03 (113)	06:07		07:00 (113)
	17:22	29	08:55 (118)	17:57			18:29	34	08:09 (119)	20:01	20:31	26	07:29 (113)	20:59	32	07:32 (113)
5	07:58		08:26 (118)	07:41			07:04		07:36 (119)	07:14	06:31		07:01 (113)	06:07		07:00 (113)
	17:23	30	08:56 (118)	17:58			18:31	34	08:10 (119)	20:02	20:32	29	07:30 (113)	21:00	32	07:32 (113)
6	07:58		08:27 (118)	07:40			07:02		07:35 (119)	07:12	06:30		06:59 (113)	06:07		07:01 (113)
	17:24	29	08:56 (118)	17:59			18:32	34	08:09 (119)	20:03	20:33	32	07:31 (113)	21:00	31	07:32 (113)
7	07:58		08:27 (118)	07:39			07:01		07:36 (119)	07:11	06:29		06:58 (113)	06:06		07:02 (113)
	17:25	30	08:57 (118)	18:01			18:33	33	08:09 (119)	20:04	20:34	34	07:32 (113)	21:01	30	07:32 (113)
8	07:57		08:28 (118)	07:37			07:59		08:35 (119)	07:09	06:28		06:58 (113)	06:06		07:03 (113)
	17:26	30	08:58 (118)	18:02			19:34	33	09:08 (119)	20:05	20:35	34	07:32 (113)	21:02	29	07:32 (113)
9	07:57		08:28 (118)	07:36			07:57		08:35 (119)	07:08	06:26		06:57 (113)	06:06		07:02 (113)
	17:27	30	08:58 (118)	18:03			19:35	32	09:07 (119)	20:06	20:36	36	07:33 (113)	21:02	29	07:31 (113)
10	07:57		08:28 (118)	07:35			07:56		08:36 (119)	07:06	06:25		06:56 (113)	06:06		07:03 (113)
	17:28	30	08:58 (118)	18:04			19:36	30	09:06 (119)	20:07	20:37	37	07:33 (113)	21:03	28	07:31 (113)
11	07:57		08:28 (118)	07:34			07:54		08:36 (119)	07:04	06:24		06:56 (113)	06:06		07:04 (113)
	17:29	31	08:59 (118)	18:05			19:37	29	09:05 (119)	20:08	20:38	38	07:34 (113)	21:03	27	07:31 (113)
12	07:57		08:29 (118)	07:33			07:53		08:38 (119)	07:03	06:23		06:55 (113)	06:05		07:04 (113)
	17:30	30	08:59 (118)	18:07			19:38	26	09:04 (119)	20:09	20:39	39	07:34 (113)	21:04	27	07:31 (113)
13	07:56		08:30 (118)	07:32			07:51		08:39 (119)	07:01	06:22		06:55 (113)	06:05		07:05 (113)
	17:31	30	09:00 (118)	18:08			19:39	23	09:02 (119)	20:10	20:40	39	07:34 (113)	21:04	26	07:31 (113)
14	07:56		08:30 (118)	07:30			07:49		08:40 (119)	07:00	06:21		06:55 (113)	06:05		07:05 (113)
	17:32	29	08:59 (118)	18:09			19:40	19	08:59 (119)	20:11	20:41	39	07:34 (113)	21:05	26	07:31 (113)
15	07:56		08:31 (118)	07:29			07:48		08:43 (119)	06:58	06:20		06:54 (113)	06:05		07:06 (113)
	17:33	29	09:00 (118)	18:10			19:41	13	08:56 (119)	20:12	20:42	41	07:35 (113)	21:05	25	07:31 (113)
16	07:55		08:31 (118)	07:28			07:46			06:57	06:19		06:55 (113)	06:05		07:06 (113)
	17:35	29	09:00 (118)	18:11			19:42			20:13	20:43	41	07:36 (113)	21:06	25	07:31 (113)
17	07:55		08:32 (118)	07:27			07:45			06:55	06:18		06:55 (113)	06:05		07:06 (113)
	17:36	28	09:00 (118)	18:12			19:43			20:14	20:44	40	07:35 (113)	21:06	25	07:31 (113)
18	07:54		08:32 (118)	07:25			07:43			06:54	06:18		06:55 (113)	06:05		07:07 (113)
	17:37	28	09:00 (118)	18:14			19:44			20:15	20:45	40	07:35 (113)	21:06	24	07:31 (113)
19	07:54		08:34 (118)	07:24			07:41			06:52	06:17		06:54 (113)	06:06		07:07 (113)
	17:38	26	09:00 (118)	18:15			19:45			20:16	20:46	41	07:35 (113)	21:07	24	07:31 (113)
20	07:53		08:34 (118)	07:23			07:40			06:51	06:16		06:54 (113)	06:06		07:08 (113)
	17:39	25	08:59 (118)	18:16			19:46			20:17	20:47	41	07:35 (113)	21:07	24	07:32 (113)
21	07:53		08:35 (118)	07:21			07:38			06:49	06:15		06:55 (113)	06:06		07:08 (113)
	17:40	24	08:59 (118)	18:17			19:48			20:18	20:48	41	07:36 (113)	21:07	24	07:32 (113)
22	07:52		08:36 (118)	07:20		07:50 (119)	07:37			06:48	06:14		06:55 (113)	06:06		07:08 (113)
	17:41	23	08:59 (118)	18:18	8	07:58 (119)	19:49			20:19	20:49	40	07:35 (113)	21:08	24	07:32 (113)
23	07:52		08:37 (118)	07:18		07:46 (119)	07:35			06:47	06:14		06:55 (113)	06:06		07:08 (113)
	17:43	21	08:58 (118)	18:19	16	08:02 (119)	19:50			20:20	20:50	40	07:35 (113)	21:08	24	07:32 (113)
24	07:51		08:38 (118)	07:17		07:43 (119)	07:33			06:45	06:13		06:56 (113)	06:07		07:09 (113)
	17:44	19	08:57 (118)	18:21	21	08:04 (119)	19:51			20:21	20:50	39	07:35 (113)	21:08	24	07:33 (113)
25	07:50		08:41 (118)	07:16		07:42 (119)	07:32			06:44	06:12		06:56 (113)	06:07		07:08 (113)
	17:45	15	08:56 (118)	18:22	24	08:06 (119)	19:52			20:22	20:51	39	07:35 (113)	21:08	25	07:33 (113)
26	07:50		08:43 (118)	07:14		07:40 (119)	07:30			06:42	06:12		06:56 (113)	06:07		07:08 (113)
	17:46	11	08:54 (118)	18:23	27	08:07 (119)	19:53			20:23	20:52	38	07:34 (113)	21:08	25	07:33 (113)
27	07:49		08:47 (118)	07:13		07:39 (119)	07:28			06:41	06:11		06:57 (113)	06:08		07:09 (113)
	17:47	3	08:50 (118)	18:24	29	08:08 (119)	19:54			20:24	20:53	38	07:35 (113)	21:08	25	07:34 (113)
28	07:48			07:11		07:38 (119)	07:27			06:40	06:10		06:56 (113)	06:08		07:08 (113)
	17:48			18:25	30	08:08 (119)	19:55			20:25	20:54	38	07:34 (113)	21:08	26	07:34 (113)
29	07:47						07:25			06:38	06:10		06:57 (113)	06:08		07:08 (113)
	17:50						19:56			20:26	20:55	37	07:34 (113)	21:08	26	07:34 (113)
30	07:46						07:24			06:37	06:09		06:57 (113)	06:09		07:08 (113)
	17:51						19:57			20:27	20:55	36	07:33 (113)	21:08	27	07:35 (113)
31	07:45						07:22				06:09		06:58 (113)			
	17:52						19:58				20:56	36	07:34 (113)			
Potential sun hours	300			299			370			397	446			449		
Total, worst case		697			155			439				1106			816	
Sun reduction		0.36			0.42			0.44				0.56			0.60	
Oper. time red.		1.00			1.00			1.00				1.00			1.00	
Wind dir. red.		0.61			0.63			0.63				0.68			0.68	
Total reduction		0.22			0.26			0.28				0.38			0.40	
Total, real		151			41			122				416			329	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 32

Licensed user:
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US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 411 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5576)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		07:08 (113)	06:32		07:06 (113)	07:02			07:31		08:17 (119)	07:04			07:37		08:10 (118)
	21:08	27	07:35 (113)	20:51	39	07:45 (113)	20:09			19:19	25	08:42 (119)	17:33			17:10	31	08:41 (118)
2	06:10		07:08 (113)	06:33		07:07 (113)	07:03			07:32		08:16 (119)	07:05			07:38		08:11 (118)
	21:08	28	07:36 (113)	20:50	37	07:44 (113)	20:08			19:17	27	08:43 (119)	17:32			17:10	30	08:41 (118)
3	06:10		07:08 (113)	06:34		07:07 (113)	07:04			07:33		08:14 (119)	07:06			07:39		08:11 (118)
	21:08	28	07:36 (113)	20:49	37	07:44 (113)	20:06			19:15	30	08:44 (119)	17:31			17:10	30	08:41 (118)
4	06:11		07:08 (113)	06:35		07:08 (113)	07:05			07:34		08:13 (119)	07:07			07:40		08:12 (118)
	21:08	29	07:37 (113)	20:48	35	07:43 (113)	20:05			19:14	31	08:44 (119)	17:30			17:10	30	08:42 (118)
5	06:11		07:07 (113)	06:36		07:09 (113)	07:06			07:35		08:12 (119)	07:08			07:41		08:12 (118)
	21:08	30	07:37 (113)	20:47	34	07:43 (113)	20:03			19:12	32	08:44 (119)	17:29			17:10	30	08:42 (118)
6	06:12		07:08 (113)	06:37		07:08 (113)	07:07			07:36		08:11 (119)	07:09			07:42		08:13 (118)
	21:08	30	07:38 (113)	20:45	33	07:41 (113)	20:01			19:11	34	08:45 (119)	17:28			17:09	29	08:42 (118)
7	06:12		07:08 (113)	06:38		07:09 (113)	07:08			07:37		08:11 (119)	07:10			07:43		08:13 (118)
	21:07	31	07:39 (113)	20:44	31	07:40 (113)	20:00			19:09	34	08:45 (119)	17:27			17:09	30	08:43 (118)
8	06:13		07:07 (113)	06:39		07:11 (113)	07:09			07:38		08:10 (119)	07:12			07:44		08:14 (118)
	21:07	32	07:39 (113)	20:43	28	07:39 (113)	19:57			19:07	34	08:44 (119)	17:26			17:09	29	08:43 (118)
9	06:14		07:07 (113)	06:40		07:12 (113)	07:10			07:39		08:10 (119)	07:13			07:45		08:14 (118)
	21:07	33	07:40 (113)	20:42	25	07:37 (113)	19:55			19:06	34	08:44 (119)	17:25			17:09	30	08:44 (118)
10	06:14		07:06 (113)	06:41		07:13 (113)	07:11			07:40		08:10 (119)	07:14			07:46		08:15 (118)
	21:06	34	07:40 (113)	20:41	23	07:36 (113)	19:53			19:04	34	08:44 (119)	17:24			17:09	29	08:44 (118)
11	06:15		07:06 (113)	06:42		07:15 (113)	07:11			07:41		08:10 (119)	07:15			07:47		08:16 (118)
	21:06	35	07:41 (113)	20:39	19	07:34 (113)	19:52			19:03	33	08:43 (119)	17:23			17:10	29	08:45 (118)
12	06:16		07:07 (113)	06:43		07:19 (113)	07:12			07:42		08:10 (119)	07:16			07:47		08:16 (118)
	21:06	35	07:42 (113)	20:38	11	07:30 (113)	19:50			19:01	32	08:42 (119)	17:22			17:10	28	08:44 (118)
13	06:17		07:06 (113)	06:44			07:13			07:43		08:11 (119)	07:17			07:48		08:16 (118)
	21:05	36	07:42 (113)	20:37			19:48			19:00	32	08:43 (119)	17:21			17:10	29	08:45 (118)
14	06:17		07:06 (113)	06:45			07:14			07:44		08:12 (119)	07:19			07:49		08:17 (118)
	21:05	36	07:42 (113)	20:36			19:47			18:58	30	08:42 (119)	17:20			17:10	28	08:45 (118)
15	06:18		07:06 (113)	06:46			07:15			07:45		08:12 (119)	07:20		08:20 (118)	07:50		08:18 (118)
	21:04	37	07:43 (113)	20:34			19:45			18:57	28	08:40 (119)	17:19	3	08:23 (118)	17:10	28	08:46 (118)
16	06:19		07:06 (113)	06:47			07:16			07:46		08:13 (119)	07:21		08:16 (118)	07:50		08:18 (118)
	21:04	38	07:44 (113)	20:33			19:43			18:55	26	08:39 (119)	17:18	11	08:27 (118)	17:11	28	08:46 (118)
17	06:20		07:05 (113)	06:48			07:17			07:47		08:14 (119)	07:22		08:14 (118)	07:51		08:19 (118)
	21:03	38	07:43 (113)	20:32			19:42			18:54	23	08:37 (119)	17:18	15	08:29 (118)	17:11	27	08:46 (118)
18	06:20		07:05 (113)	06:49			07:18			07:48		08:16 (119)	07:23		08:12 (118)	07:52		08:19 (118)
	21:02	39	07:44 (113)	20:30			19:40			18:52	19	08:35 (119)	17:17	19	08:31 (118)	17:11	27	08:46 (118)
19	06:21		07:05 (113)	06:50			07:19			07:49		08:18 (119)	07:24		08:12 (118)	07:52		08:20 (118)
	21:02	39	07:44 (113)	20:29			19:38			18:51	14	08:32 (119)	17:16	21	08:33 (118)	17:12	27	08:47 (118)
20	06:22		07:05 (113)	06:51			07:20			07:50		08:24 (119)	07:25		08:11 (118)	07:53		08:21 (118)
	21:01	40	07:45 (113)	20:27			19:37			18:49	2	08:26 (119)	17:15	23	08:34 (118)	17:12	27	08:48 (118)
21	06:23		07:06 (113)	06:52			07:21			07:51			07:27		08:11 (118)	07:53		08:20 (118)
	21:00	39	07:45 (113)	20:26			19:35			18:48			17:15	24	08:35 (118)	17:12	28	08:48 (118)
22	06:24		07:05 (113)	06:52			07:22			07:52			07:28		08:10 (118)	07:54		08:21 (118)
	21:00	40	07:45 (113)	20:25			19:33			18:46			17:14	25	08:35 (118)	17:13	28	08:49 (118)
23	06:24		07:05 (113)	06:53			07:23			07:53			07:29		08:10 (118)	07:54		08:21 (118)
	20:59	40	07:45 (113)	20:23			19:32			18:45			17:14	26	08:36 (118)	17:13	28	08:49 (118)
24	06:25		07:05 (113)	06:54			07:24			07:55			07:30		08:09 (118)	07:55		08:22 (118)
	20:58	41	07:46 (113)	20:22			19:30			18:44			17:13	28	08:37 (118)	17:14	27	08:49 (118)
25	06:26		07:05 (113)	06:55			07:25			07:56			07:31		08:10 (118)	07:55		08:23 (118)
	20:57	41	07:46 (113)	20:20			19:28			18:42			17:13	28	08:38 (118)	17:15	27	08:50 (118)
26	06:27		07:05 (113)	06:56			07:26			07:57			07:32		08:10 (118)	07:56		08:23 (118)
	20:56	41	07:46 (113)	20:19			19:27			18:41			17:12	29	08:39 (118)	17:15	27	08:50 (118)
27	06:28		07:06 (113)	06:57			07:27			07:58			07:33		08:10 (118)	07:56		08:23 (118)
	20:56	40	07:46 (113)	20:17			19:25			18:40			17:12	29	08:39 (118)	17:16	28	08:51 (118)
28	06:29		07:05 (113)	06:58			07:28		08:25 (119)	07:59			07:34		08:10 (118)	07:56		08:24 (118)
	20:55	40	07:45 (113)	20:16			19:23	10	08:35 (119)	18:38			17:11	30	08:40 (118)	17:17	28	08:52 (118)
29	06:30		07:05 (113)	06:59			07:29		08:22 (119)	08:00			07:35		08:10 (118)	07:57		08:24 (118)
	20:54	40	07:45 (113)	20:14			19:22	17	08:39 (119)	18:37			17:11	30	08:40 (118)	17:17	28	08:52 (118)
30	06:31		07:05 (113)	07:00			07:30		08:19 (119)	08:01			07:36		08:10 (118)	07:57		08:24 (118)
	20:53	40	07:45 (113)	20:13			19:20	21	08:40 (119)	18:36			17:11	30	08:40 (118)	17:18	29	08:53 (118)
31	06:32		07:06 (113)	07:01						08:02						07:57		08:24 (118)
	20:52	39	07:45 (113)	20:11						18:35						17:19	29	08:53 (118)
Potential sun hours	456			426			374			346			300			291		
Total, worst case		1116			352			48			554			371			883	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.68			0.68			0.63			0.63			0.61			0.61	
Total reduction		0.40			0.40			0.38			0.35			0.22			0.30	
Total, real		450			142			18			195			83			266	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 33

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
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Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 573 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5630)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March	April	May			June		
1	07:57			07:45		08:28 (109)	07:10	07:20	06:36			06:08		06:46 (108)
	17:20			17:53	49	09:17 (109)	18:26	19:59	20:28			20:57	38	07:24 (108)
2	07:58			07:44		08:28 (109)	07:08	07:19	06:35			06:08		06:46 (108)
	17:21			17:54	49	09:17 (109)	18:27	20:00	20:29			20:58	38	07:24 (108)
3	07:58		08:39 (109)	07:43		08:28 (109)	07:07	07:17	06:33			06:07		06:47 (108)
	17:21	6	08:45 (109)	17:56	49	09:17 (109)	18:28	20:00	20:30			20:58	38	07:25 (108)
4	07:58		08:37 (109)	07:42		08:29 (109)	07:05	07:15	06:32			06:07		06:46 (108)
	17:22	11	08:48 (109)	17:57	48	09:17 (109)	18:29	20:01	20:31			20:59	38	07:24 (108)
5	07:58		08:36 (109)	07:41		08:28 (109)	07:04	07:14	06:31			06:07		06:47 (108)
	17:23	15	08:51 (109)	17:58	48	09:16 (109)	18:31	20:02	20:32			21:00	37	07:24 (108)
6	07:58		08:35 (109)	07:40		08:29 (109)	07:02	07:12	06:30			06:06		06:47 (108)
	17:24	17	08:52 (109)	17:59	47	09:16 (109)	18:32	20:03	20:33			21:01	38	07:25 (108)
7	07:58		08:34 (109)	07:39		08:29 (109)	07:01	07:11	06:29			06:06		06:48 (108)
	17:25	20	08:54 (109)	18:01	46	09:15 (109)	18:33	20:04	20:34			21:01	37	07:25 (108)
8	07:58		08:34 (109)	07:37		08:30 (109)	07:59	07:09	06:27		06:59 (108)	06:06		06:47 (108)
	17:26	22	08:56 (109)	18:02	45	09:15 (109)	19:34	20:05	20:35	10	07:09 (108)	21:02	37	07:24 (108)
9	07:57		08:33 (109)	07:36		08:31 (109)	07:57	07:08	06:26		06:56 (108)	06:06		06:48 (108)
	17:27	25	08:58 (109)	18:03	44	09:15 (109)	19:35	20:06	20:36	16	07:12 (108)	21:02	36	07:24 (108)
10	07:57		08:33 (109)	07:35		08:31 (109)	07:56	07:06	06:25		06:54 (108)	06:06		06:48 (108)
	17:28	26	08:59 (109)	18:04	43	09:14 (109)	19:36	20:07	20:37	20	07:14 (108)	21:03	36	07:24 (108)
11	07:57		08:32 (109)	07:34		08:32 (109)	07:54	07:04	06:24		06:52 (108)	06:05		06:49 (108)
	17:29	28	09:00 (109)	18:05	42	09:14 (109)	19:37	20:08	20:38	24	07:16 (108)	21:03	36	07:25 (108)
12	07:57		08:31 (109)	07:33		08:33 (109)	07:53	07:03	06:23		06:51 (108)	06:05		06:49 (108)
	17:30	31	09:02 (109)	18:07	39	09:12 (109)	19:38	20:09	20:39	26	07:17 (108)	21:04	36	07:25 (108)
13	07:56		08:31 (109)	07:32		08:34 (109)	07:51	07:01	06:22		06:50 (108)	06:05		06:50 (108)
	17:31	32	09:03 (109)	18:08	37	09:11 (109)	19:39	20:10	20:40	28	07:18 (108)	21:04	35	07:25 (108)
14	07:56		08:30 (109)	07:30		08:35 (109)	07:49	07:00	06:21		06:49 (108)	06:05		06:50 (108)
	17:32	34	09:04 (109)	18:09	35	09:10 (109)	19:40	20:11	20:41	30	07:19 (108)	21:05	35	07:25 (108)
15	07:56		08:30 (109)	07:29		08:37 (109)	07:48	06:58	06:20		06:48 (108)	06:05		06:50 (108)
	17:33	35	09:05 (109)	18:10	32	09:09 (109)	19:41	20:12	20:42	31	07:19 (108)	21:05	35	07:25 (108)
16	07:55		08:29 (109)	07:28		08:38 (109)	07:46	06:57	06:19		06:47 (108)	06:05		06:50 (108)
	17:34	37	09:06 (109)	18:11	28	09:06 (109)	19:42	20:13	20:43	33	07:20 (108)	21:06	35	07:25 (108)
17	07:55		08:29 (109)	07:27		08:40 (109)	07:45	06:55	06:18		06:47 (108)	06:05		06:51 (108)
	17:36	39	09:08 (109)	18:12	24	09:04 (109)	19:43	20:14	20:44	34	07:21 (108)	21:06	34	07:25 (108)
18	07:55		08:29 (109)	07:25		08:43 (109)	07:43	06:54	06:17		06:47 (108)	06:05		06:51 (108)
	17:37	39	09:08 (109)	18:14	19	09:02 (109)	19:44	20:15	20:45	35	07:22 (108)	21:07	34	07:25 (108)
19	07:54		08:29 (109)	07:24		08:48 (109)	07:41	06:52	06:17		06:46 (108)	06:05		06:51 (108)
	17:38	41	09:10 (109)	18:15	8	08:56 (109)	19:45	20:16	20:46	36	07:22 (108)	21:07	34	07:25 (108)
20	07:54		08:28 (109)	07:23			07:40	06:51	06:16		06:46 (108)	06:06		06:52 (108)
	17:39	42	09:10 (109)	18:16			19:46	20:17	20:47	36	07:22 (108)	21:07	34	07:26 (108)
21	07:53		08:29 (109)	07:21			07:38	06:49	06:15		06:46 (108)	06:06		06:52 (108)
	17:40	43	09:12 (109)	18:17			19:48	20:18	20:48	37	07:23 (108)	21:07	34	07:26 (108)
22	07:52		08:28 (109)	07:20			07:37	06:48	06:14		06:46 (108)	06:06		06:52 (108)
	17:41	44	09:12 (109)	18:18			19:49	20:19	20:49	37	07:23 (108)	21:08	34	07:26 (108)
23	07:52		08:27 (109)	07:18			07:35	06:47	06:14		06:45 (108)	06:06		06:52 (108)
	17:42	45	09:12 (109)	18:19			19:50	20:20	20:50	38	07:23 (108)	21:08	34	07:26 (108)
24	07:51		08:27 (109)	07:17			07:33	06:45	06:13		06:46 (108)	06:07		06:53 (108)
	17:44	46	09:13 (109)	18:21			19:51	20:21	20:51	38	07:24 (108)	21:08	34	07:27 (108)
25	07:50		08:28 (109)	07:16			07:32	06:44	06:12		06:45 (108)	06:07		06:53 (108)
	17:45	46	09:14 (109)	18:22			19:52	20:22	20:51	39	07:24 (108)	21:08	34	07:27 (108)
26	07:50		08:27 (109)	07:14			07:30	06:42	06:11		06:45 (108)	06:07		06:52 (108)
	17:46	48	09:15 (109)	18:23			19:53	20:23	20:52	38	07:23 (108)	21:08	35	07:27 (108)
27	07:49		08:27 (109)	07:13			07:28	06:41	06:11		06:45 (108)	06:07		06:53 (108)
	17:47	48	09:15 (109)	18:24			19:54	20:24	20:53	39	07:24 (108)	21:08	35	07:28 (108)
28	07:48		08:27 (109)	07:11			07:27	06:40	06:10		06:45 (108)	06:08		06:53 (108)
	17:48	48	09:15 (109)	18:25			19:55	20:25	20:54	39	07:24 (108)	21:08	35	07:28 (108)
29	07:47		08:27 (109)				07:25	06:38	06:10		06:46 (108)	06:08		06:53 (108)
	17:50	48	09:15 (109)				19:56	20:26	20:55	38	07:24 (108)	21:08	35	07:28 (108)
30	07:46		08:27 (109)				07:23	06:37	06:09		06:45 (108)	06:09		06:53 (108)
	17:51	49	09:16 (109)				19:57	20:27	20:55	39	07:24 (108)	21:08	36	07:29 (108)
31	07:46		08:28 (109)				07:22		06:09		06:46 (108)			
	17:52	49	09:17 (109)				19:58		20:56	38	07:24 (108)			
Potential sun hours	300			299			370	397	446			449		
Total, worst case		1014			732					779			1067	
Sun reduction		0.36			0.42					0.56			0.60	
Oper. time red.		1.00			1.00					1.00			1.00	
Wind dir. red.		0.60			0.60					0.68			0.68	
Total reduction		0.21			0.25					0.38			0.40	
Total, real		218			183					293			431	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 34

Licensed user:
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Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 573 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5630)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September	October		November			December		
1	06:09		06:53 (108)	06:32		07:02 (108)	07:02	07:31		07:04		08:00 (109)	07:37		08:14 (109)
	21:08	36	07:29 (108)	20:51	25	07:27 (108)	20:09	19:19		17:33	43	08:43 (109)	17:10	28	08:42 (109)
2	06:10		06:54 (108)	06:33		07:03 (108)	07:03	07:32		07:05		08:00 (109)	07:38		08:15 (109)
	21:08	36	07:30 (108)	20:50	23	07:26 (108)	20:08	19:17		17:32	45	08:45 (109)	17:10	27	08:42 (109)
3	06:10		06:53 (108)	06:34		07:05 (108)	07:04	07:33		07:06		07:59 (109)	07:39		08:16 (109)
	21:08	36	07:29 (108)	20:49	19	07:24 (108)	20:06	19:15		17:31	46	08:45 (109)	17:10	25	08:41 (109)
4	06:11		06:54 (108)	06:35		07:08 (108)	07:05	07:34		07:07		07:59 (109)	07:40		08:18 (109)
	21:08	36	07:30 (108)	20:48	14	07:22 (108)	20:05	19:14		17:30	46	08:45 (109)	17:10	22	08:40 (109)
5	06:11		06:53 (108)	06:36		07:12 (108)	07:06	07:35		07:08		07:58 (109)	07:41		08:19 (109)
	21:08	37	07:30 (108)	20:47	6	07:18 (108)	20:03	19:12		17:29	48	08:46 (109)	17:09	21	08:40 (109)
6	06:12		06:54 (108)	06:37			07:07	07:36		07:09		07:59 (109)	07:42		08:21 (109)
	21:08	37	07:31 (108)	20:45			20:01	19:10		17:28	48	08:47 (109)	17:09	18	08:39 (109)
7	06:12		06:53 (108)	06:38			07:08	07:37		07:11		07:58 (109)	07:43		08:23 (109)
	21:07	37	07:30 (108)	20:44			20:00	19:09		17:27	49	08:47 (109)	17:09	15	08:38 (109)
8	06:13		06:54 (108)	06:39			07:09	07:38		07:12		07:58 (109)	07:44		08:25 (109)
	21:07	37	07:31 (108)	20:43			19:57	19:07		17:26	49	08:47 (109)	17:09	12	08:37 (109)
9	06:14		06:54 (108)	06:40			07:10	07:39		07:13		07:58 (109)	07:45		08:28 (109)
	21:07	38	07:32 (108)	20:42			19:55	19:06		17:25	49	08:47 (109)	17:09	7	08:35 (109)
10	06:14		06:53 (108)	06:41			07:11	07:40		07:14		07:59 (109)	07:46		
	21:06	38	07:31 (108)	20:41			19:53	19:04		17:24	49	08:48 (109)	17:09		
11	06:15		06:54 (108)	06:42			07:11	07:41		07:15		07:59 (109)	07:47		
	21:06	38	07:32 (108)	20:39			19:52	19:03		17:23	49	08:48 (109)	17:09		
12	06:16		06:54 (108)	06:43			07:12	07:42		07:16		07:59 (109)	07:47		
	21:06	39	07:33 (108)	20:38			19:50	19:01		17:22	49	08:48 (109)	17:10		
13	06:16		06:54 (108)	06:44			07:13	07:43		07:17		07:59 (109)	07:48		
	21:05	38	07:32 (108)	20:37			19:48	19:00		17:21	48	08:47 (109)	17:10		
14	06:17		06:54 (108)	06:45			07:14	07:44		07:19		08:00 (109)	07:49		
	21:05	39	07:33 (108)	20:36			19:47	18:58		17:20	48	08:48 (109)	17:10		
15	06:18		06:54 (108)	06:46			07:15	07:45		07:20		08:00 (109)	07:50		
	21:04	39	07:33 (108)	20:34			19:45	18:57		17:19	48	08:48 (109)	17:10		
16	06:19		06:55 (108)	06:47			07:16	07:46		07:21		08:00 (109)	07:50		
	21:04	38	07:33 (108)	20:33			19:43	18:55		17:18	48	08:48 (109)	17:10		
17	06:19		06:54 (108)	06:48			07:17	07:47		07:22		08:01 (109)	07:51		
	21:03	39	07:33 (108)	20:32			19:42	18:54		17:18	46	08:47 (109)	17:11		
18	06:20		06:55 (108)	06:49			07:18	07:48		07:23		08:01 (109)	07:52		
	21:02	38	07:33 (108)	20:30			19:40	18:52		17:17	46	08:47 (109)	17:11		
19	06:21		06:55 (108)	06:50			07:19	07:49		07:24		08:02 (109)	07:52		
	21:02	38	07:33 (108)	20:29			19:38	18:51		17:16	45	08:47 (109)	17:12		
20	06:22		06:55 (108)	06:51			07:20	07:50		07:25		08:03 (109)	07:53		
	21:01	38	07:33 (108)	20:27			19:37	18:49		17:15	44	08:47 (109)	17:12		
21	06:23		06:55 (108)	06:51			07:21	07:51		07:27		08:04 (109)	07:53		
	21:00	37	07:32 (108)	20:26			19:35	18:48		17:15	43	08:47 (109)	17:12		
22	06:24		06:55 (108)	06:52			07:22	07:52		07:28		08:04 (109)	07:54		
	21:00	38	07:33 (108)	20:25			19:33	18:46		17:14	42	08:46 (109)	17:13		
23	06:24		06:56 (108)	06:53			07:23	07:54	09:16 (109)	07:29		08:05 (109)	07:54		
	20:59	37	07:33 (108)	20:23			19:32	18:45	12 09:28 (109)	17:14	41	08:46 (109)	17:13		
24	06:25		06:56 (108)	06:54			07:24	07:55	09:12 (109)	07:30		08:07 (109)	07:55		
	20:58	36	07:32 (108)	20:22			19:30	18:44	20 09:32 (109)	17:13	39	08:46 (109)	17:14		
25	06:26		06:57 (108)	06:55			07:25	07:56	09:09 (109)	07:31		08:07 (109)	07:55		
	20:57	35	07:32 (108)	20:20			19:28	18:42	25 09:34 (109)	17:13	39	08:46 (109)	17:15		
26	06:27		06:58 (108)	06:56			07:26	07:57	09:07 (109)	07:32		08:08 (109)	07:56		
	20:57	34	07:32 (108)	20:19			19:27	18:41	29 09:36 (109)	17:12	37	08:45 (109)	17:15		
27	06:28		06:58 (108)	06:57			07:27	07:58	09:05 (109)	07:33		08:09 (109)	07:56		
	20:56	34	07:32 (108)	20:17			19:25	18:40	33 09:38 (109)	17:12	36	08:45 (109)	17:16		
28	06:29		06:58 (108)	06:58			07:28	07:59	09:05 (109)	07:34		08:10 (109)	07:56		
	20:55	32	07:30 (108)	20:16			19:23	18:38	35 09:40 (109)	17:11	34	08:44 (109)	17:17		
29	06:30		06:59 (108)	06:59			07:29	08:00	09:03 (109)	07:35		08:11 (109)	07:57		
	20:54	31	07:30 (108)	20:14			19:22	18:37	38 09:41 (109)	17:11	32	08:43 (109)	17:17		
30	06:31		07:00 (108)	07:00			07:30	08:01	09:02 (109)	07:36		08:12 (109)	07:57		
	20:53	29	07:29 (108)	20:13			19:20	18:36	40 09:42 (109)	17:11	31	08:43 (109)	17:18		
31	06:32		07:01 (108)	07:01				08:02	09:01 (109)				07:57		
	20:52	27	07:28 (108)	20:11				18:35	42 09:43 (109)				17:19		
Potential sun hours	456			427			374	346		300			291		
Total, worst case		1122			87				274		1317			175	
Sun reduction		0.60			0.60				0.56		0.37			0.50	
Oper. time red.		1.00			1.00				1.00		1.00			1.00	
Wind dir. red.		0.68			0.68				0.60		0.60			0.60	
Total reduction		0.40			0.40				0.33		0.22			0.30	
Total, real		453			35				91		290			52	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 35

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
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Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 581 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5633)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March	April	May			June		
1	07:57		16:34 (109)	07:45		16:34 (109)	07:10	07:20	06:36			06:08		19:11 (108)
	17:20	13	16:47 (109)	17:53	35	17:09 (109)	18:26	19:59	20:28			20:57	56	20:07 (108)
2	07:57		16:33 (109)	07:44		16:35 (109)	07:08	07:19	06:35			06:08		19:11 (108)
	17:21	15	16:48 (109)	17:54	33	17:08 (109)	18:27	20:00	20:29			20:58	57	20:08 (108)
3	07:58		16:33 (109)	07:43		16:36 (109)	07:07	07:17	06:33			06:07		19:11 (108)
	17:21	16	16:49 (109)	17:56	32	17:08 (109)	18:28	20:00	20:30			20:58	58	20:09 (108)
4	07:58		16:32 (109)	07:42		16:36 (109)	07:05	07:15	06:32			06:07		19:11 (108)
	17:22	18	16:50 (109)	17:57	30	17:06 (109)	18:29	20:01	20:31			20:59	58	20:09 (108)
5	07:58		16:32 (109)	07:41		16:37 (109)	07:04	07:14	06:31			06:07		19:11 (108)
	17:23	20	16:52 (109)	17:58	28	17:05 (109)	18:31	20:02	20:32			21:00	59	20:10 (108)
6	07:58		16:32 (109)	07:40		16:39 (109)	07:02	07:12	06:30			06:06		19:11 (108)
	17:24	21	16:53 (109)	17:59	25	17:04 (109)	18:32	20:03	20:33			21:00	59	20:10 (108)
7	07:58		16:32 (109)	07:39		16:41 (109)	07:01	07:11	06:29			06:06		19:11 (108)
	17:25	22	16:54 (109)	18:00	22	17:03 (109)	18:33	20:04	20:34			21:01	60	20:11 (108)
8	07:57		16:31 (109)	07:37		16:43 (109)	07:59	07:09	06:27			06:06		19:10 (108)
	17:26	25	16:56 (109)	18:02	18	17:01 (109)	19:34	20:05	20:35			21:02	60	20:10 (108)
9	07:57		16:31 (109)	07:36		16:46 (109)	07:57	07:07	06:26			06:06		19:11 (108)
	17:27	26	16:57 (109)	18:03	12	16:58 (109)	19:35	20:06	20:36			21:02	60	20:11 (108)
10	07:57		16:31 (109)	07:35			07:56	07:06	06:25			06:06		19:11 (108)
	17:28	27	16:58 (109)	18:04			19:36	20:07	20:37			21:03	60	20:11 (108)
11	07:57		16:30 (109)	07:34			07:54	07:04	06:24			06:05		19:11 (108)
	17:29	28	16:58 (109)	18:05			19:37	20:08	20:38			21:03	61	20:12 (108)
12	07:57		16:31 (109)	07:33			07:53	07:03	06:23			06:05		19:11 (108)
	17:30	29	17:00 (109)	18:06			19:38	20:09	20:39			21:04	61	20:12 (108)
13	07:56		16:31 (109)	07:32			07:51	07:01	06:22		19:35 (108)	06:05		19:11 (108)
	17:31	30	17:01 (109)	18:08			19:39	20:10	20:40	6	19:41 (108)	21:04	62	20:13 (108)
14	07:56		16:30 (109)	07:30			07:49	07:00	06:21		19:29 (108)	06:05		19:11 (108)
	17:32	31	17:01 (109)	18:09			19:40	20:11	20:41	18	19:47 (108)	21:05	62	20:13 (108)
15	07:56		16:30 (109)	07:29			07:48	06:58	06:20		19:26 (108)	06:05		19:12 (108)
	17:33	33	17:03 (109)	18:10			19:41	20:12	20:42	24	19:50 (108)	21:05	61	20:13 (108)
16	07:55		16:30 (109)	07:28			07:46	06:57	06:19		19:24 (108)	06:05		19:12 (108)
	17:34	33	17:03 (109)	18:11			19:42	20:13	20:43	28	19:52 (108)	21:06	61	20:13 (108)
17	07:55		16:30 (109)	07:27			07:45	06:55	06:18		19:22 (108)	06:05		19:12 (108)
	17:36	34	17:04 (109)	18:12			19:43	20:14	20:44	32	19:54 (108)	21:06	62	20:14 (108)
18	07:54		16:30 (109)	07:25			07:43	06:54	06:17		19:21 (108)	06:05		19:12 (108)
	17:37	34	17:04 (109)	18:14			19:44	20:15	20:45	35	19:56 (108)	21:06	62	20:14 (108)
19	07:54		16:30 (109)	07:24			07:41	06:52	06:17		19:19 (108)	06:05		19:12 (108)
	17:38	36	17:06 (109)	18:15			19:45	20:16	20:46	38	19:57 (108)	21:07	62	20:14 (108)
20	07:53		16:30 (109)	07:23			07:40	06:51	06:16		19:18 (108)	06:06		19:12 (108)
	17:39	36	17:06 (109)	18:16			19:46	20:17	20:47	40	19:58 (108)	21:07	62	20:14 (108)
21	07:53		16:29 (109)	07:21			07:38	06:49	06:15		19:16 (108)	06:06		19:13 (108)
	17:40	37	17:06 (109)	18:17			19:47	20:18	20:48	43	19:59 (108)	21:07	62	20:15 (108)
22	07:52		16:30 (109)	07:20			07:36	06:48	06:14		19:16 (108)	06:06		19:13 (108)
	17:41	37	17:07 (109)	18:18			19:49	20:19	20:49	45	20:01 (108)	21:08	62	20:15 (108)
23	07:52		16:30 (109)	07:18			07:35	06:47	06:13		19:15 (108)	06:06		19:13 (108)
	17:42	37	17:07 (109)	18:19			19:50	20:20	20:50	46	20:01 (108)	21:08	62	20:15 (108)
24	07:51		16:30 (109)	07:17			07:33	06:45	06:13		19:14 (108)	06:06		19:13 (108)
	17:44	37	17:07 (109)	18:20			19:51	20:21	20:50	48	20:02 (108)	21:08	62	20:15 (108)
25	07:50		16:31 (109)	07:16			07:32	06:44	06:12		19:14 (108)	06:07		19:14 (108)
	17:45	37	17:08 (109)	18:22			19:52	20:22	20:51	49	20:03 (108)	21:08	62	20:16 (108)
26	07:50		16:31 (109)	07:14			07:30	06:42	06:11		19:13 (108)	06:07		19:14 (108)
	17:46	37	17:08 (109)	18:23			19:53	20:23	20:52	51	20:04 (108)	21:08	61	20:15 (108)
27	07:49		16:31 (109)	07:13			07:28	06:41	06:11		19:13 (108)	06:07		19:14 (108)
	17:47	37	17:08 (109)	18:24			19:54	20:24	20:53	52	20:05 (108)	21:08	61	20:15 (108)
28	07:48		16:31 (109)	07:11			07:27	06:40	06:10		19:12 (108)	06:08		19:15 (108)
	17:48	37	17:08 (109)	18:25			19:55	20:25	20:54	53	20:05 (108)	21:08	61	20:16 (108)
29	07:47		16:32 (109)				07:25	06:38	06:10		19:12 (108)	06:08		19:14 (108)
	17:50	36	17:08 (109)				19:56	20:26	20:55	54	20:06 (108)	21:08	62	20:16 (108)
30	07:46		16:32 (109)				07:23	06:37	06:09		19:12 (108)	06:09		19:15 (108)
	17:51	36	17:08 (109)				19:57	20:27	20:55	54	20:06 (108)	21:08	61	20:16 (108)
31	07:45		16:33 (109)				07:22		06:09		19:12 (108)			
	17:52	35	17:08 (109)				19:58		20:56	55	20:07 (108)			
Potential sun hours	300			299			370	397	446			449		
Total, worst case		930			235					771			1819	
Sun reduction		0.36			0.42					0.56			0.60	
Oper. time red.		1.00			1.00					1.00			1.00	
Wind dir. red.		0.68			0.68					0.63			0.63	
Total reduction		0.25			0.29					0.35			0.38	
Total, real		229			67					273			690	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 36

Licensed user:
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217 Montgomery St.
US-SYRACUSE, NY 13202
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Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 581 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5633)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August	September	October	November			December		
1	06:09		19:15 (108)	06:32	07:02	07:31	07:04		16:21 (109)	07:37		16:12 (109)
	21:08	61	20:16 (108)	20:51	20:09	19:19	17:33	2	16:22 (109)	17:10	29	16:41 (109)
2	06:10		19:16 (108)	06:33	07:03	07:32	07:05		16:15 (109)	07:38		16:13 (109)
	21:08	61	20:17 (108)	20:50	20:08	19:17	17:32	14	16:29 (109)	17:10	27	16:40 (109)
3	06:10		19:16 (108)	06:34	07:04	07:33	07:06		16:12 (109)	07:39		16:14 (109)
	21:08	60	20:16 (108)	20:49	20:06	19:15	17:31	19	16:31 (109)	17:10	26	16:40 (109)
4	06:11		19:17 (108)	06:35	07:05	07:34	07:07		16:10 (109)	07:40		16:15 (109)
	21:08	60	20:17 (108)	20:48	20:05	19:14	17:30	23	16:33 (109)	17:10	25	16:40 (109)
5	06:11		19:16 (108)	06:36	07:06	07:35	07:08		16:09 (109)	07:41		16:17 (109)
	21:08	60	20:16 (108)	20:47	20:03	19:12	17:29	25	16:34 (109)	17:09	22	16:39 (109)
6	06:12		19:17 (108)	06:37	07:07	07:36	07:09		16:08 (109)	07:42		16:18 (109)
	21:08	59	20:16 (108)	20:45	20:01	19:10	17:28	28	16:36 (109)	17:09	21	16:39 (109)
7	06:12		19:17 (108)	06:38	07:08	07:37	07:10		16:07 (109)	07:43		16:19 (109)
	21:07	59	20:16 (108)	20:44	20:00	19:09	17:27	30	16:37 (109)	17:09	20	16:39 (109)
8	06:13		19:18 (108)	06:39	07:09	07:38	07:12		16:06 (109)	07:44		16:20 (109)
	21:07	58	20:16 (108)	20:43	19:57	19:07	17:26	31	16:37 (109)	17:09	19	16:39 (109)
9	06:14		19:19 (108)	06:40	07:10	07:39	07:13		16:05 (109)	07:45		16:22 (109)
	21:07	57	20:16 (108)	20:42	19:55	19:06	17:25	33	16:38 (109)	17:09	16	16:38 (109)
10	06:14		19:18 (108)	06:41	07:10	07:40	07:14		16:05 (109)	07:46		16:23 (109)
	21:06	58	20:16 (108)	20:41	19:53	19:04	17:24	34	16:39 (109)	17:09	15	16:38 (109)
11	06:15		19:19 (108)	06:42	07:11	07:41	07:15		16:05 (109)	07:47		16:25 (109)
	21:06	57	20:16 (108)	20:39	19:52	19:03	17:23	35	16:40 (109)	17:09	13	16:38 (109)
12	06:16		19:20 (108)	06:43	07:12	07:42	07:16		16:04 (109)	07:47		16:25 (109)
	21:06	56	20:16 (108)	20:38	19:50	19:01	17:22	36	16:40 (109)	17:10	11	16:36 (109)
13	06:16		19:20 (108)	06:44	07:13	07:43	07:17		16:04 (109)	07:48		16:27 (109)
	21:05	55	20:15 (108)	20:37	19:48	18:59	17:21	36	16:40 (109)	17:10	9	16:36 (109)
14	06:17		19:21 (108)	06:45	07:14	07:44	07:19		16:03 (109)	07:49		16:29 (109)
	21:05	54	20:15 (108)	20:36	19:47	18:58	17:20	37	16:40 (109)	17:10	6	16:35 (109)
15	06:18		19:21 (108)	06:46	07:15	07:45	07:20		16:04 (109)	07:50		16:32 (109)
	21:04	54	20:15 (108)	20:34	19:45	18:56	17:19	37	16:41 (109)	17:10	2	16:34 (109)
16	06:19		19:22 (108)	06:47	07:16	07:46	07:21		16:04 (109)	07:50		
	21:04	53	20:15 (108)	20:33	19:43	18:55	17:18	37	16:41 (109)	17:10		
17	06:19		19:22 (108)	06:48	07:17	07:47	07:22		16:04 (109)	07:51		
	21:03	51	20:13 (108)	20:32	19:42	18:53	17:17	37	16:41 (109)	17:11		
18	06:20		19:23 (108)	06:49	07:18	07:48	07:23		16:04 (109)	07:52		
	21:02	50	20:13 (108)	20:30	19:40	18:52	17:17	37	16:41 (109)	17:11		
19	06:21		19:24 (108)	06:50	07:19	07:49	07:24		16:05 (109)	07:52		
	21:02	49	20:13 (108)	20:29	19:38	18:51	17:16	37	16:42 (109)	17:11		
20	06:22		19:25 (108)	06:50	07:20	07:50	07:25		16:05 (109)	07:53		
	21:01	47	20:12 (108)	20:27	19:37	18:49	17:15	37	16:42 (109)	17:12		
21	06:23		19:25 (108)	06:51	07:21	07:51	07:27		16:05 (109)	07:53		
	21:00	46	20:11 (108)	20:26	19:35	18:48	17:15	37	16:42 (109)	17:12		
22	06:23		19:26 (108)	06:52	07:22	07:52	07:28		16:06 (109)	07:54		
	21:00	44	20:10 (108)	20:25	19:33	18:46	17:14	36	16:42 (109)	17:13		
23	06:24		19:28 (108)	06:53	07:23	07:53	07:29		16:06 (109)	07:54		
	20:59	41	20:09 (108)	20:23	19:32	18:45	17:14	36	16:42 (109)	17:13		
24	06:25		19:29 (108)	06:54	07:24	07:55	07:30		16:07 (109)	07:55		
	20:58	39	20:08 (108)	20:22	19:30	18:44	17:13	34	16:41 (109)	17:14		
25	06:26		19:30 (108)	06:55	07:25	07:56	07:31		16:08 (109)	07:55		
	20:57	37	20:07 (108)	20:20	19:28	18:42	17:12	34	16:42 (109)	17:14		
26	06:27		19:32 (108)	06:56	07:26	07:57	07:32		16:09 (109)	07:56		
	20:56	34	20:06 (108)	20:19	19:27	18:41	17:12	33	16:42 (109)	17:15		
27	06:28		19:33 (108)	06:57	07:27	07:58	07:33		16:09 (109)	07:56		
	20:56	30	20:03 (108)	20:17	19:25	18:40	17:12	33	16:42 (109)	17:16		
28	06:29		19:35 (108)	06:58	07:28	07:59	07:34		16:10 (109)	07:56		
	20:55	26	20:01 (108)	20:16	19:23	18:38	17:11	31	16:41 (109)	17:16		
29	06:30		19:38 (108)	06:59	07:29	08:00	07:35		16:11 (109)	07:57		16:37 (109)
	20:54	21	19:59 (108)	20:14	19:22	18:37	17:11	30	16:41 (109)	17:17	5	16:42 (109)
30	06:31		19:42 (108)	07:00	07:30	08:01	07:36		16:12 (109)	07:57		16:35 (109)
	20:53	13	19:55 (108)	20:12	19:20	18:36	17:10	29	16:41 (109)	17:18	8	16:43 (109)
31	06:31			07:01		08:02				07:57		16:34 (109)
	20:52			20:11		18:35				17:19	11	16:45 (109)
Potential sun hours	456			427	374	346	300			291		
Total, worst case		1450						938			285	
Sun reduction		0.60						0.37			0.50	
Oper. time red.		1.00						1.00			1.00	
Wind dir. red.		0.63						0.68			0.68	
Total reduction		0.38						0.25			0.34	
Total, real		550						237			97	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 37

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 616 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5648)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April			May			June		
1	07:57	07:44	07:09	07:20			06:36		18:38 (101)	06:08		18:31 (101)
	17:19	17:53	18:26	19:59			20:28	57	19:35 (101)	20:57	75	19:46 (101)
2	07:57	07:43	07:08	07:18			06:34		18:37 (101)	06:08		18:32 (101)
	17:20	17:54	18:27	20:00			20:29	60	19:37 (101)	20:57	74	19:46 (101)
3	07:57	07:42	07:06	07:17			06:33		18:35 (101)	06:07		18:31 (101)
	17:21	17:55	18:28	20:00			20:30	62	19:37 (101)	20:58	75	19:46 (101)
4	07:57	07:41	07:05	07:15			06:32		18:35 (101)	06:07		18:32 (101)
	17:22	17:57	18:29	20:01			20:31	63	19:38 (101)	20:59	74	19:46 (101)
5	07:57	07:40	07:03	07:14			06:31		18:34 (101)	06:06		18:33 (101)
	17:23	17:58	18:30	20:02			20:32	65	19:39 (101)	21:00	74	19:47 (101)
6	07:57	07:39	07:02	07:12			06:29		18:33 (101)	06:06		18:33 (101)
	17:24	17:59	18:31	20:03			20:33	66	19:39 (101)	21:00	74	19:47 (101)
7	07:57	07:38	07:00	07:10			06:28		18:33 (101)	06:06		18:33 (101)
	17:25	18:00	18:32	20:04			20:34	67	19:40 (101)	21:01	73	19:46 (101)
8	07:57	07:37	07:59	07:09			06:27		18:32 (101)	06:06		18:33 (101)
	17:26	18:01	19:34	20:05			20:35	69	19:41 (101)	21:01	74	19:47 (101)
9	07:57	07:36	07:57	07:07			06:26		18:32 (101)	06:05		18:34 (101)
	17:27	18:03	19:35	20:06			20:36	69	19:41 (101)	21:02	73	19:47 (101)
10	07:57	07:35	07:56	07:06			06:25		18:31 (101)	06:05		18:34 (101)
	17:28	18:04	19:36	20:07			20:37	71	19:42 (101)	21:03	73	19:47 (101)
11	07:57	07:34	07:54	07:04			06:24		18:31 (101)	06:05		18:34 (101)
	17:29	18:05	19:37	20:08			20:38	71	19:42 (101)	21:03	73	19:47 (101)
12	07:56	07:33	07:52	07:03			06:23		18:30 (101)	06:05		18:35 (101)
	17:30	18:06	19:38	20:09			20:39	73	19:43 (101)	21:04	73	19:48 (101)
13	07:56	07:31	07:51	07:01			06:22		18:30 (101)	06:05		18:35 (101)
	17:31	18:07	19:39	20:10			20:40	73	19:43 (101)	21:04	73	19:48 (101)
14	07:56	07:30	07:49	06:59			06:21		18:30 (101)	06:05		18:35 (101)
	17:32	18:09	19:40	20:11			20:41	73	19:43 (101)	21:05	73	19:48 (101)
15	07:56	07:29	07:48	06:58			06:20		18:30 (101)	06:05		18:36 (101)
	17:33	18:10	19:41	20:12			20:42	73	19:43 (101)	21:05	72	19:48 (101)
16	07:55	07:28	07:46	06:56			06:19		18:29 (101)	06:05		18:36 (101)
	17:34	18:11	19:42	20:13			20:43	74	19:43 (101)	21:06	72	19:48 (101)
17	07:55	07:26	07:44	06:55			06:18		18:29 (101)	06:05		18:36 (101)
	17:35	18:12	19:43	20:14			20:44	75	19:44 (101)	21:06	72	19:48 (101)
18	07:54	07:25	07:43	06:53			06:17		18:30 (101)	06:05		18:36 (101)
	17:36	18:13	19:44	20:15			20:45	75	19:45 (101)	21:06	72	19:48 (101)
19	07:54	07:24	07:41	06:52			06:16		18:30 (101)	06:05		18:36 (101)
	17:38	18:14	19:45	20:16			20:46	75	19:45 (101)	21:07	73	19:49 (101)
20	07:53	07:22	07:39	06:51			06:16		18:29 (101)	06:05		18:36 (101)
	17:39	18:16	19:46	20:17			20:47	76	19:45 (101)	21:07	73	19:49 (101)
21	07:53	07:21	07:38	06:49			06:15		18:29 (101)	06:06		18:36 (101)
	17:40	18:17	19:47	20:18			20:48	75	19:44 (101)	21:07	73	19:49 (101)
22	07:52	07:20	07:36	06:48		19:00 (101)	06:14		18:30 (101)	06:06		18:37 (101)
	17:41	18:18	19:48	20:19	17	19:17 (101)	20:48	75	19:45 (101)	21:07	73	19:50 (101)
23	07:51	07:18	07:35	06:46		18:55 (101)	06:13		18:30 (101)	06:06		18:37 (101)
	17:42	18:19	19:49	20:20	26	19:21 (101)	20:49	75	19:45 (101)	21:08	73	19:50 (101)
24	07:51	07:17	07:33	06:45		18:52 (101)	06:13		18:29 (101)	06:06		18:37 (101)
	17:43	18:20	19:50	20:21	32	19:24 (101)	20:50	76	19:45 (101)	21:08	73	19:50 (101)
25	07:50	07:15	07:31	06:43		18:49 (101)	06:12		18:30 (101)	06:07		18:38 (101)
	17:45	18:21	19:51	20:22	38	19:27 (101)	20:51	76	19:46 (101)	21:08	72	19:50 (101)
26	07:49	07:14	07:30	06:42		18:46 (101)	06:11		18:30 (101)	06:07		18:38 (101)
	17:46	18:22	19:52	20:23	42	19:28 (101)	20:52	75	19:45 (101)	21:08	72	19:50 (101)
27	07:49	07:12	07:28	06:41		18:44 (101)	06:11		18:30 (101)	06:07		18:38 (101)
	17:47	18:24	19:53	20:24	46	19:30 (101)	20:53	75	19:45 (101)	21:08	72	19:50 (101)
28	07:48	07:11	07:26	06:39		18:43 (101)	06:10		18:30 (101)	06:08		18:39 (101)
	17:48	18:25	19:54	20:25	49	19:32 (101)	20:54	76	19:46 (101)	21:08	72	19:51 (101)
29	07:47		07:25	06:38		18:40 (101)	06:09		18:30 (101)	06:08		18:38 (101)
	17:49		19:55	20:26	53	19:33 (101)	20:54	75	19:45 (101)	21:08	73	19:51 (101)
30	07:46		07:23	06:37		18:39 (101)	06:09		18:31 (101)	06:08		18:38 (101)
	17:51		19:56	20:27	55	19:34 (101)	20:55	75	19:46 (101)	21:08	73	19:51 (101)
31	07:45		07:22				06:08		18:31 (101)			
	17:52		19:57				20:56	75	19:46 (101)			
Potential sun hours	300	299	370	397			446			449		
Total, worst case					358			2215			2191	
Sun reduction					0.51			0.56			0.60	
Oper. time red.					1.00			1.00			1.00	
Wind dir. red.					0.63			0.63			0.63	
Total reduction					0.32			0.36			0.38	
Total, real					116			787			834	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

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3/1/2012 1:52 PM / 38

Licensed user:
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Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 616 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5648)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September	October	November	December
1	06:09		18:39 (101)	06:32		18:41 (101)	07:02	07:30	07:03	07:37
	21:08	73	19:52 (101)	20:51	72	19:53 (101)	20:09	19:18	17:33	17:10
2	06:09		18:38 (101)	06:33		18:42 (101)	07:03	07:31	07:04	07:38
	21:08	73	19:51 (101)	20:50	71	19:53 (101)	20:08	19:17	17:32	17:10
3	06:10		18:39 (101)	06:34		18:41 (101)	07:04	07:32	07:06	07:39
	21:08	73	19:52 (101)	20:49	70	19:51 (101)	20:06	19:15	17:31	17:10
4	06:10		18:38 (101)	06:35		18:41 (101)	07:05	07:33	07:07	07:40
	21:08	74	19:52 (101)	20:47	70	19:51 (101)	20:04	19:13	17:30	17:09
5	06:11		18:39 (101)	06:36		18:42 (101)	07:05	07:34	07:08	07:41
	21:08	74	19:53 (101)	20:46	68	19:50 (101)	20:03	19:12	17:28	17:09
6	06:12		18:39 (101)	06:37		18:43 (101)	07:06	07:35	07:09	07:42
	21:07	74	19:53 (101)	20:45	66	19:49 (101)	20:01	19:10	17:27	17:09
7	06:12		18:39 (101)	06:38		18:43 (101)	07:07	07:36	07:10	07:43
	21:07	74	19:53 (101)	20:44	66	19:49 (101)	20:00	19:09	17:26	17:09
8	06:13		18:39 (101)	06:39		18:44 (101)	07:08	07:37	07:11	07:44
	21:07	74	19:53 (101)	20:43	64	19:48 (101)	19:56	19:07	17:25	17:09
9	06:13		18:39 (101)	06:40		18:45 (101)	07:09	07:38	07:13	07:45
	21:07	74	19:53 (101)	20:42	62	19:47 (101)	19:55	19:05	17:24	17:09
10	06:14		18:39 (101)	06:41		18:45 (101)	07:10	07:39	07:14	07:46
	21:06	75	19:54 (101)	20:40	61	19:46 (101)	19:53	19:04	17:23	17:09
11	06:15		18:39 (101)	06:42		18:46 (101)	07:11	07:40	07:15	07:46
	21:06	75	19:54 (101)	20:39	59	19:45 (101)	19:51	19:02	17:22	17:09
12	06:15		18:39 (101)	06:43		18:47 (101)	07:12	07:42	07:16	07:47
	21:05	75	19:54 (101)	20:38	57	19:44 (101)	19:50	19:01	17:21	17:09
13	06:16		18:39 (101)	06:44		18:48 (101)	07:13	07:43	07:17	07:48
	21:05	75	19:54 (101)	20:37	55	19:43 (101)	19:48	18:59	17:21	17:09
14	06:17		18:39 (101)	06:44		18:49 (101)	07:14	07:44	07:18	07:49
	21:04	76	19:55 (101)	20:35	51	19:40 (101)	19:46	18:58	17:20	17:10
15	06:18		18:40 (101)	06:45		18:50 (101)	07:15	07:45	07:19	07:49
	21:04	75	19:55 (101)	20:34	49	19:39 (101)	19:45	18:56	17:19	17:10
16	06:18		18:39 (101)	06:46		18:51 (101)	07:16	07:46	07:21	07:50
	21:03	75	19:54 (101)	20:33	46	19:37 (101)	19:43	18:55	17:18	17:10
17	06:19		18:39 (101)	06:47		18:53 (101)	07:17	07:47	07:22	07:51
	21:03	76	19:55 (101)	20:31	42	19:35 (101)	19:41	18:53	17:17	17:10
18	06:20		18:40 (101)	06:48		18:55 (101)	07:18	07:48	07:23	07:51
	21:02	75	19:55 (101)	20:30	37	19:32 (101)	19:40	18:52	17:16	17:11
19	06:21		18:40 (101)	06:49		18:58 (101)	07:19	07:49	07:24	07:52
	21:02	75	19:55 (101)	20:29	31	19:29 (101)	19:38	18:50	17:16	17:11
20	06:22		18:39 (101)	06:50		19:01 (101)	07:20	07:50	07:25	07:53
	21:01	76	19:55 (101)	20:27	25	19:26 (101)	19:36	18:49	17:15	17:12
21	06:22		18:39 (101)	06:51		19:06 (101)	07:21	07:51	07:26	07:53
	21:00	76	19:55 (101)	20:26	14	19:20 (101)	19:35	18:47	17:14	17:12
22	06:23		18:39 (101)	06:52			07:22	07:52	07:27	07:54
	20:59	76	19:55 (101)	20:24			19:33	18:46	17:14	17:13
23	06:24		18:40 (101)	06:53			07:23	07:53	07:29	07:54
	20:59	75	19:55 (101)	20:23			19:31	18:45	17:13	17:13
24	06:25		18:40 (101)	06:54			07:24	07:54	07:30	07:55
	20:58	75	19:55 (101)	20:21			19:30	18:43	17:13	17:14
25	06:26		18:39 (101)	06:55			07:25	07:55	07:31	07:55
	20:57	75	19:54 (101)	20:20			19:28	18:42	17:12	17:14
26	06:27		18:39 (101)	06:56			07:25	07:57	07:32	07:55
	20:56	75	19:54 (101)	20:18			19:27	18:41	17:12	17:15
27	06:28		18:40 (101)	06:57			07:26	07:58	07:33	07:56
	20:55	74	19:54 (101)	20:17			19:25	18:39	17:11	17:16
28	06:28		18:40 (101)	06:58			07:27	07:59	07:34	07:56
	20:54	74	19:54 (101)	20:15			19:23	18:38	17:11	17:16
29	06:29		18:40 (101)	06:59			07:28	08:00	07:35	07:56
	20:54	74	19:54 (101)	20:14			19:22	18:37	17:11	17:17
30	06:30		18:41 (101)	07:00			07:29	08:01	07:36	07:57
	20:53	73	19:54 (101)	20:12			19:20	18:35	17:10	17:18
31	06:31		18:41 (101)	07:01				08:02		07:57
	20:52	72	19:53 (101)	20:11				18:34		17:18
Potential sun hours	456			427			374	346	300	291
Total, worst case		2310			1136					
Sun reduction		0.60			0.60					
Oper. time red.		1.00			1.00					
Wind dir. red.		0.63			0.63					
Total reduction		0.38			0.38					
Total, real		880			433					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

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3/1/2012 1:52 PM / 39

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Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 662 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5669)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57			07:45		08:23 (108)	07:10			07:20		08:32 (83)	06:36			06:08		06:50 (82)
	17:20			17:53	28	08:51 (108)	18:26			19:59	3	08:35 (83)	20:28			20:57	91	20:25 (107)
2	07:58			07:44		08:24 (108)	07:08			07:19			06:35			06:08		06:51 (82)
	17:21			17:54	27	08:51 (108)	18:27			20:00			20:29			20:58	92	20:26 (107)
3	07:58			07:43		08:25 (108)	07:07			07:17			06:33			06:07		06:51 (82)
	17:21			17:56	25	08:50 (108)	18:28			20:00			20:30			20:59	94	20:27 (107)
4	07:58			07:42		08:26 (108)	07:05			07:15			06:32			06:07		06:50 (82)
	17:22			17:57	23	08:49 (108)	18:29			20:01			20:31			20:59	93	20:26 (107)
5	07:58			07:41		08:26 (108)	07:04			07:14			06:31			06:07		06:50 (82)
	17:23			17:58	21	08:47 (108)	18:31			20:02			20:32			21:00	95	20:27 (107)
6	07:58			07:40		08:28 (108)	07:02			07:12			06:30			06:06		06:51 (82)
	17:24			17:59	18	08:46 (108)	18:32			20:03			20:33			21:01	94	20:27 (107)
7	07:58			07:39		08:30 (108)	07:01		07:38 (83)	07:11			06:29			06:06		06:51 (82)
	17:25			18:01	14	08:44 (108)	18:33	8	07:46 (83)	20:04			20:34			21:01	95	20:28 (107)
8	07:58		08:26 (108)	07:37		08:35 (108)	07:59		08:32 (83)	07:09			06:27			06:06		06:50 (82)
	17:26	8	08:34 (108)	18:02	5	08:40 (108)	19:34	18	08:50 (83)	20:05			20:35			21:02	95	20:27 (107)
9	07:57		08:24 (108)	07:36			07:57		08:29 (83)	07:08			06:26			06:06		06:51 (82)
	17:27	12	08:36 (108)	18:03			19:35	23	08:52 (83)	20:06			20:36			21:02	96	20:28 (107)
10	07:57		08:24 (108)	07:35			07:56		08:27 (83)	07:06			06:25			06:06		06:51 (82)
	17:28	14	08:38 (108)	18:04			19:36	27	08:54 (83)	20:07			20:37			21:03	96	20:28 (107)
11	07:57		08:22 (108)	07:34			07:54		08:25 (83)	07:04			06:24		07:10 (82)	06:05		06:51 (82)
	17:29	17	08:39 (108)	18:05			19:37	30	08:55 (83)	20:08			20:38	11	07:21 (82)	21:04	96	20:29 (107)
12	07:57		08:22 (108)	07:33			07:53		08:24 (83)	07:03			06:23		07:06 (82)	06:05		06:51 (82)
	17:30	19	08:41 (108)	18:07			19:38	33	08:57 (83)	20:09			20:39	19	07:25 (82)	21:04	97	20:29 (107)
13	07:57		08:22 (108)	07:32			07:51		08:23 (83)	07:01			06:22		07:03 (82)	06:05		06:51 (82)
	17:31	20	08:42 (108)	18:08			19:39	34	08:57 (83)	20:10			20:40	24	07:27 (82)	21:05	97	20:29 (107)
14	07:56		08:21 (108)	07:30			07:49		08:21 (83)	07:00			06:21		07:01 (82)	06:05		06:52 (82)
	17:32	22	08:43 (108)	18:09			19:40	36	08:57 (83)	20:11			20:41	28	07:29 (82)	21:05	96	20:29 (107)
15	07:56		08:21 (108)	07:29			07:48		08:21 (83)	06:58			06:20		07:00 (82)	06:05		06:52 (82)
	17:33	23	08:44 (108)	18:10			19:41	37	08:58 (83)	20:12			20:42	35	20:06 (107)	21:05	96	20:30 (107)
16	07:55		08:20 (108)	07:28			07:46		08:20 (83)	06:57			06:19		06:58 (82)	06:05		06:52 (82)
	17:34	25	08:45 (108)	18:11			19:42	38	08:58 (83)	20:13			20:43	48	20:11 (107)	21:06	97	20:30 (107)
17	07:55		08:20 (108)	07:27			07:45		08:19 (83)	06:55			06:18		06:58 (82)	06:05		06:52 (82)
	17:36	26	08:46 (108)	18:12			19:43	39	08:58 (83)	20:14			20:44	54	20:14 (107)	21:06	97	20:30 (107)
18	07:55		08:19 (108)	07:25			07:43		08:19 (83)	06:54			06:17		06:57 (82)	06:05		06:52 (82)
	17:37	28	08:47 (108)	18:14			19:44	39	08:58 (83)	20:15			20:45	60	20:16 (107)	21:07	97	20:30 (107)
19	07:54		08:20 (108)	07:24			07:41		08:18 (83)	06:52			06:17		06:56 (82)	06:05		06:52 (82)
	17:38	28	08:48 (108)	18:15			19:45	39	08:57 (83)	20:16			20:46	65	20:17 (107)	21:07	97	20:30 (107)
20	07:54		08:19 (108)	07:23			07:40		08:18 (83)	06:51			06:16		06:55 (82)	06:06		06:53 (82)
	17:39	29	08:48 (108)	18:16			19:46	40	08:58 (83)	20:17			20:47	68	20:18 (107)	21:07	97	20:31 (107)
21	07:53		08:20 (108)	07:21			07:38		08:18 (83)	06:49			06:15		06:55 (82)	06:06		06:53 (82)
	17:40	30	08:50 (108)	18:17			19:48	39	08:57 (83)	20:18			20:48	72	20:20 (107)	21:07	97	20:31 (107)
22	07:52		08:20 (108)	07:20			07:37		08:17 (83)	06:48			06:14		06:54 (82)	06:06		06:53 (82)
	17:41	30	08:50 (108)	18:18			19:49	39	08:56 (83)	20:19			20:49	74	20:20 (107)	21:08	97	20:31 (107)
23	07:52		08:19 (108)	07:18			07:35		08:18 (83)	06:47			06:14		06:53 (82)	06:06		06:53 (82)
	17:42	31	08:50 (108)	18:19			19:50	38	08:56 (83)	20:20			20:50	77	20:21 (107)	21:08	97	20:31 (107)
24	07:51		08:19 (108)	07:17			07:33		08:18 (83)	06:45			06:13		06:52 (82)	06:06		06:53 (82)
	17:44	31	08:50 (108)	18:21			19:51	36	08:54 (83)	20:21			20:51	80	20:21 (107)	21:08	97	20:31 (107)
25	07:50		08:20 (108)	07:16			07:32		08:18 (83)	06:44			06:12		06:52 (82)	06:07		06:54 (82)
	17:45	31	08:51 (108)	18:22			19:52	35	08:53 (83)	20:22			20:51	82	20:22 (107)	21:08	97	20:32 (107)
26	07:50		08:20 (108)	07:14			07:30		08:19 (83)	06:42			06:11		06:51 (82)	06:07		06:54 (82)
	17:46	31	08:51 (108)	18:23			19:53	33	08:52 (83)	20:23			20:52	85	20:23 (107)	21:08	97	20:32 (107)
27	07:49		08:20 (108)	07:13			07:28		08:19 (83)	06:41			06:11		06:52 (82)	06:07		06:55 (82)
	17:47	31	08:51 (108)	18:24			19:54	32	08:51 (83)	20:24			20:53	86	20:24 (107)	21:08	97	20:33 (107)
28	07:48		08:20 (108)	07:11			07:27		08:20 (83)	06:40			06:10		06:51 (82)	06:08		06:55 (82)
	17:48	31	08:51 (108)	18:25			19:55	28	08:48 (83)	20:25			20:54	88	20:24 (107)	21:08	96	20:32 (107)
29	07:47		08:20 (108)				07:25		08:22 (83)	06:38			06:10		06:51 (82)	06:08		06:55 (82)
	17:50	31	08:51 (108)				19:56	25	08:47 (83)	20:26			20:55	89	20:25 (107)	21:08	96	20:32 (107)
30	07:46		08:21 (108)				07:23		08:23 (83)	06:37			06:09		06:51 (82)	06:09		06:55 (82)
	17:51	30	08:51 (108)				19:57	21	08:44 (83)	20:27			20:56	90	20:25 (107)	21:08	97	20:33 (107)
31	07:46		08:22 (108)				07:22		08:26 (83)				06:09		06:51 (82)			
	17:52	30	08:52 (108)				19:58	16	08:42 (83)				20:56	91	20:25 (107)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		608			161			783			3			1326			2876	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.60			0.60			0.63			0.63			0.66			0.66	
Total reduction		0.22			0.25			0.28			0.32			0.37			0.39	
Total, real		131			40			217			1			488			1128	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 40

Licensed user:
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Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 662 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5669)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:55 (82)	06:32		07:18 (82)	07:02			07:31		08:02 (83)	07:04			07:37		08:04 (108)
	21:08	97	20:33 (107)	20:51	16	07:34 (82)	20:09			19:19	34	08:36 (83)	17:33			17:10	17	08:21 (108)
2	06:10		06:56 (82)	06:33		07:23 (82)	07:03			07:32		08:03 (83)	07:05			07:38		08:06 (108)
	21:08	95	20:33 (107)	20:50	6	07:29 (82)	20:08			19:17	31	08:34 (83)	17:32			17:10	14	08:20 (108)
3	06:10		06:56 (82)	06:34			07:04			07:33		08:04 (83)	07:06		08:04 (108)	07:39		08:07 (108)
	21:08	96	20:33 (107)	20:49			20:06			19:15	28	08:32 (83)	17:31	7	08:11 (108)	17:10	12	08:19 (108)
4	06:11		06:56 (82)	06:35			07:05			07:34		08:06 (83)	07:07		08:00 (108)	07:40		08:09 (108)
	21:08	97	20:34 (107)	20:48			20:05			19:14	24	08:30 (83)	17:30	14	08:14 (108)	17:10	9	08:18 (108)
5	06:11		06:56 (82)	06:36			07:06			07:35		08:08 (83)	07:08		07:58 (108)	07:41		08:13 (108)
	21:08	95	20:33 (107)	20:47			20:03			19:12	20	08:28 (83)	17:29	18	08:16 (108)	17:09	2	08:15 (108)
6	06:12		06:57 (82)	06:37			07:07			07:36		08:11 (83)	07:09		07:57 (108)	07:42		
	21:08	96	20:34 (107)	20:45			20:01			19:10	13	08:24 (83)	17:28	21	08:18 (108)	17:09		
7	06:12		06:57 (82)	06:38			07:08			07:37			07:11		07:56 (108)	07:43		
	21:07	94	20:33 (107)	20:44			20:00			19:09			17:27	23	08:19 (108)	17:09		
8	06:13		06:57 (82)	06:39			07:09			07:38			07:12		07:55 (108)	07:44		
	21:07	95	20:34 (107)	20:43			19:57			19:07			17:26	25	08:20 (108)	17:09		
9	06:14		06:58 (82)	06:40			07:10			07:39			07:13		07:54 (108)	07:45		
	21:07	94	20:34 (107)	20:42			19:55			19:06			17:25	27	08:21 (108)	17:09		
10	06:14		06:58 (82)	06:41			07:11			07:40			07:14		07:54 (108)	07:46		
	21:06	92	20:33 (107)	20:41			19:53			19:04			17:24	28	08:22 (108)	17:09		
11	06:15		06:58 (82)	06:42			07:11			07:41			07:15		07:53 (108)	07:47		
	21:06	93	20:34 (107)	20:39			19:52			19:03			17:23	30	08:23 (108)	17:09		
12	06:16		06:59 (82)	06:43			07:12		08:18 (83)	07:42			07:16		07:53 (108)	07:47		
	21:06	92	20:34 (107)	20:38			19:50	14	08:32 (83)	19:01			17:22	30	08:23 (108)	17:10		
13	06:16		06:59 (82)	06:44			07:13		08:15 (83)	07:43			07:17		07:52 (108)	07:48		
	21:05	90	20:33 (107)	20:37			19:48	20	08:35 (83)	19:00			17:21	31	08:23 (108)	17:10		
14	06:17		06:59 (82)	06:45			07:14		08:12 (83)	07:44			07:19		07:53 (108)	07:49		
	21:05	89	20:33 (107)	20:36			19:47	25	08:37 (83)	18:58			17:20	31	08:24 (108)	17:10		
15	06:18		07:00 (82)	06:46			07:15		08:11 (83)	07:45			07:20		07:53 (108)	07:50		
	21:04	87	20:33 (107)	20:34			19:45	27	08:38 (83)	18:57			17:19	31	08:24 (108)	17:10		
16	06:19		07:01 (82)	06:47			07:16		08:09 (83)	07:46			07:21		07:53 (108)	07:50		
	21:04	87	20:33 (107)	20:33			19:43	31	08:40 (83)	18:55			17:18	31	08:24 (108)	17:10		
17	06:19		07:01 (82)	06:48			07:17		08:07 (83)	07:47			07:22		07:53 (108)	07:51		
	21:03	85	20:32 (107)	20:32			19:42	33	08:40 (83)	18:54			17:17	31	08:24 (108)	17:11		
18	06:20		07:01 (82)	06:49			07:18		08:06 (83)	07:48			07:23		07:53 (108)	07:52		
	21:03	83	20:32 (107)	20:30			19:40	35	08:41 (83)	18:52			17:17	31	08:24 (108)	17:11		
19	06:21		07:02 (82)	06:50			07:19		08:05 (83)	07:49			07:24		07:54 (108)	07:52		
	21:02	81	20:32 (107)	20:29			19:38	37	08:42 (83)	18:51			17:16	31	08:25 (108)	17:11		
20	06:22		07:03 (82)	06:51			07:20		08:04 (83)	07:50			07:25		07:55 (108)	07:53		
	21:01	78	20:31 (107)	20:27			19:37	38	08:42 (83)	18:49			17:15	30	08:25 (108)	17:12		
21	06:23		07:03 (82)	06:51			07:21		08:04 (83)	07:51			07:27		07:55 (108)	07:53		
	21:01	76	20:30 (107)	20:26			19:35	38	08:42 (83)	18:48			17:15	30	08:25 (108)	17:12		
22	06:24		07:04 (82)	06:52			07:22		08:02 (83)	07:52			07:28		07:55 (108)	07:54		
	21:00	73	20:29 (107)	20:25			19:33	39	08:41 (83)	18:46			17:14	29	08:24 (108)	17:13		
23	06:24		07:05 (82)	06:53			07:23		08:02 (83)	07:54			07:29		07:56 (108)	07:55		
	20:59	70	20:29 (107)	20:23			19:32	39	08:41 (83)	18:45			17:14	28	08:24 (108)	17:13		
24	06:25		07:06 (82)	06:54			07:24		08:01 (83)	07:55			07:30		07:57 (108)	07:55		
	20:58	67	20:28 (107)	20:22			19:30	40	08:41 (83)	18:44			17:13	28	08:25 (108)	17:14		
25	06:26		07:07 (82)	06:55			07:25		08:01 (83)	07:56			07:31		07:58 (108)	07:55		
	20:57	62	20:27 (107)	20:20			19:28	40	08:41 (83)	18:42			17:13	26	08:24 (108)	17:15		
26	06:27		07:08 (82)	06:56			07:26		08:01 (83)	07:57			07:32		07:59 (108)	07:56		
	20:57	57	20:25 (107)	20:19			19:27	39	08:40 (83)	18:41			17:12	25	08:24 (108)	17:15		
27	06:28		07:08 (82)	06:57			07:27		08:01 (83)	07:58			07:33		08:00 (108)	07:56		
	20:56	52	20:23 (107)	20:17			19:25	38	08:39 (83)	18:40			17:12	23	08:23 (108)	17:16		
28	06:29		07:09 (82)	06:58			07:28		08:01 (83)	07:59			07:34		08:01 (108)	07:56		
	20:55	44	20:20 (107)	20:16			19:23	38	08:39 (83)	18:38			17:11	22	08:23 (108)	17:16		
29	06:30		07:11 (82)	06:59			07:29		08:01 (83)	08:00			07:35		08:02 (108)	07:57		
	20:54	30	07:41 (82)	20:14			19:22	37	08:38 (83)	18:37			17:11	20	08:22 (108)	17:17		
30	06:31		07:13 (82)	07:00			07:30		08:02 (83)	08:01			07:36		08:03 (108)	07:57		
	20:53	26	07:39 (82)	20:13			19:20	35	08:37 (83)	18:36			17:11	19	08:22 (108)	17:18		
31	06:31		07:15 (82)	07:01						08:02						07:57		
	20:52	22	07:37 (82)	20:11						18:35						17:19		
Potential sun hours	456			427			374			346			300			291		
Total, worst case		2395			22			643			150			720			54	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.66			0.68			0.63			0.63			0.60			0.60	
Total reduction		0.39			0.41			0.39			0.35			0.22			0.30	
Total, real		941			9			248			53			159			16	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 41

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 719 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5685)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May	June
1	07:57		08:47 (81)	07:45		09:06 (81)	07:10			07:20			06:36	06:08
	17:20	74	16:13 (107)	17:53	36	09:42 (81)	18:26			19:59			20:28	20:57
2	07:58		08:48 (81)	07:44		09:08 (81)	07:08			07:19			06:35	06:08
	17:21	72	16:13 (107)	17:54	33	09:41 (81)	18:27			20:00			20:29	20:58
3	07:58		08:48 (81)	07:43		09:10 (81)	07:07			07:17			06:33	06:07
	17:21	72	16:13 (107)	17:56	29	09:39 (81)	18:28			20:00			20:30	20:59
4	07:58		08:49 (81)	07:42		09:12 (81)	07:05		07:28 (106)	07:15			06:32	06:07
	17:22	68	16:12 (107)	17:57	25	09:37 (81)	18:29	6	07:34 (106)	20:01			20:31	20:59
5	07:58		08:48 (81)	07:41		09:14 (81)	07:04		07:24 (106)	07:14			06:31	06:07
	17:23	66	16:10 (107)	17:58	21	09:35 (81)	18:31	14	07:38 (106)	20:02			20:32	21:00
6	07:58		08:49 (81)	07:40		09:18 (81)	07:02		07:22 (106)	07:12			06:30	06:06
	17:24	62	16:09 (107)	17:59	12	09:30 (81)	18:32	17	07:39 (106)	20:03			20:33	21:01
7	07:58		08:49 (81)	07:39			07:01		07:21 (106)	07:11			06:29	06:06
	17:25	56	09:45 (81)	18:00			18:33	20	07:41 (106)	20:04			20:34	21:01
8	07:58		08:50 (81)	07:37			07:59		08:19 (106)	07:09		07:37 (105)	06:27	06:06
	17:26	55	09:45 (81)	18:02			19:34	22	08:41 (106)	20:05	11	07:48 (105)	20:35	21:02
9	07:57		08:50 (81)	07:36			07:57		08:18 (106)	07:07		07:33 (105)	06:26	06:06
	17:27	56	09:46 (81)	18:03			19:35	23	08:41 (106)	20:06	17	07:50 (105)	20:36	21:02
10	07:57		08:51 (81)	07:35			07:56		08:18 (106)	07:06		07:31 (105)	06:25	06:06
	17:28	56	09:47 (81)	18:04			19:36	24	08:42 (106)	20:07	22	07:53 (105)	20:37	21:03
11	07:57		08:51 (81)	07:34			07:54		08:17 (106)	07:04		07:29 (105)	06:24	06:05
	17:29	55	09:46 (81)	18:05			19:37	24	08:41 (106)	20:08	24	07:53 (105)	20:38	21:04
12	07:57		08:51 (81)	07:33			07:53		08:18 (106)	07:03		07:28 (105)	06:23	06:05
	17:30	56	09:47 (81)	18:07			19:38	23	08:41 (106)	20:09	27	07:55 (105)	20:39	21:04
13	07:57		08:52 (81)	07:32			07:51		08:17 (106)	07:01		07:27 (105)	06:22	06:05
	17:31	56	09:48 (81)	18:08			19:39	24	08:41 (106)	20:10	28	07:55 (105)	20:40	21:05
14	07:56		08:52 (81)	07:30			07:49		08:17 (106)	07:00		07:26 (105)	06:21	06:05
	17:32	55	09:47 (81)	18:09			19:40	22	08:39 (106)	20:11	30	07:56 (105)	20:41	21:05
15	07:56		08:53 (81)	07:29			07:48		08:18 (106)	06:58		07:25 (105)	06:20	06:05
	17:33	55	09:48 (81)	18:10			19:41	21	08:39 (106)	20:12	31	07:56 (105)	20:42	21:05
16	07:55		08:53 (81)	07:28			07:46		08:18 (106)	06:57		07:25 (105)	06:19	06:05
	17:34	55	09:48 (81)	18:11			19:42	19	08:37 (106)	20:13	31	07:56 (105)	20:43	21:06
17	07:55		08:54 (81)	07:27			07:45		08:19 (106)	06:55		07:24 (105)	06:18	06:05
	17:36	54	09:48 (81)	18:12			19:43	16	08:35 (106)	20:14	31	07:55 (105)	20:44	21:06
18	07:55		08:54 (81)	07:25			07:43		08:22 (106)	06:54		07:24 (105)	06:17	06:05
	17:37	54	09:48 (81)	18:14			19:44	11	08:33 (106)	20:15	32	07:56 (105)	20:45	21:07
19	07:54		08:55 (81)	07:24			07:41		08:26 (106)	06:52		07:23 (105)	06:17	06:05
	17:38	53	09:48 (81)	18:15			19:45	2	08:28 (106)	20:16	32	07:55 (105)	20:46	21:07
20	07:54		08:55 (81)	07:23			07:40			06:51		07:23 (105)	06:16	06:06
	17:39	53	09:48 (81)	18:16			19:46			20:17	32	07:55 (105)	20:47	21:07
21	07:53		08:56 (81)	07:21			07:38			06:49		07:23 (105)	06:15	06:06
	17:40	53	09:49 (81)	18:17			19:48			20:18	31	07:54 (105)	20:48	21:07
22	07:52		08:56 (81)	07:20			07:37			06:48		07:23 (105)	06:14	06:06
	17:41	52	09:48 (81)	18:18			19:49			20:19	30	07:53 (105)	20:49	21:08
23	07:52		08:57 (81)	07:18			07:35			06:47		07:24 (105)	06:13	06:06
	17:42	51	09:48 (81)	18:19			19:50			20:20	29	07:53 (105)	20:50	21:08
24	07:51		08:57 (81)	07:17			07:33			06:45		07:24 (105)	06:13	06:06
	17:44	50	09:47 (81)	18:21			19:51			20:21	27	07:51 (105)	20:51	21:08
25	07:50		08:59 (81)	07:16			07:32			06:44		07:25 (105)	06:12	06:07
	17:45	49	09:48 (81)	18:22			19:52			20:22	26	07:51 (105)	20:51	21:08
26	07:50		08:59 (81)	07:14			07:30			06:42		07:26 (105)	06:11	06:07
	17:46	48	09:47 (81)	18:23			19:53			20:23	24	07:50 (105)	20:52	21:08
27	07:49		09:00 (81)	07:13			07:28			06:41		07:27 (105)	06:11	06:07
	17:47	46	09:46 (81)	18:24			19:54			20:24	21	07:48 (105)	20:53	21:08
28	07:48		09:01 (81)	07:11			07:27			06:40		07:28 (105)	06:10	06:08
	17:48	44	09:45 (81)	18:25			19:55			20:25	18	07:46 (105)	20:54	21:08
29	07:47		09:02 (81)				07:25			06:38		07:31 (105)	06:10	06:08
	17:50	43	09:45 (81)				19:56			20:26	13	07:44 (105)	20:55	21:08
30	07:46		09:03 (81)				07:23			06:37		07:34 (105)	06:09	06:09
	17:51	41	09:44 (81)				19:57			20:27	5	07:39 (105)	20:56	21:08
31	07:46		09:05 (81)				07:22						06:09	
	17:52	39	09:44 (81)				19:58						20:56	
Potential sun hours	300			299			370			397			446	449
Total, worst case		1699			156			288			572			
Sun reduction		0.36			0.42			0.44			0.51			
Oper. time red.		1.00			1.00			1.00			1.00			
Wind dir. red.		0.61			0.61			0.63			0.67			
Total reduction		0.22			0.25			0.28			0.34			
Total, real		372			40			80			194			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

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3/1/2012 1:52 PM / 42

Licensed user:
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Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 719 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5685)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July	August		September		October		November		December	
1	06:09	06:32		07:02	07:28 (105)	07:31	07:56 (106)	07:04		07:37	08:33 (81)
	21:08	20:51		20:09	24 07:52 (105)	19:19	24 08:20 (106)	17:33		17:10	55 09:28 (81)
2	06:10	06:33		07:03	07:29 (105)	07:32	07:56 (106)	07:05		07:38	08:33 (81)
	21:08	20:50		20:08	22 07:51 (105)	19:17	24 08:20 (106)	17:32		17:10	56 09:29 (81)
3	06:10	06:34		07:04	07:31 (105)	07:33	07:55 (106)	07:06		07:39	08:33 (81)
	21:08	20:49		20:06	17 07:48 (105)	19:15	24 08:19 (106)	17:31		17:10	56 09:29 (81)
4	06:11	06:35		07:05	07:34 (105)	07:34	07:55 (106)	07:07		07:40	08:34 (81)
	21:08	20:48		20:05	11 07:45 (105)	19:14	24 08:19 (106)	17:30		17:10	55 09:29 (81)
5	06:11	06:36		07:06		07:35	07:56 (106)	07:08	08:47 (81)	07:41	08:34 (81)
	21:08	20:47		20:03		19:12	22 08:18 (106)	17:29	13 09:00 (81)	17:09	56 09:30 (81)
6	06:12	06:37		07:07		07:36	07:56 (106)	07:09	08:44 (81)	07:42	08:35 (81)
	21:08	20:46		20:01		19:10	21 08:17 (106)	17:28	21 09:05 (81)	17:09	62 15:55 (107)
7	06:12	06:38		07:08		07:37	07:57 (106)	07:11	08:41 (81)	07:43	08:35 (81)
	21:07	20:44		20:00		19:09	18 08:15 (106)	17:27	26 09:07 (81)	17:09	66 15:57 (107)
8	06:13	06:39		07:09		07:38	07:58 (106)	07:12	08:39 (81)	07:44	08:36 (81)
	21:07	20:43		19:57		19:07	15 08:13 (106)	17:26	30 09:09 (81)	17:09	68 15:59 (107)
9	06:14	06:40		07:10		07:39	08:00 (106)	07:13	08:37 (81)	07:45	08:36 (81)
	21:07	20:42		19:55		19:06	11 08:11 (106)	17:25	34 09:11 (81)	17:09	72 16:01 (107)
10	06:14	06:41		07:11		07:40		07:14	08:37 (81)	07:46	08:37 (81)
	21:07	20:41		19:53		19:04		17:24	36 09:13 (81)	17:09	72 16:02 (107)
11	06:15	06:42		07:11		07:41		07:15	08:36 (81)	07:47	08:38 (81)
	21:06	20:40		19:52		19:03		17:23	39 09:15 (81)	17:09	73 16:03 (107)
12	06:16	06:43		07:12		07:42		07:16	08:35 (81)	07:48	08:38 (81)
	21:06	20:38		19:50		19:01		17:22	41 09:16 (81)	17:10	75 16:05 (107)
13	06:16	06:44		07:41 (105)	07:13	07:43		07:17	08:34 (81)	07:48	08:38 (81)
	21:05	20:37	8	07:49 (105)	19:48	19:00		17:21	43 09:17 (81)	17:10	76 16:05 (107)
14	06:17	06:45		07:38 (105)	07:14	07:44		07:19	08:34 (81)	07:49	08:39 (81)
	21:05	20:36	14	07:52 (105)	19:47	18:58		17:20	44 09:18 (81)	17:10	77 16:06 (107)
15	06:18	06:46		07:36 (105)	07:15	07:45		07:20	08:33 (81)	07:50	08:40 (81)
	21:04	20:34	18	07:54 (105)	19:45	18:57		17:19	46 09:19 (81)	17:10	76 16:07 (107)
16	06:19	06:47		07:34 (105)	07:16	07:46		07:21	08:32 (81)	07:50	08:39 (81)
	21:04	20:33	22	07:56 (105)	19:43	18:55		17:18	48 09:20 (81)	17:10	78 16:07 (107)
17	06:19	06:48		07:32 (105)	07:17	07:47		07:22	08:32 (81)	07:51	08:40 (81)
	21:03	20:32	24	07:56 (105)	19:42	18:54		17:17	49 09:21 (81)	17:11	78 16:08 (107)
18	06:20	06:49		07:31 (105)	07:18	07:48		07:23	08:31 (81)	07:52	08:41 (81)
	21:03	20:30	26	07:57 (105)	19:40	18:52		17:17	50 09:21 (81)	17:11	78 16:09 (107)
19	06:21	06:50		07:30 (105)	07:19	07:49		07:24	08:32 (81)	07:52	08:41 (81)
	21:02	20:29	27	07:57 (105)	19:38	18:51		17:16	51 09:23 (81)	17:11	79 16:09 (107)
20	06:22	06:50		07:29 (105)	07:20	07:50		07:26	08:31 (81)	07:53	08:42 (81)
	21:01	20:27	29	07:58 (105)	19:37	18:49		17:15	52 09:23 (81)	17:12	79 16:10 (107)
21	06:23	06:51		07:28 (105)	07:21	07:51		07:27	08:31 (81)	07:54	08:42 (81)
	21:01	20:26	30	07:58 (105)	19:35	18:48		17:15	53 09:24 (81)	17:12	78 16:10 (107)
22	06:23	06:52		07:28 (105)	07:22	07:52		07:28	08:31 (81)	07:54	08:43 (81)
	21:00	20:25	31	07:59 (105)	19:33	18:46		17:14	53 09:24 (81)	17:13	78 16:11 (107)
23	06:24	06:53		07:27 (105)	07:23	07:54		07:29	08:31 (81)	07:55	08:43 (81)
	20:59	20:23	32	07:59 (105)	19:32	18:45		17:14	54 09:25 (81)	17:13	78 16:11 (107)
24	06:25	06:54		07:27 (105)	07:24	07:55		07:30	08:32 (81)	07:55	08:44 (81)
	20:58	20:22	32	07:59 (105)	19:30	18:44		17:13	54 09:26 (81)	17:14	79 16:12 (107)
25	06:26	06:55		07:27 (105)	07:25	08:05 (106)	07:56	07:31	08:32 (81)	07:55	08:44 (81)
	20:57	20:20	32	07:59 (105)	19:28	10 08:15 (106)	18:42	17:12	54 09:26 (81)	17:15	79 16:12 (107)
26	06:27	06:56		07:27 (105)	07:26	08:02 (106)	07:57	07:32	08:32 (81)	07:56	08:44 (81)
	20:57	20:19	31	07:58 (105)	19:27	15 08:17 (106)	18:41	17:12	55 09:27 (81)	17:15	78 16:12 (107)
27	06:28	06:57		07:27 (105)	07:27	08:00 (106)	07:58	07:33	08:32 (81)	07:56	08:45 (81)
	20:56	20:17	31	07:58 (105)	19:25	18 08:18 (106)	18:40	17:12	55 09:27 (81)	17:16	78 16:13 (107)
28	06:29	06:58		07:27 (105)	07:28	07:59 (106)	07:59	07:34	08:32 (81)	07:56	08:45 (81)
	20:55	20:16	30	07:57 (105)	19:23	20 08:19 (106)	18:38	17:11	55 09:27 (81)	17:16	77 16:13 (107)
29	06:30	06:59		07:26 (105)	07:29	07:58 (106)	08:00	07:35	08:32 (81)	07:57	08:46 (81)
	20:54	20:14	30	07:56 (105)	19:22	22 08:20 (106)	18:37	17:11	56 09:28 (81)	17:17	77 16:13 (107)
30	06:31	07:00		07:27 (105)	07:30	07:57 (106)	08:01	07:36	08:32 (81)	07:57	08:46 (81)
	20:53	20:13	28	07:55 (105)	19:20	23 08:20 (106)	18:36	17:11	56 09:28 (81)	17:18	76 16:13 (107)
31	06:31	07:01		07:27 (105)			08:02			07:57	08:46 (81)
	20:52	20:11	27	07:54 (105)			18:35			17:19	75 16:13 (107)
Potential sun hours	456	427			374		346		300	291	
Total, worst case			502			182		183			1168		2240
Sun reduction			0.60			0.61		0.56			0.37		0.50
Oper. time red.			1.00			1.00		1.00			1.00		1.00
Wind dir. red.			0.67			0.65		0.63			0.61		0.62
Total reduction			0.40			0.39		0.35			0.22		0.31
Total, real			200			72		65			261		696

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 43

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Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 725 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5687)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April	May	June
1	07:57		08:31 (106)	07:45		08:40 (105)	07:10		08:15 (105)	07:20	06:36	06:08
	17:20	37	09:08 (106)	17:53	18	08:58 (105)	18:26	65	09:20 (105)	19:59	20:28	20:57
2	07:58		08:32 (106)	07:44		08:36 (105)	07:08		08:14 (105)	07:19	06:35	06:08
	17:21	38	09:10 (106)	17:54	26	09:02 (105)	18:27	65	09:19 (105)	20:00	20:29	20:58
3	07:58		08:33 (106)	07:43		08:34 (105)	07:07		08:15 (105)	07:17	06:33	06:07
	17:21	37	09:10 (106)	17:56	31	09:05 (105)	18:28	64	09:19 (105)	20:00	20:30	20:59
4	07:58		08:33 (106)	07:42		08:32 (105)	07:05		08:15 (105)	07:15	06:32	06:07
	17:22	38	09:11 (106)	17:57	35	09:07 (105)	18:29	63	09:18 (105)	20:01	20:31	20:59
5	07:58		08:33 (106)	07:41		08:29 (105)	07:04		08:16 (105)	07:14	06:31	06:07
	17:23	37	09:10 (106)	17:58	39	09:08 (105)	18:31	61	09:17 (105)	20:02	20:32	21:00
6	07:58		08:33 (106)	07:40		08:27 (105)	07:02		08:16 (105)	07:12	06:30	06:06
	17:24	38	09:11 (106)	17:59	43	09:10 (105)	18:32	60	09:16 (105)	20:03	20:33	21:01
7	07:58		08:34 (106)	07:39		08:26 (105)	07:01		08:17 (105)	07:11	06:29	06:06
	17:25	37	09:11 (106)	18:00	46	09:12 (105)	18:33	58	09:15 (105)	20:04	20:34	21:01
8	07:58		08:34 (106)	07:37		08:25 (105)	07:59		09:17 (105)	07:09	06:27	06:06
	17:26	38	09:12 (106)	18:02	48	09:13 (105)	19:34	56	10:13 (105)	20:05	20:35	21:02
9	07:57		08:35 (106)	07:36		08:24 (105)	07:57		09:17 (105)	07:07	06:26	06:06
	17:27	37	09:12 (106)	18:03	51	09:15 (105)	19:35	54	10:11 (105)	20:06	20:36	21:02
10	07:57		08:36 (106)	07:35		08:23 (105)	07:56		09:18 (105)	07:06	06:25	06:05
	17:28	37	09:13 (106)	18:04	53	09:16 (105)	19:36	52	10:10 (105)	20:07	20:37	21:03
11	07:57		08:35 (106)	07:34		08:22 (105)	07:54		09:19 (105)	07:04	06:24	06:05
	17:29	38	09:13 (106)	18:05	55	09:17 (105)	19:37	49	10:08 (105)	20:08	20:38	21:04
12	07:57		08:36 (106)	07:33		08:21 (105)	07:53		09:21 (105)	07:03	06:23	06:05
	17:30	37	09:13 (106)	18:06	57	09:18 (105)	19:38	46	10:07 (105)	20:09	20:39	21:04
13	07:57		08:37 (106)	07:32		08:20 (105)	07:51		09:22 (105)	07:01	06:22	06:05
	17:31	37	09:14 (106)	18:08	59	09:19 (105)	19:39	43	10:05 (105)	20:10	20:40	21:05
14	07:56		08:37 (106)	07:30		08:19 (105)	07:49		09:23 (105)	07:00	06:21	06:05
	17:32	36	09:13 (106)	18:09	61	09:20 (105)	19:40	39	10:02 (105)	20:11	20:41	21:05
15	07:56		08:38 (106)	07:29		08:19 (105)	07:48		09:25 (105)	06:58	06:20	06:05
	17:33	36	09:14 (106)	18:10	62	09:21 (105)	19:41	35	10:00 (105)	20:12	20:42	21:05
16	07:55		08:38 (106)	07:28		08:18 (105)	07:46		09:27 (105)	06:57	06:19	06:05
	17:34	35	09:13 (106)	18:11	62	09:20 (105)	19:42	29	09:56 (105)	20:13	20:43	21:06
17	07:55		08:39 (106)	07:27		08:17 (105)	07:45		09:29 (105)	06:55	06:18	06:05
	17:36	35	09:14 (106)	18:12	64	09:21 (105)	19:43	23	09:52 (105)	20:14	20:44	21:06
18	07:55		08:39 (106)	07:25		08:17 (105)	07:43		09:35 (105)	06:54	06:17	06:05
	17:37	34	09:13 (106)	18:14	65	09:22 (105)	19:44	12	09:47 (105)	20:15	20:45	21:07
19	07:54		08:41 (106)	07:24		08:16 (105)	07:41			06:52	06:17	06:05
	17:38	33	09:14 (106)	18:15	66	09:22 (105)	19:45			20:16	20:46	21:07
20	07:54		08:41 (106)	07:23		08:16 (105)	07:40			06:51	06:16	06:06
	17:39	32	09:13 (106)	18:16	66	09:22 (105)	19:46			20:17	20:47	21:07
21	07:53		08:43 (106)	07:21		08:16 (105)	07:38			06:49	06:15	06:06
	17:40	30	09:13 (106)	18:17	67	09:23 (105)	19:48			20:18	20:48	21:07
22	07:52		08:43 (106)	07:20		08:15 (105)	07:37			06:48	06:14	06:06
	17:41	30	09:13 (106)	18:18	67	09:22 (105)	19:49			20:19	20:49	21:08
23	07:52		08:44 (106)	07:18		08:15 (105)	07:35			06:47	06:13	06:06
	17:42	28	09:12 (106)	18:19	68	09:23 (105)	19:50			20:20	20:50	21:08
24	07:51		08:45 (106)	07:17		08:14 (105)	07:33			06:45	06:13	06:06
	17:44	26	09:11 (106)	18:20	68	09:22 (105)	19:51			20:21	20:51	21:08
25	07:50		08:47 (106)	07:16		08:15 (105)	07:32			06:44	06:12	06:07
	17:45	24	09:11 (106)	18:22	67	09:22 (105)	19:52			20:22	20:51	21:08
26	07:50		08:48 (106)	07:14		08:14 (105)	07:30			06:42	06:11	06:07
	17:46	21	09:09 (106)	18:23	67	09:21 (105)	19:53			20:23	20:52	21:08
27	07:49		08:50 (106)	07:13		08:14 (105)	07:28			06:41	06:11	06:07
	17:47	17	09:07 (106)	18:24	67	09:21 (105)	19:54			20:24	20:53	21:08
28	07:48		08:53 (106)	07:11		08:14 (105)	07:27			06:40	06:10	06:08
	17:48	12	09:05 (106)	18:25	66	09:20 (105)	19:55			20:25	20:54	21:08
29	07:47						07:25			06:38	06:10	06:08
	17:50						19:56			20:26	20:55	21:08
30	07:46						07:23			06:37	06:09	06:09
	17:51						19:57			20:27	20:56	21:08
31	07:46		08:46 (105)				07:22				06:09	
	17:52	5	08:51 (105)				19:58				20:56	
Potential sun hours	300			299			370			397	446	449
Total, worst case		920			1544			874				
Sun reduction		0.36			0.42			0.44				
Oper. time red.		1.00			1.00			1.00				
Wind dir. red.		0.61			0.62			0.62				
Total reduction		0.22			0.26			0.27				
Total, real		201			399			237				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 44

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 725 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5687)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July	August	September			October			November			December		
1	06:09	06:32	07:02			07:31		09:00 (105)	07:04		07:52 (105)	07:37		08:17 (106)
	21:08	20:51	20:09			19:19	45	09:45 (105)	17:33	53	08:45 (105)	17:10	38	08:55 (106)
2	06:10	06:33	07:03			07:32		08:58 (105)	07:05		07:54 (105)	07:38		08:18 (106)
	21:08	20:50	20:08			19:17	48	09:46 (105)	17:32	50	08:44 (105)	17:10	37	08:55 (106)
3	06:10	06:34	07:04			07:33		08:57 (105)	07:06		07:55 (105)	07:39		08:18 (106)
	21:08	20:49	20:06			19:15	50	09:47 (105)	17:31	48	08:43 (105)	17:10	37	08:55 (106)
4	06:11	06:35	07:05			07:34		08:55 (105)	07:07		07:56 (105)	07:40		08:18 (106)
	21:08	20:48	20:05			19:14	53	09:48 (105)	17:30	45	08:41 (105)	17:10	38	08:56 (106)
5	06:11	06:36	07:06			07:35		08:54 (105)	07:08		07:57 (105)	07:41		08:19 (106)
	21:08	20:47	20:03			19:12	55	09:49 (105)	17:29	43	08:40 (105)	17:09	37	08:56 (106)
6	06:12	06:37	07:07			07:36		08:53 (105)	07:09		08:00 (105)	07:42		08:19 (106)
	21:08	20:45	20:01			19:10	57	09:50 (105)	17:28	39	08:39 (105)	17:09	38	08:57 (106)
7	06:12	06:38	07:08			07:37		08:52 (105)	07:11		08:02 (105)	07:43		08:20 (106)
	21:07	20:44	20:00			19:09	59	09:51 (105)	17:27	35	08:37 (105)	17:09	37	08:57 (106)
8	06:13	06:39	07:09			07:38		08:51 (105)	07:12		08:04 (105)	07:44		08:20 (106)
	21:07	20:43	19:57			19:07	60	09:51 (105)	17:26	30	08:34 (105)	17:09	38	08:58 (106)
9	06:14	06:40	07:10			07:39		08:50 (105)	07:13		08:06 (105)	07:45		08:21 (106)
	21:07	20:42	19:55			19:06	62	09:52 (105)	17:25	25	08:31 (105)	17:09	37	08:58 (106)
10	06:14	06:41	07:10			07:40		08:49 (105)	07:14		08:11 (105)	07:46		08:21 (106)
	21:06	20:41	19:53			19:04	63	09:52 (105)	17:24	18	08:29 (105)	17:09	38	08:59 (106)
11	06:15	06:42	07:11			07:41		08:48 (105)	07:15		08:18 (105)	07:47		08:22 (106)
	21:06	20:39	19:52			19:03	65	09:53 (105)	17:23	3	08:21 (105)	17:09	37	08:59 (106)
12	06:16	06:43	07:12			07:42		08:47 (105)	07:16			07:47		08:22 (106)
	21:06	20:38	19:50			19:01	66	09:53 (105)	17:22			17:10	37	08:59 (106)
13	06:16	06:44	07:13			07:43		08:48 (105)	07:17		08:30 (106)	07:48		08:22 (106)
	21:05	20:37	19:48			19:00	66	09:54 (105)	17:21	2	08:32 (106)	17:10	37	08:59 (106)
14	06:17	06:45	07:14			07:44		08:47 (105)	07:19		08:25 (106)	07:49		08:23 (106)
	21:05	20:36	19:47			18:58	67	09:54 (105)	17:20	13	08:38 (106)	17:10	37	09:00 (106)
15	06:18	06:46	07:15			07:45		08:47 (105)	07:20		08:23 (106)	07:50		08:24 (106)
	21:04	20:34	19:45			18:56	67	09:54 (105)	17:19	18	08:41 (106)	17:10	37	09:01 (106)
16	06:19	06:47	07:16			07:46		08:47 (105)	07:21		08:21 (106)	07:50		08:24 (106)
	21:04	20:33	19:43			18:55	67	09:54 (105)	17:18	21	08:42 (106)	17:10	36	09:00 (106)
17	06:19	06:48	07:17			07:47		08:46 (105)	07:22		08:20 (106)	07:51		08:25 (106)
	21:03	20:32	19:42			18:54	68	09:54 (105)	17:17	24	08:44 (106)	17:11	36	09:01 (106)
18	06:20	06:49	07:18			07:48		08:46 (105)	07:23		08:19 (106)	07:52		08:26 (106)
	21:03	20:30	19:40			18:52	67	09:53 (105)	17:17	26	08:45 (106)	17:11	36	09:02 (106)
19	06:21	06:50	07:19			07:49		08:46 (105)	07:24		08:19 (106)	07:52		08:26 (106)
	21:02	20:29	19:38			18:51	67	09:53 (105)	17:16	28	08:47 (106)	17:11	36	09:02 (106)
20	06:22	06:50	07:20			07:50		08:46 (105)	07:25		08:18 (106)	07:53		08:26 (106)
	21:01	20:27	19:37			18:49	67	09:53 (105)	17:15	30	08:48 (106)	17:12	37	09:03 (106)
21	06:23	06:51	07:21			07:51		08:46 (105)	07:27		08:18 (106)	07:54		08:26 (106)
	21:01	20:26	19:35			18:48	66	09:52 (105)	17:15	30	08:48 (106)	17:12	37	09:03 (106)
22	06:23	06:52	07:22			07:52		08:47 (105)	07:28		08:17 (106)	07:54		08:27 (106)
	21:00	20:25	19:33			18:46	66	09:53 (105)	17:14	32	08:49 (106)	17:13	37	09:04 (106)
23	06:24	06:53	07:23			07:54		08:47 (105)	07:29		08:17 (106)	07:55		08:27 (106)
	20:59	20:23	19:32			18:45	65	09:52 (105)	17:14	33	08:50 (106)	17:13	37	09:04 (106)
24	06:25	06:54	07:24			07:55		08:47 (105)	07:30		08:17 (106)	07:55		08:29 (106)
	20:58	20:22	19:30			18:44	65	09:52 (105)	17:13	34	08:51 (106)	17:14	36	09:05 (106)
25	06:26	06:55	07:25		09:21 (105)	07:56		08:47 (105)	07:31		08:17 (106)	07:55		08:29 (106)
	20:57	20:20	19:28	5	09:26 (105)	18:42	64	09:51 (105)	17:12	35	08:52 (106)	17:14	36	09:05 (106)
26	06:27	06:56	07:26		09:13 (105)	07:57		08:47 (105)	07:32		08:17 (106)	07:56		08:29 (106)
	20:57	20:19	19:27	20	09:33 (105)	18:41	63	09:50 (105)	17:12	35	08:52 (106)	17:15	36	09:05 (106)
27	06:28	06:57	07:27		09:09 (105)	07:58		08:48 (105)	07:33		08:17 (106)	07:56		08:30 (106)
	20:56	20:17	19:25	28	09:37 (105)	18:40	61	09:49 (105)	17:12	36	08:53 (106)	17:16	36	09:06 (106)
28	06:29	06:58	07:28		09:06 (105)	07:59		08:49 (105)	07:34		08:17 (106)	07:56		08:30 (106)
	20:55	20:16	19:23	33	09:39 (105)	18:38	60	09:49 (105)	17:11	36	08:53 (106)	17:16	37	09:07 (106)
29	06:30	06:59	07:29		09:04 (105)	08:00		08:50 (105)	07:35		08:17 (106)	07:57		08:30 (106)
	20:54	20:14	19:22	38	09:42 (105)	18:37	58	09:48 (105)	17:11	37	08:54 (106)	17:17	37	09:07 (106)
30	06:31	07:00	07:30		09:02 (105)	08:01		08:50 (105)	07:36		08:17 (106)	07:57		08:30 (106)
	20:53	20:13	19:20	41	09:43 (105)	18:36	57	09:47 (105)	17:10	37	08:54 (106)	17:18	37	09:07 (106)
31	06:31	07:01				08:02		08:51 (105)				07:57		08:31 (106)
	20:52	20:11				18:35	55	09:46 (105)				17:19	37	09:08 (106)
Potential sun hours	456	427	374			346			300			291		
Total, worst case				165			1899			896			1144	
Sun reduction				0.61			0.56			0.37			0.50	
Oper. time red.				1.00			1.00			1.00			1.00	
Wind dir. red.				0.62			0.62			0.61			0.61	
Total reduction				0.38			0.34			0.23			0.30	
Total, real				62			654			203			347	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 45

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 727 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5689)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June
1	07:57		16:50 (81)	07:45		17:01 (81)	07:10		17:16 (105)	07:20		18:11 (105)	06:36		07:04 (77)	06:08
	17:20	4	16:54 (81)	17:53	10	17:11 (81)	18:26	33	17:49 (105)	19:59	29	18:40 (105)	20:28	26	07:30 (77)	20:57
2	07:58		16:50 (81)	07:44			07:08		17:14 (105)	07:19		18:13 (105)	06:35		07:05 (77)	06:08
	17:21	4	16:54 (81)	17:54			18:27	37	17:51 (105)	20:00	24	18:37 (105)	20:29	24	07:29 (77)	20:58
3	07:58		16:49 (81)	07:43			07:07		17:12 (105)	07:17		18:18 (105)	06:33		07:06 (77)	06:07
	17:21	6	16:55 (81)	17:56			18:28	41	17:53 (105)	20:00	15	18:33 (105)	20:30	22	07:28 (77)	20:58
4	07:58		16:49 (81)	07:42			07:05		17:10 (105)	07:15			06:32		07:07 (77)	06:07
	17:22	7	16:56 (81)	17:57			18:29	43	17:53 (105)	20:01			20:31	20	07:27 (77)	20:59
5	07:58		16:49 (81)	07:41			07:04		17:09 (105)	07:14			06:31		07:08 (77)	06:07
	17:23	8	16:57 (81)	17:58			18:30	46	17:55 (105)	20:02			20:32	17	07:25 (77)	21:00
6	07:58		16:49 (81)	07:40			07:02		17:08 (105)	07:12			06:30		07:10 (77)	06:06
	17:24	9	16:58 (81)	17:59			18:32	48	17:56 (105)	20:03			20:33	13	07:23 (77)	21:01
7	07:58		16:49 (81)	07:39			07:01		17:07 (105)	07:11			06:29		07:13 (77)	06:06
	17:25	10	16:59 (81)	18:00			18:33	50	17:57 (105)	20:04			20:34	7	07:20 (77)	21:01
8	07:58		16:49 (81)	07:37			07:59		18:05 (105)	07:09			06:27			06:06
	17:26	11	17:00 (81)	18:02			19:34	52	18:57 (105)	20:05			20:35			21:02
9	07:57		16:49 (81)	07:36			07:57		18:04 (105)	07:07			06:26			06:06
	17:27	13	17:02 (81)	18:03			19:35	53	18:57 (105)	20:06			20:36			21:02
10	07:57		16:49 (81)	07:35			07:56		18:04 (105)	07:06			06:25			06:05
	17:28	14	17:03 (81)	18:04			19:36	54	18:58 (105)	20:07			20:37			21:03
11	07:57		16:48 (81)	07:34			07:54		18:03 (105)	07:04			06:24			06:05
	17:29	15	17:03 (81)	18:05			19:37	55	18:58 (105)	20:08			20:38			21:03
12	07:57		16:48 (81)	07:33			07:53		18:03 (105)	07:03			06:23			06:05
	17:30	17	17:05 (81)	18:06			19:38	56	18:59 (105)	20:09			20:39			21:04
13	07:56		16:49 (81)	07:32			07:51		18:02 (105)	07:01			06:22			06:05
	17:31	17	17:06 (81)	18:08			19:39	57	18:59 (105)	20:10			20:40			21:04
14	07:56		16:48 (81)	07:30			07:49		18:01 (105)	07:00			06:21			06:05
	17:32	19	17:07 (81)	18:09			19:40	57	18:58 (105)	20:11			20:41			21:05
15	07:56		16:49 (81)	07:29			07:48		18:01 (105)	06:58			06:20			06:05
	17:33	19	17:08 (81)	18:10			19:41	58	18:59 (105)	20:12			20:42			21:05
16	07:55		16:48 (81)	07:28			07:46		08:05 (116)	06:57		07:15 (77)	06:19			06:05
	17:34	21	17:09 (81)	18:11			19:42	59	18:58 (105)	20:13	10	07:25 (77)	20:43			21:06
17	07:55		16:49 (81)	07:27			07:45		08:03 (116)	06:55		07:14 (77)	06:18			06:05
	17:35	22	17:11 (81)	18:12			19:43	65	18:58 (105)	20:14	14	07:28 (77)	20:44			21:06
18	07:55		16:48 (81)	07:25			07:43		08:02 (116)	06:54		07:13 (77)	06:17			06:05
	17:37	23	17:11 (81)	18:14			19:44	67	18:58 (105)	20:15	17	07:30 (77)	20:45			21:07
19	07:54		16:49 (81)	07:24			07:41		08:00 (116)	06:52		07:11 (77)	06:17			06:05
	17:38	24	17:13 (81)	18:15			19:45	69	18:57 (105)	20:16	20	07:31 (77)	20:46			21:07
20	07:54		16:49 (81)	07:23			07:40		07:58 (116)	06:51		07:10 (77)	06:16			06:06
	17:39	25	17:14 (81)	18:16			19:46	70	18:56 (105)	20:17	22	07:32 (77)	20:47			21:07
21	07:53		16:50 (81)	07:21			07:38		07:57 (116)	06:49		07:08 (77)	06:15			06:06
	17:40	26	17:16 (81)	18:17			19:47	71	18:56 (105)	20:18	24	07:32 (77)	20:48			21:07
22	07:52		16:50 (81)	07:20			07:36		07:55 (116)	06:48		07:07 (77)	06:14			06:06
	17:41	27	17:17 (81)	18:18			19:49	72	18:55 (105)	20:19	26	07:33 (77)	20:49			21:08
23	07:52		16:50 (81)	07:18			07:35		07:54 (116)	06:46		07:05 (77)	06:13			06:06
	17:42	27	17:17 (81)	18:19			19:50	72	18:55 (105)	20:20	27	07:32 (77)	20:50			21:08
24	07:51		16:51 (81)	07:17			07:33		07:52 (116)	06:45		07:04 (77)	06:13			06:06
	17:44	25	17:16 (81)	18:20			19:51	71	18:53 (105)	20:21	29	07:33 (77)	20:51			21:08
25	07:50		16:52 (81)	07:16			07:32		07:50 (116)	06:44		07:04 (77)	06:12			06:07
	17:45	25	17:17 (81)	18:22			19:52	71	18:52 (105)	20:22	29	07:33 (77)	20:51			21:08
26	07:50		16:52 (81)	07:14		17:28 (105)	07:30		07:51 (116)	06:42		07:03 (77)	06:11			06:07
	17:46	25	17:17 (81)	18:23	10	17:38 (105)	19:53	67	18:51 (105)	20:23	29	07:32 (77)	20:52			21:08
27	07:49		16:53 (81)	07:13		17:23 (105)	07:28		07:52 (116)	06:41		07:03 (77)	06:11			06:07
	17:47	23	17:16 (81)	18:24	21	17:44 (105)	19:54	63	18:50 (105)	20:24	29	07:32 (77)	20:53			21:08
28	07:48		16:54 (81)	07:11		17:19 (105)	07:27		07:52 (116)	06:40		07:04 (77)	06:10			06:08
	17:48	21	17:15 (81)	18:25	27	17:46 (105)	19:55	57	18:48 (105)	20:25	28	07:32 (77)	20:54			21:08
29	07:47		16:55 (81)				07:25		07:55 (116)	06:38		07:04 (77)	06:10			06:08
	17:50	20	17:15 (81)				19:56	50	18:47 (105)	20:26	28	07:32 (77)	20:55			21:08
30	07:46		16:56 (81)				07:23		18:07 (105)	06:37		07:04 (77)	06:09			06:09
	17:51	17	17:13 (81)				19:57	38	18:45 (105)	20:27	26	07:30 (77)	20:55			21:08
31	07:45		16:59 (81)				07:22		18:09 (105)				06:09			
	17:52	14	17:13 (81)				19:58	33	18:42 (105)				20:56			
Potential sun hours	300			299			370			397			446			449
Total, worst case		538			68			1735			426			129		
Sun reduction		0.36			0.42			0.44			0.51			0.56		
Oper. time red.		1.00			1.00			1.00			1.00			1.00		
Wind dir. red.		0.68			0.67			0.67			0.67			0.67		
Total reduction		0.25			0.28			0.29			0.34			0.37		
Total, real		132			19			509			145			48		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 46

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 727 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5689)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July	August		September		October			November			December		
1	06:09	06:32		07:02		07:31		17:41 (105)	07:04			07:37		16:30 (81)
	21:08	20:51		20:09		19:19	57	18:38 (105)	17:33			17:10	15	16:45 (81)
2	06:10	06:33		07:03		07:32		17:41 (105)	07:05			07:38		16:31 (81)
	21:08	20:50		20:08		19:17	56	18:37 (105)	17:32			17:10	14	16:45 (81)
3	06:10	06:34		07:04		07:33		17:41 (105)	07:06			07:39		16:32 (81)
	21:08	20:49		20:06		19:15	55	18:36 (105)	17:31			17:10	13	16:45 (81)
4	06:11	06:35		07:05		07:34		17:41 (105)	07:07			07:40		16:33 (81)
	21:08	20:48		20:05		19:14	54	18:35 (105)	17:30			17:10	12	16:45 (81)
5	06:11	06:36		07:06		07:35		17:42 (105)	07:08			07:41		16:34 (81)
	21:08	20:47		20:03		19:12	52	18:34 (105)	17:29			17:09	10	16:44 (81)
6	06:12	06:37		07:21 (77)	07:07		07:36		17:42 (105)	07:09			07:42		16:35 (81)
	21:08	20:45	10	07:31 (77)	20:01		19:10	51	18:33 (105)	17:28			17:09	9	16:44 (81)
7	06:12	06:38		07:19 (77)	07:08		07:37		17:43 (105)	07:10			07:43		16:36 (81)
	21:07	20:44	14	07:33 (77)	20:00		19:09	49	18:32 (105)	17:27			17:09	8	16:44 (81)
8	06:13	06:39		07:17 (77)	07:09		07:38		17:43 (105)	07:12			07:44		16:37 (81)
	21:07	20:43	18	07:35 (77)	19:57		19:07	47	18:30 (105)	17:25			17:09	7	16:44 (81)
9	06:14	06:40		07:16 (77)	07:10	18:11 (105)	07:39		17:44 (105)	07:13			07:45		16:38 (81)
	21:07	20:42	20	07:36 (77)	19:55	15 18:26 (105)	19:06	45	18:29 (105)	17:24			17:09	6	16:44 (81)
10	06:14	06:41		07:15 (77)	07:10	18:07 (105)	07:40		17:45 (105)	07:14		16:32 (81)	07:46		16:40 (81)
	21:06	20:41	22	07:37 (77)	19:53	23 18:30 (105)	19:04	42	18:27 (105)	17:23	10	16:42 (81)	17:09	4	16:44 (81)
11	06:15	06:42		07:14 (77)	07:11	18:04 (105)	07:41		17:47 (105)	07:15		16:30 (81)	07:47		16:41 (81)
	21:06	20:39	24	07:38 (77)	19:52	28 18:32 (105)	19:03	38	18:25 (105)	17:23	14	16:44 (81)	17:09	4	16:45 (81)
12	06:16	06:43		07:13 (77)	07:12	18:01 (105)	07:42		17:48 (105)	07:16		16:28 (81)	07:47		16:42 (81)
	21:06	20:38	26	07:39 (77)	19:50	33 18:34 (105)	19:01	35	18:23 (105)	17:22	17	16:45 (81)	17:09	2	16:44 (81)
13	06:16	06:44		07:12 (77)	07:13	17:59 (105)	07:43		17:51 (105)	07:17		16:27 (81)	07:48		
	21:05	20:37	27	07:39 (77)	19:48	37 18:36 (105)	18:59	31	18:22 (105)	17:21	20	16:47 (81)	17:10		
14	06:17	06:45		07:12 (77)	07:14	07:46 (116)	07:44		17:53 (105)	07:19		16:27 (81)	07:49		
	21:05	20:36	27	07:39 (77)	19:47	48 18:37 (105)	18:58	26	18:19 (105)	17:20	21	16:48 (81)	17:10		
15	06:18	06:46		07:11 (77)	07:15	07:43 (116)	07:45		17:57 (105)	07:20		16:26 (81)	07:50		
	21:04	20:34	29	07:40 (77)	19:45	56 18:38 (105)	18:56	18	18:15 (105)	17:19	23	16:49 (81)	17:10		
16	06:19	06:47		07:11 (77)	07:16	07:41 (116)	07:46			07:21		16:25 (81)	07:50		
	21:04	20:33	29	07:40 (77)	19:43	63 18:39 (105)	18:55			17:18	25	16:50 (81)	17:10		
17	06:19	06:48		07:10 (77)	07:17	07:40 (116)	07:47			07:22		16:25 (81)	07:51		
	21:03	20:32	29	07:39 (77)	19:42	67 18:40 (105)	18:53			17:17	25	16:50 (81)	17:11		
18	06:20	06:49		07:10 (77)	07:18	07:39 (116)	07:48			07:23		16:25 (81)	07:52		
	21:02	20:30	29	07:39 (77)	19:40	69 18:40 (105)	18:52			17:17	25	16:50 (81)	17:11		
19	06:21	06:49		07:10 (77)	07:19	07:39 (116)	07:49			07:24		16:25 (81)	07:52		
	21:02	20:29	28	07:38 (77)	19:38	72 18:41 (105)	18:51			17:16	27	16:52 (81)	17:11		
20	06:22	06:50		07:11 (77)	07:20	07:40 (116)	07:50			07:25		16:25 (81)	07:53		
	21:01	20:27	27	07:38 (77)	19:37	72 18:41 (105)	18:49			17:15	27	16:52 (81)	17:12		
21	06:23	06:51		07:12 (77)	07:21	07:40 (116)	07:51			07:27		16:25 (81)	07:53		
	21:00	20:26	25	07:37 (77)	19:35	72 18:40 (105)	18:48			17:15	26	16:51 (81)	17:12		
22	06:23	06:52		07:13 (77)	07:22	07:41 (116)	07:52			07:28		16:25 (81)	07:54		
	21:00	20:25	23	07:36 (77)	19:33	72 18:40 (105)	18:46			17:14	25	16:50 (81)	17:13		
23	06:24	06:53		07:14 (77)	07:23	07:42 (116)	07:53			07:29		16:25 (81)	07:54		
	20:59	20:23	22	07:36 (77)	19:32	70 18:40 (105)	18:45			17:13	24	16:49 (81)	17:13		
24	06:25	06:54		07:15 (77)	07:24	07:43 (116)	07:55			07:30		16:26 (81)	07:55		
	20:58	20:22	19	07:34 (77)	19:30	69 18:40 (105)	18:44			17:13	23	16:49 (81)	17:14		
25	06:26	06:55		07:16 (77)	07:25	07:44 (116)	07:56			07:31		16:27 (81)	07:55		
	20:57	20:20	17	07:33 (77)	19:28	67 18:40 (105)	18:42			17:12	22	16:49 (81)	17:14		
26	06:27	06:56		07:17 (77)	07:26	07:45 (116)	07:57			07:32		16:27 (81)	07:56		
	20:57	20:19	14	07:31 (77)	19:27	65 18:40 (105)	18:41			17:12	21	16:48 (81)	17:15		
27	06:28	06:57		07:18 (77)	07:27	07:46 (116)	07:58			07:33		16:28 (81)	07:56		
	20:56	20:17	10	07:28 (77)	19:25	62 18:40 (105)	18:40			17:12	19	16:47 (81)	17:16		
28	06:29	06:58			07:28	17:42 (105)	07:59			07:34		16:28 (81)	07:56		
	20:55	20:16			19:23	57 18:39 (105)	18:38			17:11	19	16:47 (81)	17:16		
29	06:30	06:59			07:29	17:41 (105)	08:00			07:35		16:29 (81)	07:57		
	20:54	20:14			19:22	58 18:39 (105)	18:37			17:11	17	16:46 (81)	17:17		
30	06:31	07:00			07:30	17:41 (105)	08:01			07:36		16:29 (81)	07:57		
	20:53	20:13			19:20	57 18:38 (105)	18:36			17:10	17	16:46 (81)	17:18		
31	06:31	07:01					08:02						07:57		16:51 (81)
	20:52	20:11					18:34						17:19	2	16:53 (81)
Potential sun hours	456	427			374		346			300			291		
Total, worst case			489			1232		656			447			106	
Sun reduction			0.60			0.61		0.56			0.37			0.50	
Oper. time red.			1.00			1.00		1.00			1.00			1.00	
Wind dir. red.			0.67			0.67		0.67			0.68			0.68	
Total reduction			0.40			0.41		0.37			0.25			0.34	
Total, real			196			500		245			113			36	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 47

Licensed user:
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US-SYRACUSE, NY 13202
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Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 739 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5697)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January	February			March			April			May			June		
1	07:57	07:44			07:10		17:29 (116)	07:20		19:09 (77)	06:36		07:14 (72)	06:08		06:59 (72)
	17:20	17:53			18:26	29	17:58 (116)	19:59	23	19:32 (77)	20:28	31	07:45 (72)	20:57	61	08:00 (72)
2	07:57	07:44			07:08		17:28 (116)	07:18		19:09 (77)	06:34		07:12 (72)	06:08		06:59 (72)
	17:20	17:54			18:27	29	17:57 (116)	20:00	22	19:31 (77)	20:29	35	07:47 (72)	20:58	61	08:00 (72)
3	07:58	07:43			07:07		17:29 (116)	07:17		19:10 (77)	06:33		07:11 (72)	06:07		07:00 (72)
	17:21	17:56			18:28	28	17:57 (116)	20:00	20	19:30 (77)	20:30	38	07:49 (72)	20:58	60	08:00 (72)
4	07:58	07:42			07:05		17:28 (116)	07:15		19:10 (77)	06:32		07:08 (72)	06:07		06:59 (72)
	17:22	17:57			18:29	28	17:56 (116)	20:01	19	19:29 (77)	20:31	42	07:50 (72)	20:59	61	08:00 (72)
5	07:58	07:41			07:04		17:29 (116)	07:14		19:11 (77)	06:31		07:07 (72)	06:07		07:00 (72)
	17:23	17:58			18:30	27	17:56 (116)	20:02	16	19:27 (77)	20:32	44	07:51 (72)	21:00	60	08:00 (72)
6	07:58	07:40			07:02		17:29 (116)	07:12		19:13 (77)	06:30		07:06 (72)	06:06		07:00 (72)
	17:24	17:59			18:31	26	17:55 (116)	20:03	12	19:25 (77)	20:33	46	07:52 (72)	21:00	60	08:00 (72)
7	07:58	07:38			07:00		17:30 (116)	07:11		19:15 (77)	06:28		07:05 (72)	06:06		07:00 (72)
	17:25	18:00			18:33	23	17:53 (116)	20:04	6	19:21 (77)	20:34	48	07:53 (72)	21:01	60	08:00 (72)
8	07:57	07:37			07:59		18:31 (116)	07:09			06:27		07:04 (72)	06:06		07:00 (72)
	17:26	18:02			19:34	21	18:52 (116)	20:05			20:35	50	07:54 (72)	21:02	60	08:00 (72)
9	07:57	07:36			07:57		18:33 (116)	07:07			06:26		07:03 (72)	06:06		07:01 (72)
	17:27	18:03			19:35	17	18:50 (116)	20:06			20:36	52	07:55 (72)	21:02	59	08:00 (72)
10	07:57	07:35			07:56		18:36 (116)	07:06			06:25		07:02 (72)	06:05		07:01 (72)
	17:28	18:04			19:36	11	18:47 (116)	20:07			20:37	53	07:55 (72)	21:03	59	08:00 (72)
11	07:57	07:34			07:54			07:04			06:24		07:02 (72)	06:05		07:02 (72)
	17:29	18:05			19:37			20:08			20:38	54	07:56 (72)	21:03	59	08:01 (72)
12	07:57	07:33			07:53			07:03			06:23		07:01 (72)	06:05		07:02 (72)
	17:30	18:06			19:38			20:09			20:39	55	07:56 (72)	21:04	59	08:01 (72)
13	07:56	07:32			07:51			07:01			06:22		07:01 (72)	06:05		07:02 (72)
	17:31	18:08			19:39			20:10			20:40	56	07:57 (72)	21:04	59	08:01 (72)
14	07:56	07:30			07:49			07:00			06:21		07:00 (72)	06:05		07:02 (72)
	17:32	18:09			19:40			20:11			20:41	57	07:57 (72)	21:05	59	08:01 (72)
15	07:56	07:29			07:48			06:58			06:20		06:59 (72)	06:05		07:03 (72)
	17:33	18:10			19:41			20:12			20:42	58	07:57 (72)	21:05	58	08:01 (72)
16	07:55	07:28			07:46			06:57			06:19		06:59 (72)	06:05		07:03 (72)
	17:34	18:11			19:42			20:13			20:43	58	07:57 (72)	21:06	58	08:01 (72)
17	07:55	07:26			07:45			06:55			06:18		06:59 (72)	06:05		07:03 (72)
	17:35	18:12			19:43			20:14			20:44	59	07:58 (72)	21:06	58	08:01 (72)
18	07:54	07:25			07:43			06:54			06:17		06:59 (72)	06:05		07:03 (72)
	17:37	18:13			19:44			20:15			20:45	60	07:59 (72)	21:06	58	08:01 (72)
19	07:54	07:24			07:41			06:52			06:16		06:59 (72)	06:05		07:03 (72)
	17:38	18:15			19:45			20:16			20:46	60	07:59 (72)	21:07	58	08:01 (72)
20	07:53	07:22		17:41 (116)	07:40			06:51			06:16		06:58 (72)	06:05		07:03 (72)
	17:39	18:16	6	17:47 (116)	19:46			20:17			20:47	61	07:59 (72)	21:07	59	08:02 (72)
21	07:53	07:21		17:37 (116)	07:38			06:49			06:15		06:58 (72)	06:06		07:04 (72)
	17:40	18:17	13	17:50 (116)	19:47			20:18			20:48	60	07:58 (72)	21:07	59	08:03 (72)
22	07:52	07:20		17:35 (116)	07:36			06:48			06:14		06:59 (72)	06:06		07:04 (72)
	17:41	18:18	18	17:53 (116)	19:48			20:19			20:49	60	07:59 (72)	21:08	59	08:03 (72)
23	07:52	07:18		17:33 (116)	07:35			06:46			06:13		06:58 (72)	06:06		07:04 (72)
	17:42	18:19	22	17:55 (116)	19:49			20:20			20:50	61	07:59 (72)	21:08	59	08:03 (72)
24	07:51	07:17		17:32 (116)	07:33		19:19 (77)	06:45			06:13		06:58 (72)	06:06		07:04 (72)
	17:43	18:20	23	17:55 (116)	19:50	8	19:27 (77)	20:21			20:50	61	07:59 (72)	21:08	58	08:02 (72)
25	07:50	07:15		17:31 (116)	07:31		19:15 (77)	06:44			06:12		06:58 (72)	06:07		07:05 (72)
	17:45	18:21	26	17:57 (116)	19:52	14	19:29 (77)	20:22			20:51	62	08:00 (72)	21:08	58	08:03 (72)
26	07:50	07:14		17:30 (116)	07:30		19:14 (77)	06:42			06:11		06:58 (72)	06:07		07:05 (72)
	17:46	18:23	27	17:57 (116)	19:53	17	19:31 (77)	20:23			20:52	61	07:59 (72)	21:08	58	08:03 (72)
27	07:49	07:13		17:29 (116)	07:28		19:12 (77)	06:41			06:11		06:59 (72)	06:07		07:05 (72)
	17:47	18:24	28	17:57 (116)	19:54	20	19:32 (77)	20:24			20:53	61	08:00 (72)	21:08	58	08:03 (72)
28	07:48	07:11		17:28 (116)	07:27		19:11 (77)	06:40		07:25 (72)	06:10		06:58 (72)	06:08		07:06 (72)
	17:48	18:25	29	17:57 (116)	19:55	21	19:32 (77)	20:25	11	07:36 (72)	20:54	61	07:59 (72)	21:08	58	08:04 (72)
29	07:47				07:25		19:10 (77)	06:38		07:19 (72)	06:10		06:59 (72)	06:08		07:05 (72)
	17:49				19:56	23	19:33 (77)	20:26	21	07:40 (72)	20:55	61	08:00 (72)	21:08	59	08:04 (72)
30	07:46				07:23		19:09 (77)	06:37		07:16 (72)	06:09		06:59 (72)	06:09		07:06 (72)
	17:51				19:57	23	19:32 (77)	20:27	27	07:43 (72)	20:55	61	08:00 (72)	21:08	59	08:05 (72)
31	07:45				07:22		19:09 (77)				06:09		06:59 (72)			
	17:52				19:58	23	19:32 (77)				20:56	61	08:00 (72)			
Potential sun hours	300	299			370			397			446			449		
Total, worst case			192			388			177			1687			1771	
Sun reduction			0.42			0.44			0.51			0.56			0.60	
Oper. time red.			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.			0.67			0.67			0.66			0.67			0.67	
Total reduction			0.28			0.29			0.34			0.38			0.40	
Total, real			54			114			60			638			717	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 48

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 739 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5697)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November	December
1	06:09		07:06 (72)	06:32		07:12 (72)	07:02			07:31			07:03	07:37
	21:08	59	08:05 (72)	20:51	55	08:07 (72)	20:09			19:18			17:33	17:10
2	06:09		07:06 (72)	06:33		07:13 (72)	07:03			07:32			07:05	07:38
	21:08	60	08:06 (72)	20:50	53	08:06 (72)	20:08			19:17			17:32	17:10
3	06:10		07:06 (72)	06:34		07:13 (72)	07:04			07:33		18:15 (116)	07:06	07:39
	21:08	59	08:05 (72)	20:49	53	08:06 (72)	20:06			19:15	8	18:23 (116)	17:31	17:10
4	06:11		07:07 (72)	06:35		07:13 (72)	07:05			07:34		18:11 (116)	07:07	07:40
	21:08	59	08:06 (72)	20:48	51	08:04 (72)	20:05			19:14	15	18:26 (116)	17:30	17:09
5	06:11		07:06 (72)	06:36		07:14 (72)	07:06		19:13 (77)	07:35		18:09 (116)	07:08	07:41
	21:08	60	08:06 (72)	20:47	49	08:03 (72)	20:03	5	19:18 (77)	19:12	19	18:28 (116)	17:29	17:09
6	06:12		07:07 (72)	06:37		07:15 (72)	07:07		19:09 (77)	07:36		18:07 (116)	07:09	07:42
	21:08	60	08:07 (72)	20:45	47	08:02 (72)	20:01	12	19:21 (77)	19:10	22	18:29 (116)	17:27	17:09
7	06:12		07:06 (72)	06:38		07:16 (72)	07:08		19:06 (77)	07:37		18:05 (116)	07:10	07:43
	21:07	60	08:06 (72)	20:44	45	08:01 (72)	20:00	16	19:22 (77)	19:09	25	18:30 (116)	17:26	17:09
8	06:13		07:07 (72)	06:39		07:17 (72)	07:08		19:04 (77)	07:38		18:04 (116)	07:12	07:44
	21:07	60	08:07 (72)	20:43	43	08:00 (72)	19:56	19	19:23 (77)	19:07	26	18:30 (116)	17:25	17:09
9	06:13		07:06 (72)	06:40		07:18 (72)	07:09		19:03 (77)	07:39		18:03 (116)	07:13	07:45
	21:07	61	08:07 (72)	20:42	41	07:59 (72)	19:55	20	19:23 (77)	19:06	28	18:31 (116)	17:24	17:09
10	06:14		07:07 (72)	06:41		07:20 (72)	07:10		19:02 (77)	07:40		18:02 (116)	07:14	07:46
	21:06	60	08:07 (72)	20:41	37	07:57 (72)	19:53	22	19:24 (77)	19:04	29	18:31 (116)	17:23	17:09
11	06:15		07:07 (72)	06:42		07:21 (72)	07:11		19:01 (77)	07:41		18:02 (116)	07:15	07:47
	21:06	61	08:08 (72)	20:39	35	07:56 (72)	19:52	23	19:24 (77)	19:02	29	18:31 (116)	17:22	17:09
12	06:16		07:06 (72)	06:43		07:23 (72)	07:12		19:01 (77)	07:42		18:01 (116)	07:16	07:47
	21:06	61	08:07 (72)	20:38	30	07:53 (72)	19:50	23	19:24 (77)	19:01	29	18:30 (116)	17:22	17:09
13	06:16		07:07 (72)	06:44		07:26 (72)	07:13		19:01 (77)	07:43		18:01 (116)	07:17	07:48
	21:05	61	08:08 (72)	20:37	25	07:51 (72)	19:48	22	19:23 (77)	18:59	29	18:30 (116)	17:21	17:10
14	06:17		07:07 (72)	06:45		07:29 (72)	07:14		19:00 (77)	07:44		18:02 (116)	07:18	07:49
	21:05	61	08:08 (72)	20:36	18	07:47 (72)	19:47	23	19:23 (77)	18:58	28	18:30 (116)	17:20	17:10
15	06:18		07:08 (72)	06:46		07:34 (72)	07:15		19:01 (77)	07:45		18:02 (116)	07:20	07:50
	21:04	61	08:09 (72)	20:34	6	07:40 (72)	19:45	21	19:22 (77)	18:56	28	18:30 (116)	17:19	17:10
16	06:18		07:07 (72)	06:47			07:16		19:01 (77)	07:46		18:02 (116)	07:21	07:50
	21:04	61	08:08 (72)	20:33			19:43	20	19:21 (77)	18:55	27	18:29 (116)	17:18	17:10
17	06:19		07:07 (72)	06:47			07:17		19:02 (77)	07:47		18:03 (116)	07:22	07:51
	21:03	62	08:09 (72)	20:31			19:42	18	19:20 (77)	18:53	25	18:28 (116)	17:17	17:11
18	06:20		07:08 (72)	06:48			07:18		19:03 (77)	07:48		18:03 (116)	07:23	07:52
	21:02	61	08:09 (72)	20:30			19:40	15	19:18 (77)	18:52	23	18:26 (116)	17:17	17:11
19	06:21		07:08 (72)	06:49			07:19		19:05 (77)	07:49		18:04 (116)	07:24	07:52
	21:02	61	08:09 (72)	20:29			19:38	10	19:15 (77)	18:50	21	18:25 (116)	17:16	17:11
20	06:22		07:07 (72)	06:50			07:20			07:50		18:06 (116)	07:25	07:53
	21:01	62	08:09 (72)	20:27			19:37			18:49	17	18:23 (116)	17:15	17:12
21	06:22		07:08 (72)	06:51			07:21			07:51		18:08 (116)	07:27	07:53
	21:00	61	08:09 (72)	20:26			19:35			18:48	12	18:20 (116)	17:15	17:12
22	06:23		07:08 (72)	06:52			07:22			07:52			07:28	07:54
	21:00	61	08:09 (72)	20:24			19:33			18:46			17:14	17:13
23	06:24		07:09 (72)	06:53			07:23			07:53			07:29	07:54
	20:59	60	08:09 (72)	20:23			19:32			18:45			17:13	17:13
24	06:25		07:09 (72)	06:54			07:24			07:55			07:30	07:55
	20:58	60	08:09 (72)	20:22			19:30			18:43			17:13	17:14
25	06:26		07:09 (72)	06:55			07:25			07:56			07:31	07:55
	20:57	60	08:09 (72)	20:20			19:28			18:42			17:12	17:14
26	06:27		07:09 (72)	06:56			07:26			07:57			07:32	07:56
	20:56	59	08:08 (72)	20:19			19:27			18:41			17:12	17:15
27	06:28		07:09 (72)	06:57			07:27			07:58			07:33	07:56
	20:56	59	08:08 (72)	20:17			19:25			18:39			17:11	17:16
28	06:29		07:10 (72)	06:58			07:28			07:59			07:34	07:56
	20:55	58	08:08 (72)	20:16			19:23			18:38			17:11	17:16
29	06:30		07:10 (72)	06:59			07:29			08:00			07:35	07:57
	20:54	58	08:08 (72)	20:14			19:22			18:37			17:11	17:17
30	06:30		07:11 (72)	07:00			07:30			08:01			07:36	07:57
	20:53	56	08:07 (72)	20:12			19:20			18:36			17:10	17:18
31	06:31		07:11 (72)	07:01						08:02				07:57
	20:52	56	08:07 (72)	20:11						18:34				17:19
Potential sun hours	456			427			374			346			300	291
Total, worst case		1858			588			269			440			
Sun reduction		0.60			0.60			0.61			0.56			
Oper. time red.		1.00			1.00			1.00			1.00			
Wind dir. red.		0.67			0.67			0.66			0.67			
Total reduction		0.40			0.40			0.40			0.38			
Total, real		752			238			108			166			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 49

Licensed user:
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217 Montgomery St.
US-SYRACUSE, NY 13202
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Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 789 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5721)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		16:34 (105)	07:45		16:26 (105)	07:10		07:29 (116)	07:20		07:47 (77)	06:36			06:08		06:33 (76)
	17:20	7	16:41 (105)	17:53	46	17:12 (105)	18:26	19	07:48 (116)	19:59	29	08:16 (77)	20:28			20:57	38	07:11 (76)
2	07:58		16:33 (105)	07:44		16:26 (105)	07:08		07:27 (116)	07:19		07:46 (77)	06:34			06:08		06:33 (76)
	17:21	11	16:44 (105)	17:54	46	17:12 (105)	18:27	20	07:47 (116)	20:00	29	08:15 (77)	20:29			20:58	38	07:11 (76)
3	07:58		16:32 (105)	07:43		16:27 (105)	07:07		07:26 (116)	07:17		07:48 (77)	06:33			06:07		06:34 (76)
	17:21	14	16:46 (105)	17:56	45	17:12 (105)	18:28	21	07:47 (116)	20:00	26	08:14 (77)	20:30			20:58	38	07:12 (76)
4	07:58		16:31 (105)	07:42		16:27 (105)	07:05		07:25 (116)	07:15		07:48 (77)	06:32			06:07		06:33 (76)
	17:22	16	16:47 (105)	17:57	45	17:12 (105)	18:29	21	07:46 (116)	20:01	24	08:12 (77)	20:31			20:59	39	07:12 (76)
5	07:58		16:30 (105)	07:41		16:27 (105)	07:04		07:26 (116)	07:14		07:49 (77)	06:31			06:07		06:33 (76)
	17:23	19	16:49 (105)	17:58	44	17:11 (105)	18:30	19	07:45 (116)	20:02	21	08:10 (77)	20:32			21:00	39	07:12 (76)
6	07:58		16:30 (105)	07:40		16:28 (105)	07:02		07:26 (116)	07:12		07:51 (77)	06:30			06:06		06:34 (76)
	17:24	20	16:50 (105)	17:59	42	17:10 (105)	18:32	18	07:44 (116)	20:03	18	08:09 (77)	20:33			21:01	39	07:13 (76)
7	07:58		16:29 (105)	07:39		16:29 (105)	07:01		07:28 (116)	07:11		07:53 (77)	06:29			06:06		06:34 (76)
	17:25	23	16:52 (105)	18:00	41	17:10 (105)	18:33	14	07:42 (116)	20:04	12	08:05 (77)	20:34			21:01	39	07:13 (76)
8	07:58		16:29 (105)	07:37		16:30 (105)	07:59		08:30 (116)	07:09			06:27			06:06		06:33 (76)
	17:26	24	16:53 (105)	18:02	40	17:10 (105)	19:34	9	08:39 (116)	20:05			20:35			21:02	40	07:13 (76)
9	07:57		16:29 (105)	07:36		16:31 (105)	07:57			07:07			06:26			06:06		06:34 (76)
	17:27	26	16:55 (105)	18:03	38	17:09 (105)	19:35			20:06			20:36			21:02	39	07:13 (76)
10	07:57		16:28 (105)	07:35		16:32 (105)	07:56			07:06			06:25			06:05		06:34 (76)
	17:28	28	16:56 (105)	18:04	36	17:08 (105)	19:36			20:07			20:37			21:03	39	07:13 (76)
11	07:57		16:27 (105)	07:34		16:33 (105)	07:54			07:04			06:24			06:05		06:34 (76)
	17:29	30	16:57 (105)	18:05	34	17:07 (105)	19:37			20:08			20:38			21:03	40	07:14 (76)
12	07:57		16:27 (105)	07:33		16:34 (105)	07:53			07:03			06:23			06:05		06:34 (76)
	17:30	31	16:58 (105)	18:06	31	17:05 (105)	19:38			20:09			20:39			21:04	40	07:14 (76)
13	07:56		16:27 (105)	07:32		16:36 (105)	07:51			07:01			06:22			06:05		06:35 (76)
	17:31	33	17:00 (105)	18:08	28	17:04 (105)	19:39			20:10			20:40			21:04	39	07:14 (76)
14	07:56		16:26 (105)	07:30		16:38 (105)	07:49			07:00			06:21			06:05		06:35 (76)
	17:32	34	17:00 (105)	18:09	25	17:03 (105)	19:40			20:11			20:41			21:05	40	07:15 (76)
15	07:56		16:26 (105)	07:29		16:41 (105)	07:48			06:58			06:20			06:05		06:35 (76)
	17:33	36	17:02 (105)	18:10	20	17:01 (105)	19:41			20:12			20:42			21:05	40	07:15 (76)
16	07:55		16:25 (105)	07:28		16:44 (105)	07:46			06:57			06:19		06:46 (76)	06:05		06:35 (76)
	17:34	37	17:02 (105)	18:11	12	16:56 (105)	19:42			20:13			20:43	8	06:54 (76)	21:06	40	07:15 (76)
17	07:55		16:26 (105)	07:27			07:45			06:55			06:18		06:44 (76)	06:05		06:35 (76)
	17:35	38	17:04 (105)	18:12			19:43			20:14			20:44	15	06:59 (76)	21:06	40	07:15 (76)
18	07:55		16:25 (105)	07:25			07:43			06:54			06:17		06:42 (76)	06:05		06:35 (76)
	17:37	39	17:04 (105)	18:14			19:44			20:15			20:45	19	07:01 (76)	21:07	40	07:15 (76)
19	07:54		16:25 (105)	07:24			07:41		08:03 (77)	06:52			06:17		06:40 (76)	06:05		06:35 (76)
	17:38	41	17:06 (105)	18:15			19:45	5	08:08 (77)	20:16			20:46	22	07:02 (76)	21:07	40	07:15 (76)
20	07:54		16:25 (105)	07:23			07:40		07:58 (77)	06:51			06:16		06:39 (76)	06:06		06:35 (76)
	17:39	41	17:06 (105)	18:16			19:46	14	08:12 (77)	20:17			20:47	24	07:03 (76)	21:07	40	07:15 (76)
21	07:53		16:25 (105)	07:21			07:38		07:57 (77)	06:49			06:15		06:37 (76)	06:06		06:36 (76)
	17:40	42	17:07 (105)	18:17			19:47	17	08:14 (77)	20:18			20:48	27	07:04 (76)	21:07	40	07:16 (76)
22	07:52		16:25 (105)	07:20		07:39 (116)	07:36		07:55 (77)	06:48			06:14		06:37 (76)	06:06		06:36 (76)
	17:41	43	17:08 (105)	18:18	2	07:41 (116)	19:49	21	08:16 (77)	20:19			20:49	28	07:05 (76)	21:08	40	07:16 (76)
23	07:52		16:24 (105)	07:18		07:38 (116)	07:35		07:54 (77)	06:46			06:13		06:36 (76)	06:06		06:36 (76)
	17:42	44	17:08 (105)	18:19	6	07:44 (116)	19:50	23	08:17 (77)	20:20			20:50	30	07:06 (76)	21:08	40	07:16 (76)
24	07:51		16:24 (105)	07:17		07:36 (116)	07:33		07:52 (77)	06:45			06:13		06:35 (76)	06:06		06:36 (76)
	17:44	44	17:08 (105)	18:20	9	07:45 (116)	19:51	25	08:17 (77)	20:21			20:51	31	07:06 (76)	21:08	40	07:16 (76)
25	07:50		16:25 (105)	07:16		07:35 (116)	07:32		07:50 (77)	06:44			06:12		06:35 (76)	06:07		06:37 (76)
	17:45	45	17:10 (105)	18:22	12	07:47 (116)	19:52	28	08:18 (77)	20:22			20:51	33	07:08 (76)	21:08	40	07:17 (76)
26	07:50		16:25 (105)	07:14		07:33 (116)	07:30		07:49 (77)	06:42			06:11		06:35 (76)	06:07		06:37 (76)
	17:46	45	17:10 (105)	18:23	14	07:47 (116)	19:53	29	08:18 (77)	20:23			20:52	33	07:08 (76)	21:08	40	07:17 (76)
27	07:49		16:25 (105)	07:13		07:32 (116)	07:28		07:47 (77)	06:41			06:11		06:35 (76)	06:07		06:37 (76)
	17:47	45	17:10 (105)	18:24	16	07:48 (116)	19:54	31	08:18 (77)	20:24			20:53	34	07:09 (76)	21:08	40	07:17 (76)
28	07:48		16:25 (105)	07:11		07:30 (116)	07:27		07:47 (77)	06:40			06:10		06:34 (76)	06:08		06:38 (76)
	17:48	45	17:10 (105)	18:25	17	07:47 (116)	19:55	31	08:18 (77)	20:25			20:54	35	07:09 (76)	21:08	40	07:18 (76)
29	07:47		16:25 (105)				07:25		07:47 (77)	06:38			06:10		06:34 (76)	06:08		06:38 (76)
	17:50	46	17:11 (105)				19:56	31	08:18 (77)	20:26			20:55	36	07:10 (76)	21:08	39	07:17 (76)
30	07:46		16:25 (105)				07:23		07:46 (77)	06:37			06:09		06:34 (76)	06:09		06:38 (76)
	17:51	46	17:11 (105)				19:57	31	08:17 (77)	20:27			20:55	36	07:10 (76)	21:08	40	07:18 (76)
31	07:45		16:26 (105)				07:22		07:46 (77)				06:09		06:34 (76)			
	17:52	46	17:12 (105)				19:58	30	08:16 (77)				20:56	37	07:11 (76)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		1039			649			457			159			448			1186	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.68			0.67			0.65			0.66			0.68			0.68	
Total reduction		0.24			0.28			0.29			0.34			0.38			0.41	
Total, real		254			184			131			53			171			486	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 50

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 789 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5721)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August		September			October			November			December		
1	06:09		06:38 (76)	06:32		07:02			07:31			07:04		16:00 (105)	07:37		16:09 (105)
	21:08	40	07:18 (76)	20:51		20:09			19:19			17:33	37	16:37 (105)	17:10	30	16:39 (105)
2	06:10		06:39 (76)	06:33		07:03			07:32			07:05		16:00 (105)	07:38		16:10 (105)
	21:08	40	07:19 (76)	20:50		20:08			19:17			17:32	39	16:39 (105)	17:10	29	16:39 (105)
3	06:10		06:39 (76)	06:34		07:04			07:33			07:06		15:59 (105)	07:39		16:12 (105)
	21:08	39	07:18 (76)	20:49		20:06			19:15			17:31	40	16:39 (105)	17:10	26	16:38 (105)
4	06:11		06:39 (76)	06:35		07:05			07:34			07:07		15:58 (105)	07:40		16:13 (105)
	21:08	40	07:19 (76)	20:48		20:05			19:14			17:30	42	16:40 (105)	17:10	25	16:38 (105)
5	06:11		06:39 (76)	06:36		07:06		07:50 (77)	07:35		08:09 (116)	07:08		15:58 (105)	07:41		16:14 (105)
	21:08	39	07:18 (76)	20:47		20:03	12	08:02 (77)	19:12	5	08:14 (116)	17:29	42	16:40 (105)	17:09	23	16:37 (105)
6	06:12		06:40 (76)	06:37		07:07		07:47 (77)	07:36		08:05 (116)	07:09		15:58 (105)	07:42		16:16 (105)
	21:08	39	07:19 (76)	20:45		20:01	17	08:04 (77)	19:10	12	08:17 (116)	17:28	43	16:41 (105)	17:09	21	16:37 (105)
7	06:12		06:40 (76)	06:38		07:08		07:45 (77)	07:37		08:03 (116)	07:10		15:57 (105)	07:43		16:17 (105)
	21:07	38	07:18 (76)	20:44		20:00	21	08:06 (77)	19:09	16	08:19 (116)	17:27	45	16:42 (105)	17:09	19	16:36 (105)
8	06:13		06:40 (76)	06:39		07:09		07:42 (77)	07:38		08:01 (116)	07:12		15:57 (105)	07:44		16:19 (105)
	21:07	39	07:19 (76)	20:43		19:57	24	08:06 (77)	19:07	19	08:20 (116)	17:25	45	16:42 (105)	17:09	16	16:35 (105)
9	06:14		06:41 (76)	06:40		07:10		07:41 (77)	07:39		08:00 (116)	07:13		15:56 (105)	07:45		16:20 (105)
	21:07	38	07:19 (76)	20:42		19:55	26	08:07 (77)	19:06	20	08:20 (116)	17:24	46	16:42 (105)	17:09	15	16:35 (105)
10	06:14		06:41 (76)	06:41		07:10		07:40 (77)	07:40		07:59 (116)	07:14		15:57 (105)	07:46		16:22 (105)
	21:06	38	07:19 (76)	20:41		19:53	28	08:08 (77)	19:04	22	08:21 (116)	17:23	46	16:43 (105)	17:09	12	16:34 (105)
11	06:15		06:41 (76)	06:42		07:11		07:39 (77)	07:41		08:00 (116)	07:15		15:57 (105)	07:47		16:25 (105)
	21:06	38	07:19 (76)	20:39		19:52	29	08:08 (77)	19:03	21	08:21 (116)	17:23	46	16:43 (105)	17:09	8	16:33 (105)
12	06:16		06:42 (76)	06:43		07:12		07:38 (77)	07:42		08:01 (116)	07:16		15:57 (105)	07:47		16:28 (105)
	21:06	37	07:19 (76)	20:38		19:50	30	08:08 (77)	19:01	20	08:21 (116)	17:22	46	16:43 (105)	17:09	2	16:29 (105)
13	06:16		06:42 (76)	06:44		07:13		07:37 (77)	07:43		08:03 (116)	07:17		15:57 (105)	07:48		
	21:05	36	07:18 (76)	20:37		19:48	31	08:08 (77)	18:59	18	08:21 (116)	17:21	46	16:43 (105)	17:10		
14	06:17		06:42 (76)	06:45		07:14		07:37 (77)	07:44		08:04 (116)	07:19		15:58 (105)	07:49		
	21:05	37	07:19 (76)	20:36		19:47	31	08:08 (77)	18:58	17	08:21 (116)	17:20	45	16:43 (105)	17:10		
15	06:18		06:43 (76)	06:46		07:15		07:37 (77)	07:45		08:05 (116)	07:20		15:58 (105)	07:50		
	21:04	36	07:19 (76)	20:34		19:45	31	08:08 (77)	18:56	15	08:20 (116)	17:19	45	16:43 (105)	17:10		
16	06:19		06:43 (76)	06:47		07:16		07:37 (77)	07:46		08:06 (116)	07:21		15:58 (105)	07:50		
	21:04	35	07:18 (76)	20:33		19:43	30	08:07 (77)	18:55	13	08:19 (116)	17:18	45	16:43 (105)	17:10		
17	06:19		06:44 (76)	06:48		07:17		07:37 (77)	07:47		08:07 (116)	07:22		15:58 (105)	07:51		
	21:03	34	07:18 (76)	20:32		19:42	30	08:07 (77)	18:53	11	08:18 (116)	17:17	45	16:43 (105)	17:11		
18	06:20		06:44 (76)	06:49		07:18		07:38 (77)	07:48		08:08 (116)	07:23		15:58 (105)	07:52		
	21:02	33	07:17 (76)	20:30		19:40	28	08:06 (77)	18:52	8	08:16 (116)	17:17	44	16:42 (105)	17:11		
19	06:21		06:45 (76)	06:49		07:19		07:39 (77)	07:49		08:09 (116)	07:24		15:59 (105)	07:52		
	21:02	32	07:17 (76)	20:29		19:38	26	08:05 (77)	18:51	5	08:14 (116)	17:16	44	16:43 (105)	17:11		
20	06:22		06:46 (76)	06:50		07:20		07:40 (77)	07:50			07:25		16:00 (105)	07:53		
	21:01	31	07:17 (76)	20:27		19:37	24	08:04 (77)	18:49			17:15	43	16:43 (105)	17:12		
21	06:23		06:46 (76)	06:51		07:21		07:40 (77)	07:51			07:27		16:00 (105)	07:53		
	21:00	29	07:15 (76)	20:26		19:35	21	08:01 (77)	18:48			17:15	42	16:42 (105)	17:12		
22	06:23		06:47 (76)	06:52		07:22		07:41 (77)	07:52			07:28		16:01 (105)	07:54		
	21:00	28	07:15 (76)	20:25		19:33	18	07:59 (77)	18:46			17:14	41	16:42 (105)	17:13		
23	06:24		06:49 (76)	06:53		07:23		07:42 (77)	07:53			07:29		16:01 (105)	07:54		
	20:59	25	07:14 (76)	20:23		19:32	15	07:57 (77)	18:45			17:13	41	16:42 (105)	17:13		
24	06:25		06:50 (76)	06:54		07:24		07:44 (77)	07:55			07:30		16:03 (105)	07:55		
	20:58	23	07:13 (76)	20:22		19:30	9	07:53 (77)	18:44			17:13	39	16:42 (105)	17:14		
25	06:26		06:51 (76)	06:55		07:25			07:56			07:31		16:04 (105)	07:55		
	20:57	21	07:12 (76)	20:20		19:28			18:42			17:12	38	16:42 (105)	17:14		
26	06:27		06:53 (76)	06:56		07:26			07:57		17:12 (105)	07:32		16:05 (105)	07:56		
	20:57	17	07:10 (76)	20:19		19:27			18:41	15	17:27 (105)	17:12	36	16:41 (105)	17:15		
27	06:28		06:55 (76)	06:57		07:27			07:58		17:09 (105)	07:33		16:05 (105)	07:56		
	20:56	12	07:07 (76)	20:17		19:25			18:40	21	17:30 (105)	17:12	36	16:41 (105)	17:16		
28	06:29			06:58		07:28			07:59		17:07 (105)	07:34		16:06 (105)	07:56		
	20:55			20:16		19:23			18:38	26	17:33 (105)	17:11	34	16:40 (105)	17:16		
29	06:30			06:59		07:29			08:00		17:05 (105)	07:35		16:07 (105)	07:57		
	20:54			20:14		19:22			18:37	29	17:34 (105)	17:11	33	16:40 (105)	17:17		
30	06:31			07:00		07:30			08:01		17:03 (105)	07:36		16:08 (105)	07:57		
	20:53			20:13		19:20			18:36	32	17:35 (105)	17:10	32	16:40 (105)	17:18		
31	06:31			07:01					08:02		17:02 (105)				07:57		
	20:52			20:11					18:34	34	17:36 (105)				17:19		
Potential sun hours	456			427		374			346			300			291		
Total, worst case		894					481			379			1246			226	
Sun reduction		0.60					0.61			0.56			0.37			0.50	
Oper. time red.		1.00					1.00			1.00			1.00			1.00	
Wind dir. red.		0.68					0.66			0.65			0.68			0.68	
Total reduction		0.41					0.40			0.37			0.25			0.34	
Total, real		366					193			139			313			77	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

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3/1/2012 1:52 PM / 51

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Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 793 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5725)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:20 (77)	07:45		08:33 (77)	07:10		07:44 (76)	07:20			06:36		07:01 (74)	06:08		06:56 (75)
	17:20	24	08:44 (77)	17:53	20	08:53 (77)	18:26	47	08:31 (76)	19:59			20:28	22	07:23 (74)	20:57	49	07:45 (75)
2	07:58		08:20 (77)	07:44		08:35 (77)	07:08		07:43 (76)	07:19			06:34		07:01 (74)	06:08		06:56 (75)
	17:20	25	08:45 (116)	17:54	16	08:51 (77)	18:27	48	08:31 (76)	20:00			20:29	21	07:22 (74)	20:58	50	07:46 (75)
3	07:58		08:20 (77)	07:43		08:37 (77)	07:07		07:43 (76)	07:17			06:33		07:02 (74)	06:07		06:56 (75)
	17:21	25	08:45 (77)	17:56	11	08:48 (77)	18:28	49	08:32 (76)	20:00			20:30	20	07:22 (74)	20:58	51	07:47 (75)
4	07:58		08:20 (77)	07:42			07:05		07:42 (76)	07:15			06:32		07:03 (74)	06:07		06:55 (75)
	17:22	26	08:46 (77)	17:57			18:29	49	08:31 (76)	20:01			20:31	18	07:21 (74)	20:59	52	07:47 (75)
5	07:58		08:20 (77)	07:41			07:04		07:42 (76)	07:14			06:31		07:04 (74)	06:07		06:55 (75)
	17:23	27	08:47 (77)	17:58			18:30	50	08:32 (76)	20:02			20:32	14	07:18 (74)	21:00	53	07:48 (75)
6	07:58		08:20 (77)	07:40			07:02		07:42 (76)	07:12			06:30		07:06 (74)	06:06		06:55 (75)
	17:24	28	08:48 (77)	17:59			18:32	49	08:31 (76)	20:03			20:33	10	07:16 (74)	21:01	54	07:49 (75)
7	07:58		08:20 (77)	07:39			07:01		07:42 (76)	07:11			06:29		07:10 (74)	06:06		06:55 (75)
	17:25	29	08:49 (77)	18:00			18:33	50	08:32 (76)	20:04			20:34	2	07:12 (74)	21:01	55	07:50 (75)
8	07:58		08:21 (77)	07:37			07:59		08:41 (76)	07:09			06:27			06:06		06:54 (75)
	17:26	29	08:50 (77)	18:02			19:34	50	09:31 (76)	20:05			20:35			21:02	56	07:50 (75)
9	07:57		08:21 (77)	07:36			07:57		08:41 (76)	07:07			06:26			06:06		06:54 (75)
	17:27	30	08:51 (77)	18:03			19:35	49	09:30 (76)	20:06			20:36			21:02	56	07:50 (75)
10	07:57		08:21 (77)	07:35			07:56		08:42 (76)	07:06			06:25			06:05		06:54 (75)
	17:28	31	08:52 (77)	18:04			19:36	48	09:30 (76)	20:07			20:37			21:03	57	07:51 (75)
11	07:57		08:21 (77)	07:34			07:54		08:41 (76)	07:04			06:24			06:05		06:54 (75)
	17:29	30	08:51 (77)	18:05			19:37	48	09:29 (76)	20:08			20:38			21:03	57	07:51 (75)
12	07:57		08:21 (77)	07:33			07:53		08:42 (76)	07:03			06:23			06:05		06:54 (75)
	17:30	31	08:52 (77)	18:06			19:38	46	09:28 (76)	20:09			20:39			21:04	58	07:52 (75)
13	07:56		08:21 (77)	07:32			07:51		08:42 (76)	07:01			06:22			06:05		06:54 (75)
	17:31	32	08:53 (77)	18:08			19:39	45	09:27 (76)	20:10			20:40			21:04	58	07:52 (75)
14	07:56		08:21 (77)	07:30			07:49		08:42 (76)	07:00			06:21			06:05		06:54 (75)
	17:32	32	08:53 (77)	18:09			19:40	43	09:25 (76)	20:11			20:41			21:05	59	07:53 (75)
15	07:56		08:22 (77)	07:29			07:48		08:44 (76)	06:58			06:20			06:05		06:54 (75)
	17:33	32	08:54 (77)	18:10			19:41	41	09:25 (76)	20:12			20:42			21:05	59	07:53 (75)
16	07:55		08:21 (77)	07:28			07:46		08:44 (76)	06:57			06:19			06:05		06:54 (75)
	17:34	33	08:54 (77)	18:11			19:42	39	09:23 (76)	20:13			20:43			21:06	59	07:53 (75)
17	07:55		08:22 (77)	07:27			07:45		08:45 (76)	06:55			06:18			06:05		06:54 (75)
	17:35	33	08:55 (77)	18:12			19:43	36	09:21 (76)	20:14			20:44			21:06	60	07:54 (75)
18	07:55		08:22 (77)	07:25			07:43		08:46 (76)	06:54			06:17			06:05		06:54 (75)
	17:37	33	08:55 (77)	18:14			19:44	34	09:20 (76)	20:15			20:45			21:07	60	07:54 (75)
19	07:54		08:23 (77)	07:24		08:00 (76)	07:41		08:48 (76)	06:52		07:11 (74)	06:17			06:05		06:54 (75)
	17:38	33	08:56 (77)	18:15	17	08:17 (76)	19:45	29	09:17 (76)	20:16	9	07:20 (74)	20:46			21:07	60	07:54 (75)
20	07:54		08:23 (77)	07:23		07:57 (76)	07:40		08:49 (76)	06:51		07:10 (74)	06:16		07:15 (75)	06:06		06:54 (75)
	17:39	33	08:56 (77)	18:16	24	08:21 (76)	19:46	25	09:14 (76)	20:17	12	07:22 (74)	20:47	10	07:25 (75)	21:07	60	07:54 (75)
21	07:53		08:24 (77)	07:21		07:54 (76)	07:38		08:52 (76)	06:49		07:08 (74)	06:15		07:10 (75)	06:06		06:55 (75)
	17:40	33	08:57 (77)	18:17	28	08:22 (76)	19:47	19	09:11 (76)	20:18	15	07:23 (74)	20:48	19	07:29 (75)	21:07	60	07:55 (75)
22	07:52		08:24 (77)	07:20		07:53 (76)	07:36		08:57 (76)	06:48		07:07 (74)	06:14		07:08 (75)	06:06		06:55 (75)
	17:41	33	08:57 (77)	18:18	32	08:25 (76)	19:48	9	09:06 (76)	20:19	17	07:24 (74)	20:49	24	07:32 (75)	21:08	60	07:55 (75)
23	07:52		08:24 (77)	07:18		07:51 (76)	07:35			06:46		07:05 (74)	06:13		07:05 (75)	06:06		06:55 (75)
	17:42	33	08:57 (77)	18:19	36	08:27 (76)	19:50			20:20	19	07:24 (74)	20:50	29	07:34 (75)	21:08	60	07:55 (75)
24	07:51		08:24 (77)	07:17		07:49 (76)	07:33			06:45		07:04 (74)	06:13		07:03 (75)	06:06		06:55 (75)
	17:44	32	08:56 (77)	18:20	38	08:27 (76)	19:51			20:21	21	07:25 (74)	20:51	33	07:36 (75)	21:08	60	07:55 (75)
25	07:50		08:25 (77)	07:16		07:48 (76)	07:32			06:44		07:03 (74)	06:12		07:03 (75)	06:07		06:56 (75)
	17:45	32	08:57 (77)	18:22	41	08:29 (76)	19:52			20:22	22	07:25 (74)	20:51	35	07:38 (75)	21:08	60	07:56 (75)
26	07:50		08:26 (77)	07:14		07:47 (76)	07:30			06:42		07:01 (74)	06:11		07:01 (75)	06:07		06:56 (75)
	17:46	30	08:56 (77)	18:23	42	08:29 (76)	19:53			20:23	24	07:25 (74)	20:52	38	07:39 (75)	21:08	59	07:55 (75)
27	07:49		08:26 (77)	07:13		07:46 (76)	07:28			06:41		07:00 (74)	06:11		07:00 (75)	06:07		06:56 (75)
	17:47	30	08:56 (77)	18:24	44	08:30 (76)	19:54			20:24	25	07:25 (74)	20:53	41	07:41 (75)	21:08	59	07:55 (75)
28	07:48		08:27 (77)	07:11		07:45 (76)	07:27			06:40		07:00 (74)	06:10		06:59 (75)	06:08		06:57 (75)
	17:48	28	08:55 (77)	18:25	45	08:30 (76)	19:55			20:25	25	07:25 (74)	20:54	42	07:41 (75)	21:08	59	07:56 (75)
29	07:47		08:28 (77)				07:25			06:38		07:01 (74)	06:10		06:59 (75)	06:08		06:57 (75)
	17:50	27	08:55 (77)				19:56			20:26	24	07:25 (74)	20:55	44	07:43 (75)	21:08	59	07:56 (75)
30	07:46		08:29 (77)				07:23			06:37		07:00 (74)	06:09		06:57 (75)	06:09		06:58 (75)
	17:51	25	08:54 (77)				19:57			20:27	23	07:23 (74)	20:55	46	07:43 (75)	21:08	58	07:56 (75)
31	07:45		08:31 (77)				07:22						06:09		06:57 (75)			
	17:52	23	08:54 (77)				19:58						20:56	48	07:45 (75)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		922			394			903			236			516			1717	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.60			0.63			0.63			0.67			0.68			0.68	
Total reduction		0.22			0.26			0.28			0.34			0.38			0.41	
Total, real		199			103			250			80			195			699	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

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Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 793 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5725)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:58 (75)	06:32			07:02			07:31		08:21 (76)	07:04			07:37		08:03 (77)
	21:08	58	07:56 (75)	20:51			20:09			19:19	46	09:07 (76)	17:33			17:10	31	08:34 (77)
2	06:10		06:59 (75)	06:33			07:03			07:32		08:20 (76)	07:05			07:38		08:03 (77)
	21:08	57	07:56 (75)	20:50			20:08			19:17	47	09:07 (76)	17:32			17:10	31	08:34 (77)
3	06:10		06:59 (75)	06:34			07:04			07:33		08:19 (76)	07:06			07:39		08:04 (77)
	21:08	57	07:56 (75)	20:49			20:06			19:15	48	09:07 (76)	17:31			17:10	30	08:34 (77)
4	06:11		07:00 (75)	06:35			07:05			07:34		08:19 (76)	07:07			07:40		08:05 (77)
	21:08	56	07:56 (75)	20:48			20:05			19:14	48	09:07 (76)	17:30			17:10	29	08:34 (77)
5	06:11		07:00 (75)	06:36			07:06			07:35		08:18 (76)	07:08			07:41		08:05 (77)
	21:08	55	07:55 (75)	20:47			20:03			19:12	49	09:07 (76)	17:29			17:09	29	08:34 (77)
6	06:12		07:01 (75)	06:37		07:17 (74)	07:07			07:36		08:18 (76)	07:09			07:42		08:06 (77)
	21:08	54	07:55 (75)	20:45	7	07:24 (74)	20:01			19:10	49	09:07 (76)	17:28			17:09	28	08:34 (77)
7	06:12		07:01 (75)	06:38		07:15 (74)	07:08			07:37		08:17 (76)	07:10			07:43		08:07 (77)
	21:07	54	07:55 (75)	20:44	12	07:27 (74)	20:00			19:09	50	09:07 (76)	17:27			17:09	27	08:34 (77)
8	06:13		07:02 (75)	06:39		07:13 (74)	07:09			07:38		08:17 (76)	07:12		08:07 (77)	07:44		08:08 (77)
	21:07	53	07:55 (75)	20:43	15	07:28 (74)	19:57			19:07	50	09:07 (76)	17:25	12	08:19 (77)	17:09	26	08:34 (77)
9	06:14		07:03 (75)	06:40		07:12 (74)	07:10			07:39		08:17 (76)	07:13		08:04 (77)	07:45		08:09 (77)
	21:07	52	07:55 (75)	20:42	18	07:30 (74)	19:55			19:06	49	09:06 (76)	17:24	17	08:21 (77)	17:09	25	08:34 (77)
10	06:14		07:03 (75)	06:41		07:11 (74)	07:10			07:40		08:17 (76)	07:14		08:03 (77)	07:46		08:10 (77)
	21:06	51	07:54 (75)	20:41	20	07:31 (74)	19:53			19:04	49	09:06 (76)	17:23	21	08:24 (77)	17:09	25	08:35 (116)
11	06:15		07:04 (75)	06:42		07:10 (74)	07:11			07:41		08:17 (76)	07:15		08:02 (77)	07:47		08:11 (77)
	21:06	50	07:54 (75)	20:39	21	07:31 (74)	19:52			19:03	48	09:05 (76)	17:23	23	08:25 (77)	17:09	24	08:35 (77)
12	06:16		07:05 (75)	06:43		07:09 (74)	07:12			07:42		08:17 (76)	07:16		08:01 (77)	07:47		08:11 (77)
	21:06	48	07:53 (75)	20:38	23	07:32 (74)	19:50			19:01	47	09:04 (76)	17:22	25	08:26 (77)	17:09	24	08:35 (116)
13	06:16		07:05 (75)	06:44		07:09 (74)	07:13			07:43		08:18 (76)	07:17		08:00 (77)	07:48		08:12 (77)
	21:05	47	07:52 (75)	20:37	23	07:32 (74)	19:48			18:59	47	09:05 (76)	17:21	27	08:27 (77)	17:10	24	08:36 (116)
14	06:17		07:07 (75)	06:45		07:08 (74)	07:14			07:44		08:19 (76)	07:19		08:00 (77)	07:49		08:13 (77)
	21:05	45	07:52 (75)	20:36	24	07:32 (74)	19:47			18:58	45	09:04 (76)	17:20	28	08:28 (77)	17:10	24	08:37 (116)
15	06:18		07:08 (75)	06:46		07:08 (74)	07:15			07:45		08:19 (76)	07:20		07:59 (77)	07:50		08:14 (77)
	21:04	43	07:51 (75)	20:34	25	07:33 (74)	19:45			18:56	43	09:02 (76)	17:19	30	08:29 (77)	17:10	23	08:37 (116)
16	06:19		07:08 (75)	06:47		07:07 (74)	07:16			07:46		08:20 (76)	07:21		07:59 (77)	07:50		08:14 (77)
	21:04	42	07:50 (75)	20:33	24	07:31 (74)	19:43			18:55	41	09:01 (76)	17:18	30	08:29 (77)	17:10	23	08:37 (116)
17	06:19		07:10 (75)	06:48		07:08 (74)	07:17			07:47		08:20 (76)	07:22		07:58 (77)	07:51		08:15 (77)
	21:03	39	07:49 (75)	20:32	23	07:31 (74)	19:42			18:53	40	09:00 (76)	17:17	32	08:30 (77)	17:11	23	08:38 (116)
18	06:20		07:11 (75)	06:49		07:09 (74)	07:18			07:48		08:21 (76)	07:23		07:58 (77)	07:52		08:16 (77)
	21:02	37	07:48 (75)	20:30	22	07:31 (74)	19:40			18:52	37	08:58 (76)	17:17	32	08:30 (77)	17:11	23	08:39 (116)
19	06:21		07:13 (75)	06:49		07:10 (74)	07:19			07:49		08:22 (76)	07:24		07:59 (77)	07:52		08:15 (116)
	21:02	34	07:47 (75)	20:29	20	07:30 (74)	19:38			18:51	35	08:57 (76)	17:16	33	08:32 (77)	17:11	24	08:39 (116)
20	06:22		07:15 (75)	06:50		07:11 (74)	07:20			07:50		08:24 (76)	07:25		07:59 (77)	07:53		08:16 (116)
	21:01	31	07:46 (75)	20:27	19	07:30 (74)	19:37			18:49	31	08:55 (76)	17:15	33	08:32 (77)	17:12	24	08:40 (116)
21	06:23		07:16 (75)	06:51		07:12 (74)	07:21		08:46 (76)	07:51		08:26 (76)	07:27		07:59 (77)	07:53		08:16 (116)
	21:00	27	07:43 (75)	20:26	17	07:29 (74)	19:35	2	08:47 (76)	18:48	26	08:52 (76)	17:15	33	08:32 (77)	17:12	24	08:40 (116)
22	06:23		07:19 (75)	06:52		07:13 (74)	07:22		08:38 (76)	07:52		08:29 (76)	07:28		07:59 (77)	07:54		08:17 (116)
	21:00	22	07:41 (75)	20:25	14	07:27 (74)	19:33	17	08:55 (76)	18:46	21	08:50 (76)	17:14	33	08:32 (77)	17:13	24	08:41 (116)
23	06:24		07:22 (75)	06:53		07:14 (74)	07:23		08:34 (76)	07:53		08:32 (76)	07:29		07:59 (77)	07:54		08:17 (116)
	20:59	16	07:38 (75)	20:23	12	07:26 (74)	19:32	24	08:58 (76)	18:45	14	08:46 (76)	17:13	33	08:32 (77)	17:13	24	08:41 (116)
24	06:25			06:54		07:15 (74)	07:24		08:32 (76)	07:55			07:30		08:00 (77)	07:55		08:18 (116)
	20:58			20:22	8	07:23 (74)	19:30	28	09:00 (76)	18:44			17:13	33	08:33 (77)	17:14	24	08:42 (116)
25	06:26			06:55			07:25		08:29 (76)	07:56			07:31		08:00 (77)	07:55		08:19 (77)
	20:57			20:20			19:28	32	09:01 (76)	18:42			17:12	33	08:33 (77)	17:14	23	08:42 (116)
26	06:27			06:56			07:26		08:27 (76)	07:57			07:32		08:00 (77)	07:56		08:19 (77)
	20:57			20:19			19:27	36	09:03 (76)	18:41			17:12	33	08:33 (77)	17:15	23	08:42 (116)
27	06:28			06:57			07:27		08:26 (76)	07:58			07:33		08:01 (77)	07:56		08:20 (77)
	20:56			20:17			19:25	38	09:04 (76)	18:40			17:12	32	08:33 (77)	17:16	23	08:43 (116)
28	06:29			06:58			07:28		08:24 (76)	07:59			07:34		08:01 (77)	07:56		08:20 (77)
	20:55			20:16			19:23	41	09:05 (76)	18:38			17:11	32	08:33 (77)	17:16	23	08:43 (116)
29	06:30			06:59			07:29		08:23 (76)	08:00			07:35		08:02 (77)	07:57		08:20 (77)
	20:54			20:14			19:22	43	09:06 (76)	18:37			17:11	32	08:34 (77)	17:17	24	08:44 (116)
30	06:30			07:00			07:30		08:22 (76)	08:01			07:36		08:02 (77)	07:57		08:20 (77)
	20:53			20:13			19:20	44	09:06 (76)	18:36			17:10	32	08:34 (77)	17:18	24	08:44 (116)
31	06:31			07:01						08:02						07:57		08:20 (77)
	20:52			20:11						18:34						17:19	24	08:44 (116)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		1028			347			305			960			669			777	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.68			0.67			0.63			0.63			0.60			0.61	
Total reduction		0.41			0.40			0.38			0.35			0.22			0.30	
Total, real		418			138			117			338			148			234	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 53

Licensed user:
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Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 794 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5726)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:21 (77)	07:45		08:34 (77)	07:10		07:45 (76)	07:20			06:36		06:56 (74)	06:08		
	17:20	26	08:47 (77)	17:53	22	08:56 (77)	18:26	47	08:32 (76)	19:59			20:28	26	07:22 (74)	20:57		
2	07:58		08:21 (77)	07:44		08:36 (77)	07:08		07:44 (76)	07:19			06:34		06:57 (74)	06:08		
	17:20	27	08:48 (77)	17:54	18	08:54 (77)	18:27	49	08:33 (76)	20:00			20:29	25	07:22 (74)	20:58		
3	07:58		08:21 (77)	07:43		08:38 (77)	07:07		07:44 (76)	07:17			06:33		06:57 (74)	06:07		
	17:21	27	08:48 (77)	17:56	14	08:52 (77)	18:28	49	08:33 (76)	20:00			20:30	24	07:21 (74)	20:58		
4	07:58		08:21 (77)	07:42		08:42 (77)	07:05		07:42 (76)	07:15			06:32		06:57 (74)	06:07		
	17:22	28	08:49 (77)	17:57	6	08:48 (77)	18:29	51	08:33 (76)	20:01			20:31	24	07:21 (74)	20:59		
5	07:58		08:21 (77)	07:41			07:04		07:42 (76)	07:14			06:31		06:57 (74)	06:07		
	17:23	29	08:50 (77)	17:58			18:30	52	08:34 (76)	20:02			20:32	23	07:20 (74)	21:00		
6	07:58		08:21 (77)	07:40			07:02		07:41 (76)	07:12			06:30		06:58 (74)	06:06		
	17:24	30	08:51 (77)	17:59			18:32	53	08:34 (76)	20:03			20:33	21	07:19 (74)	21:01		
7	07:58		08:22 (77)	07:39			07:01		07:41 (76)	07:11			06:29		06:59 (74)	06:06		
	17:25	30	08:52 (77)	18:00			18:33	53	08:34 (76)	20:04			20:34	19	07:18 (74)	21:01		
8	07:58		08:22 (77)	07:37			07:59		08:41 (76)	07:09			06:27		07:00 (74)	06:06		
	17:26	31	08:53 (77)	18:02			19:34	53	09:34 (76)	20:05			20:35	17	07:17 (74)	21:02		
9	07:57		08:22 (77)	07:36			07:57		08:40 (76)	07:07			06:26		07:01 (74)	06:06		
	17:27	32	08:54 (77)	18:03			19:35	53	09:33 (76)	20:06			20:36	14	07:15 (74)	21:02		
10	07:57		08:22 (77)	07:35			07:56		08:40 (76)	07:06			06:25		07:03 (74)	06:05		
	17:28	33	08:55 (77)	18:04			19:36	53	09:33 (76)	20:07			20:37	10	07:13 (74)	21:03		
11	07:57		08:22 (77)	07:34			07:54		08:40 (76)	07:04			06:24		07:07 (74)	06:05		
	17:29	33	08:55 (77)	18:05			19:37	52	09:32 (76)	20:08			20:38	2	07:09 (74)	21:03		
12	07:57		08:22 (77)	07:33			07:53		08:40 (76)	07:03			06:23			06:05		
	17:30	33	08:55 (77)	18:06			19:38	52	09:32 (76)	20:09			20:39			21:04		
13	07:56		08:23 (77)	07:32			07:51		08:40 (76)	07:01			06:22			06:05		07:14 (75)
	17:31	33	08:56 (77)	18:08			19:39	51	09:31 (76)	20:10			20:40			21:04	3	07:17 (75)
14	07:56		08:22 (77)	07:30			07:49		08:40 (76)	07:00			06:21			06:05		07:11 (75)
	17:32	34	08:56 (77)	18:09			19:40	50	09:30 (76)	20:11			20:41			21:05	9	07:20 (75)
15	07:56		08:23 (77)	07:29			07:48		08:41 (76)	06:58			06:20			06:05		07:10 (75)
	17:33	34	08:57 (77)	18:10			19:41	49	09:30 (76)	20:12			20:42			21:05	12	07:22 (75)
16	07:55		08:23 (77)	07:28			07:46		08:41 (76)	06:57			06:19			06:05		07:09 (75)
	17:34	34	08:57 (77)	18:11			19:42	47	09:28 (76)	20:13			20:43			21:06	14	07:23 (75)
17	07:55		08:23 (77)	07:27			07:45		08:41 (76)	06:55			06:18			06:05		07:08 (75)
	17:35	35	08:58 (77)	18:12			19:43	46	09:27 (76)	20:14			20:44			21:06	16	07:24 (75)
18	07:55		08:23 (77)	07:25			07:43		08:42 (76)	06:54			06:17			06:05		07:08 (75)
	17:37	35	08:58 (77)	18:14			19:44	44	09:26 (76)	20:15			20:45			21:07	17	07:25 (75)
19	07:54		08:24 (77)	07:24			07:41		08:42 (76)	06:52			06:17			06:05		07:07 (75)
	17:38	35	08:59 (77)	18:15			19:45	42	09:24 (76)	20:16			20:46			21:07	18	07:25 (75)
20	07:54		08:24 (77)	07:23		08:04 (76)	07:40		08:43 (76)	06:51			06:16			06:06		07:07 (75)
	17:39	35	08:59 (77)	18:16	12	08:16 (76)	19:46	39	09:22 (76)	20:17			20:47			21:07	18	07:25 (75)
21	07:53		08:25 (77)	07:21		07:59 (76)	07:38		08:45 (76)	06:49		07:08 (74)	06:15			06:06		07:08 (75)
	17:40	35	09:00 (77)	18:17	21	08:20 (76)	19:47	36	09:21 (76)	20:18	6	07:14 (74)	20:48			21:07	19	07:27 (75)
22	07:52		08:25 (77)	07:20		07:56 (76)	07:36		08:46 (76)	06:48		07:07 (74)	06:14			06:06		07:08 (75)
	17:41	35	09:00 (77)	18:18	27	08:23 (76)	19:48	32	09:18 (76)	20:19	10	07:17 (74)	20:49			21:08	18	07:26 (75)
23	07:52		08:25 (77)	07:18		07:54 (76)	07:35		08:48 (76)	06:46		07:05 (74)	06:13			06:06		07:08 (75)
	17:42	34	08:59 (77)	18:19	32	08:26 (76)	19:50	28	09:16 (76)	20:20	13	07:18 (74)	20:50			21:08	18	07:26 (75)
24	07:51		08:25 (77)	07:17		07:52 (76)	07:33		08:50 (76)	06:45		07:04 (74)	06:13			06:06		07:09 (75)
	17:44	34	08:59 (77)	18:20	35	08:27 (76)	19:51	23	09:13 (76)	20:21	16	07:20 (74)	20:51			21:08	17	07:26 (75)
25	07:50		08:27 (77)	07:16		07:50 (76)	07:32		08:53 (76)	06:44		07:03 (74)	06:12			06:07		07:10 (75)
	17:45	33	09:00 (77)	18:22	39	08:29 (76)	19:52	15	09:08 (76)	20:22	18	07:21 (74)	20:51			21:08	16	07:26 (75)
26	07:50		08:27 (77)	07:14		07:48 (76)	07:30			06:42		07:01 (74)	06:11			06:07		07:11 (75)
	17:46	32	08:59 (77)	18:23	41	08:29 (76)	19:53			20:23	20	07:21 (74)	20:52			21:08	15	07:26 (75)
27	07:49		08:28 (77)	07:13		07:48 (76)	07:28			06:41		07:00 (74)	06:11			06:07		07:11 (75)
	17:47	31	08:59 (77)	18:24	43	08:31 (76)	19:54			20:24	22	07:22 (74)	20:53			21:08	13	07:24 (75)
28	07:48		08:28 (77)	07:11		07:46 (76)	07:27			06:40		06:59 (74)	06:10			06:08		07:13 (75)
	17:48	30	08:58 (77)	18:25	45	08:31 (76)	19:55			20:25	23	07:22 (74)	20:54			21:08	11	07:24 (75)
29	07:47		08:29 (77)				07:25			06:38		06:58 (74)	06:10			06:08		07:15 (75)
	17:50	29	08:58 (77)				19:56			20:26	25	07:23 (74)	20:55			21:08	7	07:22 (75)
30	07:46		08:30 (77)				07:23			06:37		06:56 (74)	06:09			06:09		
	17:51	27	08:57 (77)				19:57			20:27	26	07:22 (74)	20:55			21:08		
31	07:45		08:32 (77)				07:22						06:09					
	17:52	25	08:57 (77)				19:58						20:56					
Potential sun hours	300			299			370			397			446			449		
Total, worst case		979			355			1119			179			205			241	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.60			0.63			0.63			0.67			0.67			0.68	
Total reduction		0.22			0.26			0.28			0.34			0.37			0.41	
Total, real		212			93			310			61			77			98	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 54

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Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 794 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5726)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July	August			September			October			November			December		
1	06:09	06:32			07:02			07:31		08:19 (76)	07:04			07:37		08:04 (77)
	21:08	20:51			20:09			19:19	52	09:11 (76)	17:33			17:10	33	08:37 (77)
2	06:10	06:33		07:16 (74)	07:03			07:32		08:18 (76)	07:05			07:38		08:04 (77)
	21:08	20:50	6	07:22 (74)	20:08			19:17	53	09:11 (76)	17:32			17:10	33	08:37 (77)
3	06:10	06:34		07:13 (74)	07:04			07:33		08:18 (76)	07:06			07:39		08:05 (77)
	21:08	20:49	12	07:25 (74)	20:06			19:15	53	09:11 (76)	17:31			17:10	32	08:37 (77)
4	06:11	06:35		07:11 (74)	07:05			07:34		08:18 (76)	07:07			07:40		08:06 (77)
	21:08	20:48	16	07:27 (74)	20:05			19:14	52	09:10 (76)	17:30			17:10	31	08:37 (77)
5	06:11	06:36		07:09 (74)	07:06			07:35		08:17 (76)	07:08			07:41		08:07 (77)
	21:08	20:47	18	07:27 (74)	20:03			19:12	53	09:10 (76)	17:29			17:09	30	08:37 (77)
6	06:12	06:37		07:08 (74)	07:07			07:36		08:17 (76)	07:09			07:42		08:07 (77)
	21:08	20:45	20	07:28 (74)	20:01			19:10	53	09:10 (76)	17:28			17:09	30	08:37 (77)
7	06:12	06:38		07:07 (74)	07:08			07:37		08:17 (76)	07:10		08:11 (77)	07:43		08:08 (77)
	21:07	20:44	22	07:29 (74)	20:00			19:09	52	09:09 (76)	17:26	7	08:18 (77)	17:09	29	08:37 (77)
8	06:13	06:39		07:07 (74)	07:09			07:38		08:17 (76)	07:12		08:08 (77)	07:44		08:09 (77)
	21:07	20:43	22	07:29 (74)	19:57			19:07	52	09:09 (76)	17:25	14	08:22 (77)	17:09	28	08:37 (77)
9	06:14	06:40		07:06 (74)	07:10			07:39		08:17 (76)	07:13		08:05 (77)	07:45		08:10 (77)
	21:07	20:42	24	07:30 (74)	19:55			19:06	51	09:08 (76)	17:24	19	08:24 (77)	17:09	28	08:38 (77)
10	06:14	06:41		07:06 (74)	07:10			07:40		08:17 (76)	07:14		08:05 (77)	07:46		08:11 (77)
	21:06	20:41	24	07:30 (74)	19:53			19:04	50	09:07 (76)	17:23	22	08:27 (77)	17:09	27	08:38 (77)
11	06:15	06:42		07:05 (74)	07:11			07:41		08:17 (76)	07:15		08:03 (77)	07:47		08:12 (77)
	21:06	20:39	25	07:30 (74)	19:52			19:03	50	09:07 (76)	17:23	25	08:28 (77)	17:09	26	08:38 (77)
12	06:16	06:43		07:05 (74)	07:12			07:42		08:18 (76)	07:16		08:02 (77)	07:47		08:12 (77)
	21:06	20:38	25	07:30 (74)	19:50			19:01	48	09:06 (76)	17:22	27	08:29 (77)	17:09	25	08:37 (77)
13	06:16	06:44		07:05 (74)	07:13			07:43		08:19 (76)	07:17		08:01 (77)	07:48		08:13 (77)
	21:05	20:37	25	07:30 (74)	19:48			18:59	47	09:06 (76)	17:21	29	08:30 (77)	17:10	25	08:38 (77)
14	06:17	06:45		07:06 (74)	07:14			07:44		08:20 (76)	07:19		08:01 (77)	07:49		08:14 (77)
	21:05	20:36	24	07:30 (74)	19:47			18:58	44	09:04 (76)	17:20	30	08:31 (77)	17:10	24	08:38 (77)
15	06:18	06:46		07:07 (74)	07:15			07:45		08:20 (76)	07:20		08:01 (77)	07:50		08:15 (77)
	21:04	20:34	23	07:30 (74)	19:45			18:56	43	09:03 (76)	17:19	31	08:32 (77)	17:10	24	08:39 (77)
16	06:19	06:47		07:07 (74)	07:16			07:46		08:21 (76)	07:21		08:00 (77)	07:50		08:15 (77)
	21:04	20:33	21	07:28 (74)	19:43			18:55	41	09:02 (76)	17:18	32	08:32 (77)	17:10	24	08:39 (116)
17	06:19	06:48		07:08 (74)	07:17			07:47		08:23 (76)	07:22		08:00 (77)	07:51		08:16 (77)
	21:03	20:32	20	07:28 (74)	19:42			18:53	37	09:00 (76)	17:17	33	08:33 (77)	17:11	24	08:40 (116)
18	06:20	06:49		07:09 (74)	07:18		08:43 (76)	07:48		08:24 (76)	07:23		07:59 (77)	07:52		08:17 (77)
	21:02	20:30	18	07:27 (74)	19:40	12	08:55 (76)	18:52	34	08:58 (76)	17:17	34	08:33 (77)	17:11	24	08:41 (116)
19	06:21	06:49		07:10 (74)	07:19		08:38 (76)	07:49		08:25 (76)	07:24		08:00 (77)	07:52		08:17 (77)
	21:02	20:29	16	07:26 (74)	19:38	21	08:59 (76)	18:51	31	08:56 (76)	17:16	34	08:34 (77)	17:11	24	08:41 (116)
20	06:22	06:50		07:11 (74)	07:20		08:35 (76)	07:50		08:27 (76)	07:25		08:00 (77)	07:53		08:18 (77)
	21:01	20:27	13	07:24 (74)	19:37	27	09:02 (76)	18:49	26	08:53 (76)	17:15	35	08:35 (77)	17:12	24	08:42 (116)
21	06:23	06:51		07:12 (74)	07:21		08:32 (76)	07:51		08:30 (76)	07:27		08:00 (77)	07:53		08:18 (77)
	21:00	20:26	10	07:22 (74)	19:35	31	09:03 (76)	18:48	20	08:50 (76)	17:15	35	08:35 (77)	17:12	24	08:42 (116)
22	06:23	06:52		07:13 (74)	07:22		08:30 (76)	07:52		08:36 (76)	07:28		08:00 (77)	07:54		08:19 (77)
	21:00	20:25	5	07:18 (74)	19:33	35	09:05 (76)	18:46	9	08:45 (76)	17:14	35	08:35 (77)	17:13	24	08:43 (116)
23	06:24	06:53			07:23		08:28 (76)	07:53			07:29		08:00 (77)	07:54		08:19 (77)
	20:59	20:23			19:32	38	09:06 (76)	18:45			17:13	35	08:35 (77)	17:13	24	08:43 (116)
24	06:25	06:54			07:24		08:26 (76)	07:55			07:30		08:01 (77)	07:55		08:20 (77)
	20:58	20:22			19:30	41	09:07 (76)	18:44			17:13	35	08:36 (77)	17:14	24	08:44 (116)
25	06:26	06:55			07:25		08:25 (76)	07:56			07:31		08:01 (77)	07:55		08:20 (77)
	20:57	20:20			19:28	43	09:08 (76)	18:42			17:12	35	08:36 (77)	17:14	24	08:44 (116)
26	06:27	06:56			07:26		08:24 (76)	07:57			07:32		08:02 (77)	07:56		08:20 (77)
	20:57	20:19			19:27	45	09:09 (76)	18:41			17:12	34	08:36 (77)	17:15	24	08:44 (116)
27	06:28	06:57			07:27		08:22 (76)	07:58			07:33		08:02 (77)	07:56		08:21 (77)
	20:56	20:17			19:25	47	09:09 (76)	18:40			17:12	34	08:36 (77)	17:16	24	08:45 (116)
28	06:29	06:58			07:28		08:21 (76)	07:59			07:34		08:02 (77)	07:56		08:21 (77)
	20:55	20:16			19:23	49	09:10 (76)	18:38			17:11	34	08:36 (77)	17:16	24	08:45 (77)
29	06:30	06:59			07:29		08:21 (76)	08:00			07:35		08:03 (77)	07:57		08:21 (77)
	20:54	20:14			19:22	49	09:10 (76)	18:37			17:11	34	08:37 (77)	17:17	24	08:45 (77)
30	06:30	07:00			07:30		08:20 (76)	08:01			07:36		08:03 (77)	07:57		08:21 (77)
	20:53	20:13			19:20	50	09:10 (76)	18:36			17:10	34	08:37 (77)	17:18	25	08:46 (77)
31	06:31	07:01						08:02						07:57		08:21 (77)
	20:52	20:11						18:34						17:19	25	08:46 (77)
Potential sun hours	456	427			374			346			300			291		
Total, worst case			389			488			951			717			811	
Sun reduction			0.60			0.61			0.56			0.37			0.50	
Oper. time red.			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.			0.67			0.63			0.63			0.60			0.61	
Total reduction			0.40			0.38			0.35			0.22			0.30	
Total, real			156			188			336			160			245	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 55

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 795 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5727)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57			07:45		16:39 (105)	07:10		07:46 (116)	07:20		08:09 (77)	06:36			06:08		06:38 (76)
	17:20			17:53	38	17:17 (105)	18:26	9	07:55 (116)	19:59	16	08:25 (77)	20:28			20:57	43	07:21 (76)
2	07:58			07:44		16:40 (105)	07:08			07:19		08:12 (77)	06:34			06:08		06:38 (76)
	17:20			17:54	37	17:17 (105)	18:27			20:00	8	08:20 (77)	20:29			20:58	44	07:22 (76)
3	07:58			07:43		16:40 (105)	07:07			07:17			06:33			06:07		06:39 (76)
	17:21			17:56	36	17:16 (105)	18:28			20:00			20:30			20:58	43	07:22 (76)
4	07:58			07:42		16:41 (105)	07:05			07:15			06:32			06:07		06:38 (76)
	17:22			17:57	35	17:16 (105)	18:29			20:01			20:31			20:59	44	07:22 (76)
5	07:58			07:41		16:41 (105)	07:04			07:14			06:31			06:07		06:38 (76)
	17:23			17:58	34	17:15 (105)	18:30			20:02			20:32			21:00	45	07:23 (76)
6	07:58			07:40		16:41 (105)	07:02			07:12			06:30			06:06		06:38 (76)
	17:24			17:59	33	17:14 (105)	18:32			20:03			20:33			21:01	45	07:23 (76)
7	07:58			07:39		16:42 (105)	07:01			07:11			06:29			06:06		06:38 (76)
	17:25			18:00	32	17:14 (105)	18:33			20:04			20:34			21:01	46	07:24 (76)
8	07:58			07:37		16:44 (105)	07:59			07:09			06:27			06:06		06:38 (76)
	17:26			18:02	29	17:13 (105)	19:34			20:05			20:35			21:02	45	07:23 (76)
9	07:57		16:47 (105)	07:36		16:45 (105)	07:57			07:07			06:26			06:06		06:38 (76)
	17:27	7	16:54 (105)	18:03	27	17:12 (105)	19:35			20:06			20:36			21:02	46	07:24 (76)
10	07:57		16:45 (105)	07:35		16:47 (105)	07:56			07:06			06:25			06:05		06:38 (76)
	17:28	12	16:57 (105)	18:04	24	17:11 (105)	19:36			20:07			20:37			21:03	46	07:24 (76)
11	07:57		16:43 (105)	07:34		16:49 (105)	07:54		08:17 (77)	07:04			06:24			06:05		06:38 (76)
	17:29	16	16:59 (105)	18:05	21	17:10 (105)	19:37	13	08:30 (77)	20:08			20:38			21:03	47	07:25 (76)
12	07:57		16:43 (105)	07:33		16:50 (105)	07:53		08:14 (77)	07:03			06:23			06:05		06:38 (76)
	17:30	18	17:01 (105)	18:06	17	17:07 (105)	19:38	19	08:33 (77)	20:09			20:39			21:04	47	07:25 (76)
13	07:56		16:42 (105)	07:32		07:51 (116)	07:51		08:12 (77)	07:01			06:22			06:05		06:38 (76)
	17:31	21	17:03 (105)	18:08	16	17:04 (105)	19:39	23	08:35 (77)	20:10			20:40			21:04	48	07:26 (76)
14	07:56		16:41 (105)	07:30		07:50 (116)	07:49		08:09 (77)	07:00			06:21			06:05		06:39 (76)
	17:32	23	17:04 (105)	18:09	10	08:00 (116)	19:40	27	08:36 (77)	20:11			20:41			21:05	47	07:26 (76)
15	07:56		16:41 (105)	07:29		07:49 (116)	07:48		08:08 (77)	06:58			06:20			06:05		06:39 (76)
	17:33	24	17:05 (105)	18:10	12	08:01 (116)	19:41	29	08:37 (77)	20:12			20:42			21:05	47	07:26 (76)
16	07:55		16:40 (105)	07:28		07:47 (116)	07:46		08:07 (77)	06:57			06:19			06:05		06:39 (76)
	17:34	26	17:06 (105)	18:11	15	08:02 (116)	19:42	31	08:38 (77)	20:13			20:43			21:06	47	07:26 (76)
17	07:55		16:40 (105)	07:27		07:46 (116)	07:45		08:05 (77)	06:55			06:18		06:54 (76)	06:05		06:39 (76)
	17:35	28	17:08 (105)	18:12	17	08:03 (116)	19:43	33	08:38 (77)	20:14			20:44	9	07:03 (76)	21:06	47	07:26 (76)
18	07:55		16:39 (105)	07:25		07:45 (116)	07:43		08:05 (77)	06:54			06:17		06:51 (76)	06:05		06:39 (76)
	17:37	29	17:08 (105)	18:14	19	08:04 (116)	19:44	34	08:39 (77)	20:15			20:45	16	07:07 (76)	21:07	48	07:27 (76)
19	07:54		16:39 (105)	07:24		07:43 (116)	07:41		08:04 (77)	06:52			06:17		06:48 (76)	06:05		06:39 (76)
	17:38	31	17:10 (105)	18:15	21	08:04 (116)	19:45	35	08:39 (77)	20:16			20:46	21	07:09 (76)	21:07	48	07:27 (76)
20	07:53		16:38 (105)	07:23		07:42 (116)	07:40		08:03 (77)	06:51			06:16		06:46 (76)	06:06		06:39 (76)
	17:39	32	17:10 (105)	18:16	22	08:04 (116)	19:46	35	08:38 (77)	20:17			20:47	25	07:11 (76)	21:07	48	07:27 (76)
21	07:53		16:39 (105)	07:21		07:40 (116)	07:38		08:03 (77)	06:49			06:15		06:45 (76)	06:06		06:40 (76)
	17:40	33	17:12 (105)	18:17	24	08:04 (116)	19:47	36	08:39 (77)	20:18			20:48	27	07:12 (76)	21:07	48	07:28 (76)
22	07:52		16:38 (105)	07:20		07:39 (116)	07:36		08:02 (77)	06:48			06:14		06:44 (76)	06:06		06:40 (76)
	17:41	34	17:12 (105)	18:18	25	08:04 (116)	19:49	36	08:38 (77)	20:19			20:49	30	07:14 (76)	21:08	48	07:28 (76)
23	07:52		16:38 (105)	07:18		07:39 (116)	07:35		08:03 (77)	06:46			06:13		06:43 (76)	06:06		06:40 (76)
	17:42	35	17:13 (105)	18:19	25	08:04 (116)	19:50	35	08:38 (77)	20:20			20:50	31	07:14 (76)	21:08	48	07:28 (76)
24	07:51		16:37 (105)	07:17		07:39 (116)	07:33		08:02 (77)	06:45			06:13		06:42 (76)	06:06		06:40 (76)
	17:44	36	17:13 (105)	18:20	24	08:03 (116)	19:51	35	08:37 (77)	20:21			20:51	33	07:15 (76)	21:08	48	07:28 (76)
25	07:50		16:38 (105)	07:16		07:40 (116)	07:32		08:02 (77)	06:44			06:12		06:42 (76)	06:07		06:41 (76)
	17:45	36	17:14 (105)	18:22	22	08:02 (116)	19:52	34	08:36 (77)	20:22			20:51	35	07:17 (76)	21:08	47	07:28 (76)
26	07:50		16:38 (105)	07:14		07:40 (116)	07:30		08:03 (77)	06:42			06:11		06:41 (76)	06:07		06:41 (76)
	17:46	37	17:15 (105)	18:23	21	08:01 (116)	19:53	33	08:36 (77)	20:23			20:52	36	07:17 (76)	21:08	47	07:28 (76)
27	07:49		16:38 (105)	07:13		07:42 (116)	07:28		08:03 (77)	06:41			06:11		06:41 (76)	06:07		06:41 (76)
	17:47	37	17:15 (105)	18:24	18	08:00 (116)	19:54	32	08:35 (77)	20:24			20:53	37	07:18 (76)	21:08	47	07:28 (76)
28	07:48		16:38 (105)	07:11		07:43 (116)	07:27		08:03 (77)	06:40			06:10		06:40 (76)	06:08		06:42 (76)
	17:48	37	17:15 (105)	18:25	14	07:57 (116)	19:55	30	08:33 (77)	20:25			20:54	39	07:19 (76)	21:08	47	07:29 (76)
29	07:47		16:38 (105)				07:25		08:04 (77)	06:38			06:10		06:40 (76)	06:08		06:41 (76)
	17:50	37	17:15 (105)				19:56	28	08:32 (77)	20:26			20:55	40	07:20 (76)	21:08	48	07:29 (76)
30	07:46		16:38 (105)				07:23		08:05 (77)	06:37			06:09		06:39 (76)	06:09		06:42 (76)
	17:51	38	17:16 (105)				19:57	25	08:30 (77)	20:27			20:55	41	07:20 (76)	21:08	47	07:29 (76)
31	07:45		16:39 (105)				07:22		08:06 (77)				06:09		06:39 (76)			
	17:52	38	17:17 (105)				19:58	21	08:27 (77)				20:56	42	07:21 (76)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		665			668			633			24			462			1396	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.68			0.66			0.65			0.65			0.68			0.68	
Total reduction		0.24			0.28			0.28			0.33			0.38			0.41	
Total, real		163			185			180			8			177			572	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 56

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 795 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5727)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:42 (76)	06:32			07:02			07:31		07:52 (77)	07:04		16:15 (105)	07:37		16:25 (105)
	21:08	47	07:29 (76)	20:51			20:09			19:19	21	08:13 (77)	17:33	25	16:40 (105)	17:10	16	16:41 (105)
2	06:10		06:43 (76)	06:33			07:03			07:32		07:54 (77)	07:05		16:15 (105)	07:38		16:27 (105)
	21:08	47	07:30 (76)	20:50			20:08			19:17	16	08:10 (77)	17:32	27	16:42 (105)	17:10	13	16:40 (105)
3	06:10		06:43 (76)	06:34			07:04			07:33		07:59 (77)	07:06		16:13 (105)	07:39		16:30 (105)
	21:08	46	07:29 (76)	20:49			20:06			19:15	6	08:05 (77)	17:31	30	16:43 (105)	17:10	8	16:38 (105)
4	06:11		06:44 (76)	06:35			07:05			07:34			07:07		16:12 (105)	07:40		
	21:08	46	07:30 (76)	20:48			20:05			19:14			17:30	32	16:44 (105)	17:10		
5	06:11		06:43 (76)	06:36			07:06			07:35			07:08		16:11 (105)	07:41		
	21:08	46	07:29 (76)	20:47			20:03			19:12			17:29	33	16:44 (105)	17:09		
6	06:12		06:44 (76)	06:37			07:07			07:36			07:09		16:11 (105)	07:42		
	21:08	46	07:30 (76)	20:45			20:01			19:10			17:28	35	16:46 (105)	17:09		
7	06:12		06:44 (76)	06:38			07:08			07:37			07:10		16:11 (105)	07:43		
	21:07	45	07:29 (76)	20:44			20:00			19:09			17:27	35	16:46 (105)	17:09		
8	06:13		06:45 (76)	06:39			07:09			07:38			07:12		16:10 (105)	07:44		
	21:07	44	07:29 (76)	20:43			19:57			19:07			17:25	36	16:46 (105)	17:09		
9	06:14		06:46 (76)	06:40			07:10			07:39			07:13		16:10 (105)	07:45		
	21:07	44	07:30 (76)	20:42			19:55			19:06			17:24	36	16:46 (105)	17:09		
10	06:14		06:45 (76)	06:41			07:10		08:06 (77)	07:40			07:14		16:10 (105)	07:46		
	21:06	44	07:29 (76)	20:41			19:53	7	08:13 (77)	19:04			17:23	38	16:48 (105)	17:09		
11	06:15		06:46 (76)	06:42			07:11		08:01 (77)	07:41			07:15		16:10 (105)	07:47		
	21:06	43	07:29 (76)	20:39			19:52	16	08:17 (77)	19:03			17:23	38	16:48 (105)	17:09		
12	06:16		06:47 (76)	06:43			07:12		07:59 (77)	07:42			07:16		16:10 (105)	07:47		
	21:06	42	07:29 (76)	20:38			19:50	20	08:19 (77)	19:01			17:22	37	16:47 (105)	17:09		
13	06:16		06:47 (76)	06:44			07:13		07:57 (77)	07:43		08:18 (116)	07:17		16:10 (105)	07:48		
	21:05	41	07:28 (76)	20:37			19:48	24	08:21 (77)	18:59	11	08:29 (116)	17:21	37	16:47 (105)	17:10		
14	06:17		06:48 (76)	06:45			07:14		07:55 (77)	07:44		08:16 (116)	07:19		16:11 (105)	07:49		
	21:05	40	07:28 (76)	20:36			19:47	27	08:22 (77)	18:58	16	08:32 (116)	17:20	37	16:48 (105)	17:10		
15	06:18		06:49 (76)	06:46			07:15		07:53 (77)	07:45		08:14 (116)	07:20		16:11 (105)	07:50		
	21:04	39	07:28 (76)	20:34			19:45	30	08:23 (77)	18:56	19	08:33 (116)	17:19	37	16:48 (105)	17:10		
16	06:19		06:49 (76)	06:47			07:16		07:52 (77)	07:46		08:12 (116)	07:21		16:11 (105)	07:50		
	21:04	38	07:27 (76)	20:33			19:43	32	08:24 (77)	18:55	22	08:34 (116)	17:18	37	16:48 (105)	17:10		
17	06:19		06:50 (76)	06:48			07:17		07:51 (77)	07:47		08:11 (116)	07:22		16:11 (105)	07:51		
	21:03	37	07:27 (76)	20:32			19:42	33	08:24 (77)	18:53	23	08:34 (116)	17:17	36	16:47 (105)	17:11		
18	06:20		06:51 (76)	06:49			07:18		07:50 (77)	07:48		08:10 (116)	07:23		16:11 (105)	07:52		
	21:02	35	07:26 (76)	20:30			19:40	34	08:24 (77)	18:52	24	08:34 (116)	17:17	36	16:47 (105)	17:11		
19	06:21		06:52 (76)	06:49			07:19		07:49 (77)	07:49		08:10 (116)	07:24		16:13 (105)	07:52		
	21:02	34	07:26 (76)	20:29			19:38	36	08:25 (77)	18:51	25	08:35 (116)	17:16	35	16:48 (105)	17:11		
20	06:22		06:53 (76)	06:50			07:20		07:49 (77)	07:50		08:10 (116)	07:25		16:13 (105)	07:53		
	21:01	32	07:25 (76)	20:27			19:37	36	08:25 (77)	18:49	24	08:34 (116)	17:15	34	16:47 (105)	17:12		
21	06:23		06:53 (76)	06:51			07:21		07:47 (77)	07:51		08:11 (116)	07:27		16:14 (105)	07:53		
	21:00	31	07:24 (76)	20:26			19:35	36	08:23 (77)	18:48	23	08:34 (116)	17:15	33	16:47 (105)	17:12		
22	06:23		06:54 (76)	06:52			07:22		07:47 (77)	07:52		08:13 (116)	07:28		16:14 (105)	07:54		
	21:00	29	07:23 (76)	20:25			19:33	36	08:23 (77)	18:46	22	08:35 (116)	17:14	32	16:46 (105)	17:13		
23	06:24		06:56 (76)	06:53			07:23		07:47 (77)	07:53		08:14 (116)	07:29		16:15 (105)	07:54		
	20:59	26	07:22 (76)	20:23			19:32	36	08:23 (77)	18:45	20	08:34 (116)	17:13	31	16:46 (105)	17:13		
24	06:25		06:58 (76)	06:54			07:24		07:47 (77)	07:55		08:15 (116)	07:30		16:17 (105)	07:55		
	20:58	22	07:20 (76)	20:22			19:30	35	08:22 (77)	18:44	18	08:33 (116)	17:13	29	16:46 (105)	17:14		
25	06:26		07:00 (76)	06:55			07:25		07:47 (77)	07:56		08:16 (116)	07:31		16:18 (105)	07:55		
	20:57	19	07:19 (76)	20:20			19:28	35	08:22 (77)	18:42	17	08:33 (116)	17:12	28	16:46 (105)	17:14		
26	06:27		07:03 (76)	06:56			07:26		07:47 (77)	07:57		08:17 (116)	07:32		16:19 (105)	07:56		
	20:57	13	07:16 (76)	20:19			19:27	34	08:21 (77)	18:41	14	08:31 (116)	17:12	26	16:45 (105)	17:15		
27	06:28		07:08 (76)	06:57			07:27		07:48 (77)	07:58		08:18 (116)	07:33		16:20 (105)	07:56		
	20:56	2	07:09 (76)	20:17			19:25	32	08:20 (77)	18:40	12	08:30 (116)	17:12	24	16:44 (105)	17:16		
28	06:29			06:58			07:28		07:48 (77)	07:59		08:20 (116)	07:34		16:21 (105)	07:56		
	20:55			20:16			19:23	30	08:18 (77)	18:38	9	08:29 (116)	17:11	23	16:44 (105)	17:16		
29	06:30			06:59			07:29		07:49 (77)	08:00		08:21 (116)	07:35		16:22 (105)	07:57		
	20:54			20:14			19:22	28	08:17 (77)	18:37	16	17:34 (105)	17:11	21	16:43 (105)	17:17		
30	06:30			07:00			07:30		07:50 (77)	08:01		17:19 (105)	07:36		16:24 (105)	07:57		
	20:53			20:13			19:20	25	08:15 (77)	18:36	18	17:37 (105)	17:10	18	16:42 (105)	17:18		
31	06:31			07:01						08:02		17:17 (105)				07:57		
	20:52			20:11						18:34	22	17:39 (105)				17:19		
Potential sun hours	456			427			374			346			300			291		
Total, worst case		978						622			398			956			37	
Sun reduction		0.60						0.61			0.56			0.37			0.50	
Oper. time red.		1.00						1.00			1.00			1.00			1.00	
Wind dir. red.		0.68						0.65			0.64			0.68			0.68	
Total reduction		0.41						0.39			0.36			0.25			0.34	
Total, real		401						245			143			241			13	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 57

Licensed user:
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US-SYRACUSE, NY 13202
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Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 799 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5729)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:35 (72)	07:45		08:45 (72)	07:10			07:20		18:53 (117)	06:36			06:08		19:49 (74)
	17:20	79	16:54 (116)	17:53	53	09:38 (72)	18:26			19:59	36	19:29 (117)	20:28			20:57	25	20:14 (74)
2	07:57		08:35 (72)	07:44		08:46 (72)	07:08			07:18		18:52 (117)	06:34			06:08		19:50 (74)
	17:20	80	16:54 (116)	17:54	51	09:37 (72)	18:27			20:00	37	19:29 (117)	20:29			20:58	24	20:14 (74)
3	07:58		08:35 (72)	07:43		08:47 (72)	07:07			07:17		18:51 (117)	06:33			06:07		19:50 (74)
	17:21	79	16:54 (116)	17:55	49	09:36 (72)	18:28			20:00	39	19:30 (117)	20:30			20:58	24	20:14 (74)
4	07:58		08:35 (72)	07:42		08:48 (72)	07:05			07:15		18:50 (117)	06:32			06:07		19:50 (74)
	17:22	81	16:55 (116)	17:57	47	09:35 (72)	18:29			20:01	40	19:30 (117)	20:31			20:59	23	20:13 (74)
5	07:58		08:36 (72)	07:41		08:49 (72)	07:04			07:14		18:49 (117)	06:31			06:07		19:51 (74)
	17:23	80	16:55 (116)	17:58	46	09:35 (72)	18:30			20:02	41	19:30 (117)	20:32			21:00	22	20:13 (74)
6	07:58		08:36 (72)	07:40		08:50 (72)	07:02			07:12		18:49 (117)	06:30		19:54 (74)	06:06		19:52 (74)
	17:24	81	16:56 (116)	17:59	44	09:34 (72)	18:31			20:03	42	19:31 (117)	20:33	12	20:06 (74)	21:00	21	20:13 (74)
7	07:58		08:37 (72)	07:38		08:52 (72)	07:00			07:11		18:48 (117)	06:28		19:52 (74)	06:06		19:52 (74)
	17:25	80	16:56 (116)	18:00	40	09:32 (72)	18:33			20:04	42	19:30 (117)	20:34	16	20:08 (74)	21:01	20	20:12 (74)
8	07:57		08:37 (72)	07:37		08:53 (72)	07:59			07:09		18:48 (117)	06:27		19:50 (74)	06:06		19:53 (74)
	17:26	81	16:57 (116)	18:02	38	09:31 (72)	19:34			20:05	43	19:31 (117)	20:35	20	20:10 (74)	21:02	19	20:12 (74)
9	07:57		08:37 (72)	07:36		08:55 (72)	07:57			07:07		18:47 (117)	06:26		19:49 (74)	06:06		19:54 (74)
	17:27	83	16:58 (116)	18:03	35	09:30 (72)	19:35			20:06	43	19:30 (117)	20:36	22	20:11 (74)	21:02	18	20:12 (74)
10	07:57		08:37 (72)	07:35		08:57 (72)	07:56			07:06		18:47 (117)	06:25		19:48 (74)	06:05		19:55 (74)
	17:28	81	16:57 (116)	18:04	31	09:28 (72)	19:36			20:07	42	19:29 (117)	20:37	24	20:12 (74)	21:03	16	20:11 (74)
11	07:57		08:37 (72)	07:34		09:00 (72)	07:54			07:04		18:47 (117)	06:24		19:47 (74)	06:05		19:56 (74)
	17:29	82	16:58 (116)	18:05	26	09:26 (72)	19:37			20:08	42	19:29 (117)	20:38	26	20:13 (74)	21:03	15	20:11 (74)
12	07:57		08:38 (72)	07:33		09:02 (72)	07:53			07:03		18:47 (117)	06:23		19:46 (74)	06:05		19:56 (74)
	17:30	81	16:58 (116)	18:06	20	09:22 (72)	19:38			20:09	41	19:28 (117)	20:39	28	20:14 (74)	21:04	15	20:11 (74)
13	07:56		08:39 (72)	07:32		09:07 (72)	07:51			07:01		18:48 (117)	06:22		19:46 (74)	06:05		19:57 (74)
	17:31	80	16:58 (116)	18:08	10	09:17 (72)	19:39			20:10	40	19:28 (117)	20:40	28	20:14 (74)	21:04	14	20:11 (74)
14	07:56		08:38 (72)	07:30			07:49			07:00		18:47 (117)	06:21		19:45 (74)	06:05		19:58 (74)
	17:32	81	16:58 (116)	18:09			19:40			20:11	40	19:27 (117)	20:41	29	20:14 (74)	21:05	12	20:10 (74)
15	07:56		08:39 (72)	07:29			07:48			06:58		18:48 (117)	06:20		19:45 (74)	06:05		19:58 (74)
	17:33	80	16:58 (116)	18:10			19:41			20:12	39	19:27 (117)	20:42	30	20:15 (74)	21:05	12	20:10 (74)
16	07:55		08:39 (72)	07:28			07:46			06:57		18:48 (117)	06:19		19:44 (74)	06:05		19:59 (74)
	17:34	79	16:58 (116)	18:11			19:42			20:13	37	19:25 (117)	20:43	31	20:15 (74)	21:06	11	20:10 (74)
17	07:55		08:39 (72)	07:26			07:45			06:55		18:49 (117)	06:18		19:44 (74)	06:05		20:00 (74)
	17:35	78	16:58 (116)	18:12			19:43			20:14	36	19:25 (117)	20:44	31	20:15 (74)	21:06	10	20:10 (74)
18	07:54		08:39 (72)	07:25			07:43			06:54		18:50 (117)	06:17		19:45 (74)	06:05		20:00 (74)
	17:37	76	16:57 (116)	18:13			19:44			20:15	33	19:23 (117)	20:45	31	20:16 (74)	21:06	9	20:09 (74)
19	07:54		08:40 (72)	07:24			07:41			06:52		18:51 (117)	06:16		19:45 (74)	06:05		20:00 (74)
	17:38	74	16:57 (116)	18:15			19:45			20:16	31	19:22 (117)	20:46	31	20:16 (74)	21:07	9	20:09 (74)
20	07:53		08:40 (72)	07:22			07:40			06:51		18:53 (117)	06:16		19:44 (74)	06:05		20:01 (74)
	17:39	71	16:55 (116)	18:16			19:46			20:17	27	19:20 (117)	20:47	32	20:16 (74)	21:07	8	20:09 (74)
21	07:53		08:40 (72)	07:21			07:38			06:49		18:54 (117)	06:15		19:44 (74)	06:06		20:02 (74)
	17:40	67	16:53 (116)	18:17			19:47			20:18	24	19:18 (117)	20:48	31	20:15 (74)	21:07	8	20:10 (74)
22	07:52		08:41 (72)	07:20			07:36			06:48		18:56 (117)	06:14		19:45 (74)	06:06		20:02 (74)
	17:41	59	09:40 (72)	18:18			19:48			20:19	20	19:16 (117)	20:49	31	20:16 (74)	21:08	8	20:10 (74)
23	07:52		08:41 (72)	07:18			07:35			06:46		18:59 (117)	06:13		19:45 (74)	06:06		20:01 (74)
	17:42	59	09:40 (72)	18:19			19:49			20:20	13	19:12 (117)	20:50	31	20:16 (74)	21:08	9	20:10 (74)
24	07:51		08:41 (72)	07:17			07:33			06:45			06:13		19:45 (74)	06:06		20:01 (74)
	17:43	58	09:39 (72)	18:20			19:50			20:21			20:50	30	20:15 (74)	21:08	9	20:10 (74)
25	07:50		08:42 (72)	07:15			07:31			06:44			06:12		19:46 (74)	06:07		20:02 (74)
	17:45	58	09:40 (72)	18:21			19:52			20:22			20:51	30	20:16 (74)	21:08	10	20:12 (74)
26	07:50		08:42 (72)	07:14			07:30		19:11 (117)	06:42			06:11		19:46 (74)	06:07		20:01 (74)
	17:46	58	09:40 (72)	18:23			19:53	5	19:16 (117)	20:23			20:52	29	20:15 (74)	21:08	11	20:12 (74)
27	07:49		08:43 (72)	07:13			07:28		19:04 (117)	06:41			06:11		19:47 (74)	06:07		20:01 (74)
	17:47	57	09:40 (72)	18:24			19:54	17	19:21 (117)	20:24			20:53	29	20:16 (74)	21:08	11	20:12 (74)
28	07:48		08:43 (72)	07:11			07:27		19:01 (117)	06:40			06:10		19:47 (74)	06:08		20:01 (74)
	17:48	56	09:39 (72)	18:25			19:55	22	19:23 (117)	20:25			20:54	28	20:15 (74)	21:08	12	20:13 (74)
29	07:47		08:44 (72)				07:25		18:59 (117)	06:38			06:10		19:48 (74)	06:08		20:00 (74)
	17:49	55	09:39 (72)				19:56	27	19:26 (117)	20:26			20:55	27	20:15 (74)	21:08	14	20:14 (74)
30	07:46		08:44 (72)				07:23		18:56 (117)	06:37			06:09		19:48 (74)	06:09		20:01 (74)
	17:51	55	09:39 (72)				19:57	31	19:27 (117)	20:27			20:55	26	20:14 (74)	21:08	14	20:15 (74)
31	07:45		08:45 (72)				07:22		18:54 (117)				06:09		19:49 (74)			
	17:52	53	09:38 (72)				19:58	34	19:28 (117)				20:56	26	20:15 (74)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		2222			490			136			828			709			433	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.62			0.61			0.66			0.66			0.63			0.63	
Total reduction		0.22			0.25			0.29			0.33			0.35			0.38	
Total, real		496			125			39			277			250			163	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 58

Licensed user:
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Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 799 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5729)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		20:00 (74)	06:32		19:57 (74)	07:02		18:46 (117)	07:31			07:04		08:26 (72)	07:37		08:19 (72)
	21:08	15	20:15 (74)	20:51	27	20:24 (74)	20:09	42	19:28 (117)	19:18			17:33	31	08:57 (72)	17:10	82	16:40 (116)
2	06:09		20:00 (74)	06:33		19:58 (74)	07:03		18:46 (117)	07:32			07:05		08:25 (72)	07:38		08:20 (72)
	21:08	16	20:16 (74)	20:50	25	20:23 (74)	20:08	42	19:28 (117)	19:17			17:32	35	09:00 (72)	17:10	81	16:40 (116)
3	06:10		19:59 (74)	06:34		19:59 (74)	07:04		18:45 (117)	07:33			07:06		08:23 (72)	07:39		08:20 (72)
	21:08	17	20:16 (74)	20:49	23	20:22 (74)	20:06	43	19:28 (117)	19:15			17:31	38	09:01 (72)	17:10	83	16:41 (116)
4	06:10		19:59 (74)	06:35		19:59 (74)	07:05		18:45 (117)	07:34			07:07		08:21 (72)	07:40		08:21 (72)
	21:08	19	20:18 (74)	20:48	21	20:20 (74)	20:05	43	19:28 (117)	19:14			17:30	41	09:02 (72)	17:09	81	16:41 (116)
5	06:11		19:59 (74)	06:36		20:01 (74)	07:06		18:45 (117)	07:35			07:08		08:20 (72)	07:41		08:22 (72)
	21:08	19	20:18 (74)	20:47	18	20:19 (74)	20:03	42	19:27 (117)	19:12			17:29	44	09:04 (72)	17:09	81	16:42 (116)
6	06:12		19:59 (74)	06:37		20:02 (74)	07:07		18:45 (117)	07:36			07:09		08:20 (72)	07:42		08:22 (72)
	21:08	20	20:19 (74)	20:45	15	20:17 (74)	20:01	42	19:27 (117)	19:10			17:27	46	09:06 (72)	17:09	81	16:42 (116)
7	06:12		19:58 (74)	06:38		20:05 (74)	07:08		18:44 (117)	07:37			07:10		08:19 (72)	07:43		08:23 (72)
	21:07	21	20:19 (74)	20:44	10	20:15 (74)	20:00	41	19:25 (117)	19:09			17:26	47	09:06 (72)	17:09	80	16:42 (116)
8	06:13		19:58 (74)	06:39			07:08		18:44 (117)	07:38			07:12		08:18 (72)	07:44		08:24 (72)
	21:07	22	20:20 (74)	20:43			19:56	40	19:24 (117)	19:07			17:25	49	09:07 (72)	17:09	80	16:43 (116)
9	06:13		19:57 (74)	06:40			07:09		18:44 (117)	07:39			07:13		08:17 (72)	07:45		08:24 (72)
	21:07	23	20:20 (74)	20:42			19:55	40	19:24 (117)	19:06			17:24	51	09:08 (72)	17:09	79	16:43 (116)
10	06:14		19:57 (74)	06:41			07:10		18:45 (117)	07:40			07:14		08:16 (72)	07:46		08:25 (72)
	21:06	24	20:21 (74)	20:41			19:53	38	19:23 (117)	19:04			17:23	52	09:08 (72)	17:09	79	16:44 (116)
11	06:15		19:57 (74)	06:42			07:11		18:46 (117)	07:41			07:15		08:17 (72)	07:47		08:26 (72)
	21:06	25	20:22 (74)	20:39			19:52	35	19:21 (117)	19:02			17:22	53	09:10 (72)	17:09	79	16:45 (116)
12	06:16		19:56 (74)	06:43			07:12		18:46 (117)	07:42			07:16		08:16 (72)	07:47		08:26 (72)
	21:06	26	20:22 (74)	20:38			19:50	34	19:20 (117)	19:01			17:22	54	09:10 (72)	17:09	78	16:44 (116)
13	06:16		19:56 (74)	06:44			07:13		18:47 (117)	07:43			07:17		08:16 (72)	07:48		08:26 (72)
	21:05	27	20:23 (74)	20:37			19:48	31	19:18 (117)	18:59			17:21	55	09:11 (72)	17:10	77	16:44 (116)
14	06:17		19:56 (74)	06:45			07:14		18:49 (117)	07:44			07:19		08:15 (72)	07:49		08:27 (72)
	21:05	27	20:23 (74)	20:36			19:47	27	19:16 (117)	18:58			17:20	56	09:11 (72)	17:10	78	16:45 (116)
15	06:18		19:56 (74)	06:46			07:15		18:51 (117)	07:45			07:20		08:16 (72)	07:50		08:28 (72)
	21:04	28	20:24 (74)	20:34			19:45	23	19:14 (117)	18:56			17:19	57	09:13 (72)	17:10	77	16:45 (116)
16	06:18		19:55 (74)	06:47			07:16		18:53 (117)	07:46			07:21		08:15 (72)	07:50		08:28 (72)
	21:04	29	20:24 (74)	20:33			19:43	18	19:11 (117)	18:55			17:18	58	09:13 (72)	17:10	76	16:45 (116)
17	06:19		19:55 (74)	06:47			07:17		18:57 (117)	07:47			07:22		08:15 (72)	07:51		08:29 (72)
	21:03	29	20:24 (74)	20:31			19:42	9	19:06 (117)	18:53			17:17	58	09:13 (72)	17:11	75	16:45 (116)
18	06:20		19:55 (74)	06:48			07:18			07:48			07:23		08:15 (72)	07:52		08:30 (72)
	21:02	30	20:25 (74)	20:30			19:40			18:52			17:17	58	09:13 (72)	17:11	75	16:46 (116)
19	06:21		19:55 (74)	06:49		19:10 (117)	07:19			07:49			07:24		08:16 (72)	07:52		08:30 (72)
	21:02	30	20:25 (74)	20:29	3	19:13 (117)	19:38			18:50			17:16	59	09:15 (72)	17:11	75	16:46 (116)
20	06:22		19:54 (74)	06:50		19:04 (117)	07:20			07:50			07:25		08:16 (72)	07:53		08:31 (72)
	21:01	31	20:25 (74)	20:27	14	19:18 (117)	19:37			18:49			17:15	59	09:15 (72)	17:12	74	16:47 (116)
21	06:22		19:55 (74)	06:51		19:01 (117)	07:21			07:51			07:27		08:16 (72)	07:53		08:31 (72)
	21:00	30	20:25 (74)	20:26	20	19:21 (117)	19:35			18:48			17:15	67	16:29 (116)	17:12	74	16:47 (116)
22	06:23		19:55 (74)	06:52		18:58 (117)	07:22			07:52			07:28		08:16 (72)	07:54		08:32 (72)
	21:00	31	20:26 (74)	20:24	25	19:23 (117)	19:33			18:46			17:14	71	16:31 (116)	17:13	74	16:48 (116)
23	06:24		19:55 (74)	06:53		18:56 (117)	07:23			07:53			07:29		08:16 (72)	07:54		08:32 (72)
	20:59	31	20:26 (74)	20:23	28	19:24 (117)	19:32			18:45			17:13	74	16:33 (116)	17:13	74	16:48 (116)
24	06:25		19:55 (74)	06:54		18:55 (117)	07:24			07:55			07:30		08:16 (72)	07:55		08:32 (72)
	20:58	31	20:26 (74)	20:22	31	19:26 (117)	19:30			18:43			17:13	76	16:34 (116)	17:14	74	16:48 (116)
25	06:26		19:55 (74)	06:55		18:53 (117)	07:25			07:56			07:31		08:17 (72)	07:55		08:33 (72)
	20:57	31	20:26 (74)	20:20	34	19:27 (117)	19:28			18:42			17:12	78	16:36 (116)	17:14	75	16:49 (116)
26	06:27		19:55 (74)	06:56		18:52 (117)	07:26			07:57			07:32		08:18 (72)	07:56		08:33 (72)
	20:56	30	20:25 (74)	20:19	35	19:27 (117)	19:27			18:41			17:12	79	16:37 (116)	17:15	75	16:49 (116)
27	06:28		19:55 (74)	06:57		18:50 (117)	07:27			07:58			07:33		08:18 (72)	07:56		08:33 (72)
	20:56	30	20:25 (74)	20:17	37	19:27 (117)	19:25			18:39			17:11	80	16:37 (116)	17:16	76	16:50 (116)
28	06:29		19:55 (74)	06:58		18:49 (117)	07:28			07:59			07:34		08:18 (72)	07:56		08:34 (72)
	20:55	30	20:25 (74)	20:16	39	19:28 (117)	19:23			18:38			17:11	81	16:38 (116)	17:16	76	16:51 (116)
29	06:29		19:56 (74)	06:59		18:48 (117)	07:29			08:00		09:35 (72)	07:35		08:19 (72)	07:57		08:34 (72)
	20:54	29	20:25 (74)	20:14	40	19:28 (117)	19:22			18:37	13	09:48 (72)	17:11	81	16:39 (116)	17:17	77	16:51 (116)
30	06:30		19:56 (74)	07:00		18:47 (117)	07:30			08:01		09:31 (72)	07:36		08:19 (72)	07:57		08:34 (72)
	20:53	29	20:25 (74)	20:12	41	19:28 (117)	19:20			18:36	21	09:52 (72)	17:10	81	16:39 (116)	17:18	77	16:52 (116)
31	06:31		19:57 (74)	07:01		18:47 (117)				08:02		09:28 (72)				07:57		08:34 (72)
	20:52	27	20:24 (74)	20:11	41	19:28 (117)				18:34	27	09:55 (72)				17:19	79	16:53 (116)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		807			527			590			61			1769			2402	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.63			0.65			0.66			0.61			0.61			0.63	
Total reduction		0.38			0.39			0.40			0.34			0.23			0.31	
Total, real		304			205			236			21			401			752	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 59

Licensed user:
EDR
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US-SYRACUSE, NY 13202
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Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 833 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5752)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February	March			April				May			June
1	07:57		15:25 (117)	07:45	07:10			07:20				06:36		19:27 (73)	06:08
	17:20	47	16:12 (117)	17:53	18:26			19:59				20:28	32	19:59 (73)	20:57
2	07:57		15:26 (117)	07:44	07:08			07:18				06:34		19:27 (73)	06:08
	17:20	46	16:12 (117)	17:54	18:27			20:00				20:29	32	19:59 (73)	20:58
3	07:58		15:27 (117)	07:43	07:07			07:17				06:33		19:27 (73)	06:07
	17:21	45	16:12 (117)	17:55	18:28			20:00				20:30	33	20:00 (73)	20:58
4	07:58		15:27 (117)	07:42	07:05		17:40 (74)	07:15				06:32		19:26 (73)	06:07
	17:22	45	16:12 (117)	17:57	18:29	14	17:54 (74)	20:01				20:31	33	19:59 (73)	20:59
5	07:58		15:28 (117)	07:41	07:04		17:37 (74)	07:14				06:31		19:26 (73)	06:07
	17:23	45	16:13 (117)	17:58	18:30	20	17:57 (74)	20:02				20:32	33	19:59 (73)	21:00
6	07:58		15:29 (117)	07:40	07:02		17:34 (74)	07:12				06:30		19:26 (73)	06:06
	17:24	44	16:13 (117)	17:59	18:32	25	17:59 (74)	20:03				20:33	33	19:59 (73)	21:00
7	07:58		15:30 (117)	07:38	07:00		17:31 (74)	07:11				06:28		19:26 (73)	06:06
	17:25	43	16:13 (117)	18:00	18:33	29	18:00 (74)	20:04				20:34	33	19:59 (73)	21:01
8	07:57		15:31 (117)	07:37	07:59		18:30 (74)	07:09				06:27		19:26 (73)	06:06
	17:26	42	16:13 (117)	18:02	19:34	32	19:02 (74)	20:05				20:35	33	19:59 (73)	21:02
9	07:57		15:32 (117)	07:36	07:57		18:28 (74)	07:07				06:26		19:27 (73)	06:06
	17:27	42	16:14 (117)	18:03	19:35	35	19:03 (74)	20:06				20:36	32	19:59 (73)	21:02
10	07:57		15:33 (117)	07:35	07:56		18:28 (74)	07:06				06:25		19:27 (73)	06:05
	17:28	41	16:14 (117)	18:04	19:36	36	19:04 (74)	20:07				20:37	31	19:58 (73)	21:03
11	07:57		15:33 (117)	07:34	07:54		18:26 (74)	07:04				06:24		19:27 (73)	06:05
	17:29	40	16:13 (117)	18:05	19:37	38	19:04 (74)	20:08				20:38	31	19:58 (73)	21:03
12	07:57		15:35 (117)	07:33	07:53		18:25 (74)	07:03				06:23		19:28 (73)	06:05
	17:30	38	16:13 (117)	18:06	19:38	39	19:04 (74)	20:09				20:39	29	19:57 (73)	21:04
13	07:56		15:36 (117)	07:32	07:51		18:25 (74)	07:01				06:22		19:28 (73)	06:05
	17:31	37	16:13 (117)	18:08	19:39	40	19:05 (74)	20:10				20:40	29	19:57 (73)	21:04
14	07:56		15:37 (117)	07:30	07:49		18:24 (74)	07:00				06:21		19:29 (73)	06:05
	17:32	35	16:12 (117)	18:09	19:40	41	19:05 (74)	20:11				20:41	27	19:56 (73)	21:05
15	07:56		15:38 (117)	07:29	07:48		18:24 (74)	06:58				06:20		19:30 (73)	06:05
	17:33	34	16:12 (117)	18:10	19:41	41	19:05 (74)	20:12				20:42	25	19:55 (73)	21:05
16	07:55		15:39 (117)	07:28	07:46		18:23 (74)	06:57				06:19		19:30 (73)	06:05
	17:34	32	16:11 (117)	18:11	19:42	42	19:05 (74)	20:13				20:43	24	19:54 (73)	21:06
17	07:55		15:41 (117)	07:26	07:45		18:23 (74)	06:55				06:18		19:31 (73)	06:05
	17:35	30	16:11 (117)	18:12	19:43	41	19:04 (74)	20:14				20:44	22	19:53 (73)	21:06
18	07:54		15:42 (117)	07:25	07:43		18:23 (74)	06:54				06:17		19:33 (73)	06:05
	17:37	28	16:10 (117)	18:13	19:44	41	19:04 (74)	20:15				20:45	20	19:53 (73)	21:06
19	07:54		15:44 (117)	07:24	07:41		18:23 (74)	06:52				06:16		19:34 (73)	06:05
	17:38	25	16:09 (117)	18:15	19:45	41	19:04 (74)	20:16				20:46	17	19:51 (73)	21:07
20	07:53		15:46 (117)	07:22	07:40		18:23 (74)	06:51				06:16		19:36 (73)	06:05
	17:39	22	16:08 (117)	18:16	19:46	40	19:03 (74)	20:17				20:47	13	19:49 (73)	21:07
21	07:53		15:48 (117)	07:21	07:38		18:24 (74)	06:49				06:15		19:38 (73)	06:06
	17:40	17	16:05 (117)	18:17	19:47	38	19:02 (74)	20:18				20:48	8	19:46 (73)	21:07
22	07:52		15:53 (117)	07:20	07:36		18:24 (74)	06:48				06:14			06:06
	17:41	10	16:03 (117)	18:18	19:48	37	19:01 (74)	20:19				20:49			21:08
23	07:52			07:18	07:35		18:24 (74)	06:46		19:39 (73)		06:13			06:06
	17:42			18:19	19:49	36	19:00 (74)	20:20	11	19:50 (73)		20:50			21:08
24	07:51			07:17	07:33		18:25 (74)	06:45		19:36 (73)		06:13			06:06
	17:43			18:20	19:50	34	18:59 (74)	20:21	17	19:53 (73)		20:50			21:08
25	07:50			07:15	07:31		18:26 (74)	06:44		19:34 (73)		06:12			06:07
	17:45			18:21	19:52	31	18:57 (74)	20:22	21	19:55 (73)		20:51			21:08
26	07:50			07:14	07:30		18:28 (74)	06:42		19:32 (73)		06:11			06:07
	17:46			18:23	19:53	28	18:56 (74)	20:23	23	19:55 (73)		20:52			21:08
27	07:49			07:13	07:28		18:29 (74)	06:41		19:31 (73)		06:11			06:07
	17:47			18:24	19:54	25	18:54 (74)	20:24	26	19:57 (73)		20:53			21:08
28	07:48			07:11	07:27		18:31 (74)	06:40		19:30 (73)		06:10			06:08
	17:48			18:25	19:55	20	18:51 (74)	20:25	28	19:58 (73)		20:54			21:08
29	07:47				07:25		18:34 (74)	06:38		19:28 (73)		06:10			06:08
	17:49				19:56	14	18:48 (74)	20:26	30	19:58 (73)		20:55			21:08
30	07:46				07:23			06:37		19:28 (73)		06:09			06:09
	17:51				19:57			20:27	30	19:58 (73)		20:55			21:08
31	07:45				07:22							06:09			
	17:52				19:58							20:56			
Potential sun hours	300			299	370			397				446			449
Total, worst case		788				858			186				570		
Sun reduction		0.36				0.44			0.51				0.56		
Oper. time red.		1.00				1.00			1.00				1.00		
Wind dir. red.		0.68				0.67			0.63				0.63		
Total reduction		0.24				0.29			0.32				0.36		
Total, real		192				253			60				203		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 60

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Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 833 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5752)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09			06:32		19:38 (73)	07:02			07:31		18:04 (74)	07:04			07:37		15:15 (117)
	21:08			20:51	30	20:08 (73)	20:09			19:18	40	18:44 (74)	17:33			17:10	40	15:55 (117)
2	06:09			06:33		19:38 (73)	07:03			07:32		18:05 (74)	07:05			07:38		15:15 (117)
	21:08			20:50	31	20:09 (73)	20:08			19:17	38	18:43 (74)	17:32			17:10	41	15:56 (117)
3	06:10			06:34		19:37 (73)	07:04			07:33		18:05 (74)	07:06			07:39		15:15 (117)
	21:08			20:49	32	20:09 (73)	20:06			19:15	37	18:42 (74)	17:31			17:10	42	15:57 (117)
4	06:10			06:35		19:36 (73)	07:05			07:34		18:06 (74)	07:07			07:40		15:15 (117)
	21:08			20:48	32	20:08 (73)	20:05			19:14	35	18:41 (74)	17:30			17:09	42	15:57 (117)
5	06:11			06:36		19:36 (73)	07:06			07:35		18:06 (74)	07:08			07:41		15:15 (117)
	21:08			20:47	33	20:09 (73)	20:03			19:12	33	18:39 (74)	17:29			17:09	43	15:58 (117)
6	06:12			06:37		19:36 (73)	07:07			07:36		18:07 (74)	07:09			07:42		15:15 (117)
	21:08			20:45	33	20:09 (73)	20:01			19:10	31	18:38 (74)	17:27			17:09	44	15:59 (117)
7	06:12			06:38		19:36 (73)	07:08			07:37		18:09 (74)	07:10			07:43		15:15 (117)
	21:07			20:44	33	20:09 (73)	20:00			19:09	27	18:36 (74)	17:26			17:09	45	16:00 (117)
8	06:13			06:39		19:35 (73)	07:08			07:38		18:10 (74)	07:12			07:44		15:15 (117)
	21:07			20:43	34	20:09 (73)	19:56			19:07	23	18:33 (74)	17:25			17:09	45	16:00 (117)
9	06:13			06:40		19:36 (73)	07:09			07:39		18:13 (74)	07:13			07:45		15:16 (117)
	21:07			20:42	33	20:09 (73)	19:55			19:06	17	18:30 (74)	17:24			17:09	45	16:01 (117)
10	06:14			06:41		19:36 (73)	07:10			07:40		18:17 (74)	07:14			07:46		15:16 (117)
	21:06			20:41	32	20:08 (73)	19:53			19:04	9	18:26 (74)	17:23			17:09	46	16:02 (117)
11	06:15			06:42		19:36 (73)	07:11			07:41			07:15			07:47		15:16 (117)
	21:06			20:39	32	20:08 (73)	19:52			19:02			17:22			17:09	47	16:03 (117)
12	06:16			06:43		19:36 (73)	07:12			07:42			07:16			07:47		15:16 (117)
	21:06			20:38	32	20:08 (73)	19:50			19:01			17:22			17:09	47	16:03 (117)
13	06:16			06:44		19:37 (73)	07:13			07:43			07:17			07:48		15:16 (117)
	21:05			20:37	30	20:07 (73)	19:48			18:59			17:21			17:10	47	16:03 (117)
14	06:17			06:45		19:37 (73)	07:14		18:25 (74)	07:44			07:19			07:49		15:17 (117)
	21:05			20:36	29	20:06 (73)	19:47	12	18:37 (74)	18:58			17:20			17:10	47	16:04 (117)
15	06:18			06:46		19:37 (73)	07:15		18:21 (74)	07:45			07:20			07:50		15:18 (117)
	21:04			20:34	27	20:04 (73)	19:45	19	18:40 (74)	18:56			17:19			17:10	47	16:05 (117)
16	06:18			06:47		19:38 (73)	07:16		18:19 (74)	07:46			07:21			07:50		15:17 (117)
	21:04			20:33	25	20:03 (73)	19:43	23	18:42 (74)	18:55			17:18			17:10	48	16:05 (117)
17	06:19			06:47		19:39 (73)	07:17		18:16 (74)	07:47			07:22			07:51		15:18 (117)
	21:03			20:32	23	20:02 (73)	19:42	28	18:44 (74)	18:53			17:17			17:11	48	16:06 (117)
18	06:20			06:48		19:40 (73)	07:18		18:15 (74)	07:48			07:23			07:52		15:19 (117)
	21:02			20:30	20	20:00 (73)	19:40	30	18:45 (74)	18:52			17:17			17:11	48	16:07 (117)
19	06:21			06:49		19:42 (73)	07:19		18:13 (74)	07:49			07:24			07:52		15:19 (117)
	21:02			20:29	16	19:58 (73)	19:38	33	18:46 (74)	18:50			17:16			17:11	48	16:07 (117)
20	06:22			06:50		19:45 (73)	07:20		18:11 (74)	07:50			07:25		15:28 (117)	07:53		15:20 (117)
	21:01			20:27	10	19:55 (73)	19:37	35	18:46 (74)	18:49			17:15	10	15:38 (117)	17:12	47	16:07 (117)
21	06:22			06:51			07:21		18:09 (74)	07:51			07:27		15:24 (117)	07:53		15:19 (117)
	21:00			20:26			19:35	37	18:46 (74)	18:48			17:15	17	15:41 (117)	17:12	48	16:07 (117)
22	06:23		19:52 (73)	06:52			07:22		18:08 (74)	07:52			07:28		15:22 (117)	07:54		15:20 (117)
	21:00	2	19:54 (73)	20:24			19:33	39	18:47 (74)	18:46			17:14	22	15:44 (117)	17:13	48	16:08 (117)
23	06:24		19:48 (73)	06:53			07:23		18:07 (74)	07:53			07:29		15:21 (117)	07:54		15:21 (117)
	20:59	10	19:58 (73)	20:23			19:32	40	18:47 (74)	18:45			17:13	24	15:45 (117)	17:13	47	16:08 (117)
24	06:25		19:46 (73)	06:54			07:24		18:07 (74)	07:55			07:30		15:19 (117)	07:55		15:21 (117)
	20:58	15	20:01 (73)	20:22			19:30	40	18:47 (74)	18:43			17:13	28	15:47 (117)	17:14	48	16:09 (117)
25	06:26		19:44 (73)	06:55			07:25		18:06 (74)	07:56			07:31		15:19 (117)	07:55		15:22 (117)
	20:57	18	20:02 (73)	20:20			19:28	41	18:47 (74)	18:42			17:12	30	15:49 (117)	17:14	48	16:10 (117)
26	06:27		19:42 (73)	06:56			07:26		18:05 (74)	07:57			07:32		15:18 (117)	07:56		15:22 (117)
	20:56	21	20:03 (73)	20:19			19:27	42	18:47 (74)	18:41			17:12	32	15:50 (117)	17:15	48	16:10 (117)
27	06:28		19:41 (73)	06:57			07:27		18:05 (74)	07:58			07:33		15:17 (117)	07:56		15:22 (117)
	20:56	23	20:04 (73)	20:17			19:25	41	18:46 (74)	18:39			17:11	34	15:51 (117)	17:16	48	16:10 (117)
28	06:29		19:41 (73)	06:58			07:28		18:05 (74)	07:59			07:34		15:17 (117)	07:56		15:23 (117)
	20:55	24	20:05 (73)	20:16			19:23	41	18:46 (74)	18:38			17:11	35	15:52 (117)	17:16	48	16:11 (117)
29	06:29		19:40 (73)	06:59			07:29		18:04 (74)	08:00			07:35		15:16 (117)	07:57		15:24 (117)
	20:54	26	20:06 (73)	20:14			19:22	41	18:45 (74)	18:37			17:11	37	15:53 (117)	17:17	47	16:11 (117)
30	06:30		19:39 (73)	07:00			07:30		18:04 (74)	08:01			07:36		15:16 (117)	07:57		15:24 (117)
	20:53	28	20:07 (73)	20:12			19:20	41	18:45 (74)	18:36			17:10	38	15:54 (117)	17:18	47	16:11 (117)
31	06:31		19:39 (73)	07:01						08:02						07:57		15:25 (117)
	20:52	28	20:07 (73)	20:11						18:34						17:19	46	16:11 (117)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		195			567			583			290			307			1430	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.63			0.63			0.67			0.67			0.68			0.68	
Total reduction		0.38			0.38			0.41			0.37			0.25			0.34	
Total, real		74			216			238			109			77			484	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

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3/1/2012 1:52 PM / 61

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
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Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 849 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5766)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June
1	07:57		08:19 (117)	07:45			07:10		08:02 (74)	07:20			06:36		07:26 (73)	06:08
	17:20	13	08:32 (117)	17:53			18:26	21	08:23 (74)	19:59			20:28	54	08:20 (73)	20:57
2	07:58		08:19 (117)	07:44			07:08		08:04 (74)	07:19			06:34		07:26 (73)	06:08
	17:20	14	08:33 (117)	17:54			18:27	15	08:19 (74)	20:00			20:29	54	08:20 (73)	20:58
3	07:58		08:19 (117)	07:43			07:07		08:11 (74)	07:17			06:33		07:27 (73)	06:07
	17:21	14	08:33 (117)	17:56			18:28	2	08:13 (74)	20:00			20:30	52	08:19 (73)	20:58
4	07:58		08:19 (117)	07:42		08:11 (74)	07:05			07:15			06:32		07:26 (73)	06:07
	17:22	15	08:34 (117)	17:57	5	08:16 (74)	18:29			20:01			20:31	52	08:18 (73)	20:59
5	07:58		08:19 (117)	07:41		08:06 (74)	07:04			07:14			06:31		07:27 (73)	06:07
	17:23	16	08:35 (117)	17:58	14	08:20 (74)	18:30			20:02			20:32	50	08:17 (73)	21:00
6	07:58		08:19 (117)	07:40		08:03 (74)	07:02			07:12		07:54 (73)	06:30		07:27 (73)	06:06
	17:24	17	08:36 (117)	17:59	20	08:23 (74)	18:32			20:03	12	08:06 (73)	20:33	50	08:17 (73)	21:01
7	07:58		08:19 (117)	07:39		08:02 (74)	07:00			07:11		07:48 (73)	06:28		07:28 (73)	06:06
	17:25	18	08:37 (117)	18:00	23	08:25 (74)	18:33			20:04	22	08:10 (73)	20:34	48	08:16 (73)	21:01
8	07:58		08:19 (117)	07:37		08:00 (74)	07:59			07:09		07:45 (73)	06:27		07:29 (73)	06:06
	17:26	19	08:38 (117)	18:02	27	08:27 (74)	19:34			20:05	28	08:13 (73)	20:35	46	08:15 (73)	21:02
9	07:57		08:19 (117)	07:36		07:59 (74)	07:57			07:07		07:42 (73)	06:26		07:29 (73)	06:06
	17:27	20	08:39 (117)	18:03	29	08:28 (74)	19:35			20:06	33	08:15 (73)	20:36	45	08:14 (73)	21:02
10	07:57		08:19 (117)	07:35		07:58 (74)	07:56			07:06		07:41 (73)	06:25		07:30 (73)	06:05
	17:28	21	08:40 (117)	18:04	32	08:30 (74)	19:36			20:07	36	08:17 (73)	20:37	43	08:13 (73)	21:03
11	07:57		08:18 (117)	07:34		07:58 (74)	07:54			07:04		07:38 (73)	06:24		07:31 (73)	06:05
	17:29	22	08:40 (117)	18:05	33	08:31 (74)	19:37			20:08	40	08:18 (73)	20:38	41	08:12 (73)	21:03
12	07:57		08:18 (117)	07:33		07:56 (74)	07:53			07:03		07:36 (73)	06:23		07:32 (73)	06:05
	17:30	23	08:41 (117)	18:06	35	08:31 (74)	19:38			20:09	43	08:19 (73)	20:39	39	08:11 (73)	21:04
13	07:56		08:18 (117)	07:32		07:56 (74)	07:51			07:01		07:35 (73)	06:22		07:33 (73)	06:05
	17:31	24	08:42 (117)	18:08	36	08:32 (74)	19:39			20:10	45	08:20 (73)	20:40	37	08:10 (73)	21:04
14	07:56		08:17 (117)	07:30		07:56 (74)	07:49			07:00		07:33 (73)	06:21		07:34 (73)	06:05
	17:32	25	08:42 (117)	18:09	36	08:32 (74)	19:40			20:11	47	08:20 (73)	20:41	35	08:09 (73)	21:05
15	07:56		08:17 (117)	07:29		07:55 (74)	07:48			06:58		07:33 (73)	06:20		07:35 (73)	06:05
	17:33	25	08:42 (117)	18:10	38	08:33 (74)	19:41			20:12	49	08:22 (73)	20:42	33	08:08 (73)	21:05
16	07:55		08:16 (117)	07:28		07:54 (74)	07:46			06:57		07:31 (73)	06:19		07:36 (73)	06:05
	17:34	26	08:42 (117)	18:11	39	08:33 (74)	19:42			20:13	51	08:22 (73)	20:43	30	08:06 (73)	21:06
17	07:55		08:16 (117)	07:27		07:55 (74)	07:45			06:55		07:30 (73)	06:18		07:39 (73)	06:05
	17:35	27	08:43 (117)	18:12	38	08:33 (74)	19:43			20:14	52	08:22 (73)	20:44	26	08:05 (73)	21:06
18	07:55		08:16 (117)	07:25		07:55 (74)	07:43			06:54		07:30 (73)	06:17		07:40 (73)	06:05
	17:37	27	08:43 (117)	18:13	38	08:33 (74)	19:44			20:15	53	08:23 (73)	20:45	23	08:03 (73)	21:07
19	07:54		08:17 (117)	07:24		07:54 (74)	07:41			06:52		07:29 (73)	06:17		07:42 (73)	06:05
	17:38	27	08:44 (117)	18:15	39	08:33 (74)	19:45			20:16	54	08:23 (73)	20:46	19	08:01 (73)	21:07
20	07:53		08:17 (117)	07:23		07:55 (74)	07:40			06:51		07:28 (73)	06:16		07:45 (73)	06:05
	17:39	27	08:44 (117)	18:16	38	08:33 (74)	19:46			20:17	55	08:23 (73)	20:47	13	07:58 (73)	21:07
21	07:53		08:18 (117)	07:21		07:54 (74)	07:38			06:49		07:27 (73)	06:15			06:06
	17:40	26	08:44 (117)	18:17	38	08:32 (74)	19:47			20:18	56	08:23 (73)	20:48			21:07
22	07:52		08:18 (117)	07:20		07:55 (74)	07:36			06:48		07:27 (73)	06:14			06:06
	17:41	26	08:44 (117)	18:18	37	08:32 (74)	19:48			20:19	56	08:23 (73)	20:49			21:08
23	07:52		08:19 (117)	07:18		07:56 (74)	07:35			06:46		07:26 (73)	06:13			06:06
	17:42	25	08:44 (117)	18:19	35	08:31 (74)	19:50			20:20	56	08:22 (73)	20:50			21:08
24	07:51		08:19 (117)	07:17		07:56 (74)	07:33			06:45		07:26 (73)	06:13			06:06
	17:44	24	08:43 (117)	18:20	34	08:30 (74)	19:51			20:21	57	08:23 (73)	20:51			21:08
25	07:50		08:21 (117)	07:16		07:57 (74)	07:32			06:44		07:26 (73)	06:12			06:07
	17:45	22	08:43 (117)	18:22	32	08:29 (74)	19:52			20:22	57	08:23 (73)	20:51			21:08
26	07:50		08:21 (117)	07:14		07:57 (74)	07:30			06:42		07:25 (73)	06:11			06:07
	17:46	22	08:43 (117)	18:23	31	08:28 (74)	19:53			20:23	57	08:22 (73)	20:52			21:08
27	07:49		08:22 (117)	07:13		07:59 (74)	07:28			06:41		07:26 (73)	06:11			06:07
	17:47	20	08:42 (117)	18:24	28	08:27 (74)	19:54			20:24	56	08:22 (73)	20:53			21:08
28	07:48		08:24 (117)	07:11		08:00 (74)	07:27			06:40		07:26 (73)	06:10			06:08
	17:48	17	08:41 (117)	18:25	24	08:24 (74)	19:55			20:25	56	08:22 (73)	20:54			21:08
29	07:47		08:25 (117)				07:25			06:38		07:26 (73)	06:10			06:08
	17:49	14	08:39 (117)				19:56			20:26	56	08:22 (73)	20:55			21:08
30	07:46		08:28 (117)				07:23			06:37		07:25 (73)	06:09			06:09
	17:51	9	08:37 (117)				19:57			20:27	55	08:20 (73)	20:55			21:08
31	07:45						07:22						06:09			
	17:52						19:58						20:56			
Potential sun hours	300			299			370			397			446			449
Total, worst case		625			779			38			1182			790		
Sun reduction		0.36			0.42			0.44			0.51			0.56		
Oper. time red.		1.00			1.00			1.00			1.00			1.00		
Wind dir. red.		0.60			0.63			0.63			0.67			0.67		
Total reduction		0.22			0.26			0.27			0.34			0.37		
Total, real		135			204			10			400			294		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

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Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 849 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5766)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09			06:32		07:42 (73)	07:02		07:37 (73)	07:31			07:04		07:27 (74)	07:37		08:00 (117)
	21:08			20:51	40	08:22 (73)	20:09	40	08:17 (73)	19:18			17:33	31	07:58 (74)	17:10	22	08:22 (117)
2	06:09			06:33		07:41 (73)	07:03		07:39 (73)	07:32			07:05		07:29 (74)	07:38		08:01 (117)
	21:08			20:50	42	08:23 (73)	20:08	36	08:15 (73)	19:17			17:32	29	07:58 (74)	17:10	21	08:22 (117)
3	06:10			06:34		07:40 (73)	07:04		07:40 (73)	07:33			07:06		07:30 (74)	07:39		08:02 (117)
	21:08			20:49	44	08:24 (73)	20:06	33	08:13 (73)	19:15			17:31	26	07:56 (74)	17:10	20	08:22 (117)
4	06:11			06:35		07:39 (73)	07:05		07:42 (73)	07:34			07:07		07:32 (74)	07:40		08:03 (117)
	21:08			20:48	45	08:24 (73)	20:05	28	08:10 (73)	19:14			17:30	23	07:55 (74)	17:09	19	08:22 (117)
5	06:11			06:36		07:38 (73)	07:06		07:45 (73)	07:35			07:08		07:33 (74)	07:41		08:04 (117)
	21:08			20:47	47	08:25 (73)	20:03	22	08:07 (73)	19:12			17:29	19	07:52 (74)	17:09	18	08:22 (117)
6	06:12			06:37		07:37 (73)	07:07		07:50 (73)	07:36			07:09		07:37 (74)	07:42		08:05 (117)
	21:08			20:45	49	08:26 (73)	20:01	12	08:02 (73)	19:10			17:28	14	07:51 (74)	17:09	17	08:22 (117)
7	06:12			06:38		07:37 (73)	07:08			07:37			07:10		07:43 (74)	07:43		08:06 (117)
	21:07			20:44	50	08:27 (73)	20:00			19:09			17:26	2	07:45 (74)	17:09	16	08:22 (117)
8	06:13			06:39		07:36 (73)	07:09			07:38			07:12			07:44		08:07 (117)
	21:07			20:43	51	08:27 (73)	19:57			19:07			17:25			17:09	15	08:22 (117)
9	06:14			06:40		07:36 (73)	07:09			07:39			07:13			07:45		08:08 (117)
	21:07			20:42	52	08:28 (73)	19:55			19:06			17:24			17:09	15	08:23 (117)
10	06:14			06:41		07:35 (73)	07:10			07:40			07:14			07:46		08:09 (117)
	21:06			20:41	53	08:28 (73)	19:53			19:04			17:23			17:09	14	08:23 (117)
11	06:15			06:42		07:35 (73)	07:11			07:41		08:40 (74)	07:15			07:47		08:10 (117)
	21:06			20:39	54	08:29 (73)	19:52			19:03	10	08:50 (74)	17:22			17:09	13	08:23 (117)
12	06:16			06:43		07:34 (73)	07:12			07:42		08:36 (74)	07:16		08:00 (117)	07:47		08:10 (117)
	21:06			20:38	55	08:29 (73)	19:50			19:01	18	08:54 (74)	17:22	9	08:09 (117)	17:09	12	08:22 (117)
13	06:16			06:44		07:34 (73)	07:13			07:43		08:35 (74)	07:17		07:57 (117)	07:48		08:11 (117)
	21:05			20:37	55	08:29 (73)	19:48			18:59	22	08:57 (74)	17:21	14	08:11 (117)	17:10	12	08:23 (117)
14	06:17			06:45		07:34 (73)	07:14			07:44		08:33 (74)	07:19		07:57 (117)	07:49		08:12 (117)
	21:05			20:36	55	08:29 (73)	19:47			18:58	25	08:58 (74)	17:20	17	08:14 (117)	17:10	11	08:23 (117)
15	06:18			06:46		07:34 (73)	07:15			07:45		08:31 (74)	07:20		07:55 (117)	07:50		08:13 (117)
	21:04			20:34	56	08:30 (73)	19:45			18:56	29	09:00 (74)	17:19	20	08:15 (117)	17:10	10	08:23 (117)
16	06:19			06:47		07:32 (73)	07:16			07:46		08:29 (74)	07:21		07:54 (117)	07:50		08:13 (117)
	21:04			20:33	57	08:29 (73)	19:43			18:55	32	09:01 (74)	17:18	22	08:16 (117)	17:10	10	08:23 (117)
17	06:19			06:48		07:32 (73)	07:17			07:47		08:28 (74)	07:22		07:54 (117)	07:51		08:14 (117)
	21:03			20:32	57	08:29 (73)	19:42			18:53	33	09:01 (74)	17:17	22	08:16 (117)	17:11	9	08:23 (117)
18	06:20			06:48		07:32 (73)	07:18			07:48		08:27 (74)	07:23		07:53 (117)	07:52		08:15 (117)
	21:02			20:30	57	08:29 (73)	19:40			18:52	35	09:02 (74)	17:17	24	08:17 (117)	17:11	9	08:24 (117)
19	06:21			06:49		07:32 (73)	07:19			07:49		08:26 (74)	07:24		07:54 (117)	07:52		08:15 (117)
	21:02			20:29	56	08:28 (73)	19:38			18:51	36	09:02 (74)	17:16	25	08:19 (117)	17:11	9	08:24 (117)
20	06:22			06:50		07:32 (73)	07:20			07:50		08:25 (74)	07:25		07:53 (117)	07:53		08:16 (117)
	21:01			20:27	56	08:28 (73)	19:37			18:49	37	09:02 (74)	17:15	26	08:19 (117)	17:12	9	08:25 (117)
21	06:23			06:51		07:32 (73)	07:21			07:51		08:25 (74)	07:27		07:53 (117)	07:53		08:16 (117)
	21:00			20:26	56	08:28 (73)	19:35			18:48	37	09:02 (74)	17:15	26	08:19 (117)	17:12	8	08:24 (117)
22	06:23			06:52		07:32 (73)	07:22			07:52		08:25 (74)	07:28		07:53 (117)	07:54		08:17 (117)
	21:00			20:25	56	08:28 (73)	19:33			18:46	38	09:03 (74)	17:14	27	08:20 (117)	17:13	8	08:25 (117)
23	06:24		07:57 (73)	06:53		07:32 (73)	07:23			07:53		08:25 (74)	07:29		07:53 (117)	07:54		08:17 (117)
	20:59	9	08:06 (73)	20:23	55	08:27 (73)	19:32			18:45	38	09:03 (74)	17:13	27	08:20 (117)	17:13	9	08:26 (117)
24	06:25		07:54 (73)	06:54		07:33 (73)	07:24			07:55		08:24 (74)	07:30		07:54 (117)	07:55		08:18 (117)
	20:58	16	08:10 (73)	20:22	54	08:27 (73)	19:30			18:43	39	09:03 (74)	17:13	27	08:21 (117)	17:14	9	08:27 (117)
25	06:26		07:52 (73)	06:55		07:33 (73)	07:25			07:56		08:24 (74)	07:31		07:54 (117)	07:55		08:18 (117)
	20:57	21	08:13 (73)	20:20	53	08:26 (73)	19:28			18:42	39	09:03 (74)	17:12	27	08:21 (117)	17:14	9	08:27 (117)
26	06:27		07:50 (73)	06:56		07:33 (73)	07:26			07:57		08:24 (74)	07:32		07:55 (117)	07:56		08:18 (117)
	20:57	25	08:15 (73)	20:19	52	08:25 (73)	19:27			18:41	38	09:02 (74)	17:12	26	08:21 (117)	17:15	9	08:27 (117)
27	06:28		07:48 (73)	06:57		07:34 (73)	07:27			07:58		08:24 (74)	07:33		07:56 (117)	07:56		08:19 (117)
	20:56	28	08:16 (73)	20:17	50	08:24 (73)	19:25			18:39	38	09:02 (74)	17:11	25	08:21 (117)	17:16	10	08:29 (117)
28	06:29		07:46 (73)	06:58		07:33 (73)	07:28			07:59		08:25 (74)	07:34		07:57 (117)	07:56		08:19 (117)
	20:55	31	08:17 (73)	20:16	49	08:22 (73)	19:23			18:38	37	09:02 (74)	17:11	25	08:22 (117)	17:16	10	08:29 (117)
29	06:30		07:45 (73)	06:59		07:34 (73)	07:29			08:00		08:26 (74)	07:35		07:58 (117)	07:57		08:19 (117)
	20:54	34	08:19 (73)	20:14	47	08:21 (73)	19:22			18:37	35	09:01 (74)	17:11	24	08:22 (117)	17:17	11	08:30 (117)
30	06:30		07:44 (73)	07:00		07:35 (73)	07:30			08:01		08:26 (74)	07:36		07:59 (117)	07:57		08:19 (117)
	20:53	36	08:20 (73)	20:12	45	08:20 (73)	19:20			18:36	34	09:00 (74)	17:10	23	08:22 (117)	17:18	11	08:30 (117)
31	06:31		07:43 (73)	07:01		07:36 (73)				08:02		08:27 (74)				07:57		08:19 (117)
	20:52	38	08:21 (73)	20:11	43	08:19 (73)				18:34	32	08:59 (74)				17:19	12	08:31 (117)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		238			1591			171			682			580			387	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.67			0.67			0.67			0.63			0.61			0.60	
Total reduction		0.40			0.40			0.40			0.35			0.22			0.30	
Total, real		95			634			69			238			130			116	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 63

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Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m**Shadow receptor:** 3380 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5894)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March	April			May			June		
1	07:57		15:48 (108)	07:45		15:47 (108)	07:10	07:20			06:36		18:59 (83)	06:08		18:54 (83)
	17:20	40	16:28 (108)	17:53	64	16:51 (108)	18:26	19:59			20:28	45	19:44 (83)	20:57	57	19:51 (83)
2	07:58		15:48 (108)	07:44		15:48 (108)	07:08	07:19			06:35		18:58 (83)	06:08		18:55 (83)
	17:21	41	16:29 (108)	17:54	64	16:52 (108)	18:27	20:00			20:29	47	19:45 (83)	20:58	56	19:51 (83)
3	07:58		15:48 (108)	07:43		15:48 (108)	07:07	07:17			06:33		18:57 (83)	06:07		18:56 (83)
	17:21	42	16:30 (108)	17:56	64	16:52 (108)	18:28	20:00			20:30	49	19:46 (83)	20:58	56	19:52 (83)
4	07:58		15:48 (108)	07:42		15:48 (108)	07:05	07:15			06:32		18:56 (83)	06:07		18:55 (83)
	17:22	43	16:31 (108)	17:57	64	16:52 (108)	18:29	20:01			20:31	51	19:47 (83)	20:59	56	19:51 (83)
5	07:58		15:48 (108)	07:41		15:48 (108)	07:04	07:14			06:31		18:55 (83)	06:07		18:56 (83)
	17:23	44	16:32 (108)	17:58	63	16:51 (108)	18:31	20:02			20:32	52	19:47 (83)	21:00	55	19:51 (83)
6	07:58		15:48 (108)	07:40		15:48 (108)	07:02	07:12			06:30		18:54 (83)	06:06		18:57 (83)
	17:24	45	16:33 (108)	17:59	63	16:51 (108)	18:32	20:03			20:33	54	19:48 (83)	21:00	55	19:52 (83)
7	07:58		15:48 (108)	07:39		15:49 (108)	07:01	07:11			06:29		18:53 (83)	06:06		18:57 (83)
	17:25	46	16:34 (108)	18:00	62	16:51 (108)	18:33	20:04			20:34	55	19:48 (83)	21:01	55	19:52 (83)
8	07:57		15:48 (108)	07:37		15:49 (108)	07:59	07:09			06:27		18:53 (83)	06:06		18:57 (83)
	17:26	47	16:35 (108)	18:02	62	16:51 (108)	19:34	20:05			20:35	56	19:49 (83)	21:02	54	19:51 (83)
9	07:57		15:48 (108)	07:36		15:50 (108)	07:57	07:07			06:26		18:53 (83)	06:06		18:57 (83)
	17:27	48	16:36 (108)	18:03	61	16:51 (108)	19:35	20:06			20:36	56	19:49 (83)	21:02	54	19:51 (83)
10	07:57		15:48 (108)	07:35		15:51 (108)	07:56	07:06			06:25		18:52 (83)	06:06		18:58 (83)
	17:28	49	16:37 (108)	18:04	59	16:50 (108)	19:36	20:07			20:37	58	19:50 (83)	21:03	53	19:51 (83)
11	07:57		15:47 (108)	07:34		15:52 (108)	07:54	07:04			06:24		18:52 (83)	06:05		18:58 (83)
	17:29	51	16:38 (108)	18:05	58	16:50 (108)	19:37	20:08			20:38	58	19:50 (83)	21:03	54	19:52 (83)
12	07:57		15:47 (108)	07:33		15:52 (108)	07:53	07:03			06:23		18:52 (83)	06:05		18:59 (83)
	17:30	52	16:39 (108)	18:06	57	16:49 (108)	19:38	20:09			20:39	58	19:50 (83)	21:04	53	19:52 (83)
13	07:56		15:47 (108)	07:32		15:53 (108)	07:51	07:01			06:22		18:51 (83)	06:05		18:59 (83)
	17:31	53	16:40 (108)	18:08	55	16:48 (108)	19:39	20:10			20:40	59	19:50 (83)	21:04	53	19:52 (83)
14	07:56		15:47 (108)	07:30		15:54 (108)	07:49	07:00			06:21		18:51 (83)	06:05		18:59 (83)
	17:32	53	16:40 (108)	18:09	54	16:48 (108)	19:40	20:11			20:41	59	19:50 (83)	21:05	53	19:52 (83)
15	07:56		15:47 (108)	07:29		15:56 (108)	07:48	06:58			06:20		18:51 (83)	06:05		19:00 (83)
	17:33	55	16:42 (108)	18:10	51	16:47 (108)	19:41	20:12			20:42	60	19:51 (83)	21:05	52	19:52 (83)
16	07:55		15:46 (108)	07:28		15:56 (108)	07:46	06:57			06:19		18:51 (83)	06:05		19:00 (83)
	17:34	56	16:42 (108)	18:11	49	16:45 (108)	19:42	20:13			20:43	60	19:51 (83)	21:06	52	19:52 (83)
17	07:55		15:47 (108)	07:27		15:58 (108)	07:45	06:55			06:18		18:51 (83)	06:05		19:00 (83)
	17:36	56	16:43 (108)	18:12	47	16:45 (108)	19:43	20:14			20:44	61	19:52 (83)	21:06	52	19:52 (83)
18	07:55		15:46 (108)	07:25		16:00 (108)	07:43	06:54			06:17		18:51 (83)	06:05		19:00 (83)
	17:37	58	16:44 (108)	18:14	44	16:44 (108)	19:44	20:15			20:45	60	19:51 (83)	21:07	52	19:52 (83)
19	07:54		15:47 (108)	07:24		16:01 (108)	07:41	06:52			06:17		18:51 (83)	06:05		19:01 (83)
	17:38	58	16:45 (108)	18:15	41	16:42 (108)	19:45	20:16			20:46	60	19:51 (83)	21:07	51	19:52 (83)
20	07:53		15:46 (108)	07:23		16:03 (108)	07:40	06:51			06:16		18:51 (83)	06:06		19:01 (83)
	17:39	59	16:45 (108)	18:16	37	16:40 (108)	19:46	20:17			20:47	60	19:51 (83)	21:07	51	19:52 (83)
21	07:53		15:46 (108)	07:21		16:05 (108)	07:38	06:49			06:15		18:51 (83)	06:06		19:02 (83)
	17:40	60	16:46 (108)	18:17	33	16:38 (108)	19:47	20:18			20:48	60	19:51 (83)	21:07	51	19:53 (83)
22	07:52		15:46 (108)	07:20		16:08 (108)	07:36	06:48			06:14		18:52 (83)	06:06		19:02 (83)
	17:41	61	16:47 (108)	18:18	27	16:35 (108)	19:49	20:19			20:49	60	19:52 (83)	21:08	51	19:53 (83)
23	07:52		15:46 (108)	07:18		16:12 (108)	07:35	06:47			06:13		18:52 (83)	06:06		19:02 (83)
	17:42	61	16:47 (108)	18:19	20	16:32 (108)	19:50	20:20			20:50	59	19:51 (83)	21:08	51	19:53 (83)
24	07:51		15:46 (108)	07:17		16:17 (108)	07:33	06:45		19:15 (83)	06:13		18:51 (83)	06:06		19:01 (83)
	17:44	62	16:48 (108)	18:20	9	16:26 (108)	19:51	20:21	15	19:30 (83)	20:50	60	19:51 (83)	21:08	52	19:53 (83)
25	07:50		15:46 (108)	07:16			07:32	06:44		19:11 (83)	06:12		18:52 (83)	06:07		19:02 (83)
	17:45	63	16:49 (108)	18:22			19:52	20:22	23	19:34 (83)	20:51	60	19:52 (83)	21:08	52	19:54 (83)
26	07:50		15:46 (108)	07:14			07:30	06:42		19:08 (83)	06:11		18:52 (83)	06:07		19:02 (83)
	17:46	63	16:49 (108)	18:23			19:53	20:23	28	19:36 (83)	20:52	59	19:51 (83)	21:08	52	19:54 (83)
27	07:49		15:46 (108)	07:13			07:28	06:41		19:05 (83)	06:11		18:53 (83)	06:07		19:02 (83)
	17:47	63	16:49 (108)	18:24			19:54	20:24	33	19:38 (83)	20:53	59	19:52 (83)	21:08	52	19:54 (83)
28	07:48		15:46 (108)	07:11			07:27	06:40		19:04 (83)	06:10		18:53 (83)	06:08		19:03 (83)
	17:48	64	16:50 (108)	18:25			19:55	20:25	36	19:40 (83)	20:54	58	19:51 (83)	21:08	52	19:55 (83)
29	07:47		15:46 (108)				07:25	06:38		19:02 (83)	06:10		18:54 (83)	06:08		19:02 (83)
	17:50	64	16:50 (108)				19:56	20:26	40	19:42 (83)	20:55	58	19:52 (83)	21:08	53	19:55 (83)
30	07:46		15:46 (108)				07:23	06:37		19:00 (83)	06:09		18:54 (83)	06:09		19:03 (83)
	17:51	64	16:50 (108)				19:57	20:27	43	19:43 (83)	20:55	57	19:51 (83)	21:08	53	19:56 (83)
31	07:45		15:46 (108)				07:22				06:09		18:54 (83)			
	17:52	64	16:50 (108)				19:58				20:56	58	19:52 (83)			
Potential sun hours	300			299			370	397			446			449		
Total, worst case		1685			1208				218			1766			1593	
Sun reduction		0.36			0.42				0.51			0.56			0.60	
Oper. time red.		1.00			1.00				1.00			1.00			1.00	
Wind dir. red.		0.68			0.68				0.63			0.63			0.63	
Total reduction		0.24			0.29				0.33			0.36			0.38	
Total, real		413			345				71			631			610	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 64

Licensed user:
EDR
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US-SYRACUSE, NY 13202
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Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m**Shadow receptor:** 3380 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5894)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		19:02 (83)	06:32		19:02 (83)	07:02			07:31			07:04		15:20 (108)	07:37		15:29 (108)
	21:08	54	19:56 (83)	20:51	59	20:01 (83)	20:09			19:19			17:33	59	16:19 (108)	17:10	51	16:20 (108)
2	06:10		19:03 (83)	06:33		19:03 (83)	07:03			07:32			07:05		15:20 (108)	07:38		15:30 (108)
	21:08	53	19:56 (83)	20:50	57	20:00 (83)	20:08			19:17			17:32	60	16:20 (108)	17:10	49	16:19 (108)
3	06:10		19:03 (83)	06:34		19:03 (83)	07:04			07:33			07:06		15:19 (108)	07:39		15:31 (108)
	21:08	53	19:56 (83)	20:49	57	20:00 (83)	20:06			19:15			17:31	62	16:21 (108)	17:10	48	16:19 (108)
4	06:11		19:03 (83)	06:35		19:03 (83)	07:05			07:34			07:07		15:19 (108)	07:40		15:32 (108)
	21:08	54	19:57 (83)	20:48	57	20:00 (83)	20:05			19:14			17:30	62	16:21 (108)	17:10	47	16:19 (108)
5	06:11		19:02 (83)	06:36		19:03 (83)	07:06			07:35			07:08		15:18 (108)	07:41		15:33 (108)
	21:08	55	19:57 (83)	20:47	55	19:58 (83)	20:03			19:12			17:29	63	16:21 (108)	17:09	46	16:19 (108)
6	06:12		19:03 (83)	06:37		19:03 (83)	07:07			07:36			07:09		15:18 (108)	07:42		15:34 (108)
	21:08	55	19:58 (83)	20:45	55	19:58 (83)	20:01			19:10			17:28	64	16:22 (108)	17:09	45	16:19 (108)
7	06:12		19:02 (83)	06:38		19:04 (83)	07:08			07:37			07:10		15:18 (108)	07:43		15:35 (108)
	21:07	55	19:57 (83)	20:44	53	19:57 (83)	20:00			19:09			17:27	64	16:22 (108)	17:09	44	16:19 (108)
8	06:13		19:03 (83)	06:39		19:04 (83)	07:09			07:38			07:12		15:18 (108)	07:44		15:36 (108)
	21:07	55	19:58 (83)	20:43	52	19:56 (83)	19:57			19:07			17:26	64	16:22 (108)	17:09	43	16:19 (108)
9	06:14		19:03 (83)	06:40		19:05 (83)	07:10			07:39			07:13		15:17 (108)	07:45		15:37 (108)
	21:07	56	19:59 (83)	20:42	50	19:55 (83)	19:55			19:06			17:24	65	16:22 (108)	17:09	42	16:19 (108)
10	06:14		19:02 (83)	06:41		19:06 (83)	07:10			07:40			07:14		15:18 (108)	07:46		15:38 (108)
	21:06	57	19:59 (83)	20:41	48	19:54 (83)	19:53			19:04			17:24	64	16:22 (108)	17:09	41	16:19 (108)
11	06:15		19:02 (83)	06:42		19:07 (83)	07:11			07:41			07:15		15:18 (108)	07:47		15:39 (108)
	21:06	57	19:59 (83)	20:39	46	19:53 (83)	19:52			19:03			17:23	64	16:22 (108)	17:09	40	16:19 (108)
12	06:16		19:03 (83)	06:43		19:08 (83)	07:12			07:42			07:16		15:18 (108)	07:47		15:39 (108)
	21:06	57	20:00 (83)	20:38	44	19:52 (83)	19:50			19:01			17:22	64	16:22 (108)	17:10	39	16:18 (108)
13	06:16		19:02 (83)	06:44		19:09 (83)	07:13			07:43			07:17		15:18 (108)	07:48		15:40 (108)
	21:05	57	19:59 (83)	20:37	42	19:51 (83)	19:48			18:59			17:21	64	16:22 (108)	17:10	38	16:18 (108)
14	06:17		19:02 (83)	06:45		19:10 (83)	07:14			07:44			07:19		15:18 (108)	07:49		15:41 (108)
	21:05	58	20:00 (83)	20:36	39	19:49 (83)	19:47			18:58			17:20	64	16:22 (108)	17:10	38	16:19 (108)
15	06:18		19:02 (83)	06:46		19:12 (83)	07:15			07:45			07:20		15:19 (108)	07:50		15:42 (108)
	21:04	59	20:01 (83)	20:34	36	19:48 (83)	19:45			18:56			17:19	63	16:22 (108)	17:10	37	16:19 (108)
16	06:19		19:02 (83)	06:47		19:14 (83)	07:16			07:46			07:21		15:19 (108)	07:50		15:42 (108)
	21:04	59	20:01 (83)	20:33	32	19:46 (83)	19:43			18:55			17:18	63	16:22 (108)	17:10	37	16:19 (108)
17	06:19		19:02 (83)	06:48		19:15 (83)	07:17			07:47			07:22		15:19 (108)	07:51		15:43 (108)
	21:03	59	20:01 (83)	20:32	27	19:42 (83)	19:42			18:53			17:17	63	16:22 (108)	17:11	36	16:19 (108)
18	06:20		19:02 (83)	06:49		19:18 (83)	07:18			07:48		16:46 (108)	07:23		15:20 (108)	07:52		15:44 (108)
	21:02	59	20:01 (83)	20:30	21	19:39 (83)	19:40			18:52	14	17:00 (108)	17:17	62	16:22 (108)	17:11	36	16:20 (108)
19	06:21		19:02 (83)	06:50		19:22 (83)	07:19			07:49		16:41 (108)	07:24		15:21 (108)	07:52		15:44 (108)
	21:02	59	20:01 (83)	20:29	12	19:34 (83)	19:38			18:51	23	17:04 (108)	17:16	61	16:22 (108)	17:11	36	16:20 (108)
20	06:22		19:02 (83)	06:50			07:20			07:50		16:37 (108)	07:25		15:21 (108)	07:53		15:45 (108)
	21:01	60	20:02 (83)	20:27			19:37			18:49	30	17:07 (108)	17:15	61	16:22 (108)	17:12	35	16:20 (108)
21	06:23		19:01 (83)	06:51			07:21			07:51		16:35 (108)	07:27		15:22 (108)	07:53		15:45 (108)
	21:00	60	20:01 (83)	20:26			19:35			18:48	34	17:09 (108)	17:15	60	16:22 (108)	17:12	35	16:20 (108)
22	06:23		19:01 (83)	06:52			07:22			07:52		16:33 (108)	07:28		15:22 (108)	07:54		15:46 (108)
	21:00	60	20:01 (83)	20:25			19:33			18:46	38	17:11 (108)	17:14	59	16:21 (108)	17:13	35	16:21 (108)
23	06:24		19:01 (83)	06:53			07:23			07:53		16:31 (108)	07:29		15:23 (108)	07:54		15:46 (108)
	20:59	61	20:02 (83)	20:23			19:32			18:45	42	17:13 (108)	17:14	58	16:21 (108)	17:13	35	16:21 (108)
24	06:25		19:02 (83)	06:54			07:24			07:55		16:29 (108)	07:30		15:24 (108)	07:55		15:46 (108)
	20:58	60	20:02 (83)	20:22			19:30			18:44	45	17:14 (108)	17:13	58	16:22 (108)	17:14	35	16:21 (108)
25	06:26		19:02 (83)	06:55			07:25			07:56		16:27 (108)	07:31		15:25 (108)	07:55		15:47 (108)
	20:57	60	20:02 (83)	20:20			19:28			18:42	48	17:15 (108)	17:12	56	16:21 (108)	17:14	36	16:23 (108)
26	06:27		19:02 (83)	06:56			07:26			07:57		16:26 (108)	07:32		15:25 (108)	07:56		15:47 (108)
	20:57	60	20:02 (83)	20:19			19:27			18:41	49	17:15 (108)	17:12	56	16:21 (108)	17:15	36	16:23 (108)
27	06:28		19:01 (83)	06:57			07:27			07:58		16:24 (108)	07:33		15:26 (108)	07:56		15:47 (108)
	20:56	60	20:01 (83)	20:17			19:25			18:40	52	17:16 (108)	17:12	55	16:21 (108)	17:16	36	16:23 (108)
28	06:29		19:01 (83)	06:58			07:28			07:59		16:24 (108)	07:34		15:27 (108)	07:56		15:48 (108)
	20:55	60	20:01 (83)	20:16			19:23			18:38	54	17:18 (108)	17:11	53	16:20 (108)	17:16	37	16:25 (108)
29	06:30		19:02 (83)	06:59			07:29			08:00		16:23 (108)	07:35		15:27 (108)	07:57		15:48 (108)
	20:54	59	20:01 (83)	20:14			19:22			18:37	55	17:18 (108)	17:11	53	16:20 (108)	17:17	38	16:26 (108)
30	06:31		19:02 (83)	07:00			07:30			08:01		16:22 (108)	07:36		15:28 (108)	07:57		15:48 (108)
	20:53	59	20:01 (83)	20:13			19:20			18:36	57	17:19 (108)	17:10	52	16:20 (108)	17:18	38	16:26 (108)
31	06:31		19:02 (83)	07:01						08:02		16:21 (108)				07:57		15:48 (108)
	20:52	59	20:01 (83)	20:11						18:35	58	17:19 (108)				17:19	39	16:27 (108)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		1789			842						599			1816			1228	
Sun reduction		0.60			0.60						0.56			0.37			0.50	
Oper. time red.		1.00			1.00						1.00			1.00			1.00	
Wind dir. red.		0.63			0.63						0.68			0.68			0.68	
Total reduction		0.38			0.38						0.38			0.25			0.34	
Total, real		685			322						228			457			418	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 65

Licensed user:
EDR
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US-SYRACUSE, NY 13202
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Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m**Shadow receptor:** 3417 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5907)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March	April	May	June		
1	07:58		15:53 (133)	07:45		15:56 (133)	07:10	07:20	06:36	06:08		
	17:20	51	16:44 (133)	17:53	66	17:02 (133)	18:26	19:59	20:28	20:57		
2	07:58		15:53 (133)	07:44		15:56 (133)	07:08	07:19	06:35	06:08		
	17:21	51	16:44 (133)	17:55	66	17:02 (133)	18:27	20:00	20:29	20:58		
3	07:58		15:53 (133)	07:43		15:57 (133)	07:07	07:17	06:33	06:07		
	17:22	52	16:45 (133)	17:56	65	17:02 (133)	18:28	20:00	20:30	20:59		
4	07:58		15:53 (133)	07:42		15:57 (133)	07:05	07:16	06:32	06:07		
	17:22	53	16:46 (133)	17:57	65	17:02 (133)	18:30	20:01	20:31	20:59		
5	07:58		15:53 (133)	07:41		15:58 (133)	07:04	07:14	06:31	06:07		
	17:23	54	16:47 (133)	17:58	64	17:02 (133)	18:31	20:02	20:33	21:00		
6	07:58		15:52 (133)	07:40		15:58 (133)	07:02	07:12	06:30	06:06		07:20 (87)
	17:24	55	16:47 (133)	17:59	63	17:01 (133)	18:32	20:03	20:34	21:01	4	07:24 (87)
7	07:58		15:53 (133)	07:39		15:58 (133)	07:01	07:11	06:29	06:06		07:15 (87)
	17:25	55	16:48 (133)	18:01	62	17:00 (133)	18:33	20:04	20:35	21:01	14	07:29 (87)
8	07:58		15:53 (133)	07:38		15:59 (133)	07:59	07:09	06:28	06:06		07:12 (87)
	17:26	56	16:49 (133)	18:02	61	17:00 (133)	19:34	20:05	20:36	21:02	19	07:31 (87)
9	07:58		15:53 (133)	07:36		16:00 (133)	07:58	07:08	06:26	06:06		07:11 (87)
	17:27	57	16:50 (133)	18:03	60	17:00 (133)	19:35	20:06	20:37	21:02	22	07:33 (87)
10	07:57		15:53 (133)	07:35		16:01 (133)	07:56	07:06	06:25	06:06		07:10 (87)
	17:28	58	16:51 (133)	18:04	58	16:59 (133)	19:36	20:07	20:38	21:03	25	07:35 (87)
11	07:57		15:53 (133)	07:34		16:02 (133)	07:54	07:04	06:24	06:05		07:09 (87)
	17:29	58	16:51 (133)	18:05	57	16:59 (133)	19:37	20:08	20:38	21:04	27	07:36 (87)
12	07:57		15:53 (133)	07:33		16:02 (133)	07:53	07:03	06:23	06:05		07:08 (87)
	17:30	59	16:52 (133)	18:07	55	16:57 (133)	19:38	20:09	20:39	21:04	29	07:37 (87)
13	07:57		15:53 (133)	07:32		16:04 (133)	07:51	07:01	06:22	06:05		07:08 (87)
	17:31	60	16:53 (133)	18:08	53	16:57 (133)	19:39	20:10	20:40	21:05	30	07:38 (87)
14	07:56		15:53 (133)	07:30		16:05 (133)	07:50	07:00	06:21	06:05		07:07 (87)
	17:32	60	16:53 (133)	18:09	51	16:56 (133)	19:40	20:11	20:41	21:05	32	07:39 (87)
15	07:56		15:53 (133)	07:29		16:07 (133)	07:48	06:58	06:20	06:05		07:07 (87)
	17:33	61	16:54 (133)	18:10	48	16:55 (133)	19:41	20:12	20:42	21:06	33	07:40 (87)
16	07:56		15:53 (133)	07:28		16:07 (133)	07:46	06:57	06:19	06:05		07:07 (87)
	17:35	61	16:54 (133)	18:11	46	16:53 (133)	19:42	20:13	20:43	21:06	33	07:40 (87)
17	07:55		15:53 (133)	07:27		16:09 (133)	07:45	06:55	06:18	06:05		07:07 (87)
	17:36	63	16:56 (133)	18:13	43	16:52 (133)	19:43	20:14	20:44	21:06	34	07:41 (87)
18	07:55		15:53 (133)	07:25		16:12 (133)	07:43	06:54	06:18	06:05		07:06 (87)
	17:37	63	16:56 (133)	18:14	39	16:51 (133)	19:44	20:15	20:45	21:07	35	07:41 (87)
19	07:54		15:53 (133)	07:24		16:13 (133)	07:41	06:52	06:17	06:06		07:06 (87)
	17:38	64	16:57 (133)	18:15	35	16:48 (133)	19:46	20:16	20:46	21:07	36	07:42 (87)
20	07:54		15:53 (133)	07:23		16:16 (133)	07:40	06:51	06:16	06:06		07:07 (87)
	17:39	64	16:57 (133)	18:16	30	16:46 (133)	19:47	20:17	20:47	21:07	36	07:43 (87)
21	07:53		15:54 (133)	07:21		16:20 (133)	07:38	06:49	06:15	06:06		07:07 (87)
	17:40	64	16:58 (133)	18:17	23	16:43 (133)	19:48	20:18	20:48	21:08	36	07:43 (87)
22	07:52		15:53 (133)	07:20		16:24 (133)	07:37	06:48	06:14	06:06		07:07 (87)
	17:41	66	16:59 (133)	18:18	14	16:38 (133)	19:49	20:19	20:49	21:08	36	07:43 (87)
23	07:52		15:53 (133)	07:19			07:35	06:47	06:14	06:06		07:07 (87)
	17:43	66	16:59 (133)	18:19			19:50	20:20	20:50	21:08	36	07:43 (87)
24	07:51		15:54 (133)	07:17			07:33	06:45	06:13	06:07		07:08 (87)
	17:44	66	17:00 (133)	18:21			19:51	20:21	20:51	21:08	35	07:43 (87)
25	07:50		15:54 (133)	07:16			07:32	06:44	06:12	06:07		07:08 (87)
	17:45	66	17:00 (133)	18:22			19:52	20:22	20:52	21:08	35	07:43 (87)
26	07:50		15:54 (133)	07:14			07:30	06:42	06:12	06:07		07:09 (87)
	17:46	66	17:00 (133)	18:23			19:53	20:23	20:52	21:08	34	07:43 (87)
27	07:49		15:54 (133)	07:13			07:28	06:41	06:11	06:08		07:10 (87)
	17:47	66	17:00 (133)	18:24			19:54	20:24	20:53	21:09	33	07:43 (87)
28	07:48		15:54 (133)	07:11			07:27	06:40	06:10	06:08		07:10 (87)
	17:48	66	17:00 (133)	18:25			19:55	20:25	20:54	21:09	32	07:42 (87)
29	07:47		15:54 (133)				07:25	06:38	06:10	06:08		07:11 (87)
	17:50	67	17:01 (133)				19:56	20:26	20:55	21:09	31	07:42 (87)
30	07:46		15:55 (133)				07:24	06:37	06:09	06:09		07:12 (87)
	17:51	67	17:02 (133)				19:57	20:27	20:56	21:09	30	07:42 (87)
31	07:46		15:56 (133)				07:22		06:09			
	17:52	66	17:02 (133)				19:58		20:56			
Potential sun hours	300			299			370	397	446	449		
Total, worst case		1881			1124						747	
Sun reduction		0.36			0.42						0.60	
Oper. time red.		1.00			1.00						1.00	
Wind dir. red.		0.68			0.68						0.68	
Total reduction		0.24			0.28						0.41	
Total, real		457			319						306	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 66

Licensed user:
EDR
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Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 3417 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5907)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August	September	October			November			December		
1	06:09		07:13 (87)	06:32	07:02	07:31			07:04		15:31 (133)	07:38		15:35 (133)
	21:09	28	07:41 (87)	20:51	20:10	19:19			17:33	58	16:29 (133)	17:10	58	16:33 (133)
2	06:10		07:15 (87)	06:33	07:03	07:32			07:05		15:30 (133)	07:39		15:35 (133)
	21:08	25	07:40 (87)	20:50	20:08	19:17			17:32	60	16:30 (133)	17:10	58	16:33 (133)
3	06:10		07:16 (87)	06:34	07:04	07:33			07:06		15:29 (133)	07:40		15:36 (133)
	21:08	23	07:39 (87)	20:49	20:06	19:15			17:31	61	16:30 (133)	17:10	57	16:33 (133)
4	06:11		07:18 (87)	06:35	07:05	07:34			07:07		15:28 (133)	07:41		15:37 (133)
	21:08	20	07:38 (87)	20:48	20:05	19:14			17:30	62	16:30 (133)	17:10	56	16:33 (133)
5	06:11		07:19 (87)	06:36	07:06	07:35			07:08		15:27 (133)	07:41		15:38 (133)
	21:08	16	07:35 (87)	20:47	20:03	19:12			17:29	63	16:30 (133)	17:10	55	16:33 (133)
6	06:12		07:23 (87)	06:37	07:07	07:36			07:09		15:28 (133)	07:42		15:38 (133)
	21:08	10	07:33 (87)	20:46	20:02	19:11			17:28	63	16:31 (133)	17:09	55	16:33 (133)
7	06:12			06:38	07:08	07:37			07:11		15:27 (133)	07:43		15:39 (133)
	21:08			20:44	20:00	19:09			17:27	65	16:32 (133)	17:09	54	16:33 (133)
8	06:13			06:39	07:09	07:38			07:12		15:27 (133)	07:44		15:40 (133)
	21:07			20:43	19:57	19:07			17:26	65	16:32 (133)	17:09	53	16:33 (133)
9	06:14			06:40	07:10	07:39			07:13		15:26 (133)	07:45		15:41 (133)
	21:07			20:42	19:55	19:06			17:25	66	16:32 (133)	17:09	52	16:33 (133)
10	06:14			06:41	07:11	07:40			07:14		15:27 (133)	07:46		15:42 (133)
	21:07			20:41	19:53	19:04			17:24	66	16:33 (133)	17:09	52	16:34 (133)
11	06:15			06:42	07:12	07:41			07:15		15:26 (133)	07:47		15:43 (133)
	21:06			20:40	19:52	19:03			17:23	67	16:33 (133)	17:10	51	16:34 (133)
12	06:16			06:43	07:12	07:42			07:16		15:26 (133)	07:48		15:44 (133)
	21:06			20:38	19:50	19:01			17:22	67	16:33 (133)	17:10	50	16:34 (133)
13	06:16			06:44	07:13	07:43			07:18		15:26 (133)	07:48		15:44 (133)
	21:05			20:37	19:48	19:00			17:21	67	16:33 (133)	17:10	50	16:34 (133)
14	06:17			06:45	07:14	07:44			07:19		15:27 (133)	07:49		15:45 (133)
	21:05			20:36	19:47	18:58			17:20	66	16:33 (133)	17:10	49	16:34 (133)
15	06:18			06:46	07:15	07:45			07:20		15:27 (133)	07:50		15:46 (133)
	21:04			20:34	19:45	18:57			17:19	66	16:33 (133)	17:10	49	16:35 (133)
16	06:19			06:47	07:16	07:46			07:21		15:27 (133)	07:51		15:46 (133)
	21:04			20:33	19:43	18:55			17:18	66	16:33 (133)	17:11	48	16:34 (133)
17	06:19			06:48	07:17	07:47			07:22		15:27 (133)	07:51		15:47 (133)
	21:03			20:32	19:42	18:54			17:18	66	16:33 (133)	17:11	48	16:35 (133)
18	06:20			06:49	07:18	07:48			07:23		15:28 (133)	07:52		15:48 (133)
	21:03			20:30	19:40	18:52			17:17	66	16:34 (133)	17:11	47	16:35 (133)
19	06:21			06:50	07:19	07:49			07:24		15:28 (133)	07:52		15:48 (133)
	21:02			20:29	19:39	18:51			17:16	66	16:34 (133)	17:12	47	16:35 (133)
20	06:22			06:51	07:20	07:50		16:52 (133)	07:26		15:28 (133)	07:53		15:49 (133)
	21:01			20:28	19:37	18:49	18	17:10 (133)	17:15	66	16:34 (133)	17:12	47	16:36 (133)
21	06:23			06:52	07:21	07:51		16:49 (133)	07:27		15:29 (133)	07:54		15:49 (133)
	21:01			20:26	19:35	18:48	26	17:15 (133)	17:15	64	16:33 (133)	17:12	47	16:36 (133)
22	06:24			06:52	07:22	07:53		16:46 (133)	07:28		15:29 (133)	07:54		15:50 (133)
	21:00			20:25	19:34	18:46	31	17:17 (133)	17:14	64	16:33 (133)	17:13	47	16:37 (133)
23	06:24			06:53	07:23	07:54		16:43 (133)	07:29		15:29 (133)	07:55		15:50 (133)
	20:59			20:23	19:32	18:45	36	17:19 (133)	17:14	64	16:33 (133)	17:13	47	16:37 (133)
24	06:25			06:54	07:24	07:55		16:41 (133)	07:30		15:31 (133)	07:55		15:51 (133)
	20:58			20:22	19:30	18:44	40	17:21 (133)	17:13	63	16:34 (133)	17:14	47	16:38 (133)
25	06:26			06:55	07:25	07:56		16:39 (133)	07:31		15:31 (133)	07:55		15:51 (133)
	20:58			20:20	19:29	18:42	43	17:22 (133)	17:13	63	16:34 (133)	17:15	47	16:38 (133)
26	06:27			06:56	07:26	07:57		16:37 (133)	07:32		15:32 (133)	07:56		15:51 (133)
	20:57			20:19	19:27	18:41	46	17:23 (133)	17:12	61	16:33 (133)	17:15	48	16:39 (133)
27	06:28			06:57	07:27	07:58		16:36 (133)	07:33		15:32 (133)	07:56		15:52 (133)
	20:56			20:17	19:25	18:40	49	17:25 (133)	17:12	61	16:33 (133)	17:16	48	16:40 (133)
28	06:29			06:58	07:28	07:59		16:35 (133)	07:34		15:33 (133)	07:57		15:52 (133)
	20:55			20:16	19:24	18:38	51	17:26 (133)	17:11	60	16:33 (133)	17:17	48	16:40 (133)
29	06:30			06:59	07:29	08:00		16:33 (133)	07:35		15:33 (133)	07:57		15:52 (133)
	20:54			20:14	19:22	18:37	54	17:27 (133)	17:11	60	16:33 (133)	17:17	49	16:41 (133)
30	06:31			07:00	07:30	08:01		16:32 (133)	07:36		15:34 (133)	07:57		15:52 (133)
	20:53			20:13	19:20	18:36	55	17:27 (133)	17:11	59	16:33 (133)	17:18	49	16:41 (133)
31	06:32			07:01		08:03		16:31 (133)				07:57		15:52 (133)
	20:52			20:11		18:35	57	17:28 (133)				17:19	50	16:42 (133)
Potential sun hours	456			427	374	346			300			291		
Total, worst case		122					506			1911			1563	
Sun reduction		0.60					0.56			0.37			0.50	
Oper. time red.		1.00					1.00			1.00			1.00	
Wind dir. red.		0.68					0.68			0.68			0.68	
Total reduction		0.41					0.38			0.25			0.34	
Total, real		50					191			477			528	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

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3/1/2012 1:52 PM / 67

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Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m**Shadow receptor:** 3429 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5916)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April	May	June
1	07:57		09:36 (129)	07:44		09:35 (129)	07:09		09:40 (129)	07:20	06:36	06:08
	17:19	92	11:08 (129)	17:53	114	11:29 (129)	18:26	93	11:13 (129)	19:59	20:28	20:57
2	07:57		09:36 (129)	07:43		09:35 (129)	07:08		09:40 (129)	07:18	06:34	06:08
	17:20	92	11:08 (129)	17:54	114	11:29 (129)	18:27	91	11:11 (129)	20:00	20:29	20:58
3	07:57		09:36 (129)	07:42		09:34 (129)	07:06		09:41 (129)	07:17	06:33	06:07
	17:21	93	11:09 (129)	17:55	116	11:30 (129)	18:28	88	11:09 (129)	20:00	20:30	20:58
4	07:57		09:36 (129)	07:41		09:34 (129)	07:05		09:42 (129)	07:15	06:32	06:07
	17:22	94	11:10 (129)	17:57	116	11:30 (129)	18:29	85	11:07 (129)	20:01	20:31	20:59
5	07:57		09:37 (129)	07:40		09:34 (129)	07:03		09:42 (129)	07:14	06:31	06:06
	17:23	94	11:11 (129)	17:58	116	11:30 (129)	18:30	82	11:04 (129)	20:02	20:32	21:00
6	07:57		09:37 (129)	07:39		09:35 (129)	07:02		09:43 (129)	07:12	06:29	06:06
	17:24	95	11:12 (129)	17:59	115	11:30 (129)	18:31	79	11:02 (129)	20:03	20:33	21:00
7	07:57		09:37 (129)	07:38		09:35 (129)	07:00		09:44 (129)	07:10	06:28	06:06
	17:25	96	11:13 (129)	18:00	116	11:31 (129)	18:32	75	10:59 (129)	20:04	20:34	21:01
8	07:57		09:37 (129)	07:37		09:35 (129)	07:59		10:46 (129)	07:09	06:27	06:06
	17:26	97	11:14 (129)	18:01	116	11:31 (129)	19:34	71	11:57 (129)	20:05	20:35	21:02
9	07:57		09:37 (129)	07:36		09:35 (129)	07:57		10:46 (129)	07:07	06:26	06:05
	17:27	98	11:15 (129)	18:03	116	11:31 (129)	19:35	67	11:53 (129)	20:06	20:36	21:02
10	07:57		09:37 (129)	07:35		09:35 (129)	07:56		10:48 (129)	07:06	06:25	06:05
	17:28	98	11:15 (129)	18:04	116	11:31 (129)	19:36	63	11:51 (129)	20:07	20:37	21:03
11	07:57		09:37 (129)	07:34		09:34 (129)	07:54		10:49 (129)	07:04	06:24	06:05
	17:29	99	11:16 (129)	18:05	116	11:30 (129)	19:37	58	11:47 (129)	20:08	20:38	21:03
12	07:57		09:37 (129)	07:33		09:35 (129)	07:52		10:51 (129)	07:03	06:23	06:05
	17:30	100	11:17 (129)	18:06	115	11:30 (129)	19:38	52	11:43 (129)	20:09	20:39	21:04
13	07:56		09:36 (129)	07:31		09:35 (129)	07:51		10:53 (129)	07:01	06:22	06:05
	17:31	101	11:17 (129)	18:07	115	11:30 (129)	19:39	46	11:39 (129)	20:10	20:40	21:04
14	07:56		09:37 (129)	07:30		09:35 (129)	07:49		10:56 (129)	06:59	06:21	06:05
	17:32	101	11:18 (129)	18:09	115	11:30 (129)	19:40	39	11:35 (129)	20:11	20:41	21:05
15	07:56		09:37 (129)	07:29		09:35 (129)	07:48		10:58 (129)	06:58	06:20	06:05
	17:33	102	11:19 (129)	18:10	114	11:29 (129)	19:41	31	11:29 (129)	20:12	20:42	21:05
16	07:55		09:36 (129)	07:28		09:35 (129)	07:46		11:04 (129)	06:56	06:19	06:05
	17:34	104	11:20 (129)	18:11	113	11:28 (129)	19:42	19	11:23 (129)	20:13	20:43	21:06
17	07:55		09:37 (129)	07:26		09:36 (129)	07:44			06:55	06:18	06:05
	17:35	104	11:21 (129)	18:12	112	11:28 (129)	19:43			20:14	20:44	21:06
18	07:54		09:36 (129)	07:25		09:35 (129)	07:43			06:53	06:17	06:05
	17:36	105	11:21 (129)	18:13	112	11:27 (129)	19:44			20:15	20:45	21:06
19	07:54		09:37 (129)	07:24		09:36 (129)	07:41			06:52	06:16	06:05
	17:38	106	11:23 (129)	18:14	110	11:26 (129)	19:45			20:16	20:46	21:07
20	07:53		09:36 (129)	07:22		09:36 (129)	07:40			06:51	06:16	06:05
	17:39	107	11:23 (129)	18:16	110	11:26 (129)	19:46			20:17	20:47	21:07
21	07:53		09:36 (129)	07:21		09:36 (129)	07:38			06:49	06:15	06:05
	17:40	107	11:23 (129)	18:17	108	11:24 (129)	19:47			20:18	20:48	21:07
22	07:52		09:36 (129)	07:20		09:37 (129)	07:36			06:48	06:14	06:06
	17:41	109	11:25 (129)	18:18	107	11:24 (129)	19:48			20:19	20:49	21:07
23	07:51		09:36 (129)	07:18		09:36 (129)	07:35			06:46	06:13	06:06
	17:42	109	11:25 (129)	18:19	106	11:22 (129)	19:49			20:20	20:49	21:08
24	07:51		09:36 (129)	07:17		09:37 (129)	07:33			06:45	06:12	06:06
	17:43	109	11:25 (129)	18:20	104	11:21 (129)	19:50			20:21	20:50	21:08
25	07:50		09:35 (129)	07:15		09:38 (129)	07:31			06:43	06:12	06:06
	17:45	111	11:26 (129)	18:21	102	11:20 (129)	19:51			20:22	20:51	21:08
26	07:49		09:36 (129)	07:14		09:38 (129)	07:30			06:42	06:11	06:07
	17:46	111	11:27 (129)	18:22	100	11:18 (129)	19:52			20:23	20:52	21:08
27	07:49		09:36 (129)	07:12		09:39 (129)	07:28			06:41	06:11	06:07
	17:47	111	11:27 (129)	18:24	98	11:17 (129)	19:53			20:24	20:53	21:08
28	07:48		09:35 (129)	07:11		09:39 (129)	07:26			06:39	06:10	06:08
	17:48	113	11:28 (129)	18:25	96	11:15 (129)	19:54			20:25	20:54	21:08
29	07:47		09:35 (129)				07:25			06:38	06:09	06:08
	17:49	113	11:28 (129)				19:55			20:26	20:54	21:08
30	07:46		09:35 (129)				07:23			06:37	06:09	06:08
	17:51	113	11:28 (129)				19:56			20:27	20:55	21:08
31	07:45		09:35 (129)				07:22				06:08	
	17:52	114	11:29 (129)				19:58				20:56	
Potential sun hours	300			299			370			397	446	449
Total, worst case		3198			3108			1039				
Sun reduction		0.36			0.42			0.44				
Oper. time red.		1.00			1.00			1.00				
Wind dir. red.		0.60			0.60			0.60				
Total reduction		0.21			0.25			0.26				
Total, real		686			778			272				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 68

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m**Shadow receptor:** 3429 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5916)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July	August	September			October			November			December		
1	06:09	06:32	07:02			07:30		10:31 (129)	07:03		09:04 (129)	07:37		09:19 (129)
	21:08	20:51	20:09			19:18	50	11:21 (129)	17:33	116	11:00 (129)	17:10	99	10:58 (129)
2	06:09	06:33	07:03			07:31		10:29 (129)	07:05		09:04 (129)	07:38		09:20 (129)
	21:08	20:50	20:08			19:17	55	11:24 (129)	17:32	116	11:00 (129)	17:10	98	10:58 (129)
3	06:10	06:34	07:04			07:32		10:27 (129)	07:06		09:05 (129)	07:39		09:20 (129)
	21:08	20:49	20:06			19:15	60	11:27 (129)	17:31	116	11:01 (129)	17:09	98	10:58 (129)
4	06:10	06:35	07:05			07:33		10:25 (129)	07:07		09:04 (129)	07:40		09:21 (129)
	21:08	20:47	20:04			19:13	64	11:29 (129)	17:30	116	11:00 (129)	17:09	97	10:58 (129)
5	06:11	06:36	07:06			07:34		10:23 (129)	07:08		09:04 (129)	07:41		09:22 (129)
	21:08	20:46	20:03			19:12	69	11:32 (129)	17:28	116	11:00 (129)	17:09	96	10:58 (129)
6	06:12	06:37	07:06			07:35		10:21 (129)	07:09		09:04 (129)	07:42		09:23 (129)
	21:07	20:45	20:01			19:10	73	11:34 (129)	17:27	116	11:00 (129)	17:09	95	10:58 (129)
7	06:12	06:38	07:07			07:36		10:20 (129)	07:10		09:05 (129)	07:43		09:24 (129)
	21:07	20:44	20:00			19:09	76	11:36 (129)	17:26	116	11:01 (129)	17:09	94	10:58 (129)
8	06:13	06:39	07:08			07:37		10:18 (129)	07:11		09:05 (129)	07:44		09:24 (129)
	21:07	20:43	19:56			19:07	80	11:38 (129)	17:25	116	11:01 (129)	17:09	94	10:58 (129)
9	06:13	06:40	07:09			07:38		10:17 (129)	07:13		09:05 (129)	07:45		09:25 (129)
	21:07	20:42	19:55			19:05	83	11:40 (129)	17:24	115	11:00 (129)	17:09	93	10:58 (129)
10	06:14	06:41	07:10			07:39		10:15 (129)	07:14		09:06 (129)	07:46		09:26 (129)
	21:06	20:40	19:53			19:04	87	11:42 (129)	17:23	114	11:00 (129)	17:09	92	10:58 (129)
11	06:15	06:42	07:11			07:41		10:14 (129)	07:15		09:07 (129)	07:46		09:26 (129)
	21:06	20:39	19:51			19:02	90	11:44 (129)	17:22	114	11:01 (129)	17:09	92	10:58 (129)
12	06:15	06:43	07:12			07:42		10:13 (129)	07:16		09:07 (129)	07:47		09:27 (129)
	21:05	20:38	19:50			19:01	92	11:45 (129)	17:21	113	11:00 (129)	17:09	91	10:58 (129)
13	06:16	06:44	07:13			07:43		10:12 (129)	07:17		09:07 (129)	07:48		09:28 (129)
	21:05	20:37	19:48			18:59	95	11:47 (129)	17:20	113	11:00 (129)	17:09	90	10:58 (129)
14	06:17	06:44	07:14			07:44		10:11 (129)	07:18		09:07 (129)	07:49		09:29 (129)
	21:05	20:35	19:46			18:58	97	11:48 (129)	17:20	113	11:00 (129)	17:10	90	10:59 (129)
15	06:18	06:45	07:15			07:45		10:10 (129)	07:20		09:09 (129)	07:50		09:29 (129)
	21:04	20:34	19:45			18:56	99	11:49 (129)	17:19	111	11:00 (129)	17:10	89	10:58 (129)
16	06:18	06:46	07:16			07:46		10:10 (129)	07:21		09:09 (129)	07:50		09:30 (129)
	21:03	20:33	19:43			18:55	101	11:51 (129)	17:18	111	11:00 (129)	17:10	89	10:59 (129)
17	06:19	06:47	07:17			07:47		10:09 (129)	07:22		09:09 (129)	07:51		09:31 (129)
	21:03	20:31	19:41			18:53	103	11:52 (129)	17:17	111	11:00 (129)	17:10	89	11:00 (129)
18	06:20	06:48	07:18			07:48		10:09 (129)	07:23		09:10 (129)	07:52		09:31 (129)
	21:02	20:30	19:40			18:52	104	11:53 (129)	17:16	109	10:59 (129)	17:11	88	10:59 (129)
19	06:21	06:49	07:19			07:49		10:08 (129)	07:24		09:10 (129)	07:52		09:32 (129)
	21:02	20:29	19:38			18:50	106	11:54 (129)	17:16	109	10:59 (129)	17:11	88	11:00 (129)
20	06:22	06:50	07:20			07:50		10:07 (129)	07:25		09:11 (129)	07:53		09:32 (129)
	21:01	20:27	19:36			18:49	107	11:54 (129)	17:15	109	11:00 (129)	17:12	88	11:00 (129)
21	06:22	06:51	07:21			07:51		10:06 (129)	07:26		09:12 (129)	07:53		09:33 (129)
	21:00	20:26	19:35			18:47	109	11:55 (129)	17:14	107	10:59 (129)	17:12	88	11:01 (129)
22	06:23	06:52	07:22			07:52		10:06 (129)	07:27		09:12 (129)	07:54		09:33 (129)
	21:00	20:24	19:33			18:46	110	11:56 (129)	17:14	107	10:59 (129)	17:13	88	11:01 (129)
23	06:24	06:53	07:23			07:53		10:06 (129)	07:29		09:13 (129)	07:54		09:34 (129)
	20:59	20:23	19:31			18:45	111	11:57 (129)	17:13	106	10:59 (129)	17:13	88	11:02 (129)
24	06:25	06:54	07:24			07:54		10:06 (129)	07:30		09:13 (129)	07:55		09:34 (129)
	20:58	20:21	19:30			18:43	112	11:58 (129)	17:13	105	10:58 (129)	17:14	88	11:02 (129)
25	06:26	06:55	07:25			07:55		10:05 (129)	07:31		09:14 (129)	07:55		09:35 (129)
	20:57	20:20	19:28			18:42	113	11:58 (129)	17:12	104	10:58 (129)	17:14	88	11:03 (129)
26	06:27	06:56	07:26			07:57		10:05 (129)	07:32		09:15 (129)	07:56		09:35 (129)
	20:56	20:18	19:27			18:41	113	11:58 (129)	17:12	104	10:59 (129)	17:15	89	11:04 (129)
27	06:28	06:57	07:26		10:49 (129)	07:58		10:04 (129)	07:33		09:16 (129)	07:56		09:35 (129)
	20:55	20:17	19:25	11	11:00 (129)	18:39	114	11:58 (129)	17:11	103	10:59 (129)	17:16	89	11:04 (129)
28	06:28	06:58	07:27		10:42 (129)	07:59		10:04 (129)	07:34		09:17 (129)	07:56		09:36 (129)
	20:55	20:15	19:23	26	11:08 (129)	18:38	115	11:59 (129)	17:11	101	10:58 (129)	17:16	89	11:05 (129)
29	06:29	06:59	07:28		10:37 (129)	08:00		10:05 (129)	07:35		09:17 (129)	07:56		09:36 (129)
	20:54	20:14	19:22	36	11:13 (129)	18:37	115	12:00 (129)	17:11	101	10:58 (129)	17:17	90	11:06 (129)
30	06:30	07:00	07:29		10:34 (129)	08:01		10:04 (129)	07:36		09:18 (129)	07:57		09:36 (129)
	20:53	20:12	19:20	43	11:17 (129)	18:35	116	12:00 (129)	17:10	100	10:58 (129)	17:18	90	11:06 (129)
31	06:31	07:01				08:02		10:04 (129)				07:57		09:36 (129)
	20:52	20:11				18:34	116	12:00 (129)				17:18	91	11:07 (129)
Potential sun hours	456	427	374			346			300			291		
Total, worst case				116			2935			3308			2828	
Sun reduction				0.61			0.56			0.37			0.50	
Oper. time red.				1.00			1.00			1.00			1.00	
Wind dir. red.				0.60			0.60			0.60			0.60	
Total reduction				0.36			0.33			0.22			0.30	
Total, real				42			980			730			843	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 69

Licensed user:
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Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m**Shadow receptor:** 3431 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5918)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March	April			May			June		
1	07:57			07:44		08:06 (129)	07:09	07:20			06:36		07:04 (100)	06:08		07:00 (100)
	17:19			17:53	19	08:25 (129)	18:26	19:59			20:28	31	07:35 (100)	20:57	38	07:38 (100)
2	07:57			07:43		08:04 (129)	07:08	07:18			06:34		07:03 (100)	06:08		07:01 (100)
	17:20			17:54	23	08:27 (129)	18:27	20:00			20:29	33	07:36 (100)	20:58	37	07:38 (100)
3	07:57			07:42		08:03 (129)	07:06	07:17			06:33		07:02 (100)	06:07		07:01 (100)
	17:21			17:55	25	08:28 (129)	18:28	20:00			20:30	36	07:38 (100)	20:58	37	07:38 (100)
4	07:57			07:41		08:03 (129)	07:05	07:15			06:32		07:00 (100)	06:07		07:02 (100)
	17:22			17:57	26	08:29 (129)	18:29	20:01			20:31	38	07:38 (100)	20:59	36	07:38 (100)
5	07:58			07:40		08:02 (129)	07:03	07:14			06:31		06:59 (100)	06:06		07:02 (100)
	17:23			17:58	28	08:30 (129)	18:30	20:02			20:32	39	07:38 (100)	21:00	36	07:38 (100)
6	07:57			07:39		08:01 (129)	07:02	07:12			06:29		06:58 (100)	06:06		07:03 (100)
	17:24			17:59	30	08:31 (129)	18:31	20:03			20:33	41	07:39 (100)	21:00	35	07:38 (100)
7	07:57			07:38		08:01 (129)	07:00	07:10			06:28		06:58 (100)	06:06		07:03 (100)
	17:25			18:00	30	08:31 (129)	18:32	20:04			20:34	42	07:40 (100)	21:01	34	07:37 (100)
8	07:57			07:37		08:01 (129)	07:59	07:09			06:27		06:57 (100)	06:06		07:04 (100)
	17:26			18:01	31	08:32 (129)	19:34	20:05			20:35	43	07:40 (100)	21:02	33	07:37 (100)
9	07:57			07:36		08:01 (129)	07:57	07:07			06:26		06:57 (100)	06:05		07:04 (100)
	17:27			18:03	32	08:33 (129)	19:35	20:06			20:36	44	07:41 (100)	21:02	33	07:37 (100)
10	07:57			07:35		08:01 (129)	07:56	07:06			06:25		06:56 (100)	06:05		07:05 (100)
	17:28			18:04	32	08:33 (129)	19:36	20:07			20:37	45	07:41 (100)	21:03	32	07:37 (100)
11	07:57			07:34		08:00 (129)	07:54	07:04			06:24		06:56 (100)	06:05		07:06 (100)
	17:29			18:05	32	08:32 (129)	19:37	20:08			20:38	45	07:41 (100)	21:03	31	07:37 (100)
12	07:57			07:33		08:01 (129)	07:52	07:03			06:23		06:56 (100)	06:05		07:06 (100)
	17:30			18:06	31	08:32 (129)	19:38	20:09			20:39	45	07:41 (100)	21:04	31	07:37 (100)
13	07:56			07:31		08:01 (129)	07:51	07:01			06:22		06:56 (100)	06:05		07:07 (100)
	17:31			18:07	31	08:32 (129)	19:39	20:10			20:40	45	07:41 (100)	21:04	29	07:36 (100)
14	07:56			07:30		08:02 (129)	07:49	07:00			06:21		06:55 (100)	06:05		07:07 (100)
	17:32			18:09	30	08:32 (129)	19:40	20:11			20:41	46	07:41 (100)	21:05	29	07:36 (100)
15	07:56			07:29		08:01 (129)	07:48	06:58			06:20		06:55 (100)	06:05		07:08 (100)
	17:33			18:10	30	08:31 (129)	19:41	20:12			20:42	46	07:41 (100)	21:05	28	07:36 (100)
16	07:55			07:28		08:02 (129)	07:46	06:56			06:19		06:55 (100)	06:05		07:08 (100)
	17:34			18:11	29	08:31 (129)	19:42	20:13			20:43	46	07:41 (100)	21:06	28	07:36 (100)
17	07:55			07:26		08:03 (129)	07:44	06:55			06:18		06:55 (100)	06:05		07:08 (100)
	17:35			18:12	27	08:30 (129)	19:43	20:14			20:44	46	07:41 (100)	21:06	28	07:36 (100)
18	07:54			07:25		08:04 (129)	07:43	06:54			06:17		06:56 (100)	06:05		07:09 (100)
	17:36			18:13	24	08:28 (129)	19:44	20:15			20:45	46	07:42 (100)	21:06	27	07:36 (100)
19	07:54			07:24		08:05 (129)	07:41	06:52			06:16		06:56 (100)	06:05		07:09 (100)
	17:38			18:15	22	08:27 (129)	19:45	20:16			20:46	45	07:41 (100)	21:07	27	07:36 (100)
20	07:53			07:22		08:07 (129)	07:40	06:51			06:16		06:56 (100)	06:05		07:09 (100)
	17:39			18:16	19	08:26 (129)	19:46	20:17			20:47	45	07:41 (100)	21:07	27	07:36 (100)
21	07:53			07:21		08:09 (129)	07:38	06:49			06:15		06:55 (100)	06:06		07:09 (100)
	17:40			18:17	14	08:23 (129)	19:47	20:18			20:48	46	07:41 (100)	21:07	27	07:36 (100)
22	07:52			07:20		08:13 (129)	07:36	06:48			06:14		06:56 (100)	06:06		07:10 (100)
	17:41			18:18	6	08:19 (129)	19:48	20:19			20:49	45	07:41 (100)	21:07	27	07:37 (100)
23	07:52			07:18			07:35	06:46			06:13		06:56 (100)	06:06		07:10 (100)
	17:42			18:19			19:49	20:20			20:49	45	07:41 (100)	21:08	27	07:37 (100)
24	07:51			07:17			07:33	06:45			06:13		06:56 (100)	06:06		07:10 (100)
	17:43			18:20			19:50	20:21			20:50	44	07:40 (100)	21:08	27	07:37 (100)
25	07:50			07:15			07:31	06:44			06:12		06:57 (100)	06:07		07:10 (100)
	17:45			18:21			19:51	20:22			20:51	43	07:40 (100)	21:08	28	07:38 (100)
26	07:49			07:14			07:30	06:42			06:11		06:57 (100)	06:07		07:10 (100)
	17:46			18:23			19:52	20:23			20:52	43	07:40 (100)	21:08	28	07:38 (100)
27	07:49			07:12			07:28	06:41		07:13 (100)	06:11		06:57 (100)	06:07		07:10 (100)
	17:47			18:24			19:53	20:24	14	07:27 (100)	20:53	42	07:39 (100)	21:08	28	07:38 (100)
28	07:48			07:11			07:26	06:39		07:10 (100)	06:10		06:58 (100)	06:08		07:10 (100)
	17:48			18:25			19:54	20:25	20	07:30 (100)	20:54	41	07:39 (100)	21:08	29	07:39 (100)
29	07:47						07:25	06:38		07:07 (100)	06:09		06:58 (100)	06:08		07:10 (100)
	17:49						19:55	20:26	25	07:32 (100)	20:55	41	07:39 (100)	21:08	29	07:39 (100)
30	07:46		08:09 (129)				07:23	06:37		07:05 (100)	06:09		06:59 (100)	06:08		07:09 (100)
	17:51	12	08:21 (129)				19:57	20:27	28	07:33 (100)	20:55	40	07:39 (100)	21:08	31	07:40 (100)
31	07:45		08:07 (129)				07:22				06:08		07:00 (100)			
	17:52	16	08:23 (129)				19:58				20:56	39	07:39 (100)			
Potential sun hours	300			299			370	397			446			449		
Total, worst case		28			571				87			1316			917	
Sun reduction		0.36			0.42				0.51			0.56			0.60	
Oper. time red.		1.00			1.00				1.00			1.00			1.00	
Wind dir. red.		0.62			0.62				0.67			0.67			0.67	
Total reduction		0.22			0.26				0.34			0.38			0.40	
Total, real		6			148				30			495			370	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 70

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m**Shadow receptor:** 3431 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5918)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September	October			November			December
1	06:09		07:10 (100)	06:32		07:06 (100)	07:02	07:30			07:03		07:30 (129)	07:37
	21:08	31	07:41 (100)	20:51	46	07:52 (100)	20:09	19:18			17:33	32	08:02 (129)	17:10
2	06:09		07:09 (100)	06:33		07:07 (100)	07:03	07:31			07:05		07:31 (129)	07:38
	21:08	32	07:41 (100)	20:50	45	07:52 (100)	20:08	19:17			17:32	31	08:02 (129)	17:10
3	06:10		07:10 (100)	06:34		07:06 (100)	07:04	07:32			07:06		07:31 (129)	07:39
	21:08	32	07:42 (100)	20:49	44	07:50 (100)	20:06	19:15			17:31	31	08:02 (129)	17:10
4	06:10		07:09 (100)	06:35		07:07 (100)	07:05	07:33			07:07		07:31 (129)	07:40
	21:08	33	07:42 (100)	20:48	43	07:50 (100)	20:04	19:13			17:30	30	08:01 (129)	17:09
5	06:11		07:09 (100)	06:36		07:07 (100)	07:06	07:34			07:08		07:31 (129)	07:41
	21:08	34	07:43 (100)	20:46	43	07:50 (100)	20:03	19:12			17:28	30	08:01 (129)	17:09
6	06:12		07:09 (100)	06:37		07:08 (100)	07:06	07:35			07:09		07:32 (129)	07:42
	21:07	35	07:44 (100)	20:45	41	07:49 (100)	20:01	19:10			17:27	28	08:00 (129)	17:09
7	06:12		07:09 (100)	06:38		07:08 (100)	07:07	07:36			07:10		07:33 (129)	07:43
	21:07	35	07:44 (100)	20:44	41	07:49 (100)	20:00	19:09			17:26	27	08:00 (129)	17:09
8	06:13		07:09 (100)	06:39		07:09 (100)	07:08	07:37			07:11		07:34 (129)	07:44
	21:07	36	07:45 (100)	20:43	39	07:48 (100)	19:56	19:07			17:25	25	07:59 (129)	17:09
9	06:13		07:08 (100)	06:40		07:10 (100)	07:09	07:38			07:13		07:35 (129)	07:45
	21:07	37	07:45 (100)	20:42	37	07:47 (100)	19:55	19:05			17:24	22	07:57 (129)	17:09
10	06:14		07:08 (100)	06:41		07:11 (100)	07:10	07:40			07:14		07:37 (129)	07:46
	21:06	37	07:45 (100)	20:41	35	07:46 (100)	19:53	19:04			17:23	19	07:56 (129)	17:09
11	06:15		07:08 (100)	06:42		07:12 (100)	07:11	07:41			07:15		07:39 (129)	07:46
	21:06	38	07:46 (100)	20:39	33	07:45 (100)	19:51	19:02			17:22	16	07:55 (129)	17:09
12	06:15		07:07 (100)	06:43		07:13 (100)	07:12	07:42			07:16		07:42 (129)	07:47
	21:05	39	07:46 (100)	20:38	30	07:43 (100)	19:50	19:01			17:21	10	07:52 (129)	17:09
13	06:16		07:07 (100)	06:44		07:14 (100)	07:13	07:43			07:17			07:48
	21:05	40	07:47 (100)	20:37	28	07:42 (100)	19:48	18:59			17:21			17:09
14	06:17		07:08 (100)	06:44		07:15 (100)	07:14	07:44			07:18			07:49
	21:05	40	07:48 (100)	20:35	24	07:39 (100)	19:46	18:58			17:20			17:10
15	06:18		07:08 (100)	06:45		07:18 (100)	07:15	07:45			07:20			07:50
	21:04	41	07:49 (100)	20:34	18	07:36 (100)	19:45	18:56			17:19			17:10
16	06:18		07:07 (100)	06:46		07:21 (100)	07:16	07:46			07:21			07:50
	21:03	41	07:48 (100)	20:33	11	07:32 (100)	19:43	18:55			17:18			17:10
17	06:19		07:07 (100)	06:47			07:17	07:47			07:22			07:51
	21:03	42	07:49 (100)	20:31			19:42	18:53			17:17			17:10
18	06:20		07:07 (100)	06:48			07:18	07:48			07:23			07:52
	21:02	43	07:50 (100)	20:30			19:40	18:52			17:16			17:11
19	06:21		07:07 (100)	06:49			07:19	07:49			07:24			07:52
	21:02	43	07:50 (100)	20:29			19:38	18:50			17:16			17:11
20	06:22		07:06 (100)	06:50			07:20	07:50		08:42 (129)	07:25			07:53
	21:01	44	07:50 (100)	20:27			19:37	18:49	9	08:51 (129)	17:15			17:12
21	06:22		07:06 (100)	06:51			07:21	07:51		08:39 (129)	07:26			07:53
	21:00	44	07:50 (100)	20:26			19:35	18:47	15	08:54 (129)	17:14			17:12
22	06:23		07:06 (100)	06:52			07:22	07:52		08:36 (129)	07:28			07:54
	21:00	45	07:51 (100)	20:24			19:33	18:46	20	08:56 (129)	17:14			17:13
23	06:24		07:06 (100)	06:53			07:23	07:53		08:35 (129)	07:29			07:54
	20:59	45	07:51 (100)	20:23			19:32	18:45	23	08:58 (129)	17:13			17:13
24	06:25		07:06 (100)	06:54			07:24	07:54		08:34 (129)	07:30			07:55
	20:58	46	07:52 (100)	20:21			19:30	18:43	25	08:59 (129)	17:13			17:14
25	06:26		07:06 (100)	06:55			07:25	07:56		08:33 (129)	07:31			07:55
	20:57	46	07:52 (100)	20:20			19:28	18:42	27	09:00 (129)	17:12			17:14
26	06:27		07:05 (100)	06:56			07:26	07:57		08:32 (129)	07:32			07:56
	20:56	46	07:51 (100)	20:18			19:27	18:41	29	09:01 (129)	17:12			17:15
27	06:28		07:05 (100)	06:57			07:27	07:58		08:31 (129)	07:33			07:56
	20:55	47	07:52 (100)	20:17			19:25	18:39	30	09:01 (129)	17:11			17:16
28	06:28		07:06 (100)	06:58			07:27	07:59		08:30 (129)	07:34			07:56
	20:55	46	07:52 (100)	20:15			19:23	18:38	31	09:01 (129)	17:11			17:16
29	06:29		07:06 (100)	06:59			07:28	08:00		08:31 (129)	07:35			07:57
	20:54	46	07:52 (100)	20:14			19:22	18:37	31	09:02 (129)	17:11			17:17
30	06:30		07:06 (100)	07:00			07:29	08:01		08:30 (129)	07:36			07:57
	20:53	46	07:52 (100)	20:12			19:20	18:36	32	09:02 (129)	17:10			17:18
31	06:31		07:06 (100)	07:01				08:02		08:30 (129)				07:57
	20:52	46	07:52 (100)	20:11				18:34	32	09:02 (129)				17:18
Potential sun hours	456			427			374	346			300			291
Total, worst case		1256			558				304			301		
Sun reduction		0.60			0.60				0.56			0.37		
Oper. time red.		1.00			1.00				1.00			1.00		
Wind dir. red.		0.67			0.67				0.62			0.62		
Total reduction		0.40			0.40				0.35			0.23		
Total, real		506			225				105			69		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 71

Licensed user:
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Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m**Shadow receptor:** 6175 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6031)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57			07:44		08:21 (128)	07:09		08:31 (128)	07:20			06:36		19:42 (94)	06:08		19:35 (94)
	17:20			17:53	56	09:17 (128)	18:26	32	09:03 (128)	19:58			20:28	14	19:56 (94)	20:57	28	20:03 (94)
2	07:57			07:43		08:21 (128)	07:08		08:33 (128)	07:18			06:34		19:39 (94)	06:08		19:36 (94)
	17:20			17:54	57	09:18 (128)	18:27	28	09:01 (128)	19:59			20:29	19	19:58 (94)	20:57	28	20:04 (94)
3	07:57			07:42		08:20 (128)	07:06		08:36 (128)	07:17			06:33		19:37 (94)	06:07		19:36 (94)
	17:21			17:55	58	09:18 (128)	18:28	21	08:57 (128)	20:00			20:30	22	19:59 (94)	20:58	27	20:03 (94)
4	07:57			07:41		08:20 (128)	07:05		08:42 (128)	07:15			06:32		19:35 (94)	06:07		19:37 (94)
	17:22			17:57	59	09:19 (128)	18:29	10	08:52 (128)	20:00			20:31	26	20:01 (94)	20:59	25	20:02 (94)
5	07:57			07:40		08:20 (128)	07:03			07:14			06:31		19:34 (94)	06:06		19:38 (94)
	17:23			17:58	59	09:19 (128)	18:30			20:01			20:32	28	20:02 (94)	20:59	24	20:02 (94)
6	07:57			07:39		08:20 (128)	07:02			07:12			06:29		19:33 (94)	06:06		19:39 (94)
	17:24			17:59	60	09:20 (128)	18:31			20:03			20:33	30	20:03 (94)	21:00	23	20:02 (94)
7	07:57			07:38		08:20 (128)	07:00			07:10			06:28		19:32 (94)	06:06		19:39 (94)
	17:25			18:00	60	09:20 (128)	18:32			20:04			20:34	32	20:04 (94)	21:01	22	20:01 (94)
8	07:57			07:37		08:20 (128)	07:59			07:09			06:27		19:32 (94)	06:06		19:40 (94)
	17:26			18:01	61	09:21 (128)	19:33			20:05			20:35	32	20:04 (94)	21:01	21	20:01 (94)
9	07:57			07:36		08:20 (128)	07:57			07:07			06:26		19:31 (94)	06:05		19:41 (94)
	17:27			18:03	61	09:21 (128)	19:35			20:06			20:36	34	20:05 (94)	21:02	20	20:01 (94)
10	07:57			07:35		08:19 (128)	07:55			07:06			06:25		19:30 (94)	06:05		19:42 (94)
	17:28			18:04	61	09:20 (128)	19:36			20:07			20:37	35	20:05 (94)	21:02	19	20:01 (94)
11	07:57			07:34		08:19 (128)	07:54			07:04			06:24		19:30 (94)	06:05		19:42 (94)
	17:29			18:05	62	09:21 (128)	19:37			20:08			20:38	36	20:06 (94)	21:03	18	20:00 (94)
12	07:56			07:32		08:19 (128)	07:52			07:03			06:23		19:30 (94)	06:05		19:43 (94)
	17:30			18:06	62	09:21 (128)	19:38			20:09			20:39	36	20:06 (94)	21:04	17	20:00 (94)
13	07:56			07:31		08:20 (128)	07:51			07:01			06:22		19:29 (94)	06:05		19:44 (94)
	17:31			18:07	61	09:21 (128)	19:39			20:10			20:40	37	20:06 (94)	21:04	16	20:00 (94)
14	07:56			07:30		08:19 (128)	07:49			06:59			06:21		19:29 (94)	06:05		19:45 (94)
	17:32			18:09	61	09:20 (128)	19:40			20:11			20:41	37	20:06 (94)	21:05	14	19:59 (94)
15	07:55		08:39 (128)	07:29		08:19 (128)	07:48			06:58			06:20		19:29 (94)	06:05		19:45 (94)
	17:33	11	08:50 (128)	18:10	61	09:20 (128)	19:41			20:12			20:42	37	20:06 (94)	21:05	14	19:59 (94)
16	07:55		08:37 (128)	07:27		08:20 (128)	07:46			06:56			06:19		19:29 (94)	06:05		19:46 (94)
	17:34	17	08:54 (128)	18:11	60	09:20 (128)	19:42			20:13			20:43	37	20:06 (94)	21:05	13	19:59 (94)
17	07:55		08:34 (128)	07:26		08:21 (128)	07:44			06:55			06:18		19:29 (94)	06:05		19:47 (94)
	17:35	22	08:56 (128)	18:12	59	09:20 (128)	19:43			20:14			20:44	37	20:06 (94)	21:06	12	19:59 (94)
18	07:54		08:33 (128)	07:25		08:20 (128)	07:43			06:53			06:17		19:30 (94)	06:05		19:47 (94)
	17:36	26	08:59 (128)	18:13	58	09:18 (128)	19:44			20:15			20:45	37	20:07 (94)	21:06	11	19:58 (94)
19	07:54		08:31 (128)	07:24		08:21 (128)	07:41			06:52			06:16		19:30 (94)	06:05		19:47 (94)
	17:38	30	09:01 (128)	18:14	57	09:18 (128)	19:45			20:16			20:46	37	20:07 (94)	21:06	11	19:58 (94)
20	07:53		08:30 (128)	07:22		08:21 (128)	07:39			06:51			06:16		19:30 (94)	06:05		19:47 (94)
	17:39	33	09:03 (128)	18:16	56	09:17 (128)	19:46			20:17			20:47	36	20:06 (94)	21:07	11	19:58 (94)
21	07:53		08:29 (128)	07:21		08:22 (128)	07:38			06:49			06:15		19:30 (94)	06:06		19:48 (94)
	17:40	35	09:04 (128)	18:17	54	09:16 (128)	19:47			20:18			20:47	36	20:06 (94)	21:07	10	19:58 (94)
22	07:52		08:28 (128)	07:19		08:23 (128)	07:36			06:48			06:14		19:31 (94)	06:06		19:49 (94)
	17:41	38	09:06 (128)	18:18	53	09:16 (128)	19:48			20:19			20:48	36	20:07 (94)	21:07	10	19:59 (94)
23	07:51		08:27 (128)	07:18		08:23 (128)	07:35			06:46			06:13		19:31 (94)	06:06		19:48 (94)
	17:42	41	09:08 (128)	18:19	51	09:14 (128)	19:49			20:20			20:49	35	20:06 (94)	21:07	11	19:59 (94)
24	07:51		08:26 (128)	07:17		08:24 (128)	07:33			06:45			06:13		19:31 (94)	06:06		19:48 (94)
	17:43	43	09:09 (128)	18:20	49	09:13 (128)	19:50			20:21			20:50	35	20:06 (94)	21:08	11	19:59 (94)
25	07:50		08:25 (128)	07:15		08:25 (128)	07:31			06:43			06:12		19:32 (94)	06:07		19:49 (94)
	17:45	45	09:10 (128)	18:21	46	09:11 (128)	19:51			20:22			20:51	34	20:06 (94)	21:08	12	20:01 (94)
26	07:49		08:24 (128)	07:14		08:26 (128)	07:30			06:42			06:11		19:32 (94)	06:07		19:48 (94)
	17:46	47	09:11 (128)	18:22	44	09:10 (128)	19:52			20:23			20:52	33	20:05 (94)	21:08	13	20:01 (94)
27	07:48		08:24 (128)	07:12		08:27 (128)	07:28			06:41			06:11		19:32 (94)	06:07		19:48 (94)
	17:47	49	09:13 (128)	18:24	41	09:08 (128)	19:53			20:24			20:53	33	20:05 (94)	21:08	13	20:01 (94)
28	07:48		08:24 (128)	07:11		08:29 (128)	07:26			06:39			06:10		19:33 (94)	06:08		19:48 (94)
	17:48	50	09:14 (128)	18:25	37	09:06 (128)	19:54			20:25			20:53	32	20:05 (94)	21:08	14	20:02 (94)
29	07:47		08:23 (128)				07:25			06:38			06:09		19:33 (94)	06:08		19:47 (94)
	17:49	52	09:15 (128)				19:55			20:26			20:54	31	20:04 (94)	21:08	16	20:03 (94)
30	07:46		08:22 (128)				07:23			06:37		19:47 (94)	06:09		19:34 (94)	06:08		19:47 (94)
	17:51	53	09:15 (128)				19:56			20:27	3	19:50 (94)	20:55	30	20:04 (94)	21:08	16	20:03 (94)
31	07:45		08:22 (128)				07:22						06:08		19:35 (94)			
	17:52	54	09:16 (128)				19:57						20:56	29	20:04 (94)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		646			1564			91			3			1003			500	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.61			0.61			0.61			0.63			0.63			0.63	
Total reduction		0.22			0.25			0.27			0.32			0.35			0.38	
Total, real		140			396			24			1			354			189	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 72

Licensed user:
EDR
217 Montgomery St.
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Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m **Shadow receptor:** 6175 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6031)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September	October			November			December
1	06:09		19:47 (94)	06:32		19:40 (94)	07:02	07:30			07:03		07:49 (128)	07:37
	21:08	17	20:04 (94)	20:50	37	20:17 (94)	20:09	19:18			17:33	61	08:50 (128)	17:10
2	06:09		19:46 (94)	06:33		19:41 (94)	07:03	07:31			07:04		07:49 (128)	07:38
	21:08	18	20:04 (94)	20:49	35	20:16 (94)	20:07	19:17			17:32	61	08:50 (128)	17:10
3	06:10		19:46 (94)	06:34		19:40 (94)	07:04	07:32			07:05		07:50 (128)	07:39
	21:08	20	20:06 (94)	20:48	35	20:15 (94)	20:06	19:15			17:31	61	08:51 (128)	17:10
4	06:10		19:45 (94)	06:35		19:41 (94)	07:05	07:33			07:07		07:50 (128)	07:40
	21:08	21	20:06 (94)	20:47	33	20:14 (94)	20:04	19:13			17:30	60	08:50 (128)	17:09
5	06:11		19:45 (94)	06:36		19:41 (94)	07:05	07:34			07:08		07:50 (128)	07:41
	21:07	22	20:07 (94)	20:46	33	20:14 (94)	20:03	19:12			17:28	60	08:50 (128)	17:09
6	06:12		19:45 (94)	06:37		19:42 (94)	07:06	07:35			07:09		07:50 (128)	07:42
	21:07	23	20:08 (94)	20:45	31	20:13 (94)	20:01	19:10			17:27	59	08:49 (128)	17:09
7	06:12		19:44 (94)	06:38		19:43 (94)	07:07	07:36			07:10		07:50 (128)	07:43
	21:07	24	20:08 (94)	20:44	29	20:12 (94)	19:58	19:09			17:26	59	08:49 (128)	17:09
8	06:13		19:44 (94)	06:39		19:44 (94)	07:08	07:37			07:11		07:51 (128)	07:44
	21:07	25	20:09 (94)	20:43	27	20:11 (94)	19:56	19:07			17:25	58	08:49 (128)	17:09
9	06:13		19:43 (94)	06:40		19:45 (94)	07:09	07:38			07:12		07:52 (128)	07:45
	21:06	26	20:09 (94)	20:42	25	20:10 (94)	19:55	19:05			17:24	56	08:48 (128)	17:09
10	06:14		19:43 (94)	06:41		19:47 (94)	07:10	07:39		09:13 (128)	07:14		07:52 (128)	07:45
	21:06	28	20:11 (94)	20:40	21	20:08 (94)	19:53	19:04	16	09:29 (128)	17:23	56	08:48 (128)	17:09
11	06:15		19:43 (94)	06:42		19:49 (94)	07:11	07:40		09:09 (128)	07:15		07:53 (128)	07:46
	21:06	28	20:11 (94)	20:39	17	20:06 (94)	19:51	19:02	24	09:33 (128)	17:22	54	08:47 (128)	17:09
12	06:15		19:42 (94)	06:43		19:51 (94)	07:12	07:41		09:06 (128)	07:16		07:54 (128)	07:47
	21:05	29	20:11 (94)	20:38	12	20:03 (94)	19:50	19:01	30	09:36 (128)	17:21	53	08:47 (128)	17:09
13	06:16		19:42 (94)	06:44			07:13	07:42		09:03 (128)	07:17		07:55 (128)	07:48
	21:05	30	20:12 (94)	20:37			19:48	18:59	35	09:38 (128)	17:21	52	08:47 (128)	17:10
14	06:17		19:42 (94)	06:44			07:14	07:44		09:01 (128)	07:18		07:56 (128)	07:49
	21:04	31	20:13 (94)	20:35			19:46	18:58	38	09:39 (128)	17:20	50	08:46 (128)	17:10
15	06:18		19:42 (94)	06:45			07:15	07:45		08:59 (128)	07:19		07:56 (128)	07:49
	21:04	32	20:14 (94)	20:34			19:45	18:56	42	09:41 (128)	17:19	49	08:45 (128)	17:10
16	06:18		19:41 (94)	06:46			07:16	07:46		08:57 (128)	07:20		07:58 (128)	07:50
	21:03	33	20:14 (94)	20:33			19:43	18:55	45	09:42 (128)	17:18	47	08:45 (128)	17:10
17	06:19		19:41 (94)	06:47			07:17	07:47		08:57 (128)	07:22		07:59 (128)	07:51
	21:03	34	20:15 (94)	20:31			19:41	18:53	47	09:44 (128)	17:17	45	08:44 (128)	17:11
18	06:20		19:41 (94)	06:48			07:18	07:48		08:56 (128)	07:23		08:00 (128)	07:51
	21:02	34	20:15 (94)	20:30			19:40	18:52	49	09:45 (128)	17:17	43	08:43 (128)	17:11
19	06:21		19:41 (94)	06:49			07:19	07:49		08:54 (128)	07:24		08:01 (128)	07:52
	21:01	35	20:16 (94)	20:28			19:38	18:50	52	09:46 (128)	17:16	41	08:42 (128)	17:11
20	06:22		19:40 (94)	06:50			07:20	07:50		08:53 (128)	07:25		08:03 (128)	07:52
	21:01	35	20:15 (94)	20:27			19:36	18:49	54	09:47 (128)	17:15	38	08:41 (128)	17:12
21	06:22		19:40 (94)	06:51			07:21	07:51		08:52 (128)	07:26		08:05 (128)	07:53
	21:00	36	20:16 (94)	20:26			19:35	18:47	55	09:47 (128)	17:14	36	08:41 (128)	17:12
22	06:23		19:40 (94)	06:52			07:22	07:52		08:51 (128)	07:27		08:06 (128)	07:54
	20:59	36	20:16 (94)	20:24			19:33	18:46	57	09:48 (128)	17:14	33	08:39 (128)	17:13
23	06:24		19:40 (94)	06:53			07:23	07:53		08:51 (128)	07:28		08:08 (128)	07:54
	20:59	37	20:17 (94)	20:23			19:31	18:45	57	09:48 (128)	17:13	30	08:38 (128)	17:13
24	06:25		19:40 (94)	06:54			07:24	07:54		08:51 (128)	07:30		08:10 (128)	07:55
	20:58	37	20:17 (94)	20:21			19:30	18:43	58	09:49 (128)	17:13	26	08:36 (128)	17:14
25	06:26		19:40 (94)	06:55			07:24	07:55		08:50 (128)	07:31		08:12 (128)	07:55
	20:57	37	20:17 (94)	20:20			19:28	18:42	59	09:49 (128)	17:12	22	08:34 (128)	17:14
26	06:27		19:39 (94)	06:56			07:25	07:56		08:50 (128)	07:32		08:14 (128)	07:55
	20:56	38	20:17 (94)	20:18			19:26	18:41	60	09:50 (128)	17:12	18	08:32 (128)	17:15
27	06:28		19:39 (94)	06:57			07:26	07:58		08:49 (128)	07:33		08:19 (128)	07:56
	20:55	38	20:17 (94)	20:17			19:25	18:39	61	09:50 (128)	17:11	11	08:30 (128)	17:16
28	06:29		19:39 (94)	06:58			07:27	07:59		08:49 (128)	07:34			07:56
	20:54	38	20:17 (94)	20:15			19:23	18:38	61	09:50 (128)	17:11			17:16
29	06:29		19:40 (94)	06:59			07:28	08:00		08:48 (128)	07:35			07:56
	20:53	37	20:17 (94)	20:14			19:22	18:37	62	09:50 (128)	17:11			17:17
30	06:30		19:40 (94)	07:00			07:29	08:01		08:49 (128)	07:36			07:57
	20:52	37	20:17 (94)	20:12			19:20	18:35	62	09:51 (128)	17:10			17:18
31	06:31		19:40 (94)	07:01				08:02		08:49 (128)				07:57
	20:51	37	20:17 (94)	20:11				18:34	61	09:50 (128)				17:18
Potential sun hours	456			426			374	346			300			291
Total, worst case		953			335				1085			1239		
Sun reduction		0.60			0.60				0.56			0.37		
Oper. time red.		1.00			1.00				1.00			1.00		
Wind dir. red.		0.63			0.63				0.61			0.61		
Total reduction		0.38			0.38				0.34			0.22		
Total, real		361			127				366			276		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 73

Licensed user:
EDR
217 Montgomery St.
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(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m**Shadow receptor:** 6538 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6044)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May		June		July		August		September	October	November	December
1	07:57	07:44	07:09	07:20	06:36		06:08	06:46 (130)	06:09	06:49 (130)	06:32	07:22 (130)	07:02	07:30	07:03	07:37
	17:19	17:53	18:26	19:58	20:28		20:57 63	07:49 (130)	21:08 69	07:58 (130)	20:50 11	07:33 (130)	20:09	19:18	17:33	17:10
2	07:57	07:43	07:08	07:18	06:34		06:08	06:46 (130)	06:09	06:49 (130)	06:33		07:03	07:31	07:04	07:38
	17:20	17:54	18:27	19:59	20:29		20:57 64	07:50 (130)	21:08 68	07:57 (130)	20:49		20:07	19:17	17:32	17:10
3	07:57	07:42	07:06	07:17	06:33		06:07	06:45 (130)	06:10	06:50 (130)	06:34		07:04	07:32	07:06	07:39
	17:21	17:55	18:28	20:00	20:30		20:58 65	07:50 (130)	21:08 68	07:58 (130)	20:48		20:06	19:15	17:31	17:10
4	07:57	07:41	07:05	07:15	06:32		06:07	06:45 (130)	06:10	06:50 (130)	06:35		07:05	07:33	07:07	07:40
	17:22	17:57	18:29	20:00	20:31		20:59 66	07:51 (130)	21:08 67	07:57 (130)	20:47		20:04	19:13	17:30	17:09
5	07:57	07:40	07:03	07:14	06:31		06:06	06:45 (130)	06:11	06:51 (130)	06:36		07:05	07:34	07:08	07:41
	17:23	17:58	18:30	20:01	20:32		20:59 66	07:51 (130)	21:07 67	07:58 (130)	20:46		20:03	19:12	17:28	17:09
6	07:57	07:39	07:02	07:12	06:29		06:06	06:46 (130)	06:12	06:52 (130)	06:37		07:06	07:35	07:09	07:42
	17:24	17:59	18:31	20:03	20:33		21:00 66	07:52 (130)	21:07 66	07:58 (130)	20:45		20:01	19:10	17:27	17:09
7	07:57	07:38	07:00	07:10	06:28		06:06	06:45 (130)	06:12	06:52 (130)	06:38		07:07	07:36	07:10	07:43
	17:25	18:00	18:32	20:04	20:34		21:01 67	07:52 (130)	21:07 66	07:58 (130)	20:44		19:58	19:09	17:26	17:09
8	07:57	07:37	07:59	07:09	06:27		06:06	06:45 (130)	06:13	06:52 (130)	06:39		07:08	07:37	07:11	07:44
	17:26	18:01	19:33	20:05	20:35		21:01 67	07:52 (130)	21:07 66	07:58 (130)	20:43		19:56	19:07	17:25	17:09
9	07:57	07:36	07:57	07:07	06:26		06:05	06:45 (130)	06:13	06:52 (130)	06:40		07:09	07:38	07:12	07:45
	17:27	18:03	19:35	20:06	20:36		21:02 68	07:53 (130)	21:06 65	07:57 (130)	20:42		19:55	19:05	17:24	17:09
10	07:57	07:35	07:55	07:06	06:25		06:05	06:45 (130)	06:14	06:53 (130)	06:41		07:10	07:39	07:14	07:45
	17:28	18:04	19:36	20:07	20:37		21:03 68	07:53 (130)	21:06 65	07:58 (130)	20:40		19:53	19:04	17:23	17:09
11	07:57	07:34	07:54	07:04	06:24		06:05	06:45 (130)	06:15	06:54 (130)	06:42		07:11	07:40	07:15	07:46
	17:29	18:05	19:37	20:08	20:38		21:03 69	07:54 (130)	21:06 64	07:58 (130)	20:39		19:51	19:02	17:22	17:09
12	07:56	07:32	07:52	07:03	06:23	07:09 (130)	06:05	06:46 (130)	06:15	06:54 (130)	06:43		07:12	07:41	07:16	07:47
	17:30	18:06	19:38	20:09	20:39 15	07:24 (130)	21:04 68	07:54 (130)	21:05 63	07:57 (130)	20:38		19:50	19:01	17:21	17:09
13	07:56	07:31	07:51	07:01	06:22	07:05 (130)	06:05	06:46 (130)	06:16	06:55 (130)	06:43		07:13	07:42	07:17	07:48
	17:31	18:07	19:39	20:10	20:40 23	07:28 (130)	21:04 68	07:54 (130)	21:05 62	07:57 (130)	20:37		19:48	18:59	17:20	17:09
14	07:56	07:30	07:49	06:59	06:21	07:02 (130)	06:05	06:46 (130)	06:17	06:55 (130)	06:44		07:14	07:44	07:18	07:49
	17:32	18:09	19:40	20:11	20:41 29	07:31 (130)	21:05 69	07:55 (130)	21:04 62	07:57 (130)	20:35		19:46	18:58	17:20	17:10
15	07:55	07:29	07:48	06:58	06:20	07:00 (130)	06:05	06:46 (130)	06:18	06:56 (130)	06:45		07:15	07:45	07:19	07:49
	17:33	18:10	19:41	20:12	20:42 33	07:33 (130)	21:05 69	07:55 (130)	21:04 61	07:57 (130)	20:34		19:45	18:56	17:19	17:10
16	07:55	07:27	07:46	06:56	06:19	06:58 (130)	06:05	06:46 (130)	06:18	06:56 (130)	06:46		07:16	07:46	07:20	07:50
	17:34	18:11	19:42	20:13	20:43 37	07:35 (130)	21:05 69	07:55 (130)	21:03 60	07:56 (130)	20:33		19:43	18:55	17:18	17:10
17	07:55	07:26	07:44	06:55	06:18	06:56 (130)	06:05	06:46 (130)	06:19	06:57 (130)	06:47		07:17	07:47	07:22	07:51
	17:35	18:12	19:43	20:14	20:44 40	07:36 (130)	21:06 69	07:55 (130)	21:03 59	07:56 (130)	20:31		19:41	18:53	17:17	17:11
18	07:54	07:25	07:43	06:53	06:17	06:55 (130)	06:05	06:46 (130)	06:20	06:58 (130)	06:48		07:18	07:48	07:23	07:51
	17:36	18:13	19:44	20:15	20:45 44	07:39 (130)	21:06 70	07:56 (130)	21:02 57	07:55 (130)	20:30		19:40	18:52	17:16	17:11
19	07:54	07:24	07:41	06:52	06:16	06:54 (130)	06:05	06:46 (130)	06:21	06:59 (130)	06:49		07:19	07:49	07:24	07:52
	17:38	18:14	19:45	20:16	20:46 46	07:40 (130)	21:06 70	07:56 (130)	21:01 56	07:55 (130)	20:28		19:38	18:50	17:16	17:11
20	07:53	07:22	07:39	06:51	06:16	06:53 (130)	06:05	06:46 (130)	06:22	06:59 (130)	06:50		07:20	07:50	07:25	07:53
	17:39	18:16	19:46	20:17	20:47 48	07:41 (130)	21:07 70	07:56 (130)	21:01 54	07:53 (130)	20:27		19:36	18:49	17:15	17:12
21	07:53	07:21	07:38	06:49	06:15	06:51 (130)	06:06	06:46 (130)	06:22	07:00 (130)	06:51		07:21	07:51	07:26	07:53
	17:40	18:17	19:47	20:18	20:47 50	07:41 (130)	21:07 70	07:56 (130)	21:00 53	07:53 (130)	20:26		19:35	18:47	17:14	17:12
22	07:52	07:19	07:36	06:48	06:14	06:51 (130)	06:06	06:47 (130)	06:23	07:01 (130)	06:52		07:22	07:52	07:27	07:54
	17:41	18:18	19:48	20:19	20:48 52	07:43 (130)	21:07 70	07:57 (130)	20:59 51	07:52 (130)	20:24		19:33	18:46	17:14	17:13
23	07:51	07:18	07:35	06:46	06:13	06:50 (130)	06:06	06:47 (130)	06:24	07:02 (130)	06:53		07:23	07:53	07:28	07:54
	17:42	18:19	19:49	20:20	20:49 54	07:44 (130)	21:07 70	07:57 (130)	20:59 50	07:52 (130)	20:23		19:31	18:45	17:13	17:13
24	07:51	07:17	07:33	06:45	06:13	06:49 (130)	06:06	06:47 (130)	06:25	07:04 (130)	06:54		07:23	07:54	07:30	07:55
	17:43	18:20	19:50	20:21	20:50 55	07:44 (130)	21:08 70	07:57 (130)	20:58 47	07:51 (130)	20:21		19:30	18:43	17:13	17:14
25	07:50	07:15	07:31	06:43	06:12	06:49 (130)	06:07	06:48 (130)	06:26	07:04 (130)	06:55		07:24	07:55	07:31	07:55
	17:45	18:21	19:51	20:22	20:51 57	07:46 (130)	21:08 69	07:57 (130)	20:57 45	07:49 (130)	20:20		19:28	18:42	17:12	17:14
26	07:49	07:14	07:30	06:42	06:11	06:48 (130)	06:07	06:48 (130)	06:27	07:06 (130)	06:56		07:25	07:56	07:32	07:55
	17:46	18:22	19:52	20:23	20:52 58	07:46 (130)	21:08 69	07:57 (130)	20:56 42	07:48 (130)	20:18		19:26	18:41	17:12	17:15
27	07:48	07:12	07:28	06:41	06:11	06:47 (130)	06:07	06:48 (130)	06:28	07:07 (130)	06:57		07:26	07:58	07:33	07:56
	17:47	18:24	19:53	20:24	20:53 59	07:46 (130)	21:08 69	07:57 (130)	20:55 39	07:46 (130)	20:17		19:25	18:39	17:11	17:16
28	07:48	07:11	07:26	06:39	06:10	06:47 (130)	06:08	06:49 (130)	06:28	07:09 (130)	06:58		07:27	07:59	07:34	07:56
	17:48	18:25	19:54	20:25	20:53 60	07:47 (130)	21:08 69	07:58 (130)	20:54 36	07:45 (130)	20:15		19:23	18:38	17:11	17:16
29	07:47		07:25	06:38	06:09	06:46 (130)	06:08	06:49 (130)	06:29	07:11 (130)	06:59		07:28	08:00	07:35	07:56
	17:49		19:55	20:26	20:54 61	07:47 (130)	21:08 69	07:58 (130)	20:53 32	07:43 (130)	20:14		19:22	18:37	17:11	17:17
30	07:46		07:23	06:37	06:09	06:46 (130)	06:08	06:49 (130)	06:30	07:14 (130)	07:00		07:29	08:01	07:36	07:57
	17:51		19:56	20:27	20:55 62	07:48 (130)	21:08 68	07:57 (130)	20:52 27	07:41 (130)	20:12		19:20	18:35	17:10	17:18
31	07:45		07:22		06:08	06:47 (130)			06:31	07:17 (130)	07:01			08:02		07:57
	17:52		19:57		20:56 62	07:49 (130)			20:51 21	07:38 (130)	20:11			18:34		17:18
Potential sun hours	300	299	370	397	446		449		456		426		374	346	300	291
Total, worst case					945		2044		1708		11					
Sun reduction					0.56		0.60		0.60		0.60					
Oper. time red.					1.00		1.00		1.00		1.00					
Wind dir. red.					0.68		0.68		0.68		0.68					
Total reduction					0.38		0.41		0.41		0.41					
Total, real					361		837		699		5					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 74

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m**Shadow receptor:** 7825 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6113)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June
1	07:57		15:10 (83)	07:45			07:10		17:27 (82)	07:20			06:36		19:28 (81)	06:08
	17:20	44	15:54 (83)	17:53			18:26	25	17:52 (82)	19:59			20:28	37	20:05 (81)	20:57
2	07:58		15:10 (83)	07:44			07:08		17:24 (82)	07:19			06:35		19:28 (81)	06:08
	17:21	44	15:54 (83)	17:54			18:27	30	17:54 (82)	20:00			20:29	37	20:05 (81)	20:58
3	07:58		15:11 (83)	07:43			07:07		17:23 (82)	07:17			06:33		19:27 (81)	06:07
	17:21	43	15:54 (83)	17:56			18:28	33	17:56 (82)	20:00			20:30	38	20:05 (81)	20:58
4	07:58		15:12 (83)	07:42			07:05		17:21 (82)	07:15			06:32		19:27 (81)	06:07
	17:22	42	15:54 (83)	17:57			18:29	36	17:57 (82)	20:01			20:31	39	20:06 (81)	20:59
5	07:58		15:13 (83)	07:41			07:04		17:19 (82)	07:14			06:31		19:26 (81)	06:07
	17:23	41	15:54 (83)	17:58			18:31	40	17:59 (82)	20:02			20:32	39	20:05 (81)	21:00
6	07:58		15:14 (83)	07:40			07:02		17:18 (82)	07:12			06:30		19:26 (81)	06:06
	17:24	40	15:54 (83)	17:59			18:32	42	18:00 (82)	20:03			20:33	39	20:05 (81)	21:01
7	07:58		15:15 (83)	07:39			07:01		17:17 (82)	07:11			06:29		19:26 (81)	06:06
	17:25	40	15:55 (83)	18:00			18:33	44	18:01 (82)	20:04			20:34	39	20:05 (81)	21:01
8	07:58		15:16 (83)	07:37			07:59		18:16 (82)	07:09			06:27		19:26 (81)	06:06
	17:26	39	15:55 (83)	18:02			19:34	45	19:01 (82)	20:05			20:35	39	20:05 (81)	21:02
9	07:57		15:18 (83)	07:36			07:57		18:14 (82)	07:07			06:26		19:26 (81)	06:06
	17:27	37	15:55 (83)	18:03			19:35	47	19:01 (82)	20:06			20:36	39	20:05 (81)	21:02
10	07:57		15:19 (83)	07:35			07:56		18:14 (82)	07:06			06:25		19:27 (81)	06:05
	17:28	36	15:55 (83)	18:04			19:36	48	19:02 (82)	20:07			20:37	38	20:05 (81)	21:03
11	07:57		15:20 (83)	07:34			07:54		18:13 (82)	07:04			06:24		19:27 (81)	06:05
	17:29	33	15:53 (83)	18:05			19:37	49	19:02 (82)	20:08			20:38	38	20:05 (81)	21:03
12	07:57		15:22 (83)	07:33			07:53		18:13 (82)	07:03			06:23		19:27 (81)	06:05
	17:30	31	15:53 (83)	18:06			19:38	50	19:03 (82)	20:09			20:39	37	20:04 (81)	21:04
13	07:56		15:23 (83)	07:32			07:51		18:12 (82)	07:01			06:22		19:27 (81)	06:05
	17:31	30	15:53 (83)	18:08			19:39	51	19:03 (82)	20:10			20:40	37	20:04 (81)	21:04
14	07:56		15:25 (83)	07:30			07:49		18:11 (82)	07:00			06:21		19:28 (81)	06:05
	17:32	26	15:51 (83)	18:09			19:40	51	19:02 (82)	20:11			20:41	35	20:03 (81)	21:05
15	07:56		15:27 (83)	07:29			07:48		18:12 (82)	06:58			06:20		19:28 (81)	06:05
	17:33	24	15:51 (83)	18:10			19:41	51	19:03 (82)	20:12			20:42	35	20:03 (81)	21:05
16	07:55		15:29 (83)	07:28			07:46		18:11 (82)	06:57			06:19		19:29 (81)	06:05
	17:34	20	15:49 (83)	18:11			19:42	51	19:02 (82)	20:13			20:43	33	20:02 (81)	21:06
17	07:55		15:32 (83)	07:27			07:45		18:11 (82)	06:55			06:18		19:30 (81)	06:05
	17:36	15	15:47 (83)	18:12			19:43	50	19:01 (82)	20:14			20:44	32	20:02 (81)	21:06
18	07:55		15:36 (83)	07:25			07:43		18:11 (82)	06:54			06:17		19:31 (81)	06:05
	17:37	7	15:43 (83)	18:14			19:44	50	19:01 (82)	20:15			20:45	31	20:02 (81)	21:07
19	07:54			07:24			07:41		18:11 (82)	06:52			06:17		19:31 (81)	06:05
	17:38			18:15			19:45	49	19:00 (82)	20:16			20:46	30	20:01 (81)	21:07
20	07:53			07:23			07:40		18:12 (82)	06:51			06:16		19:32 (81)	06:06
	17:39			18:16			19:46	48	19:00 (82)	20:17			20:47	28	20:00 (81)	21:07
21	07:53			07:21			07:38		18:12 (82)	06:49			06:15		19:32 (81)	06:06
	17:40			18:17			19:47	47	18:59 (82)	20:18			20:48	27	19:59 (81)	21:07
22	07:52			07:20			07:36		18:12 (82)	06:48		19:43 (81)	06:14		19:34 (81)	06:06
	17:41			18:18			19:49	46	18:58 (82)	20:19	10	19:53 (81)	20:49	24	19:58 (81)	21:08
23	07:52			07:18			07:35		18:13 (82)	06:47		19:40 (81)	06:13		19:35 (81)	06:06
	17:42			18:19			19:50	44	18:57 (82)	20:20	17	19:57 (81)	20:50	22	19:57 (81)	21:08
24	07:51			07:17			07:33		18:13 (82)	06:45		19:37 (81)	06:13		19:36 (81)	06:06
	17:44			18:20			19:51	43	18:56 (82)	20:21	21	19:58 (81)	20:51	20	19:56 (81)	21:08
25	07:50			07:16			07:32		18:14 (82)	06:44		19:35 (81)	06:12		19:38 (81)	06:07
	17:45			18:22			19:52	40	18:54 (82)	20:22	25	20:00 (81)	20:51	17	19:55 (81)	21:08
26	07:50			07:14			07:30		18:16 (82)	06:42		19:33 (81)	06:11		19:40 (81)	06:07
	17:46			18:23			19:53	37	18:53 (82)	20:23	28	20:01 (81)	20:52	13	19:53 (81)	21:08
27	07:49			07:13		17:37 (82)	07:28		18:16 (82)	06:41		19:32 (81)	06:11		19:43 (81)	06:07
	17:47			18:24	6	17:43 (82)	19:54	35	18:51 (82)	20:24	30	20:02 (81)	20:53	8	19:51 (81)	21:08
28	07:48			07:11		17:30 (82)	07:27		18:18 (82)	06:40		19:31 (81)	06:10			06:08
	17:48			18:25	19	17:49 (82)	19:55	31	18:49 (82)	20:25	32	20:03 (81)	20:54			21:08
29	07:47						07:25		18:20 (82)	06:38		19:30 (81)	06:10			06:08
	17:50						19:56	27	18:47 (82)	20:26	34	20:04 (81)	20:55			21:08
30	07:46						07:23		18:22 (82)	06:37		19:29 (81)	06:09			06:09
	17:51						19:57	21	18:43 (82)	20:27	35	20:04 (81)	20:55			21:08
31	07:45						07:22		18:25 (82)				06:09			
	17:52						19:58	14	18:39 (82)				20:56			
Potential sun hours	300			299			370			397			446			449
Total, worst case		592			25			1275			232			851		
Sun reduction		0.36			0.42			0.44			0.51			0.56		
Oper. time red.		1.00			1.00			1.00			1.00			1.00		
Wind dir. red.		0.67			0.67			0.67			0.63			0.63		
Total reduction		0.24			0.28			0.29			0.32			0.36		
Total, real		143			7			375			75			303		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 75

Licensed user:
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217 Montgomery St.
US-SYRACUSE, NY 13202
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Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m**Shadow receptor:** 7825 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6113)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09			06:32		19:38 (81)	07:02			07:31		17:51 (82)	07:04			07:37		15:02 (83)
	21:08			20:51	37	20:15 (81)	20:09			19:19	51	18:42 (82)	17:33			17:10	33	15:35 (83)
2	06:10			06:33		19:37 (81)	07:03			07:32		17:51 (82)	07:05			07:38		15:01 (83)
	21:08			20:50	38	20:15 (81)	20:08			19:17	50	18:41 (82)	17:32			17:10	36	15:37 (83)
3	06:10			06:34		19:37 (81)	07:04			07:33		17:51 (82)	07:06			07:39		15:01 (83)
	21:08			20:49	39	20:16 (81)	20:06			19:15	49	18:40 (82)	17:31			17:10	37	15:38 (83)
4	06:11			06:35		19:37 (81)	07:05			07:34		17:52 (82)	07:07			07:40		15:00 (83)
	21:08			20:48	39	20:16 (81)	20:05			19:14	47	18:39 (82)	17:30			17:10	39	15:39 (83)
5	06:11			06:36		19:36 (81)	07:06			07:35		17:52 (82)	07:08			07:41		15:00 (83)
	21:08			20:47	39	20:15 (81)	20:03			19:12	46	18:38 (82)	17:29			17:09	40	15:40 (83)
6	06:12			06:37		19:36 (81)	07:07			07:36		17:52 (82)	07:09			07:42		15:00 (83)
	21:08			20:45	39	20:15 (81)	20:01			19:10	45	18:37 (82)	17:28			17:09	41	15:41 (83)
7	06:12			06:38		19:36 (81)	07:08			07:37		17:53 (82)	07:10			07:43		15:00 (83)
	21:07			20:44	39	20:15 (81)	20:00			19:09	43	18:36 (82)	17:27			17:09	41	15:41 (83)
8	06:13			06:39		19:36 (81)	07:09			07:38		17:54 (82)	07:12			07:44		15:00 (83)
	21:07			20:43	39	20:15 (81)	19:57			19:07	40	18:34 (82)	17:26			17:09	42	15:42 (83)
9	06:14			06:40		19:36 (81)	07:10			07:39		17:54 (82)	07:13			07:45		15:00 (83)
	21:07			20:42	38	20:14 (81)	19:55			19:06	39	18:33 (82)	17:24			17:09	43	15:43 (83)
10	06:14			06:41		19:36 (81)	07:10			07:40		17:56 (82)	07:14			07:46		15:00 (83)
	21:06			20:41	38	20:14 (81)	19:53			19:04	35	18:31 (82)	17:24			17:09	44	15:44 (83)
11	06:15			06:42		19:37 (81)	07:11			07:41		17:57 (82)	07:15			07:47		15:01 (83)
	21:06			20:39	37	20:14 (81)	19:52			19:03	32	18:29 (82)	17:23			17:09	44	15:45 (83)
12	06:16			06:43		19:37 (81)	07:12		18:18 (82)	07:42		17:59 (82)	07:16			07:47		15:00 (83)
	21:06			20:38	36	20:13 (81)	19:50	12	18:30 (82)	19:01	28	18:27 (82)	17:22			17:10	45	15:45 (83)
13	06:16			06:44		19:37 (81)	07:13		18:14 (82)	07:43		18:02 (82)	07:17			07:48		15:00 (83)
	21:05			20:37	35	20:12 (81)	19:48	20	18:34 (82)	18:59	23	18:25 (82)	17:21			17:10	46	15:46 (83)
14	06:17			06:45		19:38 (81)	07:14		18:11 (82)	07:44		18:06 (82)	07:19			07:49		15:01 (83)
	21:05			20:36	34	20:12 (81)	19:47	26	18:37 (82)	18:58	14	18:20 (82)	17:20			17:10	46	15:47 (83)
15	06:18			06:46		19:39 (81)	07:15		18:08 (82)	07:45			07:20			07:50		15:02 (83)
	21:04			20:34	32	20:11 (81)	19:45	30	18:38 (82)	18:56			17:19			17:10	46	15:48 (83)
16	06:19		19:53 (81)	06:47		19:40 (81)	07:16		18:06 (82)	07:46			07:21			07:50		15:01 (83)
	21:04	4	19:57 (81)	20:33	30	20:10 (81)	19:43	34	18:40 (82)	18:55			17:18			17:10	47	15:48 (83)
17	06:19		19:50 (81)	06:48		19:40 (81)	07:17		18:04 (82)	07:47			07:22			07:51		15:02 (83)
	21:03	11	20:01 (81)	20:32	27	20:07 (81)	19:42	37	18:41 (82)	18:53			17:17			17:11	46	15:48 (83)
18	06:20		19:48 (81)	06:49		19:41 (81)	07:18		18:02 (82)	07:48			07:23			07:52		15:03 (83)
	21:02	15	20:03 (81)	20:30	25	20:06 (81)	19:40	40	18:42 (82)	18:52			17:17			17:11	46	15:49 (83)
19	06:21		19:47 (81)	06:49		19:43 (81)	07:19		18:01 (82)	07:49			07:24			07:52		15:02 (83)
	21:02	18	20:05 (81)	20:29	21	20:04 (81)	19:38	42	18:43 (82)	18:51			17:16			17:11	47	15:49 (83)
20	06:22		19:46 (81)	06:50		19:45 (81)	07:20		18:00 (82)	07:50			07:25			07:53		15:03 (83)
	21:01	21	20:07 (81)	20:27	16	20:01 (81)	19:37	43	18:43 (82)	18:49			17:15			17:12	47	15:50 (83)
21	06:23		19:44 (81)	06:51		19:49 (81)	07:21		17:57 (82)	07:51			07:27			07:53		15:03 (83)
	21:00	23	20:07 (81)	20:26	8	19:57 (81)	19:35	46	18:43 (82)	18:48			17:15			17:12	47	15:50 (83)
22	06:23		19:43 (81)	06:52			07:22		17:56 (82)	07:52			07:28			07:54		15:04 (83)
	21:00	25	20:08 (81)	20:25			19:33	47	18:43 (82)	18:46			17:14			17:13	47	15:51 (83)
23	06:24		19:43 (81)	06:53			07:23		17:55 (82)	07:53			07:29			07:54		15:04 (83)
	20:59	27	20:10 (81)	20:23			19:32	48	18:43 (82)	18:45			17:14			17:13	47	15:51 (83)
24	06:25		19:42 (81)	06:54			07:24		17:54 (82)	07:55			07:30		15:14 (83)	07:55		15:05 (83)
	20:58	29	20:11 (81)	20:22			19:30	50	18:44 (82)	18:44			17:13	7	15:21 (83)	17:14	47	15:52 (83)
25	06:26		19:41 (81)	06:55			07:25		17:54 (82)	07:56			07:31		15:10 (83)	07:55		15:05 (83)
	20:57	31	20:12 (81)	20:20			19:28	50	18:44 (82)	18:42			17:12	15	15:25 (83)	17:14	47	15:52 (83)
26	06:27		19:41 (81)	06:56			07:26		17:53 (82)	07:57			07:32		15:08 (83)	07:56		15:06 (83)
	20:57	31	20:12 (81)	20:19			19:27	51	18:44 (82)	18:41			17:12	20	15:28 (83)	17:15	46	15:52 (83)
27	06:28		19:39 (81)	06:57			07:27		17:53 (82)	07:58			07:33		15:06 (83)	07:56		15:06 (83)
	20:56	33	20:12 (81)	20:17			19:25	50	18:43 (82)	18:40			17:12	24	15:30 (83)	17:16	46	15:52 (83)
28	06:29		19:39 (81)	06:58			07:28		17:52 (82)	07:59			07:34		15:05 (83)	07:56		15:07 (83)
	20:55	34	20:13 (81)	20:16			19:23	51	18:43 (82)	18:38			17:11	26	15:31 (83)	17:16	47	15:54 (83)
29	06:30		19:39 (81)	06:59			07:29		17:52 (82)	08:00			07:35		15:04 (83)	07:57		15:08 (83)
	20:54	35	20:14 (81)	20:14			19:22	51	18:43 (82)	18:37			17:11	29	15:33 (83)	17:17	46	15:54 (83)
30	06:31		19:38 (81)	07:00			07:30		17:51 (82)	08:01			07:36		15:03 (83)	07:57		15:08 (83)
	20:53	36	20:14 (81)	20:13			19:20	51	18:42 (82)	18:36			17:10	31	15:34 (83)	17:18	46	15:54 (83)
31	06:31		19:38 (81)	07:01						08:02						07:57		15:09 (83)
	20:52	37	20:15 (81)	20:11						18:35						17:19	45	15:54 (83)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		410			686			779			542			152			1367	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.63			0.63			0.67			0.67			0.67			0.67	
Total reduction		0.38			0.38			0.41			0.37			0.25			0.34	
Total, real		156			262			317			203			38			458	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 76

Licensed user:
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Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m**Shadow receptor:** 8351 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6151)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:25 (108)	07:45			07:10		07:44 (83)	07:20			06:36		07:24 (82)	06:08		06:29 (106)
	17:20	29	08:54 (108)	17:53			18:26	38	08:22 (83)	19:59			20:28	89	19:58 (107)	20:57	45	19:53 (107)
2	07:58		08:25 (108)	07:44			07:08		07:44 (83)	07:19			06:35		07:24 (82)	06:08		06:29 (106)
	17:21	29	08:54 (108)	17:54			18:27	37	08:21 (83)	20:00			20:29	91	19:59 (107)	20:58	43	19:52 (107)
3	07:58		08:26 (108)	07:43			07:07		07:44 (83)	07:17			06:33		07:24 (82)	06:07		06:29 (106)
	17:21	30	08:56 (108)	17:56			18:28	37	08:21 (83)	20:00			20:30	92	20:00 (107)	20:59	43	19:52 (107)
4	07:58		08:26 (108)	07:42			07:05		07:44 (83)	07:15			06:32		07:25 (82)	06:07		06:28 (106)
	17:22	29	08:55 (108)	17:57			18:29	36	08:20 (83)	20:01			20:31	91	20:00 (107)	20:59	43	19:51 (107)
5	07:58		08:26 (108)	07:41			07:04		07:44 (83)	07:14			06:31		07:24 (82)	06:07		06:29 (106)
	17:23	30	08:56 (108)	17:58			18:31	36	08:20 (83)	20:02			20:32	92	20:00 (107)	21:00	40	19:50 (107)
6	07:58		08:27 (108)	07:40			07:02		07:44 (83)	07:12			06:30		07:24 (82)	06:06		06:29 (106)
	17:24	29	08:56 (108)	17:59			18:32	35	08:19 (83)	20:03			20:33	91	20:00 (107)	21:01	39	19:50 (107)
7	07:58		08:27 (108)	07:39			07:01		07:45 (83)	07:11			06:29		07:25 (82)	06:06		06:29 (106)
	17:25	30	08:57 (108)	18:01			18:33	34	08:19 (83)	20:04			20:34	91	20:01 (107)	21:01	37	19:49 (107)
8	07:58		08:28 (108)	07:37			07:59		08:45 (83)	07:09			06:27		07:25 (82)	06:06		06:28 (106)
	17:26	29	08:57 (108)	18:02			19:34	32	09:17 (83)	20:05			20:35	91	20:01 (107)	21:02	36	19:47 (107)
9	07:57		08:29 (108)	07:36			07:57		08:46 (83)	07:08			06:26		07:26 (82)	06:06		06:28 (106)
	17:27	29	08:58 (108)	18:03			19:35	29	09:15 (83)	20:06			20:36	90	20:01 (107)	21:02	33	19:46 (107)
10	07:57		08:29 (108)	07:35			07:56		08:47 (83)	07:06		07:50 (82)	06:25		07:27 (82)	06:06		06:29 (106)
	17:28	29	08:58 (108)	18:04			19:36	27	09:14 (83)	20:07	11	08:01 (82)	20:37	88	20:01 (107)	21:03	27	19:44 (107)
11	07:57		08:29 (108)	07:34			07:54		08:48 (83)	07:04		07:44 (82)	06:24		07:27 (82)	06:05		06:29 (106)
	17:29	29	08:58 (108)	18:05			19:37	24	09:12 (83)	20:08	21	08:05 (82)	20:38	87	20:01 (107)	21:04	24	06:53 (106)
12	07:57		08:30 (108)	07:33			07:53		08:51 (83)	07:03		07:41 (82)	06:23		07:28 (82)	06:05		06:29 (106)
	17:30	29	08:59 (108)	18:07			19:38	19	09:10 (83)	20:09	27	08:08 (82)	20:39	85	20:01 (107)	21:04	24	06:53 (106)
13	07:57		08:31 (108)	07:32			07:51		08:53 (83)	07:01		07:38 (82)	06:22		07:29 (82)	06:05		06:29 (106)
	17:31	28	08:59 (108)	18:08			19:39	13	09:06 (83)	20:10	31	08:09 (82)	20:40	83	20:01 (107)	21:05	25	06:54 (106)
14	07:56		08:31 (108)	07:30			07:49			07:00		07:37 (82)	06:21		07:30 (82)	06:05		06:29 (106)
	17:32	28	08:59 (108)	18:09			19:40			20:11	34	08:11 (82)	20:41	80	20:00 (107)	21:05	25	06:54 (106)
15	07:56		08:32 (108)	07:29			07:48			06:58		07:35 (82)	06:20		07:31 (82)	06:05		06:30 (106)
	17:33	27	08:59 (108)	18:10			19:41			20:12	37	08:12 (82)	20:42	77	20:00 (107)	21:05	24	06:54 (106)
16	07:55		08:32 (108)	07:28			07:46			06:57		07:33 (82)	06:19		07:32 (82)	06:05		06:30 (106)
	17:34	27	08:59 (108)	18:11			19:42			20:13	41	08:14 (82)	20:43	75	20:00 (107)	21:06	24	06:54 (106)
17	07:55		08:33 (108)	07:27			07:45			06:55		07:32 (82)	06:18		07:34 (82)	06:05		06:30 (106)
	17:36	26	08:59 (108)	18:12			19:43			20:14	42	08:14 (82)	20:44	71	20:00 (107)	21:06	24	06:54 (106)
18	07:55		08:34 (108)	07:25		07:59 (83)	07:43			06:54		07:31 (82)	06:17		07:35 (82)	06:05		06:30 (106)
	17:37	24	08:58 (108)	18:14	11	08:10 (83)	19:44			20:15	44	08:15 (82)	20:45	69	20:00 (107)	21:07	24	06:54 (106)
19	07:54		08:35 (108)	07:24		07:55 (83)	07:41			06:52		07:29 (82)	06:17		07:36 (82)	06:05		06:30 (106)
	17:38	24	08:59 (108)	18:15	18	08:13 (83)	19:45			20:16	46	08:15 (82)	20:46	65	19:59 (107)	21:07	25	06:55 (106)
20	07:54		08:36 (108)	07:23		07:53 (83)	07:40			06:51		07:29 (82)	06:16		07:38 (82)	06:06		06:31 (106)
	17:39	22	08:58 (108)	18:16	22	08:15 (83)	19:46			20:17	47	08:16 (82)	20:47	60	19:59 (107)	21:07	25	06:56 (106)
21	07:53		08:37 (108)	07:21		07:52 (83)	07:38			06:49		07:27 (82)	06:15		07:41 (82)	06:06		06:31 (106)
	17:40	21	08:58 (108)	18:17	25	08:17 (83)	19:48			20:18	49	08:16 (82)	20:48	55	19:59 (107)	21:07	25	06:56 (106)
22	07:52		08:38 (108)	07:20		07:50 (83)	07:37			06:48		07:27 (82)	06:14		07:43 (82)	06:06		06:31 (106)
	17:41	19	08:57 (108)	18:18	28	08:18 (83)	19:49			20:19	49	08:16 (82)	20:49	48	19:58 (107)	21:08	25	06:56 (106)
23	07:52		08:40 (108)	07:18		07:49 (83)	07:35			06:47		07:27 (82)	06:14		19:20 (107)	06:06		06:31 (106)
	17:42	15	08:55 (108)	18:19	31	08:20 (83)	19:50			20:20	60	19:46 (107)	20:50	38	19:58 (107)	21:08	25	06:56 (106)
24	07:51		08:42 (108)	07:17		07:47 (83)	07:33			06:45		07:25 (82)	06:13		19:21 (107)	06:06		06:31 (106)
	17:44	11	08:53 (108)	18:21	33	08:20 (83)	19:51			20:21	69	19:49 (107)	20:51	36	19:57 (107)	21:08	25	06:56 (106)
25	07:50		08:46 (108)	07:16		07:47 (83)	07:32			06:44		07:25 (82)	06:12		19:22 (107)	06:07		06:32 (106)
	17:45	5	08:51 (108)	18:22	34	08:21 (83)	19:52			20:22	75	19:52 (107)	20:51	35	19:57 (107)	21:08	24	06:56 (106)
26	07:50			07:14		07:45 (83)	07:30			06:42		07:25 (82)	06:11		06:34 (106)	06:07		06:32 (106)
	17:46			18:23	36	08:21 (83)	19:53			20:23	79	19:54 (107)	20:52	42	19:56 (107)	21:08	24	06:56 (106)
27	07:49			07:13		07:45 (83)	07:28			06:41		07:24 (82)	06:11		06:33 (106)	06:07		06:32 (106)
	17:47			18:24	36	08:21 (83)	19:54			20:24	82	19:55 (107)	20:53	43	19:56 (107)	21:08	24	06:56 (106)
28	07:48			07:11		07:44 (83)	07:27			06:40		07:24 (82)	06:10		06:32 (106)	06:08		06:32 (106)
	17:48			18:25	37	08:21 (83)	19:55			20:25	85	19:56 (107)	20:54	44	19:55 (107)	21:08	25	06:57 (106)
29	07:47						07:25			06:38		07:24 (82)	06:10		06:31 (106)	06:08		06:32 (106)
	17:50						19:56			20:26	87	19:57 (107)	20:55	46	19:55 (107)	21:08	25	06:57 (106)
30	07:46						07:23			06:37		07:24 (82)	06:09		06:30 (106)	06:09		06:33 (106)
	17:51						19:57			20:27	88	19:58 (107)	20:56	46	19:54 (107)	21:08	24	06:57 (106)
31	07:46						07:22						06:09		06:30 (106)			
	17:52						19:58						20:56	45	19:54 (107)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		628			311			397			1104			2136			876	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.61			0.63			0.63			0.66			0.65			0.67	
Total reduction		0.22			0.26			0.28			0.34			0.36			0.40	
Total, real		137			82			110			371			774			353	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 77

Licensed user:
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US-SYRACUSE, NY 13202
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Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m**Shadow receptor:** 8351 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6151)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:33 (106)	06:32		07:38 (82)	07:02		07:43 (82)	07:31		08:30 (83)	07:04			07:37		08:11 (108)
	21:08	24	06:57 (106)	20:51	85	20:11 (107)	20:09	21	08:04 (82)	19:19	17	08:47 (83)	17:33			17:10	29	08:40 (108)
2	06:10		06:34 (106)	06:33		07:38 (82)	07:03		07:48 (82)	07:32		08:28 (83)	07:05			07:38		08:11 (108)
	21:08	24	06:58 (106)	20:50	86	20:11 (107)	20:08	11	07:59 (82)	19:17	22	08:50 (83)	17:32			17:10	29	08:40 (108)
3	06:10		06:34 (106)	06:34		07:37 (82)	07:04			07:33		08:26 (83)	07:06			07:39		08:12 (108)
	21:08	30	19:50 (107)	20:49	88	20:11 (107)	20:06			19:15	25	08:51 (83)	17:31			17:10	29	08:41 (108)
4	06:11		06:34 (106)	06:35		07:36 (82)	07:05			07:34		08:24 (83)	07:07			07:40		08:12 (108)
	21:08	34	19:52 (107)	20:48	89	20:11 (107)	20:05			19:14	28	08:52 (83)	17:30			17:10	29	08:41 (108)
5	06:11		06:34 (106)	06:36		07:35 (82)	07:06			07:35		08:22 (83)	07:08			07:41		08:12 (108)
	21:08	36	19:53 (107)	20:47	90	20:10 (107)	20:03			19:12	31	08:53 (83)	17:29			17:09	30	08:42 (108)
6	06:12		06:35 (106)	06:37		07:34 (82)	07:07			07:36		08:21 (83)	07:09			07:42		08:13 (108)
	21:08	38	19:55 (107)	20:45	92	20:10 (107)	20:01			19:10	33	08:54 (83)	17:28			17:09	29	08:42 (108)
7	06:12		06:35 (106)	06:38		07:34 (82)	07:08			07:37		08:20 (83)	07:11			07:43		08:13 (108)
	21:07	40	19:56 (107)	20:44	91	20:10 (107)	20:00			19:09	34	08:54 (83)	17:27			17:09	30	08:43 (108)
8	06:13		06:36 (106)	06:39		07:34 (82)	07:09			07:38		08:19 (83)	07:12			07:44		08:14 (108)
	21:07	40	19:57 (107)	20:43	91	20:09 (107)	19:57			19:07	36	08:55 (83)	17:26			17:09	29	08:43 (108)
9	06:14		06:36 (106)	06:40		07:33 (82)	07:10			07:39		08:19 (83)	07:13			07:45		08:14 (108)
	21:07	43	19:59 (107)	20:42	92	20:09 (107)	19:55			19:06	36	08:55 (83)	17:25			17:09	30	08:44 (108)
10	06:14		06:36 (106)	06:41		07:33 (82)	07:11			07:40		08:18 (83)	07:14			07:46		08:15 (108)
	21:06	44	19:59 (107)	20:41	90	20:08 (107)	19:53			19:04	37	08:55 (83)	17:24			17:09	29	08:44 (108)
11	06:15		06:37 (106)	06:42		07:33 (82)	07:11			07:41		08:18 (83)	07:15			07:47		08:16 (108)
	21:06	45	20:01 (107)	20:39	91	20:08 (107)	19:52			19:03	37	08:55 (83)	17:23			17:09	29	08:45 (108)
12	06:16		06:38 (106)	06:43		07:32 (82)	07:12			07:42		08:17 (83)	07:16			07:47		08:16 (108)
	21:06	46	20:02 (107)	20:38	90	20:07 (107)	19:50			19:01	37	08:54 (83)	17:22			17:10	28	08:44 (108)
13	06:16		06:38 (106)	06:44		07:32 (82)	07:13			07:43		08:18 (83)	07:17			07:48		08:16 (108)
	21:05	46	20:02 (107)	20:37	89	20:06 (107)	19:48			19:00	37	08:55 (83)	17:21			17:10	29	08:45 (108)
14	06:17		06:39 (106)	06:45		07:32 (82)	07:14			07:44		08:18 (83)	07:19			07:49		08:17 (108)
	21:05	45	20:03 (107)	20:36	87	20:05 (107)	19:47			18:58	36	08:54 (83)	17:20			17:10	28	08:45 (108)
15	06:18		06:40 (106)	06:46		07:32 (82)	07:15			07:45		08:18 (83)	07:20			07:50		08:18 (108)
	21:04	46	20:04 (107)	20:34	85	20:04 (107)	19:45			18:57	36	08:54 (83)	17:19			17:10	28	08:46 (108)
16	06:19		06:42 (106)	06:47		07:32 (82)	07:16			07:46		08:18 (83)	07:21			07:50		08:18 (108)
	21:04	44	20:05 (107)	20:33	81	20:02 (107)	19:43			18:55	35	08:53 (83)	17:18			17:10	28	08:46 (108)
17	06:19		06:43 (106)	06:48		07:31 (82)	07:17			07:47		08:18 (83)	07:22		08:19 (108)	07:51		08:19 (108)
	21:03	42	20:05 (107)	20:32	79	20:00 (107)	19:42			18:54	34	08:52 (83)	17:17	5	08:24 (108)	17:11	28	08:47 (108)
18	06:20		06:45 (106)	06:49		07:31 (82)	07:18			07:48		08:19 (83)	07:23		08:16 (108)	07:52		08:19 (108)
	21:03	39	20:06 (107)	20:30	73	19:57 (107)	19:40			18:52	32	08:51 (83)	17:17	11	08:27 (108)	17:11	28	08:47 (108)
19	06:21		19:31 (107)	06:50		07:31 (82)	07:19			07:49		08:20 (83)	07:24		08:15 (108)	07:52		08:19 (108)
	21:02	36	20:07 (107)	20:29	68	19:55 (107)	19:38			18:51	30	08:50 (83)	17:16	15	08:30 (108)	17:11	28	08:47 (108)
20	06:22		19:31 (107)	06:51		07:31 (82)	07:20			07:50		08:21 (83)	07:25		08:13 (108)	07:53		08:20 (108)
	21:01	37	20:08 (107)	20:27	59	19:50 (107)	19:37			18:49	27	08:48 (83)	17:15	19	08:32 (108)	17:12	28	08:48 (108)
21	06:23		07:56 (82)	06:51		07:32 (82)	07:21			07:51		08:22 (83)	07:27		08:12 (108)	07:54		08:20 (108)
	21:01	41	20:08 (107)	20:26	49	08:21 (82)	19:35			18:48	24	08:46 (83)	17:15	21	08:33 (108)	17:12	28	08:48 (108)
22	06:24		07:51 (82)	06:52		07:32 (82)	07:22			07:52		08:24 (83)	07:28		08:12 (108)	07:54		08:21 (108)
	21:00	52	20:08 (107)	20:25	48	08:20 (82)	19:33			18:46	21	08:45 (83)	17:14	22	08:34 (108)	17:13	28	08:49 (108)
23	06:24		07:49 (82)	06:53		07:33 (82)	07:23			07:54		08:26 (83)	07:29		08:11 (108)	07:55		08:21 (108)
	20:59	58	20:09 (107)	20:23	47	08:20 (82)	19:32			18:45	17	08:43 (83)	17:14	24	08:35 (108)	17:13	28	08:49 (108)
24	06:25		07:47 (82)	06:54		07:33 (82)	07:24			07:55		08:30 (83)	07:30		08:12 (108)	07:55		08:22 (108)
	20:58	63	20:10 (107)	20:22	46	08:19 (82)	19:30			18:44	8	08:38 (83)	17:13	24	08:36 (108)	17:14	28	08:50 (108)
25	06:26		07:46 (82)	06:55		07:34 (82)	07:25			07:56			07:31		08:11 (108)	07:55		08:22 (108)
	20:57	66	20:10 (107)	20:20	44	08:18 (82)	19:28			18:42			17:13	26	08:37 (108)	17:15	28	08:50 (108)
26	06:27		07:45 (82)	06:56		07:35 (82)	07:26			07:57			07:32		08:11 (108)	07:56		08:23 (108)
	20:57	70	20:11 (107)	20:19	42	08:17 (82)	19:27			18:41			17:12	27	08:38 (108)	17:15	27	08:50 (108)
27	06:28		07:43 (82)	06:57		07:35 (82)	07:27			07:58			07:33		08:11 (108)	07:56		08:24 (108)
	20:56	73	20:10 (107)	20:17	40	08:15 (82)	19:25			18:40			17:12	27	08:38 (108)	17:16	28	08:52 (108)
28	06:29		07:42 (82)	06:58		07:37 (82)	07:28			07:59			07:34		08:11 (108)	07:56		08:24 (108)
	20:55	76	20:10 (107)	20:16	37	08:14 (82)	19:23			18:38			17:11	28	08:39 (108)	17:16	28	08:52 (108)
29	06:30		07:41 (82)	06:59		07:37 (82)	07:29			08:00			07:35		08:11 (108)	07:57		08:24 (108)
	20:54	79	20:11 (107)	20:14	34	08:11 (82)	19:22			18:37			17:11	28	08:39 (108)	17:17	28	08:52 (108)
30	06:31		07:40 (82)	07:00		07:38 (82)	07:30		08:35 (83)	08:01			07:36		08:11 (108)	07:57		08:24 (108)
	20:53	81	20:11 (107)	20:13	31	08:09 (82)	19:20	9	08:44 (83)	18:36			17:11	29	08:40 (108)	17:18	29	08:53 (108)
31	06:31		07:39 (82)	07:01		07:41 (82)				08:02						07:57		08:24 (108)
	20:52	83	20:11 (107)	20:11	26	08:07 (82)				18:35						17:19	29	08:53 (108)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		1521			2140			41			710			306			884	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.65			0.66			0.66			0.63			0.61			0.61	
Total reduction		0.39			0.39			0.40			0.35			0.22			0.30	
Total, real		593			840			16			251			68			267	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 78

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
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Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m**Shadow receptor:** 8352 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6152)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:26 (108)	07:45			07:10		07:45 (83)	07:20			06:36		07:23 (82)	06:08		06:29 (106)
	17:20	29	08:55 (108)	17:53			18:26	37	08:22 (83)	19:59			20:28	92	19:59 (107)	20:57	41	19:52 (107)
2	07:58		08:26 (108)	07:44			07:08		07:44 (83)	07:19			06:35		07:23 (82)	06:08		06:29 (106)
	17:21	29	08:55 (108)	17:54			18:27	38	08:22 (83)	20:00			20:29	93	20:00 (107)	20:58	39	19:51 (107)
3	07:58		08:27 (108)	07:43			07:07		07:45 (83)	07:17			06:33		07:23 (82)	06:07		06:29 (106)
	17:21	30	08:57 (108)	17:56			18:28	37	08:22 (83)	20:00			20:30	93	20:00 (107)	20:59	39	19:51 (107)
4	07:58		08:27 (108)	07:42			07:05		07:44 (83)	07:15			06:32		07:23 (82)	06:07		06:28 (106)
	17:22	29	08:56 (108)	17:57			18:29	37	08:21 (83)	20:01			20:31	94	20:01 (107)	20:59	37	19:49 (107)
5	07:58		08:27 (108)	07:41			07:04		07:45 (83)	07:14			06:31		07:23 (82)	06:07		06:28 (106)
	17:23	30	08:57 (108)	17:58			18:31	36	08:21 (83)	20:02			20:32	93	20:00 (107)	21:00	34	19:48 (107)
6	07:58		08:28 (108)	07:40			07:02		07:45 (83)	07:12			06:30		07:23 (82)	06:06		06:29 (106)
	17:24	29	08:57 (108)	17:59			18:32	35	08:20 (83)	20:03			20:33	93	20:00 (107)	21:01	32	19:47 (107)
7	07:58		08:28 (108)	07:39			07:01		07:45 (83)	07:11			06:29		07:23 (82)	06:06		06:29 (106)
	17:25	30	08:58 (108)	18:01			18:33	35	08:20 (83)	20:04			20:34	94	20:01 (107)	21:01	28	19:45 (107)
8	07:58		08:29 (108)	07:37			07:59		08:46 (83)	07:09			06:27		07:24 (82)	06:06		06:28 (106)
	17:26	29	08:58 (108)	18:02			19:34	32	09:18 (83)	20:05			20:35	93	20:01 (107)	21:02	22	06:50 (106)
9	07:57		08:29 (108)	07:36			07:57		08:46 (83)	07:08			06:26		07:24 (82)	06:06		06:28 (106)
	17:27	30	08:59 (108)	18:03			19:35	30	09:16 (83)	20:06			20:36	92	20:01 (107)	21:02	23	06:51 (106)
10	07:57		08:30 (108)	07:35			07:56		08:48 (83)	07:06			06:25		07:25 (82)	06:06		06:28 (106)
	17:28	29	08:59 (108)	18:04			19:36	27	09:15 (83)	20:07			20:37	90	20:01 (107)	21:03	23	06:51 (106)
11	07:57		08:30 (108)	07:34			07:54		08:48 (83)	07:04		07:48 (82)	06:24		07:25 (82)	06:05		06:28 (106)
	17:29	29	08:59 (108)	18:05			19:37	25	09:13 (83)	20:08	12	08:00 (82)	20:38	90	20:01 (107)	21:04	24	06:52 (106)
12	07:57		08:31 (108)	07:33			07:53		08:51 (83)	07:03		07:44 (82)	06:23		07:26 (82)	06:05		06:28 (106)
	17:30	29	09:00 (108)	18:07			19:38	20	09:11 (83)	20:09	21	08:05 (82)	20:39	88	20:01 (107)	21:04	24	06:52 (106)
13	07:57		08:32 (108)	07:32			07:51		08:53 (83)	07:01		07:40 (82)	06:22		07:26 (82)	06:05		06:29 (106)
	17:31	28	09:00 (108)	18:08			19:39	15	09:08 (83)	20:10	27	08:07 (82)	20:40	87	20:01 (107)	21:05	23	06:52 (106)
14	07:56		08:32 (108)	07:30			07:49		08:58 (83)	07:00		07:38 (82)	06:21		07:27 (82)	06:05		06:29 (106)
	17:32	28	09:00 (108)	18:09			19:40	3	09:01 (83)	20:11	31	08:09 (82)	20:41	84	20:00 (107)	21:05	24	06:53 (106)
15	07:56		08:33 (108)	07:29			07:48			06:58		07:36 (82)	06:20		07:28 (82)	06:05		06:29 (106)
	17:33	27	09:00 (108)	18:10			19:41			20:12	35	08:11 (82)	20:42	81	20:00 (107)	21:05	24	06:53 (106)
16	07:55		08:33 (108)	07:28			07:46			06:57		07:34 (82)	06:19		07:28 (82)	06:05		06:29 (106)
	17:34	26	08:59 (108)	18:11			19:42			20:13	38	08:12 (82)	20:43	80	20:00 (107)	21:06	24	06:53 (106)
17	07:55		08:34 (108)	07:27			07:45			06:55		07:32 (82)	06:18		07:30 (82)	06:05		06:29 (106)
	17:36	26	09:00 (108)	18:12			19:43			20:14	41	08:13 (82)	20:44	77	20:00 (107)	21:06	24	06:53 (106)
18	07:55		08:35 (108)	07:25		07:59 (83)	07:43			06:54		07:31 (82)	06:17		07:31 (82)	06:05		06:29 (106)
	17:37	24	08:59 (108)	18:14	12	08:11 (83)	19:44			20:15	43	08:14 (82)	20:45	75	20:00 (107)	21:07	25	06:54 (106)
19	07:54		08:36 (108)	07:24		07:55 (83)	07:41			06:52		07:29 (82)	06:17		07:32 (82)	06:05		06:29 (106)
	17:38	23	08:59 (108)	18:15	19	08:14 (83)	19:45			20:16	45	08:14 (82)	20:46	72	19:59 (107)	21:07	25	06:54 (106)
20	07:54		08:37 (108)	07:23		07:53 (83)	07:40			06:51		07:29 (82)	06:16		07:33 (82)	06:06		06:30 (106)
	17:39	21	08:58 (108)	18:16	23	08:16 (83)	19:46			20:17	46	08:15 (82)	20:47	68	19:59 (107)	21:07	25	06:55 (106)
21	07:53		08:39 (108)	07:21		07:52 (83)	07:38			06:49		07:27 (82)	06:15		07:35 (82)	06:06		06:30 (106)
	17:40	19	08:58 (108)	18:17	26	08:18 (83)	19:48			20:18	48	08:15 (82)	20:48	65	19:59 (107)	21:07	25	06:55 (106)
22	07:52		08:40 (108)	07:20		07:50 (83)	07:37			06:48		07:27 (82)	06:14		07:36 (82)	06:06		06:30 (106)
	17:41	17	08:57 (108)	18:18	29	08:19 (83)	19:49			20:19	49	08:16 (82)	20:49	61	19:58 (107)	21:08	25	06:55 (106)
23	07:52		08:41 (108)	07:18		07:49 (83)	07:35			06:47		07:26 (82)	06:14		07:38 (82)	06:06		06:30 (106)
	17:42	15	08:56 (108)	18:19	31	08:20 (83)	19:50			20:20	62	19:47 (107)	20:50	55	19:57 (107)	21:08	25	06:55 (106)
24	07:51		08:44 (108)	07:17		07:48 (83)	07:33			06:45		07:25 (82)	06:13		07:39 (82)	06:06		06:30 (106)
	17:44	9	08:53 (108)	18:21	33	08:21 (83)	19:51			20:21	70	19:50 (107)	20:51	51	19:56 (107)	21:08	25	06:55 (106)
25	07:50			07:16		07:47 (83)	07:32			06:44		07:25 (82)	06:12		07:43 (82)	06:07		06:31 (106)
	17:45			18:22	35	08:22 (83)	19:52			20:22	76	19:53 (107)	20:51	45	19:57 (107)	21:08	24	06:55 (106)
26	07:50			07:14		07:46 (83)	07:30			06:42		07:25 (82)	06:11		19:24 (107)	06:07		06:31 (106)
	17:46			18:23	36	08:22 (83)	19:53			20:23	80	19:55 (107)	20:52	32	19:56 (107)	21:08	24	06:55 (106)
27	07:49			07:13		07:46 (83)	07:28			06:41		07:24 (82)	06:11		06:35 (106)	06:07		06:31 (106)
	17:47			18:24	36	08:22 (83)	19:54			20:24	82	19:55 (107)	20:53	36	19:56 (107)	21:08	24	06:55 (106)
28	07:48			07:11		07:45 (83)	07:27			06:40		07:24 (82)	06:10		06:33 (106)	06:08		06:32 (106)
	17:48			18:25	37	08:22 (83)	19:55			20:25	85	19:57 (107)	20:54	39	19:55 (107)	21:08	24	06:56 (106)
29	07:47						07:25			06:38		07:24 (82)	06:10		06:32 (106)	06:08		06:32 (106)
	17:50						19:56			20:26	88	19:58 (107)	20:55	39	19:54 (107)	21:08	24	06:56 (106)
30	07:46						07:23			06:37		07:23 (82)	06:09		06:31 (106)	06:09		06:33 (106)
	17:51						19:57			20:27	90	19:58 (107)	20:56	40	19:53 (107)	21:08	23	06:56 (106)
31	07:46						07:22						06:09		06:30 (106)			
	17:52						19:58						20:56	40	19:53 (107)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		615			317			407			1069			2232			803	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.61			0.63			0.63			0.66			0.65			0.68	
Total reduction		0.22			0.26			0.28			0.34			0.36			0.40	
Total, real		134			84			113			359			810			325	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 79

Licensed user:
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US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m**Shadow receptor:** 8352 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6152)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:32 (106)	06:32		07:36 (82)	07:02		07:47 (82)	07:31		08:30 (83)	07:04			07:37		08:12 (108)
	21:08	24	06:56 (106)	20:51	88	20:11 (107)	20:09	12	07:59 (82)	19:19	19	08:49 (83)	17:33			17:10	29	08:41 (108)
2	06:10		06:33 (106)	06:33		07:36 (82)	07:03			07:32		08:28 (83)	07:05			07:38		08:12 (108)
	21:08	24	06:57 (106)	20:50	90	20:12 (107)	20:08			19:17	23	08:51 (83)	17:32			17:10	30	08:42 (108)
3	06:10		06:33 (106)	06:34		07:35 (82)	07:04			07:33		08:26 (83)	07:06			07:39		08:13 (108)
	21:08	23	06:56 (106)	20:49	91	20:12 (107)	20:06			19:15	26	08:52 (83)	17:31			17:10	29	08:42 (108)
4	06:11		06:34 (106)	06:35		07:35 (82)	07:05			07:34		08:24 (83)	07:07			07:40		08:13 (108)
	21:08	23	06:57 (106)	20:48	92	20:12 (107)	20:05			19:14	29	08:53 (83)	17:30			17:10	29	08:42 (108)
5	06:11		06:34 (106)	06:36		07:33 (82)	07:06			07:35		08:23 (83)	07:08			07:41		08:13 (108)
	21:08	25	19:49 (107)	20:47	92	20:10 (107)	20:03			19:12	31	08:54 (83)	17:29			17:09	30	08:43 (108)
6	06:12		06:35 (106)	06:37		07:33 (82)	07:07			07:36		08:21 (83)	07:09			07:42		08:14 (108)
	21:08	30	19:52 (107)	20:45	93	20:10 (107)	20:01			19:10	34	08:55 (83)	17:28			17:09	29	08:43 (108)
7	06:12		06:34 (106)	06:38		07:33 (82)	07:08			07:37		08:20 (83)	07:11			07:43		08:14 (108)
	21:07	35	19:54 (107)	20:44	93	20:10 (107)	20:00			19:09	35	08:55 (83)	17:27			17:09	30	08:44 (108)
8	06:13		06:35 (106)	06:39		07:32 (82)	07:09			07:38		08:20 (83)	07:12			07:44		08:15 (108)
	21:07	36	19:56 (107)	20:43	95	20:10 (107)	19:57			19:07	35	08:55 (83)	17:26			17:09	29	08:44 (108)
9	06:14		06:36 (106)	06:40		07:32 (82)	07:10			07:39		08:19 (83)	07:13			07:45		08:15 (108)
	21:07	37	19:57 (107)	20:42	93	20:09 (107)	19:55			19:06	37	08:56 (83)	17:25			17:09	30	08:45 (108)
10	06:14		06:36 (106)	06:41		07:32 (82)	07:11			07:40		08:18 (83)	07:14			07:46		08:16 (108)
	21:06	39	19:58 (107)	20:41	93	20:09 (107)	19:53			19:04	38	08:56 (83)	17:24			17:09	29	08:45 (108)
11	06:15		06:37 (106)	06:42		07:32 (82)	07:11			07:41		08:18 (83)	07:15			07:47		08:17 (108)
	21:06	39	19:59 (107)	20:39	91	20:08 (107)	19:52			19:03	37	08:55 (83)	17:23			17:09	29	08:46 (108)
12	06:16		06:38 (106)	06:43		07:31 (82)	07:12			07:42		08:18 (83)	07:16			07:47		08:16 (108)
	21:06	41	20:01 (107)	20:38	91	20:07 (107)	19:50			19:01	37	08:55 (83)	17:22			17:10	29	08:45 (108)
13	06:16		06:38 (106)	06:44		07:31 (82)	07:13			07:43		08:18 (83)	07:17			07:48		08:17 (108)
	21:05	41	20:01 (107)	20:37	89	20:06 (107)	19:48			19:00	38	08:56 (83)	17:21			17:10	29	08:46 (108)
14	06:17		06:40 (106)	06:45		07:31 (82)	07:14			07:44		08:18 (83)	07:19			07:49		08:18 (108)
	21:05	40	20:02 (107)	20:36	87	20:05 (107)	19:47			18:58	37	08:55 (83)	17:20			17:10	29	08:47 (108)
15	06:18		06:41 (106)	06:46		07:31 (82)	07:15			07:45		08:18 (83)	07:20			07:50		08:19 (108)
	21:04	39	20:03 (107)	20:34	85	20:04 (107)	19:45			18:57	37	08:55 (83)	17:19			17:10	28	08:47 (108)
16	06:19		06:43 (106)	06:47		07:31 (82)	07:16			07:46		08:19 (83)	07:21			07:50		08:18 (108)
	21:04	38	20:05 (107)	20:33	83	20:03 (107)	19:43			18:55	35	08:54 (83)	17:18			17:10	29	08:47 (108)
17	06:19		19:33 (107)	06:48		07:30 (82)	07:17			07:47		08:19 (83)	07:22			07:51		08:19 (108)
	21:03	32	20:05 (107)	20:32	80	20:00 (107)	19:42			18:54	34	08:53 (83)	17:17			17:11	29	08:48 (108)
18	06:20		07:54 (82)	06:49		07:31 (82)	07:18			07:48		08:19 (83)	07:23		08:18 (108)	07:52		08:20 (108)
	21:03	40	20:06 (107)	20:30	74	19:58 (107)	19:40			18:52	33	08:52 (83)	17:17	9	08:27 (108)	17:11	29	08:49 (108)
19	06:21		07:51 (82)	06:50		07:31 (82)	07:19			07:49		08:20 (83)	07:24		08:16 (108)	07:52		08:20 (108)
	21:02	48	20:07 (107)	20:29	68	19:55 (107)	19:38			18:51	31	08:51 (83)	17:16	15	08:31 (108)	17:11	29	08:49 (108)
20	06:22		07:49 (82)	06:51		07:31 (82)	07:20			07:50		08:21 (83)	07:25		08:15 (108)	07:53		08:21 (108)
	21:01	53	20:07 (107)	20:27	60	19:51 (107)	19:37			18:49	28	08:49 (83)	17:15	17	08:32 (108)	17:12	28	08:49 (108)
21	06:23		07:46 (82)	06:51		07:32 (82)	07:21			07:51		08:22 (83)	07:27		08:14 (108)	07:54		08:21 (108)
	21:01	58	20:07 (107)	20:26	49	08:21 (82)	19:35			18:48	25	08:47 (83)	17:15	19	08:33 (108)	17:12	28	08:49 (108)
22	06:24		07:45 (82)	06:52		07:32 (82)	07:22			07:52		08:25 (83)	07:28		08:13 (108)	07:54		08:22 (108)
	21:00	62	20:08 (107)	20:25	48	08:20 (82)	19:33			18:46	21	08:46 (83)	17:14	21	08:34 (108)	17:13	28	08:50 (108)
23	06:24		07:44 (82)	06:53		07:33 (82)	07:23			07:54		08:27 (83)	07:29		08:12 (108)	07:55		08:22 (108)
	20:59	67	20:09 (107)	20:23	46	08:19 (82)	19:32			18:45	17	08:44 (83)	17:14	23	08:35 (108)	17:13	28	08:50 (108)
24	06:25		07:43 (82)	06:54		07:33 (82)	07:24			07:55		08:30 (83)	07:30		08:13 (108)	07:55		08:23 (108)
	20:58	69	20:09 (107)	20:22	45	08:18 (82)	19:30			18:44	10	08:40 (83)	17:13	24	08:37 (108)	17:14	29	08:52 (108)
25	06:26		07:42 (82)	06:55		07:34 (82)	07:25			07:56			07:31		08:12 (108)	07:55		08:23 (108)
	20:57	73	20:10 (107)	20:20	43	08:17 (82)	19:28			18:42			17:13	26	08:38 (108)	17:15	29	08:52 (108)
26	06:27		07:41 (82)	06:56		07:35 (82)	07:26			07:57			07:32		08:12 (108)	07:56		08:23 (108)
	20:57	75	20:10 (107)	20:19	41	08:16 (82)	19:27			18:41			17:12	27	08:39 (108)	17:15	29	08:52 (108)
27	06:28		07:39 (82)	06:57		07:36 (82)	07:27			07:58			07:33		08:12 (108)	07:56		08:24 (108)
	20:56	79	20:10 (107)	20:17	38	08:14 (82)	19:25			18:40			17:12	27	08:39 (108)	17:16	29	08:53 (108)
28	06:29		07:39 (82)	06:58		07:38 (82)	07:28			07:59			07:34		08:12 (108)	07:56		08:25 (108)
	20:55	80	20:10 (107)	20:16	34	08:12 (82)	19:23			18:38			17:11	28	08:40 (108)	17:16	28	08:53 (108)
29	06:30		07:38 (82)	06:59		07:38 (82)	07:29			08:00			07:35		08:12 (108)	07:57		08:25 (108)
	20:54	83	20:11 (107)	20:14	31	08:09 (82)	19:22			18:37			17:11	28	08:40 (108)	17:17	29	08:54 (108)
30	06:31		07:37 (82)	07:00		07:40 (82)	07:30		08:34 (83)	08:01			07:36		08:12 (108)	07:57		08:25 (108)
	20:53	85	20:11 (107)	20:13	27	08:07 (82)	19:20	12	08:46 (83)	18:36			17:11	29	08:41 (108)	17:18	29	08:54 (108)
31	06:31		07:37 (82)	07:01		07:43 (82)				08:02						07:57		08:25 (108)
	20:52	86	20:11 (107)	20:11	21	08:04 (82)				18:35						17:19	29	08:54 (108)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		1524			2151			24			727			293			897	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.65			0.66			0.65			0.63			0.61			0.61	
Total reduction		0.39			0.39			0.40			0.35			0.22			0.30	
Total, real		595			845			9			257			66			271	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 80

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m**Shadow receptor:** 8353 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6153)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:30 (108)	07:45			07:10		07:49 (83)	07:20			06:36		07:26 (82)	06:08		06:30 (106)
	17:20	30	09:00 (108)	17:53			18:26	38	08:27 (83)	19:59			20:28	96	19:57 (107)	20:57	17	06:47 (106)
2	07:58		08:30 (108)	07:44			07:08		07:49 (83)	07:19			06:35		07:26 (82)	06:08		06:30 (106)
	17:21	30	09:00 (108)	17:54			18:27	37	08:26 (83)	20:00			20:29	97	19:58 (107)	20:58	19	06:49 (106)
3	07:58		08:31 (108)	07:43			07:07		07:49 (83)	07:17			06:33		07:27 (82)	06:07		06:30 (106)
	17:21	30	09:01 (108)	17:56			18:28	37	08:26 (83)	20:00			20:30	95	19:58 (107)	20:59	20	06:50 (106)
4	07:58		08:31 (108)	07:42			07:05		07:49 (83)	07:15			06:32		07:27 (82)	06:07		06:29 (106)
	17:22	30	09:01 (108)	17:57			18:29	36	08:25 (83)	20:01			20:31	95	19:58 (107)	20:59	20	06:49 (106)
5	07:58		08:32 (108)	07:41			07:04		07:50 (83)	07:14			06:31		07:26 (82)	06:07		06:29 (106)
	17:23	29	09:01 (108)	17:58			18:31	35	08:25 (83)	20:02			20:32	95	19:57 (107)	21:00	21	06:50 (106)
6	07:58		08:32 (108)	07:40			07:02		07:50 (83)	07:12			06:30		07:27 (82)	06:06		06:29 (106)
	17:24	29	09:01 (108)	17:59			18:32	33	08:23 (83)	20:03			20:33	93	19:57 (107)	21:01	22	06:51 (106)
7	07:58		08:33 (108)	07:39			07:01		07:52 (83)	07:11			06:29		07:27 (82)	06:06		06:29 (106)
	17:25	29	09:02 (108)	18:01			18:33	30	08:22 (83)	20:04			20:34	93	19:57 (107)	21:01	23	06:52 (106)
8	07:58		08:34 (108)	07:37			07:59		08:52 (83)	07:09			06:27		07:28 (82)	06:06		06:28 (106)
	17:26	28	09:02 (108)	18:02			19:34	28	09:20 (83)	20:05			20:35	91	19:57 (107)	21:02	23	06:51 (106)
9	07:57		08:34 (108)	07:36			07:57		08:53 (83)	07:08		07:54 (82)	06:26		07:28 (82)	06:06		06:28 (106)
	17:27	29	09:03 (108)	18:03			19:35	25	09:18 (83)	20:06	10	08:04 (82)	20:36	91	19:57 (107)	21:02	24	06:52 (106)
10	07:57		08:35 (108)	07:35			07:56		08:56 (83)	07:06		07:49 (82)	06:25		07:29 (82)	06:06		06:29 (106)
	17:28	28	09:03 (108)	18:04			19:36	20	09:16 (83)	20:07	21	08:10 (82)	20:37	87	19:56 (107)	21:03	23	06:52 (106)
11	07:57		08:35 (108)	07:34			07:54		08:58 (83)	07:04		07:45 (82)	06:24		07:29 (82)	06:05		06:29 (106)
	17:29	27	09:02 (108)	18:05			19:37	15	09:13 (83)	20:08	27	08:12 (82)	20:38	86	19:56 (107)	21:04	24	06:53 (106)
12	07:57		08:36 (108)	07:33			07:53			07:03		07:43 (82)	06:23		07:30 (82)	06:05		06:29 (106)
	17:30	27	09:03 (108)	18:07			19:38			20:09	32	08:15 (82)	20:39	84	19:56 (107)	21:04	24	06:53 (106)
13	07:57		08:37 (108)	07:32			07:51			07:01		07:40 (82)	06:22		07:31 (82)	06:05		06:29 (106)
	17:31	26	09:03 (108)	18:08			19:39			20:10	36	08:16 (82)	20:40	80	19:55 (107)	21:05	24	06:53 (106)
14	07:56		08:38 (108)	07:30			07:49			07:00		07:39 (82)	06:21		07:31 (82)	06:05		06:29 (106)
	17:32	24	09:02 (108)	18:09			19:40			20:11	39	08:18 (82)	20:41	79	19:55 (107)	21:05	25	06:54 (106)
15	07:56		08:39 (108)	07:29		08:04 (83)	07:48			06:58		07:37 (82)	06:20		07:32 (82)	06:05		06:29 (106)
	17:33	24	09:03 (108)	18:10	12	08:16 (83)	19:41			20:12	41	08:18 (82)	20:42	75	19:54 (107)	21:05	25	06:54 (106)
16	07:55		08:40 (108)	07:28		08:00 (83)	07:46			06:57		07:36 (82)	06:19		07:33 (82)	06:05		06:29 (106)
	17:34	22	09:02 (108)	18:11	18	08:18 (83)	19:42			20:13	44	08:20 (82)	20:43	72	19:53 (107)	21:06	25	06:54 (106)
17	07:55		08:41 (108)	07:27		07:58 (83)	07:45			06:55		07:34 (82)	06:18		07:35 (82)	06:05		06:29 (106)
	17:36	21	09:02 (108)	18:12	23	08:21 (83)	19:43			20:14	46	08:20 (82)	20:44	69	19:54 (107)	21:06	25	06:54 (106)
18	07:55		08:42 (108)	07:25		07:57 (83)	07:43			06:54		07:33 (82)	06:17		07:36 (82)	06:05		06:30 (106)
	17:37	19	09:01 (108)	18:14	26	08:23 (83)	19:44			20:15	48	08:21 (82)	20:45	66	19:53 (107)	21:07	24	06:54 (106)
19	07:54		08:44 (108)	07:24		07:55 (83)	07:41			06:52		07:32 (82)	06:17		07:37 (82)	06:05		06:30 (106)
	17:38	16	09:00 (108)	18:15	29	08:24 (83)	19:45			20:16	49	08:21 (82)	20:46	61	19:52 (107)	21:07	24	06:54 (106)
20	07:54		08:46 (108)	07:23		07:54 (83)	07:40			06:51		07:31 (82)	06:16		07:38 (82)	06:06		06:31 (106)
	17:39	12	08:58 (108)	18:16	31	08:25 (83)	19:46			20:17	66	19:46 (107)	20:47	57	19:51 (107)	21:07	24	06:55 (106)
21	07:53		08:49 (108)	07:21		07:53 (83)	07:38			06:49		07:30 (82)	06:15		07:40 (82)	06:06		06:31 (106)
	17:40	8	08:57 (108)	18:17	33	08:26 (83)	19:48			20:18	73	19:49 (107)	20:48	52	19:50 (107)	21:07	25	06:56 (106)
22	07:52			07:20		07:52 (83)	07:37			06:48		07:29 (82)	06:14		07:42 (82)	06:06		06:31 (106)
	17:41			18:18	34	08:26 (83)	19:49			20:19	78	19:51 (107)	20:49	46	19:49 (107)	21:08	25	06:56 (106)
23	07:52			07:18		07:51 (83)	07:35			06:47		07:29 (82)	06:14		07:43 (82)	06:06		06:31 (106)
	17:42			18:19	36	08:27 (83)	19:50			20:20	83	19:53 (107)	20:50	41	19:48 (107)	21:08	24	06:55 (106)
24	07:51			07:17		07:50 (83)	07:33			06:45		07:28 (82)	06:13		07:46 (82)	06:06		06:31 (106)
	17:44			18:21	37	08:27 (83)	19:51			20:21	85	19:53 (107)	20:51	32	19:46 (107)	21:08	24	06:55 (106)
25	07:50			07:16		07:50 (83)	07:32			06:44		07:28 (82)	06:12		19:28 (107)	06:07		06:31 (106)
	17:45			18:22	38	08:28 (83)	19:52			20:22	88	19:55 (107)	20:51	17	19:45 (107)	21:08	25	06:56 (106)
26	07:50			07:14		07:49 (83)	07:30			06:42		07:28 (82)	06:11		19:30 (107)	06:07		06:31 (106)
	17:46			18:23	38	08:27 (83)	19:53			20:23	91	19:56 (107)	20:52	13	19:43 (107)	21:08	25	06:56 (106)
27	07:49			07:13		07:49 (83)	07:28			06:41		07:27 (82)	06:11		06:35 (106)	06:07		06:31 (106)
	17:47			18:24	39	08:28 (83)	19:54			20:24	92	19:56 (107)	20:53	15	19:41 (107)	21:08	25	06:56 (106)
28	07:48			07:11		07:49 (83)	07:27			06:40		07:27 (82)	06:10		06:33 (106)	06:08		06:32 (106)
	17:48			18:25	38	08:27 (83)	19:55			20:25	93	19:56 (107)	20:54	10	06:43 (106)	21:08	25	06:57 (106)
29	07:47						07:25			06:38		07:27 (82)	06:10		06:32 (106)	06:08		06:32 (106)
	17:50						19:56			20:26	94	19:57 (107)	20:55	13	06:45 (106)	21:08	24	06:56 (106)
30	07:46						07:23			06:37		07:26 (82)	06:09		06:31 (106)	06:09		06:33 (106)
	17:51						19:57			20:27	96	19:57 (107)	20:56	15	06:46 (106)	21:08	24	06:57 (106)
31	07:46						07:22						06:09		06:31 (106)			
	17:52						19:58						20:56	16	06:47 (106)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		518			432			334			1332			1932			702	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.61			0.63			0.63			0.66			0.65			0.68	
Total reduction		0.22			0.26			0.28			0.34			0.36			0.41	
Total, real		113			114			92			446			704			287	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 81

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
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Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m**Shadow receptor:** 8353 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6153)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:33 (106)	06:32		07:40 (82)	07:02		07:44 (82)	07:31			07:04			07:37		08:17 (108)
	21:08	24	06:57 (106)	20:51	85	20:07 (107)	20:09	27	08:11 (82)	19:19			17:33			17:10	28	08:45 (108)
2	06:10		06:34 (106)	06:33		07:40 (82)	07:03		07:47 (82)	07:32		08:38 (83)	07:05			07:38		08:17 (108)
	21:08	23	06:57 (106)	20:50	87	20:07 (107)	20:08	21	08:08 (82)	19:17	11	08:49 (83)	17:32			17:10	28	08:45 (108)
3	06:10		06:33 (106)	06:34		07:39 (82)	07:04		07:52 (82)	07:33		08:34 (83)	07:06			07:39		08:18 (108)
	21:08	24	06:57 (106)	20:49	89	20:07 (107)	20:06	11	08:03 (82)	19:15	19	08:53 (83)	17:31			17:10	28	08:46 (108)
4	06:11		06:34 (106)	06:35		07:39 (82)	07:05			07:34		08:32 (83)	07:07			07:40		08:18 (108)
	21:08	23	06:57 (106)	20:48	89	20:07 (107)	20:05			19:14	23	08:55 (83)	17:30			17:10	28	08:46 (108)
5	06:11		06:34 (106)	06:36		07:37 (82)	07:06			07:35		08:30 (83)	07:08			07:41		08:18 (108)
	21:08	23	06:57 (106)	20:47	92	20:07 (107)	20:03			19:12	26	08:56 (83)	17:29			17:09	29	08:47 (108)
6	06:12		06:35 (106)	06:37		07:37 (82)	07:07			07:36		08:28 (83)	07:09			07:42		08:18 (108)
	21:08	22	06:57 (106)	20:45	93	20:07 (107)	20:01			19:10	29	08:57 (83)	17:28			17:09	30	08:48 (108)
7	06:12		06:35 (106)	06:38		07:36 (82)	07:08			07:37		08:26 (83)	07:11			07:43		08:19 (108)
	21:07	22	06:57 (106)	20:44	95	20:07 (107)	20:00			19:09	32	08:58 (83)	17:27			17:09	29	08:48 (108)
8	06:13		06:36 (106)	06:39		07:36 (82)	07:09			07:38		08:25 (83)	07:12			07:44		08:19 (108)
	21:07	21	06:57 (106)	20:43	95	20:07 (107)	19:57			19:07	34	08:59 (83)	17:26			17:09	30	08:49 (108)
9	06:14		06:37 (106)	06:40		07:36 (82)	07:10			07:39		08:24 (83)	07:13			07:45		08:20 (108)
	21:07	20	06:57 (106)	20:42	96	20:07 (107)	19:55			19:06	35	08:59 (83)	17:25			17:09	29	08:49 (108)
10	06:14		06:37 (106)	06:41		07:35 (82)	07:11			07:40		08:23 (83)	07:14			07:46		08:20 (108)
	21:06	19	06:56 (106)	20:41	96	20:06 (107)	19:53			19:04	37	09:00 (83)	17:24			17:09	30	08:50 (108)
11	06:15		06:38 (106)	06:42		07:35 (82)	07:11			07:41		08:23 (83)	07:15			07:47		08:21 (108)
	21:06	18	06:56 (106)	20:39	95	20:06 (107)	19:52			19:03	37	09:00 (83)	17:23			17:09	30	08:51 (108)
12	06:16		06:39 (106)	06:43		07:35 (82)	07:12			07:42		08:22 (83)	07:16			07:47		08:20 (108)
	21:06	17	06:56 (106)	20:38	96	20:06 (107)	19:50			19:01	38	09:00 (83)	17:22			17:10	30	08:50 (108)
13	06:16		06:39 (106)	06:44		07:35 (82)	07:13			07:43		08:22 (83)	07:17			07:48		08:21 (108)
	21:05	16	06:55 (106)	20:37	95	20:05 (107)	19:48			19:00	39	09:01 (83)	17:21			17:10	30	08:51 (108)
14	06:17		06:40 (106)	06:45		07:35 (82)	07:14			07:44		08:22 (83)	07:19			07:49		08:22 (108)
	21:05	14	06:54 (106)	20:36	95	20:05 (107)	19:47			18:58	39	09:01 (83)	17:20			17:10	30	08:52 (108)
15	06:18		06:42 (106)	06:46		07:34 (82)	07:15			07:45		08:22 (83)	07:20			07:50		08:22 (108)
	21:04	11	06:53 (106)	20:34	94	20:04 (107)	19:45			18:57	38	09:00 (83)	17:19			17:10	30	08:52 (108)
16	06:19		06:44 (106)	06:47		07:34 (82)	07:16			07:46		08:22 (83)	07:21			07:50		08:22 (108)
	21:04	10	19:48 (107)	20:33	93	20:03 (107)	19:43			18:55	38	09:00 (83)	17:18			17:10	30	08:52 (108)
17	06:19		19:41 (107)	06:48		07:33 (82)	07:17			07:47		08:22 (83)	07:22			07:51		08:23 (108)
	21:03	10	19:51 (107)	20:32	90	20:01 (107)	19:42			18:54	37	08:59 (83)	17:17			17:11	30	08:53 (108)
18	06:20		19:39 (107)	06:49		07:34 (82)	07:18			07:48		08:22 (83)	07:23			07:52		08:24 (108)
	21:03	15	19:54 (107)	20:30	87	20:00 (107)	19:40			18:52	37	08:59 (83)	17:17			17:11	30	08:54 (108)
19	06:21		07:58 (82)	06:50		07:34 (82)	07:19			07:49		08:22 (83)	07:24			07:52		08:24 (108)
	21:02	27	19:56 (107)	20:29	85	19:59 (107)	19:38			18:51	36	08:58 (83)	17:16			17:11	30	08:54 (108)
20	06:22		07:55 (82)	06:51		07:34 (82)	07:20			07:50		08:22 (83)	07:25			07:53		08:25 (108)
	21:01	37	19:58 (107)	20:27	81	19:57 (107)	19:37			18:49	35	08:57 (83)	17:15			17:12	30	08:55 (108)
21	06:23		07:52 (82)	06:51		07:34 (82)	07:21			07:51		08:23 (83)	07:27		08:24 (108)	07:53		08:25 (108)
	21:01	43	19:58 (107)	20:26	77	19:55 (107)	19:35			18:48	33	08:56 (83)	17:15	8	08:32 (108)	17:12	30	08:55 (108)
22	06:24		07:50 (82)	06:52		07:35 (82)	07:22			07:52		08:25 (83)	07:28		08:22 (108)	07:54		08:26 (108)
	21:00	50	19:59 (107)	20:25	71	19:53 (107)	19:33			18:46	30	08:55 (83)	17:14	12	08:34 (108)	17:13	30	08:56 (108)
23	06:24		07:49 (82)	06:53		07:35 (82)	07:23			07:54		08:26 (83)	07:29		08:20 (108)	07:55		08:26 (108)
	20:59	54	20:01 (107)	20:23	65	19:50 (107)	19:32			18:45	28	08:54 (83)	17:14	16	08:36 (108)	17:13	30	08:56 (108)
24	06:25		07:48 (82)	06:54		07:35 (82)	07:24			07:55		08:27 (83)	07:30		08:20 (108)	07:55		08:27 (108)
	20:58	59	20:02 (107)	20:22	50	08:25 (82)	19:30			18:44	25	08:52 (83)	17:13	19	08:39 (108)	17:14	30	08:57 (108)
25	06:26		07:47 (82)	06:55		07:36 (82)	07:25			07:56		08:28 (83)	07:31		08:19 (108)	07:55		08:27 (108)
	20:57	64	20:03 (107)	20:20	48	08:24 (82)	19:28			18:42	22	08:50 (83)	17:13	21	08:40 (108)	17:15	30	08:57 (108)
26	06:27		07:46 (82)	06:56		07:37 (82)	07:26			07:57		08:31 (83)	07:32		08:19 (108)	07:56		08:27 (108)
	20:57	67	20:04 (107)	20:19	46	08:23 (82)	19:27			18:41	16	08:47 (83)	17:12	22	08:41 (108)	17:15	30	08:57 (108)
27	06:28		07:44 (82)	06:57		07:38 (82)	07:27			07:58		08:34 (83)	07:33		08:18 (108)	07:56		08:28 (108)
	20:56	70	20:03 (107)	20:17	44	08:22 (82)	19:25			18:40	9	08:43 (83)	17:12	24	08:42 (108)	17:16	30	08:58 (108)
28	06:29		07:43 (82)	06:58		07:39 (82)	07:28			07:59			07:34		08:18 (108)	07:56		08:28 (108)
	20:55	74	20:04 (107)	20:16	41	08:20 (82)	19:23			18:38			17:11	24	08:42 (108)	17:16	30	08:58 (108)
29	06:30		07:42 (82)	06:59		07:39 (82)	07:29			08:00			07:35		08:18 (108)	07:57		08:28 (108)
	20:54	77	20:05 (107)	20:14	39	08:18 (82)	19:22			18:37			17:11	25	08:43 (108)	17:17	31	08:59 (108)
30	06:31		07:42 (82)	07:00		07:40 (82)	07:30			08:01			07:36		08:17 (108)	07:57		08:29 (108)
	20:53	79	20:06 (107)	20:13	36	08:16 (82)	19:20			18:36			17:11	27	08:44 (108)	17:18	30	08:59 (108)
31	06:31		07:41 (82)	07:01		07:42 (82)				08:02						07:57		08:29 (108)
	20:52	82	20:06 (107)	20:11	32	08:14 (82)				18:35						17:19	30	08:59 (108)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		1115			2377			59			783			198			920	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.66			0.66			0.67			0.63			0.61			0.61	
Total reduction		0.39			0.39			0.41			0.35			0.22			0.30	
Total, real		440			933			24			276			44			279	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 82

Licensed user:
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217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m**Shadow receptor:** 8354 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6154)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:28 (108)	07:45			07:10		07:47 (83)	07:20			06:36		07:24 (82)	06:08		06:30 (106)
	17:20	30	08:58 (108)	17:53			18:26	38	08:25 (83)	19:59			20:28	93	19:58 (107)	20:57	23	19:43 (107)
2	07:58		08:28 (108)	07:44			07:08		07:46 (83)	07:19			06:35		07:24 (82)	06:08		06:29 (106)
	17:21	30	08:58 (108)	17:54			18:27	38	08:24 (83)	20:00			20:29	95	19:59 (107)	20:58	18	06:47 (106)
3	07:58		08:29 (108)	07:43			07:07		07:47 (83)	07:17			06:33		07:24 (82)	06:07		06:29 (106)
	17:21	30	08:59 (108)	17:56			18:28	37	08:24 (83)	20:00			20:30	95	19:59 (107)	20:59	19	06:48 (106)
4	07:58		08:29 (108)	07:42			07:05		07:46 (83)	07:15			06:32		07:24 (82)	06:07		06:28 (106)
	17:22	30	08:59 (108)	17:57			18:29	37	08:23 (83)	20:01			20:31	96	20:00 (107)	20:59	20	06:48 (106)
5	07:58		08:29 (108)	07:41			07:04		07:47 (83)	07:14			06:31		07:23 (82)	06:07		06:28 (106)
	17:23	30	08:59 (108)	17:58			18:31	36	08:23 (83)	20:02			20:32	95	19:59 (107)	21:00	21	06:49 (106)
6	07:58		08:30 (108)	07:40			07:02		07:47 (83)	07:12			06:30		07:24 (82)	06:06		06:29 (106)
	17:24	30	09:00 (108)	17:59			18:32	35	08:22 (83)	20:03			20:33	94	19:59 (107)	21:01	21	06:50 (106)
7	07:58		08:30 (108)	07:39			07:01		07:48 (83)	07:11			06:29		07:24 (82)	06:06		06:29 (106)
	17:25	30	09:00 (108)	18:01			18:33	33	08:21 (83)	20:04			20:34	94	19:59 (107)	21:01	21	06:50 (106)
8	07:58		08:31 (108)	07:37			07:59		08:48 (83)	07:09			06:27		07:24 (82)	06:06		06:28 (106)
	17:26	30	09:01 (108)	18:02			19:34	32	09:20 (83)	20:05			20:35	93	19:59 (107)	21:02	22	06:50 (106)
9	07:57		08:32 (108)	07:36			07:57		08:49 (83)	07:08			06:26		07:25 (82)	06:06		06:28 (106)
	17:27	29	09:01 (108)	18:03			19:35	29	09:18 (83)	20:06			20:36	92	19:59 (107)	21:02	22	06:50 (106)
10	07:57		08:33 (108)	07:35			07:56		08:51 (83)	07:06			06:25		07:25 (82)	06:06		06:28 (106)
	17:28	29	09:02 (108)	18:04			19:36	26	09:17 (83)	20:07			20:37	91	19:59 (107)	21:03	23	06:51 (106)
11	07:57		08:33 (108)	07:34			07:54		08:52 (83)	07:04		07:48 (82)	06:24		07:26 (82)	06:05		06:28 (106)
	17:29	28	09:01 (108)	18:05			19:37	22	09:14 (83)	20:08	15	08:03 (82)	20:38	89	19:59 (107)	21:04	23	06:51 (106)
12	07:57		08:34 (108)	07:33			07:53		08:55 (83)	07:03		07:45 (82)	06:23		07:26 (82)	06:05		06:28 (106)
	17:30	28	09:02 (108)	18:07			19:38	17	09:12 (83)	20:09	22	08:07 (82)	20:39	89	19:59 (107)	21:04	24	06:52 (106)
13	07:57		08:35 (108)	07:32			07:51		08:58 (83)	07:01		07:41 (82)	06:22		07:27 (82)	06:05		06:29 (106)
	17:31	27	09:02 (108)	18:08			19:39	9	09:07 (83)	20:10	28	08:09 (82)	20:40	87	19:59 (107)	21:05	23	06:52 (106)
14	07:56		08:35 (108)	07:30			07:49			07:00		07:39 (82)	06:21		07:27 (82)	06:05		06:29 (106)
	17:32	26	09:01 (108)	18:09			19:40			20:11	33	08:12 (82)	20:41	84	19:58 (107)	21:05	23	06:52 (106)
15	07:56		08:36 (108)	07:29			07:48			06:58		07:37 (82)	06:20		07:28 (82)	06:05		06:29 (106)
	17:33	26	09:02 (108)	18:10			19:41			20:12	36	08:13 (82)	20:42	82	19:58 (107)	21:05	24	06:53 (106)
16	07:55		08:36 (108)	07:28			07:46			06:57		07:35 (82)	06:19		07:29 (82)	06:05		06:29 (106)
	17:34	25	09:01 (108)	18:11			19:42			20:13	40	08:15 (82)	20:43	79	19:57 (107)	21:06	24	06:53 (106)
17	07:55		08:38 (108)	07:27		08:00 (83)	07:45			06:55		07:33 (82)	06:18		07:30 (82)	06:05		06:29 (106)
	17:36	23	09:01 (108)	18:12	14	08:14 (83)	19:43			20:14	42	08:15 (82)	20:44	77	19:58 (107)	21:06	24	06:53 (106)
18	07:55		08:38 (108)	07:25		07:58 (83)	07:43			06:54		07:32 (82)	06:17		07:31 (82)	06:05		06:29 (106)
	17:37	22	09:00 (108)	18:14	19	08:17 (83)	19:44			20:15	44	08:16 (82)	20:45	74	19:57 (107)	21:07	24	06:53 (106)
19	07:54		08:40 (108)	07:24		07:55 (83)	07:41			06:52		07:30 (82)	06:17		07:32 (82)	06:05		06:29 (106)
	17:38	20	09:00 (108)	18:15	24	08:19 (83)	19:45			20:16	47	08:17 (82)	20:46	71	19:56 (107)	21:07	24	06:53 (106)
20	07:54		08:41 (108)	07:23		07:53 (83)	07:40			06:51		07:30 (82)	06:16		07:33 (82)	06:06		06:30 (106)
	17:39	18	08:59 (108)	18:16	28	08:21 (83)	19:46			20:17	48	08:18 (82)	20:47	66	19:55 (107)	21:07	24	06:54 (106)
21	07:53		08:43 (108)	07:21		07:52 (83)	07:38			06:49		07:28 (82)	06:15		07:35 (82)	06:06		06:30 (106)
	17:40	16	08:59 (108)	18:17	30	08:22 (83)	19:48			20:18	53	19:42 (107)	20:48	64	19:56 (107)	21:07	24	06:54 (106)
22	07:52		08:45 (108)	07:20		07:51 (83)	07:37			06:48		07:28 (82)	06:14		07:36 (82)	06:06		06:30 (106)
	17:41	12	08:57 (108)	18:18	32	08:23 (83)	19:49			20:19	65	19:48 (107)	20:49	60	19:55 (107)	21:08	24	06:54 (106)
23	07:52		08:48 (108)	07:18		07:50 (83)	07:35			06:47		07:27 (82)	06:14		07:37 (82)	06:06		06:30 (106)
	17:42	6	08:54 (108)	18:19	34	08:24 (83)	19:50			20:20	73	19:51 (107)	20:50	56	19:54 (107)	21:08	24	06:54 (106)
24	07:51			07:17		07:49 (83)	07:33			06:45		07:26 (82)	06:13		07:38 (82)	06:06		06:30 (106)
	17:44			18:21	35	08:24 (83)	19:51			20:21	77	19:52 (107)	20:51	51	19:53 (107)	21:08	24	06:54 (106)
25	07:50			07:16		07:48 (83)	07:32			06:44		07:26 (82)	06:12		07:40 (82)	06:07		06:31 (106)
	17:45			18:22	37	08:25 (83)	19:52			20:22	82	19:54 (107)	20:51	46	19:52 (107)	21:08	24	06:55 (106)
26	07:50			07:14		07:47 (83)	07:30			06:42		07:26 (82)	06:11		07:42 (82)	06:07		06:31 (106)
	17:46			18:23	38	08:25 (83)	19:53			20:23	85	19:56 (107)	20:52	39	19:51 (107)	21:08	24	06:55 (106)
27	07:49			07:13		07:47 (83)	07:28			06:41		07:24 (82)	06:11		07:46 (82)	06:07		06:31 (106)
	17:47			18:24	38	08:25 (83)	19:54			20:24	89	19:56 (107)	20:53	31	19:51 (107)	21:08	24	06:55 (106)
28	07:48			07:11		07:46 (83)	07:27			06:40		07:24 (82)	06:10		06:34 (106)	06:08		06:32 (106)
	17:48			18:25	39	08:25 (83)	19:55			20:25	91	19:57 (107)	20:54	27	19:49 (107)	21:08	24	06:56 (106)
29	07:47						07:25			06:38		07:24 (82)	06:10		06:33 (106)	06:08		06:32 (106)
	17:50						19:56			20:26	92	19:58 (107)	20:55	29	19:49 (107)	21:08	23	06:55 (106)
30	07:46						07:23			06:37		07:23 (82)	06:09		06:31 (106)	06:09		06:32 (106)
	17:51						19:57			20:27	94	19:58 (107)	20:56	29	19:47 (107)	21:08	24	06:56 (106)
31	07:46						07:22						06:09		06:31 (106)			
	17:52						19:58						20:56	27	19:46 (107)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		575			368			389			1156			2195			686	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.61			0.63			0.63			0.66			0.65			0.68	
Total reduction		0.22			0.26			0.28			0.34			0.36			0.41	
Total, real		125			97			108			388			799			280	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 83

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
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Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m**Shadow receptor:** 8354 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6154)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:32 (106)	06:32		07:37 (82)	07:02		07:48 (82)	07:31		08:35 (83)	07:04			07:37		08:15 (108)
	21:08	24	06:56 (106)	20:51	88	20:10 (107)	20:09	14	08:02 (82)	19:19	14	08:49 (83)	17:33			17:10	28	08:43 (108)
2	06:10		06:33 (106)	06:33		07:36 (82)	07:03			07:32		08:31 (83)	07:05			07:38		08:15 (108)
	21:08	23	06:56 (106)	20:50	91	20:10 (107)	20:08			19:17	21	08:52 (83)	17:32			17:10	29	08:44 (108)
3	06:10		06:33 (106)	06:34		07:36 (82)	07:04			07:33		08:29 (83)	07:06			07:39		08:15 (108)
	21:08	23	06:56 (106)	20:49	92	20:10 (107)	20:06			19:15	24	08:53 (83)	17:31			17:10	29	08:44 (108)
4	06:11		06:34 (106)	06:35		07:35 (82)	07:05			07:34		08:27 (83)	07:07			07:40		08:15 (108)
	21:08	22	06:56 (106)	20:48	93	20:10 (107)	20:05			19:14	28	08:55 (83)	17:30			17:10	30	08:45 (108)
5	06:11		06:34 (106)	06:36		07:34 (82)	07:06			07:35		08:25 (83)	07:08			07:41		08:16 (108)
	21:08	22	06:56 (106)	20:47	94	20:09 (107)	20:03			19:12	31	08:56 (83)	17:29			17:09	29	08:45 (108)
6	06:12		06:35 (106)	06:37		07:34 (82)	07:07			07:36		08:24 (83)	07:09			07:42		08:16 (108)
	21:08	21	06:56 (106)	20:45	94	20:09 (107)	20:01			19:10	33	08:57 (83)	17:28			17:09	30	08:46 (108)
7	06:12		06:35 (106)	06:38		07:33 (82)	07:08			07:37		08:23 (83)	07:11			07:43		08:16 (108)
	21:07	20	06:55 (106)	20:44	96	20:09 (107)	20:00			19:09	34	08:57 (83)	17:27			17:09	30	08:46 (108)
8	06:13		06:35 (106)	06:39		07:33 (82)	07:09			07:38		08:22 (83)	07:12			07:44		08:17 (108)
	21:07	20	06:55 (106)	20:43	96	20:09 (107)	19:57			19:07	36	08:58 (83)	17:26			17:09	30	08:47 (108)
9	06:14		06:36 (106)	06:40		07:33 (82)	07:10			07:39		08:21 (83)	07:13			07:45		08:17 (108)
	21:07	20	06:56 (106)	20:42	94	20:08 (107)	19:55			19:06	37	08:58 (83)	17:25			17:09	30	08:47 (108)
10	06:14		06:36 (106)	06:41		07:33 (82)	07:11			07:40		08:20 (83)	07:14			07:46		08:18 (108)
	21:06	19	06:55 (106)	20:41	94	20:08 (107)	19:53			19:04	38	08:58 (83)	17:24			17:09	30	08:48 (108)
11	06:15		06:38 (106)	06:42		07:32 (82)	07:11			07:41		08:20 (83)	07:15			07:47		08:19 (108)
	21:06	16	06:54 (106)	20:39	96	20:08 (107)	19:52			19:03	38	08:58 (83)	17:23			17:09	30	08:49 (108)
12	06:16		06:39 (106)	06:43		07:32 (82)	07:12			07:42		08:19 (83)	07:16			07:47		08:18 (108)
	21:06	25	19:53 (107)	20:38	94	20:07 (107)	19:50			19:01	39	08:58 (83)	17:22			17:10	30	08:48 (108)
13	06:16		06:39 (106)	06:44		07:32 (82)	07:13			07:43		08:20 (83)	07:17			07:48		08:19 (108)
	21:05	27	19:54 (107)	20:37	93	20:06 (107)	19:48			19:00	38	08:58 (83)	17:21			17:10	30	08:49 (108)
14	06:17		06:40 (106)	06:45		07:32 (82)	07:14			07:44		08:20 (83)	07:19			07:49		08:20 (108)
	21:05	29	19:56 (107)	20:36	91	20:05 (107)	19:47			18:58	38	08:58 (83)	17:20			17:10	30	08:50 (108)
15	06:18		06:42 (106)	06:46		07:32 (82)	07:15			07:45		08:20 (83)	07:20			07:50		08:20 (108)
	21:04	29	19:58 (107)	20:34	90	20:05 (107)	19:45			18:57	38	08:58 (83)	17:19			17:10	30	08:50 (108)
16	06:19		06:46 (106)	06:47		07:32 (82)	07:16			07:46		08:20 (83)	07:21			07:50		08:20 (108)
	21:04	24	20:00 (107)	20:33	87	20:03 (107)	19:43			18:55	37	08:57 (83)	17:18			17:10	30	08:50 (108)
17	06:19		07:53 (82)	06:48		07:31 (82)	07:17			07:47		08:20 (83)	07:22			07:51		08:21 (108)
	21:03	35	20:00 (107)	20:32	85	20:01 (107)	19:42			18:54	36	08:56 (83)	17:17			17:11	30	08:51 (108)
18	06:20		07:51 (82)	06:49		07:32 (82)	07:18			07:48		08:20 (83)	07:23			07:52		08:22 (108)
	21:03	42	20:01 (107)	20:30	81	20:00 (107)	19:40			18:52	35	08:55 (83)	17:17			17:11	30	08:52 (108)
19	06:21		07:49 (82)	06:50		07:32 (82)	07:19			07:49		08:21 (83)	07:24		08:23 (108)	07:52		08:22 (108)
	21:02	48	20:02 (107)	20:29	77	19:58 (107)	19:38			18:51	33	08:54 (83)	17:16	6	08:29 (108)	17:11	29	08:51 (108)
20	06:22		07:48 (82)	06:51		07:32 (82)	07:20			07:50		08:22 (83)	07:25		08:20 (108)	07:53		08:23 (108)
	21:01	54	20:04 (107)	20:27	72	19:55 (107)	19:37			18:49	31	08:53 (83)	17:15	12	08:32 (108)	17:12	29	08:52 (108)
21	06:23		07:46 (82)	06:51		07:33 (82)	07:21			07:51		08:22 (83)	07:27		08:18 (108)	07:53		08:23 (108)
	21:01	57	20:04 (107)	20:26	64	19:52 (107)	19:35			18:48	29	08:51 (83)	17:15	16	08:34 (108)	17:12	29	08:52 (108)
22	06:24		07:45 (82)	06:52		07:33 (82)	07:22			07:52		08:25 (83)	07:28		08:17 (108)	07:54		08:24 (108)
	21:00	62	20:05 (107)	20:25	49	08:22 (82)	19:33			18:46	26	08:51 (83)	17:14	18	08:35 (108)	17:13	29	08:53 (108)
23	06:24		07:44 (82)	06:53		07:34 (82)	07:23			07:54		08:26 (83)	07:29		08:16 (108)	07:55		08:24 (108)
	20:59	64	20:05 (107)	20:23	47	08:21 (82)	19:32			18:45	23	08:49 (83)	17:14	20	08:36 (108)	17:13	29	08:53 (108)
24	06:25		07:43 (82)	06:54		07:34 (82)	07:24			07:55		08:28 (83)	07:30		08:16 (108)	07:55		08:25 (108)
	20:58	69	20:06 (107)	20:22	46	08:20 (82)	19:30			18:44	18	08:46 (83)	17:13	22	08:38 (108)	17:14	29	08:54 (108)
25	06:26		07:42 (82)	06:55		07:35 (82)	07:25			07:56		08:31 (83)	07:31		08:16 (108)	07:55		08:25 (108)
	20:57	72	20:07 (107)	20:20	44	08:19 (82)	19:28			18:42	12	08:43 (83)	17:13	23	08:39 (108)	17:15	30	08:55 (108)
26	06:27		07:41 (82)	06:56		07:36 (82)	07:26			07:57			07:32		08:15 (108)	07:56		08:25 (108)
	20:57	76	20:08 (107)	20:19	42	08:18 (82)	19:27			18:41			17:12	25	08:40 (108)	17:15	30	08:55 (108)
27	06:28		07:40 (82)	06:57		07:37 (82)	07:27			07:58			07:33		08:15 (108)	07:56		08:26 (108)
	20:56	77	20:07 (107)	20:17	39	08:16 (82)	19:25			18:40			17:12	26	08:41 (108)	17:16	30	08:56 (108)
28	06:29		07:39 (82)	06:58		07:39 (82)	07:28			07:59			07:34		08:15 (108)	07:56		08:26 (108)
	20:55	80	20:08 (107)	20:16	36	08:15 (82)	19:23			18:38			17:11	26	08:41 (108)	17:16	30	08:56 (108)
29	06:30		07:38 (82)	06:59		07:39 (82)	07:29			08:00			07:35		08:15 (108)	07:57		08:27 (108)
	20:54	83	20:08 (107)	20:14	33	08:12 (82)	19:22			18:37			17:11	27	08:42 (108)	17:17	29	08:56 (108)
30	06:31		07:38 (82)	07:00		07:41 (82)	07:30			08:01			07:36		08:15 (108)	07:57		08:27 (108)
	20:53	85	20:09 (107)	20:13	28	08:09 (82)	19:20			18:36			17:11	28	08:43 (108)	17:18	30	08:57 (108)
31	06:31		07:37 (82)	07:01		07:44 (82)				08:02						07:57		08:27 (108)
	20:52	87	20:09 (107)	20:11	22	08:06 (82)				18:35						17:19	30	08:57 (108)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		1355			2248			14			767			249			918	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.66			0.66			0.67			0.63			0.61			0.61	
Total reduction		0.39			0.39			0.41			0.35			0.22			0.30	
Total, real		532			883			6			271			56			278	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 84

Licensed user:
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US-SYRACUSE, NY 13202
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Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m**Shadow receptor:** 8355 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6155)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:24 (108)	07:45			07:10		07:45 (83)	07:20			06:36		07:29 (82)	06:08		06:30 (106)
	17:20	29	08:53 (108)	17:53			18:26	37	08:22 (83)	19:59			20:28	88	19:57 (107)	20:57	47	19:49 (107)
2	07:58		08:25 (108)	07:44			07:08		07:45 (83)	07:19			06:35		07:30 (82)	06:08		06:30 (106)
	17:21	28	08:53 (108)	17:54			18:27	36	08:21 (83)	20:00			20:29	88	19:58 (107)	20:58	45	19:49 (107)
3	07:58		08:26 (108)	07:43			07:07		07:46 (83)	07:17			06:33		07:30 (82)	06:07		06:31 (106)
	17:21	29	08:55 (108)	17:56			18:28	35	08:21 (83)	20:00			20:30	87	19:58 (107)	20:59	43	19:48 (107)
4	07:58		08:26 (108)	07:42			07:05		07:45 (83)	07:15			06:32		07:31 (82)	06:07		06:30 (106)
	17:22	28	08:54 (108)	17:57			18:29	35	08:20 (83)	20:01			20:31	87	19:59 (107)	20:59	42	19:47 (107)
5	07:58		08:26 (108)	07:41			07:04		07:46 (83)	07:14			06:31		07:31 (82)	06:07		06:30 (106)
	17:23	29	08:55 (108)	17:58			18:31	33	08:19 (83)	20:02			20:32	85	19:58 (107)	21:00	40	19:46 (107)
6	07:58		08:26 (108)	07:40			07:02		07:46 (83)	07:12			06:30		07:32 (82)	06:06		06:31 (106)
	17:24	29	08:55 (108)	17:59			18:32	32	08:18 (83)	20:03			20:33	83	19:58 (107)	21:01	37	19:45 (107)
7	07:58		08:27 (108)	07:39			07:01		07:48 (83)	07:11		07:50 (82)	06:29		07:33 (82)	06:06		06:31 (106)
	17:25	29	08:56 (108)	18:01			18:33	29	08:17 (83)	20:04	16	08:06 (82)	20:34	82	19:59 (107)	21:01	34	19:44 (107)
8	07:58		08:28 (108)	07:37			07:59		08:48 (83)	07:09		07:47 (82)	06:27		07:34 (82)	06:06		06:30 (106)
	17:26	28	08:56 (108)	18:02			19:34	27	09:15 (83)	20:05	23	08:10 (82)	20:35	80	19:59 (107)	21:02	30	19:41 (107)
9	07:57		08:28 (108)	07:36			07:57		08:49 (83)	07:08		07:44 (82)	06:26		07:35 (82)	06:06		06:31 (106)
	17:27	29	08:57 (108)	18:03			19:35	24	09:13 (83)	20:06	28	08:12 (82)	20:36	78	19:59 (107)	21:02	24	06:55 (106)
10	07:57		08:29 (108)	07:35			07:56		08:51 (83)	07:06		07:42 (82)	06:25		07:36 (82)	06:06		06:31 (106)
	17:28	28	08:57 (108)	18:04			19:36	20	09:11 (83)	20:07	32	08:14 (82)	20:37	76	19:59 (107)	21:03	24	06:55 (106)
11	07:57		08:29 (108)	07:34			07:54		08:53 (83)	07:04		07:40 (82)	06:24		07:38 (82)	06:05		06:31 (106)
	17:29	28	08:57 (108)	18:05			19:37	15	09:08 (83)	20:08	35	08:15 (82)	20:38	72	19:59 (107)	21:04	25	06:56 (106)
12	07:57		08:30 (108)	07:33			07:53		08:59 (83)	07:03		07:38 (82)	06:23		07:39 (82)	06:05		06:31 (106)
	17:30	28	08:58 (108)	18:07			19:38	4	09:03 (83)	20:09	39	08:17 (82)	20:39	68	19:58 (107)	21:04	25	06:56 (106)
13	07:57		08:31 (108)	07:32			07:51			07:01		07:36 (82)	06:22		07:42 (82)	06:05		06:32 (106)
	17:31	27	08:58 (108)	18:08			19:39			20:10	41	08:17 (82)	20:40	63	19:58 (107)	21:05	24	06:56 (106)
14	07:56		08:31 (108)	07:30			07:49			07:00		07:36 (82)	06:21		07:44 (82)	06:05		06:32 (106)
	17:32	27	08:58 (108)	18:09			19:40			20:11	42	08:18 (82)	20:41	58	19:58 (107)	21:05	24	06:56 (106)
15	07:56		08:32 (108)	07:29			07:48			06:58		07:34 (82)	06:20		19:13 (107)	06:05		06:32 (106)
	17:33	26	08:58 (108)	18:10			19:41			20:12	44	08:18 (82)	20:42	45	19:58 (107)	21:05	25	06:57 (106)
16	07:55		08:32 (108)	07:28			07:46			06:57		07:33 (82)	06:19		19:14 (107)	06:05		06:32 (106)
	17:34	25	08:57 (108)	18:11			19:42			20:13	46	08:19 (82)	20:43	43	19:57 (107)	21:06	25	06:57 (106)
17	07:55		08:33 (108)	07:27		07:59 (83)	07:45			06:55		07:32 (82)	06:18		19:15 (107)	06:05		06:32 (106)
	17:36	25	08:58 (108)	18:12	12	08:11 (83)	19:43			20:14	47	08:19 (82)	20:44	43	19:58 (107)	21:06	25	06:57 (106)
18	07:55		08:34 (108)	07:25		07:56 (83)	07:43			06:54		07:32 (82)	06:17		19:15 (107)	06:05		06:32 (106)
	17:37	23	08:57 (108)	18:14	18	08:14 (83)	19:44			20:15	48	08:20 (82)	20:45	42	19:57 (107)	21:07	25	06:57 (106)
19	07:54		08:35 (108)	07:24		07:53 (83)	07:41			06:52		07:30 (82)	06:17		19:15 (107)	06:05		06:33 (106)
	17:38	22	08:57 (108)	18:15	23	08:16 (83)	19:45			20:16	49	08:19 (82)	20:46	42	19:57 (107)	21:07	24	06:57 (106)
20	07:54		08:36 (108)	07:23		07:52 (83)	07:40			06:51		07:30 (82)	06:16		19:16 (107)	06:06		06:34 (106)
	17:39	20	08:56 (108)	18:16	26	08:18 (83)	19:46			20:17	50	08:20 (82)	20:47	40	19:56 (107)	21:07	24	06:58 (106)
21	07:53		08:38 (108)	07:21		07:51 (83)	07:38			06:49		07:29 (82)	06:15		19:17 (107)	06:06		06:34 (106)
	17:40	18	08:56 (108)	18:17	28	08:19 (83)	19:48			20:18	50	08:19 (82)	20:48	39	19:56 (107)	21:07	24	06:58 (106)
22	07:52		08:39 (108)	07:20		07:49 (83)	07:37			06:48		07:29 (82)	06:14		06:37 (106)	06:06		06:34 (106)
	17:41	16	08:55 (108)	18:18	31	08:20 (83)	19:49			20:19	66	19:46 (107)	20:49	46	19:56 (107)	21:08	24	06:58 (106)
23	07:52		08:40 (108)	07:18		07:48 (83)	07:35			06:47		07:29 (82)	06:14		06:35 (106)	06:06		06:34 (106)
	17:42	13	08:53 (108)	18:19	33	08:21 (83)	19:50			20:20	73	19:49 (107)	20:50	48	19:55 (107)	21:08	24	06:58 (106)
24	07:51		08:43 (108)	07:17		07:47 (83)	07:33			06:45		07:28 (82)	06:13		06:33 (106)	06:06		06:33 (106)
	17:44	8	08:51 (108)	18:21	34	08:21 (83)	19:51			20:21	77	19:50 (107)	20:51	50	19:54 (107)	21:08	25	06:58 (106)
25	07:50			07:16		07:47 (83)	07:32			06:44		07:29 (82)	06:12		06:33 (106)	06:07		06:34 (106)
	17:45			18:22	35	08:22 (83)	19:52			20:22	79	19:52 (107)	20:51	51	19:54 (107)	21:08	25	06:59 (106)
26	07:50			07:14		07:46 (83)	07:30			06:42		07:29 (82)	06:11		06:32 (106)	06:07		06:34 (106)
	17:46			18:23	35	08:21 (83)	19:53			20:23	83	19:54 (107)	20:52	50	19:53 (107)	21:08	25	06:59 (106)
27	07:49			07:13		07:46 (83)	07:28			06:41		07:28 (82)	06:11		06:32 (106)	06:07		06:34 (106)
	17:47			18:24	36	08:22 (83)	19:54			20:24	84	19:54 (107)	20:53	51	19:53 (107)	21:08	25	06:59 (106)
28	07:48			07:11		07:45 (83)	07:27			06:40		07:29 (82)	06:10		06:31 (106)	06:08		06:35 (106)
	17:48			18:25	36	08:21 (83)	19:55			20:25	85	19:55 (107)	20:54	51	19:52 (107)	21:08	24	06:59 (106)
29	07:47						07:25			06:38		07:29 (82)	06:10		06:31 (106)	06:08		06:35 (106)
	17:50						19:56			20:26	86	19:56 (107)	20:55	50	19:52 (107)	21:08	24	06:59 (106)
30	07:46						07:23			06:37		07:29 (82)	06:09		06:30 (106)	06:09		06:35 (106)
	17:51						19:57			20:27	87	19:56 (107)	20:56	50	19:51 (107)	21:08	25	07:00 (106)
31	07:46						07:22						06:09		06:31 (106)			
	17:52						19:58						20:56	47	19:50 (107)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		592			347			327			1310			1883			857	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.61			0.63			0.63			0.66			0.65			0.68	
Total reduction		0.22			0.26			0.28			0.34			0.36			0.40	
Total, real		129			92			91			440			680			347	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 85

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m**Shadow receptor:** 8355 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6155)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:35 (106)	06:32		07:49 (82)	07:02		07:39 (82)	07:31			07:04			07:37		08:11 (108)
	21:08	25	07:00 (106)	20:51	71	20:09 (107)	20:09	35	08:14 (82)	19:19			17:33			17:10	28	08:39 (108)
2	06:10		06:36 (106)	06:33		07:48 (82)	07:03		07:40 (82)	07:32		08:33 (83)	07:05			07:38		08:11 (108)
	21:08	24	07:00 (106)	20:50	73	20:09 (107)	20:08	32	08:12 (82)	19:17	12	08:45 (83)	17:32			17:10	28	08:39 (108)
3	06:10		06:36 (106)	06:34		07:46 (82)	07:04		07:42 (82)	07:33		08:30 (83)	07:06			07:39		08:11 (108)
	21:08	24	07:00 (106)	20:49	77	20:09 (107)	20:06	28	08:10 (82)	19:15	18	08:48 (83)	17:31			17:10	29	08:40 (108)
4	06:11		06:36 (106)	06:35		07:45 (82)	07:05		07:44 (82)	07:34		08:27 (83)	07:07			07:40		08:12 (108)
	21:08	25	07:01 (106)	20:48	79	20:09 (107)	20:05	23	08:07 (82)	19:14	23	08:50 (83)	17:30			17:10	28	08:40 (108)
5	06:11		06:36 (106)	06:36		07:43 (82)	07:06		07:47 (82)	07:35		08:25 (83)	07:08			07:41		08:12 (108)
	21:08	32	19:48 (107)	20:47	81	20:08 (107)	20:03	16	08:03 (82)	19:12	26	08:51 (83)	17:29			17:09	29	08:41 (108)
6	06:12		06:37 (106)	06:37		07:42 (82)	07:07			07:36		08:24 (83)	07:09			07:42		08:13 (108)
	21:08	35	19:50 (107)	20:45	83	20:08 (107)	20:01			19:10	28	08:52 (83)	17:28			17:09	28	08:41 (108)
7	06:12		06:36 (106)	06:38		07:41 (82)	07:08			07:37		08:22 (83)	07:11			07:43		08:13 (108)
	21:07	38	19:51 (107)	20:44	84	20:08 (107)	20:00			19:09	31	08:53 (83)	17:27			17:09	29	08:42 (108)
8	06:13		06:37 (106)	06:39		07:40 (82)	07:09			07:38		08:21 (83)	07:12			07:44		08:14 (108)
	21:07	41	19:53 (107)	20:43	86	20:08 (107)	19:57			19:07	33	08:54 (83)	17:26			17:09	28	08:42 (108)
9	06:14		06:38 (106)	06:40		07:40 (82)	07:10			07:39		08:20 (83)	07:13			07:45		08:14 (108)
	21:07	42	19:55 (107)	20:42	86	20:07 (107)	19:55			19:06	34	08:54 (83)	17:25			17:09	29	08:43 (108)
10	06:14		06:37 (106)	06:41		07:39 (82)	07:11			07:40		08:19 (83)	07:14			07:46		08:15 (108)
	21:06	45	19:55 (107)	20:41	88	20:07 (107)	19:53			19:04	35	08:54 (83)	17:24			17:09	28	08:43 (108)
11	06:15		06:38 (106)	06:42		07:38 (82)	07:11			07:41		08:19 (83)	07:15			07:47		08:15 (108)
	21:06	46	19:57 (107)	20:39	87	20:06 (107)	19:52			19:03	35	08:54 (83)	17:23			17:09	29	08:44 (108)
12	06:16		06:39 (106)	06:43		07:38 (82)	07:12			07:42		08:18 (83)	07:16			07:47		08:15 (108)
	21:06	47	19:58 (107)	20:38	88	20:06 (107)	19:50			19:01	36	08:54 (83)	17:22			17:10	28	08:43 (108)
13	06:16		06:38 (106)	06:44		07:37 (82)	07:13			07:43		08:19 (83)	07:17			07:48		08:16 (108)
	21:05	48	19:58 (107)	20:37	87	20:05 (107)	19:48			19:00	36	08:55 (83)	17:21			17:10	28	08:44 (108)
14	06:17		06:39 (106)	06:45		07:37 (82)	07:14			07:44		08:19 (83)	07:19			07:49		08:17 (108)
	21:05	50	20:00 (107)	20:36	87	20:04 (107)	19:47			18:58	36	08:55 (83)	17:20			17:10	28	08:45 (108)
15	06:18		06:40 (106)	06:46		07:36 (82)	07:15			07:45		08:18 (83)	07:20			07:50		08:17 (108)
	21:04	50	20:01 (107)	20:34	86	20:03 (107)	19:45			18:57	36	08:54 (83)	17:19			17:10	28	08:45 (108)
16	06:19		06:41 (106)	06:47		07:36 (82)	07:16			07:46		08:18 (83)	07:21			07:50		08:17 (108)
	21:04	50	20:02 (107)	20:33	84	20:02 (107)	19:43			18:55	36	08:54 (83)	17:18			17:10	28	08:45 (108)
17	06:19		06:41 (106)	06:48		07:35 (82)	07:17			07:47		08:19 (83)	07:22			07:51		08:18 (108)
	21:03	51	20:02 (107)	20:32	81	19:59 (107)	19:42			18:54	34	08:53 (83)	17:17			17:11	28	08:46 (108)
18	06:20		06:42 (106)	06:49		07:34 (82)	07:18			07:48		08:19 (83)	07:23		08:17 (108)	07:52		08:19 (108)
	21:03	51	20:03 (107)	20:30	79	19:58 (107)	19:40			18:52	33	08:52 (83)	17:17	8	08:25 (108)	17:11	28	08:47 (108)
19	06:21		06:43 (106)	06:50		07:34 (82)	07:19			07:49		08:19 (83)	07:24		08:15 (108)	07:52		08:19 (108)
	21:02	50	20:04 (107)	20:29	76	19:56 (107)	19:38			18:51	32	08:51 (83)	17:16	13	08:28 (108)	17:11	27	08:46 (108)
20	06:22		06:45 (106)	06:51		07:34 (82)	07:20			07:50		08:20 (83)	07:25		08:14 (108)	07:53		08:20 (108)
	21:01	49	20:05 (107)	20:27	70	19:53 (107)	19:37			18:49	30	08:50 (83)	17:15	16	08:30 (108)	17:12	27	08:47 (108)
21	06:23		06:45 (106)	06:51		07:34 (82)	07:21			07:51		08:21 (83)	07:27		08:13 (108)	07:54		08:20 (108)
	21:01	48	20:05 (107)	20:26	64	19:50 (107)	19:35			18:48	27	08:48 (83)	17:15	18	08:31 (108)	17:12	27	08:47 (108)
22	06:24		06:49 (106)	06:52		07:34 (82)	07:22			07:52		08:23 (83)	07:28		08:12 (108)	07:54		08:21 (108)
	21:00	41	20:05 (107)	20:25	50	08:24 (82)	19:33			18:46	25	08:48 (83)	17:14	20	08:32 (108)	17:13	27	08:48 (108)
23	06:24		19:26 (107)	06:53		07:34 (82)	07:23			07:54		08:24 (83)	07:29		08:11 (108)	07:55		08:21 (108)
	20:59	40	20:06 (107)	20:23	49	08:23 (82)	19:32			18:45	22	08:46 (83)	17:14	22	08:33 (108)	17:13	27	08:48 (108)
24	06:25		19:26 (107)	06:54		07:34 (82)	07:24			07:55		08:26 (83)	07:30		08:12 (108)	07:55		08:22 (108)
	20:58	41	20:07 (107)	20:22	49	08:23 (82)	19:30			18:44	17	08:43 (83)	17:13	23	08:35 (108)	17:14	27	08:49 (108)
25	06:26		19:26 (107)	06:55		07:35 (82)	07:25			07:56		08:29 (83)	07:31		08:11 (108)	07:55		08:22 (108)
	20:57	41	20:07 (107)	20:20	47	08:22 (82)	19:28			18:42	11	08:40 (83)	17:13	25	08:36 (108)	17:15	27	08:49 (108)
26	06:27		19:25 (107)	06:56		07:35 (82)	07:26			07:57			07:32		08:11 (108)	07:56		08:22 (108)
	20:57	43	20:08 (107)	20:19	47	08:22 (82)	19:27			18:41			17:12	25	08:36 (108)	17:15	28	08:50 (108)
27	06:28		19:24 (107)	06:57		07:35 (82)	07:27			07:58			07:33		08:11 (108)	07:56		08:23 (108)
	20:56	43	20:07 (107)	20:17	46	08:21 (82)	19:25			18:40			17:12	26	08:37 (108)	17:16	28	08:51 (108)
28	06:29		19:24 (107)	06:58		07:36 (82)	07:28			07:59			07:34		08:11 (108)	07:56		08:23 (108)
	20:55	44	20:08 (107)	20:16	44	08:20 (82)	19:23			18:38			17:11	27	08:38 (108)	17:16	28	08:51 (108)
29	06:30		07:58 (82)	06:59		07:36 (82)	07:29			08:00			07:35		08:11 (108)	07:57		08:24 (108)
	20:54	51	20:08 (107)	20:14	42	08:18 (82)	19:22			18:37			17:11	27	08:38 (108)	17:17	27	08:51 (108)
30	06:31		07:54 (82)	07:00		07:36 (82)	07:30			08:01			07:36		08:11 (108)	07:57		08:24 (108)
	20:53	60	20:09 (107)	20:13	41	08:17 (82)	19:20			18:36			17:11	28	08:39 (108)	17:18	28	08:52 (108)
31	06:31		07:51 (82)	07:01		07:37 (82)				08:02						07:57		08:24 (108)
	20:52	66	20:09 (107)	20:11	39	08:16 (82)				18:35						17:19	28	08:52 (108)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		1341			2151			134			686			278			865	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.65			0.65			0.67			0.63			0.61			0.61	
Total reduction		0.39			0.39			0.41			0.35			0.22			0.30	
Total, real		523			843			54			242			62			261	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 86

Licensed user:
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Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m**Shadow receptor:** 8356 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6156)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:24 (108)	07:45			07:10		07:44 (83)	07:20			06:36		07:25 (82)	06:08		06:29 (106)
	17:20	28	08:52 (108)	17:53			18:26	36	08:20 (83)	19:59			20:28	88	19:58 (107)	20:57	50	19:54 (107)
2	07:58		08:24 (108)	07:44			07:08		07:43 (83)	07:19			06:35		07:25 (82)	06:08		06:29 (106)
	17:21	29	08:53 (108)	17:54			18:27	37	08:20 (83)	20:00			20:29	89	19:59 (107)	20:58	50	19:54 (107)
3	07:58		08:26 (108)	07:43			07:07		07:44 (83)	07:17			06:33		07:26 (82)	06:07		06:30 (106)
	17:21	28	08:54 (108)	17:56			18:28	36	08:20 (83)	20:00			20:30	90	20:00 (107)	20:59	48	19:53 (107)
4	07:58		08:25 (108)	07:42			07:05		07:43 (83)	07:15			06:32		07:26 (82)	06:07		06:29 (106)
	17:22	29	08:54 (108)	17:57			18:29	36	08:19 (83)	20:01			20:31	89	20:00 (107)	20:59	47	19:52 (107)
5	07:58		08:25 (108)	07:41			07:04		07:44 (83)	07:14			06:31		07:26 (82)	06:07		06:29 (106)
	17:23	29	08:54 (108)	17:58			18:31	35	08:19 (83)	20:02			20:32	90	20:00 (107)	21:00	46	19:52 (107)
6	07:58		08:26 (108)	07:40			07:02		07:44 (83)	07:12			06:30		07:26 (82)	06:06		06:29 (106)
	17:24	29	08:55 (108)	17:59			18:32	34	08:18 (83)	20:03			20:33	89	20:00 (107)	21:01	46	19:52 (107)
7	07:58		08:26 (108)	07:39			07:01		07:45 (83)	07:11			06:29		07:27 (82)	06:06		06:30 (106)
	17:25	29	08:55 (108)	18:01			18:33	32	08:17 (83)	20:04			20:34	87	20:00 (107)	21:01	43	19:51 (107)
8	07:58		08:27 (108)	07:37			07:59		08:45 (83)	07:09			06:27		07:28 (82)	06:06		06:29 (106)
	17:26	29	08:56 (108)	18:02			19:34	31	09:16 (83)	20:05			20:35	87	20:01 (107)	21:02	42	19:50 (107)
9	07:57		08:28 (108)	07:36			07:57		08:45 (83)	07:08		07:49 (82)	06:26		07:28 (82)	06:06		06:29 (106)
	17:27	28	08:56 (108)	18:03			19:35	29	09:14 (83)	20:06	12	08:01 (82)	20:36	87	20:01 (107)	21:02	40	19:49 (107)
10	07:57		08:28 (108)	07:35			07:56		08:47 (83)	07:06		07:45 (82)	06:25		07:29 (82)	06:06		06:29 (106)
	17:28	29	08:57 (108)	18:04			19:36	26	09:13 (83)	20:07	21	08:06 (82)	20:37	85	20:01 (107)	21:03	40	19:49 (107)
11	07:57		08:28 (108)	07:34			07:54		08:48 (83)	07:04		07:41 (82)	06:24		07:30 (82)	06:05		06:30 (106)
	17:29	29	08:57 (108)	18:05			19:37	22	09:10 (83)	20:08	27	08:08 (82)	20:38	83	20:01 (107)	21:04	37	19:48 (107)
12	07:57		08:29 (108)	07:33			07:53		08:51 (83)	07:03		07:40 (82)	06:23		07:31 (82)	06:05		06:30 (106)
	17:30	28	08:57 (108)	18:07			19:38	17	09:08 (83)	20:09	30	08:10 (82)	20:39	81	20:01 (107)	21:04	34	19:47 (107)
13	07:57		08:30 (108)	07:32			07:51		08:54 (83)	07:01		07:37 (82)	06:22		07:32 (82)	06:05		06:30 (106)
	17:31	28	08:58 (108)	18:08			19:39	10	09:04 (83)	20:10	34	08:11 (82)	20:40	78	20:01 (107)	21:05	33	19:46 (107)
14	07:56		08:30 (108)	07:30			07:49			07:00		07:36 (82)	06:21		07:33 (82)	06:05		06:30 (106)
	17:32	27	08:57 (108)	18:09			19:40			20:11	37	08:13 (82)	20:41	75	20:00 (107)	21:05	30	19:45 (107)
15	07:56		08:31 (108)	07:29			07:48			06:58		07:34 (82)	06:20		07:35 (82)	06:05		06:30 (106)
	17:33	27	08:58 (108)	18:10			19:41			20:12	40	08:14 (82)	20:42	70	20:00 (107)	21:05	25	06:55 (106)
16	07:55		08:31 (108)	07:28			07:46			06:57		07:33 (82)	06:19		07:36 (82)	06:05		06:31 (106)
	17:34	26	08:57 (108)	18:11			19:42			20:13	42	08:15 (82)	20:43	68	20:00 (107)	21:06	24	06:55 (106)
17	07:55		08:32 (108)	07:27			07:45			06:55		07:31 (82)	06:18		07:39 (82)	06:05		06:31 (106)
	17:36	26	08:58 (108)	18:12			19:43			20:14	44	08:15 (82)	20:44	64	20:01 (107)	21:06	24	06:55 (106)
18	07:55		08:32 (108)	07:25		07:59 (83)	07:43			06:54		07:30 (82)	06:17		07:41 (82)	06:05		06:31 (106)
	17:37	25	08:57 (108)	18:14	10	08:09 (83)	19:44			20:15	46	08:16 (82)	20:45	58	20:00 (107)	21:07	24	06:55 (106)
19	07:54		08:34 (108)	07:24		07:55 (83)	07:41			06:52		07:29 (82)	06:17		07:45 (82)	06:05		06:31 (106)
	17:38	24	08:58 (108)	18:15	17	08:12 (83)	19:45			20:16	47	08:16 (82)	20:46	50	20:00 (107)	21:07	24	06:55 (106)
20	07:54		08:34 (108)	07:23		07:53 (83)	07:40			06:51		07:29 (82)	06:16		19:17 (107)	06:06		06:32 (106)
	17:39	23	08:57 (108)	18:16	21	08:14 (83)	19:46			20:17	47	08:16 (82)	20:47	42	19:59 (107)	21:07	25	06:57 (106)
21	07:53		08:36 (108)	07:21		07:51 (83)	07:38			06:49		07:27 (82)	06:15		19:18 (107)	06:06		06:32 (106)
	17:40	21	08:57 (108)	18:17	25	08:16 (83)	19:48			20:18	49	08:16 (82)	20:48	42	20:00 (107)	21:07	25	06:57 (106)
22	07:52		08:37 (108)	07:20		07:49 (83)	07:37			06:48		07:27 (82)	06:14		19:19 (107)	06:06		06:32 (106)
	17:41	19	08:56 (108)	18:18	28	08:17 (83)	19:49			20:19	50	08:17 (82)	20:49	40	19:59 (107)	21:08	25	06:57 (106)
23	07:52		08:38 (108)	07:18		07:48 (83)	07:35			06:47		07:27 (82)	06:14		19:19 (107)	06:06		06:32 (106)
	17:42	17	08:55 (108)	18:19	30	08:18 (83)	19:50			20:20	58	19:45 (107)	20:50	39	19:58 (107)	21:08	25	06:57 (106)
24	07:51		08:40 (108)	07:17		07:47 (83)	07:33			06:45		07:26 (82)	06:13		06:36 (106)	06:06		06:32 (106)
	17:44	13	08:53 (108)	18:21	32	08:19 (83)	19:51			20:21	67	19:48 (107)	20:51	44	19:58 (107)	21:08	24	06:56 (106)
25	07:50		08:43 (108)	07:16		07:46 (83)	07:32			06:44		07:26 (82)	06:12		06:34 (106)	06:07		06:33 (106)
	17:45	9	08:52 (108)	18:22	34	08:20 (83)	19:52			20:22	73	19:51 (107)	20:51	48	19:58 (107)	21:08	24	06:57 (106)
26	07:50			07:14		07:45 (83)	07:30			06:42		07:26 (82)	06:11		06:33 (106)	06:07		06:33 (106)
	17:46			18:23	35	08:20 (83)	19:53			20:23	77	19:53 (107)	20:52	49	19:57 (107)	21:08	24	06:57 (106)
27	07:49			07:13		07:45 (83)	07:28			06:41		07:25 (82)	06:11		06:32 (106)	06:07		06:32 (106)
	17:47			18:24	35	08:20 (83)	19:54			20:24	81	19:54 (107)	20:53	50	19:57 (107)	21:08	25	06:57 (106)
28	07:48			07:11		07:44 (83)	07:27			06:40		07:25 (82)	06:10		06:31 (106)	06:08		06:33 (106)
	17:48			18:25	36	08:20 (83)	19:55			20:25	84	19:56 (107)	20:54	51	19:56 (107)	21:08	30	19:48 (107)
29	07:47						07:25			06:38		07:25 (82)	06:10		06:31 (106)	06:08		06:33 (106)
	17:50						19:56			20:26	86	19:57 (107)	20:55	51	19:56 (107)	21:08	32	19:49 (107)
30	07:46						07:23			06:37		07:25 (82)	06:09		06:30 (106)	06:09		06:34 (106)
	17:51						19:57			20:27	87	19:57 (107)	20:56	50	19:55 (107)	21:08	34	19:51 (107)
31	07:46						07:22						06:09		06:30 (106)			
	17:52						19:58						20:56	50	19:55 (107)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		629			303			381			1139			2064			1000	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.61			0.63			0.63			0.66			0.65			0.67	
Total reduction		0.22			0.26			0.28			0.34			0.36			0.40	
Total, real		137			80			106			383			747			401	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 87

Licensed user:
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Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m**Shadow receptor:** 8356 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6156)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:34 (106)	06:32		07:41 (82)	07:02		07:41 (82)	07:31		08:31 (83)	07:04			07:37		08:10 (108)
	21:08	36	19:52 (107)	20:51	81	20:11 (107)	20:09	26	08:07 (82)	19:19	15	08:46 (83)	17:33			17:10	29	08:39 (108)
2	06:10		06:34 (106)	06:33		07:40 (82)	07:03		07:43 (82)	07:32		08:28 (83)	07:05			07:38		08:10 (108)
	21:08	38	19:53 (107)	20:50	83	20:11 (107)	20:08	21	08:04 (82)	19:17	20	08:48 (83)	17:32			17:10	29	08:39 (108)
3	06:10		06:34 (106)	06:34		07:40 (82)	07:04		07:47 (82)	07:33		08:25 (83)	07:06			07:39		08:11 (108)
	21:08	40	19:54 (107)	20:49	84	20:11 (107)	20:06	12	07:59 (82)	19:15	25	08:50 (83)	17:31			17:10	29	08:40 (108)
4	06:11		06:35 (106)	06:35		07:39 (82)	07:05			07:34		08:24 (83)	07:07			07:40		08:11 (108)
	21:08	42	19:56 (107)	20:48	86	20:11 (107)	20:05			19:14	27	08:51 (83)	17:30			17:10	29	08:40 (108)
5	06:11		06:35 (106)	06:36		07:37 (82)	07:06			07:35		08:22 (83)	07:08			07:41		08:11 (108)
	21:08	43	19:56 (107)	20:47	87	20:10 (107)	20:03			19:12	30	08:52 (83)	17:29			17:09	29	08:40 (108)
6	06:12		06:35 (106)	06:37		07:36 (82)	07:07			07:36		08:21 (83)	07:09			07:42		08:12 (108)
	21:08	44	19:57 (107)	20:45	88	20:10 (107)	20:01			19:10	32	08:53 (83)	17:28			17:09	29	08:41 (108)
7	06:12		06:35 (106)	06:38		07:36 (82)	07:08			07:37		08:20 (83)	07:11			07:43		08:12 (108)
	21:07	46	19:58 (107)	20:44	89	20:10 (107)	20:00			19:09	33	08:53 (83)	17:27			17:09	29	08:41 (108)
8	06:13		06:36 (106)	06:39		07:35 (82)	07:09			07:38		08:19 (83)	07:12			07:44		08:13 (108)
	21:07	47	19:59 (107)	20:43	89	20:09 (107)	19:57			19:07	34	08:53 (83)	17:26			17:09	29	08:42 (108)
9	06:14		06:37 (106)	06:40		07:35 (82)	07:10			07:39		08:18 (83)	07:13			07:45		08:14 (108)
	21:07	47	20:00 (107)	20:42	90	20:09 (107)	19:55			19:06	36	08:54 (83)	17:25			17:09	28	08:42 (108)
10	06:14		06:36 (106)	06:41		07:34 (82)	07:11			07:40		08:18 (83)	07:14			07:46		08:14 (108)
	21:06	49	20:01 (107)	20:41	89	20:08 (107)	19:53			19:04	36	08:54 (83)	17:24			17:09	29	08:43 (108)
11	06:15		06:37 (106)	06:42		07:34 (82)	07:11			07:41		08:17 (83)	07:15			07:47		08:15 (108)
	21:06	50	20:02 (107)	20:39	88	20:07 (107)	19:52			19:03	36	08:53 (83)	17:23			17:09	28	08:43 (108)
12	06:16		06:38 (106)	06:43		07:34 (82)	07:12			07:42		08:17 (83)	07:16			07:47		08:15 (108)
	21:06	51	20:03 (107)	20:38	88	20:07 (107)	19:50			19:01	36	08:53 (83)	17:22			17:10	28	08:43 (108)
13	06:16		06:38 (106)	06:44		07:33 (82)	07:13			07:43		08:18 (83)	07:17			07:48		08:15 (108)
	21:05	51	20:03 (107)	20:37	87	20:06 (107)	19:48			19:00	36	08:54 (83)	17:21			17:10	28	08:43 (108)
14	06:17		06:39 (106)	06:45		07:33 (82)	07:14			07:44		08:17 (83)	07:19			07:49		08:16 (108)
	21:05	51	20:04 (107)	20:36	84	20:04 (107)	19:47			18:58	36	08:53 (83)	17:20			17:10	28	08:44 (108)
15	06:18		06:40 (106)	06:46		07:33 (82)	07:15			07:45		08:17 (83)	07:20			07:50		08:17 (108)
	21:04	50	20:05 (107)	20:34	83	20:03 (107)	19:45			18:57	36	08:53 (83)	17:19			17:10	28	08:45 (108)
16	06:19		06:41 (106)	06:47		07:33 (82)	07:16			07:46		08:18 (83)	07:21			07:50		08:17 (108)
	21:04	51	20:06 (107)	20:33	81	20:02 (107)	19:43			18:55	34	08:52 (83)	17:18			17:10	27	08:44 (108)
17	06:19		06:41 (106)	06:48		07:32 (82)	07:17			07:47		08:18 (83)	07:22		08:16 (108)	07:51		08:18 (108)
	21:03	50	20:06 (107)	20:32	76	19:59 (107)	19:42			18:54	33	08:51 (83)	17:17	9	08:25 (108)	17:11	27	08:45 (108)
18	06:20		06:43 (106)	06:49		07:32 (82)	07:18			07:48		08:18 (83)	07:23		08:14 (108)	07:52		08:19 (108)
	21:03	49	20:07 (107)	20:30	72	19:57 (107)	19:40			18:52	32	08:50 (83)	17:17	13	08:27 (108)	17:11	27	08:46 (108)
19	06:21		06:45 (106)	06:50		07:32 (82)	07:19			07:49		08:19 (83)	07:24		08:13 (108)	07:52		08:19 (108)
	21:02	46	20:08 (107)	20:29	66	19:54 (107)	19:38			18:51	30	08:49 (83)	17:16	17	08:30 (108)	17:11	27	08:46 (108)
20	06:22		19:30 (107)	06:51		07:32 (82)	07:20			07:50		08:20 (83)	07:25		08:12 (108)	07:53		08:20 (108)
	21:01	38	20:08 (107)	20:27	54	19:47 (107)	19:37			18:49	27	08:47 (83)	17:15	19	08:31 (108)	17:12	26	08:46 (108)
21	06:23		19:28 (107)	06:51		07:32 (82)	07:21			07:51		08:21 (83)	07:27		08:11 (108)	07:54		08:20 (108)
	21:01	40	20:08 (107)	20:26	49	08:21 (82)	19:35			18:48	24	08:45 (83)	17:15	21	08:32 (108)	17:12	26	08:46 (108)
22	06:24		19:28 (107)	06:52		07:32 (82)	07:22			07:52		08:24 (83)	07:28		08:10 (108)	07:54		08:21 (108)
	21:00	41	20:09 (107)	20:25	49	08:21 (82)	19:33			18:46	20	08:44 (83)	17:14	23	08:33 (108)	17:13	26	08:47 (108)
23	06:24		19:28 (107)	06:53		07:33 (82)	07:23			07:54		08:26 (83)	07:29		08:10 (108)	07:55		08:21 (108)
	20:59	41	20:09 (107)	20:23	47	08:20 (82)	19:32			18:45	15	08:41 (83)	17:14	24	08:34 (108)	17:13	26	08:47 (108)
24	06:25		19:28 (107)	06:54		07:33 (82)	07:24			07:55		08:30 (83)	07:30		08:10 (108)	07:55		08:22 (108)
	20:58	42	20:10 (107)	20:22	47	08:20 (82)	19:30			18:44	7	08:37 (83)	17:13	25	08:35 (108)	17:14	27	08:49 (108)
25	06:26		07:53 (82)	06:55		07:33 (82)	07:25			07:56			07:31		08:10 (108)	07:55		08:22 (108)
	20:57	54	20:10 (107)	20:20	46	08:19 (82)	19:28			18:42			17:13	26	08:36 (108)	17:15	27	08:49 (108)
26	06:27		07:51 (82)	06:56		07:34 (82)	07:26			07:57			07:32		08:10 (108)	07:56		08:22 (108)
	20:57	61	20:11 (107)	20:19	44	08:18 (82)	19:27			18:41			17:12	26	08:36 (108)	17:15	27	08:49 (108)
27	06:28		07:48 (82)	06:57		07:35 (82)	07:27			07:58			07:33		08:10 (108)	07:56		08:23 (108)
	20:56	65	20:10 (107)	20:17	42	08:17 (82)	19:25			18:40			17:12	27	08:37 (108)	17:16	27	08:50 (108)
28	06:29		07:46 (82)	06:58		07:36 (82)	07:28			07:59			07:34		08:10 (108)	07:56		08:23 (108)
	20:55	70	20:11 (107)	20:16	39	08:15 (82)	19:23			18:38			17:11	27	08:37 (108)	17:16	27	08:50 (108)
29	06:30		07:45 (82)	06:59		07:36 (82)	07:29			08:00			07:35		08:10 (108)	07:57		08:23 (108)
	20:54	73	20:11 (107)	20:14	37	08:13 (82)	19:22			18:37			17:11	28	08:38 (108)	17:17	28	08:51 (108)
30	06:31		07:43 (82)	07:00		07:37 (82)	07:30		08:36 (83)	08:01			07:36		08:10 (108)	07:57		08:23 (108)
	20:53	76	20:11 (107)	20:13	34	08:11 (82)	19:20	5	08:41 (83)	18:36			17:11	28	08:38 (108)	17:18	28	08:51 (108)
31	06:31		07:42 (82)	07:01		07:39 (82)				08:02						07:57		08:24 (108)
	20:52	78	20:11 (107)	20:11	30	08:09 (82)				18:35						17:19	27	08:51 (108)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		1560			2109			64			690			313			859	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.65			0.66			0.66			0.63			0.61			0.61	
Total reduction		0.39			0.39			0.40			0.35			0.22			0.30	
Total, real		607			828			26			244			70			260	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 88

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m**Shadow receptor:** 8386 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6164)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:42 (72)	07:45		16:16 (117)	07:10		16:26 (117)	07:20			06:36		18:59 (74)	06:08		20:08 (73)
	17:20	45	16:53 (77)	17:53	52	17:08 (117)	18:26	36	17:02 (117)	19:59			20:28	32	19:31 (74)	20:57	20	20:28 (73)
2	07:57		08:43 (72)	07:44		16:17 (117)	07:08		16:27 (117)	07:19			06:34		19:00 (74)	06:08		20:07 (73)
	17:20	45	16:54 (77)	17:54	52	17:09 (117)	18:27	33	17:00 (117)	20:00			20:29	30	19:30 (74)	20:58	22	20:29 (73)
3	07:58		08:44 (72)	07:43		16:16 (117)	07:07		16:30 (117)	07:17			06:33		19:02 (74)	06:07		20:07 (73)
	17:21	44	16:55 (77)	17:56	54	17:10 (117)	18:28	28	16:58 (117)	20:00			20:30	27	19:29 (74)	20:58	23	20:30 (73)
4	07:58		08:45 (72)	07:42		16:15 (117)	07:05		16:33 (117)	07:15			06:32		19:02 (74)	06:07		20:06 (73)
	17:22	44	16:56 (77)	17:57	55	17:10 (117)	18:29	21	16:54 (117)	20:01			20:31	24	19:26 (74)	20:59	24	20:30 (73)
5	07:58		08:46 (72)	07:41		16:15 (117)	07:04		16:38 (117)	07:14			06:31		19:04 (74)	06:07		20:06 (73)
	17:23	44	16:57 (77)	17:58	56	17:11 (117)	18:30	12	16:50 (117)	20:02			20:32	21	19:25 (74)	21:00	25	20:31 (73)
6	07:58		08:47 (72)	07:40		16:14 (117)	07:02			07:12		19:15 (74)	06:30		19:07 (74)	06:06		20:06 (73)
	17:24	44	16:58 (77)	17:59	57	17:11 (117)	18:32			20:03	12	19:27 (74)	20:33	15	19:22 (74)	21:00	26	20:32 (73)
7	07:58		08:48 (72)	07:38		16:14 (117)	07:00			07:11		19:10 (74)	06:28		19:11 (74)	06:06		20:05 (73)
	17:25	43	16:59 (77)	18:00	58	17:12 (117)	18:33			20:04	20	19:30 (74)	20:34	7	19:18 (74)	21:01	26	20:31 (73)
8	07:57		08:49 (72)	07:37		16:14 (117)	07:59			07:09		19:08 (74)	06:27			06:06		20:05 (73)
	17:26	43	17:00 (77)	18:02	59	17:13 (117)	19:34			20:05	25	19:33 (74)	20:35			21:02	27	20:32 (73)
9	07:57		08:50 (72)	07:36		16:14 (117)	07:57			07:07		19:05 (74)	06:26			06:06		20:05 (73)
	17:27	44	17:02 (77)	18:03	59	17:13 (117)	19:35			20:06	29	19:34 (74)	20:36			21:02	28	20:33 (73)
10	07:57		08:51 (72)	07:35		16:14 (117)	07:56			07:06		19:03 (74)	06:25			06:05		20:06 (73)
	17:28	41	17:02 (77)	18:04	60	17:14 (117)	19:36			20:07	32	19:35 (74)	20:37			21:03	27	20:33 (73)
11	07:57		08:53 (72)	07:34		16:14 (117)	07:54			07:04		19:02 (74)	06:24			06:05		20:06 (73)
	17:29	40	17:03 (77)	18:05	60	17:14 (117)	19:37			20:08	34	19:36 (74)	20:38			21:03	28	20:34 (73)
12	07:57		08:55 (72)	07:33		16:14 (117)	07:53			07:03		19:00 (74)	06:23			06:05		20:06 (73)
	17:30	36	17:03 (77)	18:06	59	17:13 (117)	19:38			20:09	36	19:36 (74)	20:39			21:04	28	20:34 (73)
13	07:56		08:58 (72)	07:32		16:14 (117)	07:51			07:01		18:59 (74)	06:22			06:05		20:06 (73)
	17:31	32	17:04 (77)	18:08	60	17:14 (117)	19:39			20:10	39	19:38 (74)	20:40			21:04	29	20:35 (73)
14	07:56		16:40 (77)	07:30		16:14 (117)	07:49			07:00		18:58 (74)	06:21			06:05		20:06 (73)
	17:32	24	17:04 (77)	18:09	60	17:14 (117)	19:40			20:11	40	19:38 (74)	20:41			21:05	29	20:35 (73)
15	07:56		16:41 (77)	07:29		16:14 (117)	07:48			06:58		18:58 (74)	06:20			06:05		20:06 (73)
	17:33	24	17:05 (77)	18:10	59	17:13 (117)	19:41			20:12	40	19:38 (74)	20:42			21:05	29	20:35 (73)
16	07:55		16:41 (77)	07:28		16:14 (117)	07:46			06:57		18:56 (74)	06:19			06:05		20:06 (73)
	17:34	24	17:05 (77)	18:11	59	17:13 (117)	19:42			20:13	42	19:38 (74)	20:43			21:06	30	20:36 (73)
17	07:55		16:42 (77)	07:26		16:15 (117)	07:45			06:55		18:56 (74)	06:18			06:05		20:06 (73)
	17:35	23	17:05 (77)	18:12	59	17:14 (117)	19:43			20:14	43	19:39 (74)	20:44			21:06	30	20:36 (73)
18	07:54		16:42 (77)	07:25		16:16 (117)	07:43			06:54		18:55 (74)	06:17			06:05		20:06 (73)
	17:37	23	17:05 (77)	18:13	58	17:14 (117)	19:44			20:15	43	19:38 (74)	20:45			21:06	30	20:36 (73)
19	07:54		16:34 (117)	07:24		16:15 (117)	07:41			06:52		18:55 (74)	06:16			06:05		20:06 (73)
	17:38	32	17:06 (77)	18:15	58	17:13 (117)	19:45			20:16	44	19:39 (74)	20:46			21:07	30	20:36 (73)
20	07:53		16:30 (117)	07:22		16:16 (117)	07:40			06:51		18:56 (74)	06:16			06:05		20:06 (73)
	17:39	35	17:05 (77)	18:16	56	17:12 (117)	19:46			20:17	43	19:39 (74)	20:47			21:07	30	20:36 (73)
21	07:53		16:28 (117)	07:21		16:16 (117)	07:38			06:49		18:55 (74)	06:15			06:06		20:07 (73)
	17:40	37	17:05 (77)	18:17	55	17:11 (117)	19:47			20:18	43	19:38 (74)	20:48			21:07	30	20:37 (73)
22	07:52		16:27 (117)	07:20		16:17 (117)	07:36			06:48		18:55 (74)	06:14			06:06		20:07 (73)
	17:41	38	17:05 (77)	18:18	54	17:11 (117)	19:48			20:19	43	19:38 (74)	20:49			21:08	30	20:37 (73)
23	07:52		16:25 (117)	07:18		16:18 (117)	07:35			06:46		18:55 (74)	06:13			06:06		20:07 (73)
	17:42	39	17:04 (77)	18:19	53	17:11 (117)	19:49			20:20	42	19:37 (74)	20:50			21:08	30	20:37 (73)
24	07:51		16:23 (117)	07:17		16:19 (117)	07:33			06:45		18:55 (74)	06:13			06:06		20:07 (73)
	17:43	40	17:03 (77)	18:20	50	17:09 (117)	19:50			20:21	42	19:37 (74)	20:50			21:08	30	20:37 (73)
25	07:50		16:23 (117)	07:15		16:20 (117)	07:31			06:44		18:56 (74)	06:12			06:07		20:08 (73)
	17:45	40	17:03 (77)	18:21	48	17:08 (117)	19:52			20:22	41	19:37 (74)	20:51			21:08	30	20:38 (73)
26	07:50		16:22 (117)	07:14		16:21 (117)	07:30			06:42		18:55 (74)	06:11			06:07		20:08 (73)
	17:46	39	17:01 (77)	18:23	46	17:07 (117)	19:53			20:23	40	19:35 (74)	20:52			21:08	30	20:38 (73)
27	07:49		16:21 (117)	07:13		16:23 (117)	07:28			06:41		18:56 (74)	06:11		20:15 (73)	06:07		20:08 (73)
	17:47	41	17:02 (117)	18:24	43	17:06 (117)	19:54			20:24	39	19:35 (74)	20:53	5	20:20 (73)	21:08	29	20:37 (73)
28	07:48		16:20 (117)	07:11		16:24 (117)	07:27			06:40		18:57 (74)	06:10		20:12 (73)	06:08		20:09 (73)
	17:48	44	17:04 (117)	18:25	40	17:04 (117)	19:55			20:25	38	19:35 (74)	20:54	11	20:23 (73)	21:08	29	20:38 (73)
29	07:47		16:19 (117)				07:25			06:38		18:57 (74)	06:10		20:11 (73)	06:08		20:09 (73)
	17:49	46	17:05 (117)				19:56			20:26	36	19:33 (74)	20:55	14	20:25 (73)	21:08	29	20:38 (73)
30	07:46		16:18 (117)				07:23			06:37		18:58 (74)	06:09		20:09 (73)	06:09		20:10 (73)
	17:51	48	17:06 (117)				19:57			20:27	34	19:32 (74)	20:55	17	20:26 (73)	21:08	28	20:38 (73)
31	07:45		16:17 (117)				07:22						06:09		20:09 (73)			
	17:52	50	17:07 (117)				19:58						20:56	18	20:27 (73)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		1192			1539			130			920			221			836	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.66			0.68			0.68			0.64			0.64			0.62	
Total reduction		0.24			0.29			0.30			0.33			0.36			0.37	
Total, real		285			442			39			304			79			311	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 89

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m**Shadow receptor:** 8386 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6164)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		20:10 (73)	06:32			07:02		19:01 (74)	07:31			07:04		15:43 (117)	07:37		08:35 (72)
	21:08	28	20:38 (73)	20:51			20:09	34	19:35 (74)	19:18			17:33	59	16:42 (117)	17:10	40	16:45 (77)
2	06:09		20:11 (73)	06:33			07:03		19:02 (74)	07:32			07:05		15:44 (117)	07:38		08:34 (72)
	21:08	28	20:39 (73)	20:50			20:08	32	19:34 (74)	19:17			17:32	59	16:43 (117)	17:10	41	16:45 (77)
3	06:10		20:10 (73)	06:34			07:04		19:03 (74)	07:33			07:06		15:44 (117)	07:39		08:34 (72)
	21:08	28	20:38 (73)	20:49			20:06	29	19:32 (74)	19:15			17:31	58	16:42 (117)	17:10	43	16:45 (77)
4	06:10		20:11 (73)	06:35			07:05		19:05 (74)	07:34			07:07		15:44 (117)	07:40		08:33 (72)
	21:08	27	20:38 (73)	20:48			20:05	25	19:30 (74)	19:14			17:30	58	16:42 (117)	17:09	43	16:44 (77)
5	06:11		20:11 (73)	06:36			07:06		19:07 (74)	07:35			07:08		15:44 (117)	07:41		08:33 (72)
	21:08	27	20:38 (73)	20:47			20:03	20	19:27 (74)	19:12			17:29	57	16:41 (117)	17:09	43	16:44 (77)
6	06:12		20:12 (73)	06:37		19:19 (74)	07:07		19:10 (74)	07:36			07:09		15:46 (117)	07:42		08:33 (72)
	21:08	26	20:38 (73)	20:45	11	19:30 (74)	20:01	13	19:23 (74)	19:10			17:27	56	16:42 (117)	17:09	44	16:44 (77)
7	06:12		20:12 (73)	06:38		19:16 (74)	07:08			07:37			07:10		15:46 (117)	07:43		08:33 (72)
	21:07	25	20:37 (73)	20:44	17	19:33 (74)	20:00			19:09			17:26	55	16:41 (117)	17:09	44	16:44 (77)
8	06:13		20:13 (73)	06:39		19:13 (74)	07:08			07:38			07:12		15:46 (117)	07:44		08:33 (72)
	21:07	24	20:37 (73)	20:43	22	19:35 (74)	19:56			19:07			17:25	54	16:40 (117)	17:09	44	16:44 (77)
9	06:13		20:13 (73)	06:40		19:12 (74)	07:09			07:39		17:10 (117)	07:13		15:47 (117)	07:45		08:33 (72)
	21:07	23	20:36 (73)	20:42	25	19:37 (74)	19:55			19:06	17	17:27 (117)	17:24	52	16:39 (117)	17:09	44	16:44 (77)
10	06:14		20:14 (73)	06:41		19:10 (74)	07:10			07:40		17:06 (117)	07:14		15:47 (117)	07:46		08:33 (72)
	21:06	22	20:36 (73)	20:41	28	19:38 (74)	19:53			19:04	24	17:30 (117)	17:23	51	16:38 (117)	17:09	44	16:44 (77)
11	06:15		20:15 (73)	06:42		19:09 (74)	07:11			07:41		17:02 (117)	07:15		15:49 (117)	07:47		08:33 (72)
	21:06	21	20:36 (73)	20:39	30	19:39 (74)	19:52			19:02	30	17:32 (117)	17:22	50	16:39 (117)	17:09	46	16:45 (77)
12	06:16		20:16 (73)	06:43		19:07 (74)	07:12			07:42		17:00 (117)	07:16		15:50 (117)	07:47		08:33 (72)
	21:06	19	20:35 (73)	20:38	33	19:40 (74)	19:50			19:01	34	17:34 (117)	17:22	48	16:38 (117)	17:09	45	16:44 (77)
13	06:16		20:17 (73)	06:44		19:06 (74)	07:13			07:43		16:57 (117)	07:17		15:51 (117)	07:48		08:33 (72)
	21:05	18	20:35 (73)	20:37	35	19:41 (74)	19:48			18:59	39	17:36 (117)	17:21	46	16:37 (117)	17:10	45	16:44 (77)
14	06:17		20:18 (73)	06:45		19:05 (74)	07:14			07:44		16:56 (117)	07:19		15:52 (117)	07:49		08:34 (72)
	21:05	16	20:34 (73)	20:36	37	19:42 (74)	19:47			18:58	42	17:38 (117)	17:20	43	16:35 (117)	17:10	45	16:45 (77)
15	06:18		20:20 (73)	06:46		19:03 (74)	07:15			07:45		16:55 (117)	07:20		15:54 (117)	07:50		08:34 (72)
	21:04	13	20:33 (73)	20:34	38	19:41 (74)	19:45			18:56	44	17:39 (117)	17:19	41	16:35 (117)	17:10	45	16:45 (77)
16	06:18		20:22 (73)	06:47		19:03 (74)	07:16			07:46		16:53 (117)	07:21		15:55 (117)	07:50		08:34 (72)
	21:04	8	20:30 (73)	20:33	39	19:42 (74)	19:43			18:55	47	17:40 (117)	17:18	40	16:35 (77)	17:10	45	16:45 (77)
17	06:19			06:47		19:02 (74)	07:17			07:47		16:51 (117)	07:22		15:56 (117)	07:51		08:35 (72)
	21:03			20:32	40	19:43 (74)	19:42			18:53	49	17:40 (117)	17:17	40	16:36 (77)	17:11	43	16:45 (77)
18	06:20			06:48		19:01 (74)	07:18			07:48		16:50 (117)	07:23		15:57 (117)	07:52		08:35 (72)
	21:02			20:30	42	19:43 (74)	19:40			18:52	51	17:41 (117)	17:17	40	16:37 (77)	17:11	44	16:46 (77)
19	06:21			06:49		19:01 (74)	07:19			07:49		16:49 (117)	07:24		16:00 (117)	07:52		08:35 (72)
	21:02			20:29	42	19:43 (74)	19:38			18:50	52	17:41 (117)	17:16	39	16:39 (77)	17:11	44	16:46 (77)
20	06:22			06:50		19:00 (74)	07:20			07:50		16:48 (117)	07:25		16:02 (117)	07:53		08:36 (72)
	21:01			20:27	43	19:43 (74)	19:37			18:49	54	17:42 (117)	17:15	38	16:40 (77)	17:12	44	16:47 (77)
21	06:22			06:51		19:00 (74)	07:21			07:51		16:47 (117)	07:27		16:04 (117)	07:53		08:36 (72)
	21:00			20:26	43	19:43 (74)	19:35			18:48	55	17:42 (117)	17:15	37	16:41 (77)	17:12	44	16:47 (77)
22	06:23			06:52		19:00 (74)	07:22			07:52		16:47 (117)	07:28		16:06 (117)	07:54		08:37 (72)
	21:00			20:24	43	19:43 (74)	19:33			18:46	56	17:43 (117)	17:14	35	16:41 (77)	17:13	43	16:47 (77)
23	06:24			06:53		18:59 (74)	07:23			07:53		16:46 (117)	07:29		16:10 (117)	07:54		08:37 (72)
	20:59			20:23	44	19:43 (74)	19:32			18:45	57	17:43 (117)	17:13	32	16:42 (77)	17:13	44	16:48 (77)
24	06:25			06:54		18:59 (74)	07:24			07:55		16:45 (117)	07:30		16:19 (77)	07:55		08:37 (72)
	20:58			20:22	43	19:42 (74)	19:30			18:43	58	17:43 (117)	17:13	23	16:42 (77)	17:14	44	16:48 (77)
25	06:26			06:55		18:59 (74)	07:25			07:56		16:44 (117)	07:31		16:20 (77)	07:55		08:38 (72)
	20:57			20:20	43	19:42 (74)	19:28			18:42	59	17:43 (117)	17:12	23	16:43 (77)	17:14	44	16:49 (77)
26	06:27			06:56		18:59 (74)	07:26			07:57		16:44 (117)	07:32		16:20 (77)	07:56		08:39 (72)
	20:56			20:19	43	19:42 (74)	19:27			18:41	59	17:43 (117)	17:12	24	16:44 (77)	17:15	43	16:49 (77)
27	06:28			06:57		18:58 (74)	07:27			07:58		16:43 (117)	07:33		16:20 (77)	07:56		08:39 (72)
	20:56			20:17	42	19:40 (74)	19:25			18:39	60	17:43 (117)	17:11	24	16:44 (77)	17:16	45	16:50 (77)
28	06:29			06:58		18:59 (74)	07:28			07:59		16:44 (117)	07:34		16:20 (77)	07:56		08:40 (72)
	20:55			20:16	40	19:39 (74)	19:23			18:38	60	17:44 (117)	17:11	24	16:44 (77)	17:16	45	16:51 (77)
29	06:29			06:59		18:59 (74)	07:29			08:00		16:44 (117)	07:35		08:39 (72)	07:57		08:41 (72)
	20:54			20:14	39	19:38 (74)	19:22			18:37	60	17:44 (117)	17:11	31	16:44 (77)	17:17	44	16:51 (77)
30	06:30			07:00		18:59 (74)	07:30			08:01		16:43 (117)	07:36		08:36 (72)	07:57		08:41 (72)
	20:53			20:12	38	19:37 (74)	19:20			18:36	60	17:43 (117)	17:10	36	16:44 (77)	17:18	45	16:52 (77)
31	06:31			07:01		19:00 (74)				08:02		16:43 (117)				07:57		08:42 (72)
	20:52			20:11	36	19:36 (74)				18:34	60	17:43 (117)				17:19	45	16:53 (77)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		353			936			153			1127			1273			1362	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.62			0.64			0.64			0.68			0.68			0.63	
Total reduction		0.37			0.39			0.39			0.38			0.25			0.32	
Total, real		131			363			60			431			321			433	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 90

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m**Shadow receptor:** 9758 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6246)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January	February	March			April			May			June
1	07:57	07:44	07:10			07:20		08:02 (131)	06:36		06:55 (80)	06:08
	17:20	17:53	18:26			19:59	56	08:58 (131)	20:28	41	19:54 (86)	20:57
2	07:57	07:43	07:08			07:19		08:01 (131)	06:35		06:55 (80)	06:08
	17:21	17:54	18:27			20:00	57	08:58 (131)	20:29	38	19:52 (86)	20:58
3	07:57	07:43	07:07			07:17		08:00 (131)	06:33		06:54 (80)	06:07
	17:21	17:56	18:28			20:00	58	08:58 (131)	20:30	34	19:50 (86)	20:58
4	07:57	07:42	07:05			07:15		07:59 (131)	06:32		06:54 (80)	06:07
	17:22	17:57	18:29			20:01	59	08:58 (131)	20:31	27	07:21 (80)	20:59
5	07:57	07:40	07:03			07:14		07:58 (131)	06:31		06:53 (80)	06:07
	17:23	17:58	18:30			20:02	59	08:57 (131)	20:32	27	07:20 (80)	21:00
6	07:57	07:39	07:02			07:12		07:58 (131)	06:30		06:53 (80)	06:06
	17:24	17:59	18:32			20:03	60	08:58 (131)	20:33	27	07:20 (80)	21:00
7	07:57	07:38	07:00			07:11		07:57 (131)	06:29		06:53 (80)	06:06
	17:25	18:00	18:33			20:04	60	08:57 (131)	20:34	27	07:20 (80)	21:01
8	07:57	07:37	07:59			07:09		07:58 (131)	06:27		06:53 (80)	06:06
	17:26	18:02	19:34			20:05	59	08:57 (131)	20:35	27	07:20 (80)	21:02
9	07:57	07:36	07:57			07:07		07:57 (131)	06:26		06:53 (80)	06:06
	17:27	18:03	19:35			20:06	60	08:57 (131)	20:36	27	07:20 (80)	21:02
10	07:57	07:35	07:56			07:06		07:57 (131)	06:25		06:53 (80)	06:06
	17:28	18:04	19:36			20:07	60	08:57 (131)	20:37	26	07:19 (80)	21:03
11	07:57	07:34	07:54			07:04		07:57 (131)	06:24		06:54 (80)	06:05
	17:29	18:05	19:37			20:08	59	08:56 (131)	20:38	25	07:19 (80)	21:03
12	07:57	07:33	07:53			07:03		07:56 (131)	06:23		06:54 (80)	06:05
	17:30	18:06	19:38			20:09	58	08:54 (131)	20:39	24	07:18 (80)	21:04
13	07:56	07:31	07:51		08:11 (90)	07:01		07:57 (131)	06:22		06:54 (80)	06:05
	17:31	18:08	19:39	10	08:21 (90)	20:10	57	08:54 (131)	20:40	24	07:18 (80)	21:04
14	07:56	07:30	07:49		08:08 (90)	07:00		07:56 (131)	06:21		06:55 (80)	06:05
	17:32	18:09	19:40	15	08:23 (90)	20:11	57	08:53 (131)	20:41	22	07:17 (80)	21:05
15	07:56	07:29	07:48		08:07 (90)	06:58		07:57 (131)	06:20		06:56 (80)	06:05
	17:33	18:10	19:41	18	08:25 (90)	20:12	56	08:53 (131)	20:42	20	07:16 (80)	21:05
16	07:55	07:28	07:46		08:05 (90)	06:57		07:57 (131)	06:19		06:57 (80)	06:05
	17:34	18:11	19:42	20	08:25 (90)	20:13	63	19:52 (86)	20:43	18	07:15 (80)	21:06
17	07:55	07:26	07:45		08:03 (90)	06:55		07:57 (131)	06:18		06:59 (80)	06:05
	17:36	18:12	19:43	22	08:25 (90)	20:14	66	19:53 (86)	20:44	16	07:15 (80)	21:06
18	07:54	07:25	07:43		08:02 (90)	06:54		07:58 (131)	06:17		07:00 (80)	06:05
	17:37	18:14	19:44	24	08:26 (90)	20:15	67	19:54 (86)	20:45	13	07:13 (80)	21:06
19	07:54	07:24	07:41		08:01 (90)	06:52		07:58 (131)	06:17		07:02 (80)	06:05
	17:38	18:15	19:45	25	08:26 (90)	20:16	68	19:55 (86)	20:46	9	07:11 (80)	21:07
20	07:53	07:22	07:40		08:01 (90)	06:51		07:59 (131)	06:16			06:06
	17:39	18:16	19:46	30	08:36 (131)	20:17	68	19:56 (86)	20:47			21:07
21	07:53	07:21	07:38		08:01 (90)	06:49		07:59 (131)	06:15			06:06
	17:40	18:17	19:47	43	08:44 (131)	20:18	69	19:57 (86)	20:48			21:07
22	07:52	07:20	07:36		08:01 (90)	06:48		08:01 (131)	06:14			06:06
	17:41	18:18	19:48	46	08:47 (131)	20:19	67	19:58 (86)	20:49			21:07
23	07:52	07:18	07:35		08:00 (90)	06:46		08:01 (131)	06:13			06:06
	17:42	18:19	19:49	49	08:49 (131)	20:20	66	19:58 (86)	20:49			21:08
24	07:51	07:17	07:33		08:02 (90)	06:45		08:03 (131)	06:13			06:06
	17:44	18:20	19:50	49	08:51 (131)	20:21	63	19:59 (86)	20:50			21:08
25	07:50	07:15	07:32		08:02 (90)	06:44		08:04 (131)	06:12			06:07
	17:45	18:22	19:52	50	08:52 (131)	20:22	60	19:59 (86)	20:51			21:08
26	07:49	07:14	07:30		08:04 (90)	06:42		07:04 (80)	06:11			06:07
	17:46	18:23	19:53	50	08:54 (131)	20:23	63	19:58 (86)	20:52			21:08
27	07:49	07:12	07:28		08:05 (90)	06:41		07:01 (80)	06:11			06:07
	17:47	18:24	19:54	50	08:55 (131)	20:24	65	19:58 (86)	20:53			21:08
28	07:48	07:11	07:27		08:06 (131)	06:40		06:59 (80)	06:10			06:08
	17:48	18:25	19:55	50	08:56 (131)	20:25	62	19:57 (86)	20:54			21:08
29	07:47		07:25		08:05 (131)	06:38		06:58 (80)	06:10			06:08
	17:50		19:56	52	08:57 (131)	20:26	57	19:57 (86)	20:54			21:08
30	07:46		07:23		08:04 (131)	06:37		06:56 (80)	06:09			06:09
	17:51		19:57	53	08:57 (131)	20:27	41	19:55 (86)	20:55			21:08
31	07:45		07:22		08:02 (131)				06:09			
	17:52		19:58	55	08:57 (131)				20:56			
Potential sun hours	300	299	370			397			446			449
Total, worst case				711			1820			472		
Sun reduction				0.44			0.51			0.56		
Oper. time red.				1.00			1.00			1.00		
Wind dir. red.				0.65			0.65			0.67		
Total reduction				0.29			0.33			0.38		
Total, real				204			605			177		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 91

Licensed user:
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217 Montgomery St.
US-SYRACUSE, NY 13202
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Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m**Shadow receptor:** 9758 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6246)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November	December
1	06:09			06:32		07:04 (80)	07:02		07:56 (131)	07:31		07:53 (90)	07:03	07:37
	21:08			20:51	25	07:29 (80)	20:09	59	08:55 (131)	19:18	4	07:57 (90)	17:33	17:10
2	06:10			06:33		07:04 (80)	07:03		07:55 (131)	07:32			07:05	07:38
	21:08			20:50	26	07:30 (80)	20:08	60	08:55 (131)	19:17			17:32	17:10
3	06:10			06:34		07:04 (80)	07:04		07:55 (131)	07:33			07:06	07:39
	21:08			20:49	26	07:30 (80)	20:06	60	08:55 (131)	19:15			17:31	17:10
4	06:11			06:35		07:04 (80)	07:05		07:55 (131)	07:34			07:07	07:40
	21:08			20:48	26	07:30 (80)	20:05	59	08:54 (131)	19:14			17:30	17:10
5	06:11			06:36		07:02 (80)	07:06		07:54 (131)	07:35			07:08	07:41
	21:08			20:46	28	07:30 (80)	20:03	60	08:54 (131)	19:12			17:29	17:09
6	06:12			06:37		07:02 (80)	07:07		07:54 (131)	07:36			07:09	07:42
	21:07			20:45	28	07:30 (80)	20:01	60	08:54 (131)	19:10			17:28	17:09
7	06:12			06:38		07:02 (80)	07:08		07:54 (131)	07:37			07:10	07:43
	21:07			20:44	28	07:30 (80)	20:00	60	08:54 (131)	19:09			17:27	17:09
8	06:13			06:39		07:03 (80)	07:09		07:53 (131)	07:38			07:11	07:44
	21:07			20:43	26	07:29 (80)	19:56	59	08:52 (131)	19:07			17:25	17:09
9	06:14			06:40		07:03 (80)	07:09		07:54 (131)	07:39			07:13	07:45
	21:07			20:42	26	07:29 (80)	19:55	58	08:52 (131)	19:06			17:24	17:09
10	06:14			06:41		07:03 (80)	07:10		07:54 (131)	07:40			07:14	07:46
	21:06			20:41	36	19:59 (86)	19:53	57	08:51 (131)	19:04			17:24	17:09
11	06:15			06:42		07:04 (80)	07:11		07:54 (131)	07:41			07:15	07:46
	21:06			20:39	38	20:01 (86)	19:52	56	08:50 (131)	19:03			17:23	17:09
12	06:16			06:43		07:04 (80)	07:12		07:54 (131)	07:42			07:16	07:47
	21:05			20:38	41	20:03 (86)	19:50	55	08:49 (131)	19:01			17:22	17:10
13	06:16			06:44		07:05 (80)	07:13		07:55 (131)	07:43			07:17	07:48
	21:05			20:37	50	20:04 (86)	19:48	53	08:48 (131)	18:59			17:21	17:10
14	06:17			06:45		07:06 (80)	07:14		07:55 (131)	07:44			07:18	07:49
	21:05			20:35	59	20:05 (86)	19:47	52	08:47 (131)	18:58			17:20	17:10
15	06:18			06:46		07:07 (80)	07:15		07:56 (131)	07:45			07:20	07:49
	21:04			20:34	63	20:05 (86)	19:45	50	08:46 (131)	18:56			17:19	17:10
16	06:19			06:47		07:08 (80)	07:16		07:55 (90)	07:46			07:21	07:50
	21:03			20:33	66	20:05 (86)	19:43	50	08:45 (131)	18:55			17:18	17:10
17	06:19			06:48		07:12 (80)	07:17		07:52 (90)	07:47			07:22	07:51
	21:03			20:31	62	20:05 (86)	19:42	51	08:43 (131)	18:53			17:17	17:11
18	06:20			06:49		08:10 (131)	07:18		07:50 (90)	07:48			07:23	07:52
	21:02			20:30	61	20:05 (86)	19:40	51	08:41 (131)	18:52			17:17	17:11
19	06:21			06:49		08:08 (131)	07:19		07:49 (90)	07:49			07:24	07:52
	21:02			20:29	64	20:05 (86)	19:38	50	08:39 (131)	18:51			17:16	17:11
20	06:22			06:50		08:07 (131)	07:20		07:47 (90)	07:50			07:25	07:53
	21:01			20:27	66	20:04 (86)	19:37	49	08:36 (131)	18:49			17:15	17:12
21	06:23			06:51		08:05 (131)	07:21		07:46 (90)	07:51			07:26	07:53
	21:00			20:26	67	20:02 (86)	19:35	47	08:33 (131)	18:48			17:15	17:12
22	06:23			06:52		08:04 (131)	07:22		07:45 (90)	07:52			07:28	07:54
	21:00			20:24	68	20:01 (86)	19:33	44	08:29 (131)	18:46			17:14	17:13
23	06:24			06:53		08:03 (131)	07:23		07:45 (90)	07:53			07:29	07:54
	20:59			20:23	68	20:00 (86)	19:32	37	08:24 (131)	18:45			17:14	17:13
24	06:25		07:14 (80)	06:54		08:02 (131)	07:24		07:45 (90)	07:54			07:30	07:55
	20:58	5	07:19 (80)	20:21	67	19:58 (86)	19:30	24	08:09 (90)	18:44			17:13	17:14
25	06:26		07:11 (80)	06:55		08:01 (131)	07:25		07:45 (90)	07:56			07:31	07:55
	20:57	11	07:22 (80)	20:20	67	19:57 (86)	19:28	24	08:09 (90)	18:42			17:12	17:15
26	06:27		07:10 (80)	06:56		08:00 (131)	07:26		07:45 (90)	07:57			07:32	07:56
	20:56	14	07:24 (80)	20:18	66	19:56 (86)	19:27	23	08:08 (90)	18:41			17:12	17:15
27	06:28		07:08 (80)	06:57		07:59 (131)	07:27		07:46 (90)	07:58			07:33	07:56
	20:55	17	07:25 (80)	20:17	63	19:54 (86)	19:25	21	08:07 (90)	18:40			17:12	17:16
28	06:29		07:07 (80)	06:58		07:58 (131)	07:28		07:47 (90)	07:59			07:34	07:56
	20:55	19	07:26 (80)	20:15	56	08:54 (131)	19:23	19	08:06 (90)	18:38			17:11	17:16
29	06:30		07:06 (80)	06:59		07:57 (131)	07:29		07:48 (90)	08:00			07:35	07:56
	20:54	21	07:27 (80)	20:14	57	08:54 (131)	19:22	16	08:04 (90)	18:37			17:11	17:17
30	06:31		07:05 (80)	07:00		07:56 (131)	07:30		07:49 (90)	08:01			07:36	07:57
	20:53	23	07:28 (80)	20:12	58	08:54 (131)	19:20	12	08:01 (90)	18:36			17:11	17:18
31	06:31		07:05 (80)	07:01		07:56 (131)				08:02				07:57
	20:52	24	07:29 (80)	20:11	58	08:54 (131)				18:34				17:19
Potential sun hours	456			426			374			346			300	291
Total, worst case		134			1540			1376			4			
Sun reduction		0.60			0.60			0.61			0.56			
Oper. time red.		1.00			1.00			1.00			1.00			
Wind dir. red.		0.67			0.66			0.65			0.65			
Total reduction		0.40			0.39			0.40			0.36			
Total, real		54			605			548			1			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 92

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m**Shadow receptor:** 10055 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6276)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January	February			March			April	May			June		
1	07:57	07:45			07:10		08:07 (108)	07:20	06:36			06:08		07:01 (83)
	17:20	17:53			18:26	36	08:43 (108)	19:59	20:28			20:57	64	08:05 (83)
2	07:58	07:44			07:08		08:07 (108)	07:19	06:35		07:28 (83)	06:08		07:02 (83)
	17:21	17:54			18:27	34	08:41 (108)	20:00	20:29	11	07:39 (83)	20:58	63	08:05 (83)
3	07:58	07:43		08:19 (108)	07:07		08:09 (108)	07:17	06:33		07:23 (83)	06:07		07:02 (83)
	17:21	17:56	15	08:34 (108)	18:28	31	08:40 (108)	20:00	20:30	21	07:44 (83)	20:58	64	08:06 (83)
4	07:58	07:42		08:16 (108)	07:05		08:10 (108)	07:15	06:32		07:20 (83)	06:07		07:02 (83)
	17:22	17:57	21	08:37 (108)	18:29	27	08:37 (108)	20:01	20:31	27	07:47 (83)	20:59	63	08:05 (83)
5	07:58	07:41		08:13 (108)	07:04		08:13 (108)	07:14	06:31		07:17 (83)	06:07		07:02 (83)
	17:23	17:58	25	08:38 (108)	18:31	22	08:35 (108)	20:02	20:32	32	07:49 (83)	21:00	64	08:06 (83)
6	07:58	07:40		08:11 (108)	07:02		08:15 (108)	07:12	06:30		07:15 (83)	06:06		07:02 (83)
	17:24	17:59	29	08:40 (108)	18:32	16	08:31 (108)	20:03	20:33	36	07:51 (83)	21:01	64	08:06 (83)
7	07:58	07:39		08:10 (108)	07:01			07:11	06:29		07:13 (83)	06:06		07:03 (83)
	17:25	18:01	32	08:42 (108)	18:33			20:04	20:34	39	07:52 (83)	21:01	64	08:07 (83)
8	07:58	07:37		08:09 (108)	07:59			07:09	06:27		07:12 (83)	06:06		07:02 (83)
	17:26	18:02	34	08:43 (108)	19:34			20:05	20:35	42	07:54 (83)	21:02	64	08:06 (83)
9	07:57	07:36		08:08 (108)	07:57			07:07	06:26		07:11 (83)	06:06		07:03 (83)
	17:27	18:03	37	08:45 (108)	19:35			20:06	20:36	44	07:55 (83)	21:02	63	08:06 (83)
10	07:57	07:35		08:07 (108)	07:56			07:06	06:25		07:10 (83)	06:06		07:03 (83)
	17:28	18:04	39	08:46 (108)	19:36			20:07	20:37	46	07:56 (83)	21:03	64	08:07 (83)
11	07:57	07:34		08:07 (108)	07:54			07:04	06:24		07:09 (83)	06:05		07:03 (83)
	17:29	18:05	40	08:47 (108)	19:37			20:08	20:38	48	07:57 (83)	21:03	64	08:07 (83)
12	07:57	07:33		08:05 (108)	07:53			07:03	06:23		07:08 (83)	06:05		07:03 (83)
	17:30	18:07	42	08:47 (108)	19:38			20:09	20:39	50	07:58 (83)	21:04	64	08:07 (83)
13	07:56	07:32		08:05 (108)	07:51			07:01	06:22		07:07 (83)	06:05		07:04 (83)
	17:31	18:08	43	08:48 (108)	19:39			20:10	20:40	52	07:59 (83)	21:04	63	08:07 (83)
14	07:56	07:30		08:05 (108)	07:49			07:00	06:21		07:06 (83)	06:05		07:04 (83)
	17:32	18:09	44	08:49 (108)	19:40			20:11	20:41	53	07:59 (83)	21:05	64	08:08 (83)
15	07:56	07:29		08:04 (108)	07:48			06:58	06:20		07:05 (83)	06:05		07:04 (83)
	17:33	18:10	46	08:50 (108)	19:41			20:12	20:42	55	08:00 (83)	21:05	64	08:08 (83)
16	07:55	07:28		08:03 (108)	07:46			06:57	06:19		07:04 (83)	06:05		07:04 (83)
	17:34	18:11	46	08:49 (108)	19:42			20:13	20:43	56	08:00 (83)	21:06	64	08:08 (83)
17	07:55	07:27		08:03 (108)	07:45			06:55	06:18		07:05 (83)	06:05		07:04 (83)
	17:36	18:12	47	08:50 (108)	19:43			20:14	20:44	56	08:01 (83)	21:06	64	08:08 (83)
18	07:55	07:25		08:03 (108)	07:43			06:54	06:17		07:04 (83)	06:05		07:05 (83)
	17:37	18:14	47	08:50 (108)	19:44			20:15	20:45	58	08:02 (83)	21:07	63	08:08 (83)
19	07:54	07:24		08:03 (108)	07:41			06:52	06:17		07:03 (83)	06:05		07:05 (83)
	17:38	18:15	46	08:49 (108)	19:45			20:16	20:46	59	08:02 (83)	21:07	63	08:08 (83)
20	07:54	07:23		08:03 (108)	07:40			06:51	06:16		07:03 (83)	06:06		07:06 (83)
	17:39	18:16	47	08:50 (108)	19:46			20:17	20:47	59	08:02 (83)	21:07	63	08:09 (83)
21	07:53	07:21		08:02 (108)	07:38			06:49	06:15		07:03 (83)	06:06		07:06 (83)
	17:40	18:17	47	08:49 (108)	19:48			20:18	20:48	60	08:03 (83)	21:07	63	08:09 (83)
22	07:52	07:20		08:03 (108)	07:37			06:48	06:14		07:03 (83)	06:06		07:06 (83)
	17:41	18:18	46	08:49 (108)	19:49			20:19	20:49	60	08:03 (83)	21:08	63	08:09 (83)
23	07:52	07:18		08:03 (108)	07:35			06:47	06:13		07:02 (83)	06:06		07:06 (83)
	17:42	18:19	46	08:49 (108)	19:50			20:20	20:50	61	08:03 (83)	21:08	63	08:09 (83)
24	07:51	07:17		08:03 (108)	07:33			06:45	06:13		07:01 (83)	06:06		07:06 (83)
	17:44	18:20	45	08:48 (108)	19:51			20:21	20:51	62	08:03 (83)	21:08	63	08:09 (83)
25	07:50	07:16		08:04 (108)	07:32			06:44	06:12		07:02 (83)	06:07		07:06 (83)
	17:45	18:22	43	08:47 (108)	19:52			20:22	20:51	62	08:04 (83)	21:08	64	08:10 (83)
26	07:50	07:14		08:04 (108)	07:30			06:42	06:11		07:01 (83)	06:07		07:06 (83)
	17:46	18:23	42	08:46 (108)	19:53			20:23	20:52	63	08:04 (83)	21:08	64	08:10 (83)
27	07:49	07:13		08:05 (108)	07:28			06:41	06:11		07:02 (83)	06:07		07:06 (83)
	17:47	18:24	41	08:46 (108)	19:54			20:24	20:53	63	08:05 (83)	21:08	64	08:10 (83)
28	07:48	07:11		08:05 (108)	07:27			06:40	06:10		07:01 (83)	06:08		07:07 (83)
	17:48	18:25	39	08:44 (108)	19:55			20:25	20:54	63	08:04 (83)	21:08	64	08:11 (83)
29	07:47				07:25			06:38	06:10		07:02 (83)	06:08		07:07 (83)
	17:50				19:56			20:26	20:55	63	08:05 (83)	21:08	63	08:10 (83)
30	07:46				07:23			06:37	06:09		07:01 (83)	06:09		07:08 (83)
	17:51				19:57			20:27	20:55	64	08:05 (83)	21:08	63	08:11 (83)
31	07:46				07:22				06:09		07:02 (83)			
	17:52				19:58				20:56	63	08:05 (83)			
Potential sun hours	300	299			370			397	446			449		
Total, worst case			1029			166				1528			1907	
Sun reduction			0.42			0.44				0.56			0.60	
Oper. time red.			1.00			1.00				1.00			1.00	
Wind dir. red.			0.62			0.62				0.68			0.68	
Total reduction			0.26			0.27				0.38			0.40	
Total, real			268			45				576			771	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 93

Licensed user:
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Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m**Shadow receptor:** 10055 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6276)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September	October			November			December
1	06:09		07:07 (83)	06:32		07:19 (83)	07:02	07:31			07:04		07:36 (108)	07:37
	21:08	64	08:11 (83)	20:51	49	08:08 (83)	20:09	19:19			17:33	39	08:15 (108)	17:10
2	06:10		07:08 (83)	06:33		07:20 (83)	07:03	07:32			07:05		07:38 (108)	07:38
	21:08	64	08:12 (83)	20:50	47	08:07 (83)	20:08	19:17			17:32	36	08:14 (108)	17:10
3	06:10		07:08 (83)	06:34		07:21 (83)	07:04	07:33			07:06		07:39 (108)	07:39
	21:08	63	08:11 (83)	20:49	45	08:06 (83)	20:06	19:15			17:31	34	08:13 (108)	17:10
4	06:11		07:08 (83)	06:35		07:22 (83)	07:05	07:34			07:07		07:40 (108)	07:40
	21:08	64	08:12 (83)	20:48	43	08:05 (83)	20:05	19:14			17:30	31	08:11 (108)	17:10
5	06:11		07:08 (83)	06:36		07:22 (83)	07:06	07:35			07:08		07:42 (108)	07:41
	21:08	64	08:12 (83)	20:47	41	08:03 (83)	20:03	19:12			17:29	28	08:10 (108)	17:09
6	06:12		07:09 (83)	06:37		07:24 (83)	07:07	07:36			07:09		07:44 (108)	07:42
	21:08	63	08:12 (83)	20:45	37	08:01 (83)	20:01	19:10			17:28	25	08:09 (108)	17:09
7	06:12		07:08 (83)	06:38		07:25 (83)	07:08	07:37		08:53 (108)	07:11		07:46 (108)	07:43
	21:07	64	08:12 (83)	20:44	35	08:00 (83)	20:00	19:09	11	09:04 (108)	17:27	20	08:06 (108)	17:09
8	06:13		07:09 (83)	06:39		07:27 (83)	07:09	07:38		08:49 (108)	07:12		07:49 (108)	07:44
	21:07	64	08:13 (83)	20:43	31	07:58 (83)	19:57	19:07	19	09:08 (108)	17:26	14	08:03 (108)	17:09
9	06:14		07:09 (83)	06:40		07:30 (83)	07:10	07:39		08:46 (108)	07:13			07:45
	21:07	64	08:13 (83)	20:42	25	07:55 (83)	19:55	19:06	25	09:11 (108)	17:25			17:09
10	06:14		07:09 (83)	06:41		07:33 (83)	07:11	07:40		08:44 (108)	07:14			07:46
	21:06	64	08:13 (83)	20:41	19	07:52 (83)	19:53	19:04	29	09:13 (108)	17:24			17:09
11	06:15		07:10 (83)	06:42		07:40 (83)	07:11	07:41		08:42 (108)	07:15			07:47
	21:06	63	08:13 (83)	20:39	5	07:45 (83)	19:52	19:03	32	09:14 (108)	17:23			17:09
12	06:16		07:10 (83)	06:43			07:12	07:42		08:40 (108)	07:16			07:47
	21:06	64	08:14 (83)	20:38			19:50	19:01	35	09:15 (108)	17:22			17:10
13	06:16		07:10 (83)	06:44			07:13	07:43		08:39 (108)	07:17			07:48
	21:05	63	08:13 (83)	20:37			19:48	19:00	38	09:17 (108)	17:21			17:10
14	06:17		07:10 (83)	06:45			07:14	07:44		08:38 (108)	07:19			07:49
	21:05	63	08:13 (83)	20:36			19:47	18:58	40	09:18 (108)	17:20			17:10
15	06:18		07:11 (83)	06:46			07:15	07:45		08:37 (108)	07:20			07:50
	21:04	63	08:14 (83)	20:34			19:45	18:57	41	09:18 (108)	17:19			17:10
16	06:19		07:11 (83)	06:47			07:16	07:46		08:36 (108)	07:21			07:50
	21:04	63	08:14 (83)	20:33			19:43	18:55	43	09:19 (108)	17:18			17:10
17	06:19		07:11 (83)	06:48			07:17	07:47		08:35 (108)	07:22			07:51
	21:03	62	08:13 (83)	20:32			19:42	18:54	44	09:19 (108)	17:17			17:11
18	06:20		07:11 (83)	06:49			07:18	07:48		08:34 (108)	07:23			07:52
	21:02	62	08:13 (83)	20:30			19:40	18:52	45	09:19 (108)	17:17			17:11
19	06:21		07:12 (83)	06:50			07:19	07:49		08:34 (108)	07:24			07:52
	21:02	62	08:14 (83)	20:29			19:38	18:51	46	09:20 (108)	17:16			17:11
20	06:22		07:12 (83)	06:50			07:20	07:50		08:33 (108)	07:25			07:53
	21:01	62	08:14 (83)	20:27			19:37	18:49	47	09:20 (108)	17:15			17:12
21	06:23		07:12 (83)	06:51			07:21	07:51		08:33 (108)	07:27			07:53
	21:00	61	08:13 (83)	20:26			19:35	18:48	46	09:19 (108)	17:15			17:12
22	06:24		07:12 (83)	06:52			07:22	07:52		08:34 (108)	07:28			07:54
	21:00	61	08:13 (83)	20:25			19:33	18:46	46	09:20 (108)	17:14			17:13
23	06:24		07:13 (83)	06:53			07:23	07:54		08:33 (108)	07:29			07:54
	20:59	60	08:13 (83)	20:23			19:32	18:45	47	09:20 (108)	17:14			17:13
24	06:25		07:14 (83)	06:54			07:24	07:55		08:33 (108)	07:30			07:55
	20:58	59	08:13 (83)	20:22			19:30	18:44	47	09:20 (108)	17:13			17:14
25	06:26		07:14 (83)	06:55			07:25	07:56		08:33 (108)	07:31			07:55
	20:57	58	08:12 (83)	20:20			19:28	18:42	46	09:19 (108)	17:13			17:15
26	06:27		07:15 (83)	06:56			07:26	07:57		08:33 (108)	07:32			07:56
	20:57	57	08:12 (83)	20:19			19:27	18:41	46	09:19 (108)	17:12			17:15
27	06:28		07:14 (83)	06:57			07:27	07:58		08:33 (108)	07:33			07:56
	20:56	57	08:11 (83)	20:17			19:25	18:40	45	09:18 (108)	17:12			17:16
28	06:29		07:15 (83)	06:58			07:28	07:59		08:34 (108)	07:34			07:56
	20:55	56	08:11 (83)	20:16			19:23	18:38	44	09:18 (108)	17:11			17:16
29	06:30		07:16 (83)	06:59			07:29	08:00		08:35 (108)	07:35			07:57
	20:54	54	08:10 (83)	20:14			19:22	18:37	43	09:18 (108)	17:11			17:17
30	06:31		07:17 (83)	07:00			07:30	08:01		08:35 (108)	07:36			07:57
	20:53	52	08:09 (83)	20:13			19:20	18:36	42	09:17 (108)	17:11			17:18
31	06:31		07:18 (83)	07:01				08:02		08:36 (108)				07:57
	20:52	51	08:09 (83)	20:11				18:35	40	09:16 (108)				17:19
Potential sun hours	456			427			374	346			300			291
Total, worst case		1891			377				987			227		
Sun reduction		0.60			0.60				0.56			0.37		
Oper. time red.		1.00			1.00				1.00			1.00		
Wind dir. red.		0.68			0.68				0.62			0.62		
Total reduction		0.40			0.40				0.35			0.23		
Total, real		764			152				343			52		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 94

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
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Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m**Shadow receptor:** 10206 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6301)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:34 (72)	07:44		08:38 (72)	07:10			07:20		19:07 (117)	06:36			06:08		19:50 (74)
	17:20	68	16:54 (116)	17:53	59	09:37 (72)	18:26			19:59	20	19:27 (117)	20:28			20:57	29	20:19 (74)
2	07:57		08:34 (72)	07:44		08:38 (72)	07:08			07:18		19:04 (117)	06:34			06:08		19:51 (74)
	17:20	68	16:54 (116)	17:54	59	09:37 (72)	18:27			20:00	24	19:28 (117)	20:29			20:58	29	20:20 (74)
3	07:58		08:34 (72)	07:43		08:39 (72)	07:07			07:17		19:02 (117)	06:33			06:07		19:52 (74)
	17:21	70	16:55 (116)	17:55	58	09:37 (72)	18:28			20:00	29	19:31 (117)	20:30			20:58	28	20:20 (74)
4	07:58		08:34 (72)	07:42		08:39 (72)	07:05			07:15		19:00 (117)	06:32			06:07		19:51 (74)
	17:22	72	16:56 (116)	17:57	57	09:36 (72)	18:29			20:01	31	19:31 (117)	20:31			20:59	28	20:19 (74)
5	07:58		08:34 (72)	07:41		08:40 (72)	07:04			07:14		18:58 (117)	06:31			06:07		19:52 (74)
	17:23	73	16:57 (116)	17:58	56	09:36 (72)	18:30			20:02	34	19:32 (117)	20:32			21:00	27	20:19 (74)
6	07:58		08:35 (72)	07:40		08:41 (72)	07:02			07:12		18:57 (117)	06:30			06:06		19:53 (74)
	17:24	74	16:58 (116)	17:59	55	09:36 (72)	18:31			20:03	36	19:33 (117)	20:33			21:00	27	20:20 (74)
7	07:58		08:35 (72)	07:38		08:41 (72)	07:00			07:11		18:56 (117)	06:28			06:06		19:52 (74)
	17:25	76	16:59 (116)	18:00	54	09:35 (72)	18:33			20:04	38	19:34 (117)	20:34			21:01	27	20:19 (74)
8	07:57		08:35 (72)	07:37		08:42 (72)	07:59			07:09		18:55 (117)	06:27			06:06		19:53 (74)
	17:26	77	17:00 (116)	18:02	53	09:35 (72)	19:34			20:05	40	19:35 (117)	20:35			21:02	26	20:19 (74)
9	07:57		08:35 (72)	07:36		08:43 (72)	07:57			07:07		18:54 (117)	06:26		20:00 (74)	06:06		19:54 (74)
	17:27	78	17:01 (116)	18:03	51	09:34 (72)	19:35			20:06	40	19:34 (117)	20:36	7	20:07 (74)	21:02	25	20:19 (74)
10	07:57		08:35 (72)	07:35		08:44 (72)	07:56			07:06		18:53 (117)	06:25		19:57 (74)	06:05		19:54 (74)
	17:28	78	17:01 (116)	18:04	49	09:33 (72)	19:36			20:07	41	19:34 (117)	20:37	13	20:10 (74)	21:03	25	20:19 (74)
11	07:57		08:35 (72)	07:34		08:46 (72)	07:54			07:04		18:53 (117)	06:24		19:55 (74)	06:05		19:55 (74)
	17:29	78	17:01 (116)	18:05	46	09:32 (72)	19:37			20:08	42	19:35 (117)	20:38	17	20:12 (74)	21:03	24	20:19 (74)
12	07:57		08:35 (72)	07:33		08:46 (72)	07:53			07:03		18:52 (117)	06:23		19:54 (74)	06:05		19:55 (74)
	17:30	81	17:02 (116)	18:06	44	09:30 (72)	19:38			20:09	42	19:34 (117)	20:39	19	20:13 (74)	21:04	24	20:19 (74)
13	07:56		08:36 (72)	07:32		08:48 (72)	07:51			07:01		18:52 (117)	06:22		19:52 (74)	06:05		19:56 (74)
	17:31	81	17:03 (116)	18:08	41	09:29 (72)	19:39			20:10	42	19:34 (117)	20:40	23	20:15 (74)	21:04	23	20:19 (74)
14	07:56		08:35 (72)	07:30		08:49 (72)	07:49			07:00		18:51 (117)	06:21		19:51 (74)	06:05		19:56 (74)
	17:32	81	17:02 (116)	18:09	38	09:27 (72)	19:40			20:11	43	19:34 (117)	20:41	24	20:15 (74)	21:05	23	20:19 (74)
15	07:56		08:36 (72)	07:29		08:50 (72)	07:48			06:58		18:52 (117)	06:20		19:51 (74)	06:05		19:56 (74)
	17:33	81	17:03 (116)	18:10	35	09:25 (72)	19:41			20:12	42	19:34 (117)	20:42	25	20:16 (74)	21:05	23	20:19 (74)
16	07:55		08:35 (72)	07:28		08:53 (72)	07:46			06:57		18:51 (117)	06:19		19:50 (74)	06:05		19:57 (74)
	17:34	82	17:03 (116)	18:11	30	09:23 (72)	19:42			20:13	42	19:33 (117)	20:43	27	20:17 (74)	21:06	22	20:19 (74)
17	07:55		08:36 (72)	07:26		08:55 (72)	07:45			06:55		18:52 (117)	06:18		19:49 (74)	06:05		19:57 (74)
	17:35	81	17:03 (116)	18:12	25	09:20 (72)	19:43			20:14	41	19:33 (117)	20:44	28	20:17 (74)	21:06	22	20:19 (74)
18	07:54		08:35 (72)	07:25		08:59 (72)	07:43			06:54		18:51 (117)	06:17		19:50 (74)	06:05		19:57 (74)
	17:37	82	17:03 (116)	18:13	18	09:17 (72)	19:44			20:15	41	19:32 (117)	20:45	28	20:18 (74)	21:06	22	20:19 (74)
19	07:54		08:36 (72)	07:24			07:41			06:52		18:52 (117)	06:16		19:49 (74)	06:05		19:57 (74)
	17:38	80	17:03 (116)	18:15			19:45			20:16	39	19:31 (117)	20:46	29	20:18 (74)	21:07	22	20:19 (74)
20	07:53		08:36 (72)	07:22			07:40			06:51		18:53 (117)	06:16		19:49 (74)	06:05		19:58 (74)
	17:39	80	17:03 (116)	18:16			19:46			20:17	38	19:31 (117)	20:47	29	20:18 (74)	21:07	21	20:19 (74)
21	07:53		08:35 (72)	07:21			07:38			06:49		18:53 (117)	06:15		19:48 (74)	06:06		19:59 (74)
	17:40	79	17:02 (116)	18:17			19:47			20:18	36	19:29 (117)	20:48	30	20:18 (74)	21:07	21	20:20 (74)
22	07:52		08:36 (72)	07:20			07:36			06:48		18:54 (117)	06:14		19:49 (74)	06:06		19:59 (74)
	17:41	77	17:02 (116)	18:18			19:48			20:19	35	19:29 (117)	20:49	30	20:19 (74)	21:08	21	20:20 (74)
23	07:52		08:36 (72)	07:18			07:35			06:46		18:55 (117)	06:13		19:49 (74)	06:06		19:58 (74)
	17:42	76	17:01 (116)	18:19			19:49			20:20	32	19:27 (117)	20:50	30	20:19 (74)	21:08	22	20:20 (74)
24	07:51		08:36 (72)	07:17			07:33			06:45		18:56 (117)	06:13		19:48 (74)	06:06		19:58 (74)
	17:43	73	16:59 (116)	18:20			19:50			20:21	30	19:26 (117)	20:50	31	20:19 (74)	21:08	22	20:20 (74)
25	07:50		08:37 (72)	07:15			07:31			06:44		18:57 (117)	06:12		19:49 (74)	06:07		19:59 (74)
	17:45	68	16:58 (116)	18:21			19:52			20:22	28	19:25 (117)	20:51	31	20:20 (74)	21:08	22	20:21 (74)
26	07:50		08:37 (72)	07:14			07:30			06:42		18:58 (117)	06:11		19:49 (74)	06:07		19:59 (74)
	17:46	61	09:38 (72)	18:23			19:53			20:23	24	19:22 (117)	20:52	30	20:19 (74)	21:08	22	20:21 (74)
27	07:49		08:37 (72)	07:13			07:28			06:41		19:01 (117)	06:11		19:49 (74)	06:07		19:59 (74)
	17:47	61	09:38 (72)	18:24			19:54			20:24	19	19:20 (117)	20:53	31	20:20 (74)	21:08	22	20:21 (74)
28	07:48		08:37 (72)	07:11			07:27			06:40		19:04 (117)	06:10		19:49 (74)	06:08		19:59 (74)
	17:48	61	09:38 (72)	18:25			19:55			20:25	13	19:17 (117)	20:54	31	20:20 (74)	21:08	23	20:22 (74)
29	07:47		08:37 (72)				07:25			06:38			06:10		19:50 (74)	06:08		19:59 (74)
	17:49	61	09:38 (72)				19:56			20:26			20:55	30	20:20 (74)	21:08	23	20:22 (74)
30	07:46		08:37 (72)				07:23			06:37			06:09		19:50 (74)	06:09		19:59 (74)
	17:51	60	09:37 (72)				19:57			20:27			20:55	30	20:20 (74)	21:08	24	20:23 (74)
31	07:45		08:37 (72)				07:22		19:10 (117)				06:09		19:50 (74)			
	17:52	60	09:37 (72)				19:58	13	19:23 (117)				20:56	30	20:20 (74)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		2278			828			13			962			603			719	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.62			0.61			0.65			0.65			0.63			0.63	
Total reduction		0.22			0.25			0.29			0.33			0.35			0.38	
Total, real		510			211			4			319			212			270	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 95

Licensed user:
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US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m**Shadow receptor:** 10206 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6301)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		19:59 (74)	06:32		20:05 (74)	07:02		18:52 (117)	07:31			07:04		08:13 (72)	07:37		08:17 (72)
	21:08	24	20:23 (74)	20:51	19	20:24 (74)	20:09	42	19:34 (117)	19:18			17:33	49	09:02 (72)	17:10	79	16:43 (116)
2	06:09		19:59 (74)	06:33		20:06 (74)	07:03		18:52 (117)	07:32			07:05		08:13 (72)	07:38		08:18 (72)
	21:08	25	20:24 (74)	20:50	16	20:22 (74)	20:08	41	19:33 (117)	19:17			17:32	51	09:04 (72)	17:10	79	16:44 (116)
3	06:10		19:59 (74)	06:34		20:09 (74)	07:04		18:52 (117)	07:33			07:06		08:12 (72)	07:39		08:18 (72)
	21:08	25	20:24 (74)	20:49	11	20:20 (74)	20:06	40	19:32 (117)	19:15			17:31	52	09:04 (72)	17:10	78	16:44 (116)
4	06:10		19:59 (74)	06:35			07:05		18:52 (117)	07:34			07:07		08:11 (72)	07:40		08:19 (72)
	21:08	26	20:25 (74)	20:48			20:05	40	19:32 (117)	19:14			17:30	54	09:05 (72)	17:09	77	16:44 (116)
5	06:11		19:59 (74)	06:36			07:06		18:53 (117)	07:35			07:08		08:10 (72)	07:41		08:20 (72)
	21:08	26	20:25 (74)	20:47			20:03	38	19:31 (117)	19:12			17:29	56	09:06 (72)	17:09	75	16:44 (116)
6	06:12		19:59 (74)	06:37			07:07		18:53 (117)	07:36			07:09		08:11 (72)	07:42		08:21 (72)
	21:08	27	20:26 (74)	20:45			20:01	36	19:29 (117)	19:10			17:27	56	09:07 (72)	17:09	74	16:44 (116)
7	06:12		19:58 (74)	06:38			07:08		18:53 (117)	07:37			07:10		08:10 (72)	07:43		08:21 (72)
	21:07	27	20:25 (74)	20:44			20:00	34	19:27 (117)	19:09			17:26	57	09:07 (72)	17:09	73	16:44 (116)
8	06:13		19:59 (74)	06:39			07:08		18:54 (117)	07:38			07:12		08:10 (72)	07:44		08:22 (72)
	21:07	27	20:26 (74)	20:43			19:56	32	19:26 (117)	19:07			17:25	58	09:08 (72)	17:09	72	16:44 (116)
9	06:13		19:58 (74)	06:40			07:09		18:55 (117)	07:39			07:13		08:09 (72)	07:45		08:23 (72)
	21:07	28	20:26 (74)	20:42			19:55	29	19:24 (117)	19:06			17:24	59	09:08 (72)	17:09	70	16:44 (116)
10	06:14		19:58 (74)	06:41			07:10		18:57 (117)	07:40			07:14		08:09 (72)	07:46		08:24 (72)
	21:06	29	20:27 (74)	20:41			19:53	25	19:22 (117)	19:04			17:23	59	09:08 (72)	17:09	69	16:44 (116)
11	06:15		19:58 (74)	06:42			07:11		18:59 (117)	07:41			07:15		08:09 (72)	07:47		08:25 (72)
	21:06	29	20:27 (74)	20:39			19:52	20	19:19 (117)	19:02			17:22	60	09:09 (72)	17:09	68	16:45 (116)
12	06:16		19:58 (74)	06:43			07:12		19:02 (117)	07:42			07:16		08:09 (72)	07:47		08:25 (72)
	21:06	29	20:27 (74)	20:38			19:50	13	19:15 (117)	19:01			17:22	60	09:09 (72)	17:09	67	16:44 (116)
13	06:16		19:58 (74)	06:44			07:13			07:43			07:17		08:09 (72)	07:48		08:26 (72)
	21:05	30	20:28 (74)	20:37			19:48			18:59			17:21	61	09:10 (72)	17:10	66	16:44 (116)
14	06:17		19:58 (74)	06:45		19:15 (117)	07:14			07:44			07:19		08:09 (72)	07:49		08:27 (72)
	21:05	30	20:28 (74)	20:36	6	19:21 (117)	19:47			18:58			17:20	61	09:10 (72)	17:10	65	16:45 (116)
15	06:18		19:58 (74)	06:46		19:10 (117)	07:15			07:45			07:20		08:10 (72)	07:50		08:28 (72)
	21:04	31	20:29 (74)	20:34	15	19:25 (117)	19:45			18:56			17:19	61	09:11 (72)	17:10	64	16:45 (116)
16	06:18		19:58 (74)	06:47		19:07 (117)	07:16			07:46			07:21		08:10 (72)	07:50		08:28 (72)
	21:04	30	20:28 (74)	20:33	20	19:27 (117)	19:43			18:55			17:18	61	09:11 (72)	17:10	63	16:45 (116)
17	06:19		19:58 (74)	06:47		19:05 (117)	07:17			07:47			07:22		08:10 (72)	07:51		08:29 (72)
	21:03	31	20:29 (74)	20:31	24	19:29 (117)	19:42			18:53			17:17	68	16:31 (116)	17:11	62	16:45 (116)
18	06:20		19:58 (74)	06:48		19:03 (117)	07:18			07:48			07:23		08:10 (72)	07:52		08:30 (72)
	21:02	31	20:29 (74)	20:30	28	19:31 (117)	19:40			18:52			17:17	73	16:33 (116)	17:11	62	16:46 (116)
19	06:21		19:59 (74)	06:49		19:01 (117)	07:19			07:49			07:24		08:11 (72)	07:52		08:30 (72)
	21:02	30	20:29 (74)	20:29	31	19:32 (117)	19:38			18:50			17:16	76	16:36 (116)	17:11	61	16:46 (116)
20	06:22		19:58 (74)	06:50		19:00 (117)	07:20			07:50			07:25		08:11 (72)	07:53		08:31 (72)
	21:01	31	20:29 (74)	20:27	33	19:33 (117)	19:37			18:49			17:15	77	16:37 (116)	17:12	61	16:47 (116)
21	06:22		19:58 (74)	06:51		18:59 (117)	07:21			07:51			07:27		08:11 (72)	07:53		08:31 (72)
	21:00	31	20:29 (74)	20:26	35	19:34 (117)	19:35			18:48			17:15	79	16:38 (116)	17:12	61	16:47 (116)
22	06:23		19:59 (74)	06:52		18:58 (117)	07:22			07:52			07:28		08:12 (72)	07:54		08:32 (72)
	21:00	30	20:29 (74)	20:24	36	19:34 (117)	19:33			18:46			17:14	80	16:39 (116)	17:13	61	16:48 (116)
23	06:24		19:59 (74)	06:53		18:57 (117)	07:23			07:53		09:33 (72)	07:29		08:12 (72)	07:54		08:32 (72)
	20:59	30	20:29 (74)	20:23	38	19:35 (117)	19:32			18:45	10	09:43 (72)	17:13	80	16:39 (116)	17:13	61	16:48 (116)
24	06:25		19:59 (74)	06:54		18:56 (117)	07:24			07:55		09:28 (72)	07:30		08:12 (72)	07:55		08:32 (72)
	20:58	30	20:29 (74)	20:22	39	19:35 (117)	19:30			18:43	20	09:48 (72)	17:13	82	16:40 (116)	17:14	61	16:48 (116)
25	06:26		20:00 (74)	06:55		18:55 (117)	07:25			07:56		09:24 (72)	07:31		08:14 (72)	07:55		08:33 (72)
	20:57	29	20:29 (74)	20:20	41	19:36 (117)	19:28			18:42	27	09:51 (72)	17:12	81	16:41 (116)	17:14	62	16:49 (116)
26	06:27		19:59 (74)	06:56		18:55 (117)	07:26			07:57		09:22 (72)	07:32		08:14 (72)	07:56		08:33 (72)
	20:56	29	20:28 (74)	20:19	41	19:36 (117)	19:27			18:41	31	09:53 (72)	17:12	82	16:42 (116)	17:15	62	16:49 (116)
27	06:28		20:00 (74)	06:57		18:53 (117)	07:27			07:58		09:20 (72)	07:33		08:15 (72)	07:56		08:33 (72)
	20:56	27	20:27 (74)	20:17	42	19:35 (117)	19:25			18:39	35	09:55 (72)	17:11	81	16:42 (116)	17:16	63	16:50 (116)
28	06:29		20:01 (74)	06:58		18:53 (117)	07:28			07:59		09:19 (72)	07:34		08:15 (72)	07:56		08:34 (72)
	20:55	26	20:27 (74)	20:16	42	19:35 (117)	19:23			18:38	39	09:58 (72)	17:11	81	16:42 (116)	17:16	64	16:51 (116)
29	06:29		20:01 (74)	06:59		18:52 (117)	07:29			08:00		09:17 (72)	07:35		08:16 (72)	07:57		08:34 (72)
	20:54	25	20:26 (74)	20:14	43	19:35 (117)	19:22			18:37	42	09:59 (72)	17:11	81	16:43 (116)	17:17	64	16:51 (116)
30	06:30		20:02 (74)	07:00		18:52 (117)	07:30			08:01		09:16 (72)	07:36		08:16 (72)	07:57		08:34 (72)
	20:53	24	20:26 (74)	20:12	42	19:34 (117)	19:20			18:36	44	10:00 (72)	17:10	81	16:43 (116)	17:18	65	16:52 (116)
31	06:31		20:04 (74)	07:01		18:52 (117)				08:02		09:14 (72)				07:57		08:34 (72)
	20:52	21	20:25 (74)	20:11	42	19:34 (117)				18:34	47	10:01 (72)				17:19	67	16:53 (116)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		868			644			390			295			2017			2076	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.63			0.65			0.65			0.61			0.62			0.63	
Total reduction		0.38			0.39			0.40			0.34			0.23			0.31	
Total, real		327			251			155			100			459			649	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 96

Licensed user:
EDR
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US-SYRACUSE, NY 13202
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Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m**Shadow receptor:** 10280 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6302)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:25 (108)	07:45			07:10		07:43 (83)	07:20			06:36		07:20 (82)	06:08		06:30 (106)
	17:20	29	08:54 (108)	17:53			18:26	38	08:21 (83)	19:59			20:28	88	19:59 (107)	20:57	47	19:57 (107)
2	07:58		08:25 (108)	07:44			07:08		07:43 (83)	07:19			06:35		07:20 (82)	06:08		06:30 (106)
	17:21	29	08:54 (108)	17:54			18:27	37	08:20 (83)	20:00			20:29	89	20:00 (107)	20:58	40	19:56 (107)
3	07:58		08:26 (108)	07:43			07:07		07:43 (83)	07:17			06:33		07:20 (82)	06:07		06:29 (106)
	17:21	30	08:56 (108)	17:56			18:28	38	08:21 (83)	20:00			20:30	91	20:01 (107)	20:59	41	19:56 (107)
4	07:58		08:26 (108)	07:42			07:05		07:42 (83)	07:15			06:32		07:20 (82)	06:07		06:28 (106)
	17:22	29	08:55 (108)	17:57			18:29	38	08:20 (83)	20:01			20:31	93	20:02 (107)	20:59	41	19:55 (107)
5	07:58		08:26 (108)	07:41			07:04		07:43 (83)	07:14			06:31		07:19 (82)	06:07		06:28 (106)
	17:23	30	08:56 (108)	17:58			18:31	37	08:20 (83)	20:02			20:32	93	20:01 (107)	21:00	40	19:55 (107)
6	07:58		08:27 (108)	07:40			07:02		07:42 (83)	07:12			06:30		07:19 (82)	06:06		06:28 (106)
	17:24	29	08:56 (108)	17:59			18:32	37	08:19 (83)	20:03			20:33	94	20:02 (107)	21:01	39	19:54 (107)
7	07:58		08:27 (108)	07:39			07:01		07:43 (83)	07:11			06:29		07:19 (82)	06:06		06:28 (106)
	17:25	30	08:57 (108)	18:01			18:33	36	08:19 (83)	20:04			20:34	95	20:02 (107)	21:01	39	19:54 (107)
8	07:58		08:28 (108)	07:37			07:59		08:43 (83)	07:09			06:27		07:19 (82)	06:06		06:27 (106)
	17:26	30	08:58 (108)	18:02			19:34	35	09:18 (83)	20:05			20:35	95	20:03 (107)	21:02	39	19:53 (107)
9	07:57		08:28 (108)	07:36			07:57		08:43 (83)	07:08			06:26		07:20 (82)	06:06		06:27 (106)
	17:27	30	08:58 (108)	18:03			19:35	33	09:16 (83)	20:06			20:36	94	20:03 (107)	21:02	37	19:52 (107)
10	07:57		08:29 (108)	07:35			07:56		08:44 (83)	07:06			06:25		07:20 (82)	06:06		06:27 (106)
	17:28	30	08:59 (108)	18:04			19:36	32	09:16 (83)	20:07			20:37	94	20:03 (107)	21:03	35	19:51 (107)
11	07:57		08:29 (108)	07:34			07:54		08:45 (83)	07:04			06:24		07:20 (82)	06:05		06:28 (106)
	17:29	29	08:58 (108)	18:05			19:37	29	09:14 (83)	20:08			20:38	93	20:03 (107)	21:04	33	19:51 (107)
12	07:57		08:30 (108)	07:33			07:53		08:46 (83)	07:03			06:23		07:21 (82)	06:05		06:28 (106)
	17:30	29	08:59 (108)	18:07			19:38	27	09:13 (83)	20:09			20:39	92	20:03 (107)	21:04	32	19:50 (107)
13	07:57		08:30 (108)	07:32			07:51		08:47 (83)	07:01			06:22		07:21 (82)	06:05		06:28 (106)
	17:31	30	09:00 (108)	18:08			19:39	23	09:10 (83)	20:10			20:40	91	20:03 (107)	21:05	29	19:49 (107)
14	07:56		08:30 (108)	07:30			07:49		08:49 (83)	07:00		07:43 (82)	06:21		07:21 (82)	06:05		06:28 (106)
	17:32	29	08:59 (108)	18:09			19:40	18	09:07 (83)	20:11	16	07:59 (82)	20:41	90	20:03 (107)	21:05	27	19:48 (107)
15	07:56		08:31 (108)	07:29			07:48		08:53 (83)	06:58		07:38 (82)	06:20		07:22 (82)	06:05		06:28 (106)
	17:33	29	09:00 (108)	18:10			19:41	11	09:04 (83)	20:12	24	08:02 (82)	20:42	89	20:03 (107)	21:05	23	06:51 (106)
16	07:55		08:32 (108)	07:28			07:46			06:57		07:36 (82)	06:19		07:22 (82)	06:05		06:28 (106)
	17:34	27	08:59 (108)	18:11			19:42			20:13	29	08:05 (82)	20:43	87	20:02 (107)	21:06	23	06:51 (106)
17	07:55		08:33 (108)	07:27			07:45			06:55		07:33 (82)	06:18		07:24 (82)	06:05		06:28 (106)
	17:36	27	09:00 (108)	18:12			19:43			20:14	33	08:06 (82)	20:44	85	20:03 (107)	21:06	23	06:51 (106)
18	07:55		08:33 (108)	07:25			07:43			06:54		07:32 (82)	06:17		07:24 (82)	06:05		06:28 (106)
	17:37	26	08:59 (108)	18:14			19:44			20:15	36	08:08 (82)	20:45	84	20:03 (107)	21:07	23	06:51 (106)
19	07:54		08:34 (108)	07:24		07:59 (83)	07:41			06:52		07:29 (82)	06:17		07:25 (82)	06:05		06:28 (106)
	17:38	25	08:59 (108)	18:15	8	08:07 (83)	19:45			20:16	40	08:09 (82)	20:46	81	20:02 (107)	21:07	23	06:51 (106)
20	07:54		08:35 (108)	07:23		07:55 (83)	07:40			06:51		07:28 (82)	06:16		07:25 (82)	06:06		06:29 (106)
	17:39	24	08:59 (108)	18:16	16	08:11 (83)	19:46			20:17	42	08:10 (82)	20:47	80	20:02 (107)	21:07	24	06:53 (106)
21	07:53		08:37 (108)	07:21		07:53 (83)	07:38			06:49		07:27 (82)	06:15		07:27 (82)	06:06		06:29 (106)
	17:40	22	08:59 (108)	18:17	21	08:14 (83)	19:48			20:18	43	08:10 (82)	20:48	77	20:02 (107)	21:07	24	06:53 (106)
22	07:52		08:38 (108)	07:20		07:50 (83)	07:37			06:48		07:26 (82)	06:14		07:27 (82)	06:06		06:29 (106)
	17:41	20	08:58 (108)	18:18	25	08:15 (83)	19:49			20:19	45	08:11 (82)	20:49	74	20:01 (107)	21:08	24	06:53 (106)
23	07:52		08:39 (108)	07:18		07:49 (83)	07:35			06:47		07:25 (82)	06:14		07:28 (82)	06:06		06:29 (106)
	17:42	18	08:57 (108)	18:19	28	08:17 (83)	19:50			20:20	47	08:12 (82)	20:50	72	20:01 (107)	21:08	24	06:53 (106)
24	07:51		08:40 (108)	07:17		07:47 (83)	07:33			06:45		07:24 (82)	06:13		07:29 (82)	06:06		06:29 (106)
	17:44	15	08:55 (108)	18:21	31	08:18 (83)	19:51			20:21	48	08:12 (82)	20:51	69	20:00 (107)	21:08	23	06:52 (106)
25	07:50		08:43 (108)	07:16		07:47 (83)	07:32			06:44		07:23 (82)	06:12		07:30 (82)	06:07		06:30 (106)
	17:45	11	08:54 (108)	18:22	32	08:19 (83)	19:52			20:22	64	19:50 (107)	20:51	66	20:00 (107)	21:08	23	06:53 (106)
26	07:50		08:48 (108)	07:14		07:45 (83)	07:30			06:42		07:23 (82)	06:11		07:31 (82)	06:07		06:30 (106)
	17:46	2	08:50 (108)	18:23	34	08:19 (83)	19:53			20:23	70	19:53 (107)	20:52	64	20:00 (107)	21:08	23	06:53 (106)
27	07:49			07:13		07:45 (83)	07:28			06:41		07:21 (82)	06:11		07:33 (82)	06:07		06:30 (106)
	17:47			18:24	35	08:20 (83)	19:54			20:24	77	19:55 (107)	20:53	59	20:00 (107)	21:08	23	06:53 (106)
28	07:48			07:11		07:44 (83)	07:27			06:40		07:21 (82)	06:10		07:34 (82)	06:08		06:31 (106)
	17:48			18:25	36	08:20 (83)	19:55			20:25	80	19:57 (107)	20:54	56	19:59 (107)	21:08	25	19:49 (107)
29	07:47						07:25			06:38		07:21 (82)	06:10		07:36 (82)	06:08		06:31 (106)
	17:50						19:56			20:26	84	19:58 (107)	20:55	52	19:59 (107)	21:08	29	19:52 (107)
30	07:46						07:23			06:37		07:20 (82)	06:09		06:32 (106)	06:09		06:32 (106)
	17:51						19:57			20:27	86	19:58 (107)	20:56	56	19:58 (107)	21:08	31	19:54 (107)
31	07:46						07:22						06:09		06:31 (106)			
	17:52						19:58						20:56	53	19:58 (107)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		659			266			469			864			2496			907	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.61			0.63			0.63			0.66			0.65			0.67	
Total reduction		0.22			0.27			0.28			0.34			0.36			0.40	
Total, real		143			71			130			291			908			363	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 97

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Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m**Shadow receptor:** 10280 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6302)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:32 (106)	06:32		07:31 (82)	07:02			07:31		08:26 (83)	07:04			07:37		08:11 (108)
	21:08	33	19:54 (107)	20:51	93	20:14 (107)	20:09			19:19	25	08:51 (83)	17:33			17:10	30	08:41 (108)
2	06:10		06:33 (106)	06:33		07:31 (82)	07:03			07:32		08:24 (83)	07:05			07:38		08:11 (108)
	21:08	34	19:56 (107)	20:50	94	20:14 (107)	20:08			19:17	28	08:52 (83)	17:32			17:10	30	08:41 (108)
3	06:10		06:32 (106)	06:34		07:30 (82)	07:04			07:33		08:22 (83)	07:06			07:39		08:11 (108)
	21:08	37	19:57 (107)	20:49	95	20:14 (107)	20:06			19:15	31	08:53 (83)	17:31			17:10	30	08:41 (108)
4	06:11		06:33 (106)	06:35		07:30 (82)	07:05			07:34		08:21 (83)	07:07			07:40		08:12 (108)
	21:08	37	19:58 (107)	20:48	94	20:13 (107)	20:05			19:14	33	08:54 (83)	17:30			17:10	30	08:42 (108)
5	06:11		06:33 (106)	06:36		07:29 (82)	07:06			07:35		08:20 (83)	07:08			07:41		08:12 (108)
	21:08	39	19:59 (107)	20:47	94	20:12 (107)	20:03			19:12	34	08:54 (83)	17:29			17:09	30	08:42 (108)
6	06:12		06:34 (106)	06:37		07:29 (82)	07:07			07:36		08:19 (83)	07:09			07:42		08:13 (108)
	21:08	40	20:00 (107)	20:45	94	20:12 (107)	20:01			19:10	35	08:54 (83)	17:28			17:09	30	08:43 (108)
7	06:12		06:34 (106)	06:38		07:29 (82)	07:08			07:37		08:18 (83)	07:11			07:43		08:13 (108)
	21:07	41	20:01 (107)	20:44	94	20:11 (107)	20:00			19:09	37	08:55 (83)	17:27			17:09	30	08:43 (108)
8	06:13		06:35 (106)	06:39		07:29 (82)	07:09			07:38		08:17 (83)	07:12			07:44		08:14 (108)
	21:07	41	20:02 (107)	20:43	93	20:11 (107)	19:57			19:07	38	08:55 (83)	17:26			17:09	29	08:43 (108)
9	06:14		06:36 (106)	06:40		07:28 (82)	07:10			07:39		08:17 (83)	07:13			07:45		08:14 (108)
	21:07	41	20:03 (107)	20:42	93	20:10 (107)	19:55			19:06	38	08:55 (83)	17:25			17:09	30	08:44 (108)
10	06:14		06:36 (106)	06:41		07:28 (82)	07:11			07:40		08:16 (83)	07:14			07:46		08:15 (108)
	21:06	42	20:03 (107)	20:41	92	20:10 (107)	19:53			19:04	38	08:54 (83)	17:24			17:09	29	08:44 (108)
11	06:15		06:38 (106)	06:42		07:28 (82)	07:11			07:41		08:16 (83)	07:15			07:47		08:16 (108)
	21:06	41	20:05 (107)	20:39	90	20:09 (107)	19:52			19:03	38	08:54 (83)	17:23			17:09	29	08:45 (108)
12	06:16		06:39 (106)	06:43		07:28 (82)	07:12			07:42		08:16 (83)	07:16			07:47		08:16 (108)
	21:06	51	20:06 (107)	20:38	89	20:08 (107)	19:50			19:01	38	08:54 (83)	17:22			17:10	28	08:44 (108)
13	06:16		06:40 (106)	06:44		07:29 (82)	07:13			07:43		08:17 (83)	07:17			07:48		08:16 (108)
	21:05	54	20:06 (107)	20:37	86	20:07 (107)	19:48			19:00	37	08:54 (83)	17:21			17:10	29	08:45 (108)
14	06:17		06:43 (106)	06:45		07:29 (82)	07:14			07:44		08:17 (83)	07:19			07:49		08:17 (108)
	21:05	53	20:07 (107)	20:36	82	20:05 (107)	19:47			18:58	36	08:53 (83)	17:20			17:10	29	08:46 (108)
15	06:18		07:44 (82)	06:46		07:29 (82)	07:15			07:45		08:17 (83)	07:20			07:50		08:18 (108)
	21:04	54	20:08 (107)	20:34	79	20:04 (107)	19:45			18:57	36	08:53 (83)	17:19			17:10	28	08:46 (108)
16	06:19		07:43 (82)	06:47		07:29 (82)	07:16			07:46		08:18 (83)	07:21		08:20 (108)	07:50		08:18 (108)
	21:04	58	20:09 (107)	20:33	75	20:02 (107)	19:43			18:55	34	08:52 (83)	17:18	3	08:23 (108)	17:10	28	08:46 (108)
17	06:19		07:41 (82)	06:48		07:29 (82)	07:17			07:47		08:18 (83)	07:22		08:16 (108)	07:51		08:19 (108)
	21:03	62	20:09 (107)	20:32	69	19:59 (107)	19:42			18:54	32	08:50 (83)	17:17	11	08:27 (108)	17:11	28	08:47 (108)
18	06:20		07:40 (82)	06:49		07:29 (82)	07:18			07:48		08:19 (83)	07:23		08:14 (108)	07:52		08:20 (108)
	21:03	64	20:09 (107)	20:30	62	19:55 (107)	19:40			18:52	30	08:49 (83)	17:17	15	08:29 (108)	17:11	28	08:48 (108)
19	06:21		07:40 (82)	06:50		07:29 (82)	07:19			07:49		08:20 (83)	07:24		08:14 (108)	07:52		08:19 (108)
	21:02	67	20:10 (107)	20:29	49	08:18 (82)	19:38			18:51	27	08:47 (83)	17:16	18	08:32 (108)	17:11	28	08:47 (108)
20	06:22		07:39 (82)	06:51		07:30 (82)	07:20			07:50		08:21 (83)	07:25		08:13 (108)	07:53		08:20 (108)
	21:01	71	20:11 (107)	20:27	47	08:17 (82)	19:37			18:49	24	08:45 (83)	17:15	20	08:33 (108)	17:12	28	08:48 (108)
21	06:23		07:37 (82)	06:51		07:31 (82)	07:21			07:51		08:23 (83)	07:27		08:12 (108)	07:53		08:20 (108)
	21:01	74	20:11 (107)	20:26	45	08:16 (82)	19:35			18:48	20	08:43 (83)	17:15	22	08:34 (108)	17:12	28	08:48 (108)
22	06:24		07:37 (82)	06:52		07:31 (82)	07:22			07:52		08:27 (83)	07:28		08:11 (108)	07:54		08:21 (108)
	21:00	75	20:11 (107)	20:25	44	08:15 (82)	19:33			18:46	14	08:41 (83)	17:14	24	08:35 (108)	17:13	28	08:49 (108)
23	06:24		07:36 (82)	06:53		07:32 (82)	07:23			07:54			07:29		08:10 (108)	07:55		08:21 (108)
	20:59	78	20:12 (107)	20:23	42	08:14 (82)	19:32			18:45			17:14	26	08:36 (108)	17:13	28	08:49 (108)
24	06:25		07:36 (82)	06:54		07:33 (82)	07:24			07:55			07:30		08:11 (108)	07:55		08:22 (108)
	20:58	79	20:12 (107)	20:22	39	08:12 (82)	19:30			18:44			17:13	26	08:37 (108)	17:14	28	08:50 (108)
25	06:26		07:35 (82)	06:55		07:35 (82)	07:25			07:56			07:31		08:11 (108)	07:55		08:23 (108)
	20:57	83	20:13 (107)	20:20	36	08:11 (82)	19:28			18:42			17:13	27	08:38 (108)	17:15	28	08:51 (108)
26	06:27		07:35 (82)	06:56		07:36 (82)	07:26			07:57			07:32		08:11 (108)	07:56		08:23 (108)
	20:57	84	20:13 (107)	20:19	33	08:09 (82)	19:27			18:41			17:12	27	08:38 (108)	17:15	28	08:51 (108)
27	06:28		07:33 (82)	06:57		07:38 (82)	07:27			07:58			07:33		08:10 (108)	07:56		08:24 (108)
	20:56	87	20:13 (107)	20:17	29	08:07 (82)	19:25			18:40			17:12	29	08:39 (108)	17:16	28	08:52 (108)
28	06:29		07:33 (82)	06:58		07:41 (82)	07:28		08:36 (83)	07:59			07:34		08:10 (108)	07:56		08:24 (108)
	20:55	88	20:13 (107)	20:16	23	08:04 (82)	19:23	6	08:42 (83)	18:38			17:11	29	08:39 (108)	17:16	28	08:52 (108)
29	06:30		07:32 (82)	06:59		07:43 (82)	07:29		08:31 (83)	08:00			07:35		08:11 (108)	07:57		08:24 (108)
	20:54	90	20:13 (107)	20:14	16	07:59 (82)	19:22	16	08:47 (83)	18:37			17:11	29	08:40 (108)	17:17	29	08:53 (108)
30	06:31		07:32 (82)	07:00			07:30		08:28 (83)	08:01			07:36		08:11 (108)	07:57		08:24 (108)
	20:53	90	20:13 (107)	20:13			19:20	21	08:49 (83)	18:36			17:11	29	08:40 (108)	17:18	29	08:53 (108)
31	06:31		07:31 (82)	07:01						08:02						07:57		08:24 (108)
	20:52	93	20:14 (107)	20:11						18:35						17:19	29	08:53 (108)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		1881			1971			43			703			335			892	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.65			0.66			0.63			0.63			0.61			0.61	
Total reduction		0.39			0.39			0.38			0.35			0.22			0.30	
Total, real		734			775			17			248			75			270	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 98

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m**Shadow receptor:** 10308 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6304)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January	February			March			April			May			June		
1	07:57	07:44			07:10		07:32 (131)	07:20		18:20 (86)	06:36			06:08		19:57 (98)
	17:20	17:53			18:26	25	07:57 (131)	19:59	57	19:17 (86)	20:28			20:57	33	20:30 (98)
2	07:57	07:44			07:08		07:32 (131)	07:19		18:20 (86)	06:35			06:08		19:58 (98)
	17:21	17:54			18:27	24	07:56 (131)	20:00	56	19:16 (86)	20:29			20:58	33	20:31 (98)
3	07:57	07:43			07:07		07:33 (131)	07:17		18:20 (86)	06:33			06:07		19:58 (98)
	17:21	17:56			18:28	23	07:56 (131)	20:00	56	19:16 (86)	20:30			20:58	33	20:31 (98)
4	07:57	07:42			07:05		07:33 (131)	07:15		18:20 (86)	06:32			06:07		19:58 (98)
	17:22	17:57			18:29	21	07:54 (131)	20:01	55	19:15 (86)	20:31			20:59	32	20:30 (98)
5	07:58	07:41			07:04		07:34 (131)	07:14		18:19 (86)	06:31			06:07		19:58 (98)
	17:23	17:58			18:30	20	07:54 (131)	20:02	56	19:15 (86)	20:32			21:00	33	20:31 (98)
6	07:57	07:39			07:02		07:35 (131)	07:12		18:20 (86)	06:30			06:06		19:59 (98)
	17:24	17:59			18:32	17	07:52 (131)	20:03	54	19:14 (86)	20:33			21:00	32	20:31 (98)
7	07:57	07:38			07:00		07:36 (131)	07:11		18:20 (86)	06:29			06:06		19:59 (98)
	17:25	18:00			18:33	13	07:49 (131)	20:04	53	19:13 (86)	20:34			21:01	35	20:37 (85)
8	07:57	07:37			07:59		08:41 (131)	07:09		18:21 (86)	06:27			06:06		19:59 (98)
	17:26	18:02			19:34	4	08:45 (131)	20:05	52	19:13 (86)	20:35			21:02	36	20:37 (85)
9	07:57	07:36			07:57			07:07		18:21 (86)	06:26			06:06		19:59 (98)
	17:27	18:03			19:35			20:06	51	19:12 (86)	20:36			21:02	36	20:37 (85)
10	07:57	07:35			07:56			07:06		18:22 (86)	06:25			06:06		19:59 (98)
	17:28	18:04			19:36			20:07	49	19:11 (86)	20:37			21:03	37	20:38 (85)
11	07:57	07:34			07:54			07:04		18:22 (86)	06:24			06:05		20:00 (98)
	17:29	18:05			19:37			20:08	48	19:10 (86)	20:38			21:03	39	20:39 (85)
12	07:57	07:33			07:53			07:03		18:22 (86)	06:23			06:05		20:00 (98)
	17:30	18:06			19:38			20:09	46	19:08 (86)	20:39			21:04	39	20:39 (85)
13	07:56	07:31			07:51			07:01		18:24 (86)	06:22		20:08 (98)	06:05		20:01 (98)
	17:31	18:08			19:39			20:10	43	19:07 (86)	20:40	9	20:17 (98)	21:04	39	20:40 (85)
14	07:56	07:30			07:49			07:00		18:24 (86)	06:21		20:05 (98)	06:05		20:01 (98)
	17:32	18:09			19:40			20:11	41	19:05 (86)	20:41	13	20:18 (98)	21:05	39	20:40 (85)
15	07:56	07:29			07:48		18:46 (86)	06:58		18:26 (86)	06:20		20:03 (98)	06:05		20:01 (98)
	17:33	18:10			19:41	16	19:02 (86)	20:12	38	19:04 (86)	20:42	16	20:19 (98)	21:05	40	20:41 (85)
16	07:55	07:28			07:46		18:41 (86)	06:57		18:27 (86)	06:19		20:02 (98)	06:05		20:01 (98)
	17:34	18:11			19:42	24	19:05 (86)	20:13	35	19:02 (86)	20:43	18	20:20 (98)	21:06	40	20:41 (85)
17	07:55	07:26			07:45		18:37 (86)	06:55		18:29 (86)	06:18		20:02 (98)	06:05		20:01 (98)
	17:36	18:12			19:43	30	19:07 (86)	20:14	31	19:00 (86)	20:44	19	20:21 (98)	21:06	40	20:41 (85)
18	07:54	07:25			07:43		18:35 (86)	06:54		18:31 (86)	06:17		20:01 (98)	06:05		20:02 (98)
	17:37	18:14			19:44	35	19:10 (86)	20:15	28	18:59 (86)	20:45	21	20:22 (98)	21:06	39	20:41 (85)
19	07:54	07:24			07:41		18:33 (86)	06:52		18:33 (86)	06:17		20:00 (98)	06:05		20:02 (98)
	17:38	18:15			19:45	38	19:11 (86)	20:16	22	18:55 (86)	20:46	23	20:23 (98)	21:07	39	20:41 (85)
20	07:53	07:22		07:44 (131)	07:40		18:30 (86)	06:51		18:37 (86)	06:16		19:59 (98)	06:06		20:03 (98)
	17:39	18:16	4	07:48 (131)	19:46	42	19:12 (86)	20:17	15	18:52 (86)	20:47	24	20:23 (98)	21:07	40	20:43 (85)
21	07:53	07:21		07:40 (131)	07:38		18:29 (86)	06:49			06:15		19:58 (98)	06:06		20:03 (98)
	17:40	18:17	11	07:51 (131)	19:47	45	19:14 (86)	20:18			20:48	26	20:24 (98)	21:07	40	20:43 (85)
22	07:52	07:20		07:39 (131)	07:36		18:28 (86)	06:48			06:14		19:58 (98)	06:06		20:03 (98)
	17:41	18:18	14	07:53 (131)	19:48	46	19:14 (86)	20:19			20:49	27	20:25 (98)	21:07	40	20:43 (85)
23	07:52	07:18		07:38 (131)	07:35		18:27 (86)	06:47			06:13		19:58 (98)	06:06		20:03 (98)
	17:42	18:19	17	07:55 (131)	19:49	49	19:16 (86)	20:20			20:49	28	20:26 (98)	21:08	40	20:43 (85)
24	07:51	07:17		07:36 (131)	07:33		18:25 (86)	06:45			06:13		19:57 (98)	06:07		20:03 (98)
	17:44	18:20	20	07:56 (131)	19:51	51	19:16 (86)	20:21			20:50	29	20:26 (98)	21:08	39	20:42 (85)
25	07:50	07:15		07:35 (131)	07:32		18:24 (86)	06:44			06:12		19:57 (98)	06:07		20:04 (98)
	17:45	18:22	22	07:57 (131)	19:52	52	19:16 (86)	20:22			20:51	31	20:28 (98)	21:08	39	20:43 (85)
26	07:49	07:14		07:33 (131)	07:30		18:24 (86)	06:42			06:11		19:57 (98)	06:07		20:03 (98)
	17:46	18:23	24	07:57 (131)	19:53	53	19:17 (86)	20:23			20:52	31	20:28 (98)	21:08	40	20:43 (85)
27	07:49	07:13		07:33 (131)	07:28		18:23 (86)	06:41			06:11		19:57 (98)	06:07		20:03 (98)
	17:47	18:24	24	07:57 (131)	19:54	54	19:17 (86)	20:24			20:53	33	20:30 (98)	21:08	40	20:43 (85)
28	07:48	07:11		07:32 (131)	07:27		18:21 (86)	06:40			06:10		19:57 (98)	06:08		20:04 (98)
	17:48	18:25	25	07:57 (131)	19:55	56	19:17 (86)	20:25			20:54	32	20:29 (98)	21:08	39	20:43 (85)
29	07:47				07:25		18:22 (86)	06:38			06:10		19:57 (98)	06:08		20:04 (98)
	17:50				19:56	55	19:17 (86)	20:26			20:55	33	20:30 (98)	21:08	39	20:43 (85)
30	07:46				07:23		18:21 (86)	06:37			06:09		19:57 (98)	06:09		20:04 (98)
	17:51				19:57	56	19:17 (86)	20:27			20:55	33	20:30 (98)	21:08	39	20:43 (85)
31	07:45				07:22		18:20 (86)				06:09		19:58 (98)			
	17:52				19:58	56	19:16 (86)				20:56	32	20:30 (98)			
Potential sun hours	300	299			370			397			446			449		
Total, worst case			161			905			886			478			1129	
Sun reduction			0.42			0.44			0.51			0.56			0.60	
Oper. time red.			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.			0.63			0.66			0.67			0.62			0.62	
Total reduction			0.27			0.29			0.34			0.35			0.37	
Total, real			43			263			301			167			422	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II SFA_3-GE_1100m

Printed/Page
3/1/2012 1:52 PM / 99

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 12:18 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II SFA_3-GE_1100m**Shadow receptor:** 10308 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6304)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November	December
1	06:09		20:04 (98)	06:32			07:02		18:21 (86)	07:31			07:03	07:37
	21:08	39	20:43 (85)	20:51			20:09	48	19:09 (86)	19:18			17:33	17:10
2	06:10		20:05 (98)	06:33			07:03		18:20 (86)	07:32			07:05	07:38
	21:08	37	20:43 (85)	20:50			20:08	49	19:09 (86)	19:17			17:32	17:10
3	06:10		20:04 (98)	06:34			07:04		18:19 (86)	07:33			07:06	07:39
	21:08	37	20:43 (85)	20:49			20:06	51	19:10 (86)	19:15			17:31	17:10
4	06:11		20:05 (98)	06:35			07:05		18:18 (86)	07:34			07:07	07:40
	21:08	36	20:43 (85)	20:48			20:05	52	19:10 (86)	19:14			17:30	17:10
5	06:11		20:04 (98)	06:36			07:06		18:17 (86)	07:35			07:08	07:41
	21:08	36	20:42 (85)	20:46			20:03	53	19:10 (86)	19:12			17:29	17:09
6	06:12		20:05 (98)	06:37			07:07		18:16 (86)	07:36		08:14 (131)	07:09	07:42
	21:07	34	20:43 (85)	20:45			20:01	55	19:11 (86)	19:10	10	08:24 (131)	17:28	17:09
7	06:12		20:04 (98)	06:38			07:08		18:15 (86)	07:37		08:11 (131)	07:10	07:43
	21:07	33	20:37 (98)	20:44			20:00	56	19:11 (86)	19:09	15	08:26 (131)	17:27	17:09
8	06:13		20:05 (98)	06:39			07:09		18:14 (86)	07:38		08:10 (131)	07:12	07:44
	21:07	33	20:38 (98)	20:43			19:56	56	19:10 (86)	19:07	18	08:28 (131)	17:26	17:09
9	06:14		20:05 (98)	06:40			07:09		18:13 (86)	07:39		08:08 (131)	07:13	07:45
	21:07	33	20:38 (98)	20:42			19:55	56	19:09 (86)	19:06	21	08:29 (131)	17:25	17:09
10	06:14		20:05 (98)	06:41			07:10		18:13 (86)	07:40		08:07 (131)	07:14	07:46
	21:06	33	20:38 (98)	20:41			19:53	56	19:09 (86)	19:04	22	08:29 (131)	17:24	17:09
11	06:15		20:05 (98)	06:42			07:11		18:12 (86)	07:41		08:06 (131)	07:15	07:46
	21:06	33	20:38 (98)	20:39			19:52	57	19:09 (86)	19:03	23	08:29 (131)	17:23	17:09
12	06:16		20:06 (98)	06:43			07:12		18:12 (86)	07:42		08:05 (131)	07:16	07:47
	21:05	33	20:39 (98)	20:38			19:50	57	19:09 (86)	19:01	24	08:29 (131)	17:22	17:10
13	06:16		20:05 (98)	06:44			07:13		18:12 (86)	07:43		08:05 (131)	07:17	07:48
	21:05	33	20:38 (98)	20:37			19:48	56	19:08 (86)	18:59	24	08:29 (131)	17:21	17:10
14	06:17		20:06 (98)	06:45			07:14		18:12 (86)	07:44		08:04 (131)	07:18	07:49
	21:05	33	20:39 (98)	20:35			19:47	56	19:08 (86)	18:58	25	08:29 (131)	17:20	17:10
15	06:18		20:06 (98)	06:46			07:15		18:12 (86)	07:45		08:05 (131)	07:20	07:50
	21:04	33	20:39 (98)	20:34			19:45	55	19:07 (86)	18:56	25	08:30 (131)	17:19	17:10
16	06:19		20:07 (98)	06:47			07:16		18:12 (86)	07:46		08:06 (131)	07:21	07:50
	21:03	32	20:39 (98)	20:33			19:43	54	19:06 (86)	18:55	23	08:29 (131)	17:18	17:10
17	06:19		20:06 (98)	06:48			07:17		18:12 (86)	07:47		08:07 (131)	07:22	07:51
	21:03	32	20:38 (98)	20:31			19:42	53	19:05 (86)	18:53	21	08:28 (131)	17:17	17:11
18	06:20		20:07 (98)	06:49			07:18		18:12 (86)	07:48		08:08 (131)	07:23	07:52
	21:02	31	20:38 (98)	20:30			19:40	52	19:04 (86)	18:52	19	08:27 (131)	17:17	17:11
19	06:21		20:07 (98)	06:49			07:19		18:13 (86)	07:49		08:09 (131)	07:24	07:52
	21:02	30	20:37 (98)	20:29			19:38	50	19:03 (86)	18:51	16	08:25 (131)	17:16	17:11
20	06:22		20:08 (98)	06:50			07:20		18:12 (86)	07:50		08:10 (131)	07:25	07:53
	21:01	29	20:37 (98)	20:27			19:37	49	19:01 (86)	18:49	13	08:23 (131)	17:15	17:12
21	06:23		20:07 (98)	06:51			07:21		18:13 (86)	07:51		08:11 (131)	07:26	07:53
	21:00	28	20:35 (98)	20:26			19:35	47	19:00 (86)	18:48	10	08:21 (131)	17:15	17:12
22	06:23		20:08 (98)	06:52			07:22		18:13 (86)	07:52			07:28	07:54
	21:00	27	20:35 (98)	20:24			19:33	46	18:59 (86)	18:46			17:14	17:13
23	06:24		20:09 (98)	06:53		18:40 (86)	07:23		18:14 (86)	07:53			07:29	07:54
	20:59	25	20:34 (98)	20:23	16	18:56 (86)	19:32	43	18:57 (86)	18:45			17:14	17:13
24	06:25		20:10 (98)	06:54		18:37 (86)	07:24		18:16 (86)	07:54			07:30	07:55
	20:58	24	20:34 (98)	20:21	22	18:59 (86)	19:30	39	18:55 (86)	18:44			17:13	17:14
25	06:26		20:11 (98)	06:55		18:34 (86)	07:25		18:17 (86)	07:56			07:31	07:55
	20:57	22	20:33 (98)	20:20	28	19:02 (86)	19:28	36	18:53 (86)	18:42			17:12	17:15
26	06:27		20:12 (98)	06:56		18:31 (86)	07:26		18:19 (86)	07:57			07:32	07:56
	20:56	20	20:32 (98)	20:19	32	19:03 (86)	19:27	32	18:51 (86)	18:41			17:12	17:15
27	06:28		20:12 (98)	06:57		18:29 (86)	07:27		18:21 (86)	07:58			07:33	07:56
	20:55	19	20:31 (98)	20:17	36	19:05 (86)	19:25	27	18:48 (86)	18:40			17:12	17:16
28	06:29		20:13 (98)	06:58		18:27 (86)	07:28		18:24 (86)	07:59			07:34	07:56
	20:55	17	20:30 (98)	20:15	38	19:05 (86)	19:23	20	18:44 (86)	18:38			17:11	17:16
29	06:30		20:15 (98)	06:59		18:25 (86)	07:29		18:31 (86)	08:00			07:35	07:57
	20:54	14	20:29 (98)	20:14	41	19:06 (86)	19:22	6	18:37 (86)	18:37			17:11	17:17
30	06:31		20:17 (98)	07:00		18:24 (86)	07:30			08:01			07:36	07:57
	20:53	11	20:28 (98)	20:12	43	19:07 (86)	19:20			18:36			17:11	17:18
31	06:31		20:20 (98)	07:01		18:22 (86)				08:02				07:57
	20:52	6	20:26 (98)	20:11	46	19:08 (86)				18:34				17:19
Potential sun hours	456			426			374			346			300	291
Total, worst case		883			302			1367			309			
Sun reduction		0.60			0.60			0.61			0.56			
Oper. time red.		1.00			1.00			1.00			1.00			
Wind dir. red.		0.62			0.67			0.67			0.63			
Total reduction		0.37			0.40			0.41			0.36			
Total, real		331			121			556			110			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Attachment D

Obstacle Analysis Data Sheets

PROJECT NAME: Buckeye II Shadow Flicker Assessment

Date: 4/19/2012 Weather: Sunny 61°F light S wind Camera: D90 - JP

Sheet: 1 of 2

VP #	GPS #	Photo Reference	Receptor #	Time	Type of Screening/ Amount of Screening/# of Windows/Direction of View/Comments
	1	DSC_5002 - 5018	342	0915	structures at Farmhouse across the street. windows on all sides of house. large ~~[illegible]~~ tree in
	2	5019 - 5033	342	0920	lawn. Smaller landscape trees/evergreens present as
	3	5034 - 5051	342	0925	well. Point 1 taken in front of house. Point 2 south. Point 3 - north.
	4	5052 - 5065	410	0955	410 is a white ranch windows in front at
some screening from house across the road	5	5066 - 5079	410	1000	south side. Garage door to north. Several
	6	5080 - 5090	410	1001	landscape trees in front yard.
	6	5091 - 5102	411	1002	411 is a small green farmhouse with windows
	7	5103 - 5118	411	1003	on all sides. Several 40-50' high trees in
	8	5119 - 5130	411	1005	front yard.
	9	5131 - 5143	8224	1031	Grey colonial - Evergreen at smaller trees/shrubs
South Mutual Ville Rd.	10	5144 - 5156	8224	1033	~20' high windows east at south. Garage to north
	11	5157 - 5173	8226	1034	- Small brick ranch with large pasture in front
	12	5174 - 5187	8226	1035	8224 evergreens at smaller trees by house provide
					screening.
	13	5188 - 5203	10056	1100	set back from road 1 story cape cod. Minimal
Arsk Road	14	5204 - 5220	10056	1102	landscaping. Small woodlot behind house. 40-50' trees
	15	5221 - 5236	10056	1105	open field to west. windows front, west & south.
	16	5237 - 5254	833	~~833~~ 1133	sits back at low from road. line of trees to
Yorgy Rd.	17	5255 - 5274	833	~~833~~ 1135	the south but not much protecting from
	18	5275 - 5288	833	~~833~~ 1138	west. windows all around except north.
	19	5289 - 5309	8343	1154	Small veg. 10-12' high in front. open field to
N. Parkview Road	20	5310 5324	8343	1155	east. windows all around. open field to west.
	21	5325 - 5341	8343	1156	Full pans at each location.
	22	5342 - 5365	812	1205	windows to north, west & south. Heavy evergreen
"	23	5366 - 5384	812	1207	veg. in front. ~20' line of trees along SE from house.
	24	5385 - 5396	812	1210	line of evergreens along road to north. woodlot directly east.

PROJECT NAME:

Date: 4/19/2012 Weather: ptly Sunny / overcast Camera: D90 - JP Sheet: 2 of 3

VP #	GPS #	Photo Reference	Receptor #	Time	Type of Screening/ Amount of Screening/# of Windows/Direction of View/Comments
	25	5397 - 5420	3431	1217	No Screening. looks like a new home, open
	26	5421 - 5434	3431	1219	to fields east & west.
	27	5435 - 5448	3431	1221	
	~~28~~		~~747~~		
	~~29 & 30~~		~~747~~		
	~~31~~		3426 ~~[illegible]~~		
	~~32~~		~~750~~		
	28	5449 - 5469	747	1234	Tree stand to NW of cot. 40-50' high. Windows
	29	5470 - 5494	747	1235	all around.
	30	5495 - 5519	3426	1238	2 windows in front. mix of large decid. & evergreen
	31	5520 - 5541	750	1240	large shrubs & 1 tall tree >50' in front
	32	5542 - 5566	750	1242	1 large tree to SE. Full pans taken at
					each location.
	33	5567 - 5590	10168	1304	Pine stand to west - SW large decid. to North
	34	5591 - 5612	10168	1306	& NE. windows all around. wood lots to
	35	5613 - 5643	10168	1309	the South. otherwise open fields all around
	36	5644 - 5660	732	~~1454~~	Small decid. trees (landscaping) no real screening
	37	5661 - 5678	732	~~1456~~	present. windows to North & South & west.
	38	5679 - 5692	799	1503	mix of shrubs evergreens & taller decid. trees
	39	5693 - 5705	799	1505	to North - evergreens on SE corner of
	40	5706 - 5721	799	1507	house. windows all around.
	41	5722 - 5750	789/795	1518	Sizeable woodlot behind 789. otherwise a mix
	42	5751 - 5771	789/795	1520	of evergreen & deciduous landscape trees around
	43	5772 - 5785	789/795	1522	homes. windows all around.
	44	5786 - 5801	725	1531	landscape trees in front yard & side. large woodlot
	45	5802 - 5817	725	1533	between turbine & house. 40-50' trees.

PROJECT NAME:

Date: 4/19/2012 Weather: Sunny 76°F Camera: D90-JP Sheet: 3 of 3

VP #	GPS #	Photo Reference	Receptor #	Time	Type of Screening/ Amount of Screening/# of Windows/Direction of View/Comments
	46	5818 - 5834	719	1542	Screening (veg). Small stand of trees to North of
	47	5835 - 5851	719	1544	NE Corner of house. Windows all around.
	48	5852 - 5871	662	1551	long line of pines to Northeast. Tall shrubs
	49	5872 - 5888	662	1553	along western side. large trees w/opening to east. windows all around
	50	5889 - 5896	10055	1555	Similar to 10056.
	51	5897 - 5910	6538	1608	No Screening available. Sits atop a hill with
	52	5911 - 5926	6538	1610	Clear view to turbine.

Attachment E

WindPRO Overview Reports and Calendars (Obstacle Analysis)

Project:
11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:39 AM / 1

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Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Main Result

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
280	307	482	420	473	385	412	385	596	797	832	727

W	WNW	NW	NNW	Sum
858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: 11052 contours.wpo (2)
Obstacles used in calculation
Eye height: 1.5 m
Grid resolution: 10 m

WTGs

	UTM NAD83 Zone: 17				WTG type						
	East	North	Z	Row data/Description	Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	RPM
	UTM NAD83 Zone: 17		[m]					[kW]	[m]	[m]	[RPM]
71	279,368	4,445,092	360.8	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
72	277,985	4,446,737	380.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
73	276,767	4,447,605	399.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
74	276,919	4,447,310	395.2	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
75	276,272	4,447,236	402.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
76	276,392	4,446,951	400.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
77	276,558	4,446,666	396.2	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
78	279,498	4,440,175	352.5	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
79	278,190	4,442,124	383.9	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
80	278,158	4,441,799	390.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
81	274,913	4,446,038	390.1	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
82	275,069	4,445,768	395.5	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
83	275,215	4,445,504	400.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
84	276,290	4,442,736	379.6	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
85	275,852	4,442,363	375.3	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
86	276,329	4,441,802	384.9	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
87	273,127	4,446,337	368.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
88	276,592	4,438,677	390.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
89	275,778	4,438,425	380.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
90	278,236	4,441,453	390.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
91	281,835	4,443,472	341.3	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
92	281,137	4,443,883	347.8	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
93	280,804	4,444,251	350.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
94	281,156	4,441,420	350.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
95	282,198	4,441,581	340.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0

To be continued on next page...

Project:
11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

...continued from previous page

	UTM NAD83 Zone: 17 East	North	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	RPM
	UTM NAD83 Zone: 17		[m]					[kW]	[m]	[m]	[RPM]
96	282,065	4,442,739	347.1	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
97	276,789	4,442,289	381.2	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
98	276,034	4,442,154	380.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
99	276,489	4,442,477	379.4	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
100	280,316	4,446,937	360.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
101	280,472	4,445,042	351.6	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
105	275,340	4,446,427	400.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
106	275,561	4,446,153	400.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
107	274,088	4,445,876	388.2	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
108	275,300	4,445,175	395.3	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
109	275,088	4,444,675	390.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
110	272,661	4,447,412	358.7	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
112	275,073	4,442,766	370.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
113	275,193	4,442,396	367.4	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
114	279,563	4,439,098	342.9	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
115	276,812	4,445,897	387.5	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
116	276,801	4,446,428	390.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
117	277,119	4,447,042	390.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
118	275,271	4,441,707	366.2	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
119	275,266	4,442,026	367.1	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
122	268,302	4,438,216	348.7	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
123	268,534	4,437,137	342.9	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
125	267,824	4,438,274	350.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
126	280,855	4,447,117	350.4	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
127	280,863	4,445,374	350.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
128	282,108	4,440,994	335.2	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
129	280,479	4,446,456	360.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
130	282,325	4,442,257	340.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
131	277,665	4,441,538	390.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
132	278,636	4,438,180	350.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
133	272,570	4,446,003	355.5	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0

Shadow receptor-Input

No.	UTM NAD83 Zone: 17 East	North	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
			[m]	[m]	[m]	[m]	[°]	[°]	
2.1	281,235	4,442,108	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
339	277,415	4,441,801	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
340	277,368	4,441,802	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
341	277,278	4,441,852	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
342	277,272	4,441,798	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
343	277,386	4,441,735	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
344	277,453	4,441,790	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
348	277,409	4,441,768	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
400	275,488	4,442,760	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
401	275,447	4,442,761	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
402	275,404	4,442,794	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
403	275,418	4,442,729	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
404	275,448	4,442,695	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
405	275,430	4,442,663	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"

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Project:
11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

...continued from previous page

UTM NAD83 Zone: 17

No.	East	North	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode
406	274,741	4,442,652	364.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
410	274,603	4,442,172	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
411	274,606	4,442,229	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
573	274,681	4,444,963	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
581	275,654	4,445,023	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
616	280,775	4,444,963	348.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
662	274,637	4,445,617	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
719	274,593	4,446,352	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
725	275,043	4,446,592	398.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
727	275,731	4,446,508	404.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
739	277,597	4,446,632	382.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
789	275,797	4,446,704	406.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
793	275,948	4,447,105	400.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
794	275,977	4,447,091	400.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
795	275,910	4,446,752	404.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
799	277,669	4,447,012	389.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
833	277,475	4,447,400	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
849	276,351	4,447,569	401.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3380	275,601	4,445,395	394.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3417	272,870	4,446,213	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3429	280,369	4,446,608	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3431	279,798	4,446,799	361.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6175	281,782	4,441,201	342.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6538	282,006	4,442,134	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
7825	275,516	4,445,853	400.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8351	274,616	4,445,718	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8352	274,625	4,445,716	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8353	274,644	4,445,726	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8354	274,638	4,445,718	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8355	274,600	4,445,730	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8356	274,605	4,445,721	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8386	277,463	4,447,234	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9758	277,283	4,441,567	387.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10055	274,845	4,445,400	394.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10206	277,674	4,446,991	388.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10280	274,629	4,445,707	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10308	276,737	4,441,822	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"

Calculation Results

Shadow receptor

No.	Shadow, worst case: Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow, expected values: Shadow hours per year [h/year]
2.1	9:29	38	0:22	2:13
339	179:42	265	1:08	53:13
340	170:04	271	1:01	50:37
341	121:03	227	0:50	34:49
342	107:28	209	0:57	32:19
343	150:05	224	1:25	44:42

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

...continued from previous page

	Shadow, worst case			Shadow, expected values
No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
344	180:13	241	1:15	52:02
348	188:31	263	1:12	55:04
400	141:15	173	1:23	45:43
401	142:19	190	1:24	46:11
402	133:13	160	1:33	44:05
403	187:38	217	1:17	60:34
404	251:28	289	1:40	78:38
405	298:09	302	1:43	93:40
406	118:48	152	1:08	42:14
410	65:39	122	0:41	24:55
411	108:57	223	0:41	36:53
573	109:27	186	0:49	34:06
581	107:08	167	1:02	35:44
616	136:50	122	1:16	50:49
662	162:21	200	1:37	57:11
719	116:30	171	1:19	32:59
725	124:02	172	1:08	35:03
727	97:06	184	1:12	32:23
739	122:50	178	1:02	47:27
789	49:27	103	0:40	19:20
793	146:14	256	1:00	48:39
794	107:14	218	0:53	32:15
795	113:59	223	0:48	38:45
799	160:24	261	0:59	47:47
833	42:05	64	0:48	12:30
849	117:43	227	0:57	38:43
3380	212:24	248	1:05	69:39
3417	130:54	157	1:07	38:48
3429	275:32	171	1:56	72:10
3431	88:58	160	0:47	32:35
6175	123:39	203	1:02	37:15
6538	78:28	82	1:10	31:42
7825	115:11	195	0:51	38:56
8351	184:14	265	1:32	64:24
8352	184:19	262	1:35	64:28
8353	178:22	261	1:37	62:32
8354	182:00	260	1:36	63:42
8355	179:31	268	1:28	62:43
8356	185:11	267	1:30	64:47
8386	167:22	263	1:00	53:20
9758	100:57	138	1:09	36:35
10055	135:12	167	1:04	49:32
10206	157:37	178	1:22	43:58
10280	191:26	260	1:35	67:03
10308	51:47	113	0:40	18:33

Project:
11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
71	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (58)	0:00	0:00
72	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (59)	207:53	67:11
73	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (60)	87:06	32:42
74	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (61)	113:23	39:44
75	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (62)	52:34	21:21
76	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (63)	103:16	37:39
77	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (64)	113:31	33:36
78	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (65)	0:00	0:00
79	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (66)	53:38	21:32
80	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (67)	56:02	20:47
81	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (68)	132:07	37:47
82	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (69)	187:35	69:45
83	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (70)	290:26	105:10
84	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (71)	34:44	12:36
85	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (72)	118:55	31:24
86	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (73)	31:53	11:23
87	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (74)	14:29	5:56
88	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (75)	0:00	0:00
89	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (76)	0:00	0:00
90	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (77)	36:10	11:16
91	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (78)	0:00	0:00
92	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (79)	0:00	0:00
93	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (80)	0:00	0:00
94	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (81)	46:34	17:15
95	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (82)	9:29	2:13
96	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (83)	0:00	0:00
97	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (84)	0:00	0:00
98	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (85)	76:19	24:44
99	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (86)	19:11	6:09
100	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (87)	68:54	27:12
101	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (88)	136:50	50:49
105	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (89)	190:56	59:23
106	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (90)	77:07	24:00
107	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (91)	115:09	43:05
108	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (92)	320:39	101:29
109	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (93)	98:19	24:30
110	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (94)	0:00	0:00
112	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (95)	322:13	121:25
113	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (96)	209:45	66:37
114	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (97)	0:00	0:00
115	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (98)	0:00	0:00
116	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (99)	78:22	23:19
117	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (100)	178:16	54:28
118	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (101)	32:31	8:22
119	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (102)	33:05	10:38
122	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (103)	0:00	0:00
123	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (104)	0:00	0:00
125	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (105)	0:00	0:00
126	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (109)	0:00	0:00
127	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (106)	0:00	0:00
128	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (107)	77:05	20:07
129	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (108)	295:36	77:41
130	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (110)	78:28	31:42

To be continued on next page...

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11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

...continued from previous page

No.	Name	Worst case [h/year]	Expected [h/year]
131	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (111)	317:39	89:16
132	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (112)	0:00	0:00
133	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (113)	116:25	32:53

Project:
11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

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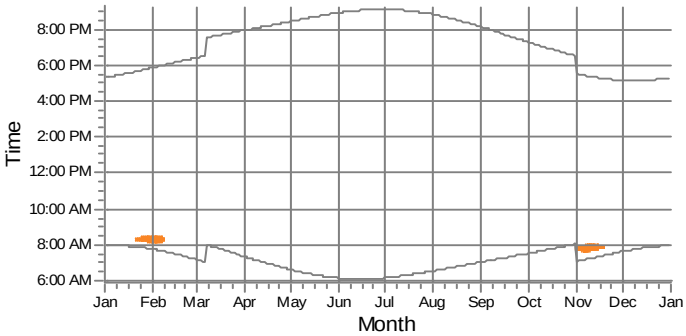
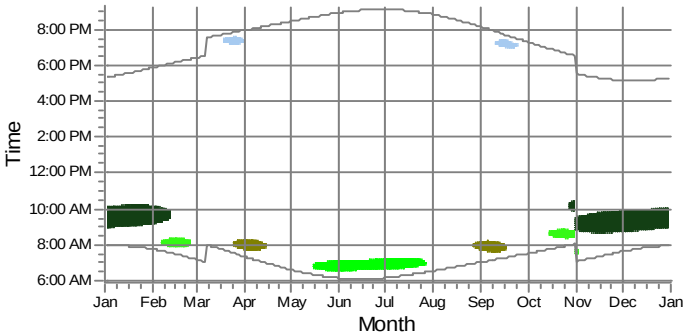
SHADOW - Calendar, graphical

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

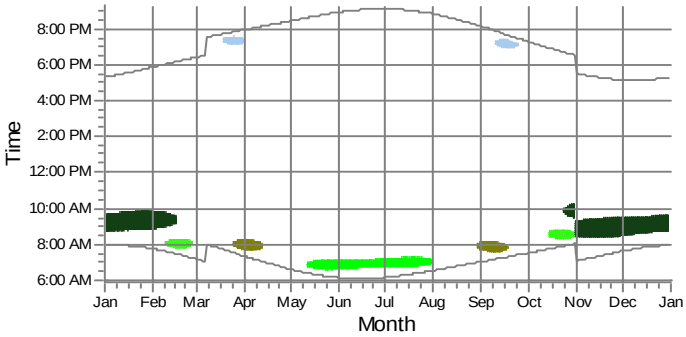
2.1: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5427)



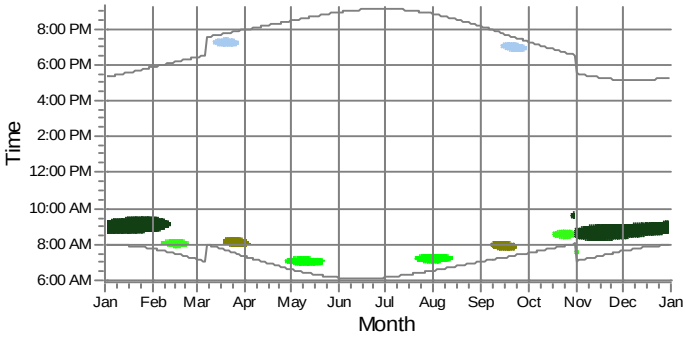
339: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5529)



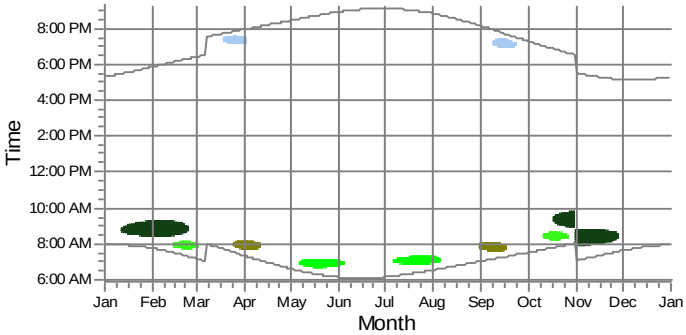
340: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5530)



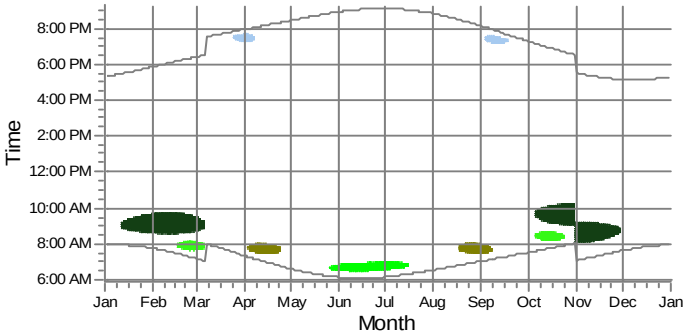
341: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5531)



342: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5532)



343: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5533)



WTGs

79: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (66)
80: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (67)
86: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (73)
90: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (77)
95: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (82)
131: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (111)

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SHADOW - Calendar, graphical

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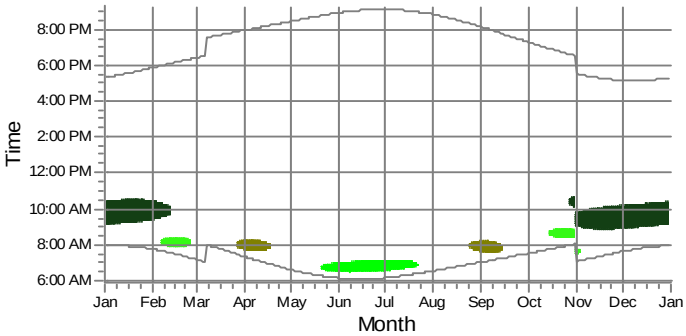
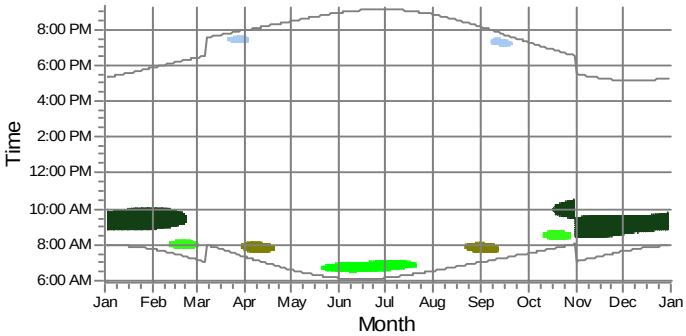
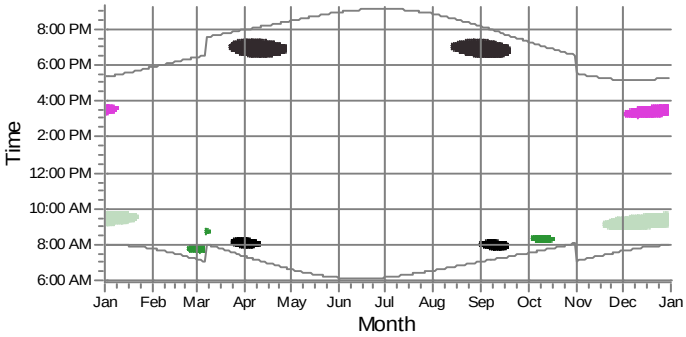
344: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5534)



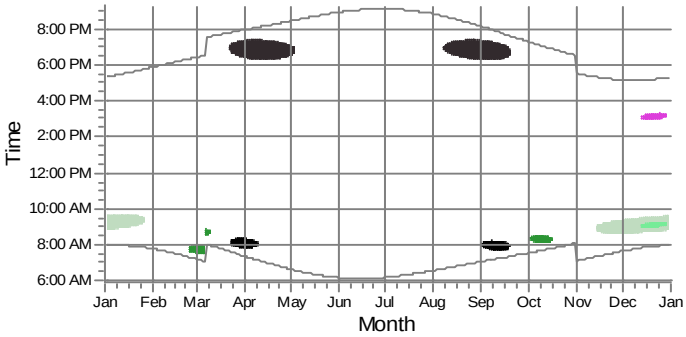
348: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5535)



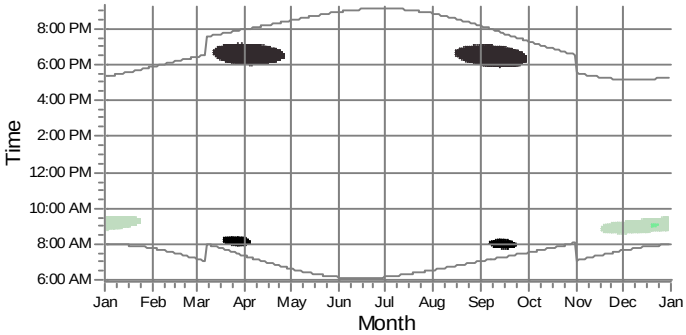
400: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5566)



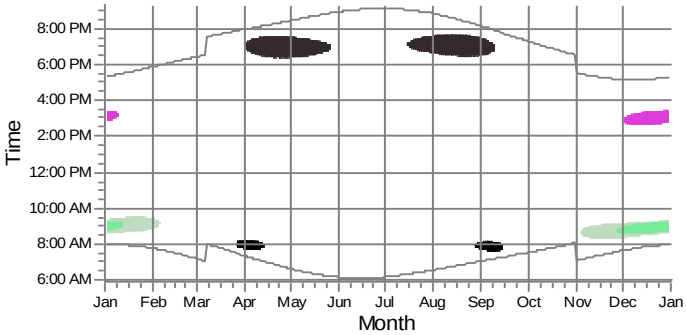
401: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5567)



402: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5568)



403: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5569)



WTGs

79: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (66)
80: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (67)
84: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (71)
85: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (72)
86: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (73)
90: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (77)
98: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (85)
99: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (86)
112: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (95)
113: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (96)
131: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (111)

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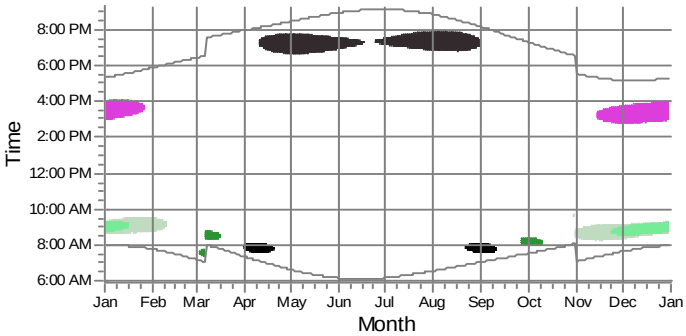
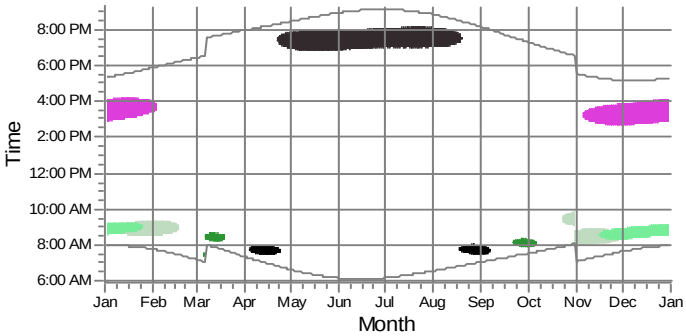
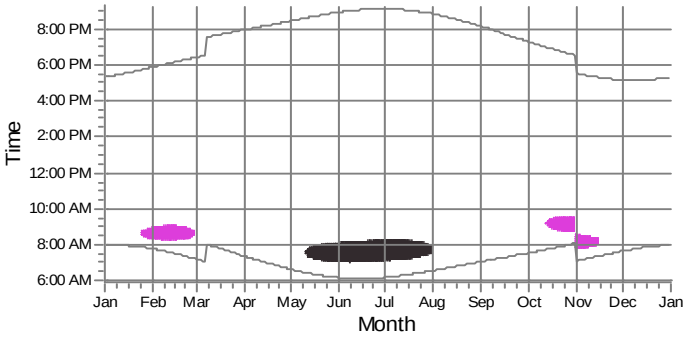
404: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5570)



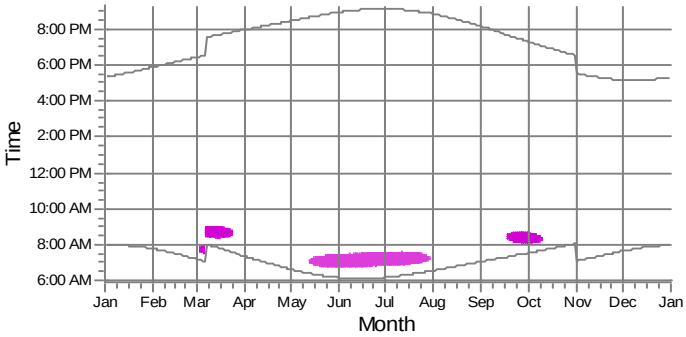
405: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5571)



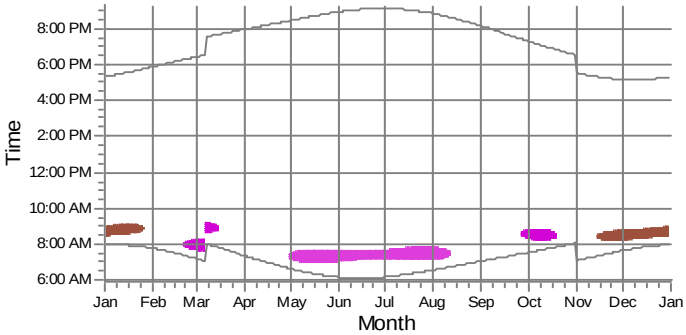
406: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5572)



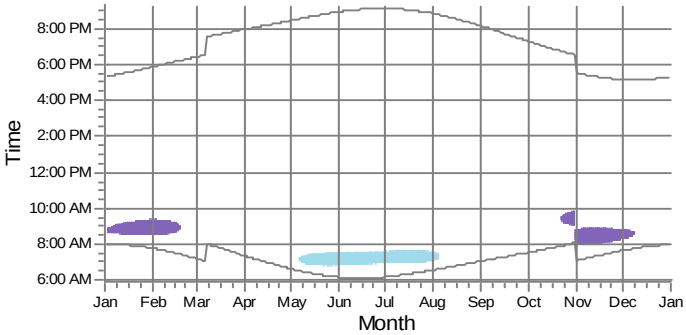
410: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5575)



411: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5576)



573: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5630)



WTGs

- 84: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (71)
- 85: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (72)
- 98: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (85)
- 99: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (86)
- 108: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (92)
- 109: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (93)
- 112: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (95)
- 113: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (96)
- 118: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (101)
- 119: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (102)

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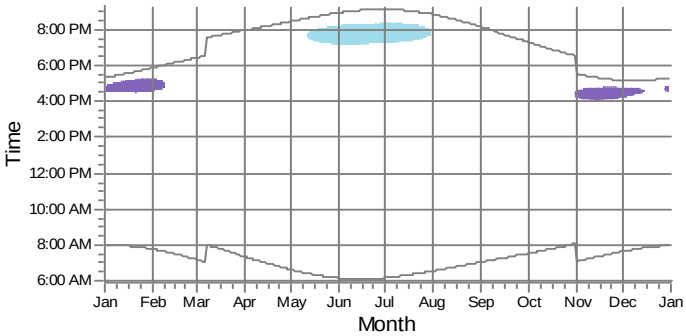
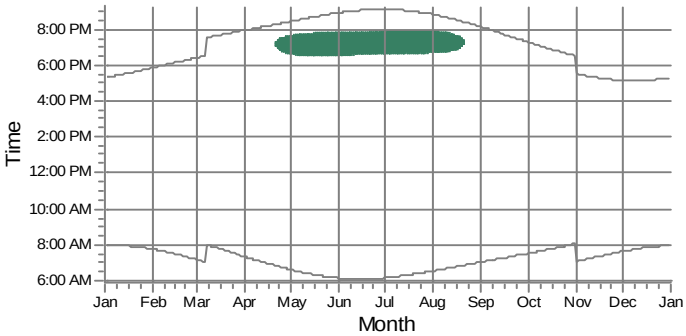
Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

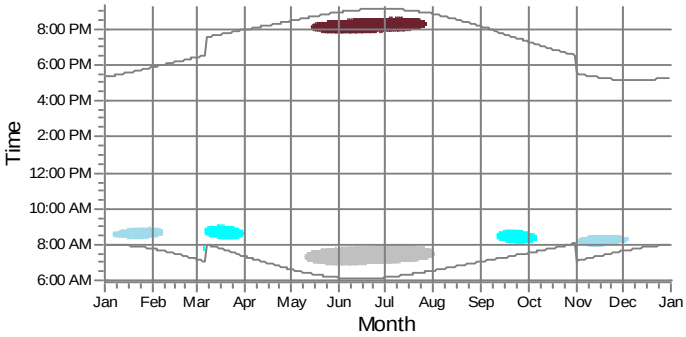
581: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5633)



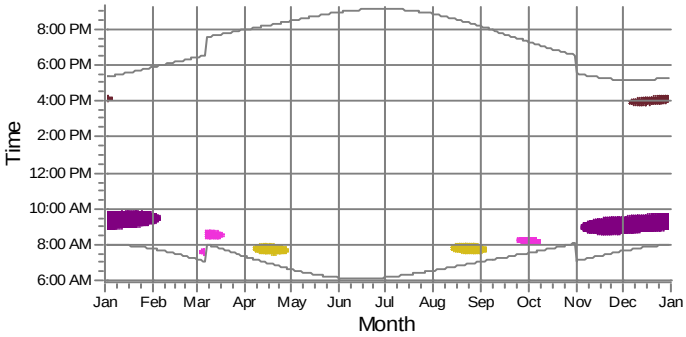
616: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5648)



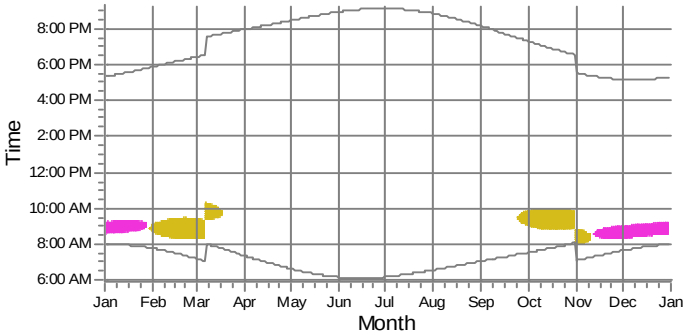
662: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5669)



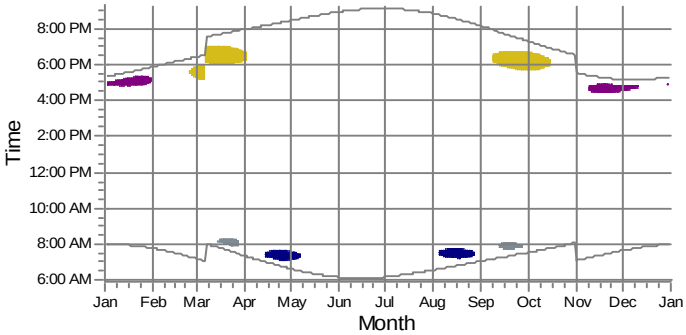
719: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5685)



725: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5687)



727: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5689)



WTGs

77: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (64)
81: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (68)
82: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (69)
83: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (70)
101: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (88)
105: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (89)
106: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (90)
107: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (91)
108: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (92)
109: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (93)
116: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (99)

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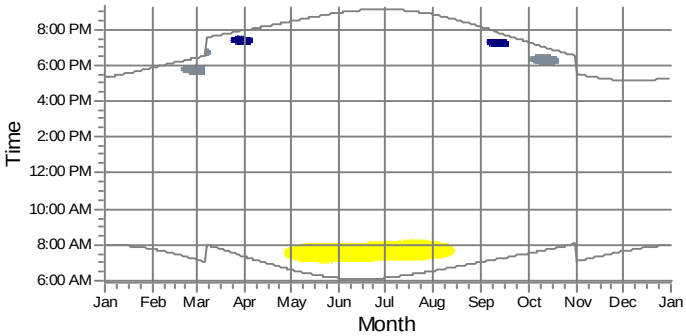
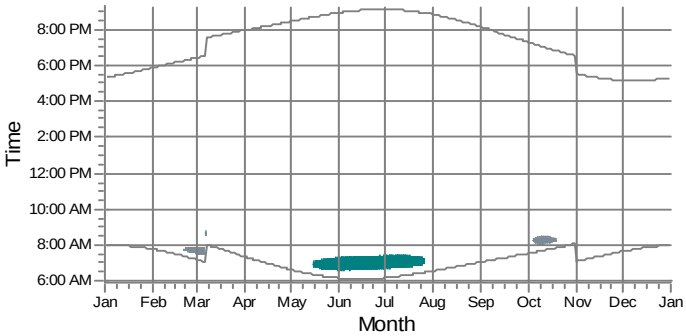
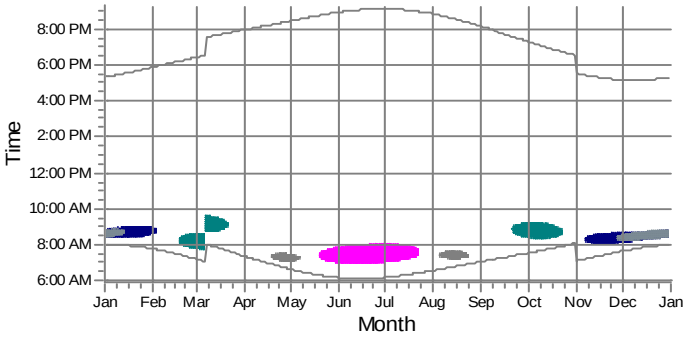
739: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5697)



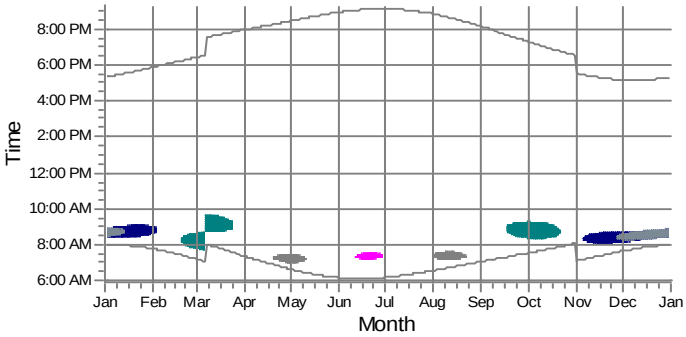
789: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5721)



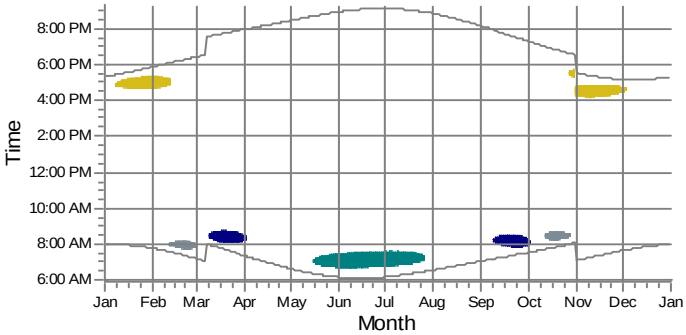
793: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5725)



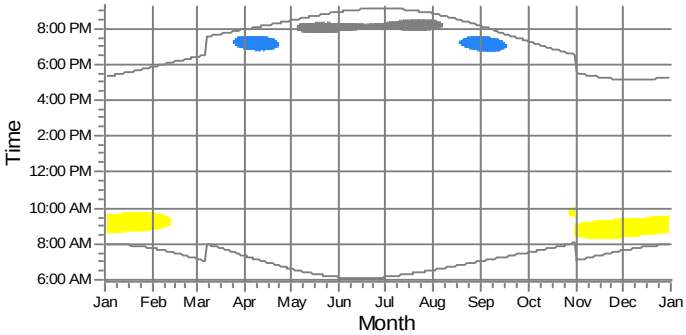
794: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5726)



795: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5727)



799: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5729)



WTGs

- 72: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (59)
- 74: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (61)
- 75: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (62)
- 76: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (63)
- 77: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (64)
- 105: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (89)
- 116: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (99)
- 117: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (100)

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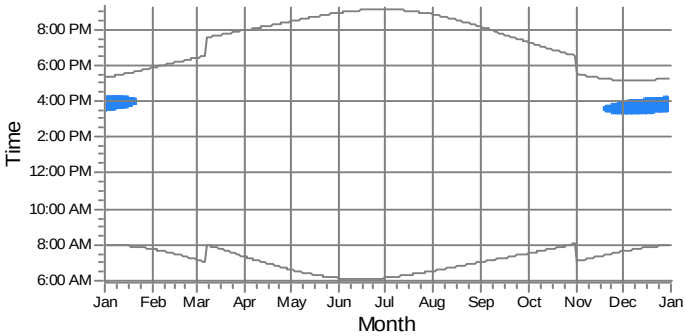
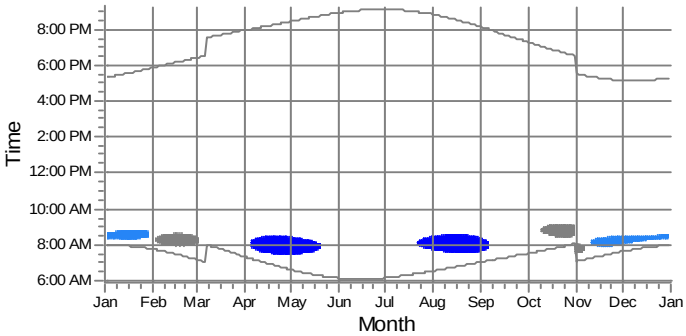
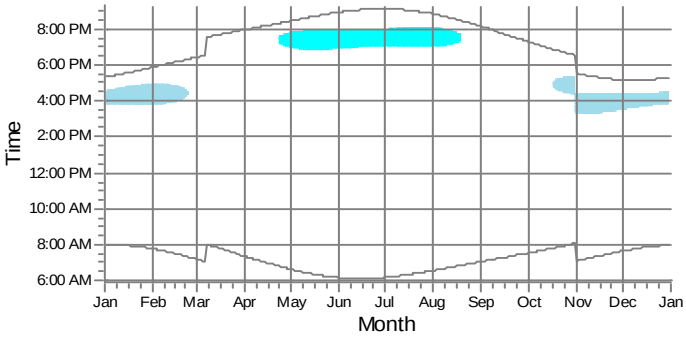
833: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5752)



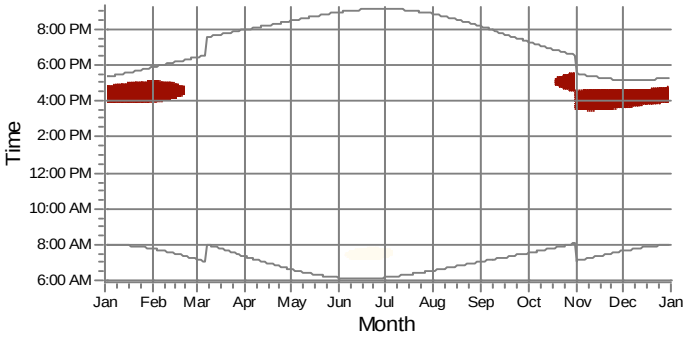
849: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5766)



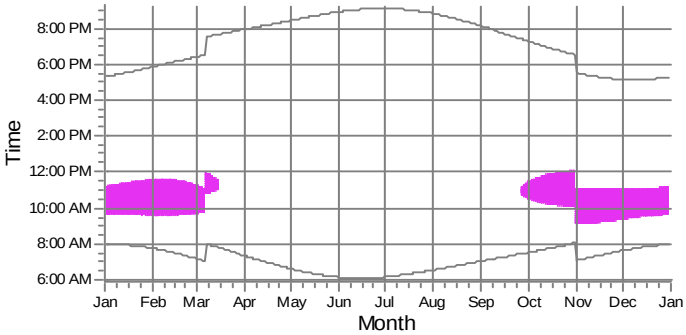
3380: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5894)



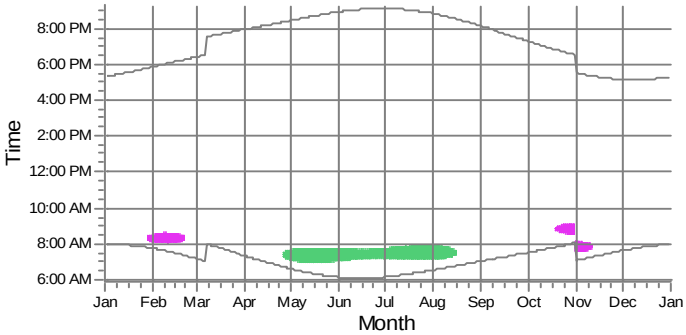
3417: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5907)



3429: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5916)



3431: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5918)



WTGs

- 73: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (60)
- 74: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (61)
- 83: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (70)
- 87: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (74)
- 100: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (87)
- 108: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (92)
- 117: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (100)
- 129: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (108)
- 133: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (113)

Project:
11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

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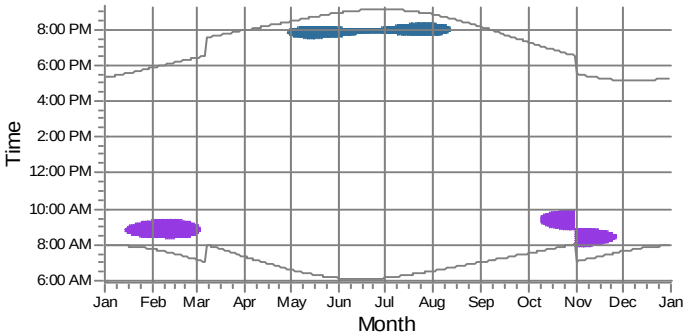
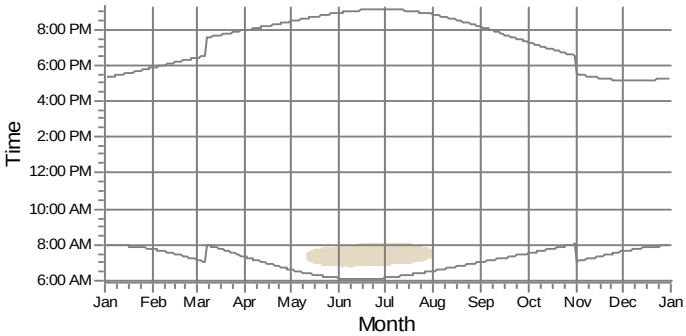
SHADOW - Calendar, graphical

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

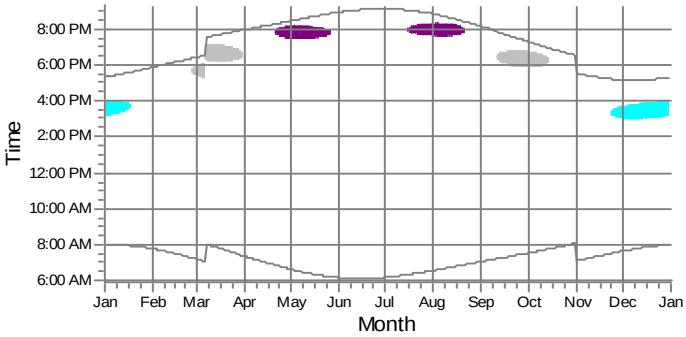
6175: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6031)



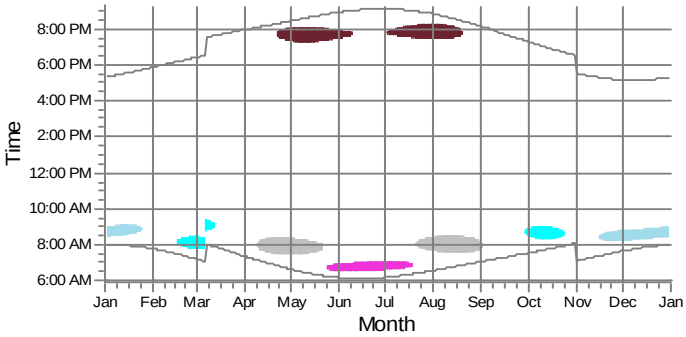
6538: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6044)



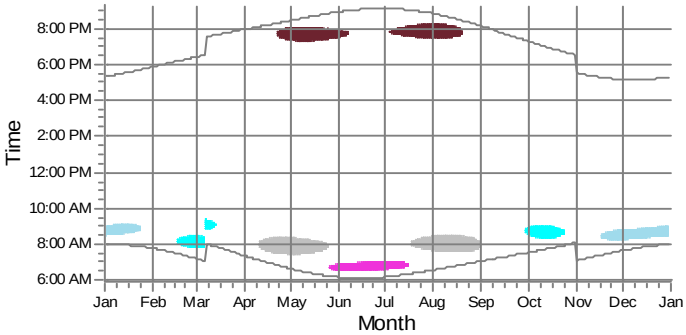
7825: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6113)



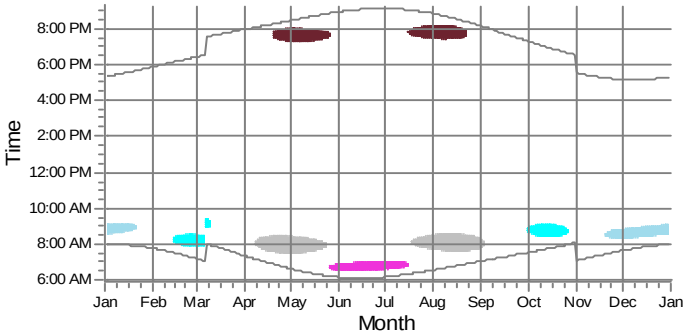
8351: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6151)



8352: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6152)



8353: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6153)



WTGs

- 81: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (68)
- 82: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (69)
- 83: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (70)
- 94: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (81)
- 106: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (90)
- 107: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (91)
- 108: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (92)
- 128: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (107)
- 130: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (110)

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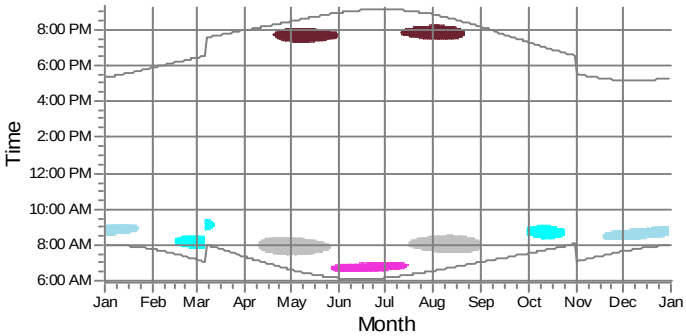
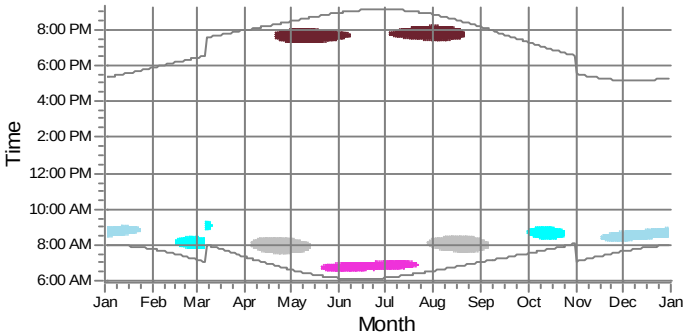
SHADOW - Calendar, graphical

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

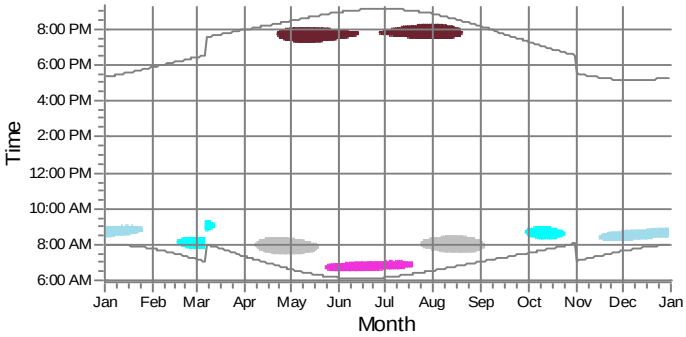
8354: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6154)



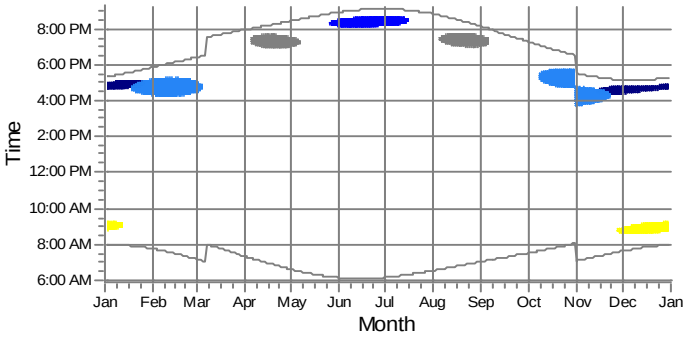
8355: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6155)



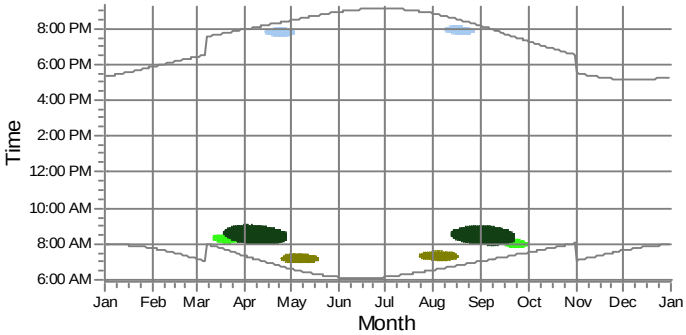
8356: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6156)



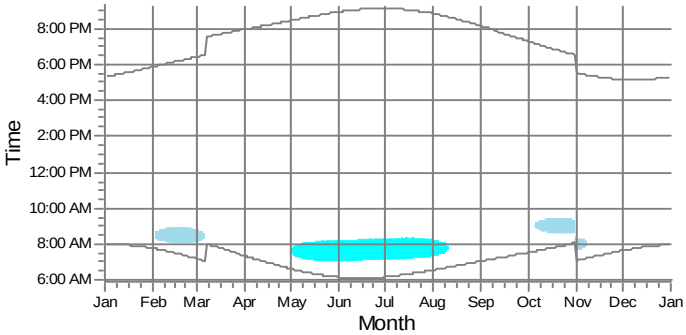
8386: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6164)



9758: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6246)



10055: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6276)



WTGs

- 72: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (59)
- 73: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (60)
- 74: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (61)
- 77: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (64)
- 80: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (67)
- 82: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (69)
- 83: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (70)
- 86: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (73)
- 90: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (77)
- 106: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (90)
- 107: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (91)
- 108: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (92)
- 117: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (100)
- 131: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (111)

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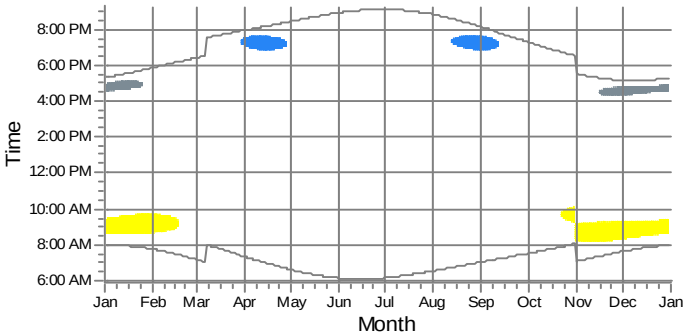
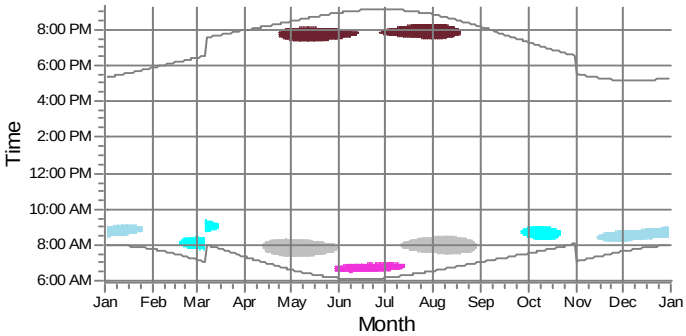
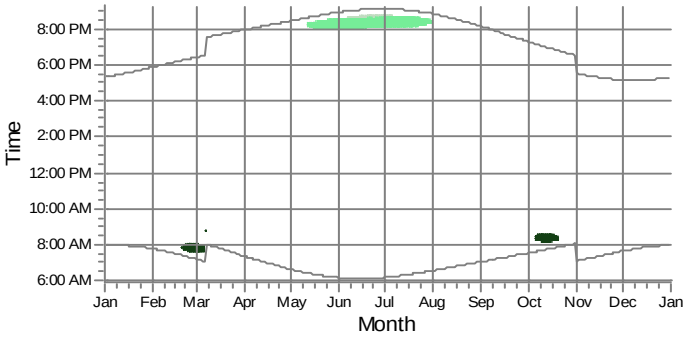
10206: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6301)



10280: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6302)



10308: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6304)



WTGs

72: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (59)
82: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (69)
83: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (70)
85: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (72)
98: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (85)
106: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (90)
107: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (91)
108: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (92)
116: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (99)
117: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (100)
131: GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (111)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

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SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 2.1 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5427)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January		February			March	April	May	June	July	August	September	October	November			December
1	07:57		07:44		08:04 (95)	07:09	07:20	06:36	06:08	06:09	06:32	07:02	07:30	07:03			07:37
	17:20		17:53	21	08:25 (95)	18:26	19:58	20:28	20:57	21:08	20:51	20:09	19:18	17:33			17:10
2	07:57		07:43		08:03 (95)	07:08	07:18	06:34	06:08	06:09	06:33	07:03	07:31	07:04		07:39 (95)	07:38
	17:20		17:54	22	08:25 (95)	18:27	19:59	20:29	20:57	21:08	20:49	20:08	19:17	17:32	9	07:48 (95)	17:10
3	07:57		07:42		08:03 (95)	07:06	07:17	06:33	06:07	06:10	06:34	07:04	07:32	07:06		07:38 (95)	07:39
	17:21		17:55	22	08:25 (95)	18:28	20:01	20:30	20:58	21:08	20:48	20:06	19:15	17:31	13	07:51 (95)	17:10
4	07:57		07:41		08:03 (95)	07:05	07:15	06:32	06:07	06:10	06:35	07:05	07:33	07:07		07:36 (95)	07:40
	17:22		17:57	21	08:24 (95)	18:29	20:01	20:31	20:59	21:08	20:47	20:04	19:13	17:30	16	07:52 (95)	17:09
5	07:57		07:40		08:04 (95)	07:03	07:14	06:31	06:06	06:11	06:36	07:05	07:34	07:08		07:35 (95)	07:41
	17:23		17:58	20	08:24 (95)	18:30	20:02	20:32	20:59	21:07	20:46	20:03	19:12	17:28	18	07:53 (95)	17:09
6	07:57		07:39		08:05 (95)	07:02	07:12	06:29	06:06	06:12	06:37	07:06	07:35	07:09		07:34 (95)	07:42
	17:24		17:59	18	08:23 (95)	18:31	20:03	20:33	21:00	21:07	20:45	20:01	19:10	17:27	20	07:54 (95)	17:09
7	07:57		07:38		08:06 (95)	07:00	07:10	06:28	06:06	06:12	06:38	07:07	07:36	07:10		07:33 (95)	07:43
	17:25		18:00	16	08:22 (95)	18:32	20:04	20:34	21:01	21:07	20:44	20:00	19:09	17:26	21	07:54 (95)	17:09
8	07:57		07:37		08:08 (95)	07:59	07:09	06:27	06:06	06:13	06:39	07:08	07:37	07:11		07:33 (95)	07:44
	17:26		18:01	13	08:21 (95)	19:34	20:05	20:35	21:01	21:07	20:43	19:56	19:07	17:25	22	07:55 (95)	17:09
9	07:57		07:36		08:11 (95)	07:57	07:07	06:26	06:05	06:13	06:40	07:09	07:38	07:12		07:34 (95)	07:45
	17:27		18:03	8	08:19 (95)	19:35	20:06	20:36	21:02	21:06	20:42	19:55	19:05	17:24	22	07:56 (95)	17:09
10	07:57		07:35			07:56	07:06	06:25	06:05	06:14	06:41	07:10	07:39	07:14		07:35 (95)	07:45
	17:28		18:04			19:36	20:07	20:37	21:03	21:06	20:40	19:53	19:04	17:23	21	07:56 (95)	17:09
11	07:57		07:34			07:54	07:04	06:24	06:05	06:15	06:42	07:11	07:40	07:15		07:36 (95)	07:46
	17:29		18:05			19:37	20:08	20:38	21:03	21:06	20:39	19:51	19:02	17:22	19	07:55 (95)	17:09
12	07:56		07:32			07:52	07:03	06:23	06:05	06:15	06:43	07:12	07:41	07:16		07:38 (95)	07:47
	17:30		18:06			19:38	20:09	20:39	21:04	21:05	20:38	19:50	19:01	17:21	18	07:56 (95)	17:09
13	07:56		07:31			07:51	07:01	06:22	06:05	06:16	06:44	07:13	07:43	07:17		07:39 (95)	07:48
	17:31		18:07			19:39	20:10	20:40	21:04	21:05	20:37	19:48	18:59	17:21	17	07:56 (95)	17:10
14	07:56		07:30			07:49	06:59	06:21	06:05	06:17	06:44	07:14	07:44	07:18		07:40 (95)	07:49
	17:32		18:09			19:40	20:11	20:41	21:05	21:04	20:35	19:46	18:58	17:20	15	07:55 (95)	17:10
15	07:55		07:29			07:48	06:58	06:20	06:05	06:18	06:45	07:15	07:45	07:19		07:41 (95)	07:49
	17:33		18:10			19:41	20:12	20:42	21:05	21:04	20:34	19:45	18:56	17:19	14	07:55 (95)	17:10
16	07:55		07:28			07:46	06:56	06:19	06:05	06:18	06:46	07:16	07:46	07:21		07:43 (95)	07:50
	17:34		18:11			19:42	20:13	20:43	21:05	21:03	20:33	19:43	18:55	17:18	12	07:55 (95)	17:10
17	07:55		07:26			07:44	06:55	06:18	06:05	06:19	06:47	07:17	07:47	07:22		07:44 (95)	07:51
	17:35		18:12			19:43	20:14	20:44	21:06	21:03	20:31	19:41	18:53	17:17	10	07:54 (95)	17:11
18	07:54		07:25			07:43	06:53	06:17	06:05	06:20	06:48	07:18	07:48	07:23		07:45 (95)	07:51
	17:36		18:13			19:44	20:15	20:45	21:06	21:02	20:30	19:40	18:52	17:17	8	07:53 (95)	17:11
19	07:54		07:24			07:41	06:52	06:16	06:05	06:21	06:49	07:19	07:49	07:24		07:46 (95)	07:52
	17:38		18:14			19:45	20:16	20:46	21:06	21:01	20:28	19:38	18:50	17:16	6	07:52 (95)	17:11
20	07:53		07:22			07:39	06:51	06:16	06:05	06:22	06:50	07:20	07:50	07:25		07:47 (95)	07:53
	17:39		18:16			19:46	20:17	20:47	21:07	21:01	20:27	19:36	18:49	17:15	4	07:51 (95)	17:12
21	07:53		07:21			07:38	06:49	06:15	06:06	06:22	06:51	07:21	07:51	07:26			07:53
	17:40		18:17			19:47	20:18	20:47	21:07	21:00	20:26	19:35	18:47	17:14			17:12
22	07:52		07:19		08:12 (95)	07:36	06:48	06:14	06:06	06:23	06:52	07:22	07:52	07:27			07:54
	17:41	4	18:18		08:16 (95)	19:48	20:19	20:48	21:07	20:59	20:24	19:33	18:46	17:14			17:13
23	07:51		07:18		08:12 (95)	07:35	06:46	06:13	06:06	06:24	06:53	07:23	07:53	07:28			07:54
	17:42	6	18:19		08:18 (95)	19:49	20:20	20:49	21:07	20:59	20:23	19:31	18:45	17:13			17:13
24	07:51		07:17		08:11 (95)	07:33	06:45	06:13	06:06	06:25	06:54	07:24	07:54	07:30			07:55
	17:43	8	18:20		08:19 (95)	19:50	20:21	20:50	21:08	20:58	20:21	19:30	18:43	17:13			17:14
25	07:50		07:15		08:10 (95)	07:31	06:44	06:12	06:07	06:26	06:55	07:24	07:55	07:31			07:55
	17:45	10	18:21		08:20 (95)	19:51	20:22	20:51	21:08	20:57	20:20	19:28	18:42	17:12			17:14
26	07:49		07:14		08:10 (95)	07:30	06:42	06:11	06:07	06:27	06:56	07:25	07:56	07:32			07:55
	17:46	12	18:22		08:22 (95)	19:52	20:23	20:52	21:08	20:56	20:18	19:26	18:41	17:12			17:15
27	07:48		07:12		08:09 (95)	07:28	06:41	06:11	06:07	06:28	06:57	07:26	07:58	07:33			07:56
	17:47	14	18:24		08:23 (95)	19:53	20:24	20:53	21:08	20:55	20:17	19:25	18:39	17:11			17:16
28	07:48		07:11		08:08 (95)	07:26	06:39	06:10	06:08	06:29	06:58	07:27	07:59	07:34			07:56
	17:48	15	18:25		08:23 (95)	19:54	20:25	20:54	21:08	20:54	20:15	19:23	18:38	17:11			17:16
29	07:47				08:07 (95)	07:25	06:38	06:09	06:08	06:29	06:59	07:28	08:00	07:35			07:56
	17:49	17			08:24 (95)	19:55	20:26	20:54	21:08	20:53	20:14	19:22	18:37	17:11			17:17
30	07:46				08:06 (95)	07:23	06:37	06:09	06:08	06:30	07:00	07:29	08:01	07:36			07:57
	17:51	18			08:24 (95)	19:56	20:27	20:55	21:08	20:53	20:12	19:20	18:36	17:10			17:18
31	07:45				08:05 (95)	07:22		06:08		06:31	07:01		08:02				07:57
	17:52	19			08:24 (95)	19:57		20:56		20:52	20:11		18:34				17:18
Potential sun hours	300		299			370	397	446	449	456	426	374	346	300			291
Total, worst case		123			161										285		
Sun reduction		0.36			0.42										0.37		
Oper. time red.		1.00			1.00										1.00		
Wind dir. red.		0.62			0.62										0.62		
Total reduction		0.22			0.26										0.23		
Total, real		27			42										65		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 2

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 339 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5529)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:55 (131)	07:44		09:08 (131)	07:10			07:20		07:42 (80)	06:36			06:08		06:31 (79)
	17:20	66	10:01 (131)	17:53	58	10:06 (131)	18:26			19:59	35	19:22 (86)	20:28			20:57	30	07:01 (79)
2	07:57		08:55 (131)	07:43		09:09 (131)	07:08			07:19		07:41 (80)	06:35			06:08		06:31 (79)
	17:21	66	10:01 (131)	17:54	56	10:05 (131)	18:27			20:00	31	08:12 (80)	20:29			20:58	30	07:01 (79)
3	07:57		08:56 (131)	07:43		09:10 (131)	07:07			07:17		07:41 (80)	06:33			06:07		06:31 (79)
	17:21	66	10:02 (131)	17:56	54	10:04 (131)	18:28			20:00	32	08:13 (80)	20:30			20:58	31	07:02 (79)
4	07:57		08:56 (131)	07:42		09:11 (131)	07:05			07:15		07:40 (80)	06:32			06:07		06:31 (79)
	17:22	66	10:02 (131)	17:57	52	10:03 (131)	18:29			20:01	32	08:12 (80)	20:31			20:59	30	07:01 (79)
5	07:57		08:56 (131)	07:40		09:12 (131)	07:03			07:14		07:39 (80)	06:31			06:07		06:31 (79)
	17:23	67	10:03 (131)	17:58	50	10:02 (131)	18:30			20:02	32	08:11 (80)	20:32			21:00	31	07:02 (79)
6	07:57		08:57 (131)	07:39		09:13 (131)	07:02			07:12		07:40 (80)	06:30			06:06		06:32 (79)
	17:24	66	10:03 (131)	17:59	48	10:01 (131)	18:32			20:03	32	08:12 (80)	20:33			21:00	30	07:02 (79)
7	07:57		08:57 (131)	07:38		09:15 (131)	07:00			07:11		07:39 (80)	06:29			06:06		06:32 (79)
	17:25	67	10:04 (131)	18:00	45	10:00 (131)	18:33			20:04	31	08:10 (80)	20:34			21:01	31	07:03 (79)
8	07:57		08:58 (131)	07:37		07:58 (90)	07:59			07:09		07:40 (80)	06:27			06:06		06:32 (79)
	17:26	67	10:05 (131)	18:02	53	09:59 (131)	19:34			20:05	30	08:10 (80)	20:35			21:02	30	07:02 (79)
9	07:57		08:58 (131)	07:36		07:56 (90)	07:57			07:07		07:40 (80)	06:26			06:06		06:32 (79)
	17:27	67	10:05 (131)	18:03	54	09:57 (131)	19:35			20:06	29	08:09 (80)	20:36			21:02	30	07:02 (79)
10	07:57		08:58 (131)	07:35		07:55 (90)	07:56			07:06		07:41 (80)	06:25			06:06		06:32 (79)
	17:28	67	10:05 (131)	18:04	53	09:55 (131)	19:36			20:07	27	08:08 (80)	20:37			21:03	31	07:03 (79)
11	07:57		08:58 (131)	07:34		07:53 (90)	07:54			07:04		07:41 (80)	06:24			06:05		06:33 (79)
	17:29	68	10:06 (131)	18:05	51	09:52 (131)	19:37			20:08	26	08:07 (80)	20:38			21:03	30	07:03 (79)
12	07:57		08:59 (131)	07:33		07:52 (90)	07:53			07:03		07:42 (80)	06:23			06:05		06:33 (79)
	17:30	68	10:07 (131)	18:06	48	09:49 (131)	19:38			20:09	23	08:05 (80)	20:39			21:04	30	07:03 (79)
13	07:56		08:59 (131)	07:31		07:51 (90)	07:51			07:01		07:43 (80)	06:22			06:05		06:33 (79)
	17:31	67	10:06 (131)	18:08	42	09:45 (131)	19:39			20:10	20	08:03 (80)	20:40			21:04	30	07:03 (79)
14	07:56		08:59 (131)	07:30		07:51 (90)	07:49			07:00		07:45 (80)	06:21			06:05		06:34 (79)
	17:32	68	10:07 (131)	18:09	26	08:17 (90)	19:40			20:11	15	08:00 (80)	20:41			21:05	29	07:03 (79)
15	07:56		09:00 (131)	07:29		07:50 (90)	07:48			06:58		07:48 (80)	06:20			06:05		06:34 (79)
	17:33	68	10:08 (131)	18:10	26	08:16 (90)	19:41			20:12	9	07:57 (80)	20:42			21:05	30	07:04 (79)
16	07:55		09:00 (131)	07:28		07:50 (90)	07:46			06:57			06:19		06:40 (79)	06:05		06:34 (79)
	17:34	68	10:08 (131)	18:11	27	08:17 (90)	19:42			20:13			20:43	9	06:49 (79)	21:06	30	07:04 (79)
17	07:55		09:01 (131)	07:26		07:50 (90)	07:45			06:55			06:18		06:39 (79)	06:05		06:34 (79)
	17:36	67	10:08 (131)	18:12	27	08:17 (90)	19:43			20:14			20:44	13	06:52 (79)	21:06	30	07:04 (79)
18	07:54		09:01 (131)	07:25		07:49 (90)	07:43			06:54			06:17		06:38 (79)	06:05		06:34 (79)
	17:37	67	10:08 (131)	18:14	27	08:16 (90)	19:44			20:15			20:45	16	06:54 (79)	21:06	30	07:04 (79)
19	07:54		09:02 (131)	07:24		07:50 (90)	07:41		19:18 (86)	06:52			06:17		06:37 (79)	06:05		06:34 (79)
	17:38	67	10:09 (131)	18:15	26	08:16 (90)	19:45	6	19:24 (86)	20:16			20:46	18	06:55 (79)	21:07	30	07:04 (79)
20	07:53		09:02 (131)	07:22		07:50 (90)	07:40		19:16 (86)	06:51			06:16		06:36 (79)	06:06		06:34 (79)
	17:39	67	10:09 (131)	18:16	26	08:16 (90)	19:46	9	19:25 (86)	20:17			20:47	19	06:55 (79)	21:07	30	07:04 (79)
21	07:53		09:02 (131)	07:21		07:50 (90)	07:38		19:14 (86)	06:49			06:15		06:35 (79)	06:06		06:35 (79)
	17:40	66	10:08 (131)	18:17	25	08:15 (90)	19:47	13	19:27 (86)	20:18			20:48	21	06:56 (79)	21:07	30	07:05 (79)
22	07:52		09:03 (131)	07:20		07:51 (90)	07:36		19:13 (86)	06:48			06:14		06:35 (79)	06:06		06:35 (79)
	17:41	66	10:09 (131)	18:18	23	08:14 (90)	19:48	14	19:27 (86)	20:19			20:49	22	06:57 (79)	21:07	30	07:05 (79)
23	07:52		09:03 (131)	07:18		07:52 (90)	07:35		19:11 (86)	06:46			06:13		06:34 (79)	06:06		06:35 (79)
	17:42	66	10:09 (131)	18:19	21	08:13 (90)	19:49	17	19:28 (86)	20:20			20:49	24	06:58 (79)	21:08	30	07:05 (79)
24	07:51		09:03 (131)	07:17		07:54 (90)	07:33		19:11 (86)	06:45			06:13		06:33 (79)	06:06		06:35 (79)
	17:44	66	10:09 (131)	18:20	18	08:12 (90)	19:50	19	19:30 (86)	20:21			20:50	25	06:58 (79)	21:08	30	07:05 (79)
25	07:50		09:03 (131)	07:15		07:56 (90)	07:32		19:11 (86)	06:44			06:12		06:33 (79)	06:07		06:36 (79)
	17:45	65	10:08 (131)	18:22	14	08:10 (90)	19:51	19	19:30 (86)	20:22			20:51	26	06:59 (79)	21:08	30	07:06 (79)
26	07:49		09:05 (131)	07:14		07:59 (90)	07:30		07:54 (80)	06:42			06:11		06:32 (79)	06:07		06:36 (79)
	17:46	64	10:09 (131)	18:23	7	08:06 (90)	19:53	32	19:32 (86)	20:23			20:52	27	06:59 (79)	21:08	30	07:06 (79)
27	07:49		09:05 (131)	07:12			07:28		07:50 (80)	06:41			06:11		06:32 (79)	06:07		06:36 (79)
	17:47	64	10:09 (131)	18:24			19:54	38	19:32 (86)	20:24			20:53	28	07:00 (79)	21:08	30	07:06 (79)
28	07:48		09:06 (131)	07:11			07:27		07:48 (80)	06:40			06:10		06:31 (79)	06:08		06:37 (79)
	17:48	62	10:08 (131)	18:25			19:55	41	19:30 (86)	20:25			20:54	29	07:00 (79)	21:08	29	07:06 (79)
29	07:47		09:06 (131)				07:25		07:46 (80)	06:38			06:10		06:31 (79)	06:08		06:36 (79)
	17:50	62	10:08 (131)				19:56	43	19:30 (86)	20:26			20:54	30	07:01 (79)	21:08	30	07:06 (79)
30	07:46		09:07 (131)				07:23		07:44 (80)	06:37			06:09		06:31 (79)	06:09		06:37 (79)
	17:51	60	10:07 (131)				19:57	43	19:28 (86)	20:27			20:55	30	07:01 (79)	21:08	30	07:07 (79)
31	07:45		09:07 (131)				07:22		07:43 (80)				06:09		06:31 (79)			
	17:52	59	10:06 (131)				19:58	40	19:25 (86)				20:56	30	07:01 (79)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		2040			957			334			404			367			902	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.61			0.62			0.66			0.66			0.68			0.68	
Total reduction		0.22			0.26			0.29			0.34			0.38			0.41	
Total, real		442			246			97			135			139			367	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 3

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 339 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5529)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:37 (79)	06:32			07:02		07:40 (80)	07:31			07:03		07:24 (90)	07:37		08:40 (131)
	21:08	30	07:07 (79)	20:51			20:09	26	08:06 (80)	19:18			17:33	53	09:24 (131)	17:10	68	09:48 (131)
2	06:10		06:38 (79)	06:33			07:03		07:39 (80)	07:32			07:05		07:26 (90)	07:38		08:41 (131)
	21:08	30	07:08 (79)	20:50			20:08	27	08:06 (80)	19:17			17:32	54	09:27 (131)	17:10	67	09:48 (131)
3	06:10		06:37 (79)	06:34			07:04		07:38 (80)	07:33			07:06		07:28 (90)	07:39		08:41 (131)
	21:08	30	07:07 (79)	20:49			20:06	29	08:07 (80)	19:15			17:31	53	09:29 (131)	17:10	68	09:49 (131)
4	06:11		06:38 (79)	06:35			07:05		07:37 (80)	07:34			08:44 (131)			07:40		08:42 (131)
	21:08	30	07:08 (79)	20:48			20:05	30	08:07 (80)	19:14			17:30	46	09:30 (131)	17:10	67	09:49 (131)
5	06:11		06:37 (79)	06:36			07:06		07:36 (80)	07:35			07:08		08:43 (131)	07:41		08:42 (131)
	21:08	31	07:08 (79)	20:46			20:03	32	08:08 (80)	19:12			17:29	48	09:31 (131)	17:09	67	09:49 (131)
6	06:12		06:38 (79)	06:37			07:07		07:36 (80)	07:36			07:09		08:42 (131)	07:42		08:43 (131)
	21:07	30	07:08 (79)	20:45			20:01	32	08:08 (80)	19:10			17:28	50	09:32 (131)	17:09	67	09:50 (131)
7	06:12		06:38 (79)	06:38			07:08		07:36 (80)	07:37			07:10		08:42 (131)	07:43		08:43 (131)
	21:07	30	07:08 (79)	20:44			20:00	31	08:07 (80)	19:09			17:27	52	09:34 (131)	17:09	67	09:50 (131)
8	06:13		06:38 (79)	06:39			07:09		07:34 (80)	07:38			07:11		08:41 (131)	07:44		08:44 (131)
	21:07	31	07:09 (79)	20:43			19:56	32	08:06 (80)	19:07			17:25	54	09:35 (131)	17:09	66	09:50 (131)
9	06:14		06:39 (79)	06:40			07:09		07:34 (80)	07:39			07:13		08:40 (131)	07:45		08:45 (131)
	21:07	30	07:09 (79)	20:42			19:55	32	08:06 (80)	19:06			17:24	56	09:36 (131)	17:09	66	09:51 (131)
10	06:14		06:38 (79)	06:41			07:10		07:34 (80)	07:40			07:14		08:39 (131)	07:46		08:45 (131)
	21:06	31	07:09 (79)	20:41			19:53	31	08:05 (80)	19:04			17:23	58	09:37 (131)	17:09	66	09:51 (131)
11	06:15		06:39 (79)	06:42			07:11		07:34 (80)	07:41			07:15		08:39 (131)	07:46		08:45 (131)
	21:06	30	07:09 (79)	20:39			19:52	34	19:14 (86)	19:03			17:23	59	09:38 (131)	17:09	66	09:51 (131)
12	06:16		06:39 (79)	06:43			07:12		07:35 (80)	07:42			07:16		08:38 (131)	07:47		08:46 (131)
	21:05	31	07:10 (79)	20:38			19:50	40	19:17 (86)	19:01			17:22	61	09:39 (131)	17:10	65	09:51 (131)
13	06:16		06:39 (79)	06:44			07:13		07:35 (80)	07:43			07:17		08:38 (131)	07:48		08:47 (131)
	21:05	30	07:09 (79)	20:37			19:48	42	19:19 (86)	18:59			17:21	62	09:40 (131)	17:10	65	09:52 (131)
14	06:17		06:39 (79)	06:45			07:14		07:36 (80)	07:44			07:18		08:37 (131)	07:49		08:47 (131)
	21:05	30	07:09 (79)	20:35			19:47	43	19:20 (86)	18:58			17:20	63	09:40 (131)	17:10	66	09:53 (131)
15	06:18		06:40 (79)	06:46			07:15		07:37 (80)	07:45			07:20		08:38 (131)	07:50		08:47 (131)
	21:04	29	07:09 (79)	20:34			19:45	42	19:21 (86)	18:56			17:19	64	09:42 (131)	17:10	65	09:52 (131)
16	06:19		06:40 (79)	06:47			07:16		07:39 (80)	07:46		08:29 (90)	07:21		08:38 (131)	07:50		08:48 (131)
	21:03	29	07:09 (79)	20:33			19:43	39	19:21 (86)	18:55	11	08:40 (90)	17:18	64	09:42 (131)	17:10	65	09:53 (131)
17	06:19		06:41 (79)	06:48			07:17		07:42 (80)	07:47		08:27 (90)	07:22		08:37 (131)	07:51		08:49 (131)
	21:03	28	07:09 (79)	20:31			19:42	33	19:20 (86)	18:53	15	08:42 (90)	17:17	65	09:42 (131)	17:11	65	09:54 (131)
18	06:20		06:42 (79)	06:49			07:18		18:59 (86)	07:48		08:25 (90)	07:23		08:37 (131)	07:52		08:49 (131)
	21:02	27	07:09 (79)	20:30			19:40	20	19:19 (86)	18:52	19	08:44 (90)	17:17	66	09:43 (131)	17:11	65	09:54 (131)
19	06:21		06:43 (79)	06:49			07:19		18:59 (86)	07:49		08:23 (90)	07:24		08:37 (131)	07:52		08:50 (131)
	21:02	26	07:09 (79)	20:29			19:38	18	19:17 (86)	18:51	22	08:45 (90)	17:16	66	09:43 (131)	17:11	64	09:54 (131)
20	06:22		06:44 (79)	06:50			07:20		18:58 (86)	07:50		08:22 (90)	07:25		08:38 (131)	07:53		08:50 (131)
	21:01	24	07:08 (79)	20:27			19:37	17	19:15 (86)	18:49	23	08:45 (90)	17:15	66	09:44 (131)	17:12	64	09:54 (131)
21	06:23		06:44 (79)	06:51			07:21		18:58 (86)	07:51		08:21 (90)	07:26		08:38 (131)	07:53		08:51 (131)
	21:00	23	07:07 (79)	20:26			19:35	15	19:13 (86)	18:48	25	08:46 (90)	17:15	66	09:44 (131)	17:12	64	09:55 (131)
22	06:23		06:45 (79)	06:52			07:22		18:58 (86)	07:52		08:20 (90)	07:28		08:38 (131)	07:54		08:51 (131)
	21:00	22	07:07 (79)	20:24			19:33	13	19:11 (86)	18:46	26	08:46 (90)	17:14	67	09:45 (131)	17:13	64	09:55 (131)
23	06:24		06:46 (79)	06:53			07:23		18:59 (86)	07:53		08:20 (90)	07:29		08:38 (131)	07:54		08:52 (131)
	20:59	20	07:06 (79)	20:23			19:32	11	19:10 (86)	18:45	27	08:47 (90)	17:14	67	09:45 (131)	17:13	64	09:56 (131)
24	06:25		06:47 (79)	06:54			07:24		19:01 (86)	07:54		08:20 (90)	07:30		08:38 (131)	07:55		08:52 (131)
	20:58	19	07:06 (79)	20:21			19:30	7	19:08 (86)	18:44	27	08:47 (90)	17:13	67	09:45 (131)	17:14	64	09:56 (131)
25	06:26		06:48 (79)	06:55			07:25		19:05 (86)	07:56		08:20 (90)	07:31		08:38 (131)	07:55		08:53 (131)
	20:57	17	07:05 (79)	20:20			19:28	2	19:06 (86)	18:42	27	08:47 (90)	17:12	67	09:45 (131)	17:14	64	09:57 (131)
26	06:27		06:49 (79)	06:56			07:26			07:57		08:19 (90)	07:32		08:39 (131)	07:56		08:53 (131)
	20:56	15	07:04 (79)	20:18			19:27			18:41	27	08:46 (90)	17:12	68	09:47 (131)	17:15	65	09:58 (131)
27	06:28		06:49 (79)	06:57			07:27			07:58		08:19 (90)	07:33		08:39 (131)	07:56		08:53 (131)
	20:55	12	07:01 (79)	20:17			19:25			18:40	27	08:46 (90)	17:12	68	09:47 (131)	17:16	65	09:58 (131)
28	06:29		06:52 (79)	06:58		07:49 (80)	07:28			07:59		08:20 (90)	07:34		08:40 (131)	07:56		08:54 (131)
	20:55	6	06:58 (79)	20:15	10	07:59 (80)	19:23			18:38	28	10:07 (131)	17:11	67	09:47 (131)	17:16	65	09:59 (131)
29	06:30			06:59		07:45 (80)	07:29			08:00		08:21 (90)	07:35		08:40 (131)	07:56		08:54 (131)
	20:54			20:14	17	08:02 (80)	19:22			18:37	43	10:16 (131)	17:11	67	09:47 (131)	17:17	65	09:59 (131)
30	06:31			07:00		07:43 (80)	07:30			08:01		08:22 (90)	07:36		08:40 (131)	07:57		08:55 (131)
	20:53			20:12	20	08:03 (80)	19:20			18:36	49	10:20 (131)	17:10	68	09:48 (131)	17:18	65	10:00 (131)
31	06:31			07:01		07:41 (80)				08:02		08:23 (90)				07:57		08:55 (131)
	20:52			20:11	24	08:05 (80)				18:34	51	10:22 (131)				17:19	65	10:00 (131)
Potential sun hours	456			426			374			346			300			291		
Total, worst case		721			71			678			447			1832			2029	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.68			0.66			0.66			0.62			0.61			0.61	
Total reduction		0.41			0.39			0.40			0.35			0.22			0.30	
Total, real		293			28			272			155			409			611	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 4

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 340 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5530)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:43 (131)	07:44		08:49 (131)	07:10			07:20		07:42 (80)	06:36			06:08		06:34 (79)
	17:20	52	09:35 (131)	17:53	59	09:48 (131)	18:26			19:59	39	19:24 (86)	20:28			20:57	28	07:02 (79)
2	07:57		08:43 (131)	07:43		08:50 (131)	07:08			07:19		07:41 (80)	06:35			06:08		06:35 (79)
	17:21	53	09:36 (131)	17:54	57	09:47 (131)	18:27			20:00	29	08:10 (80)	20:29			20:58	28	07:03 (79)
3	07:57		08:43 (131)	07:43		08:51 (131)	07:07			07:17		07:41 (80)	06:33			06:07		06:35 (79)
	17:21	53	09:36 (131)	17:56	56	09:47 (131)	18:28			20:00	30	08:11 (80)	20:30			20:58	28	07:03 (79)
4	07:57		08:44 (131)	07:42		08:51 (131)	07:05			07:15		07:40 (80)	06:32			06:07		06:35 (79)
	17:22	53	09:37 (131)	17:57	56	09:47 (131)	18:29			20:01	30	08:10 (80)	20:31			20:59	27	07:02 (79)
5	07:57		08:44 (131)	07:40		08:52 (131)	07:03			07:14		07:39 (80)	06:31			06:07		06:36 (79)
	17:23	54	09:38 (131)	17:58	54	09:46 (131)	18:30			20:02	30	08:09 (80)	20:32			21:00	27	07:03 (79)
6	07:57		08:44 (131)	07:39		08:53 (131)	07:02			07:12		07:40 (80)	06:30			06:06		06:36 (79)
	17:24	55	09:39 (131)	17:59	52	09:45 (131)	18:32			20:03	29	08:09 (80)	20:33			21:00	27	07:03 (79)
7	07:57		08:44 (131)	07:38		08:54 (131)	07:00			07:11		07:40 (80)	06:29			06:06		06:37 (79)
	17:25	56	09:40 (131)	18:00	51	09:45 (131)	18:33			20:04	28	08:08 (80)	20:34			21:01	26	07:03 (79)
8	07:57		08:45 (131)	07:37		08:55 (131)	07:59			07:09		07:41 (80)	06:27			06:06		06:36 (79)
	17:26	55	09:40 (131)	18:02	49	09:44 (131)	19:34			20:05	27	08:08 (80)	20:35			21:02	26	07:02 (79)
9	07:57		08:45 (131)	07:36		08:56 (131)	07:57			07:07		07:41 (80)	06:26			06:06		06:37 (79)
	17:27	56	09:41 (131)	18:03	47	09:43 (131)	19:35			20:06	25	08:06 (80)	20:36			21:02	25	07:02 (79)
10	07:57		08:44 (131)	07:35		07:56 (90)	07:56			07:06		07:42 (80)	06:25			06:06		06:37 (79)
	17:28	57	09:41 (131)	18:04	53	09:42 (131)	19:36			20:07	23	08:05 (80)	20:37			21:03	25	07:02 (79)
11	07:57		08:45 (131)	07:34		07:53 (90)	07:54			07:04		07:42 (80)	06:24			06:05		06:38 (79)
	17:29	57	09:42 (131)	18:05	55	09:40 (131)	19:37			20:08	21	08:03 (80)	20:38			21:03	25	07:03 (79)
12	07:57		08:45 (131)	07:33		07:52 (90)	07:53			07:03		07:44 (80)	06:23		06:43 (79)	06:05		06:38 (79)
	17:30	58	09:43 (131)	18:06	55	09:38 (131)	19:38			20:09	17	08:01 (80)	20:39	9	06:52 (79)	21:04	25	07:03 (79)
13	07:56		08:45 (131)	07:31		07:51 (90)	07:51			07:01		07:46 (80)	06:22		06:42 (79)	06:05		06:39 (79)
	17:31	58	09:43 (131)	18:08	55	09:37 (131)	19:39			20:10	12	07:58 (80)	20:40	12	06:54 (79)	21:04	24	07:03 (79)
14	07:56		08:45 (131)	07:30		07:50 (90)	07:49			07:00			06:21		06:41 (79)	06:05		06:39 (79)
	17:32	59	09:44 (131)	18:09	53	09:35 (131)	19:40			20:11			20:41	15	06:56 (79)	21:05	24	07:03 (79)
15	07:56		08:46 (131)	07:29		07:48 (90)	07:48			06:58			06:20		06:40 (79)	06:05		06:40 (79)
	17:33	59	09:45 (131)	18:10	50	09:32 (131)	19:41			20:12			20:42	17	06:57 (79)	21:05	23	07:03 (79)
16	07:55		08:45 (131)	07:28		07:47 (90)	07:46			06:57			06:19		06:39 (79)	06:05		06:40 (79)
	17:34	60	09:45 (131)	18:11	46	09:29 (131)	19:42			20:13			20:43	19	06:58 (79)	21:06	23	07:03 (79)
17	07:55		08:46 (131)	07:26		07:47 (90)	07:45			06:55			06:18		06:39 (79)	06:05		06:40 (79)
	17:36	60	09:46 (131)	18:12	35	09:24 (131)	19:43			20:14			20:44	20	06:59 (79)	21:06	23	07:03 (79)
18	07:54		08:46 (131)	07:25		07:46 (90)	07:43			06:54			06:17		06:38 (79)	06:05		06:40 (79)
	17:37	60	09:46 (131)	18:14	26	08:12 (90)	19:44			20:15			20:45	22	07:00 (79)	21:06	23	07:03 (79)
19	07:54		08:46 (131)	07:24		07:46 (90)	07:41		19:17 (86)	06:52			06:17		06:37 (79)	06:05		06:40 (79)
	17:38	61	09:47 (131)	18:15	26	08:12 (90)	19:45	7	19:24 (86)	20:16			20:46	23	07:00 (79)	21:07	23	07:03 (79)
20	07:53		08:46 (131)	07:22		07:47 (90)	07:40		19:14 (86)	06:51			06:16		06:36 (79)	06:06		06:40 (79)
	17:39	61	09:47 (131)	18:16	25	08:12 (90)	19:46	11	19:25 (86)	20:17			20:47	24	07:00 (79)	21:07	23	07:03 (79)
21	07:53		08:46 (131)	07:21		07:46 (90)	07:38		19:13 (86)	06:49			06:15		06:35 (79)	06:06		06:41 (79)
	17:40	61	09:47 (131)	18:17	25	08:11 (90)	19:47	14	19:27 (86)	20:18			20:48	26	07:01 (79)	21:07	23	07:04 (79)
22	07:52		08:47 (131)	07:20		07:47 (90)	07:36		19:11 (86)	06:48			06:14		06:35 (79)	06:06		06:41 (79)
	17:41	61	09:48 (131)	18:18	24	08:11 (90)	19:48	16	19:27 (86)	20:19			20:49	27	07:02 (79)	21:07	23	07:04 (79)
23	07:52		08:47 (131)	07:18		07:47 (90)	07:35		19:10 (86)	06:46			06:13		06:34 (79)	06:06		06:41 (79)
	17:42	61	09:48 (131)	18:19	23	08:10 (90)	19:49	18	19:28 (86)	20:20			20:49	28	07:02 (79)	21:08	23	07:04 (79)
24	07:51		08:47 (131)	07:17		07:49 (90)	07:33		19:10 (86)	06:45			06:13		06:33 (79)	06:06		06:41 (79)
	17:44	61	09:48 (131)	18:20	20	08:09 (90)	19:50	20	19:30 (86)	20:21			20:50	28	07:01 (79)	21:08	23	07:04 (79)
25	07:50		08:47 (131)	07:15		07:50 (90)	07:32		19:09 (86)	06:44			06:12		06:34 (79)	06:07		06:42 (79)
	17:45	61	09:48 (131)	18:22	18	08:08 (90)	19:51	21	19:30 (86)	20:22			20:51	28	07:02 (79)	21:08	23	07:05 (79)
26	07:49		08:48 (131)	07:14		07:51 (90)	07:30		07:52 (80)	06:42			06:11		06:33 (79)	06:07		06:42 (79)
	17:46	61	09:49 (131)	18:23	15	08:06 (90)	19:53	35	19:32 (86)	20:23			20:52	29	07:02 (79)	21:08	23	07:05 (79)
27	07:49		08:48 (131)	07:12		07:55 (90)	07:28		07:49 (80)	06:41			06:11		06:34 (79)	06:07		06:42 (79)
	17:47	61	09:49 (131)	18:24	8	08:03 (90)	19:54	40	19:31 (86)	20:24			20:53	29	07:03 (79)	21:08	23	07:05 (79)
28	07:48		08:48 (131)	07:11			07:27		07:46 (80)	06:40			06:10		06:33 (79)	06:08		06:42 (79)
	17:48	61	09:49 (131)	18:25			19:55	43	19:30 (86)	20:25			20:54	29	07:02 (79)	21:08	24	07:06 (79)
29	07:47		08:48 (131)				07:25		07:45 (80)	06:38			06:10		06:34 (79)	06:08		06:42 (79)
	17:50	61	09:49 (131)				19:56	44	19:30 (86)	20:26			20:54	29	07:03 (79)	21:08	24	07:06 (79)
30	07:46		08:49 (131)				07:23		07:44 (80)	06:37			06:09		06:34 (79)	06:09		06:43 (79)
	17:51	59	09:48 (131)				19:57	44	19:28 (86)	20:27			20:55	28	07:02 (79)	21:08	24	07:07 (79)
31	07:45		08:49 (131)				07:22		07:42 (80)				06:09		06:34 (79)			
	17:52	59	09:48 (131)				19:58	43	19:26 (86)				20:56	29	07:03 (79)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		1804			1093			356			340			471			736	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.61			0.62			0.66			0.66			0.68			0.68	
Total reduction		0.22			0.26			0.29			0.34			0.38			0.41	
Total, real		392			280			103			114			179			299	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 5

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 340 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5530)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:42 (79)	06:32		06:55 (79)	07:02		07:41 (80)	07:31			07:03		07:25 (90)	07:37		08:27 (131)
	21:08	25	07:07 (79)	20:51	6	07:01 (79)	20:09	21	08:02 (80)	19:18			17:33	52	09:11 (131)	17:10	57	09:24 (131)
2	06:10		06:43 (79)	06:33			07:03		07:40 (80)	07:32			07:05		08:26 (131)	07:38		08:27 (131)
	21:08	25	07:08 (79)	20:50			20:08	23	08:03 (80)	19:17			17:32	47	09:13 (131)	17:10	57	09:24 (131)
3	06:10		06:42 (79)	06:34			07:04		07:39 (80)	07:33			07:06		08:24 (131)	07:39		08:28 (131)
	21:08	25	07:07 (79)	20:49			20:06	25	08:04 (80)	19:15			17:31	50	09:14 (131)	17:10	56	09:24 (131)
4	06:11		06:43 (79)	06:35			07:05		07:38 (80)	07:34			07:07		08:23 (131)	07:40		08:29 (131)
	21:08	25	07:08 (79)	20:48			20:05	27	08:05 (80)	19:14			17:30	52	09:15 (131)	17:10	55	09:24 (131)
5	06:11		06:42 (79)	06:36			07:06		07:37 (80)	07:35			07:08		08:23 (131)	07:41		08:29 (131)
	21:08	26	07:08 (79)	20:46			20:03	28	08:05 (80)	19:12			17:29	52	09:15 (131)	17:09	56	09:25 (131)
6	06:12		06:43 (79)	06:37			07:07		07:36 (80)	07:36			07:09		08:22 (131)	07:42		08:30 (131)
	21:07	26	07:09 (79)	20:45			20:01	29	08:05 (80)	19:10			17:28	54	09:16 (131)	17:09	55	09:25 (131)
7	06:12		06:42 (79)	06:38			07:08		07:35 (80)	07:37			07:10		08:22 (131)	07:43		08:31 (131)
	21:07	27	07:09 (79)	20:44			20:00	30	08:05 (80)	19:09			17:27	56	09:18 (131)	17:09	54	09:25 (131)
8	06:13		06:42 (79)	06:39			07:09		07:34 (80)	07:38			07:11		08:21 (131)	07:44		08:32 (131)
	21:07	27	07:09 (79)	20:43			19:56	30	08:04 (80)	19:07			17:25	57	09:18 (131)	17:09	53	09:25 (131)
9	06:14		06:43 (79)	06:40			07:09		07:34 (80)	07:39			07:13		08:21 (131)	07:45		08:32 (131)
	21:07	27	07:10 (79)	20:42			19:55	30	08:04 (80)	19:06			17:24	57	09:18 (131)	17:09	54	09:26 (131)
10	06:14		06:42 (79)	06:41			07:10		07:34 (80)	07:40			07:14		08:20 (131)	07:46		08:33 (131)
	21:06	28	07:10 (79)	20:41			19:53	29	08:03 (80)	19:04			17:23	59	09:19 (131)	17:09	53	09:26 (131)
11	06:15		06:42 (79)	06:42			07:11		07:34 (80)	07:41			07:15		08:21 (131)	07:46		08:33 (131)
	21:06	28	07:10 (79)	20:39			19:52	39	19:16 (86)	19:03			17:23	59	09:20 (131)	17:09	52	09:25 (131)
12	06:16		06:43 (79)	06:43			07:12		07:34 (80)	07:42			07:16		08:21 (131)	07:47		08:34 (131)
	21:05	28	07:11 (79)	20:38			19:50	42	19:18 (86)	19:01			17:22	59	09:20 (131)	17:10	52	09:26 (131)
13	06:16		06:42 (79)	06:44			07:13		07:35 (80)	07:43			07:17		08:20 (131)	07:48		08:35 (131)
	21:05	29	07:11 (79)	20:37			19:48	43	19:19 (86)	18:59			17:21	60	09:20 (131)	17:10	51	09:26 (131)
14	06:17		06:42 (79)	06:45			07:14		07:35 (80)	07:44			07:18		08:20 (131)	07:49		08:36 (131)
	21:05	29	07:11 (79)	20:35			19:47	45	19:20 (86)	18:58			17:20	61	09:21 (131)	17:10	51	09:27 (131)
15	06:18		06:43 (79)	06:46			07:15		07:36 (80)	07:45		08:26 (90)	07:20		08:21 (131)	07:50		08:36 (131)
	21:04	29	07:12 (79)	20:34			19:45	43	19:20 (86)	18:56	11	08:37 (90)	17:19	61	09:22 (131)	17:10	50	09:26 (131)
16	06:19		06:42 (79)	06:47			07:16		07:38 (80)	07:46		08:23 (90)	07:21		08:21 (131)	07:50		08:37 (131)
	21:03	29	07:11 (79)	20:33			19:43	41	19:21 (86)	18:55	16	08:39 (90)	17:18	61	09:22 (131)	17:10	50	09:27 (131)
17	06:19		06:43 (79)	06:48			07:17		07:40 (80)	07:47		08:21 (90)	07:22		08:21 (131)	07:51		08:37 (131)
	21:03	28	07:11 (79)	20:31			19:42	36	19:20 (86)	18:53	19	08:40 (90)	17:17	61	09:22 (131)	17:11	51	09:28 (131)
18	06:20		06:43 (79)	06:49			07:18		07:44 (80)	07:48		08:20 (90)	07:23		08:21 (131)	07:52		08:37 (131)
	21:02	29	07:12 (79)	20:30			19:40	26	19:19 (86)	18:52	21	08:41 (90)	17:17	61	09:22 (131)	17:11	50	09:27 (131)
19	06:21		06:43 (79)	06:49			07:19		18:57 (86)	07:49		08:19 (90)	07:24		08:21 (131)	07:52		08:38 (131)
	21:02	29	07:12 (79)	20:29			19:38	20	19:17 (86)	18:51	23	08:42 (90)	17:16	61	09:22 (131)	17:11	50	09:28 (131)
20	06:22		06:44 (79)	06:50			07:20		18:56 (86)	07:50		08:18 (90)	07:25		08:22 (131)	07:53		08:38 (131)
	21:01	28	07:12 (79)	20:27			19:37	19	19:15 (86)	18:49	24	08:42 (90)	17:15	61	09:23 (131)	17:12	50	09:28 (131)
21	06:23		06:44 (79)	06:51			07:21		18:57 (86)	07:51		08:17 (90)	07:26		08:22 (131)	07:53		08:39 (131)
	21:00	27	07:11 (79)	20:26			19:35	16	19:13 (86)	18:48	25	08:42 (90)	17:15	61	09:23 (131)	17:12	50	09:29 (131)
22	06:23		06:45 (79)	06:52			07:22		18:57 (86)	07:52		08:16 (90)	07:28		08:22 (131)	07:54		08:39 (131)
	21:00	26	07:11 (79)	20:24			19:33	14	19:11 (86)	18:46	26	08:42 (90)	17:14	61	09:23 (131)	17:13	50	09:29 (131)
23	06:24		06:46 (79)	06:53			07:23		18:58 (86)	07:53		08:17 (90)	07:29		08:22 (131)	07:54		08:40 (131)
	20:59	25	07:11 (79)	20:23			19:32	12	19:10 (86)	18:45	26	08:43 (90)	17:14	61	09:23 (131)	17:13	50	09:30 (131)
24	06:25		06:47 (79)	06:54			07:24		19:00 (86)	07:54		08:17 (90)	07:30		08:23 (131)	07:55		08:40 (131)
	20:58	24	07:11 (79)	20:21			19:30	8	19:08 (86)	18:44	26	08:43 (90)	17:13	60	09:23 (131)	17:14	50	09:30 (131)
25	06:26		06:48 (79)	06:55			07:25		19:03 (86)	07:56		08:17 (90)	07:31		08:23 (131)	07:55		08:41 (131)
	20:57	23	07:11 (79)	20:20			19:28	3	19:06 (86)	18:42	38	09:55 (131)	17:12	60	09:23 (131)	17:14	50	09:31 (131)
26	06:27		06:49 (79)	06:56			07:26			07:57		08:17 (90)	07:32		08:24 (131)	07:56		08:41 (131)
	20:56	21	07:10 (79)	20:18			19:27			18:41	46	09:59 (131)	17:12	60	09:24 (131)	17:15	50	09:31 (131)
27	06:28		06:49 (79)	06:57			07:27			07:58		08:18 (90)	07:33		08:25 (131)	07:56		08:42 (131)
	20:55	20	07:09 (79)	20:17			19:25			18:40	51	10:02 (131)	17:12	59	09:24 (131)	17:16	50	09:32 (131)
28	06:29		06:50 (79)	06:58			07:28			07:59		08:19 (90)	07:34		08:25 (131)	07:56		08:43 (131)
	20:55	18	07:08 (79)	20:15			19:23			18:38	52	10:04 (131)	17:11	59	09:24 (131)	17:16	50	09:33 (131)
29	06:30		06:51 (79)	06:59			07:29			08:00		08:21 (90)	07:35		08:26 (131)	07:56		08:43 (131)
	20:54	16	07:07 (79)	20:14			19:22			18:37	54	10:07 (131)	17:11	58	09:24 (131)	17:17	50	09:33 (131)
30	06:31		06:52 (79)	07:00		07:46 (80)	07:30			08:01		08:22 (90)	07:36		08:26 (131)	07:57		08:43 (131)
	20:53	14	07:06 (79)	20:12	12	07:58 (80)	19:20			18:36	56	10:09 (131)	17:10	58	09:24 (131)	17:18	51	09:34 (131)
31	06:31		06:53 (79)	07:01		07:43 (80)				08:02		08:23 (90)				07:57		08:43 (131)
	20:52	11	07:04 (79)	20:11	18	08:01 (80)				18:34	56	10:10 (131)				17:19	51	09:34 (131)
Potential sun hours	456			426			374			346			300			291		
Total, worst case		772			36			679			570			1738			1609	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.68			0.67			0.66			0.62			0.61			0.61	
Total reduction		0.41			0.40			0.40			0.35			0.22			0.30	
Total, real		314			14			272			197			388			485	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 6

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 341 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5531)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:33 (131)	07:44		08:40 (131)	07:10			07:20		07:51 (80)	06:36		06:55 (79)	06:08		
	17:20	40	09:13 (131)	17:53	45	09:25 (131)	18:26			19:59	22	08:13 (80)	20:28	13	07:08 (79)	20:57		
2	07:57		08:33 (131)	07:43		08:41 (131)	07:08			07:19		07:51 (80)	06:35		06:54 (79)	06:08		
	17:21	41	09:14 (131)	17:54	44	09:25 (131)	18:27			20:00	20	08:11 (80)	20:29	16	07:10 (79)	20:58		
3	07:57		08:34 (131)	07:43		08:42 (131)	07:07			07:17		07:53 (80)	06:33		06:53 (79)	06:07		
	17:21	41	09:15 (131)	17:56	42	09:24 (131)	18:28			20:00	17	08:10 (80)	20:30	18	07:11 (79)	20:58		
4	07:57		08:34 (131)	07:42		08:43 (131)	07:05			07:15		07:55 (80)	06:32		06:52 (79)	06:07		
	17:22	41	09:15 (131)	17:57	40	09:23 (131)	18:29			20:01	12	08:07 (80)	20:31	19	07:11 (79)	20:59		
5	07:57		08:34 (131)	07:40		08:44 (131)	07:03			07:14		07:59 (80)	06:31		06:50 (79)	06:07		
	17:23	42	09:16 (131)	17:58	39	09:23 (131)	18:30			20:02	2	08:01 (80)	20:32	21	07:11 (79)	21:00		
6	07:57		08:34 (131)	07:39		08:45 (131)	07:02			07:12			06:30		06:49 (79)	06:06		
	17:24	43	09:17 (131)	17:59	37	09:22 (131)	18:32			20:03			20:33	23	07:12 (79)	21:00		
7	07:57		08:34 (131)	07:38		08:47 (131)	07:00			07:11			06:29		06:48 (79)	06:06		
	17:25	44	09:18 (131)	18:00	34	09:21 (131)	18:33			20:04			20:34	24	07:12 (79)	21:01		
8	07:57		08:35 (131)	07:37		07:57 (90)	07:59			07:09			06:27		06:47 (79)	06:06		
	17:26	44	09:19 (131)	18:02	37	09:19 (131)	19:34			20:05			20:35	25	07:12 (79)	21:02		
9	07:57		08:35 (131)	07:36		07:56 (90)	07:57			07:07			06:26		06:46 (79)	06:06		
	17:27	45	09:20 (131)	18:03	38	09:18 (131)	19:35			20:06			20:36	26	07:12 (79)	21:02		
10	07:57		08:34 (131)	07:35		07:55 (90)	07:56			07:06			06:25		06:46 (79)	06:06		
	17:28	46	09:20 (131)	18:04	36	09:16 (131)	19:36			20:07			20:37	26	07:12 (79)	21:03		
11	07:57		08:35 (131)	07:34		07:53 (90)	07:54			07:04			06:24		06:46 (79)	06:05		
	17:29	46	09:21 (131)	18:05	32	09:12 (131)	19:37			20:08			20:38	26	07:12 (79)	21:03		
12	07:57		08:35 (131)	07:33		07:52 (90)	07:53			07:03			06:23		06:46 (79)	06:05		
	17:30	46	09:21 (131)	18:06	25	09:07 (131)	19:38			20:09			20:39	26	07:12 (79)	21:04		
13	07:56		08:34 (131)	07:31		07:51 (90)	07:51		19:11 (86)	07:01			06:22		06:46 (79)	06:05		
	17:31	47	09:21 (131)	18:08	20	08:11 (90)	19:39	7	19:18 (86)	20:10			20:40	25	07:11 (79)	21:04		
14	07:56		08:35 (131)	07:30		07:50 (90)	07:49		19:07 (86)	07:00			06:21		06:47 (79)	06:05		
	17:32	47	09:22 (131)	18:09	21	08:11 (90)	19:40	12	19:19 (86)	20:11			20:41	24	07:11 (79)	21:05		
15	07:56		08:36 (131)	07:29		07:48 (90)	07:48		19:06 (86)	06:58			06:20		06:47 (79)	06:05		
	17:33	47	09:23 (131)	18:10	23	08:11 (90)	19:41	15	19:21 (86)	20:12			20:42	23	07:10 (79)	21:05		
16	07:55		08:35 (131)	07:28		07:48 (90)	07:46		19:04 (86)	06:57			06:19		06:47 (79)	06:05		
	17:34	48	09:23 (131)	18:11	23	08:11 (90)	19:42	17	19:21 (86)	20:13			20:43	23	07:10 (79)	21:06		
17	07:55		08:36 (131)	07:26		07:48 (90)	07:45		19:03 (86)	06:55			06:18		06:49 (79)	06:05		
	17:36	49	09:25 (131)	18:12	23	08:11 (90)	19:43	19	19:22 (86)	20:14			20:44	21	07:10 (79)	21:06		
18	07:54		08:35 (131)	07:25		07:48 (90)	07:43		19:02 (86)	06:54			06:17		06:50 (79)	06:05		
	17:37	50	09:25 (131)	18:14	23	08:11 (90)	19:44	22	19:24 (86)	20:15			20:45	19	07:09 (79)	21:06		
19	07:54		08:36 (131)	07:24		07:48 (90)	07:41		08:03 (80)	06:52			06:17		06:50 (79)	06:05		
	17:38	50	09:26 (131)	18:15	22	08:10 (90)	19:45	29	19:24 (86)	20:16			20:46	18	07:08 (79)	21:07		
20	07:53		08:36 (131)	07:22		07:49 (90)	07:40		07:58 (80)	06:51			06:16		06:51 (79)	06:06		
	17:39	50	09:26 (131)	18:16	21	08:10 (90)	19:46	39	19:25 (86)	20:17			20:47	16	07:07 (79)	21:07		
21	07:53		08:36 (131)	07:21		07:50 (90)	07:38		07:57 (80)	06:49			06:15		06:52 (79)	06:06		
	17:40	49	09:25 (131)	18:17	18	08:08 (90)	19:47	43	19:26 (86)	20:18			20:48	13	07:05 (79)	21:07		
22	07:52		08:37 (131)	07:20		07:51 (90)	07:36		07:55 (80)	06:48			06:14		06:55 (79)	06:06		
	17:41	49	09:26 (131)	18:18	16	08:07 (90)	19:48	46	19:25 (86)	20:19			20:49	9	07:04 (79)	21:07		
23	07:52		08:37 (131)	07:18		07:52 (90)	07:35		07:53 (80)	06:46			06:13		06:59 (79)	06:06		
	17:42	49	09:26 (131)	18:19	13	08:05 (90)	19:49	47	19:24 (86)	20:20			20:49	2	07:00 (79)	21:08		
24	07:51		08:37 (131)	07:17		07:56 (90)	07:33		07:52 (80)	06:45			06:13			06:06		
	17:44	49	09:26 (131)	18:20	6	08:02 (90)	19:50	47	19:23 (86)	20:21			20:50			21:08		
25	07:50		08:37 (131)	07:15			07:32		07:51 (80)	06:44			06:12			06:07		
	17:45	49	09:26 (131)	18:22			19:52	47	19:22 (86)	20:22			20:51			21:08		
26	07:49		08:38 (131)	07:14			07:30		07:51 (80)	06:42			06:11			06:07		
	17:46	49	09:27 (131)	18:23			19:53	45	19:21 (86)	20:23			20:52			21:08		
27	07:49		08:38 (131)	07:12			07:28		07:50 (80)	06:41			06:11			06:07		
	17:47	49	09:27 (131)	18:24			19:54	41	19:18 (86)	20:24			20:53			21:08		
28	07:48		08:39 (131)	07:11			07:27		07:49 (80)	06:40			06:10			06:08		
	17:48	48	09:27 (131)	18:25			19:55	34	19:14 (86)	20:25			20:54			21:08		
29	07:47		08:39 (131)				07:25		07:50 (80)	06:38		06:58 (79)	06:10			06:08		
	17:50	47	09:26 (131)				19:56	26	08:16 (80)	20:26	6	07:04 (79)	20:54			21:08		
30	07:46		08:39 (131)				07:23		07:50 (80)	06:37		06:56 (79)	06:09			06:09		
	17:51	47	09:26 (131)				19:57	25	08:15 (80)	20:27	10	07:06 (79)	20:55			21:08		
31	07:45		08:40 (131)				07:22		07:50 (80)				06:09					
	17:52	46	09:26 (131)				19:58	24	08:14 (80)				20:56					
Potential sun hours	300			299			370			397			446			449		
Total, worst case		1438			678			585			89			456				
Sun reduction		0.36			0.42			0.44			0.51			0.56				
Oper. time red.		1.00			1.00			1.00			1.00			1.00				
Wind dir. red.		0.61			0.62			0.66			0.66			0.68				
Total reduction		0.22			0.26			0.29			0.33			0.38				
Total, real		312			174			169			30			172				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 7

Licensed user:
EDR
217 Montgomery St.
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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 341 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5531)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09			06:32		06:57 (79)	07:02			07:31			07:03		07:24 (90)	07:37		08:17 (131)
	21:08			20:51	25	07:22 (79)	20:09			19:18			17:33	36	08:45 (131)	17:10	46	09:03 (131)
2	06:10			06:33		06:57 (79)	07:03			07:32			07:05		07:26 (90)	07:38		08:17 (131)
	21:08			20:50	26	07:23 (79)	20:08			19:17			17:32	37	08:48 (131)	17:10	46	09:03 (131)
3	06:10			06:34		06:57 (79)	07:04			07:33			07:06		07:27 (90)	07:39		08:18 (131)
	21:08			20:49	26	07:23 (79)	20:06			19:15			17:31	36	08:49 (131)	17:10	45	09:03 (131)
4	06:11			06:35		06:57 (79)	07:05			07:34			07:07		08:16 (131)	07:40		08:19 (131)
	21:08			20:48	26	07:23 (79)	20:05			19:14			17:30	35	08:51 (131)	17:10	44	09:03 (131)
5	06:11			06:36		06:57 (79)	07:06			07:35			07:08		08:15 (131)	07:41		08:19 (131)
	21:08			20:46	25	07:22 (79)	20:03			19:12			17:29	37	08:52 (131)	17:09	44	09:03 (131)
6	06:12			06:37		06:58 (79)	07:07			07:36			07:09		08:14 (131)	07:42		08:20 (131)
	21:07			20:45	23	07:21 (79)	20:01			19:10			17:28	39	08:53 (131)	17:09	43	09:03 (131)
7	06:12			06:38		06:59 (79)	07:08			07:37			07:10		08:14 (131)	07:43		08:21 (131)
	21:07			20:44	22	07:21 (79)	20:00			19:09			17:27	40	08:54 (131)	17:09	42	09:03 (131)
8	06:13			06:39		07:00 (79)	07:09		07:49 (80)	07:38			07:11		08:13 (131)	07:44		08:22 (131)
	21:07			20:43	21	07:21 (79)	19:56	12	08:01 (80)	19:07			17:25	42	08:55 (131)	17:09	41	09:03 (131)
9	06:14			06:40		07:01 (79)	07:09		07:46 (80)	07:39			07:13		08:12 (131)	07:45		08:23 (131)
	21:07			20:42	19	07:20 (79)	19:55	17	08:03 (80)	19:06			17:24	44	08:56 (131)	17:09	41	09:04 (131)
10	06:14			06:41		07:02 (79)	07:10		07:45 (80)	07:40			07:14		08:11 (131)	07:46		08:23 (131)
	21:06			20:41	17	07:19 (79)	19:53	19	08:04 (80)	19:04			17:23	45	08:56 (131)	17:09	41	09:04 (131)
11	06:15			06:42		07:03 (79)	07:11		07:43 (80)	07:41			07:15		08:12 (131)	07:46		08:23 (131)
	21:06			20:39	15	07:18 (79)	19:52	22	08:05 (80)	19:03			17:23	46	08:58 (131)	17:09	40	09:03 (131)
12	06:16			06:43		07:04 (79)	07:12		07:42 (80)	07:42			07:16		08:11 (131)	07:47		08:24 (131)
	21:05			20:38	12	07:16 (79)	19:50	24	08:06 (80)	19:01			17:22	47	08:58 (131)	17:10	40	09:04 (131)
13	06:16			06:44		07:05 (79)	07:13		07:41 (80)	07:43			07:17		08:11 (131)	07:48		08:25 (131)
	21:05			20:37	9	07:14 (79)	19:48	25	08:06 (80)	18:59			17:21	47	08:58 (131)	17:10	39	09:04 (131)
14	06:17			06:45		07:06 (79)	07:14		07:40 (80)	07:44			07:18		08:10 (131)	07:49		08:26 (131)
	21:05			20:35	5	07:11 (79)	19:47	27	08:07 (80)	18:58			17:20	49	08:59 (131)	17:10	39	09:05 (131)
15	06:18			06:46			07:15		07:40 (80)	07:45			07:20		08:11 (131)	07:50		08:26 (131)
	21:04			20:34			19:45	31	19:03 (86)	18:56			17:19	49	09:00 (131)	17:10	38	09:04 (131)
16	06:19			06:47			07:16		07:39 (80)	07:46			07:21		08:11 (131)	07:50		08:27 (131)
	21:03			20:33			19:43	40	19:07 (86)	18:55			17:18	49	09:00 (131)	17:10	38	09:05 (131)
17	06:19			06:48			07:17		07:39 (80)	07:47			07:22		08:11 (131)	07:51		08:28 (131)
	21:03			20:31			19:42	44	19:09 (86)	18:53			17:17	49	09:00 (131)	17:11	37	09:05 (131)
18	06:20			06:49			07:18		07:39 (80)	07:48		08:26 (90)	07:23		08:11 (131)	07:52		08:28 (131)
	21:02			20:30			19:40	46	19:10 (86)	18:52	9	08:35 (90)	17:17	49	09:00 (131)	17:11	37	09:05 (131)
19	06:21			06:49			07:19		07:39 (80)	07:49		08:23 (90)	07:24		08:11 (131)	07:52		08:29 (131)
	21:02			20:29			19:38	47	19:10 (86)	18:51	14	08:37 (90)	17:16	49	09:00 (131)	17:11	37	09:06 (131)
20	06:22			06:50			07:20		07:39 (80)	07:50		08:21 (90)	07:25		08:12 (131)	07:53		08:29 (131)
	21:01			20:27			19:37	46	19:10 (86)	18:49	17	08:38 (90)	17:15	49	09:01 (131)	17:12	37	09:06 (131)
21	06:23		07:06 (79)	06:51			07:21		07:40 (80)	07:51		08:20 (90)	07:26		08:12 (131)	07:53		08:30 (131)
	21:00	6	07:12 (79)	20:26			19:35	45	19:10 (86)	18:48	19	08:39 (90)	17:15	49	09:01 (131)	17:12	37	09:07 (131)
22	06:23		07:04 (79)	06:52			07:22		07:41 (80)	07:52		08:19 (90)	07:28		08:12 (131)	07:54		08:30 (131)
	21:00	10	07:14 (79)	20:24			19:33	44	19:10 (86)	18:46	21	08:40 (90)	17:14	50	09:02 (131)	17:13	37	09:07 (131)
23	06:24		07:02 (79)	06:53			07:23		07:42 (80)	07:53		08:19 (90)	07:29		08:12 (131)	07:54		08:31 (131)
	20:59	14	07:16 (79)	20:23			19:32	40	19:10 (86)	18:45	22	08:41 (90)	17:14	50	09:02 (131)	17:13	37	09:08 (131)
24	06:25		07:01 (79)	06:54			07:24		07:45 (80)	07:54		08:18 (90)	07:30		08:13 (131)	07:55		08:31 (131)
	20:58	17	07:18 (79)	20:21			19:30	32	19:08 (86)	18:44	23	08:41 (90)	17:13	49	09:02 (131)	17:14	37	09:08 (131)
25	06:26		07:00 (79)	06:55			07:25		18:45 (86)	07:56		08:18 (90)	07:31		08:13 (131)	07:55		08:32 (131)
	20:57	19	07:19 (79)	20:20			19:28	21	19:06 (86)	18:42	23	08:41 (90)	17:12	49	09:02 (131)	17:15	37	09:09 (131)
26	06:27		07:00 (79)	06:56			07:26		18:45 (86)	07:57		08:18 (90)	07:32		08:14 (131)	07:56		08:32 (131)
	20:56	20	07:20 (79)	20:18			19:27	20	19:05 (86)	18:41	23	08:41 (90)	17:12	49	09:03 (131)	17:15	37	09:09 (131)
27	06:28		06:58 (79)	06:57			07:27		18:45 (86)	07:58		08:18 (90)	07:33		08:15 (131)	07:56		08:32 (131)
	20:55	22	07:20 (79)	20:17			19:25	18	19:03 (86)	18:40	23	08:41 (90)	17:12	48	09:03 (131)	17:16	38	09:10 (131)
28	06:29		06:58 (79)	06:58			07:28		18:46 (86)	07:59		08:19 (90)	07:34		08:15 (131)	07:56		08:33 (131)
	20:55	23	07:21 (79)	20:15			19:23	16	19:02 (86)	18:38	21	08:40 (90)	17:11	48	09:03 (131)	17:16	38	09:11 (131)
29	06:30		06:57 (79)	06:59			07:29		18:47 (86)	08:00		08:21 (90)	07:35		08:16 (131)	07:56		08:33 (131)
	20:54	24	07:21 (79)	20:14			19:22	13	19:00 (86)	18:37	19	08:40 (90)	17:11	47	09:03 (131)	17:17	38	09:11 (131)
30	06:31		06:57 (79)	07:00			07:30		18:49 (86)	08:01		08:22 (90)	07:36		08:16 (131)	07:57		08:33 (131)
	20:53	25	07:22 (79)	20:12			19:20	9	18:58 (86)	18:36	27	09:38 (131)	17:10	47	09:03 (131)	17:18	39	09:12 (131)
31	06:31		06:57 (79)	07:01						08:02		08:23 (90)				07:57		08:33 (131)
	20:52	25	07:22 (79)	20:11						18:34	33	09:42 (131)				17:19	39	09:12 (131)
Potential sun hours	456			426			374			346			300			291		
Total, worst case	205			271			658			294			1360			1229		
Sun reduction	0.60			0.60			0.61			0.56			0.37			0.50		
Oper. time red.	1.00			1.00			1.00			1.00			1.00			1.00		
Wind dir. red.	0.68			0.68			0.66			0.63			0.61			0.61		
Total reduction	0.40			0.40			0.40			0.35			0.22			0.30		
Total, real	83			109			263			103			304			371		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 8

Licensed user:
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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 342 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5532)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57			07:44		08:23 (131)	07:10		07:45 (90)	07:20		07:40 (80)	06:36			06:08		06:44 (79)
	17:20			17:53	50	09:13 (131)	18:26	12	07:57 (90)	19:59	45	19:27 (86)	20:28			20:57	15	06:59 (79)
2	07:57			07:43		08:23 (131)	07:08		07:48 (90)	07:19		07:39 (80)	06:35			06:08		06:45 (79)
	17:21			17:54	50	09:13 (131)	18:27	4	07:52 (90)	20:00	43	19:25 (86)	20:29			20:58	14	06:59 (79)
3	07:57			07:43		08:23 (131)	07:07			07:17		07:39 (80)	06:33			06:07		06:47 (79)
	17:21			17:56	51	09:14 (131)	18:28			20:00	38	19:23 (86)	20:30			20:58	11	06:58 (79)
4	07:57			07:42		08:23 (131)	07:05			07:15		07:39 (80)	06:32			06:07		06:47 (79)
	17:22			17:57	51	09:14 (131)	18:29			20:01	26	08:05 (80)	20:31			20:59	10	06:57 (79)
5	07:57			07:40		08:23 (131)	07:03			07:14		07:38 (80)	06:31			06:07		06:49 (79)
	17:23			17:58	51	09:14 (131)	18:30			20:02	26	08:04 (80)	20:32			21:00	7	06:56 (79)
6	07:57			07:39		08:23 (131)	07:02			07:12		07:39 (80)	06:30			06:06		
	17:24			17:59	51	09:14 (131)	18:32			20:03	25	08:04 (80)	20:33			21:00		
7	07:57			07:38		08:23 (131)	07:00			07:11		07:39 (80)	06:29		06:48 (79)	06:06		
	17:25			18:00	51	09:14 (131)	18:33			20:04	24	08:03 (80)	20:34	8	06:56 (79)	21:01		
8	07:57			07:37		08:24 (131)	07:59			07:09		07:40 (80)	06:27		06:47 (79)	06:06		
	17:26			18:02	51	09:15 (131)	19:34			20:05	22	08:02 (80)	20:35	11	06:58 (79)	21:02		
9	07:57			07:36		08:24 (131)	07:57			07:07		07:40 (80)	06:26		06:46 (79)	06:06		
	17:27			18:03	51	09:15 (131)	19:35			20:06	20	08:00 (80)	20:36	13	06:59 (79)	21:02		
10	07:57			07:35		08:24 (131)	07:56			07:06		07:42 (80)	06:25		06:45 (79)	06:06		
	17:28			18:04	51	09:15 (131)	19:36			20:07	17	07:59 (80)	20:37	16	07:01 (79)	21:03		
11	07:57			07:34		08:24 (131)	07:54			07:04		07:44 (80)	06:24		06:44 (79)	06:05		
	17:29			18:05	49	09:13 (131)	19:37			20:08	12	07:56 (80)	20:38	17	07:01 (79)	21:03		
12	07:57			07:33		08:25 (131)	07:53			07:03		07:48 (80)	06:23		06:43 (79)	06:05		
	17:30			18:06	48	09:13 (131)	19:38			20:09	3	07:51 (80)	20:39	19	07:02 (79)	21:04		
13	07:56		08:38 (131)	07:31		08:25 (131)	07:51			07:01			06:22		06:42 (79)	06:05		
	17:31	10	08:48 (131)	18:08	48	09:13 (131)	19:39			20:10			20:40	20	07:02 (79)	21:04		
14	07:56		08:36 (131)	07:30		08:26 (131)	07:49			07:00			06:21		06:41 (79)	06:05		
	17:32	16	08:52 (131)	18:09	47	09:13 (131)	19:40			20:11			20:41	22	07:03 (79)	21:05		
15	07:56		08:34 (131)	07:29		07:48 (90)	07:48			06:58			06:20		06:40 (79)	06:05		
	17:33	20	08:54 (131)	18:10	54	09:11 (131)	19:41			20:12			20:42	23	07:03 (79)	21:05		
16	07:55		08:32 (131)	07:28		07:47 (90)	07:46			06:57			06:19		06:39 (79)	06:05		
	17:34	24	08:56 (131)	18:11	55	09:10 (131)	19:42			20:13			20:43	24	07:03 (79)	21:06		
17	07:55		08:32 (131)	07:26		07:46 (90)	07:45			06:55			06:18		06:39 (79)	06:05		
	17:36	26	08:58 (131)	18:12	57	09:10 (131)	19:43			20:14			20:44	25	07:04 (79)	21:06		
18	07:54		08:30 (131)	07:25		07:44 (90)	07:43			06:54			06:17		06:38 (79)	06:05		
	17:37	29	08:59 (131)	18:14	56	09:08 (131)	19:44			20:15			20:45	26	07:04 (79)	21:06		
19	07:54		08:30 (131)	07:24		07:43 (90)	07:41		19:18 (86)	06:52			06:17		06:38 (79)	06:05		
	17:38	32	09:02 (131)	18:15	56	09:07 (131)	19:45	6	19:24 (86)	20:16			20:46	26	07:04 (79)	21:07		
20	07:53		08:29 (131)	07:22		07:42 (90)	07:40		19:14 (86)	06:51			06:16		06:38 (79)	06:06		
	17:39	34	09:03 (131)	18:16	54	09:05 (131)	19:46	11	19:25 (86)	20:17			20:47	25	07:03 (79)	21:07		
21	07:53		08:28 (131)	07:21		07:40 (90)	07:38		19:13 (86)	06:49			06:15		06:38 (79)	06:06		
	17:40	35	09:03 (131)	18:17	53	09:03 (131)	19:47	14	19:27 (86)	20:18			20:48	25	07:03 (79)	21:07		
22	07:52		08:28 (131)	07:20		07:40 (90)	07:36		19:10 (86)	06:48			06:14		06:39 (79)	06:06		
	17:41	37	09:05 (131)	18:18	49	09:01 (131)	19:48	17	19:27 (86)	20:19			20:49	25	07:04 (79)	21:07		
23	07:52		08:27 (131)	07:18		07:39 (90)	07:35		19:09 (86)	06:46			06:13		06:39 (79)	06:06		
	17:42	39	09:06 (131)	18:19	44	08:57 (131)	19:49	19	19:28 (86)	20:20			20:49	24	07:03 (79)	21:08		
24	07:51		08:26 (131)	07:17		07:40 (90)	07:33		19:08 (86)	06:45			06:13		06:39 (79)	06:06		
	17:44	41	09:07 (131)	18:20	34	08:53 (131)	19:50	22	19:30 (86)	20:21			20:50	23	07:02 (79)	21:08		
25	07:50		08:25 (131)	07:15		07:41 (90)	07:32		19:07 (86)	06:44			06:12		06:40 (79)	06:07		
	17:45	43	09:08 (131)	18:22	22	08:03 (90)	19:52	23	19:30 (86)	20:22			20:51	23	07:03 (79)	21:08		
26	07:49		08:26 (131)	07:14		07:41 (90)	07:30		07:51 (80)	06:42			06:11		06:40 (79)	06:07		
	17:46	43	09:09 (131)	18:23	20	08:01 (90)	19:53	34	19:32 (86)	20:23			20:52	22	07:02 (79)	21:08		
27	07:49		08:25 (131)	07:12		07:42 (90)	07:28		07:47 (80)	06:41			06:11		06:41 (79)	06:07		
	17:47	45	09:10 (131)	18:24	19	08:01 (90)	19:54	40	19:32 (86)	20:24			20:53	21	07:02 (79)	21:08		
28	07:48		08:25 (131)	07:11		07:43 (90)	07:27		07:45 (80)	06:40			06:10		06:41 (79)	06:08		
	17:48	46	09:11 (131)	18:25	16	07:59 (90)	19:55	43	19:31 (86)	20:25			20:54	20	07:01 (79)	21:08		
29	07:47		08:24 (131)				07:25		07:44 (80)	06:38			06:10		06:42 (79)	06:08		
	17:50	47	09:11 (131)				19:56	45	19:31 (86)	20:26			20:54	19	07:01 (79)	21:08		
30	07:46		08:24 (131)				07:23		07:42 (80)	06:37			06:09		06:42 (79)	06:09		
	17:51	48	09:12 (131)				19:57	46	19:30 (86)	20:27			20:55	18	07:00 (79)	21:08		
31	07:45		08:23 (131)				07:22		07:40 (80)				06:09		06:44 (79)			
	17:52	49	09:12 (131)				19:58	46	19:28 (86)				20:56	16	07:00 (79)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		664			1289			382			301			511			57	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.60			0.61			0.66			0.66			0.68			0.68	
Total reduction		0.21			0.25			0.29			0.34			0.38			0.41	
Total, real		143			327			110			101			193			23	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 9

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 342 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5532)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December
1	06:09			06:32		06:54 (79)	07:02		07:42 (80)	07:31			07:03		07:53 (131)	07:37
	20:08			20:51	18	07:12 (79)	20:09	13	07:55 (80)	19:18			17:33	50	08:43 (131)	17:10
2	06:10			06:33		06:55 (79)	07:03		07:40 (80)	07:32			07:05		07:54 (131)	07:38
	20:08			20:50	17	07:12 (79)	20:08	17	07:57 (80)	19:17			17:32	50	08:44 (131)	17:10
3	06:10			06:34		06:56 (79)	07:04		07:38 (80)	07:33			07:06		07:53 (131)	07:39
	20:08			20:49	15	07:11 (79)	20:06	20	07:58 (80)	19:15			17:31	51	08:44 (131)	17:10
4	06:11			06:35		06:57 (79)	07:05		07:37 (80)	07:34			07:07		07:53 (131)	07:40
	20:08			20:48	13	07:10 (79)	20:05	22	07:59 (80)	19:14			17:30	51	08:44 (131)	17:10
5	06:11			06:36		06:57 (79)	07:06		07:36 (80)	07:35			07:08		07:53 (131)	07:41
	20:08			20:46	10	07:07 (79)	20:03	24	08:00 (80)	19:12			17:29	51	08:44 (131)	17:09
6	06:12			06:37		06:58 (79)	07:07		07:35 (80)	07:36			07:09		07:53 (131)	07:42
	20:07			20:45	7	07:05 (79)	20:01	25	08:00 (80)	19:10			17:28	51	08:44 (131)	17:09
7	06:12		06:56 (79)	06:38			07:08		07:34 (80)	07:37			07:10		07:54 (131)	07:43
	20:07	5	07:01 (79)	20:44			20:00	26	08:00 (80)	19:09			17:27	51	08:45 (131)	17:09
8	06:13		06:55 (79)	06:39			07:09		07:33 (80)	07:38			07:11		07:54 (131)	07:44
	20:07	8	07:03 (79)	20:43			19:56	26	07:59 (80)	19:07			17:25	50	08:44 (131)	17:09
9	06:14		06:54 (79)	06:40			07:09		07:32 (80)	07:39			07:13		07:54 (131)	07:45
	20:07	11	07:05 (79)	20:42			19:55	38	19:16 (86)	19:06			17:24	50	08:44 (131)	17:09
10	06:14		06:53 (79)	06:41			07:10		07:32 (80)	07:40			07:14		07:54 (131)	07:46
	20:06	13	07:06 (79)	20:41			19:53	42	19:18 (86)	19:04			17:23	50	08:44 (131)	17:09
11	06:15		06:52 (79)	06:42			07:11		07:32 (80)	07:41			07:15		07:55 (131)	07:46
	20:06	15	07:07 (79)	20:39			19:52	44	19:19 (86)	19:03			17:23	49	08:44 (131)	17:09
12	06:16		06:52 (79)	06:43			07:12		07:32 (80)	07:42		08:19 (90)	07:16		07:56 (131)	07:47
	20:05	16	07:08 (79)	20:38			19:50	47	19:20 (86)	19:01	9	08:28 (90)	17:22	48	08:44 (131)	17:10
13	06:16		06:51 (79)	06:44			07:13		07:33 (80)	07:43		08:16 (90)	07:17		07:56 (131)	07:48
	20:05	17	07:08 (79)	20:37			19:48	47	19:21 (86)	18:59	14	08:30 (90)	17:21	47	08:43 (131)	17:10
14	06:17		06:51 (79)	06:45			07:14		07:34 (80)	07:44		08:14 (90)	07:18		07:56 (131)	07:49
	20:05	18	07:09 (79)	20:35			19:47	45	19:21 (86)	18:58	18	08:32 (90)	17:20	47	08:43 (131)	17:10
15	06:18		06:51 (79)	06:46			07:15		07:35 (80)	07:45		08:14 (90)	07:20		07:58 (131)	07:50
	20:04	19	07:10 (79)	20:34			19:45	43	19:21 (86)	18:56	20	08:34 (90)	17:19	45	08:43 (131)	17:10
16	06:19		06:49 (79)	06:47			07:16		07:36 (80)	07:46		08:13 (90)	07:21		07:59 (131)	07:50
	20:03	21	07:10 (79)	20:33			19:43	41	19:21 (86)	18:55	21	08:34 (90)	17:18	43	08:42 (131)	17:10
17	06:19		06:49 (79)	06:48			07:17		07:38 (80)	07:47		08:12 (90)	07:22		07:59 (131)	07:51
	20:03	22	07:11 (79)	20:31			19:42	35	19:20 (86)	18:53	22	08:34 (90)	17:17	43	08:42 (131)	17:11
18	06:20		06:49 (79)	06:49			07:18		18:56 (86)	07:48		08:11 (90)	07:23		08:00 (131)	07:52
	20:02	23	07:12 (79)	20:30			19:40	23	19:19 (86)	18:52	38	09:27 (131)	17:17	41	08:41 (131)	17:11
19	06:21		06:49 (79)	06:49			07:19		18:56 (86)	07:49		08:11 (90)	07:24		08:01 (131)	07:52
	20:02	24	07:13 (79)	20:29			19:38	21	19:17 (86)	18:51	45	09:30 (131)	17:16	39	08:40 (131)	17:11
20	06:22		06:49 (79)	06:50			07:20		18:55 (86)	07:50		08:10 (90)	07:25		08:03 (131)	07:53
	20:01	24	07:13 (79)	20:27			19:37	20	19:15 (86)	18:49	51	09:32 (131)	17:15	37	08:40 (131)	17:12
21	06:23		06:48 (79)	06:51			07:21		18:56 (86)	07:51		08:11 (90)	07:26		08:04 (131)	07:53
	20:00	25	07:13 (79)	20:26			19:35	17	19:13 (86)	18:48	53	09:34 (131)	17:15	35	08:39 (131)	17:12
22	06:23		06:48 (79)	06:52			07:22		18:56 (86)	07:52		08:12 (90)	07:28		08:05 (131)	07:54
	20:00	25	07:13 (79)	20:24			19:33	15	19:11 (86)	18:46	56	09:36 (131)	17:14	34	08:39 (131)	17:13
23	06:24		06:48 (79)	06:53			07:23		18:58 (86)	07:53		08:14 (90)	07:29		08:06 (131)	07:54
	20:59	26	07:14 (79)	20:23			19:32	12	19:10 (86)	18:45	57	09:38 (131)	17:14	32	08:38 (131)	17:13
24	06:25		06:48 (79)	06:54			07:24		19:00 (86)	07:54		08:15 (90)	07:30		08:07 (131)	07:55
	20:58	26	07:14 (79)	20:21			19:30	8	19:08 (86)	18:44	57	09:39 (131)	17:13	29	08:36 (131)	17:14
25	06:26		06:48 (79)	06:55			07:25			07:56		08:16 (90)	07:31		08:09 (131)	07:55
	20:57	26	07:14 (79)	20:20			19:28			18:42	56	09:40 (131)	17:12	26	08:35 (131)	17:15
26	06:27		06:49 (79)	06:56			07:26			07:57		08:17 (90)	07:32		08:11 (131)	07:56
	20:56	25	07:14 (79)	20:18			19:27			18:41	54	09:40 (131)	17:12	24	08:35 (131)	17:15
27	06:28		06:49 (79)	06:57			07:27			07:58		08:18 (90)	07:33		08:13 (131)	07:56
	20:55	25	07:14 (79)	20:17			19:25			18:40	53	09:41 (131)	17:12	21	08:34 (131)	17:16
28	06:29		06:50 (79)	06:58			07:28			07:59		08:55 (131)	07:34		08:16 (131)	07:56
	20:55	24	07:14 (79)	20:15			19:23			18:38	46	09:41 (131)	17:11	16	08:32 (131)	17:16
29	06:30		06:51 (79)	06:59			07:29			08:00		08:55 (131)	07:35		08:18 (131)	07:56
	20:54	22	07:13 (79)	20:14			19:22			18:37	48	09:43 (131)	17:11	11	08:29 (131)	17:17
30	06:31		06:52 (79)	07:00			07:30			08:01		08:54 (131)	07:36			07:57
	20:53	21	07:13 (79)	20:12			19:20			18:36	49	09:43 (131)	17:10			17:18
31	06:31		06:53 (79)	07:01		07:47 (80)				08:02		08:54 (131)				07:57
	20:52	20	07:13 (79)	20:11	4	07:51 (80)				18:34	49	09:43 (131)				17:19
Potential sun hours	456			426			374			346			300			291
Total, worst case		501			84			671			816			1172		
Sun reduction		0.60			0.60			0.61			0.56			0.37		
Oper. time red.		1.00			1.00			1.00			1.00			1.00		
Wind dir. red.		0.68			0.68			0.66			0.61			0.60		
Total reduction		0.41			0.41			0.40			0.34			0.22		
Total, real		203			34			269			278			259		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 10

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 343 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5533)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57			07:44		08:34 (131)	07:10		07:37 (90)	07:20		19:17 (86)	06:36			06:08		06:29 (79)
	17:20			17:53	62	09:36 (131)	18:26	71	09:26 (131)	19:59	21	19:38 (86)	20:28			20:57	16	06:45 (79)
2	07:57			07:43		08:33 (131)	07:08		07:37 (90)	07:19		19:17 (86)	06:35			06:08		06:29 (79)
	17:21			17:54	64	09:37 (131)	18:27	67	09:24 (131)	20:00	21	19:38 (86)	20:29			20:58	17	06:46 (79)
3	07:57			07:43		08:33 (131)	07:07		07:38 (90)	07:17		19:17 (86)	06:33			06:07		06:29 (79)
	17:21			17:56	64	09:37 (131)	18:28	61	09:22 (131)	20:00	22	19:39 (86)	20:30			20:58	18	06:47 (79)
4	07:57			07:42		08:33 (131)	07:05		07:38 (90)	07:15		07:42 (80)	06:32			06:07		06:28 (79)
	17:22			17:57	65	09:38 (131)	18:29	55	09:19 (131)	20:01	23	19:38 (86)	20:31			20:59	19	06:47 (79)
5	07:57			07:40		08:32 (131)	07:03		07:40 (90)	07:14		07:35 (80)	06:31			06:07		06:28 (79)
	17:23			17:58	66	09:38 (131)	18:30	45	09:16 (131)	20:02	33	19:36 (86)	20:32			21:00	20	06:48 (79)
6	07:57			07:39		08:32 (131)	07:02		07:42 (90)	07:12		07:33 (80)	06:30			06:06		06:28 (79)
	17:24			17:59	67	09:39 (131)	18:32	35	09:12 (131)	20:03	37	19:36 (86)	20:33			21:00	20	06:48 (79)
7	07:57			07:38		08:32 (131)	07:00		07:46 (90)	07:11		07:31 (80)	06:29			06:06		06:28 (79)
	17:25			18:00	67	09:39 (131)	18:33	12	09:05 (131)	20:04	36	19:33 (86)	20:34			21:01	21	06:49 (79)
8	07:57			07:37		08:32 (131)	07:59			07:09		07:30 (80)	06:27			06:06		06:27 (79)
	17:26			18:02	68	09:40 (131)	19:34			20:05	33	19:31 (86)	20:35			21:02	22	06:49 (79)
9	07:57			07:36		08:32 (131)	07:57			07:07		07:28 (80)	06:26			06:06		06:27 (79)
	17:27			18:03	68	09:40 (131)	19:35			20:06	27	07:55 (80)	20:36			21:02	22	06:49 (79)
10	07:57			07:35		08:32 (131)	07:56			07:06		07:27 (80)	06:25			06:06		06:27 (79)
	17:28			18:04	68	09:40 (131)	19:36			20:07	29	07:56 (80)	20:37			21:03	23	06:50 (79)
11	07:57			07:34		08:31 (131)	07:54			07:04		07:26 (80)	06:24			06:05		06:27 (79)
	17:29			18:05	69	09:40 (131)	19:37			20:08	29	07:55 (80)	20:38			21:03	23	06:50 (79)
12	07:57		08:54 (131)	07:33		08:31 (131)	07:53			07:03		07:25 (80)	06:23			06:05		06:27 (79)
	17:30	11	09:05 (131)	18:06	69	09:40 (131)	19:38			20:09	30	07:55 (80)	20:39			21:04	24	06:51 (79)
13	07:56		08:51 (131)	07:31		08:32 (131)	07:51			07:01		07:25 (80)	06:22			06:05		06:27 (79)
	17:31	18	09:09 (131)	18:08	68	09:40 (131)	19:39			20:10	30	07:55 (80)	20:40			21:04	24	06:51 (79)
14	07:56		08:49 (131)	07:30		08:32 (131)	07:49			07:00		07:24 (80)	06:21			06:05		06:27 (79)
	17:32	23	09:12 (131)	18:09	68	09:40 (131)	19:40			20:11	31	07:55 (80)	20:41			21:05	25	06:52 (79)
15	07:56		08:48 (131)	07:29		08:31 (131)	07:48			06:58		07:24 (80)	06:20			06:05		06:27 (79)
	17:33	27	09:15 (131)	18:10	68	09:39 (131)	19:41			20:12	31	07:55 (80)	20:42			21:05	25	06:52 (79)
16	07:55		08:46 (131)	07:28		08:32 (131)	07:46			06:57		07:24 (80)	06:19			06:05		06:27 (79)
	17:34	30	09:16 (131)	18:11	67	09:39 (131)	19:42			20:13	30	07:54 (80)	20:43			21:06	25	06:52 (79)
17	07:55		08:45 (131)	07:26		08:32 (131)	07:45			06:55		07:24 (80)	06:18			06:05		06:27 (79)
	17:36	34	09:19 (131)	18:12	67	09:39 (131)	19:43			20:14	30	07:54 (80)	20:44			21:06	25	06:52 (79)
18	07:54		08:44 (131)	07:25		07:45 (90)	07:43			06:54		07:25 (80)	06:17			06:05		06:27 (79)
	17:37	36	09:20 (131)	18:14	76	09:38 (131)	19:44			20:15	29	07:54 (80)	20:45			21:06	25	06:52 (79)
19	07:54		08:43 (131)	07:24		07:43 (90)	07:41			06:52		07:24 (80)	06:17			06:05		06:27 (79)
	17:38	39	09:22 (131)	18:15	80	09:38 (131)	19:45			20:16	28	07:52 (80)	20:46			21:07	25	06:52 (79)
20	07:53		08:42 (131)	07:22		07:42 (90)	07:40			06:51		07:25 (80)	06:16			06:06		06:27 (79)
	17:39	41	09:23 (131)	18:16	82	09:37 (131)	19:46			20:17	27	07:52 (80)	20:47			21:07	26	06:53 (79)
21	07:53		08:41 (131)	07:21		07:40 (90)	07:38			06:49		07:26 (80)	06:15			06:06		06:28 (79)
	17:40	43	09:24 (131)	18:17	84	09:36 (131)	19:47			20:18	24	07:50 (80)	20:48			21:07	26	06:54 (79)
22	07:52		08:40 (131)	07:20		07:39 (90)	07:36			06:48		07:27 (80)	06:14			06:06		06:28 (79)
	17:41	46	09:26 (131)	18:18	85	09:36 (131)	19:48			20:19	22	07:49 (80)	20:49			21:07	26	06:54 (79)
23	07:52		08:39 (131)	07:18		07:37 (90)	07:35			06:46		07:28 (80)	06:13			06:06		06:28 (79)
	17:42	48	09:27 (131)	18:19	85	09:34 (131)	19:49			20:20	18	07:46 (80)	20:49			21:08	25	06:53 (79)
24	07:51		08:38 (131)	07:17		07:37 (90)	07:33			06:45		07:30 (80)	06:13			06:06		06:28 (79)
	17:44	50	09:28 (131)	18:20	84	09:33 (131)	19:50			20:21	14	07:44 (80)	20:50			21:08	25	06:53 (79)
25	07:50		08:37 (131)	07:15		07:37 (90)	07:32			06:44		07:33 (80)	06:12			06:07		06:29 (79)
	17:45	52	09:29 (131)	18:22	84	09:33 (131)	19:51			20:22	8	07:41 (80)	20:51			21:08	25	06:54 (79)
26	07:49		08:37 (131)	07:14		07:36 (90)	07:30		19:25 (86)	06:42			06:11			06:07		06:29 (79)
	17:46	54	09:31 (131)	18:23	82	09:31 (131)	19:53	7	19:32 (86)	20:23			20:52			21:08	25	06:54 (79)
27	07:49		08:37 (131)	07:12		07:37 (90)	07:28		19:22 (86)	06:41			06:11		06:34 (79)	06:07		06:29 (79)
	17:47	55	09:32 (131)	18:24	78	09:30 (131)	19:54	11	19:33 (86)	20:24			20:53	3	06:37 (79)	21:08	25	06:54 (79)
28	07:48		08:36 (131)	07:11		07:36 (90)	07:27		19:20 (86)	06:40			06:10		06:31 (79)	06:08		06:30 (79)
	17:48	57	09:33 (131)	18:25	75	09:27 (131)	19:55	13	19:33 (86)	20:25			20:54	9	06:40 (79)	21:08	25	06:55 (79)
29	07:47		08:35 (131)				07:25		19:20 (86)	06:38			06:10		06:31 (79)	06:08		06:30 (79)
	17:50	59	09:34 (131)				19:56	15	19:35 (86)	20:26			20:54	11	06:42 (79)	21:08	24	06:54 (79)
30	07:46		08:35 (131)				07:23		19:18 (86)	06:37			06:09		06:30 (79)	06:09		06:31 (79)
	17:51	60	09:35 (131)				19:57	17	19:35 (86)	20:27			20:55	13	06:43 (79)	21:08	24	06:55 (79)
31	07:45		08:34 (131)				07:22		19:17 (86)				06:09		06:30 (79)			
	17:52	61	09:35 (131)				19:58	19	19:36 (86)				20:56	14	06:44 (79)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		844			2030			428			663			50			695	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.60			0.61			0.62			0.66			0.68			0.68	
Total reduction		0.22			0.25			0.27			0.34			0.38			0.41	
Total, real		182			514			116			223			19			283	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 11

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 343 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5533)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December
1	06:09		06:31 (79)	06:32			07:02		07:25 (80)	07:31			07:03		08:01 (131)	07:37
	21:08	24	06:55 (79)	20:51			20:09	29	07:54 (80)	19:18			17:33	68	09:09 (131)	17:10
2	06:10		06:32 (79)	06:33			07:03		07:25 (80)	07:32			07:05		08:02 (131)	07:38
	21:08	23	06:55 (79)	20:50			20:08	29	07:54 (80)	19:17			17:32	68	09:10 (131)	17:10
3	06:10		06:32 (79)	06:34			07:04		07:26 (80)	07:33			07:06		08:02 (131)	07:39
	21:08	23	06:55 (79)	20:49			20:06	27	07:53 (80)	19:15			17:31	68	09:10 (131)	17:10
4	06:11		06:33 (79)	06:35			07:05		07:27 (80)	07:34			07:07		08:02 (131)	07:40
	21:08	22	06:55 (79)	20:48			20:05	33	19:28 (86)	19:14			17:30	67	09:09 (131)	17:10
5	06:11		06:33 (79)	06:36			07:06		07:28 (80)	07:35			07:08		08:02 (131)	07:41
	21:08	21	06:54 (79)	20:46			20:03	36	19:30 (86)	19:12			17:29	67	09:09 (131)	17:09
6	06:12		06:34 (79)	06:37			07:07		07:29 (80)	07:36			07:09		08:02 (131)	07:42
	21:07	21	06:55 (79)	20:45			20:01	37	19:32 (86)	19:10			17:28	66	09:08 (131)	17:09
7	06:12		06:34 (79)	06:38			07:08		07:31 (80)	07:37		08:19 (90)	07:10		08:04 (131)	07:43
	21:07	20	06:54 (79)	20:44			20:00	33	19:32 (86)	19:09	27	09:45 (131)	17:27	65	09:09 (131)	17:09
8	06:13		06:35 (79)	06:39			07:09		07:35 (80)	07:38		08:16 (90)	07:11		08:04 (131)	07:44
	21:07	19	06:54 (79)	20:43			19:56	25	19:32 (86)	19:07	40	09:49 (131)	17:25	64	09:08 (131)	17:09
9	06:14		06:36 (79)	06:40			07:09		19:10 (86)	07:39		08:14 (90)	07:13		08:04 (131)	07:45
	21:07	18	06:54 (79)	20:42			19:55	22	19:32 (86)	19:06	50	09:52 (131)	17:24	64	09:08 (131)	17:09
10	06:14		06:36 (79)	06:41			07:10		19:10 (86)	07:40		08:12 (90)	07:14		08:05 (131)	07:46
	21:06	17	06:53 (79)	20:41			19:53	21	19:31 (86)	19:04	58	09:54 (131)	17:23	62	09:07 (131)	17:09
11	06:15		06:37 (79)	06:42			07:11		19:09 (86)	07:41		08:11 (90)	07:15		08:06 (131)	07:46
	21:06	16	06:53 (79)	20:39			19:52	21	19:30 (86)	19:03	63	09:56 (131)	17:23	61	09:07 (131)	17:09
12	06:16		06:38 (79)	06:43			07:12		19:09 (86)	07:42		08:10 (90)	07:16		08:07 (131)	07:47
	21:05	15	06:53 (79)	20:38			19:50	19	19:28 (86)	19:01	69	09:58 (131)	17:22	59	09:06 (131)	17:10
13	06:16		06:38 (79)	06:44			07:13		19:09 (86)	07:43		08:09 (90)	07:17		08:07 (131)	07:48
	21:05	14	06:52 (79)	20:37			19:48	18	19:27 (86)	18:59	73	09:59 (131)	17:21	59	09:06 (131)	17:10
14	06:17		06:39 (79)	06:45			07:14		19:10 (86)	07:44		08:08 (90)	07:18		08:08 (131)	07:49
	21:05	12	06:51 (79)	20:35			19:47	15	19:25 (86)	18:58	78	10:01 (131)	17:20	57	09:05 (131)	17:10
15	06:18		06:40 (79)	06:46			07:15		19:10 (86)	07:45		08:09 (90)	07:20		08:10 (131)	07:49
	21:04	10	06:50 (79)	20:34			19:45	14	19:24 (86)	18:56	80	10:03 (131)	17:19	55	09:05 (131)	17:10
16	06:19		06:40 (79)	06:47			07:16		19:11 (86)	07:46		08:09 (90)	07:21		08:10 (131)	07:50
	21:03	7	06:47 (79)	20:33			19:43	11	19:22 (86)	18:55	81	10:04 (131)	17:18	54	09:04 (131)	17:10
17	06:19			06:48			07:17		19:13 (86)	07:47		08:09 (90)	07:22		08:11 (131)	07:51
	21:03			20:31			19:42	7	19:20 (86)	18:53	84	10:05 (131)	17:17	52	09:03 (131)	17:11
18	06:20			06:49		07:38 (80)	07:18		19:17 (86)	07:48		08:09 (90)	07:23		08:12 (131)	07:52
	21:02			20:30	10	07:48 (80)	19:40	2	19:19 (86)	18:52	84	10:05 (131)	17:17	50	09:02 (131)	17:11
19	06:21			06:49		07:35 (80)	07:19			07:49		08:09 (90)	07:24		08:13 (131)	07:52
	21:02			20:29	16	07:51 (80)	19:38			18:51	85	10:06 (131)	17:16	48	09:01 (131)	17:11
20	06:22			06:50		07:33 (80)	07:20			07:50		08:10 (90)	07:25		08:15 (131)	07:53
	21:01			20:27	19	07:52 (80)	19:37			18:49	84	10:06 (131)	17:15	46	09:01 (131)	17:12
21	06:23			06:51		07:32 (80)	07:21			07:51		08:11 (90)	07:26		08:17 (131)	07:53
	21:00			20:26	22	07:54 (80)	19:35			18:48	83	10:07 (131)	17:15	43	09:00 (131)	17:12
22	06:23			06:52		07:30 (80)	07:22			07:52		08:12 (90)	07:28		08:18 (131)	07:54
	21:00			20:24	25	07:55 (80)	19:33			18:46	81	10:07 (131)	17:14	41	08:59 (131)	17:13
23	06:24			06:53		07:29 (80)	07:23			07:53		08:14 (90)	07:29		08:19 (131)	07:54
	20:59			20:23	27	07:56 (80)	19:32			18:45	80	10:09 (131)	17:14	39	08:58 (131)	17:13
24	06:25			06:54		07:28 (80)	07:24			07:54		08:17 (90)	07:30		08:21 (131)	07:55
	20:58			20:21	28	07:56 (80)	19:30			18:44	74	10:09 (131)	17:13	36	08:57 (131)	17:14
25	06:26			06:55		07:27 (80)	07:25			07:56		09:02 (131)	07:31		08:22 (131)	07:55
	20:57			20:20	30	07:57 (80)	19:28			18:42	67	10:09 (131)	17:12	34	08:56 (131)	17:15
26	06:27			06:56		07:27 (80)	07:26			07:57		09:02 (131)	07:32		08:25 (131)	07:56
	20:56			20:18	30	07:57 (80)	19:27			18:41	67	10:09 (131)	17:12	30	08:55 (131)	17:15
27	06:28			06:57		07:26 (80)	07:27			07:58		09:01 (131)	07:33		08:27 (131)	07:56
	20:55			20:17	31	07:57 (80)	19:25			18:40	68	10:09 (131)	17:12	27	08:54 (131)	17:16
28	06:29			06:58		07:25 (80)	07:28			07:59		09:01 (131)	07:34		08:29 (131)	07:56
	20:55			20:15	31	07:56 (80)	19:23			18:38	68	10:09 (131)	17:11	23	08:52 (131)	17:16
29	06:30			06:59		07:25 (80)	07:29			08:00		09:01 (131)	07:35		08:32 (131)	07:56
	20:54			20:14	31	07:56 (80)	19:22			18:37	69	10:10 (131)	17:11	18	08:50 (131)	17:17
30	06:31			07:00		07:25 (80)	07:30			08:01		09:01 (131)	07:36		08:35 (131)	07:57
	20:53			20:12	30	07:55 (80)	19:20			18:36	69	10:10 (131)	17:10	12	08:47 (131)	17:18
31	06:31			07:01		07:25 (80)				08:02		09:01 (131)				07:57
	20:52			20:11	30	07:55 (80)				18:34	69	10:10 (131)				17:19
Potential sun hours	456			426			374			346			300			291
Total, worst case		282			360			399			1751			1503		
Sun reduction		0.60			0.60			0.61			0.56			0.37		
Oper. time red.		1.00			1.00			1.00			1.00			1.00		
Wind dir. red.		0.68			0.67			0.66			0.61			0.60		
Total reduction		0.41			0.40			0.40			0.34			0.22		
Total, real		115			143			160			594			333		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 12

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 344 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5534)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		09:07 (131)	07:44		09:21 (131)	07:10			07:20		07:42 (80)	06:36			06:08		06:29 (79)
	17:20	73	10:20 (131)	17:53	62	10:23 (131)	18:26			19:59	28	08:10 (80)	20:28			20:57	26	06:55 (79)
2	07:57		09:07 (131)	07:43		09:22 (131)	07:08			07:19		07:41 (80)	06:35			06:08		06:29 (79)
	17:21	74	10:21 (131)	17:54	60	10:22 (131)	18:27			20:00	29	08:10 (80)	20:29			20:58	27	06:56 (79)
3	07:57		09:07 (131)	07:43		09:23 (131)	07:07			07:17		07:40 (80)	06:33			06:07		06:29 (79)
	17:21	74	10:21 (131)	17:56	58	10:21 (131)	18:28			20:00	31	08:11 (80)	20:30			20:58	28	06:57 (79)
4	07:57		09:08 (131)	07:42		09:25 (131)	07:05			07:15		07:39 (80)	06:32			06:07		06:28 (79)
	17:22	74	10:22 (131)	17:57	55	10:20 (131)	18:29			20:01	32	08:11 (80)	20:31			20:59	29	06:57 (79)
5	07:57		09:08 (131)	07:40		09:26 (131)	07:03			07:14		07:38 (80)	06:31			06:07		06:28 (79)
	17:23	74	10:22 (131)	17:58	53	10:19 (131)	18:30			20:02	33	08:11 (80)	20:32			21:00	29	06:57 (79)
6	07:57		09:09 (131)	07:39		09:27 (131)	07:02			07:12		07:38 (80)	06:30			06:06		06:28 (79)
	17:24	74	10:23 (131)	17:59	50	10:17 (131)	18:32			20:03	33	08:11 (80)	20:33			21:00	30	06:58 (79)
7	07:57		09:09 (131)	07:38		08:01 (90)	07:00			07:11		07:37 (80)	06:29			06:06		06:28 (79)
	17:25	74	10:23 (131)	18:00	55	10:16 (131)	18:33			20:04	34	08:11 (80)	20:34			21:01	30	06:58 (79)
8	07:57		09:10 (131)	07:37		07:58 (90)	07:59			07:09		07:37 (80)	06:27			06:06		06:27 (79)
	17:26	74	10:24 (131)	18:02	58	10:14 (131)	19:34			20:05	34	08:11 (80)	20:35			21:02	31	06:58 (79)
9	07:57		09:10 (131)	07:36		07:56 (90)	07:57			07:07		07:37 (80)	06:26			06:06		06:28 (79)
	17:27	75	10:25 (131)	18:03	58	10:12 (131)	19:35			20:06	33	08:10 (80)	20:36			21:02	30	06:58 (79)
10	07:57		09:10 (131)	07:35		07:55 (90)	07:56			07:06		07:37 (80)	06:25			06:06		06:28 (79)
	17:28	74	10:24 (131)	18:04	57	10:10 (131)	19:36			20:07	33	08:10 (80)	20:37			21:03	31	06:59 (79)
11	07:57		09:10 (131)	07:34		07:53 (90)	07:54			07:04		07:37 (80)	06:24			06:05		06:28 (79)
	17:29	75	10:25 (131)	18:05	54	10:07 (131)	19:37			20:08	32	08:09 (80)	20:38			21:03	31	06:59 (79)
12	07:57		09:11 (131)	07:33		07:53 (90)	07:53			07:03		07:37 (80)	06:23			06:05		06:28 (79)
	17:30	75	10:26 (131)	18:06	49	10:04 (131)	19:38			20:09	30	08:07 (80)	20:39			21:04	31	06:59 (79)
13	07:56		09:11 (131)	07:31		07:52 (90)	07:51			07:01		07:38 (80)	06:22			06:05		06:28 (79)
	17:31	74	10:25 (131)	18:08	41	09:59 (131)	19:39			20:10	29	08:07 (80)	20:40			21:04	32	07:00 (79)
14	07:56		09:12 (131)	07:30		07:52 (90)	07:49			07:00		07:38 (80)	06:21			06:05		06:29 (79)
	17:32	74	10:26 (131)	18:09	27	08:19 (90)	19:40			20:11	27	08:05 (80)	20:41			21:05	31	07:00 (79)
15	07:56		09:12 (131)	07:29		07:51 (90)	07:48			06:58		07:40 (80)	06:20			06:05		06:29 (79)
	17:33	75	10:27 (131)	18:10	28	08:19 (90)	19:41			20:12	24	08:04 (80)	20:42			21:05	31	07:00 (79)
16	07:55		09:12 (131)	07:28		07:51 (90)	07:46			06:57		07:40 (80)	06:19			06:05		06:29 (79)
	17:34	74	10:26 (131)	18:11	28	08:19 (90)	19:42			20:13	22	08:02 (80)	20:43			21:06	31	07:00 (79)
17	07:55		09:13 (131)	07:26		07:51 (90)	07:45			06:55		07:43 (80)	06:18			06:05		06:29 (79)
	17:36	74	10:27 (131)	18:12	28	08:19 (90)	19:43			20:14	17	08:00 (80)	20:44			21:06	32	07:01 (79)
18	07:54		09:13 (131)	07:25		07:50 (90)	07:43			06:54		07:46 (80)	06:17			06:05		06:29 (79)
	17:37	74	10:27 (131)	18:14	29	08:19 (90)	19:44			20:15	11	07:57 (80)	20:45			21:06	32	07:01 (79)
19	07:54		09:14 (131)	07:24		07:51 (90)	07:41			06:52			06:17			06:05		06:29 (79)
	17:38	73	10:27 (131)	18:15	28	08:19 (90)	19:45			20:16			20:46			21:07	32	07:01 (79)
20	07:53		09:14 (131)	07:22		07:52 (90)	07:40			06:51			06:16			06:06		06:29 (79)
	17:39	73	10:27 (131)	18:16	27	08:19 (90)	19:46			20:17			20:47			21:07	32	07:01 (79)
21	07:53		09:14 (131)	07:21		07:51 (90)	07:38			06:49			06:15			06:06		06:30 (79)
	17:40	73	10:27 (131)	18:17	26	08:17 (90)	19:47			20:18			20:48			21:07	32	07:02 (79)
22	07:52		09:16 (131)	07:20		07:53 (90)	07:36			06:48			06:14		06:37 (79)	06:06		06:30 (79)
	17:41	71	10:27 (131)	18:18	24	08:17 (90)	19:48			20:19			20:49	8	06:45 (79)	21:07	32	07:02 (79)
23	07:52		09:16 (131)	07:18		07:53 (90)	07:35			06:46			06:13		06:34 (79)	06:06		06:30 (79)
	17:42	71	10:27 (131)	18:19	22	08:15 (90)	19:49			20:20			20:49	13	06:47 (79)	21:08	32	07:02 (79)
24	07:51		09:16 (131)	07:17		07:55 (90)	07:33			06:45			06:13		06:33 (79)	06:06		06:30 (79)
	17:44	70	10:26 (131)	18:20	19	08:14 (90)	19:50			20:21			20:50	15	06:48 (79)	21:08	32	07:02 (79)
25	07:50		09:16 (131)	07:15		07:57 (90)	07:32			06:44			06:12		06:33 (79)	06:07		06:31 (79)
	17:45	70	10:26 (131)	18:22	15	08:12 (90)	19:51			20:22			20:51	17	06:50 (79)	21:08	32	07:03 (79)
26	07:49		09:18 (131)	07:14		07:59 (90)	07:30			06:42			06:11		06:32 (79)	06:07		06:31 (79)
	17:46	69	10:27 (131)	18:23	10	08:09 (90)	19:53			20:23			20:52	19	06:51 (79)	21:08	31	07:02 (79)
27	07:49		09:18 (131)	07:12			07:28			06:41			06:11		06:32 (79)	06:07		06:31 (79)
	17:47	68	10:26 (131)	18:24			19:54			20:24			20:53	20	06:52 (79)	21:08	31	07:02 (79)
28	07:48		09:19 (131)	07:11			07:27		07:51 (80)	06:40			06:10		06:31 (79)	06:08		06:32 (79)
	17:48	66	10:25 (131)	18:25			19:55	12	08:03 (80)	20:25			20:54	22	06:53 (79)	21:08	31	07:03 (79)
29	07:47		09:19 (131)				07:25		07:48 (80)	06:38			06:10		06:31 (79)	06:08		06:31 (79)
	17:50	66	10:25 (131)				19:56	19	08:07 (80)	20:26			20:54	23	06:54 (79)	21:08	32	07:03 (79)
30	07:46		09:20 (131)				07:23		07:46 (80)	06:37			06:09		06:30 (79)	06:09		06:32 (79)
	17:51	64	10:24 (131)				19:57	22	08:08 (80)	20:27			20:55	24	06:54 (79)	21:08	32	07:04 (79)
31	07:45		09:21 (131)				07:22		07:43 (80)				06:09		06:30 (79)			
	17:52	62	10:23 (131)				19:58	26	08:09 (80)				20:56	25	06:55 (79)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		2231			1021			79			512			186			923	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.60			0.61			0.66			0.66			0.68			0.68	
Total reduction		0.22			0.26			0.29			0.34			0.38			0.41	
Total, real		481			261			23			172			71			376	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 13

Licensed user:
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217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 344 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5534)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:32 (79)	06:32			07:02		07:36 (80)	07:31			07:03		07:24 (90)	07:37		08:52 (131)
	21:08	31	07:03 (79)	20:51			20:09	32	08:08 (80)	19:18			17:33	57	09:40 (131)	17:10	75	10:07 (131)
2	06:10		06:33 (79)	06:33			07:03		07:35 (80)	07:32			07:05		07:26 (90)	07:38		08:53 (131)
	21:08	31	07:04 (79)	20:50			20:08	33	08:08 (80)	19:17			17:32	59	09:43 (131)	17:10	74	10:07 (131)
3	06:10		06:33 (79)	06:34			07:04		07:35 (80)	07:33			07:06		07:28 (90)	07:39		08:53 (131)
	21:08	30	07:03 (79)	20:49			20:06	33	08:08 (80)	19:15			17:31	57	09:44 (131)	17:10	75	10:08 (131)
4	06:11		06:33 (79)	06:35			07:05		07:34 (80)	07:34			07:07		07:31 (90)	07:40		08:54 (131)
	21:08	31	07:04 (79)	20:48			20:05	34	08:08 (80)	19:14			17:30	55	09:46 (131)	17:10	74	10:08 (131)
5	06:11		06:33 (79)	06:36			07:06		07:34 (80)	07:35			07:08		08:57 (131)	07:41		08:54 (131)
	21:08	31	07:04 (79)	20:46			20:03	34	08:08 (80)	19:12			17:29	50	09:47 (131)	17:09	74	10:08 (131)
6	06:12		06:34 (79)	06:37			07:07		07:34 (80)	07:36			07:09		08:55 (131)	07:42		08:55 (131)
	21:07	30	07:04 (79)	20:45			20:01	34	08:08 (80)	19:10			17:28	54	09:49 (131)	17:09	74	10:09 (131)
7	06:12		06:34 (79)	06:38			07:08		07:34 (80)	07:37			07:10		08:55 (131)	07:43		08:55 (131)
	21:07	29	07:03 (79)	20:44			20:00	33	08:07 (80)	19:09			17:27	56	09:51 (131)	17:09	74	10:09 (131)
8	06:13		06:35 (79)	06:39			07:09		07:33 (80)	07:38			07:11		08:54 (131)	07:44		08:56 (131)
	21:07	29	07:04 (79)	20:43			19:56	32	08:05 (80)	19:07			17:25	58	09:52 (131)	17:09	74	10:10 (131)
9	06:14		06:36 (79)	06:40			07:09		07:33 (80)	07:39			07:13		08:53 (131)	07:45		08:56 (131)
	21:07	28	07:04 (79)	20:42			19:55	32	08:05 (80)	19:06			17:24	60	09:53 (131)	17:09	74	10:10 (131)
10	06:14		06:36 (79)	06:41			07:10		07:34 (80)	07:40			07:14		08:52 (131)	07:46		08:57 (131)
	21:06	27	07:03 (79)	20:41			19:53	30	08:04 (80)	19:04			17:23	62	09:54 (131)	17:09	74	10:11 (131)
11	06:15		06:37 (79)	06:42			07:11		07:34 (80)	07:41			07:15		08:53 (131)	07:46		08:57 (131)
	21:06	27	07:04 (79)	20:39			19:52	29	08:03 (80)	19:03			17:23	62	09:55 (131)	17:09	73	10:10 (131)
12	06:16		06:38 (79)	06:43			07:12		07:35 (80)	07:42			07:16		08:52 (131)	07:47		08:57 (131)
	21:05	26	07:04 (79)	20:38			19:50	26	08:01 (80)	19:01			17:22	64	09:56 (131)	17:10	74	10:11 (131)
13	06:16		06:38 (79)	06:44			07:13		07:36 (80)	07:43			07:17		08:51 (131)	07:48		08:58 (131)
	21:05	25	07:03 (79)	20:37			19:48	23	07:59 (80)	18:59			17:21	66	09:57 (131)	17:10	74	10:12 (131)
14	06:17		06:39 (79)	06:45			07:14		07:38 (80)	07:44			07:18		08:51 (131)	07:49		08:59 (131)
	21:05	24	07:03 (79)	20:35			19:47	19	07:57 (80)	18:58			17:20	66	09:57 (131)	17:10	73	10:12 (131)
15	06:18		06:40 (79)	06:46			07:15		07:41 (80)	07:45		08:36 (90)	07:20		08:51 (131)	07:49		08:59 (131)
	21:04	22	07:02 (79)	20:34			19:45	13	07:54 (80)	18:56	2	08:38 (90)	17:19	68	09:59 (131)	17:10	73	10:12 (131)
16	06:19		06:40 (79)	06:47			07:16			07:46		08:30 (90)	07:21		08:51 (131)	07:50		08:59 (131)
	21:03	21	07:01 (79)	20:33			19:43			18:55	13	08:43 (90)	17:18	69	10:00 (131)	17:10	74	10:13 (131)
17	06:19		06:41 (79)	06:48			07:17			07:47		08:27 (90)	07:22		08:50 (131)	07:51		09:00 (131)
	21:03	20	07:01 (79)	20:31			19:42			18:53	18	08:45 (90)	17:17	70	10:00 (131)	17:11	74	10:14 (131)
18	06:20		06:42 (79)	06:49			07:18			07:48		08:26 (90)	07:23		08:50 (131)	07:52		09:00 (131)
	21:02	18	07:00 (79)	20:30			19:40			18:52	20	08:46 (90)	17:17	70	10:00 (131)	17:11	73	10:13 (131)
19	06:21		06:43 (79)	06:49			07:19			07:49		08:24 (90)	07:24		08:50 (131)	07:52		09:01 (131)
	21:02	16	06:59 (79)	20:29			19:38			18:51	23	08:47 (90)	17:16	71	10:01 (131)	17:11	73	10:14 (131)
20	06:22		06:44 (79)	06:50			07:20			07:50		08:23 (90)	07:25		08:51 (131)	07:53		09:01 (131)
	21:01	14	06:58 (79)	20:27			19:37			18:49	25	08:48 (90)	17:15	71	10:02 (131)	17:12	73	10:14 (131)
21	06:23		06:45 (79)	06:51			07:21			07:51		08:22 (90)	07:26		08:50 (131)	07:53		09:02 (131)
	21:00	11	06:56 (79)	20:26			19:35			18:48	26	08:48 (90)	17:15	73	10:03 (131)	17:12	73	10:15 (131)
22	06:23		06:49 (79)	06:52			07:22			07:52		08:21 (90)	07:28		08:50 (131)	07:54		09:02 (131)
	21:00	3	06:52 (79)	20:24			19:33			18:46	27	08:48 (90)	17:14	73	10:03 (131)	17:13	73	10:15 (131)
23	06:24			06:53			07:23			07:53		08:21 (90)	07:29		08:50 (131)	07:54		09:03 (131)
	20:59			20:23			19:32			18:45	28	08:49 (90)	17:14	73	10:03 (131)	17:13	73	10:16 (131)
24	06:25			06:54			07:24			07:54		08:21 (90)	07:30		08:50 (131)	07:55		09:03 (131)
	20:58			20:21			19:30			18:43	28	08:49 (90)	17:13	74	10:04 (131)	17:14	73	10:16 (131)
25	06:26			06:55		07:48 (80)	07:25			07:56		08:21 (90)	07:31		08:50 (131)	07:55		09:04 (131)
	20:57			20:20	12	08:00 (80)	19:28			18:42	28	08:49 (90)	17:12	74	10:04 (131)	17:14	73	10:17 (131)
26	06:27			06:56		07:45 (80)	07:26			07:57		08:21 (90)	07:32		08:51 (131)	07:56		09:04 (131)
	20:56			20:18	18	08:03 (80)	19:27			18:41	28	08:49 (90)	17:12	74	10:05 (131)	17:15	74	10:18 (131)
27	06:28			06:57		07:43 (80)	07:27			07:58		08:21 (90)	07:33		08:52 (131)	07:56		09:04 (131)
	20:55			20:17	22	08:05 (80)	19:25			18:40	27	08:48 (90)	17:12	74	10:06 (131)	17:16	74	10:18 (131)
28	06:29			06:58		07:40 (80)	07:28			07:59		08:21 (90)	07:34		08:52 (131)	07:56		09:05 (131)
	20:55			20:15	25	08:05 (80)	19:23			18:38	27	08:48 (90)	17:11	74	10:06 (131)	17:16	74	10:19 (131)
29	06:30			06:59		07:39 (80)	07:29			08:00		08:22 (90)	07:35		08:52 (131)	07:56		09:06 (131)
	20:54			20:14	27	08:06 (80)	19:22			18:37	44	10:30 (131)	17:11	74	10:06 (131)	17:17	73	10:19 (131)
30	06:31			07:00		07:38 (80)	07:30			08:01		08:22 (90)	07:36		08:52 (131)	07:57		09:06 (131)
	20:53			20:12	29	08:07 (80)	19:20			18:36	51	10:34 (131)	17:10	75	10:07 (131)	17:18	74	10:20 (131)
31	06:31			07:01		07:37 (80)				08:02		08:23 (90)				07:57		09:06 (131)
	20:52			20:11	30	08:07 (80)				18:34	55	10:37 (131)				17:19	74	10:20 (131)
Potential sun hours	456			426			374			346			300			291		
Total, worst case		524			163			437			470			1983			2284	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.68			0.66			0.66			0.62			0.60			0.60	
Total reduction		0.41			0.40			0.40			0.35			0.22			0.30	
Total, real		213			64			176			163			440			684	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 14

Licensed user:
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US-SYRACUSE, NY 13202
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Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 348 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5535)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:48 (131)	07:44		08:50 (131)	07:10		07:49 (90)	07:20		07:42 (80)	06:36			06:08		06:29 (79)
	17:20	54	09:42 (131)	17:53	70	10:00 (131)	18:26	15	08:04 (90)	19:59	37	19:34 (86)	20:28			20:57	24	06:53 (79)
2	07:57		08:49 (131)	07:43		08:51 (131)	07:08		07:51 (90)	07:19		07:39 (80)	06:35			06:08		06:29 (79)
	17:21	54	09:43 (131)	17:54	69	10:00 (131)	18:27	9	08:00 (90)	20:00	39	19:32 (86)	20:29			20:58	25	06:54 (79)
3	07:57		08:49 (131)	07:43		08:51 (131)	07:07			07:17		07:38 (80)	06:33			06:07		06:29 (79)
	17:21	55	09:44 (131)	17:56	68	09:59 (131)	18:28			20:00	38	19:31 (86)	20:30			20:58	26	06:55 (79)
4	07:57		08:49 (131)	07:42		08:51 (131)	07:05			07:15		07:36 (80)	06:32			06:07		06:28 (79)
	17:22	56	09:45 (131)	17:57	68	09:59 (131)	18:29			20:01	37	19:28 (86)	20:31			20:59	26	06:54 (79)
5	07:57		08:49 (131)	07:40		08:52 (131)	07:03			07:14		07:35 (80)	06:31			06:07		06:28 (79)
	17:23	56	09:45 (131)	17:58	67	09:59 (131)	18:30			20:02	28	08:03 (80)	20:32			21:00	27	06:55 (79)
6	07:57		08:49 (131)	07:39		08:52 (131)	07:02			07:12		07:34 (80)	06:30			06:06		06:28 (79)
	17:24	57	09:46 (131)	17:59	67	09:59 (131)	18:32			20:03	30	08:04 (80)	20:33			21:00	27	06:55 (79)
7	07:57		08:49 (131)	07:38		08:53 (131)	07:00			07:11		07:33 (80)	06:29			06:06		06:28 (79)
	17:25	58	09:47 (131)	18:00	65	09:58 (131)	18:33			20:04	31	08:04 (80)	20:34			21:01	28	06:56 (79)
8	07:57		08:49 (131)	07:37		08:53 (131)	07:59			07:09		07:33 (80)	06:27			06:06		06:27 (79)
	17:26	59	09:48 (131)	18:02	65	09:58 (131)	19:34			20:05	31	08:04 (80)	20:35			21:02	29	06:56 (79)
9	07:57		08:50 (131)	07:36		08:54 (131)	07:57			07:07		07:32 (80)	06:26			06:06		06:27 (79)
	17:27	59	09:49 (131)	18:03	64	09:58 (131)	19:35			20:06	32	08:04 (80)	20:36			21:02	29	06:56 (79)
10	07:57		08:49 (131)	07:35		08:55 (131)	07:56			07:06		07:32 (80)	06:25			06:06		06:27 (79)
	17:28	60	09:49 (131)	18:04	62	09:57 (131)	19:36			20:07	32	08:04 (80)	20:37			21:03	29	06:56 (79)
11	07:57		08:49 (131)	07:34		08:55 (131)	07:54			07:04		07:32 (80)	06:24			06:05		06:27 (79)
	17:29	61	09:50 (131)	18:05	61	09:56 (131)	19:37			20:08	31	08:03 (80)	20:38			21:03	30	06:57 (79)
12	07:57		08:50 (131)	07:33		07:56 (90)	07:53			07:03		07:31 (80)	06:23			06:05		06:27 (79)
	17:30	61	09:51 (131)	18:06	62	09:55 (131)	19:38			20:09	31	08:02 (80)	20:39			21:04	30	06:57 (79)
13	07:56		08:49 (131)	07:31		07:52 (90)	07:51			07:01		07:32 (80)	06:22			06:05		06:28 (79)
	17:31	62	09:51 (131)	18:08	69	09:54 (131)	19:39			20:10	30	08:02 (80)	20:40			21:04	29	06:57 (79)
14	07:56		08:49 (131)	07:30		07:50 (90)	07:49			07:00		07:31 (80)	06:21			06:05		06:28 (79)
	17:32	64	09:53 (131)	18:09	71	09:53 (131)	19:40			20:11	30	08:01 (80)	20:41			21:05	30	06:58 (79)
15	07:56		08:50 (131)	07:29		07:48 (90)	07:48			06:58		07:32 (80)	06:20			06:05		06:28 (79)
	17:33	64	09:54 (131)	18:10	72	09:51 (131)	19:41			20:12	28	08:00 (80)	20:42			21:05	30	06:58 (79)
16	07:55		08:49 (131)	07:28		07:47 (90)	07:46			06:57		07:33 (80)	06:19			06:05		06:28 (79)
	17:34	65	09:54 (131)	18:11	72	09:50 (131)	19:42			20:13	25	07:58 (80)	20:43			21:06	30	06:58 (79)
17	07:55		08:50 (131)	07:26		07:46 (90)	07:45			06:55		07:34 (80)	06:18			06:05		06:28 (79)
	17:36	65	09:55 (131)	18:12	72	09:49 (131)	19:43			20:14	23	07:57 (80)	20:44			21:06	30	06:58 (79)
18	07:54		08:49 (131)	07:25		07:44 (90)	07:43			06:54		07:36 (80)	06:17			06:05		06:28 (79)
	17:37	66	09:55 (131)	18:14	71	09:47 (131)	19:44			20:15	20	07:56 (80)	20:45			21:06	30	06:58 (79)
19	07:54		08:50 (131)	07:24		07:44 (90)	07:41			06:52		07:37 (80)	06:17			06:05		06:28 (79)
	17:38	66	09:56 (131)	18:15	68	09:45 (131)	19:45			20:16	17	07:54 (80)	20:46			21:07	30	06:58 (79)
20	07:53		08:49 (131)	07:22		07:44 (90)	07:40			06:51		07:39 (80)	06:16			06:06		06:28 (79)
	17:39	68	09:57 (131)	18:16	64	09:43 (131)	19:46			20:17	12	07:51 (80)	20:47			21:07	30	06:58 (79)
21	07:53		08:49 (131)	07:21		07:43 (90)	07:38			06:49			06:15			06:06		06:29 (79)
	17:40	68	09:57 (131)	18:17	61	09:40 (131)	19:47			20:18			20:48			21:07	30	06:59 (79)
22	07:52		08:50 (131)	07:20		07:44 (90)	07:36		19:23 (86)	06:48			06:14		06:37 (79)	06:06		06:29 (79)
	17:41	68	09:58 (131)	18:18	54	09:37 (131)	19:48	4	19:27 (86)	20:19			20:49	5	06:42 (79)	21:07	30	06:59 (79)
23	07:52		08:49 (131)	07:18		07:43 (90)	07:35		19:20 (86)	06:46			06:13		06:34 (79)	06:06		06:29 (79)
	17:42	69	09:58 (131)	18:19	46	09:32 (131)	19:49	8	19:28 (86)	20:20			20:49	11	06:45 (79)	21:08	30	06:59 (79)
24	07:51		08:49 (131)	07:17		07:44 (90)	07:33		19:18 (86)	06:45			06:13		06:33 (79)	06:06		06:29 (79)
	17:44	69	09:58 (131)	18:20	26	08:10 (90)	19:50	12	19:30 (86)	20:21			20:50	13	06:46 (79)	21:08	30	06:59 (79)
25	07:50		08:49 (131)	07:15		07:45 (90)	07:32		19:16 (86)	06:44			06:12		06:33 (79)	06:07		06:30 (79)
	17:45	69	09:58 (131)	18:22	25	08:10 (90)	19:51	14	19:30 (86)	20:22			20:51	15	06:48 (79)	21:08	30	07:00 (79)
26	07:49		08:50 (131)	07:14		07:45 (90)	07:30		19:16 (86)	06:42			06:11		06:32 (79)	06:07		06:30 (79)
	17:46	69	09:59 (131)	18:23	23	08:08 (90)	19:53	16	19:32 (86)	20:23			20:52	17	06:49 (79)	21:08	30	07:00 (79)
27	07:49		08:50 (131)	07:12		07:46 (90)	07:28		19:15 (86)	06:41			06:11		06:32 (79)	06:07		06:30 (79)
	17:47	69	09:59 (131)	18:24	22	08:08 (90)	19:54	18	19:33 (86)	20:24			20:53	18	06:50 (79)	21:08	30	07:00 (79)
28	07:48		08:50 (131)	07:11		07:47 (90)	07:27		19:14 (86)	06:40			06:10		06:31 (79)	06:08		06:31 (79)
	17:48	70	10:00 (131)	18:25	19	08:06 (90)	19:55	19	19:33 (86)	20:25			20:54	20	06:51 (79)	21:08	30	07:01 (79)
29	07:47		08:50 (131)				07:25		19:14 (86)	06:38			06:10		06:31 (79)	06:08		06:31 (79)
	17:50	70	10:00 (131)				19:56	21	19:35 (86)	20:26			20:54	21	06:52 (79)	21:08	29	07:00 (79)
30	07:46		08:50 (131)				07:23		19:14 (86)	06:37			06:09		06:30 (79)	06:09		06:32 (79)
	17:51	70	10:00 (131)				19:57	21	19:35 (86)	20:27			20:55	22	06:52 (79)	21:08	29	07:01 (79)
31	07:45		08:50 (131)				07:22		07:45 (80)				06:09		06:30 (79)			
	17:52	70	10:00 (131)				19:58	32	19:34 (86)				20:56	23	06:53 (79)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		1971			1623			189			582			165			867	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.61			0.61			0.66			0.66			0.68			0.68	
Total reduction		0.22			0.26			0.29			0.34			0.38			0.41	
Total, real		429			415			54			196			63			353	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 15

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 348 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5535)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:31 (79)	06:32			07:02		07:31 (80)	07:31			07:03		08:24 (131)	07:37		08:31 (131)
	21:08	30	07:01 (79)	20:51			20:09	31	08:02 (80)	19:18			17:33	62	09:26 (131)	17:10	61	09:32 (131)
2	06:10		06:32 (79)	06:33			07:03		07:30 (80)	07:32			07:05		08:24 (131)	07:38		08:32 (131)
	21:08	30	07:02 (79)	20:50			20:08	32	08:02 (80)	19:17			17:32	64	09:28 (131)	17:10	60	09:32 (131)
3	06:10		06:32 (79)	06:34			07:04		07:30 (80)	07:33			07:06		08:23 (131)	07:39		08:33 (131)
	21:08	29	07:01 (79)	20:49			20:06	32	08:02 (80)	19:15			17:31	65	09:28 (131)	17:10	59	09:32 (131)
4	06:11		06:33 (79)	06:35			07:05		07:30 (80)	07:34			07:07		08:23 (131)	07:40		08:33 (131)
	21:08	29	07:02 (79)	20:48			20:05	31	08:01 (80)	19:14			17:30	65	09:28 (131)	17:10	59	09:32 (131)
5	06:11		06:33 (79)	06:36			07:06		07:30 (80)	07:35			07:08		08:22 (131)	07:41		08:34 (131)
	21:08	28	07:01 (79)	20:46			20:03	31	08:01 (80)	19:12			17:29	67	09:29 (131)	17:09	58	09:32 (131)
6	06:12		06:34 (79)	06:37			07:07		07:30 (80)	07:36			07:09		08:22 (131)	07:42		08:35 (131)
	21:07	28	07:02 (79)	20:45			20:01	30	08:00 (80)	19:10			17:28	67	09:29 (131)	17:09	57	09:32 (131)
7	06:12		06:34 (79)	06:38			07:08		07:31 (80)	07:37			07:10		08:22 (131)	07:43		08:36 (131)
	21:07	27	07:01 (79)	20:44			20:00	28	07:59 (80)	19:09			17:27	68	09:30 (131)	17:09	57	09:33 (131)
8	06:13		06:35 (79)	06:39			07:09		07:30 (80)	07:38			07:11		08:22 (131)	07:44		08:37 (131)
	21:07	27	07:02 (79)	20:43			19:56	37	19:22 (86)	19:07			17:25	68	09:30 (131)	17:09	56	09:33 (131)
9	06:14		06:36 (79)	06:40			07:09		07:31 (80)	07:39			07:13		08:22 (131)	07:45		08:38 (131)
	21:07	26	07:02 (79)	20:42			19:55	39	19:24 (86)	19:06			17:24	68	09:30 (131)	17:09	55	09:33 (131)
10	06:14		06:36 (79)	06:41			07:10		07:32 (80)	07:40			07:14		08:21 (131)	07:46		08:39 (131)
	21:06	25	07:01 (79)	20:41			19:53	39	19:25 (86)	19:04			17:23	70	09:31 (131)	17:09	54	09:33 (131)
11	06:15		06:37 (79)	06:42			07:11		07:34 (80)	07:41			07:15		08:22 (131)	07:46		08:38 (131)
	21:06	24	07:01 (79)	20:39			19:52	37	19:26 (86)	19:03			17:23	70	09:32 (131)	17:09	54	09:32 (131)
12	06:16		06:38 (79)	06:43			07:12		07:36 (80)	07:42		08:23 (90)	07:16		08:22 (131)	07:47		08:39 (131)
	21:05	23	07:01 (79)	20:38			19:50	33	19:26 (86)	19:01	12	08:35 (90)	17:22	70	09:32 (131)	17:10	54	09:33 (131)
13	06:16		06:38 (79)	06:44			07:13		19:05 (86)	07:43		08:21 (90)	07:17		08:22 (131)	07:48		08:40 (131)
	21:05	22	07:00 (79)	20:37			19:48	21	19:26 (86)	18:59	16	08:37 (90)	17:21	70	09:32 (131)	17:10	53	09:33 (131)
14	06:17		06:39 (79)	06:45			07:14		19:04 (86)	07:44		08:19 (90)	07:18		08:22 (131)	07:49		08:41 (131)
	21:05	21	07:00 (79)	20:35			19:47	21	19:25 (86)	18:58	20	08:39 (90)	17:20	69	09:31 (131)	17:10	53	09:34 (131)
15	06:18		06:40 (79)	06:46			07:15		19:04 (86)	07:45		08:18 (90)	07:20		08:23 (131)	07:49		08:41 (131)
	21:04	20	07:00 (79)	20:34			19:45	20	19:24 (86)	18:56	23	08:41 (90)	17:19	69	09:32 (131)	17:10	52	09:33 (131)
16	06:19		06:40 (79)	06:47			07:16		19:04 (86)	07:46		08:17 (90)	07:21		08:23 (131)	07:50		08:42 (131)
	21:03	19	06:59 (79)	20:33			19:43	18	19:22 (86)	18:55	24	08:41 (90)	17:18	69	09:32 (131)	17:10	52	09:34 (131)
17	06:19		06:41 (79)	06:48			07:17		19:04 (86)	07:47		08:16 (90)	07:22		08:23 (131)	07:51		08:43 (131)
	21:03	18	06:59 (79)	20:31			19:42	16	19:20 (86)	18:53	26	08:42 (90)	17:17	69	09:32 (131)	17:11	51	09:34 (131)
18	06:20		06:42 (79)	06:49			07:18		19:05 (86)	07:48		08:15 (90)	07:23		08:23 (131)	07:52		08:43 (131)
	21:02	16	06:58 (79)	20:30			19:40	14	19:19 (86)	18:52	38	10:00 (131)	17:17	69	09:32 (131)	17:11	51	09:34 (131)
19	06:21		06:43 (79)	06:49			07:19		19:05 (86)	07:49		08:15 (90)	07:24		08:23 (131)	07:52		08:44 (131)
	21:02	14	06:57 (79)	20:29			19:38	12	19:17 (86)	18:51	48	10:05 (131)	17:16	69	09:32 (131)	17:11	51	09:35 (131)
20	06:22		06:44 (79)	06:50			07:20		19:05 (86)	07:50		08:14 (90)	07:25		08:25 (131)	07:53		08:44 (131)
	21:01	12	06:56 (79)	20:27			19:37	10	19:15 (86)	18:49	57	10:09 (131)	17:15	68	09:33 (131)	17:12	51	09:35 (131)
21	06:23		06:44 (79)	06:51			07:21		19:08 (86)	07:51		08:14 (90)	07:26		08:25 (131)	07:53		08:45 (131)
	21:00	9	06:53 (79)	20:26			19:35	5	19:13 (86)	18:48	61	10:11 (131)	17:15	68	09:33 (131)	17:12	51	09:36 (131)
22	06:23			06:52			07:22			07:52		08:14 (90)	07:28		08:25 (131)	07:54		08:45 (131)
	21:00			20:24			19:33			18:46	65	10:13 (131)	17:14	68	09:33 (131)	17:13	51	09:36 (131)
23	06:24			06:53		07:43 (80)	07:23			07:53		08:15 (90)	07:29		08:26 (131)	07:54		08:46 (131)
	20:59			20:23	12	07:55 (80)	19:32			18:45	68	10:16 (131)	17:14	66	09:32 (131)	17:13	51	09:37 (131)
24	06:25			06:54		07:40 (80)	07:24			07:54		08:15 (90)	07:30		08:26 (131)	07:55		08:46 (131)
	20:58			20:21	18	07:58 (80)	19:30			18:44	71	10:18 (131)	17:13	66	09:32 (131)	17:14	51	09:37 (131)
25	06:26			06:55		07:38 (80)	07:25			07:56		08:16 (90)	07:31		08:27 (131)	07:55		08:47 (131)
	20:57			20:20	21	07:59 (80)	19:28			18:42	72	10:19 (131)	17:12	65	09:32 (131)	17:14	51	09:38 (131)
26	06:27			06:56		07:37 (80)	07:26			07:57		08:17 (90)	07:32		08:28 (131)	07:56		08:47 (131)
	20:56			20:18	23	08:00 (80)	19:27			18:41	72	10:20 (131)	17:12	65	09:33 (131)	17:15	51	09:38 (131)
27	06:28			06:57		07:35 (80)	07:27			07:58		08:18 (90)	07:33		08:29 (131)	07:56		08:47 (131)
	20:55			20:17	26	08:01 (80)	19:25			18:40	71	10:21 (131)	17:12	64	09:33 (131)	17:16	52	09:39 (131)
28	06:29			06:58		07:33 (80)	07:28			07:59		08:19 (90)	07:34		08:29 (131)	07:56		08:48 (131)
	20:55			20:15	28	08:01 (80)	19:23			18:38	72	10:22 (131)	17:11	64	09:33 (131)	17:16	52	09:40 (131)
29	06:30			06:59		07:32 (80)	07:29			08:00		08:22 (90)	07:35		08:30 (131)	07:56		08:48 (131)
	20:54			20:14	30	08:02 (80)	19:22			18:37	69	10:24 (131)	17:11	63	09:33 (131)	17:17	53	09:41 (131)
30	06:31			07:00		07:32 (80)	07:30			08:01		09:25 (131)	07:36		08:31 (131)	07:57		08:48 (131)
	20:53			20:12	30	08:02 (80)	19:20			18:36	60	10:25 (131)	17:10	61	09:32 (131)	17:18	53	09:41 (131)
31	06:31			07:01		07:31 (80)				08:02		09:24 (131)				07:57		08:48 (131)
	20:52			20:11	31	08:02 (80)				18:34	62	10:26 (131)				17:19	54	09:42 (131)
Potential sun hours	456			426			374			346			300			291		
Total, worst case		477			219			537			1007			2006			1668	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.68			0.67			0.66			0.62			0.61			0.61	
Total reduction		0.41			0.40			0.40			0.34			0.22			0.30	
Total, real		194			87			216			346			448			504	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 16

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 400 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5566)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May	June
1	07:57		08:58 (85)	07:45			07:10		07:30 (99)	07:20		07:47 (84)	06:36	06:08
	17:20	76	15:42 (113)	17:53			18:26	23	07:53 (99)	19:59	79	19:21 (112)	20:28	20:57
2	07:57		08:58 (85)	07:44			07:08		07:30 (99)	07:19		07:46 (84)	06:35	06:08
	17:21	75	15:42 (113)	17:54			18:27	22	07:52 (99)	20:00	81	19:21 (112)	20:29	20:58
3	07:58		08:59 (85)	07:43			07:07		07:30 (99)	07:17		07:47 (84)	06:33	06:07
	17:21	73	15:42 (113)	17:56			18:28	23	07:53 (99)	20:00	82	19:22 (112)	20:30	20:58
4	07:58		09:00 (85)	07:42			07:05		07:29 (99)	07:15		07:46 (84)	06:32	06:07
	17:22	70	15:42 (113)	17:57			18:29	23	07:52 (99)	20:01	83	19:22 (112)	20:31	20:59
5	07:58		09:00 (85)	07:41			07:04		07:30 (99)	07:14		07:46 (84)	06:31	06:07
	17:23	69	15:41 (113)	17:58			18:31	22	07:52 (99)	20:02	82	19:21 (112)	20:32	21:00
6	07:58		09:01 (85)	07:40			07:02		07:30 (99)	07:12		07:47 (84)	06:30	06:06
	17:24	66	15:41 (113)	17:59			18:32	21	07:51 (99)	20:03	81	19:22 (112)	20:33	21:00
7	07:58		09:02 (85)	07:38			07:00		07:30 (99)	07:11		07:47 (84)	06:29	06:06
	17:25	63	15:40 (113)	18:01			18:33	19	07:49 (99)	20:04	81	19:22 (112)	20:34	21:01
8	07:57		09:03 (85)	07:37			07:59		08:32 (99)	07:09		07:48 (84)	06:27	06:06
	17:26	60	15:39 (113)	18:02			19:34	16	08:48 (99)	20:05	79	19:22 (112)	20:35	21:02
9	07:57		09:04 (85)	07:36			07:57		08:33 (99)	07:07		07:49 (84)	06:26	06:06
	17:27	55	15:38 (113)	18:03			19:35	13	08:46 (99)	20:06	76	19:22 (112)	20:36	21:02
10	07:57		09:04 (85)	07:35			07:56		08:37 (99)	07:06		07:51 (84)	06:25	06:06
	17:28	48	15:35 (113)	18:04			19:36	6	08:43 (99)	20:07	72	19:22 (112)	20:37	21:03
11	07:57		09:05 (85)	07:34			07:54			07:04		07:53 (84)	06:24	06:05
	17:29	39	09:44 (85)	18:05			19:37			20:08	66	19:21 (112)	20:38	21:03
12	07:57		09:06 (85)	07:33			07:53			07:03		18:26 (112)	06:23	06:05
	17:30	38	09:44 (85)	18:07			19:38			20:09	55	19:21 (112)	20:39	21:04
13	07:56		09:06 (85)	07:32			07:51			07:01		18:26 (112)	06:22	06:05
	17:31	38	09:44 (85)	18:08			19:39			20:10	54	19:20 (112)	20:40	21:04
14	07:56		09:08 (85)	07:30			07:49			07:00		18:25 (112)	06:21	06:05
	17:32	36	09:44 (85)	18:09			19:40			20:11	54	19:19 (112)	20:41	21:05
15	07:56		09:09 (85)	07:29			07:48			06:58		18:26 (112)	06:20	06:05
	17:33	35	09:44 (85)	18:10			19:41			20:12	53	19:19 (112)	20:42	21:05
16	07:55		09:10 (85)	07:28			07:46			06:57		18:27 (112)	06:19	06:05
	17:34	33	09:43 (85)	18:11			19:42			20:13	52	19:19 (112)	20:43	21:06
17	07:55		09:11 (85)	07:26			07:45			06:55		18:27 (112)	06:18	06:05
	17:36	32	09:43 (85)	18:12			19:43			20:14	50	19:17 (112)	20:44	21:06
18	07:54		09:12 (85)	07:25			07:43			06:54		18:27 (112)	06:18	06:05
	17:37	29	09:41 (85)	18:14			19:44			20:15	50	19:17 (112)	20:45	21:06
19	07:54		09:14 (85)	07:24			07:41			06:52		18:27 (112)	06:17	06:05
	17:38	27	09:41 (85)	18:15			19:45			20:16	49	19:16 (112)	20:46	21:07
20	07:53		09:15 (85)	07:22			07:40			06:51		18:29 (112)	06:16	06:06
	17:39	24	09:39 (85)	18:16			19:46			20:17	46	19:15 (112)	20:47	21:07
21	07:53		09:17 (85)	07:21			07:38			06:49		18:29 (112)	06:15	06:06
	17:40	20	09:37 (85)	18:17			19:47			20:18	44	19:13 (112)	20:48	21:07
22	07:52		09:20 (85)	07:20			07:36			06:48		18:30 (112)	06:14	06:06
	17:41	16	09:36 (85)	18:18			19:49			20:19	42	19:12 (112)	20:49	21:08
23	07:52		09:24 (85)	07:18			07:35		18:52 (112)	06:47		18:32 (112)	06:14	06:06
	17:42	8	09:32 (85)	18:19			19:50	14	19:06 (112)	20:20	39	19:11 (112)	20:50	21:08
24	07:51			07:17		07:37 (99)	07:33		07:59 (84)	06:45		18:32 (112)	06:13	06:07
	17:44			18:20	10	07:47 (99)	19:51	33	19:10 (112)	20:21	37	19:09 (112)	20:50	21:08
25	07:50			07:15		07:35 (99)	07:32		07:55 (84)	06:44		18:34 (112)	06:12	06:07
	17:45			18:22	14	07:49 (99)	19:52	46	19:12 (112)	20:22	34	19:08 (112)	20:51	21:08
26	07:50			07:14		07:33 (99)	07:30		07:54 (84)	06:42		18:36 (112)	06:11	06:07
	17:46			18:23	17	07:50 (99)	19:53	54	19:15 (112)	20:23	30	19:06 (112)	20:52	21:08
27	07:49			07:13		07:32 (99)	07:28		07:52 (84)	06:41		18:37 (112)	06:11	06:08
	17:47			18:24	20	07:52 (99)	19:54	60	19:16 (112)	20:24	27	19:04 (112)	20:53	21:08
28	07:48			07:11		07:31 (99)	07:27		07:50 (84)	06:40		18:40 (112)	06:10	06:08
	17:48			18:25	21	07:52 (99)	19:55	66	19:17 (112)	20:25	21	19:01 (112)	20:54	21:08
29	07:47						07:25		07:49 (84)	06:38		18:43 (112)	06:10	06:08
	17:50						19:56	71	19:19 (112)	20:26	15	18:58 (112)	20:55	21:08
30	07:46						07:23		07:48 (84)	06:37			06:09	06:09
	17:51						19:57	74	19:19 (112)	20:27			20:55	21:08
31	07:45						07:22		07:47 (84)				06:09	
	17:52						19:58	77	19:20 (112)				20:56	
Potential sun hours	300			299			370			397			446	449
Total, worst case		1030			82			683			1614			
Sun reduction		0.36			0.42			0.44			0.51			
Oper. time red.		1.00			1.00			1.00			1.00			
Wind dir. red.		0.62			0.63			0.65			0.66			
Total reduction		0.22			0.27			0.29			0.34			
Total, real		229			22			196			542			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 17

Licensed user:
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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 400 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5566)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July	August		September		October			November			December		
1	06:09	06:32		07:02		07:31			07:04			07:37		
	21:08	20:51		20:09	66	07:52 (84)	19:19		17:33			17:10	39	08:47 (85)
2	06:10	06:33		07:03		19:20 (112)	07:32		07:05			07:38		09:26 (85)
	21:08	20:50		20:08	72	07:49 (84)	19:17		17:32			17:10	47	08:47 (85)
3	06:10	06:34		07:04		19:20 (112)	07:33		07:06			07:39		15:17 (113)
	21:08	20:49		20:06	76	07:47 (84)	19:15		17:31			17:10	55	08:47 (85)
4	06:11	06:35		07:05		19:20 (112)	07:34		07:07			07:40		15:21 (113)
	21:08	20:48		20:05	79	07:45 (84)	19:14	10	08:12 (99)	17:30		17:10	59	08:47 (85)
5	06:11	06:36		07:06		19:19 (112)	07:35		08:22 (99)	07:08		07:41		15:23 (113)
	21:08	20:47		20:03	81	07:44 (84)	19:12	15	08:09 (99)	17:29		17:10	62	08:47 (85)
6	06:12	06:37		07:07		19:19 (112)	07:36		08:24 (99)	07:09		07:42		15:25 (113)
	21:08	20:45		20:01	81	07:43 (84)	19:10	18	08:07 (99)	17:28		17:09	66	08:47 (85)
7	06:12	06:38		07:08		19:18 (112)	07:37		08:25 (99)	07:10		07:43		15:27 (113)
	21:07	20:44		20:00	83	07:42 (84)	19:09	20	08:06 (99)	17:27		17:09	69	08:47 (85)
8	06:13	06:39		07:09		19:18 (112)	07:38		08:26 (99)	07:12		07:44		15:28 (113)
	21:07	20:43		19:57	83	07:41 (84)	19:07	21	08:05 (99)	17:26		17:09	71	08:48 (85)
9	06:14	06:40		07:10		19:17 (112)	07:39		08:26 (99)	07:13		07:45		15:30 (113)
	21:07	20:42		19:55	81	07:40 (84)	19:06	22	08:04 (99)	17:25		17:09	73	08:48 (85)
10	06:14	06:41		07:10		19:15 (112)	07:40		08:26 (99)	07:14		07:46		15:31 (113)
	21:06	20:41		19:53	81	07:39 (84)	19:04	22	08:04 (99)	17:24		17:09	75	08:48 (85)
11	06:15	06:42		07:11		19:14 (112)	07:41		08:26 (99)	07:15		07:47		15:32 (113)
	21:06	20:39		19:52	80	07:39 (84)	19:03	23	08:03 (99)	17:23		17:09	76	08:49 (85)
12	06:16	06:43		07:12		19:13 (112)	07:42		08:26 (99)	07:16		07:47		15:33 (113)
	21:06	20:38		19:50	77	07:39 (84)	19:01	23	08:03 (99)	17:22		17:10	79	08:48 (85)
13	06:16	06:44		07:13		19:12 (112)	07:43		08:26 (99)	07:17		07:48		15:34 (113)
	21:05	20:37	5	19:48	75	07:39 (84)	19:00	22	08:03 (99)	17:21		17:10	78	08:49 (85)
14	06:17	06:45		07:14		19:11 (112)	07:44		08:25 (99)	07:19		07:49		15:35 (113)
	21:05	20:36	17	19:47	72	07:39 (84)	18:58	21	08:04 (99)	17:20		17:10	79	08:50 (85)
15	06:18	06:46		07:15		19:09 (112)	07:45		08:25 (99)	07:20		07:50		15:36 (113)
	21:04	20:34	23	19:45	68	07:40 (84)	18:56	19	08:05 (99)	17:19		17:10	81	08:50 (85)
16	06:19	06:47		07:16		19:08 (112)	07:46		08:24 (99)	07:21		07:50		15:37 (113)
	21:04	20:33	28	19:43	61	07:41 (84)	18:55	16	08:06 (99)	17:18		17:10	81	08:50 (85)
17	06:19	06:48		07:17		19:06 (112)	07:47		08:22 (99)	07:22		07:51		15:37 (113)
	21:03	20:32	32	19:42	56	07:42 (84)	18:54	13	08:07 (99)	17:18		17:11	82	08:51 (85)
18	06:20	06:49		07:18		19:04 (112)	07:48		08:20 (99)	07:23		07:52		15:38 (113)
	21:02	20:30	35	19:40	48	07:43 (84)	18:52	7	08:10 (99)	17:17		17:11	82	08:51 (85)
19	06:21	06:50		07:19		19:01 (112)	07:49		08:17 (99)	07:24		07:52		15:38 (113)
	21:02	20:29	37	19:38	38	07:45 (84)	18:51			17:16	8	08:59 (85)	17:12	08:51 (85)
20	06:22	06:51		07:20		18:58 (112)	07:50			07:25		09:07 (85)	07:53	15:39 (113)
	21:01	20:27	40	19:37	17	18:37 (112)	18:49			17:15	16	08:55 (85)	17:12	08:52 (85)
21	06:23	06:51		07:21		18:54 (112)	07:51			07:27		09:11 (85)	07:53	15:40 (113)
	21:00	20:26	42	19:35			18:48			17:15	20	08:53 (85)	17:12	08:52 (85)
22	06:24	06:52		07:22			07:52			07:28		09:13 (85)	07:54	15:40 (113)
	21:00	20:24	45	19:33			18:46			17:14	24	08:51 (85)	17:13	08:53 (85)
23	06:24	06:53		07:23			07:53			07:29		09:15 (85)	07:54	15:41 (113)
	20:59	20:23	47	19:32			18:45			17:14	27	08:50 (85)	17:13	08:53 (85)
24	06:25	06:54		07:24			07:55			07:30		09:17 (85)	07:55	15:41 (113)
	20:58	20:22	49	19:30			18:44			17:13	29	08:49 (85)	17:14	08:53 (85)
25	06:26	06:55		07:25			07:56			07:31		09:18 (85)	07:55	15:41 (113)
	20:57	20:20	50	19:28			18:42			17:13	32	08:49 (85)	17:15	08:55 (85)
26	06:27	06:56		07:26			07:57			07:32		09:21 (85)	07:56	15:42 (113)
	20:56	20:19	51	19:27			18:41			17:12	33	08:49 (85)	17:15	08:55 (85)
27	06:28	06:57		07:27			07:58			07:33		09:22 (85)	07:56	15:42 (113)
	20:56	20:17	53	19:25			18:40			17:12	35	08:48 (85)	17:16	08:55 (85)
28	06:29	06:58		07:28			07:59			07:34		09:23 (85)	07:56	15:42 (113)
	20:55	20:16	53	19:23			18:38			17:11	36	08:48 (85)	17:17	08:56 (85)
29	06:30	06:59		07:29			08:00			07:35		09:24 (85)	07:57	15:43 (113)
	20:54	20:14	54	19:22			18:37			17:11	38	08:47 (85)	17:17	08:57 (85)
30	06:31	07:00		07:30			08:01			07:36		09:25 (85)	07:57	15:43 (113)
	20:53	20:12	55	19:20			18:36			17:11	38	08:47 (85)	17:18	08:57 (85)
31	06:32	07:01		07:30			08:02					09:25 (85)	07:57	15:43 (113)
	20:52	20:11	55	19:20			18:35						17:19	08:57 (85)
Potential sun hours	456	426		374		346			300			291		15:43 (113)
Total, worst case		771		1375		272			336			2312		
Sun reduction		0.60		0.61		0.56			0.37			0.50		
Oper. time red.		1.00		1.00		1.00			1.00			1.00		
Wind dir. red.		0.66		0.66		0.63			0.61			0.63		
Total reduction		0.40		0.40		0.35			0.22			0.31		
Total, real		305		552		96			75			726		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 18

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 401 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5567)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June
1	07:57		08:46 (85)	07:45			07:10		07:29 (99)	07:20		07:47 (84)	06:36		18:30 (112)	06:08
	17:20	45	09:31 (85)	17:53			18:26	21	07:50 (99)	19:59	81	19:18 (112)	20:28	31	19:01 (112)	20:57
2	07:57		08:47 (85)	07:44			07:08		07:28 (99)	07:19		07:46 (84)	06:35		18:32 (112)	06:08
	17:21	44	09:31 (85)	17:54			18:27	22	07:50 (99)	20:00	83	19:18 (112)	20:29	27	18:59 (112)	20:58
3	07:58		08:47 (85)	07:43			07:07		07:28 (99)	07:17		07:46 (84)	06:33		18:35 (112)	06:07
	17:21	45	09:32 (85)	17:56			18:28	22	07:50 (99)	20:00	84	19:19 (112)	20:30	22	18:57 (112)	20:58
4	07:58		08:48 (85)	07:42			07:05		07:28 (99)	07:15		07:46 (84)	06:32		18:38 (112)	06:07
	17:22	44	09:32 (85)	17:57			18:29	22	07:50 (99)	20:01	84	19:19 (112)	20:31	15	18:53 (112)	20:59
5	07:58		08:48 (85)	07:41			07:04		07:28 (99)	07:14		07:46 (84)	06:31			06:07
	17:23	45	09:33 (85)	17:58			18:31	22	07:50 (99)	20:02	84	19:19 (112)	20:32			21:00
6	07:58		08:49 (85)	07:40			07:02		07:28 (99)	07:12		07:47 (84)	06:30			06:06
	17:24	44	09:33 (85)	17:59			18:32	21	07:49 (99)	20:03	84	19:20 (112)	20:33			21:00
7	07:58		08:50 (85)	07:38			07:00		07:28 (99)	07:11		07:47 (84)	06:29			06:06
	17:25	43	09:33 (85)	18:01			18:33	19	07:47 (99)	20:04	82	19:19 (112)	20:34			21:01
8	07:57		08:50 (85)	07:37			07:59		08:29 (99)	07:09		07:49 (84)	06:27			06:06
	17:26	44	09:34 (85)	18:02			19:34	17	08:46 (99)	20:05	80	19:20 (112)	20:35			21:02
9	07:57		08:51 (85)	07:36			07:57		08:30 (99)	07:07		07:50 (84)	06:26			06:06
	17:27	43	09:34 (85)	18:03			19:35	14	08:44 (99)	20:06	77	19:20 (112)	20:36			21:02
10	07:57		08:51 (85)	07:35			07:56		08:33 (99)	07:06		07:54 (84)	06:25			06:06
	17:28	43	09:34 (85)	18:04			19:36	9	08:42 (99)	20:07	69	19:20 (112)	20:37			21:03
11	07:57		08:52 (85)	07:34			07:54			07:04		18:18 (112)	06:24			06:05
	17:29	42	09:34 (85)	18:05			19:37			20:08	61	19:19 (112)	20:38			21:03
12	07:57		08:53 (85)	07:33			07:53			07:03		18:18 (112)	06:23			06:05
	17:30	42	09:35 (85)	18:07			19:38			20:09	62	19:20 (112)	20:39			21:04
13	07:56		08:53 (85)	07:32			07:51			07:01		18:18 (112)	06:22			06:05
	17:31	41	09:34 (85)	18:08			19:39			20:10	61	19:19 (112)	20:40			21:04
14	07:56		08:54 (85)	07:30			07:49			07:00		18:17 (112)	06:21			06:05
	17:32	40	09:34 (85)	18:09			19:40			20:11	61	19:18 (112)	20:41			21:05
15	07:56		08:55 (85)	07:29			07:48			06:58		18:18 (112)	06:20			06:05
	17:33	40	09:35 (85)	18:10			19:41			20:12	60	19:18 (112)	20:42			21:05
16	07:55		08:55 (85)	07:28			07:46			06:57		18:18 (112)	06:19			06:05
	17:34	39	09:34 (85)	18:11			19:42			20:13	60	19:18 (112)	20:43			21:06
17	07:55		08:57 (85)	07:26			07:45			06:55		18:18 (112)	06:18			06:05
	17:36	37	09:34 (85)	18:12			19:43			20:14	59	19:17 (112)	20:44			21:06
18	07:54		08:57 (85)	07:25			07:43			06:54		18:19 (112)	06:18			06:05
	17:37	37	09:34 (85)	18:14			19:44			20:15	58	19:17 (112)	20:45			21:06
19	07:54		08:59 (85)	07:24			07:41			06:52		18:18 (112)	06:17			06:06
	17:38	35	09:34 (85)	18:15			19:45			20:16	58	19:16 (112)	20:46			21:07
20	07:53		08:59 (85)	07:22			07:40			06:51		18:19 (112)	06:16			06:06
	17:39	34	09:33 (85)	18:16			19:46			20:17	56	19:15 (112)	20:47			21:07
21	07:53		09:00 (85)	07:21			07:38			06:49		18:19 (112)	06:15			06:06
	17:40	32	09:32 (85)	18:17			19:47			20:18	55	19:14 (112)	20:48			21:07
22	07:52		09:02 (85)	07:20			07:36			06:48		18:20 (112)	06:14			06:06
	17:41	30	09:32 (85)	18:18			19:49			20:19	53	19:13 (112)	20:49			21:08
23	07:52		09:03 (85)	07:18			07:35		18:48 (112)	06:47		18:21 (112)	06:14			06:06
	17:42	28	09:31 (85)	18:19			19:50	12	19:00 (112)	20:20	52	19:13 (112)	20:50			21:08
24	07:51		09:04 (85)	07:17			07:33		07:57 (84)	06:45		18:21 (112)	06:13			06:07
	17:44	25	09:29 (85)	18:20			19:51	35	19:05 (112)	20:21	50	19:11 (112)	20:50			21:08
25	07:50		09:07 (85)	07:15		07:35 (99)	07:32		07:54 (84)	06:44		18:22 (112)	06:12			06:07
	17:45	21	09:28 (85)	18:22	10	07:45 (99)	19:52	47	19:08 (112)	20:22	48	19:10 (112)	20:51			21:08
26	07:50		09:09 (85)	07:14		07:33 (99)	07:30		07:53 (84)	06:42		18:24 (112)	06:11			06:07
	17:46	17	09:26 (85)	18:23	14	07:47 (99)	19:53	55	19:11 (112)	20:23	46	19:10 (112)	20:52			21:08
27	07:49		09:12 (85)	07:13		07:32 (99)	07:28		07:51 (84)	06:41		18:24 (112)	06:11			06:08
	17:47	11	09:23 (85)	18:24	17	07:49 (99)	19:54	62	19:12 (112)	20:24	44	19:08 (112)	20:53			21:08
28	07:48			07:11		07:30 (99)	07:27		07:49 (84)	06:40		18:25 (112)	06:10			06:08
	17:48			18:25	19	07:49 (99)	19:55	67	19:13 (112)	20:25	42	19:07 (112)	20:54			21:08
29	07:47						07:25		07:49 (84)	06:38		18:27 (112)	06:10			06:08
	17:50						19:56	71	19:15 (112)	20:26	38	19:05 (112)	20:55			21:08
30	07:46						07:23		07:47 (84)	06:37		18:28 (112)	06:09			06:09
	17:51						19:57	77	19:16 (112)	20:27	35	19:03 (112)	20:55			21:08
31	07:45						07:22		07:47 (84)				06:09			
	17:52						19:58	78	19:17 (112)				20:56			
Potential sun hours	300			299			370			397			446			449
Total, worst case		991			60			693			1867			95		
Sun reduction		0.36			0.42			0.44			0.51			0.56		
Oper. time red.		1.00			1.00			1.00			1.00			1.00		
Wind dir. red.		0.61			0.63			0.65			0.66			0.66		
Total reduction		0.22			0.27			0.29			0.34			0.37		
Total, real		216			16			198			627			35		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

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4/30/2012 9:43 AM / 19

Licensed user:
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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 401 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5567)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July	August			September			October			November			December		
1	06:09	06:32			07:02		18:17 (112)	07:31			07:04			07:37		08:34 (85)
	21:08	20:51			20:09	61	19:18 (112)	19:19			17:33			17:10	42	09:16 (85)
2	06:10	06:33			07:03		07:52 (84)	07:32			07:05			07:38		08:34 (85)
	21:08	20:50			20:08	69	19:18 (112)	19:17			17:32			17:10	43	09:17 (85)
3	06:10	06:34			07:04		07:48 (84)	07:33		08:13 (99)	07:06			07:39		08:34 (85)
	21:08	20:49			20:06	77	19:18 (112)	19:15	5	08:18 (99)	17:31			17:10	43	09:17 (85)
4	06:11	06:35			07:05		07:46 (84)	07:34		08:09 (99)	07:07			07:40		08:34 (85)
	21:08	20:48			20:05	80	19:17 (112)	19:14	12	08:21 (99)	17:30			17:10	44	09:18 (85)
5	06:11	06:36			07:06		07:44 (84)	07:35		08:07 (99)	07:08			07:41		08:35 (85)
	21:08	20:47			20:03	82	19:16 (112)	19:12	15	08:22 (99)	17:29			17:10	44	09:19 (85)
6	06:12	06:37			07:07		07:43 (84)	07:36		08:05 (99)	07:09			07:42		08:35 (85)
	21:08	20:45			20:01	84	19:16 (112)	19:10	18	08:23 (99)	17:28			17:09	44	09:19 (85)
7	06:12	06:38			07:08		07:42 (84)	07:37		08:04 (99)	07:10			07:43		08:35 (85)
	21:07	20:44			20:00	84	19:15 (112)	19:09	20	08:24 (99)	17:27			17:09	45	09:20 (85)
8	06:13	06:39		18:51 (112)	07:09		07:41 (84)	07:38		08:03 (99)	07:12			07:44		08:36 (85)
	21:07	20:43	7	18:58 (112)	19:57	84	19:14 (112)	19:07	21	08:24 (99)	17:26			17:09	44	09:20 (85)
9	06:14	06:40		18:46 (112)	07:10		07:40 (84)	07:39		08:02 (99)	07:13			07:45		08:36 (85)
	21:07	20:42	17	19:03 (112)	19:55	83	19:12 (112)	19:06	22	08:24 (99)	17:25			17:09	45	09:21 (85)
10	06:14	06:41		18:42 (112)	07:10		07:39 (84)	07:40		08:02 (99)	07:14			07:46		08:37 (85)
	21:06	20:41	24	19:06 (112)	19:53	83	19:11 (112)	19:04	22	08:24 (99)	17:24			17:09	45	09:22 (85)
11	06:15	06:42		18:40 (112)	07:11		07:39 (84)	07:41		08:02 (99)	07:15			07:47		08:37 (85)
	21:06	20:39	28	19:08 (112)	19:52	81	19:10 (112)	19:03	22	08:24 (99)	17:23			17:09	45	09:22 (85)
12	06:16	06:43		18:38 (112)	07:12		07:38 (84)	07:42		08:02 (99)	07:16			07:47		08:37 (85)
	21:06	20:38	32	19:10 (112)	19:50	79	19:09 (112)	19:01	21	08:23 (99)	17:22			17:10	45	09:22 (85)
13	06:16	06:44		18:36 (112)	07:13		07:38 (84)	07:43		08:02 (99)	07:17			07:48		08:38 (85)
	21:05	20:37	36	19:12 (112)	19:48	77	19:07 (112)	19:00	20	08:22 (99)	17:21			17:10	45	09:23 (85)
14	06:17	06:45		18:34 (112)	07:14		07:39 (84)	07:44		08:04 (99)	07:19			07:49		08:38 (85)
	21:05	20:36	39	19:13 (112)	19:47	73	19:06 (112)	18:58	18	08:22 (99)	17:20			17:10	48	15:03 (113)
15	06:18	06:46		18:33 (112)	07:15		07:39 (84)	07:45		08:05 (99)	07:20		08:45 (85)	07:50		08:39 (85)
	21:04	20:34	42	19:15 (112)	19:45	68	19:04 (112)	18:56	15	08:20 (99)	17:19	11	08:56 (85)	17:10	53	15:06 (113)
16	06:19	06:47		18:31 (112)	07:16		07:40 (84)	07:46		08:06 (99)	07:21		08:42 (85)	07:50		08:39 (85)
	21:04	20:33	45	19:16 (112)	19:43	63	19:02 (112)	18:55	12	08:18 (99)	17:18	17	08:59 (85)	17:10	56	15:08 (113)
17	06:19	06:48		18:29 (112)	07:17		07:41 (84)	07:47		08:08 (99)	07:22		08:40 (85)	07:51		08:40 (85)
	21:03	20:32	47	19:16 (112)	19:42	57	19:00 (112)	18:54	7	08:15 (99)	17:18	21	09:01 (85)	17:11	57	15:09 (113)
18	06:20	06:49		18:28 (112)	07:18		07:42 (84)	07:48			07:23		08:38 (85)	07:52		08:40 (85)
	21:02	20:30	48	19:16 (112)	19:40	49	18:57 (112)	18:52			17:17	25	09:03 (85)	17:11	59	15:10 (113)
19	06:21	06:50		18:27 (112)	07:19		07:44 (84)	07:49			07:24		08:38 (85)	07:52		08:40 (85)
	21:02	20:29	50	19:17 (112)	19:38	37	18:53 (112)	18:51			17:16	28	09:06 (85)	17:12	60	15:11 (113)
20	06:22	06:51		18:26 (112)	07:20		07:49 (84)	07:50			07:25		08:37 (85)	07:53		08:41 (85)
	21:01	20:27	52	19:18 (112)	19:37	17	18:48 (112)	18:49			17:15	30	09:07 (85)	17:12	60	15:12 (113)
21	06:23	06:51		18:25 (112)	07:21			07:51			07:27		08:36 (85)	07:53		08:41 (85)
	21:00	20:26	53	19:18 (112)	19:35			18:48			17:15	32	09:08 (85)	17:12	60	15:12 (113)
22	06:24	06:52		18:24 (112)	07:22			07:52			07:28		08:35 (85)	07:54		08:42 (85)
	21:00	20:24	55	19:19 (112)	19:33			18:46			17:14	34	09:09 (85)	17:13	60	15:13 (113)
23	06:24	06:53		18:23 (112)	07:23			07:53			07:29		08:35 (85)	07:54		08:42 (85)
	20:59	20:23	56	19:19 (112)	19:32			18:45			17:14	35	09:10 (85)	17:13	60	15:13 (113)
24	06:25	06:54		18:22 (112)	07:24			07:55			07:30		08:34 (85)	07:55		08:42 (85)
	20:58	20:22	58	19:20 (112)	19:30			18:44			17:13	37	09:11 (85)	17:14	60	15:13 (113)
25	06:26	06:55		18:21 (112)	07:25			07:56			07:31		08:35 (85)	07:55		08:44 (85)
	20:57	20:20	59	19:20 (112)	19:28			18:42			17:13	37	09:12 (85)	17:15	59	15:14 (113)
26	06:27	06:56		18:21 (112)	07:26			07:57			07:32		08:34 (85)	07:56		08:44 (85)
	20:56	20:19	59	19:20 (112)	19:27			18:41			17:12	39	09:13 (85)	17:15	58	15:13 (113)
27	06:28	06:57		18:20 (112)	07:27			07:58			07:33		08:34 (85)	07:56		08:44 (85)
	20:56	20:17	60	19:20 (112)	19:25			18:40			17:12	40	09:14 (85)	17:16	57	15:13 (113)
28	06:29	06:58		18:19 (112)	07:28			07:59			07:34		08:34 (85)	07:56		08:45 (85)
	20:55	20:16	61	19:20 (112)	19:23			18:38			17:11	40	09:14 (85)	17:17	54	15:13 (113)
29	06:30	06:59		18:18 (112)	07:29			08:00			07:35		08:34 (85)	07:57		08:45 (85)
	20:54	20:14	61	19:19 (112)	19:22			18:37			17:11	41	09:15 (85)	17:17	50	15:11 (113)
30	06:31	07:00		18:18 (112)	07:30			08:01			07:36		08:34 (85)	07:57		08:46 (85)
	20:53	20:12	61	19:19 (112)	19:20			18:36			17:11	42	09:16 (85)	17:18	44	09:30 (85)
31	06:32	07:01		18:17 (112)				08:02						07:57		08:46 (85)
	20:52	20:11	62	19:19 (112)				18:35						17:19	45	09:31 (85)
Potential sun hours	456	426			374			346			300			291		
Total, worst case			1112			1388			250			509			1574	
Sun reduction			0.60			0.61			0.56			0.37			0.50	
Oper. time red.			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.			0.66			0.66			0.63			0.61			0.61	
Total reduction			0.40			0.40			0.35			0.22			0.31	
Total, real			439			557			88			114			481	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 20

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 402 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5568)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February	March			April			May	June
1	07:57		08:44 (85)	07:45	07:10			07:20		07:53 (84)	06:36	06:08
	17:20	41	09:25 (85)	17:53	18:26			19:59	90	19:06 (112)	20:28	20:57
2	07:57		08:45 (85)	07:44	07:08			07:19		07:54 (84)	06:35	06:08
	17:21	40	09:25 (85)	17:54	18:27			20:00	88	19:06 (112)	20:29	20:58
3	07:58		08:45 (85)	07:43	07:07			07:17		07:55 (84)	06:33	06:07
	17:21	40	09:25 (85)	17:56	18:28			20:00	86	19:06 (112)	20:30	20:58
4	07:58		08:46 (85)	07:42	07:05			07:15		07:57 (84)	06:32	06:07
	17:22	40	09:26 (85)	17:57	18:29			20:01	81	19:06 (112)	20:31	20:59
5	07:58		08:46 (85)	07:41	07:04			07:14		08:00 (84)	06:31	06:07
	17:23	40	09:26 (85)	17:58	18:31			20:02	74	19:05 (112)	20:32	21:00
6	07:58		08:47 (85)	07:40	07:02			07:12		17:58 (112)	06:30	06:06
	17:24	40	09:27 (85)	17:59	18:32			20:03	67	19:05 (112)	20:33	21:00
7	07:58		08:48 (85)	07:38	07:00			07:11		17:57 (112)	06:29	06:06
	17:25	39	09:27 (85)	18:01	18:33			20:04	67	19:04 (112)	20:34	21:01
8	07:57		08:48 (85)	07:37	07:59			07:09		17:58 (112)	06:27	06:06
	17:26	39	09:27 (85)	18:02	19:34			20:05	66	19:04 (112)	20:35	21:02
9	07:57		08:49 (85)	07:36	07:57			07:07		17:58 (112)	06:26	06:06
	17:27	39	09:28 (85)	18:03	19:35			20:06	65	19:03 (112)	20:36	21:02
10	07:57		08:49 (85)	07:35	07:56			07:06		17:59 (112)	06:25	06:06
	17:28	38	09:27 (85)	18:04	19:36			20:07	64	19:03 (112)	20:37	21:03
11	07:57		08:50 (85)	07:34	07:54			07:04		17:59 (112)	06:24	06:05
	17:29	37	09:27 (85)	18:05	19:37			20:08	63	19:02 (112)	20:38	21:03
12	07:57		08:51 (85)	07:33	07:53			07:03		18:00 (112)	06:23	06:05
	17:30	37	09:28 (85)	18:07	19:38			20:09	62	19:02 (112)	20:39	21:04
13	07:56		08:52 (85)	07:32	07:51		18:32 (112)	07:01		18:00 (112)	06:22	06:05
	17:31	36	09:28 (85)	18:08	19:39	12	18:44 (112)	20:10	60	19:00 (112)	20:40	21:04
14	07:56		08:52 (85)	07:30	07:49		18:25 (112)	07:00		18:01 (112)	06:21	06:05
	17:32	35	09:27 (85)	18:09	19:40	24	18:49 (112)	20:11	59	19:00 (112)	20:41	21:05
15	07:56		08:54 (85)	07:29	07:48		18:22 (112)	06:58		18:01 (112)	06:20	06:05
	17:33	34	09:28 (85)	18:10	19:41	31	18:53 (112)	20:12	57	18:58 (112)	20:42	21:05
16	07:55		08:54 (85)	07:28	07:46		18:18 (112)	06:57		18:02 (112)	06:19	06:05
	17:34	33	09:27 (85)	18:11	19:42	37	18:55 (112)	20:13	56	18:58 (112)	20:43	21:06
17	07:55		08:56 (85)	07:26	07:45		18:15 (112)	06:55		18:02 (112)	06:18	06:05
	17:36	31	09:27 (85)	18:12	19:43	42	18:57 (112)	20:14	54	18:56 (112)	20:44	21:06
18	07:54		08:56 (85)	07:25	07:43		18:14 (112)	06:54		18:04 (112)	06:18	06:05
	17:37	30	09:26 (85)	18:14	19:44	45	18:59 (112)	20:15	51	18:55 (112)	20:45	21:06
19	07:54		08:58 (85)	07:24	07:41		18:12 (112)	06:52		18:04 (112)	06:17	06:06
	17:38	28	09:26 (85)	18:15	19:45	48	19:00 (112)	20:16	49	18:53 (112)	20:46	21:07
20	07:53		08:59 (85)	07:22	07:40		08:03 (84)	06:51		18:06 (112)	06:16	06:06
	17:39	26	09:25 (85)	18:16	19:46	64	19:02 (112)	20:17	46	18:52 (112)	20:47	21:07
21	07:53		09:00 (85)	07:21	07:38		08:00 (84)	06:49		18:07 (112)	06:15	06:06
	17:40	23	09:23 (85)	18:17	19:47	72	19:03 (112)	20:18	43	18:50 (112)	20:48	21:07
22	07:52		09:02 (85)	07:20	07:36		07:58 (84)	06:48		18:08 (112)	06:14	06:06
	17:41	21	09:23 (85)	18:18	19:49	76	19:03 (112)	20:19	41	18:49 (112)	20:49	21:08
23	07:52		09:04 (85)	07:18	07:35		07:57 (84)	06:47		18:10 (112)	06:14	06:06
	17:42	17	09:21 (85)	18:19	19:50	80	19:04 (112)	20:20	37	18:47 (112)	20:50	21:08
24	07:51		09:07 (85)	07:17	07:33		07:55 (84)	06:45		18:12 (112)	06:13	06:07
	17:44	11	09:18 (85)	18:20	19:51	85	19:05 (112)	20:21	32	18:44 (112)	20:50	21:08
25	07:50			07:15	07:32		07:54 (84)	06:44		18:14 (112)	06:12	06:07
	17:45			18:22	19:52	87	19:05 (112)	20:22	28	18:42 (112)	20:51	21:08
26	07:50			07:14	07:30		07:54 (84)	06:42		18:18 (112)	06:11	06:07
	17:46			18:23	19:53	89	19:06 (112)	20:23	21	18:39 (112)	20:52	21:08
27	07:49			07:13	07:28		07:53 (84)	06:41		18:21 (112)	06:11	06:08
	17:47			18:24	19:54	91	19:06 (112)	20:24	13	18:34 (112)	20:53	21:08
28	07:48			07:11	07:27		07:52 (84)	06:40			06:10	06:08
	17:48			18:25	19:55	93	19:06 (112)	20:25			20:54	21:08
29	07:47				07:25		07:53 (84)	06:38			06:10	06:08
	17:50				19:56	93	19:07 (112)	20:26			20:55	21:08
30	07:46				07:23		07:52 (84)	06:37			06:09	06:09
	17:51				19:57	93	19:06 (112)	20:27			20:55	21:08
31	07:45				07:22		07:53 (84)				06:09	
	17:52				19:58	92	19:07 (112)				20:56	
Potential sun hours	300			299	370			397			446	449
Total, worst case		795				1254			1520			
Sun reduction		0.36				0.44			0.51			
Oper. time red.		1.00				1.00			1.00			
Wind dir. red.		0.61				0.66			0.67			
Total reduction		0.22				0.29			0.34			
Total, real		173				365			515			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

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4/30/2012 9:43 AM / 21

Licensed user:
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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 402 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5568)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July	August			September			October	November			December		
1	06:09	06:32			07:02		17:58 (112)	07:31	07:04			07:37		08:32 (85)
	21:08	20:51			20:09	63	19:01 (112)	19:19	17:33			17:10	37	09:09 (85)
2	06:10	06:33			07:03		17:57 (112)	07:32	07:05			07:38		08:32 (85)
	21:08	20:50			20:08	64	19:01 (112)	19:17	17:32			17:10	38	09:10 (85)
3	06:10	06:34			07:04		17:56 (112)	07:33	07:06			07:39		08:32 (85)
	21:08	20:49			20:06	65	19:01 (112)	19:15	17:31			17:10	39	09:11 (85)
4	06:11	06:35			07:05		17:55 (112)	07:34	07:07			07:40		08:32 (85)
	21:08	20:48			20:05	66	19:01 (112)	19:14	17:30			17:10	39	09:11 (85)
5	06:11	06:36			07:06		17:55 (112)	07:35	07:08			07:41		08:33 (85)
	21:08	20:47			20:03	66	19:01 (112)	19:12	17:29			17:10	39	09:12 (85)
6	06:12	06:37			07:07		17:54 (112)	07:36	07:09			07:42		08:33 (85)
	21:08	20:45			20:01	67	19:01 (112)	19:10	17:28			17:09	40	09:13 (85)
7	06:12	06:38			07:08		07:56 (84)	07:37	07:10			07:43		08:33 (85)
	21:07	20:44			20:00	74	19:01 (112)	19:09	17:27			17:09	40	09:13 (85)
8	06:13	06:39			07:09		07:52 (84)	07:38	07:12			07:44		08:34 (85)
	21:07	20:43			19:57	81	19:01 (112)	19:07	17:26			17:09	40	09:14 (85)
9	06:14	06:40			07:10		07:49 (84)	07:39	07:13			07:45		08:34 (85)
	21:07	20:42			19:55	85	18:59 (112)	19:06	17:25			17:09	41	09:15 (85)
10	06:14	06:41			07:10		07:47 (84)	07:40	07:14			07:46		08:35 (85)
	21:06	20:41			19:53	88	18:59 (112)	19:04	17:24			17:09	40	09:15 (85)
11	06:15	06:42			07:11		07:45 (84)	07:41	07:15			07:47		08:35 (85)
	21:06	20:39			19:52	91	18:59 (112)	19:03	17:23			17:09	41	09:16 (85)
12	06:16	06:43			07:12		07:44 (84)	07:42	07:16			07:47		08:35 (85)
	21:06	20:38			19:50	92	18:58 (112)	19:01	17:22			17:10	41	09:16 (85)
13	06:16	06:44			07:13		07:44 (84)	07:43	07:17			07:48		08:35 (85)
	21:05	20:37			19:48	92	18:58 (112)	19:00	17:21			17:10	41	09:16 (85)
14	06:17	06:45			07:14		07:43 (84)	07:44	07:19			07:49		08:36 (85)
	21:05	20:36			19:47	93	18:57 (112)	18:58	17:20			17:10	41	09:17 (85)
15	06:18	06:46			07:15		07:42 (84)	07:45	07:20			07:50		08:37 (85)
	21:04	20:34			19:45	92	18:56 (112)	18:56	17:19			17:10	41	09:18 (85)
16	06:19	06:47		18:28 (112)	07:16		07:42 (84)	07:46	07:21			07:50		08:37 (85)
	21:04	20:33	15	18:43 (112)	19:43	91	18:55 (112)	18:55	17:18			17:10	41	09:18 (85)
17	06:19	06:48		18:23 (112)	07:17		07:42 (84)	07:47	07:22			07:51		08:37 (85)
	21:03	20:32	23	18:46 (112)	19:42	89	18:54 (112)	18:54	17:18			17:11	41	09:18 (85)
18	06:20	06:49		18:20 (112)	07:18		07:42 (84)	07:48	07:23		08:41 (85)	07:52		08:37 (85)
	21:02	20:30	29	18:49 (112)	19:40	88	18:53 (112)	18:52	17:17	11	08:52 (85)	07:11	41	09:18 (85)
19	06:21	06:50		18:17 (112)	07:19		07:42 (84)	07:49	07:24		08:39 (85)	07:52		08:38 (85)
	21:02	20:29	34	18:51 (112)	19:38	85	18:52 (112)	18:51	17:16	17	08:56 (85)	07:12	41	09:19 (85)
20	06:22	06:51		18:15 (112)	07:20		07:43 (84)	07:50	07:25		08:37 (85)	07:53		08:39 (85)
	21:01	20:27	37	18:52 (112)	19:37	82	18:51 (112)	18:49	17:15	21	08:58 (85)	07:12	41	09:20 (85)
21	06:23	06:51		18:13 (112)	07:21		07:43 (84)	07:51	07:27		08:36 (85)	07:53		08:39 (85)
	21:00	20:26	41	18:54 (112)	19:35	77	18:49 (112)	18:48	17:15	23	08:59 (85)	07:12	41	09:20 (85)
22	06:24	06:52		18:11 (112)	07:22		07:44 (84)	07:52	07:28		08:35 (85)	07:54		08:40 (85)
	21:00	20:24	44	18:55 (112)	19:33	72	18:47 (112)	18:46	17:14	26	09:01 (85)	07:13	41	09:21 (85)
23	06:24	06:53		18:09 (112)	07:23		07:46 (84)	07:53	07:29		08:34 (85)	07:54		08:40 (85)
	20:59	20:23	47	18:56 (112)	19:32	66	18:46 (112)	18:45	17:14	28	09:02 (85)	07:13	41	09:21 (85)
24	06:25	06:54		18:08 (112)	07:24		07:49 (84)	07:55	07:30		08:33 (85)	07:55		08:40 (85)
	20:58	20:22	49	18:57 (112)	19:30	56	18:44 (112)	18:44	17:13	30	09:03 (85)	07:14	41	09:21 (85)
25	06:26	06:55		18:07 (112)	07:25		17:56 (112)	07:56	07:31		08:34 (85)	07:55		08:41 (85)
	20:57	20:20	51	18:58 (112)	19:28	46	18:42 (112)	18:42	17:13	31	09:05 (85)	07:15	41	09:22 (85)
26	06:27	06:56		18:05 (112)	07:26		17:57 (112)	07:57	07:32		08:33 (85)	07:56		08:41 (85)
	20:56	20:19	54	18:59 (112)	19:27	43	18:40 (112)	18:41	17:12	33	09:06 (85)	07:15	41	09:22 (85)
27	06:28	06:57		18:04 (112)	07:27		17:59 (112)	07:58	07:33		08:33 (85)	07:56		08:41 (85)
	20:56	20:17	56	19:00 (112)	19:25	38	18:37 (112)	18:40	17:12	34	09:07 (85)	07:16	42	09:23 (85)
28	06:29	06:58		18:03 (112)	07:28		18:01 (112)	07:59	07:34		08:33 (85)	07:56		08:43 (85)
	20:55	20:16	57	19:00 (112)	19:23	34	18:35 (112)	18:38	17:11	34	09:07 (85)	07:17	41	09:24 (85)
29	06:30	06:59		18:01 (112)	07:29		18:04 (112)	08:00	07:35		08:32 (85)	07:57		08:43 (85)
	20:54	20:14	59	19:00 (112)	19:22	27	18:31 (112)	18:37	17:11	36	09:08 (85)	07:17	41	09:24 (85)
30	06:31	07:00		18:00 (112)	07:30		18:08 (112)	08:01	07:36		08:32 (85)	07:57		08:43 (85)
	20:53	20:12	60	19:00 (112)	19:20	18	18:26 (112)	18:36	17:11	37	09:09 (85)	07:18	41	09:24 (85)
31	06:32	07:01		17:59 (112)				08:02				07:57		08:44 (85)
	20:52	20:11	62	19:01 (112)				18:35				17:19	40	09:24 (85)
Potential sun hours	456	426			374			346	300			291		
Total, worst case		718			2091				361			1254		
Sun reduction		0.60			0.61				0.37			0.50		
Oper. time red.		1.00			1.00				1.00			1.00		
Wind dir. red.		0.67			0.67				0.61			0.61		
Total reduction		0.40			0.40				0.22			0.30		
Total, real		286			845				81			380		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

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4/30/2012 9:43 AM / 22

Licensed user:
EDR
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Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 403 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5569)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June
1	07:57		08:35 (85)	07:45		08:49 (85)	07:10			07:20		07:42 (84)	06:36		18:22 (112)	06:08
	17:20	74	15:21 (113)	17:53	30	09:19 (85)	18:26			19:59	25	08:07 (84)	20:28	65	19:27 (112)	20:57
2	07:57		08:35 (85)	07:44		08:51 (85)	07:08			07:19		07:41 (84)	06:35		18:23 (112)	06:08
	17:21	73	15:21 (113)	17:54	28	09:19 (85)	18:27			20:00	26	08:07 (84)	20:29	64	19:27 (112)	20:58
3	07:58		08:35 (85)	07:43		08:52 (85)	07:07			07:17		07:41 (84)	06:33		18:23 (112)	06:07
	17:21	72	15:20 (113)	17:56	24	09:16 (85)	18:28			20:00	45	19:10 (112)	20:30	63	19:26 (112)	20:58
4	07:58		08:35 (85)	07:42		08:54 (85)	07:05			07:15		07:40 (84)	06:32		18:24 (112)	06:07
	17:22	71	15:20 (113)	17:57	21	09:15 (85)	18:29			20:01	54	19:13 (112)	20:31	62	19:26 (112)	20:59
5	07:58		08:36 (85)	07:41		08:57 (85)	07:04			07:14		07:39 (84)	06:31		18:23 (112)	06:07
	17:23	68	15:19 (113)	17:58	15	09:12 (85)	18:31			20:02	61	19:16 (112)	20:32	62	19:25 (112)	21:00
6	07:58		08:36 (85)	07:40		09:04 (85)	07:02			07:12		07:39 (84)	06:30		18:24 (112)	06:06
	17:24	67	15:19 (113)	17:59	2	09:05 (85)	18:32			20:03	65	19:18 (112)	20:33	60	19:24 (112)	21:00
7	07:58		08:36 (85)	07:38			07:00			07:11		07:39 (84)	06:29		18:25 (112)	06:06
	17:25	65	15:18 (113)	18:01			18:33			20:04	69	19:20 (112)	20:34	59	19:24 (112)	21:01
8	07:57		08:37 (85)	07:37			07:59			07:09		07:40 (84)	06:27		18:25 (112)	06:06
	17:26	61	15:17 (113)	18:02			19:34			20:05	71	19:22 (112)	20:35	58	19:23 (112)	21:02
9	07:57		08:37 (85)	07:36			07:57			07:07		07:39 (84)	06:26		18:26 (112)	06:06
	17:27	58	15:16 (113)	18:03			19:35			20:06	74	19:23 (112)	20:36	57	19:23 (112)	21:02
10	07:57		08:37 (85)	07:35			07:56			07:06		07:40 (84)	06:25		18:27 (112)	06:06
	17:28	49	15:11 (113)	18:04			19:36			20:07	74	19:24 (112)	20:37	55	19:22 (112)	21:03
11	07:57		08:37 (85)	07:34			07:54			07:04		07:41 (84)	06:24		18:27 (112)	06:05
	17:29	44	09:21 (85)	18:05			19:37			20:08	74	19:25 (112)	20:38	54	19:21 (112)	21:03
12	07:57		08:38 (85)	07:33			07:53			07:03		07:43 (84)	06:23		18:28 (112)	06:05
	17:30	43	09:21 (85)	18:07			19:38			20:09	73	19:26 (112)	20:39	52	19:20 (112)	21:04
13	07:56		08:37 (85)	07:32			07:51			07:01		07:44 (84)	06:22		18:29 (112)	06:05
	17:31	44	09:21 (85)	18:08			19:39			20:10	71	19:26 (112)	20:40	51	19:20 (112)	21:04
14	07:56		08:38 (85)	07:30			07:49			07:00		07:48 (84)	06:21		18:30 (112)	06:05
	17:32	44	09:22 (85)	18:09			19:40			20:11	65	19:27 (112)	20:41	49	19:19 (112)	21:05
15	07:56		08:39 (85)	07:29			07:48			06:58		18:26 (112)	06:20		18:31 (112)	06:05
	17:33	44	09:23 (85)	18:10			19:41			20:12	61	19:27 (112)	20:42	47	19:18 (112)	21:05
16	07:55		08:39 (85)	07:28			07:46			06:57		18:26 (112)	06:19		18:31 (112)	06:05
	17:34	44	09:23 (85)	18:11			19:42			20:13	62	19:28 (112)	20:43	46	19:17 (112)	21:06
17	07:55		08:39 (85)	07:26			07:45			06:55		18:25 (112)	06:18		18:33 (112)	06:05
	17:36	45	09:24 (85)	18:12			19:43			20:14	63	19:28 (112)	20:44	44	19:17 (112)	21:06
18	07:54		08:39 (85)	07:25			07:43			06:54		18:25 (112)	06:18		18:34 (112)	06:05
	17:37	44	09:23 (85)	18:14			19:44			20:15	64	19:29 (112)	20:45	41	19:15 (112)	21:06
19	07:54		08:40 (85)	07:24			07:41			06:52		18:23 (112)	06:17		18:35 (112)	06:06
	17:38	44	09:24 (85)	18:15			19:45			20:16	65	19:28 (112)	20:46	39	19:14 (112)	21:07
20	07:53		08:40 (85)	07:22			07:40			06:51		18:23 (112)	06:16		18:36 (112)	06:06
	17:39	44	09:24 (85)	18:16			19:46			20:17	66	19:29 (112)	20:47	37	19:13 (112)	21:07
21	07:53		08:40 (85)	07:21			07:38			06:49		18:22 (112)	06:15		18:38 (112)	06:06
	17:40	44	09:24 (85)	18:17			19:47			20:18	66	19:28 (112)	20:48	34	19:12 (112)	21:07
22	07:52		08:41 (85)	07:20			07:36			06:48		18:22 (112)	06:14		18:39 (112)	06:06
	17:41	43	09:24 (85)	18:18			19:49			20:19	67	19:29 (112)	20:49	32	19:11 (112)	21:08
23	07:52		08:42 (85)	07:18			07:35			06:47		18:23 (112)	06:14		18:41 (112)	06:06
	17:42	42	09:24 (85)	18:19			19:50			20:20	66	19:29 (112)	20:50	28	19:09 (112)	21:08
24	07:51		08:42 (85)	07:17			07:33			06:45		18:22 (112)	06:13		18:43 (112)	06:07
	17:44	42	09:24 (85)	18:20			19:51			20:21	66	19:28 (112)	20:50	25	19:08 (112)	21:08
25	07:50		08:43 (85)	07:15			07:32			06:44		18:22 (112)	06:12		18:45 (112)	06:07
	17:45	41	09:24 (85)	18:22			19:52			20:22	67	19:29 (112)	20:51	21	19:06 (112)	21:08
26	07:50		08:44 (85)	07:14			07:30			06:42		18:22 (112)	06:11		18:47 (112)	06:07
	17:46	40	09:24 (85)	18:23			19:53			20:23	67	19:29 (112)	20:52	17	19:04 (112)	21:08
27	07:49		08:44 (85)	07:13			07:28			06:41		18:22 (112)	06:11		18:50 (112)	06:08
	17:47	39	09:23 (85)	18:24			19:54			20:24	66	19:28 (112)	20:53	11	19:01 (112)	21:08
28	07:48		08:45 (85)	07:11			07:27		07:50 (84)	06:40		18:22 (112)	06:10			06:08
	17:48	38	09:23 (85)	18:25			19:55	11	08:01 (84)	20:25	66	19:28 (112)	20:54			21:08
29	07:47		08:46 (85)				07:25		07:47 (84)	06:38		18:22 (112)	06:10			06:08
	17:50	36	09:22 (85)				19:56	17	08:04 (84)	20:26	66	19:28 (112)	20:55			21:08
30	07:46		08:47 (85)				07:23		07:45 (84)	06:37		18:22 (112)	06:09			06:09
	17:51	34	09:21 (85)				19:57	20	08:05 (84)	20:27	65	19:27 (112)	20:55			21:08
31	07:45		08:48 (85)				07:22		07:44 (84)				06:09			
	17:52	32	09:20 (85)				19:58	22	08:06 (84)				20:56			
Potential sun hours	300			299			370			397			446			449
Total, worst case		1529			120			70			1890			1233		
Sun reduction		0.36			0.42			0.44			0.51			0.56		
Oper. time red.		1.00			1.00			1.00			1.00			1.00		
Wind dir. red.		0.61			0.61			0.66			0.65			0.65		
Total reduction		0.22			0.25			0.29			0.33			0.36		
Total, real		337			30			20			626			447		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 23

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 403 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5569)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October	November			December		
1	06:09			06:32		18:38 (112)	07:02		07:40 (84)	07:31	07:04			07:37		08:19 (85)
	21:08			20:51	53	19:31 (112)	20:09	74	19:24 (112)	19:19	17:33			17:10	44	09:03 (85)
2	06:10			06:33		18:38 (112)	07:03		07:38 (84)	07:32	07:05			07:38		08:20 (85)
	21:08			20:50	54	19:32 (112)	20:08	74	19:22 (112)	19:17	17:32			17:10	49	14:54 (113)
3	06:10			06:34		18:37 (112)	07:04		07:37 (84)	07:33	07:06			07:39		08:20 (85)
	21:08			20:49	56	19:33 (112)	20:06	74	19:21 (112)	19:15	17:31			17:10	57	14:58 (113)
4	06:11			06:35		18:36 (112)	07:05		07:37 (84)	07:34	07:07			07:40		08:21 (85)
	21:08			20:48	57	19:33 (112)	20:05	71	19:19 (112)	19:14	17:30			17:10	61	15:01 (113)
5	06:11			06:36		18:36 (112)	07:06		07:36 (84)	07:35	07:08		08:32 (85)	07:41		08:21 (85)
	21:08			20:47	58	19:34 (112)	20:03	69	19:17 (112)	19:12	17:29	5	08:37 (85)	17:10	65	15:03 (113)
6	06:12			06:37		18:34 (112)	07:07		07:35 (84)	07:36	07:09		08:28 (85)	07:42		08:22 (85)
	21:08			20:45	60	19:34 (112)	20:01	66	19:15 (112)	19:10	17:28	15	08:43 (85)	17:09	67	15:05 (113)
7	06:12			06:38		18:33 (112)	07:08		07:35 (84)	07:37	07:10		08:25 (85)	07:43		08:23 (85)
	21:07			20:44	61	19:34 (112)	20:00	61	19:12 (112)	19:09	17:27	21	08:46 (85)	17:09	68	15:06 (113)
8	06:13			06:39		18:33 (112)	07:09		07:35 (84)	07:38	07:12		08:23 (85)	07:44		08:23 (85)
	21:07			20:43	61	19:34 (112)	19:57	55	19:09 (112)	19:07	17:26	25	08:48 (85)	17:09	70	15:08 (113)
9	06:14			06:40		18:32 (112)	07:10		07:34 (84)	07:39	07:13		08:21 (85)	07:45		08:24 (85)
	21:07			20:42	63	19:35 (112)	19:55	45	19:03 (112)	19:06	17:25	28	08:49 (85)	17:09	72	15:09 (113)
10	06:14			06:41		18:32 (112)	07:10		07:34 (84)	07:40	07:14		08:20 (85)	07:46		08:25 (85)
	21:06			20:41	63	19:35 (112)	19:53	26	08:00 (84)	19:04	17:24	30	08:50 (85)	17:09	72	15:10 (113)
11	06:15			06:42		18:31 (112)	07:11		07:34 (84)	07:41	07:15		08:20 (85)	07:47		08:26 (85)
	21:06			20:39	64	19:35 (112)	19:52	25	07:59 (84)	19:03	17:23	32	08:52 (85)	17:09	74	15:12 (113)
12	06:16			06:43		18:31 (112)	07:12		07:35 (84)	07:42	07:16		08:19 (85)	07:47		08:25 (85)
	21:06			20:38	64	19:35 (112)	19:50	23	07:58 (84)	19:01	17:22	34	08:53 (85)	17:10	75	15:12 (113)
13	06:16			06:44		18:30 (112)	07:13		07:36 (84)	07:43	07:17		08:18 (85)	07:48		08:26 (85)
	21:05			20:37	66	19:36 (112)	19:48	20	07:56 (84)	19:00	17:21	36	08:54 (85)	17:10	76	15:13 (113)
14	06:17			06:45		18:30 (112)	07:14		07:37 (84)	07:44	07:19		08:17 (85)	07:49		08:27 (85)
	21:05			20:36	66	19:36 (112)	19:47	17	07:54 (84)	18:58	17:20	38	08:55 (85)	17:10	76	15:14 (113)
15	06:18			06:46		18:30 (112)	07:15		07:39 (84)	07:45	07:20		08:17 (85)	07:50		08:28 (85)
	21:04			20:34	66	19:36 (112)	19:45	13	07:52 (84)	18:56	17:19	39	08:56 (85)	17:10	76	15:15 (113)
16	06:19		19:02 (112)	06:47		18:29 (112)	07:16			07:46	07:21		08:17 (85)	07:50		08:28 (85)
	21:04	6	19:08 (112)	20:33	67	19:36 (112)	19:43			18:55	17:18	40	08:57 (85)	17:10	77	15:15 (113)
17	06:19		18:57 (112)	06:48		18:28 (112)	07:17			07:47	07:22		08:16 (85)	07:51		08:29 (85)
	21:03	15	19:12 (112)	20:32	67	19:35 (112)	19:42			18:54	17:18	41	08:57 (85)	17:11	76	15:16 (113)
18	06:20		18:55 (112)	06:49		18:28 (112)	07:18			07:48	07:23		08:16 (85)	07:52		08:29 (85)
	21:02	20	19:15 (112)	20:30	66	19:34 (112)	19:40			18:52	17:17	42	08:58 (85)	17:11	77	15:16 (113)
19	06:21		18:53 (112)	06:50		18:27 (112)	07:19			07:49	07:24		08:17 (85)	07:52		08:30 (85)
	21:02	24	19:17 (112)	20:29	67	19:34 (112)	19:38			18:51	17:16	42	08:59 (85)	17:12	77	15:17 (113)
20	06:22		18:52 (112)	06:51		18:27 (112)	07:20			07:50	07:25		08:16 (85)	07:53		08:31 (85)
	21:01	27	19:19 (112)	20:27	67	19:34 (112)	19:37			18:49	17:15	43	08:59 (85)	17:12	77	15:18 (113)
21	06:23		18:50 (112)	06:51		18:27 (112)	07:21			07:51	07:27		08:16 (85)	07:53		08:31 (85)
	21:00	30	19:20 (112)	20:26	67	19:34 (112)	19:35			18:48	17:15	44	09:00 (85)	17:12	77	15:18 (113)
22	06:24		18:48 (112)	06:52		18:27 (112)	07:22			07:52	07:28		08:16 (85)	07:54		08:32 (85)
	21:00	33	19:21 (112)	20:24	66	19:33 (112)	19:33			18:46	17:14	44	09:00 (85)	17:13	77	15:19 (113)
23	06:24		18:47 (112)	06:53		18:27 (112)	07:23			07:53	07:29		08:16 (85)	07:54		08:32 (85)
	20:59	36	19:23 (112)	20:23	66	19:33 (112)	19:32			18:45	17:14	44	09:00 (85)	17:13	77	15:19 (113)
24	06:25		18:46 (112)	06:54		18:27 (112)	07:24			07:55	07:30		08:16 (85)	07:55		08:32 (85)
	20:58	38	19:24 (112)	20:22	65	19:32 (112)	19:30			18:44	17:13	44	09:00 (85)	17:14	77	15:19 (113)
25	06:26		18:45 (112)	06:55		18:27 (112)	07:25			07:56	07:31		08:17 (85)	07:55		08:33 (85)
	20:57	40	19:25 (112)	20:20	65	19:32 (112)	19:28			18:42	17:13	45	09:02 (85)	17:15	77	15:20 (113)
26	06:27		18:44 (112)	06:56		18:28 (112)	07:26			07:57	07:32		08:18 (85)	07:56		08:33 (85)
	20:56	43	19:27 (112)	20:19	63	19:31 (112)	19:27			18:41	17:12	44	09:02 (85)	17:15	77	15:20 (113)
27	06:28		18:43 (112)	06:57		18:28 (112)	07:27			07:58	07:33		08:18 (85)	07:56		08:33 (85)
	20:56	45	19:28 (112)	20:17	62	19:30 (112)	19:25			18:40	17:12	44	09:02 (85)	17:16	76	15:20 (113)
28	06:29		18:42 (112)	06:58		18:28 (112)	07:28			07:59	07:34		08:18 (85)	07:56		08:34 (85)
	20:55	46	19:28 (112)	20:16	61	19:29 (112)	19:23			18:38	17:11	44	09:02 (85)	17:17	77	15:21 (113)
29	06:30		18:41 (112)	06:59		07:47 (84)	07:29			08:00	07:35		08:18 (85)	07:57		08:34 (85)
	20:54	48	19:29 (112)	20:14	66	19:27 (112)	19:22			18:37	17:11	44	09:02 (85)	17:17	76	15:21 (113)
30	06:31		18:40 (112)	07:00		07:44 (84)	07:30			08:01	07:36		08:19 (85)	07:57		08:34 (85)
	20:53	50	19:30 (112)	20:12	71	19:26 (112)	19:20			18:36	17:11	43	09:02 (85)	17:18	76	15:21 (113)
31	06:32		18:39 (112)	07:01		07:42 (84)				08:02				07:57		08:34 (85)
	20:52	52	19:31 (112)	20:11	73	19:25 (112)				18:35				17:19	75	15:21 (113)
Potential sun hours	456			426			374			346	300			291		
Total, worst case		553			1971			713				951			2228	
Sun reduction		0.60			0.60			0.61				0.37			0.50	
Oper. time red.		1.00			1.00			1.00				1.00			1.00	
Wind dir. red.		0.65			0.65			0.66				0.61			0.63	
Total reduction		0.39			0.39			0.40				0.22			0.31	
Total, real		215			766			284				213			696	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 24

Licensed user:
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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 404 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5570)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:36 (85)	07:45		08:43 (85)	07:10			07:20		07:48 (84)	06:36		18:39 (112)	06:08		18:54 (112)
	17:20	99	15:57 (113)	17:53	42	09:25 (85)	18:26			19:59	2	07:50 (84)	20:28	62	19:41 (112)	20:57	35	19:29 (112)
2	07:57		08:36 (85)	07:44		08:44 (85)	07:08			07:19		07:42 (84)	06:35		18:39 (112)	06:08		18:55 (112)
	17:21	98	15:57 (113)	17:54	40	09:24 (85)	18:27			20:00	13	07:55 (84)	20:29	62	19:41 (112)	20:58	33	19:28 (112)
3	07:58		08:36 (85)	07:43		08:45 (85)	07:07			07:17		07:40 (84)	06:33		18:39 (112)	06:07		18:56 (112)
	17:21	98	15:57 (113)	17:56	39	09:24 (85)	18:28			20:00	18	07:58 (84)	20:30	62	19:41 (112)	20:58	32	19:28 (112)
4	07:58		08:36 (85)	07:42		08:46 (85)	07:05		07:24 (99)	07:15		07:38 (84)	06:32		18:39 (112)	06:07		18:57 (112)
	17:22	99	15:57 (113)	17:57	37	09:23 (85)	18:29	11	07:35 (99)	20:01	21	07:59 (84)	20:31	62	19:41 (112)	20:59	30	19:27 (112)
5	07:58		08:36 (85)	07:41		08:47 (85)	07:04		07:23 (99)	07:14		07:36 (84)	06:31		18:38 (112)	06:07		18:58 (112)
	17:23	100	15:58 (113)	17:58	35	09:22 (85)	18:31	15	07:38 (99)	20:02	23	07:59 (84)	20:32	62	19:40 (112)	21:00	28	19:26 (112)
6	07:58		08:36 (85)	07:40		08:49 (85)	07:02		07:21 (99)	07:12		07:35 (84)	06:30		18:38 (112)	06:06		18:59 (112)
	17:24	99	15:58 (113)	17:59	32	09:21 (85)	18:32	18	07:39 (99)	20:03	25	08:00 (84)	20:33	62	19:40 (112)	21:00	27	19:26 (112)
7	07:58		08:37 (85)	07:38		08:51 (85)	07:00		07:19 (99)	07:11		07:34 (84)	06:29		18:39 (112)	06:06		19:01 (112)
	17:25	98	15:58 (113)	18:01	28	09:19 (85)	18:33	20	07:39 (99)	20:04	26	08:00 (84)	20:34	61	19:40 (112)	21:01	24	19:25 (112)
8	07:57		08:37 (85)	07:37		08:52 (85)	07:59		08:19 (99)	07:09		07:33 (84)	06:27		18:39 (112)	06:06		19:01 (112)
	17:26	99	15:59 (113)	18:02	26	09:18 (85)	19:34	21	08:40 (99)	20:05	28	08:01 (84)	20:35	61	19:40 (112)	21:02	23	19:24 (112)
9	07:57		08:37 (85)	07:36		08:55 (85)	07:57		08:18 (99)	07:07		07:32 (84)	06:26		18:39 (112)	06:06		19:02 (112)
	17:27	99	15:59 (113)	18:03	21	09:16 (85)	19:35	22	08:40 (99)	20:06	28	08:00 (84)	20:36	61	19:40 (112)	21:02	21	19:23 (112)
10	07:57		08:37 (85)	07:35		08:58 (85)	07:56		08:18 (99)	07:06		07:33 (84)	06:25		18:39 (112)	06:06		19:03 (112)
	17:28	98	15:58 (113)	18:04	14	09:12 (85)	19:36	22	08:40 (99)	20:07	28	08:01 (84)	20:37	60	19:39 (112)	21:03	20	19:23 (112)
11	07:57		08:37 (85)	07:34			07:54		08:17 (99)	07:04		07:32 (84)	06:24		18:40 (112)	06:05		19:04 (112)
	17:29	98	15:58 (113)	18:05			19:37	22	08:39 (99)	20:08	28	08:00 (84)	20:38	59	19:39 (112)	21:03	18	19:22 (112)
12	07:57		08:37 (85)	07:33			07:53		08:18 (99)	07:03		07:32 (84)	06:23		18:40 (112)	06:05		19:06 (112)
	17:30	99	15:59 (113)	18:07			19:38	21	08:39 (99)	20:09	46	19:23 (112)	20:39	59	19:39 (112)	21:04	16	19:22 (112)
13	07:56		08:37 (85)	07:32			07:51		08:18 (99)	07:01		07:32 (84)	06:22		18:40 (112)	06:05		19:07 (112)
	17:31	98	15:58 (113)	18:08			19:39	20	08:38 (99)	20:10	53	19:26 (112)	20:40	58	19:38 (112)	21:04	14	19:21 (112)
14	07:56		08:37 (85)	07:30			07:49		08:18 (99)	07:00		07:32 (84)	06:21		18:41 (112)	06:05		19:08 (112)
	17:32	97	15:58 (113)	18:09			19:40	19	08:37 (99)	20:11	57	19:28 (112)	20:41	57	19:38 (112)	21:05	12	19:20 (112)
15	07:56		08:38 (85)	07:29			07:48		08:19 (99)	06:58		07:33 (84)	06:20		18:41 (112)	06:05		19:09 (112)
	17:33	96	15:58 (113)	18:10			19:41	17	08:36 (99)	20:12	60	19:31 (112)	20:42	57	19:38 (112)	21:05	10	19:19 (112)
16	07:55		08:38 (85)	07:28			07:46		08:20 (99)	06:57		07:34 (84)	06:19		18:41 (112)	06:05		19:10 (112)
	17:34	95	15:58 (113)	18:11			19:42	13	08:33 (99)	20:13	62	19:33 (112)	20:43	56	19:37 (112)	21:06	8	19:18 (112)
17	07:55		08:38 (85)	07:26			07:45		08:23 (99)	06:55		07:34 (84)	06:18		18:43 (112)	06:05		19:12 (112)
	17:36	94	15:58 (113)	18:12			19:43	7	08:30 (99)	20:14	63	19:34 (112)	20:44	54	19:37 (112)	21:06	5	19:17 (112)
18	07:54		08:38 (85)	07:25			07:43			06:54		07:36 (84)	06:18		18:43 (112)	06:05		19:13 (112)
	17:37	93	15:57 (113)	18:14			19:44			20:15	63	19:35 (112)	20:45	54	19:37 (112)	21:06	3	19:16 (112)
19	07:54		08:39 (85)	07:24			07:41			06:52		07:37 (84)	06:17		18:44 (112)	06:06		
	17:38	91	15:57 (113)	18:15			19:45			20:16	62	19:36 (112)	20:46	52	19:36 (112)	21:07		
20	07:53		08:38 (85)	07:22			07:40			06:51		07:42 (84)	06:16		18:44 (112)	06:06		
	17:39	90	15:56 (113)	18:16			19:46			20:17	55	19:37 (112)	20:47	51	19:35 (112)	21:07		
21	07:53		08:38 (85)	07:21			07:38			06:49		18:45 (112)	06:15		18:45 (112)	06:06		
	17:40	87	15:55 (113)	18:17			19:47			20:18	52	19:37 (112)	20:48	51	19:36 (112)	21:07		
22	07:52		08:39 (85)	07:20			07:36			06:48		18:44 (112)	06:14		18:46 (112)	06:06		
	17:41	84	15:54 (113)	18:18			19:49			20:19	54	19:38 (112)	20:49	49	19:35 (112)	21:08		
23	07:52		08:39 (85)	07:18			07:35			06:47		18:44 (112)	06:14		18:46 (112)	06:06		
	17:42	81	15:53 (113)	18:19			19:50			20:20	55	19:39 (112)	20:50	48	19:34 (112)	21:08		
24	07:51		08:39 (85)	07:17			07:33			06:45		18:42 (112)	06:13		18:48 (112)	06:07		
	17:44	76	15:51 (113)	18:20			19:51			20:21	57	19:39 (112)	20:50	46	19:34 (112)	21:08		
25	07:50		08:40 (85)	07:15			07:32			06:44		18:42 (112)	06:12		18:48 (112)	06:07		19:14 (112)
	17:45	72	15:50 (113)	18:22			19:52			20:22	58	19:40 (112)	20:51	45	19:33 (112)	21:08	5	19:19 (112)
26	07:50		08:41 (85)	07:14			07:30			06:42		18:41 (112)	06:11		18:48 (112)	06:07		19:13 (112)
	17:46	66	15:48 (113)	18:23			19:53			20:23	59	19:40 (112)	20:52	44	19:32 (112)	21:08	7	19:20 (112)
27	07:49		08:41 (85)	07:13			07:28			06:41		18:40 (112)	06:11		18:50 (112)	06:08		19:13 (112)
	17:47	57	15:43 (113)	18:24			19:54			20:24	60	19:40 (112)	20:53	42	19:32 (112)	21:08	9	19:22 (112)
28	07:48		08:41 (85)	07:11			07:27			06:40		18:40 (112)	06:10		18:50 (112)	06:08		19:12 (112)
	17:48	46	09:27 (85)	18:25			19:55			20:25	60	19:40 (112)	20:54	41	19:31 (112)	21:08	11	19:23 (112)
29	07:47		08:42 (85)				07:25			06:38		18:40 (112)	06:10		18:52 (112)	06:08		19:10 (112)
	17:50	44	09:26 (85)				19:56			20:26	61	19:41 (112)	20:55	39	19:31 (112)	21:08	14	19:24 (112)
30	07:46		08:42 (85)				07:23			06:37		18:39 (112)	06:09		18:52 (112)	06:09		19:10 (112)
	17:51	44	09:26 (85)				19:57			20:27	61	19:40 (112)	20:55	38	19:30 (112)	21:08	15	19:25 (112)
31	07:45		08:43 (85)				07:22						06:09		18:53 (112)			
	17:52	43	09:26 (85)				19:58						20:56	37	19:30 (112)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		2638			314			248			1338			1652			420	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.64			0.61			0.63			0.64			0.64			0.64	
Total reduction		0.23			0.25			0.28			0.33			0.36			0.38	
Total, real		604			80			69			440			587			160	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 25

Licensed user:
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217 Montgomery St.
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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 404 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5570)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		19:09 (112)	06:32		18:50 (112)	07:02		07:31 (84)	07:31		07:57 (99)	07:04		08:26 (85)	07:37		08:19 (85)
	21:08	17	19:26 (112)	20:51	60	19:50 (112)	20:09	28	07:59 (84)	19:19	21	08:18 (99)	17:33	16	08:42 (85)	17:10	98	15:40 (113)
2	06:10		19:09 (112)	06:33		18:50 (112)	07:03		07:31 (84)	07:32		07:56 (99)	07:05		08:24 (85)	07:38		08:20 (85)
	21:08	19	19:28 (112)	20:50	60	19:50 (112)	20:08	28	07:59 (84)	19:17	22	08:18 (99)	17:32	22	08:46 (85)	17:10	98	15:41 (113)
3	06:10		19:08 (112)	06:34		18:50 (112)	07:04		07:30 (84)	07:33		07:55 (99)	07:06		08:22 (85)	07:39		08:20 (85)
	21:08	20	19:28 (112)	20:49	60	19:50 (112)	20:06	28	07:58 (84)	19:15	23	08:18 (99)	17:31	26	08:48 (85)	17:10	99	15:42 (113)
4	06:11		19:07 (112)	06:35		18:50 (112)	07:05		07:30 (84)	07:34		07:55 (99)	07:07		08:20 (85)	07:40		08:21 (85)
	21:08	23	19:30 (112)	20:48	60	19:50 (112)	20:05	28	07:58 (84)	19:14	22	08:17 (99)	17:30	29	08:49 (85)	17:10	99	15:43 (113)
5	06:11		19:06 (112)	06:36		18:49 (112)	07:06		07:31 (84)	07:35		07:55 (99)	07:08		08:19 (85)	07:41		08:22 (85)
	21:08	24	19:30 (112)	20:47	62	19:51 (112)	20:03	26	07:57 (84)	19:12	22	08:17 (99)	17:29	32	08:51 (85)	17:10	98	15:43 (113)
6	06:12		19:06 (112)	06:37		18:48 (112)	07:07		07:31 (84)	07:36		07:55 (99)	07:09		08:18 (85)	07:42		08:22 (85)
	21:08	26	19:32 (112)	20:45	62	19:50 (112)	20:01	25	07:56 (84)	19:10	21	08:16 (99)	17:28	35	08:53 (85)	17:09	99	15:44 (113)
7	06:12		19:05 (112)	06:38		18:48 (112)	07:08		07:32 (84)	07:37		07:56 (99)	07:10		08:17 (85)	07:43		08:23 (85)
	21:07	27	19:32 (112)	20:44	62	19:50 (112)	20:00	23	07:55 (84)	19:09	19	08:15 (99)	17:27	37	08:54 (85)	17:09	100	15:45 (113)
8	06:13		19:04 (112)	06:39		18:48 (112)	07:09		07:33 (84)	07:38		07:57 (99)	07:12		08:16 (85)	07:44		08:24 (85)
	21:07	29	19:33 (112)	20:43	62	19:50 (112)	19:57	21	07:54 (84)	19:07	16	08:13 (99)	17:26	39	08:55 (85)	17:09	99	15:45 (113)
9	06:14		19:04 (112)	06:40		18:48 (112)	07:10		07:33 (84)	07:39		07:58 (99)	07:13		08:15 (85)	07:45		08:25 (85)
	21:07	31	19:35 (112)	20:42	62	19:50 (112)	19:55	18	07:51 (84)	19:06	13	08:11 (99)	17:25	40	08:55 (85)	17:09	98	15:46 (113)
10	06:14		19:03 (112)	06:41		18:48 (112)	07:10		07:35 (84)	07:40		08:00 (99)	07:14		08:14 (85)	07:46		08:26 (85)
	21:06	32	19:35 (112)	20:41	62	19:50 (112)	19:53	13	07:48 (84)	19:04	8	08:08 (99)	17:24	42	08:56 (85)	17:09	98	15:47 (113)
11	06:15		19:02 (112)	06:42		18:48 (112)	07:11		07:39 (84)	07:41			07:15		08:15 (85)	07:47		08:27 (85)
	21:06	34	19:36 (112)	20:39	61	19:49 (112)	19:52	5	07:44 (84)	19:03			17:23	42	08:57 (85)	17:09	99	15:48 (113)
12	06:16		19:02 (112)	06:43		18:48 (112)	07:12			07:42			07:16		08:14 (85)	07:47		08:26 (85)
	21:06	36	19:38 (112)	20:38	61	19:49 (112)	19:50			19:01			17:22	44	08:58 (85)	17:10	98	15:47 (113)
13	06:16		19:01 (112)	06:44		18:48 (112)	07:13			07:43			07:17		08:14 (85)	07:48		08:27 (85)
	21:05	37	19:38 (112)	20:37	61	19:49 (112)	19:48			19:00			17:21	44	08:58 (85)	17:10	99	15:48 (113)
14	06:17		19:00 (112)	06:45		18:48 (112)	07:14			07:44			07:19		08:13 (85)	07:49		08:28 (85)
	21:05	39	19:39 (112)	20:36	61	19:49 (112)	19:47			18:58			17:20	46	08:59 (85)	17:10	98	15:49 (113)
15	06:18		19:00 (112)	06:46		18:48 (112)	07:15			07:45			07:20		08:14 (85)	07:50		08:29 (85)
	21:04	40	19:40 (112)	20:34	60	19:48 (112)	19:45			18:56			17:19	58	15:17 (113)	17:10	98	15:50 (113)
16	06:19		18:59 (112)	06:47		18:48 (112)	07:16			07:46			07:21		08:14 (85)	07:50		08:29 (85)
	21:04	42	19:41 (112)	20:33	60	19:48 (112)	19:43			18:55			17:18	66	15:21 (113)	17:10	98	15:50 (113)
17	06:19		18:58 (112)	06:48		18:47 (112)	07:17			07:47			07:22		08:13 (85)	07:51		08:30 (85)
	21:03	43	19:41 (112)	20:32	59	19:46 (112)	19:42			18:54			17:18	72	15:23 (113)	17:11	98	15:51 (113)
18	06:20		18:58 (112)	06:49		18:48 (112)	07:18			07:48			07:23		08:13 (85)	07:52		08:30 (85)
	21:02	44	19:42 (112)	20:30	57	19:45 (112)	19:40			18:52			17:17	76	15:25 (113)	17:11	97	15:50 (113)
19	06:21		18:57 (112)	06:50		18:48 (112)	07:19			07:49			07:24		08:14 (85)	07:52		08:31 (85)
	21:02	46	19:43 (112)	20:29	57	19:45 (112)	19:38			18:51			17:16	81	15:28 (113)	17:12	96	15:51 (113)
20	06:22		18:57 (112)	06:51		18:48 (112)	07:20			07:50			07:25		08:14 (85)	07:53		08:32 (85)
	21:01	47	19:44 (112)	20:27	56	19:44 (112)	19:37			18:49			17:15	84	15:29 (113)	17:12	96	15:52 (113)
21	06:23		18:56 (112)	06:51		18:49 (112)	07:21			07:51			07:27		08:14 (85)	07:53		08:32 (85)
	21:00	48	19:44 (112)	20:26	54	19:43 (112)	19:35			18:48			17:15	87	15:31 (113)	17:12	96	15:52 (113)
22	06:24		18:55 (112)	06:52		18:50 (112)	07:22			07:52			07:28		08:14 (85)	07:54		08:33 (85)
	21:00	50	19:45 (112)	20:24	52	19:42 (112)	19:33			18:46			17:14	90	15:32 (113)	17:13	96	15:53 (113)
23	06:24		18:55 (112)	06:53		07:45 (84)	07:23			07:53			07:29		08:15 (85)	07:54		08:33 (85)
	20:59	51	19:46 (112)	20:23	57	19:41 (112)	19:32			18:45			17:14	91	15:33 (113)	17:13	96	15:53 (113)
24	06:25		18:54 (112)	06:54		07:41 (84)	07:24			07:55			07:30		08:15 (85)	07:55		08:33 (85)
	20:58	52	19:46 (112)	20:22	61	19:39 (112)	19:30			18:44			17:13	93	15:34 (113)	17:14	96	15:53 (113)
25	06:26		18:54 (112)	06:55		07:39 (84)	07:25			07:56			07:31		08:16 (85)	07:55		08:34 (85)
	20:57	53	19:47 (112)	20:20	63	19:38 (112)	19:28			18:42			17:13	94	15:36 (113)	17:15	96	15:54 (113)
26	06:27		18:54 (112)	06:56		07:37 (84)	07:26			07:57			07:32		08:17 (85)	07:56		08:34 (85)
	20:56	54	19:48 (112)	20:19	62	19:36 (112)	19:27			18:41			17:12	95	15:37 (113)	17:15	97	15:54 (113)
27	06:28		18:53 (112)	06:57		07:35 (84)	07:27		08:03 (99)	07:58			07:33		08:17 (85)	07:56		08:34 (85)
	20:56	55	19:48 (112)	20:17	62	19:34 (112)	19:25	11	08:14 (99)	18:40			17:12	96	15:37 (113)	17:16	98	15:55 (113)
28	06:29		18:52 (112)	06:58		07:34 (84)	07:28		08:00 (99)	07:59			07:34		08:17 (85)	07:56		08:35 (85)
	20:55	56	19:48 (112)	20:16	60	19:32 (112)	19:23	16	08:16 (99)	18:38			17:11	97	15:38 (113)	17:17	97	15:56 (113)
29	06:30		18:51 (112)	06:59		07:32 (84)	07:29		07:59 (99)	08:00			07:35		08:18 (85)	07:57		08:35 (85)
	20:54	57	19:48 (112)	20:14	58	19:29 (112)	19:22	18	08:17 (99)	18:37			17:11	97	15:39 (113)	17:17	98	15:56 (113)
30	06:31		18:51 (112)	07:00		07:32 (84)	07:30		07:57 (99)	08:01			07:36		08:18 (85)	07:57		08:35 (85)
	20:53	58	19:49 (112)	20:12	53	19:26 (112)	19:20	20	08:17 (99)	18:36			17:11	99	15:40 (113)	17:18	98	15:56 (113)
31	06:32		18:51 (112)	07:01		07:31 (84)				08:02		09:33 (85)				07:57		08:35 (85)
	20:52	58	19:49 (112)	20:11	46	19:22 (112)				18:35	3	09:36 (85)				17:19	98	15:56 (113)
Potential sun hours	456			426			374			346			300			291		
Total, worst case		1248			1833			308			190			1870			3029	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.64			0.64			0.66			0.63			0.63			0.64	
Total reduction		0.38			0.38			0.40			0.35			0.23			0.32	
Total, real		475			702			124			67			434			976	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 26

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 405 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5571)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:32 (98)	07:45		08:29 (85)	07:10			07:20			06:36		18:57 (112)	06:08		18:51 (112)
	17:20	102	16:02 (113)	17:53	80	15:56 (113)	18:26			19:59			20:28	49	19:46 (112)	20:57	63	19:54 (112)
2	07:57		08:32 (98)	07:44		08:29 (85)	07:08			07:19			06:35		18:56 (112)	06:08		18:52 (112)
	17:21	101	16:02 (113)	17:54	76	15:54 (113)	18:27			20:00			20:29	51	19:47 (112)	20:58	62	19:54 (112)
3	07:58		08:32 (98)	07:43		08:29 (85)	07:07			07:17			06:33		18:55 (112)	06:07		18:52 (112)
	17:21	103	16:03 (113)	17:56	69	15:51 (113)	18:28			20:00			20:30	53	19:48 (112)	20:58	63	19:55 (112)
4	07:58		08:33 (98)	07:42		08:30 (85)	07:05			07:15			06:32		18:54 (112)	06:07		18:52 (112)
	17:22	101	16:03 (113)	17:57	59	15:47 (113)	18:29			20:01			20:31	55	19:49 (112)	20:59	62	19:54 (112)
5	07:58		08:33 (98)	07:41		08:30 (85)	07:04			07:14		07:40 (84)	06:31		18:53 (112)	06:07		18:53 (112)
	17:23	102	16:04 (113)	17:58	46	09:16 (85)	18:31			20:02	3	07:43 (84)	20:32	56	19:49 (112)	21:00	61	19:54 (112)
6	07:58		08:34 (98)	07:40		08:30 (85)	07:02			07:12		07:36 (84)	06:30		18:52 (112)	06:06		18:53 (112)
	17:24	101	16:04 (113)	17:59	46	09:16 (85)	18:32			20:03	12	07:48 (84)	20:33	57	19:49 (112)	21:00	62	19:55 (112)
7	07:58		08:34 (98)	07:38		08:31 (85)	07:00		07:20 (99)	07:11		07:32 (84)	06:29		18:51 (112)	06:06		18:54 (112)
	17:25	101	16:04 (113)	18:01	45	09:16 (85)	18:33	7	07:27 (99)	20:04	18	07:50 (84)	20:34	59	19:50 (112)	21:01	61	19:55 (112)
8	07:57		08:35 (98)	07:37		08:32 (85)	07:59		08:18 (99)	07:09		07:31 (84)	06:27		18:51 (112)	06:06		18:53 (112)
	17:26	100	16:05 (113)	18:02	43	09:15 (85)	19:34	13	08:31 (99)	20:05	21	07:52 (84)	20:35	60	19:51 (112)	21:02	61	19:54 (112)
9	07:57		08:36 (98)	07:36		08:33 (85)	07:57		08:16 (99)	07:07		07:29 (84)	06:26		18:50 (112)	06:06		18:54 (112)
	17:27	99	16:05 (113)	18:03	42	09:15 (85)	19:35	16	08:32 (99)	20:06	23	07:52 (84)	20:36	61	19:51 (112)	21:02	60	19:54 (112)
10	07:57		08:35 (85)	07:35		08:33 (85)	07:56		08:15 (99)	07:06		07:29 (84)	06:25		18:50 (112)	06:06		18:54 (112)
	17:28	100	16:05 (113)	18:04	41	09:14 (85)	19:36	18	08:33 (99)	20:07	24	07:53 (84)	20:37	62	19:52 (112)	21:03	61	19:55 (112)
11	07:57		08:34 (85)	07:34		08:34 (85)	07:54		08:13 (99)	07:04		07:27 (84)	06:24		18:50 (112)	06:05		18:55 (112)
	17:29	101	16:05 (113)	18:05	40	09:14 (85)	19:37	21	08:34 (99)	20:08	26	07:53 (84)	20:38	62	19:52 (112)	21:03	60	19:55 (112)
12	07:57		08:34 (85)	07:33		08:35 (85)	07:53		08:13 (99)	07:03		07:27 (84)	06:23		18:49 (112)	06:05		18:55 (112)
	17:30	101	16:06 (113)	18:07	37	09:12 (85)	19:38	21	08:34 (99)	20:09	27	07:54 (84)	20:39	63	19:52 (112)	21:04	60	19:55 (112)
13	07:56		08:33 (85)	07:32		08:36 (85)	07:51		08:12 (99)	07:01		07:26 (84)	06:22		18:49 (112)	06:05		18:56 (112)
	17:31	101	16:05 (113)	18:08	35	09:11 (85)	19:39	22	08:34 (99)	20:10	27	07:53 (84)	20:40	63	19:52 (112)	21:04	59	19:55 (112)
14	07:56		08:33 (85)	07:30		08:38 (85)	07:49		08:11 (99)	07:00		07:26 (84)	06:21		18:49 (112)	06:05		18:56 (112)
	17:32	101	16:06 (113)	18:09	32	09:10 (85)	19:40	22	08:33 (99)	20:11	28	07:54 (84)	20:41	64	19:53 (112)	21:05	59	19:55 (112)
15	07:56		08:33 (85)	07:29		08:39 (85)	07:48		08:12 (99)	06:58		07:25 (84)	06:20		18:49 (112)	06:05		18:56 (112)
	17:33	100	16:06 (113)	18:10	29	09:08 (85)	19:41	21	08:33 (99)	20:12	28	07:53 (84)	20:42	64	19:53 (112)	21:05	59	19:55 (112)
16	07:55		08:32 (85)	07:28		08:40 (85)	07:46		08:12 (99)	06:57		07:26 (84)	06:19		18:48 (112)	06:05		18:57 (112)
	17:34	100	16:06 (113)	18:11	26	09:06 (85)	19:42	20	08:32 (99)	20:13	27	07:53 (84)	20:43	65	19:53 (112)	21:06	58	19:55 (112)
17	07:55		08:32 (85)	07:26		08:43 (85)	07:45		08:12 (99)	06:55		07:25 (84)	06:18		18:49 (112)	06:05		18:57 (112)
	17:36	99	16:06 (113)	18:12	20	09:03 (85)	19:43	19	08:31 (99)	20:14	27	07:52 (84)	20:44	65	19:54 (112)	21:06	58	19:55 (112)
18	07:54		08:31 (85)	07:25		08:47 (85)	07:43		08:13 (99)	06:54		07:26 (84)	06:18		18:49 (112)	06:05		18:57 (112)
	17:37	100	16:06 (113)	18:14	13	09:00 (85)	19:44	17	08:30 (99)	20:15	25	07:51 (84)	20:45	65	19:54 (112)	21:06	59	19:56 (112)
19	07:54		08:31 (85)	07:24			07:41		08:14 (99)	06:52		07:26 (84)	06:17		18:49 (112)	06:06		18:57 (112)
	17:38	99	16:06 (113)	18:15			19:45	14	08:28 (99)	20:16	24	07:50 (84)	20:46	65	19:54 (112)	21:07	59	19:56 (112)
20	07:53		08:30 (85)	07:22			07:40		08:16 (99)	06:51		07:27 (84)	06:16		18:49 (112)	06:06		18:58 (112)
	17:39	101	16:06 (113)	18:16			19:46	9	08:25 (99)	20:17	22	07:49 (84)	20:47	65	19:54 (112)	21:07	59	19:57 (112)
21	07:53		08:30 (85)	07:21			07:38			06:49		07:27 (84)	06:15		18:49 (112)	06:06		18:58 (112)
	17:40	99	16:05 (113)	18:17			19:47			20:18	20	07:47 (84)	20:48	65	19:54 (112)	21:07	59	19:57 (112)
22	07:52		08:30 (85)	07:20			07:36			06:48		07:29 (84)	06:14		18:49 (112)	06:06		18:58 (112)
	17:41	99	16:05 (113)	18:18			19:49			20:19	17	07:46 (84)	20:49	65	19:54 (112)	21:08	59	19:57 (112)
23	07:52		08:30 (85)	07:18			07:35			06:47		07:31 (84)	06:14		18:49 (112)	06:06		18:58 (112)
	17:42	98	16:05 (113)	18:19			19:50			20:20	22	19:28 (112)	20:50	65	19:54 (112)	21:08	59	19:57 (112)
24	07:51		08:29 (85)	07:17			07:33			06:45		07:34 (84)	06:13		18:50 (112)	06:07		18:59 (112)
	17:44	99	16:04 (113)	18:20			19:51			20:21	26	19:33 (112)	20:50	65	19:55 (112)	21:08	59	19:58 (112)
25	07:50		08:30 (85)	07:15			07:32			06:44		19:09 (112)	06:12		18:50 (112)	06:07		18:59 (112)
	17:45	97	16:04 (113)	18:22			19:52			20:22	27	19:36 (112)	20:51	64	19:54 (112)	21:08	59	19:58 (112)
26	07:50		08:29 (85)	07:14			07:30			06:42		19:06 (112)	06:12		18:49 (112)	06:07		18:59 (112)
	17:46	96	16:03 (113)	18:23			19:53			20:23	33	19:39 (112)	20:52	65	19:54 (112)	21:08	58	19:57 (112)
27	07:49		08:29 (85)	07:13			07:28			06:41		19:03 (112)	06:11		18:50 (112)	06:08		18:59 (112)
	17:47	95	16:03 (113)	18:24			19:54			20:24	37	19:40 (112)	20:53	64	19:54 (112)	21:08	59	19:58 (112)
28	07:48		08:29 (85)	07:11			07:27			06:40		19:02 (112)	06:10		18:50 (112)	06:08		18:59 (112)
	17:48	93	16:02 (113)	18:25			19:55			20:25	40	19:42 (112)	20:54	64	19:54 (112)	21:08	59	19:58 (112)
29	07:47		08:29 (85)				07:25			06:38		19:00 (112)	06:10		18:51 (112)	06:08		18:59 (112)
	17:50	89	16:00 (113)				19:56			20:26	44	19:44 (112)	20:55	64	19:55 (112)	21:08	59	19:58 (112)
30	07:46		08:29 (85)				07:23			06:37		18:58 (112)	06:09		18:51 (112)	06:09		18:59 (112)
	17:51	87	15:59 (113)				19:57			20:27	46	19:44 (112)	20:55	63	19:54 (112)	21:08	60	19:59 (112)
31	07:45		08:29 (85)				07:22						06:09		18:51 (112)			
	17:52	84	15:58 (113)				19:58						20:56	64	19:55 (112)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		3049			779			240			674			1912			1796	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.65			0.61			0.64			0.65			0.63			0.63	
Total reduction		0.23			0.26			0.28			0.33			0.36			0.38	
Total, real		709			200			67			225			680			684	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 27

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 405 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5571)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		18:59 (112)	06:32		19:00 (112)	07:02		07:26 (84)	07:31		07:51 (99)	07:04		08:02 (85)	07:37		08:16 (85)
	21:08	60	19:59 (112)	20:51	63	20:03 (112)	20:09	26	07:52 (84)	19:19	22	08:13 (99)	17:33	41	08:43 (85)	17:10	101	15:47 (113)
2	06:10		19:00 (112)	06:33		19:00 (112)	07:03		07:27 (84)	07:32		07:51 (99)	07:05		08:02 (85)	07:38		08:18 (85)
	21:08	60	20:00 (112)	20:50	62	20:02 (112)	20:08	24	07:51 (84)	19:17	21	08:12 (99)	17:32	43	08:45 (85)	17:10	100	15:48 (113)
3	06:10		18:59 (112)	06:34		19:01 (112)	07:04		07:27 (84)	07:33		07:52 (99)	07:06		08:01 (85)	07:39		08:19 (85)
	21:08	60	19:59 (112)	20:49	61	20:02 (112)	20:06	23	07:50 (84)	19:15	19	08:11 (99)	17:31	44	08:45 (85)	17:10	99	15:48 (113)
4	06:11		19:00 (112)	06:35		19:01 (112)	07:05		07:28 (84)	07:34		07:53 (99)	07:07		08:01 (85)	07:40		08:19 (98)
	21:08	60	20:00 (112)	20:48	61	20:02 (112)	20:05	21	07:49 (84)	19:14	17	08:10 (99)	17:30	44	08:45 (85)	17:10	100	15:49 (113)
5	06:11		18:59 (112)	06:36		19:02 (112)	07:06		07:29 (84)	07:35		07:54 (99)	07:08		08:00 (85)	07:41		08:19 (98)
	21:08	61	20:00 (112)	20:47	59	20:01 (112)	20:03	18	07:47 (84)	19:12	14	08:08 (99)	17:29	46	08:46 (85)	17:10	101	15:49 (113)
6	06:12		19:00 (112)	06:37		19:01 (112)	07:07		07:31 (84)	07:36		07:55 (99)	07:09		08:01 (85)	07:42		08:20 (98)
	21:08	61	20:01 (112)	20:45	58	19:59 (112)	20:01	14	07:45 (84)	19:10	11	08:06 (99)	17:28	46	08:47 (85)	17:09	101	15:50 (113)
7	06:12		18:59 (112)	06:38		19:02 (112)	07:08		07:36 (84)	07:37			07:10		08:00 (85)	07:43		08:20 (98)
	21:07	62	20:01 (112)	20:44	57	19:59 (112)	20:00	4	07:40 (84)	19:09			17:27	62	15:19 (113)	17:09	102	15:51 (113)
8	06:13		18:59 (112)	06:39		19:02 (112)	07:09			07:38			07:12		08:00 (85)	07:44		08:21 (98)
	21:07	62	20:01 (112)	20:43	56	19:58 (112)	19:57			19:07			17:26	71	15:23 (113)	17:09	101	15:51 (113)
9	06:14		19:00 (112)	06:40		19:03 (112)	07:10			07:39			07:13		08:00 (85)	07:45		08:21 (98)
	21:07	62	20:02 (112)	20:42	54	19:57 (112)	19:55			19:06			17:25	76	15:25 (113)	17:09	103	15:52 (113)
10	06:14		18:59 (112)	06:41		19:04 (112)	07:10			07:40			07:14		08:00 (85)	07:46		08:22 (98)
	21:06	63	20:02 (112)	20:41	52	19:56 (112)	19:53			19:04			17:24	80	15:27 (113)	17:09	101	15:52 (113)
11	06:15		18:59 (112)	06:42		19:05 (112)	07:11			07:41			07:15		08:01 (85)	07:47		08:23 (98)
	21:06	63	20:02 (112)	20:39	50	19:55 (112)	19:52			19:03			17:23	85	15:30 (113)	17:09	102	15:53 (113)
12	06:16		19:00 (112)	06:43		19:06 (112)	07:12			07:42			07:16		08:01 (85)	07:47		08:22 (98)
	21:06	63	20:03 (112)	20:38	48	19:54 (112)	19:50			19:01			17:22	88	15:31 (113)	17:10	103	15:53 (113)
13	06:16		18:59 (112)	06:44		19:07 (112)	07:13			07:43			07:17		08:01 (85)	07:48		08:23 (98)
	21:05	63	20:02 (112)	20:37	46	19:53 (112)	19:48			19:00			17:21	89	15:32 (113)	17:10	101	15:53 (113)
14	06:17		18:59 (112)	06:45		19:08 (112)	07:14			07:44			07:19		08:01 (85)	07:49		08:24 (98)
	21:05	64	20:03 (112)	20:36	43	19:51 (112)	19:47			18:58			17:20	93	15:34 (113)	17:10	102	15:54 (113)
15	06:18		18:59 (112)	06:46		19:10 (112)	07:15			07:45			07:20		08:02 (85)	07:50		08:24 (98)
	21:04	64	20:03 (112)	20:34	40	19:50 (112)	19:45			18:56			17:19	95	15:36 (113)	17:10	103	15:55 (113)
16	06:19		19:00 (112)	06:47		19:12 (112)	07:16			07:46			07:21		08:02 (85)	07:50		08:24 (98)
	21:04	64	20:04 (112)	20:33	36	19:48 (112)	19:43			18:55			17:18	97	15:36 (113)	17:10	102	15:55 (113)
17	06:19		18:59 (112)	06:48		19:13 (112)	07:17			07:47			07:22		08:03 (85)	07:51		08:25 (98)
	21:03	64	20:03 (112)	20:32	31	19:44 (112)	19:42			18:54			17:18	97	15:37 (113)	17:11	102	15:56 (113)
18	06:20		18:59 (112)	06:49		19:15 (112)	07:18			07:48			07:23		08:03 (85)	07:52		08:25 (98)
	21:02	65	20:04 (112)	20:30	27	19:42 (112)	19:40			18:52			17:17	99	15:38 (113)	17:11	102	15:55 (113)
19	06:21		18:59 (112)	06:50		07:39 (84)	07:19			07:49			07:24		08:05 (85)	07:52		08:26 (98)
	21:02	65	20:04 (112)	20:29	26	19:38 (112)	19:38			18:51			17:16	98	15:40 (113)	17:12	102	15:56 (113)
20	06:22		18:59 (112)	06:51		07:36 (84)	07:20			07:50			07:25		08:05 (85)	07:53		08:27 (98)
	21:01	65	20:04 (112)	20:27	17	19:30 (112)	19:37			18:49			17:15	99	15:40 (113)	17:12	102	15:57 (113)
21	06:23		18:59 (112)	06:51		07:34 (84)	07:21			07:51			07:27		08:06 (85)	07:53		08:27 (98)
	21:00	65	20:04 (112)	20:26	17	07:51 (84)	19:35			18:48			17:15	99	15:41 (113)	17:12	102	15:57 (113)
22	06:24		18:59 (112)	06:52		07:32 (84)	07:22			07:52			07:28		08:06 (85)	07:54		08:28 (98)
	21:00	65	20:04 (112)	20:24	20	07:52 (84)	19:33			18:46			17:14	101	15:42 (113)	17:13	102	15:58 (113)
23	06:24		18:59 (112)	06:53		07:31 (84)	07:23		08:01 (99)	07:53			07:29		08:07 (85)	07:54		08:28 (98)
	20:59	65	20:04 (112)	20:23	22	07:53 (84)	19:32	7	08:08 (99)	18:45			17:14	99	15:42 (113)	17:13	102	15:58 (113)
24	06:25		18:59 (112)	06:54		07:30 (84)	07:24		07:58 (99)	07:55		09:15 (85)	07:30		08:08 (85)	07:55		08:28 (98)
	20:58	65	20:04 (112)	20:22	24	07:54 (84)	19:30	13	08:11 (99)	18:44	16	09:31 (85)	17:13	99	15:43 (113)	17:14	102	15:58 (113)
25	06:26		18:59 (112)	06:55		07:29 (84)	07:25		07:56 (99)	07:56		09:12 (85)	07:31		08:10 (85)	07:55		08:29 (98)
	20:57	65	20:04 (112)	20:20	25	07:54 (84)	19:28	16	08:12 (99)	18:42	22	09:34 (85)	17:13	99	15:44 (113)	17:15	102	15:59 (113)
26	06:27		19:00 (112)	06:56		07:28 (84)	07:26		07:54 (99)	07:57		09:10 (85)	07:32		08:11 (85)	07:56		08:29 (98)
	20:56	64	20:04 (112)	20:19	27	07:55 (84)	19:27	19	08:13 (99)	18:41	26	09:36 (85)	17:12	100	15:45 (113)	17:15	103	16:00 (113)
27	06:28		19:00 (112)	06:57		07:28 (84)	07:27		07:53 (99)	07:58		09:08 (85)	07:33		08:12 (85)	07:56		08:29 (98)
	20:56	64	20:04 (112)	20:17	27	07:55 (84)	19:25	21	08:14 (99)	18:40	29	09:37 (85)	17:12	100	15:45 (113)	17:16	102	16:00 (113)
28	06:29		18:59 (112)	06:58		07:27 (84)	07:28		07:52 (99)	07:59		09:07 (85)	07:34		08:13 (85)	07:56		08:30 (98)
	20:55	64	20:03 (112)	20:16	28	07:55 (84)	19:23	22	08:14 (99)	18:38	33	09:40 (85)	17:11	101	15:46 (113)	17:17	102	16:01 (113)
29	06:30		18:59 (112)	06:59		07:26 (84)	07:29		07:52 (99)	08:00		09:05 (85)	07:35		08:14 (85)	07:57		08:31 (98)
	20:54	64	20:03 (112)	20:14	28	07:54 (84)	19:22	22	08:14 (99)	18:37	36	09:41 (85)	17:11	101	15:46 (113)	17:17	102	16:01 (113)
30	06:31		19:00 (112)	07:00		07:26 (84)	07:30		07:51 (99)	08:01		09:04 (85)	07:36		08:15 (85)	07:57		08:31 (98)
	20:53	63	20:03 (112)	20:12	27	07:53 (84)	19:20	23	08:14 (99)	18:36	38	09:42 (85)	17:11	101	15:47 (113)	17:18	101	16:01 (113)
31	06:32		19:00 (112)	07:01		07:26 (84)				08:02		09:03 (85)				07:57		08:31 (98)
	20:52	63	20:03 (112)	20:11	27	07:53 (84)				18:35	40	09:43 (85)				17:19	102	16:02 (113)
Potential sun hours	456			426			374			346			300			291		
Total, worst case		1958			1219			273			344			2493			3152	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.63			0.64			0.65			0.61			0.64			0.65	
Total reduction		0.38			0.39			0.40			0.34			0.24			0.33	
Total, real		746			470			109			118			588			1025	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 28

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 406 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5572)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March	April	May			June		
1	07:57			07:45		08:18 (113)	07:10	07:20	06:36			06:08		06:59 (112)
	17:20			17:53	34	08:52 (113)	18:26	19:59	20:28			20:57	62	08:01 (112)
2	07:57			07:44		08:17 (113)	07:08	07:19	06:35			06:08		06:59 (112)
	17:21			17:54	36	08:53 (113)	18:27	20:00	20:29			20:58	63	08:02 (112)
3	07:58			07:43		08:16 (113)	07:07	07:17	06:33			06:07		06:59 (112)
	17:22			17:56	38	08:54 (113)	18:28	20:00	20:30			20:58	64	08:03 (112)
4	07:58			07:42		08:15 (113)	07:05	07:15	06:32			06:07		06:59 (112)
	17:22			17:57	39	08:54 (113)	18:29	20:01	20:31			20:59	64	08:03 (112)
5	07:58			07:41		08:14 (113)	07:04	07:14	06:31			06:07		06:59 (112)
	17:23			17:58	41	08:55 (113)	18:31	20:02	20:32			21:00	64	08:03 (112)
6	07:58			07:40		08:14 (113)	07:02	07:12	06:30			06:06		06:59 (112)
	17:24			17:59	42	08:56 (113)	18:32	20:03	20:33			21:00	65	08:04 (112)
7	07:58			07:39		08:13 (113)	07:01	07:11	06:29			06:06		06:59 (112)
	17:25			18:01	44	08:57 (113)	18:33	20:04	20:34			21:01	65	08:04 (112)
8	07:57			07:37		08:13 (113)	07:59	07:09	06:28			06:06		06:58 (112)
	17:26			18:02	44	08:57 (113)	19:34	20:05	20:35			21:02	66	08:04 (112)
9	07:57			07:36		08:13 (113)	07:57	07:08	06:26			06:06		06:59 (112)
	17:27			18:03	45	08:58 (113)	19:35	20:06	20:36			21:02	65	08:04 (112)
10	07:57			07:35		08:13 (113)	07:56	07:06	06:25			06:06		06:59 (112)
	17:28			18:04	45	08:58 (113)	19:36	20:07	20:37			21:03	66	08:05 (112)
11	07:57			07:34		08:13 (113)	07:54	07:04	06:24		07:25 (112)	06:05		06:59 (112)
	17:29			18:05	46	08:59 (113)	19:37	20:08	20:38	9	07:34 (112)	21:03	66	08:05 (112)
12	07:57			07:33		08:12 (113)	07:53	07:03	06:23		07:19 (112)	06:05		06:59 (112)
	17:30			18:07	46	08:58 (113)	19:38	20:09	20:39	20	07:39 (112)	21:04	67	08:06 (112)
13	07:56			07:32		08:12 (113)	07:51	07:01	06:22		07:16 (112)	06:05		06:59 (112)
	17:31			18:08	46	08:58 (113)	19:39	20:10	20:40	26	07:42 (112)	21:04	67	08:06 (112)
14	07:56			07:30		08:13 (113)	07:49	07:00	06:21		07:14 (112)	06:05		06:59 (112)
	17:32			18:09	46	08:59 (113)	19:40	20:11	20:41	31	07:45 (112)	21:05	67	08:06 (112)
15	07:56			07:29		08:13 (113)	07:48	06:58	06:20		07:12 (112)	06:05		06:59 (112)
	17:33			18:10	46	08:59 (113)	19:41	20:12	20:42	35	07:47 (112)	21:05	68	08:07 (112)
16	07:55			07:28		08:13 (113)	07:46	06:57	06:19		07:11 (112)	06:05		06:59 (112)
	17:35			18:11	45	08:58 (113)	19:42	20:13	20:43	38	07:49 (112)	21:06	68	08:07 (112)
17	07:55			07:27		08:13 (113)	07:45	06:55	06:18		07:09 (112)	06:05		07:00 (112)
	17:36			18:12	45	08:58 (113)	19:43	20:14	20:44	41	07:50 (112)	21:06	67	08:07 (112)
18	07:54			07:25		08:14 (113)	07:43	06:54	06:18		07:08 (112)	06:05		07:00 (112)
	17:37			18:14	43	08:57 (113)	19:44	20:15	20:45	43	07:51 (112)	21:06	67	08:07 (112)
19	07:54			07:24		08:14 (113)	07:41	06:52	06:17		07:06 (112)	06:06		07:00 (112)
	17:38			18:15	42	08:56 (113)	19:45	20:16	20:46	46	07:52 (112)	21:07	67	08:07 (112)
20	07:53			07:23		08:15 (113)	07:40	06:51	06:16		07:05 (112)	06:06		07:01 (112)
	17:39			18:16	41	08:56 (113)	19:46	20:17	20:47	48	07:53 (112)	21:07	67	08:08 (112)
21	07:53			07:21		08:15 (113)	07:38	06:49	06:15		07:05 (112)	06:06		07:01 (112)
	17:40			18:17	39	08:54 (113)	19:48	20:18	20:48	50	07:55 (112)	21:07	67	08:08 (112)
22	07:52			07:20		08:16 (113)	07:37	06:48	06:14		07:04 (112)	06:06		07:01 (112)
	17:41			18:18	37	08:53 (113)	19:49	20:19	20:49	52	07:56 (112)	21:08	67	08:08 (112)
23	07:52			07:18		08:17 (113)	07:35	06:47	06:14		07:03 (112)	06:06		07:01 (112)
	17:43			18:19	36	08:53 (113)	19:50	20:20	20:50	53	07:56 (112)	21:08	67	08:08 (112)
24	07:51			07:17		08:18 (113)	07:33	06:45	06:13		07:03 (112)	06:07		07:02 (112)
	17:44			18:21	32	08:50 (113)	19:51	20:21	20:50	55	07:58 (112)	21:08	67	08:09 (112)
25	07:50			07:16		08:20 (113)	07:32	06:44	06:12		07:02 (112)	06:07		07:02 (112)
	17:45			18:22	29	08:49 (113)	19:52	20:22	20:51	56	07:58 (112)	21:08	67	08:09 (112)
26	07:50		08:27 (113)	07:14		08:21 (113)	07:30	06:42	06:12		07:01 (112)	06:07		07:01 (112)
	17:46	13	08:40 (113)	18:23	25	08:46 (113)	19:53	20:23	20:52	57	07:58 (112)	21:08	68	08:09 (112)
27	07:49		08:24 (113)	07:13		08:24 (113)	07:28	06:41	06:11		07:01 (112)	06:08		07:02 (112)
	17:47	19	08:43 (113)	18:24	20	08:44 (113)	19:54	20:24	20:53	58	07:59 (112)	21:08	68	08:10 (112)
28	07:48		08:22 (113)	07:11		08:27 (113)	07:27	06:40	06:10		07:00 (112)	06:08		07:02 (112)
	17:48	23	08:45 (113)	18:25	13	08:40 (113)	19:55	20:25	20:54	59	07:59 (112)	21:08	67	08:09 (112)
29	07:47		08:21 (113)				07:25	06:38	06:10		07:00 (112)	06:08		07:02 (112)
	17:50	26	08:47 (113)				19:56	20:26	20:55	61	08:01 (112)	21:08	67	08:09 (112)
30	07:46		08:19 (113)				07:23	06:37	06:09		07:00 (112)	06:09		07:03 (112)
	17:51	30	08:49 (113)				19:57	20:27	20:55	60	08:00 (112)	21:08	67	08:10 (112)
31	07:45		08:18 (113)				07:22		06:09		07:00 (112)			
	17:52	32	08:50 (113)				19:58		20:56	61	08:01 (112)			
Potential sun hours	300			299			370	397	446			449		
Total, worst case		143			1085					959			1987	
Sun reduction		0.36			0.42					0.56			0.60	
Oper. time red.		1.00			1.00					1.00			1.00	
Wind dir. red.		0.61			0.61					0.68			0.68	
Total reduction		0.22			0.26					0.38			0.41	
Total, real		31			278					363			806	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 29

Licensed user:
EDR
217 Montgomery St.
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Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 406 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5572)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September	October			November			December
1	06:09		07:03 (112)	06:32		07:32 (112)	07:02	07:31			07:04		07:42 (113)	07:37
	21:08	66	08:09 (112)	20:51	16	07:48 (112)	20:09	19:19			17:33	45	08:27 (113)	17:10
2	06:10		07:04 (112)	06:33			07:03	07:32			07:05		07:43 (113)	07:38
	21:08	66	08:10 (112)	20:50			20:08	19:17			17:32	45	08:28 (113)	17:10
3	06:10		07:04 (112)	06:34			07:04	07:33			07:06		07:43 (113)	07:39
	21:08	66	08:10 (112)	20:49			20:06	19:15			17:31	44	08:27 (113)	17:10
4	06:11		07:04 (112)	06:35			07:05	07:34			07:07		07:43 (113)	07:40
	21:08	66	08:10 (112)	20:48			20:05	19:14			17:30	44	08:27 (113)	17:10
5	06:11		07:04 (112)	06:36			07:06	07:35			07:08		07:44 (113)	07:41
	21:08	66	08:10 (112)	20:47			20:03	19:12			17:29	42	08:26 (113)	17:10
6	06:12		07:05 (112)	06:37			07:07	07:36			07:09		07:45 (113)	07:42
	21:08	65	08:10 (112)	20:45			20:01	19:11			17:28	41	08:26 (113)	17:09
7	06:12		07:05 (112)	06:38			07:08	07:37			07:10		07:46 (113)	07:43
	21:07	65	08:10 (112)	20:44			20:00	19:09			17:27	39	08:25 (113)	17:09
8	06:13		07:06 (112)	06:39			07:09	07:38			07:12		07:46 (113)	07:44
	21:07	64	08:10 (112)	20:43			19:57	19:07			17:26	38	08:24 (113)	17:09
9	06:14		07:06 (112)	06:40			07:10	07:39			07:13		07:47 (113)	07:45
	21:07	64	08:10 (112)	20:42			19:55	19:06			17:25	36	08:23 (113)	17:09
10	06:14		07:06 (112)	06:41			07:11	07:40			07:14		07:49 (113)	07:46
	21:06	63	08:09 (112)	20:41			19:53	19:04			17:24	34	08:23 (113)	17:09
11	06:15		07:07 (112)	06:42			07:11	07:41			07:15		07:50 (113)	07:47
	21:06	63	08:10 (112)	20:39			19:52	19:03			17:23	32	08:22 (113)	17:10
12	06:16		07:08 (112)	06:43			07:12	07:42			07:16		07:51 (113)	07:47
	21:06	62	08:10 (112)	20:38			19:50	19:01			17:22	29	08:20 (113)	17:10
13	06:16		07:08 (112)	06:44			07:13	07:43		09:05 (113)	07:17		07:53 (113)	07:48
	21:05	61	08:09 (112)	20:37			19:48	19:00	4	09:09 (113)	17:21	26	08:19 (113)	17:10
14	06:17		07:09 (112)	06:45			07:14	07:44		08:58 (113)	07:19		07:54 (113)	07:49
	21:05	60	08:09 (112)	20:36			19:47	18:58	17	09:15 (113)	17:20	23	08:17 (113)	17:10
15	06:18		07:09 (112)	06:46			07:15	07:45		08:55 (113)	07:20		07:57 (113)	07:50
	21:04	60	08:09 (112)	20:34			19:45	18:57	23	09:18 (113)	17:19	19	08:16 (113)	17:10
16	06:19		07:10 (112)	06:47			07:16	07:46		08:53 (113)	07:21		08:00 (113)	07:50
	21:04	59	08:09 (112)	20:33			19:43	18:55	27	09:20 (113)	17:18	13	08:13 (113)	17:11
17	06:19		07:10 (112)	06:48			07:17	07:47		08:51 (113)	07:22			07:51
	21:03	58	08:08 (112)	20:32			19:42	18:54	30	09:21 (113)	17:18			17:11
18	06:20		07:11 (112)	06:49			07:18	07:48		08:49 (113)	07:23			07:52
	21:02	57	08:08 (112)	20:30			19:40	18:52	34	09:23 (113)	17:17			17:11
19	06:21		07:12 (112)	06:50			07:19	07:49		08:47 (113)	07:24			07:52
	21:02	55	08:07 (112)	20:29			19:38	18:51	37	09:24 (113)	17:16			17:12
20	06:22		07:13 (112)	06:51			07:20	07:50		08:46 (113)	07:25			07:53
	21:01	54	08:07 (112)	20:27			19:37	18:49	38	09:24 (113)	17:15			17:12
21	06:23		07:14 (112)	06:51			07:21	07:51		08:45 (113)	07:27			07:53
	21:00	52	08:06 (112)	20:26			19:35	18:48	40	09:25 (113)	17:15			17:12
22	06:24		07:14 (112)	06:52			07:22	07:52		08:45 (113)	07:28			07:54
	21:00	51	08:05 (112)	20:25			19:33	18:46	42	09:27 (113)	17:14			17:13
23	06:24		07:15 (112)	06:53			07:23	07:53		08:44 (113)	07:29			07:54
	20:59	49	08:04 (112)	20:23			19:32	18:45	43	09:27 (113)	17:14			17:13
24	06:25		07:16 (112)	06:54			07:24	07:55		08:43 (113)	07:30			07:55
	20:58	48	08:04 (112)	20:22			19:30	18:44	44	09:27 (113)	17:13			17:14
25	06:26		07:18 (112)	06:55			07:25	07:56		08:43 (113)	07:31			07:55
	20:57	45	08:03 (112)	20:20			19:28	18:42	44	09:27 (113)	17:13			17:15
26	06:27		07:19 (112)	06:56			07:26	07:57		08:42 (113)	07:32			07:56
	20:56	43	08:02 (112)	20:19			19:27	18:41	45	09:27 (113)	17:12			17:15
27	06:28		07:20 (112)	06:57			07:27	07:58		08:42 (113)	07:33			07:56
	20:56	40	08:00 (112)	20:17			19:25	18:40	45	09:27 (113)	17:12			17:16
28	06:29		07:21 (112)	06:58			07:28	07:59		08:42 (113)	07:34			07:56
	20:55	37	07:58 (112)	20:16			19:23	18:38	46	09:28 (113)	17:11			17:17
29	06:30		07:23 (112)	06:59			07:29	08:00		08:42 (113)	07:35			07:57
	20:54	33	07:56 (112)	20:14			19:22	18:37	46	09:28 (113)	17:11			17:17
30	06:31		07:25 (112)	07:00			07:30	08:01		08:42 (113)	07:36			07:57
	20:53	29	07:54 (112)	20:13			19:20	18:36	46	09:28 (113)	17:11			17:18
31	06:32		07:28 (112)	07:01				08:02		08:42 (113)				07:57
	20:52	24	07:52 (112)	20:11				18:35	46	09:28 (113)				17:19
Potential sun hours	456			426			374	346			300			291
Total, worst case		1691			16				697			550		
Sun reduction		0.60			0.60				0.56			0.37		
Oper. time red.		1.00			1.00				1.00			1.00		
Wind dir. red.		0.68			0.68				0.61			0.61		
Total reduction		0.41			0.41				0.34			0.23		
Total, real		686			6				238			124		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 30

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 410 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5575)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January	February	March			April	May			June		
1	07:57	07:45	07:10			07:20	06:36			06:08		06:42 (113)
	17:20	17:53	18:26			19:59	20:28			20:57	39	07:21 (113)
2	07:57	07:44	07:08			07:19	06:35			06:08		06:42 (113)
	17:21	17:55	18:27			20:00	20:29			20:58	40	07:22 (113)
3	07:58	07:43	07:07			07:17	06:33			06:08		06:43 (113)
	17:22	17:56	18:28			20:00	20:30			20:58	39	07:22 (113)
4	07:58	07:42	07:05		07:33 (119)	07:15	06:32			06:07		06:42 (113)
	17:22	17:57	18:29	14	07:47 (119)	20:01	20:31			20:59	40	07:22 (113)
5	07:58	07:41	07:04		07:31 (119)	07:14	06:31			06:07		06:42 (113)
	17:23	17:58	18:31	20	07:51 (119)	20:02	20:32			21:00	40	07:22 (113)
6	07:58	07:40	07:02		07:28 (119)	07:12	06:30			06:07		06:43 (113)
	17:24	17:59	18:32	24	07:52 (119)	20:03	20:33			21:00	40	07:23 (113)
7	07:58	07:39	07:01		07:27 (119)	07:11	06:29			06:06		06:43 (113)
	17:25	18:01	18:33	27	07:54 (119)	20:04	20:34			21:01	40	07:23 (113)
8	07:57	07:37	07:59		08:25 (119)	07:09	06:28			06:06		06:43 (113)
	17:26	18:02	19:34	29	08:54 (119)	20:05	20:35			21:02	41	07:24 (113)
9	07:57	07:36	07:57		08:24 (119)	07:08	06:26			06:06		06:43 (113)
	17:27	18:03	19:35	31	08:55 (119)	20:06	20:36			21:02	40	07:23 (113)
10	07:57	07:35	07:56		08:23 (119)	07:06	06:25			06:06		06:43 (113)
	17:28	18:04	19:36	33	08:56 (119)	20:07	20:37			21:03	40	07:23 (113)
11	07:57	07:34	07:54		08:22 (119)	07:04	06:24			06:06		06:43 (113)
	17:29	18:05	19:37	33	08:55 (119)	20:08	20:38			21:03	41	07:24 (113)
12	07:57	07:33	07:53		08:22 (119)	07:03	06:23			06:05		06:43 (113)
	17:30	18:07	19:38	34	08:56 (119)	20:09	20:39			21:04	41	07:24 (113)
13	07:56	07:32	07:51		08:21 (119)	07:01	06:22			06:05		06:44 (113)
	17:31	18:08	19:39	35	08:56 (119)	20:10	20:40			21:04	40	07:24 (113)
14	07:56	07:30	07:49		08:20 (119)	07:00	06:21		06:56 (113)	06:05		06:44 (113)
	17:32	18:09	19:40	35	08:55 (119)	20:11	20:41	8	07:04 (113)	21:05	40	07:24 (113)
15	07:56	07:29	07:48		08:21 (119)	06:58	06:20		06:53 (113)	06:05		06:44 (113)
	17:33	18:10	19:41	34	08:55 (119)	20:12	20:42	15	07:08 (113)	21:05	40	07:24 (113)
16	07:55	07:28	07:46		08:20 (119)	06:57	06:19		06:51 (113)	06:05		06:44 (113)
	17:35	18:11	19:42	34	08:54 (119)	20:13	20:43	20	07:11 (113)	21:06	41	07:25 (113)
17	07:55	07:27	07:45		08:20 (119)	06:55	06:18		06:50 (113)	06:05		06:44 (113)
	17:36	18:12	19:43	33	08:53 (119)	20:14	20:44	22	07:12 (113)	21:06	41	07:25 (113)
18	07:54	07:25	07:43		08:21 (119)	06:54	06:18		06:48 (113)	06:05		06:44 (113)
	17:37	18:14	19:44	32	08:53 (119)	20:15	20:45	25	07:13 (113)	21:06	41	07:25 (113)
19	07:54	07:24	07:41		08:21 (119)	06:52	06:17		06:47 (113)	06:06		06:45 (113)
	17:38	18:15	19:45	31	08:52 (119)	20:16	20:46	27	07:14 (113)	21:07	40	07:25 (113)
20	07:53	07:23	07:40		08:22 (119)	06:51	06:16		06:46 (113)	06:06		06:46 (113)
	17:39	18:16	19:46	29	08:51 (119)	20:17	20:47	29	07:15 (113)	21:07	40	07:26 (113)
21	07:53	07:21	07:38		08:23 (119)	06:49	06:15		06:46 (113)	06:06		06:46 (113)
	17:40	18:17	19:48	26	08:49 (119)	20:18	20:48	30	07:16 (113)	21:07	40	07:26 (113)
22	07:52	07:20	07:37		08:23 (119)	06:48	06:14		06:45 (113)	06:06		06:46 (113)
	17:41	18:18	19:49	24	08:47 (119)	20:19	20:49	32	07:17 (113)	21:08	40	07:26 (113)
23	07:52	07:18	07:35		08:26 (119)	06:47	06:14		06:44 (113)	06:06		06:46 (113)
	17:43	18:19	19:50	20	08:46 (119)	20:20	20:50	33	07:17 (113)	21:08	40	07:26 (113)
24	07:51	07:17	07:33		08:27 (119)	06:45	06:13		06:44 (113)	06:07		06:47 (113)
	17:44	18:21	19:51	15	08:42 (119)	20:21	20:50	35	07:19 (113)	21:08	40	07:27 (113)
25	07:50	07:16	07:32		08:32 (119)	06:44	06:12		06:43 (113)	06:07		06:46 (113)
	17:45	18:22	19:52	5	08:37 (119)	20:22	20:51	36	07:19 (113)	21:08	41	07:27 (113)
26	07:50	07:14	07:30			06:42	06:12		06:43 (113)	06:07		06:46 (113)
	17:46	18:23	19:53			20:23	20:52	36	07:19 (113)	21:08	41	07:27 (113)
27	07:49	07:13	07:28			06:41	06:11		06:43 (113)	06:08		06:47 (113)
	17:47	18:24	19:54			20:24	20:53	37	07:20 (113)	21:08	40	07:27 (113)
28	07:48	07:11	07:27			06:40	06:10		06:42 (113)	06:08		06:47 (113)
	17:48	18:25	19:55			20:25	20:54	38	07:20 (113)	21:08	40	07:27 (113)
29	07:47		07:25			06:38	06:10		06:43 (113)	06:08		06:47 (113)
	17:50		19:56			20:26	20:55	38	07:21 (113)	21:08	40	07:27 (113)
30	07:46		07:24			06:37	06:09		06:42 (113)	06:09		06:48 (113)
	17:51		19:57			20:27	20:55	38	07:20 (113)	21:08	40	07:28 (113)
31	07:45		07:22				06:09		06:42 (113)			
	17:52		19:58				20:56	39	07:21 (113)			
Potential sun hours	300	299	370			397	446			449		
Total, worst case				598				538			1206	
Sun reduction				0.44				0.56			0.60	
Oper. time red.				1.00				1.00			1.00	
Wind dir. red.				0.63				0.68			0.68	
Total reduction				0.28				0.38			0.41	
Total, real				166				205			493	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 31

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 410 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5575)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August		September			October			November	December
1	06:09		06:47 (113)	06:32		07:02			07:31		08:01 (119)	07:04	07:37
	21:08	41	07:28 (113)	20:51		20:09			19:19	34	08:35 (119)	17:33	17:10
2	06:10		06:48 (113)	06:33		07:03			07:32		08:01 (119)	07:05	07:38
	21:08	40	07:28 (113)	20:50		20:08			19:17	33	08:34 (119)	17:32	17:10
3	06:10		06:48 (113)	06:34		07:04			07:33		08:01 (119)	07:06	07:39
	21:08	40	07:28 (113)	20:49		20:06			19:15	32	08:33 (119)	17:31	17:10
4	06:11		06:48 (113)	06:35		07:05			07:34		08:01 (119)	07:07	07:40
	21:08	41	07:29 (113)	20:48		20:05			19:14	31	08:32 (119)	17:30	17:10
5	06:11		06:48 (113)	06:36		07:06			07:35		08:02 (119)	07:08	07:41
	21:08	40	07:28 (113)	20:47		20:03			19:12	29	08:31 (119)	17:29	17:10
6	06:12		06:49 (113)	06:37		07:07			07:36		08:02 (119)	07:09	07:42
	21:08	40	07:29 (113)	20:45		20:01			19:11	28	08:30 (119)	17:28	17:09
7	06:13		06:49 (113)	06:38		07:08			07:37		08:03 (119)	07:10	07:43
	21:07	40	07:29 (113)	20:44		20:00			19:09	25	08:28 (119)	17:27	17:09
8	06:13		06:49 (113)	06:39		07:09			07:38		08:05 (119)	07:12	07:44
	21:07	40	07:29 (113)	20:43		19:57			19:07	21	08:26 (119)	17:26	17:09
9	06:14		06:50 (113)	06:40		07:10			07:39		08:07 (119)	07:13	07:45
	21:07	39	07:29 (113)	20:42		19:55			19:06	17	08:24 (119)	17:25	17:09
10	06:14		06:49 (113)	06:41		07:11			07:40		08:10 (119)	07:14	07:46
	21:06	40	07:29 (113)	20:41		19:53			19:04	10	08:20 (119)	17:24	17:09
11	06:15		06:50 (113)	06:42		07:11			07:41			07:15	07:47
	21:06	39	07:29 (113)	20:39		19:52			19:03			17:23	17:10
12	06:16		06:51 (113)	06:43		07:12			07:42			07:16	07:47
	21:06	39	07:30 (113)	20:38		19:50			19:01			17:22	17:10
13	06:17		06:50 (113)	06:44		07:13			07:43			07:17	07:48
	21:05	39	07:29 (113)	20:37		19:48			19:00			17:21	17:10
14	06:17		06:51 (113)	06:45		07:14			07:44			07:19	07:49
	21:05	38	07:29 (113)	20:36		19:47			18:58			17:20	17:10
15	06:18		06:52 (113)	06:46		07:15			07:45			07:20	07:50
	21:04	37	07:29 (113)	20:34		19:45			18:57			17:19	17:10
16	06:19		06:52 (113)	06:47		07:16			07:46			07:21	07:50
	21:04	37	07:29 (113)	20:33		19:43			18:55			17:18	17:11
17	06:20		06:52 (113)	06:48		07:17			07:47			07:22	07:51
	21:03	36	07:28 (113)	20:32		19:42			18:54			17:18	17:11
18	06:20		06:53 (113)	06:49		07:18			07:48			07:23	07:52
	21:02	35	07:28 (113)	20:30		19:40			18:52			17:17	17:11
19	06:21		06:53 (113)	06:50		07:19		08:15 (119)	07:49			07:24	07:52
	21:02	35	07:28 (113)	20:29		19:38	14	08:29 (119)	18:51			17:16	17:12
20	06:22		06:54 (113)	06:51		07:20		08:12 (119)	07:50			07:25	07:53
	21:01	34	07:28 (113)	20:27		19:37	19	08:31 (119)	18:49			17:15	17:12
21	06:23		06:55 (113)	06:52		07:21		08:10 (119)	07:51			07:27	07:53
	21:00	33	07:28 (113)	20:26		19:35	23	08:33 (119)	18:48			17:15	17:12
22	06:24		06:55 (113)	06:52		07:22		08:07 (119)	07:52			07:28	07:54
	21:00	31	07:26 (113)	20:25		19:33	26	08:33 (119)	18:46			17:14	17:13
23	06:24		06:56 (113)	06:53		07:23		08:06 (119)	07:53			07:29	07:54
	20:59	30	07:26 (113)	20:23		19:32	28	08:34 (119)	18:45			17:14	17:13
24	06:25		06:57 (113)	06:54		07:24		08:05 (119)	07:55			07:30	07:55
	20:58	28	07:25 (113)	20:22		19:30	30	08:35 (119)	18:44			17:13	17:14
25	06:26		06:58 (113)	06:55		07:25		08:04 (119)	07:56			07:31	07:55
	20:57	26	07:24 (113)	20:20		19:28	31	08:35 (119)	18:42			17:13	17:15
26	06:27		06:59 (113)	06:56		07:26		08:03 (119)	07:57			07:32	07:56
	20:56	24	07:23 (113)	20:19		19:27	33	08:36 (119)	18:41			17:12	17:15
27	06:28		07:01 (113)	06:57		07:27		08:02 (119)	07:58			07:33	07:56
	20:56	21	07:22 (113)	20:17		19:25	34	08:36 (119)	18:40			17:12	17:16
28	06:29		07:02 (113)	06:58		07:28		08:01 (119)	07:59			07:34	07:56
	20:55	17	07:19 (113)	20:16		19:23	35	08:36 (119)	18:38			17:11	17:17
29	06:30		07:04 (113)	06:59		07:29		08:01 (119)	08:00			07:35	07:57
	20:54	13	07:17 (113)	20:14		19:22	35	08:36 (119)	18:37			17:11	17:17
30	06:31		07:10 (113)	07:00		07:30		08:01 (119)	08:01			07:36	07:57
	20:53	2	07:12 (113)	20:13		19:20	34	08:35 (119)	18:36			17:11	17:18
31	06:32			07:01					08:02				07:57
	20:52			20:11					18:35				17:19
Potential sun hours	456			426		374			346			300	291
Total, worst case		995					342			260			
Sun reduction		0.60					0.61			0.56			
Oper. time red.		1.00					1.00			1.00			
Wind dir. red.		0.68					0.63			0.63			
Total reduction		0.41					0.39			0.35			
Total, real		407					132			92			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 32

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 411 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5576)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April	May			June		
1	07:57		08:25 (118)	07:45			07:10		07:37 (119)	07:20	06:36		07:09 (113)	06:08		06:58 (113)
	17:20	29	08:54 (118)	17:53			18:26	32	08:09 (119)	19:59	20:28	14	07:23 (113)	20:57	35	07:33 (113)
2	07:57		08:25 (118)	07:44			07:08		07:36 (119)	07:19	06:35		07:06 (113)	06:08		06:59 (113)
	17:21	29	08:54 (118)	17:55			18:27	33	08:09 (119)	20:00	20:29	19	07:25 (113)	20:58	34	07:33 (113)
3	07:58		08:25 (118)	07:43			07:07		07:36 (119)	07:17	06:33		07:04 (113)	06:07		07:00 (113)
	17:22	30	08:55 (118)	17:56			18:28	34	08:10 (119)	20:00	20:30	24	07:28 (113)	20:58	33	07:33 (113)
4	07:58		08:26 (118)	07:42			07:05		07:35 (119)	07:15	06:32		07:03 (113)	06:07		07:00 (113)
	17:22	29	08:55 (118)	17:57			18:29	34	08:09 (119)	20:01	20:31	26	07:29 (113)	20:59	32	07:32 (113)
5	07:58		08:26 (118)	07:41			07:04		07:36 (119)	07:14	06:31		07:01 (113)	06:07		07:00 (113)
	17:23	30	08:56 (118)	17:58			18:31	34	08:10 (119)	20:02	20:32	29	07:30 (113)	21:00	32	07:32 (113)
6	07:58		08:27 (118)	07:40			07:02		07:35 (119)	07:12	06:30		06:59 (113)	06:07		07:01 (113)
	17:24	29	08:56 (118)	17:59			18:32	34	08:09 (119)	20:03	20:33	32	07:31 (113)	21:00	31	07:32 (113)
7	07:58		08:27 (118)	07:39			07:01		07:36 (119)	07:11	06:29		06:58 (113)	06:06		07:02 (113)
	17:25	30	08:57 (118)	18:01			18:33	33	08:09 (119)	20:04	20:34	34	07:32 (113)	21:01	30	07:32 (113)
8	07:57		08:28 (118)	07:37			07:59		08:35 (119)	07:09	06:28		06:58 (113)	06:06		07:03 (113)
	17:26	30	08:58 (118)	18:02			19:34	33	09:08 (119)	20:05	20:35	34	07:32 (113)	21:02	29	07:32 (113)
9	07:57		08:28 (118)	07:36			07:57		08:35 (119)	07:08	06:26		06:57 (113)	06:06		07:02 (113)
	17:27	30	08:58 (118)	18:03			19:35	32	09:07 (119)	20:06	20:36	36	07:33 (113)	21:02	29	07:31 (113)
10	07:57		08:28 (118)	07:35			07:56		08:36 (119)	07:06	06:25		06:56 (113)	06:06		07:03 (113)
	17:28	30	08:58 (118)	18:04			19:36	30	09:06 (119)	20:07	20:37	37	07:33 (113)	21:03	28	07:31 (113)
11	07:57		08:28 (118)	07:34			07:54		08:36 (119)	07:04	06:24		06:56 (113)	06:06		07:04 (113)
	17:29	31	08:59 (118)	18:05			19:37	29	09:05 (119)	20:08	20:38	38	07:34 (113)	21:03	27	07:31 (113)
12	07:57		08:29 (118)	07:33			07:53		08:38 (119)	07:03	06:23		06:55 (113)	06:05		07:04 (113)
	17:30	30	08:59 (118)	18:07			19:38	26	09:04 (119)	20:09	20:39	39	07:34 (113)	21:04	27	07:31 (113)
13	07:56		08:30 (118)	07:32			07:51		08:39 (119)	07:01	06:22		06:55 (113)	06:05		07:05 (113)
	17:31	30	09:00 (118)	18:08			19:39	23	09:02 (119)	20:10	20:40	39	07:34 (113)	21:04	26	07:31 (113)
14	07:56		08:30 (118)	07:30			07:49		08:40 (119)	07:00	06:21		06:55 (113)	06:05		07:05 (113)
	17:32	29	08:59 (118)	18:09			19:40	19	08:59 (119)	20:11	20:41	39	07:34 (113)	21:05	26	07:31 (113)
15	07:56		08:31 (118)	07:29			07:48		08:43 (119)	06:58	06:20		06:54 (113)	06:05		07:06 (113)
	17:33	29	09:00 (118)	18:10			19:41	13	08:56 (119)	20:12	20:42	41	07:35 (113)	21:05	25	07:31 (113)
16	07:55		08:31 (118)	07:28			07:46			06:57	06:19		06:55 (113)	06:05		07:06 (113)
	17:35	29	09:00 (118)	18:11			19:42			20:13	20:43	41	07:36 (113)	21:06	25	07:31 (113)
17	07:55		08:32 (118)	07:27			07:45			06:55	06:18		06:55 (113)	06:05		07:06 (113)
	17:36	28	09:00 (118)	18:12			19:43			20:14	20:44	40	07:35 (113)	21:06	25	07:31 (113)
18	07:54		08:32 (118)	07:25			07:43			06:54	06:18		06:55 (113)	06:05		07:07 (113)
	17:37	28	09:00 (118)	18:14			19:44			20:15	20:45	40	07:35 (113)	21:06	24	07:31 (113)
19	07:54		08:34 (118)	07:24			07:41			06:52	06:17		06:54 (113)	06:06		07:07 (113)
	17:38	26	09:00 (118)	18:15			19:45			20:16	20:46	41	07:35 (113)	21:07	24	07:31 (113)
20	07:53		08:34 (118)	07:23			07:40			06:51	06:16		06:54 (113)	06:06		07:08 (113)
	17:39	25	08:59 (118)	18:16			19:46			20:17	20:47	41	07:35 (113)	21:07	24	07:32 (113)
21	07:53		08:35 (118)	07:21			07:38			06:49	06:15		06:55 (113)	06:06		07:08 (113)
	17:40	24	08:59 (118)	18:17			19:48			20:18	20:48	41	07:36 (113)	21:07	24	07:32 (113)
22	07:52		08:36 (118)	07:20		07:50 (119)	07:37			06:48	06:14		06:55 (113)	06:06		07:08 (113)
	17:41	23	08:59 (118)	18:18	8	07:58 (119)	19:49			20:19	20:49	40	07:35 (113)	21:08	24	07:32 (113)
23	07:52		08:37 (118)	07:18		07:46 (119)	07:35			06:47	06:14		06:55 (113)	06:06		07:08 (113)
	17:43	21	08:58 (118)	18:19	16	08:02 (119)	19:50			20:20	20:50	40	07:35 (113)	21:08	24	07:32 (113)
24	07:51		08:38 (118)	07:17		07:43 (119)	07:33			06:45	06:13		06:56 (113)	06:07		07:09 (113)
	17:44	19	08:57 (118)	18:21	21	08:04 (119)	19:51			20:21	20:50	39	07:35 (113)	21:08	24	07:33 (113)
25	07:50		08:41 (118)	07:16		07:42 (119)	07:32			06:44	06:12		06:56 (113)	06:07		07:08 (113)
	17:45	15	08:56 (118)	18:22	24	08:06 (119)	19:52			20:22	20:51	39	07:35 (113)	21:08	25	07:33 (113)
26	07:50		08:43 (118)	07:14		07:40 (119)	07:30			06:42	06:12		06:56 (113)	06:07		07:08 (113)
	17:46	11	08:54 (118)	18:23	27	08:07 (119)	19:53			20:23	20:52	38	07:34 (113)	21:08	25	07:33 (113)
27	07:49		08:47 (118)	07:13		07:39 (119)	07:28			06:41	06:11		06:57 (113)	06:08		07:09 (113)
	17:47	3	08:50 (118)	18:24	29	08:08 (119)	19:54			20:24	20:53	38	07:35 (113)	21:08	25	07:34 (113)
28	07:48			07:11		07:38 (119)	07:27			06:40	06:10		06:56 (113)	06:08		07:08 (113)
	17:48			18:25	30	08:08 (119)	19:55			20:25	20:54	38	07:34 (113)	21:08	26	07:34 (113)
29	07:47						07:25			06:38	06:10		06:57 (113)	06:08		07:08 (113)
	17:50						19:56			20:26	20:55	37	07:34 (113)	21:08	26	07:34 (113)
30	07:46						07:24			06:37	06:09		06:57 (113)	06:09		07:08 (113)
	17:51						19:57			20:27	20:55	36	07:33 (113)	21:08	27	07:35 (113)
31	07:45						07:22				06:09		06:58 (113)			
	17:52						19:58				20:56	36	07:34 (113)			
Potential sun hours	300			299			370			397	446			449		
Total, worst case		697			155			439				1106			816	
Sun reduction		0.36			0.42			0.44				0.56			0.60	
Oper. time red.		1.00			1.00			1.00				1.00			1.00	
Wind dir. red.		0.61			0.63			0.63				0.68			0.68	
Total reduction		0.22			0.26			0.28				0.38			0.40	
Total, real		151			41			122				416			329	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 33

Licensed user:
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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 411 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5576)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		07:08 (113)	06:32		07:06 (113)	07:02			07:31		08:17 (119)	07:04			07:37		08:10 (118)
	21:08	27	07:35 (113)	20:51	39	07:45 (113)	20:09			19:19	25	08:42 (119)	17:33			17:10	31	08:41 (118)
2	06:10		07:08 (113)	06:33		07:07 (113)	07:03			07:32		08:16 (119)	07:05			07:38		08:11 (118)
	21:08	28	07:36 (113)	20:50	37	07:44 (113)	20:08			19:17	27	08:43 (119)	17:32			17:10	30	08:41 (118)
3	06:10		07:08 (113)	06:34		07:07 (113)	07:04			07:33		08:14 (119)	07:06			07:39		08:11 (118)
	21:08	28	07:36 (113)	20:49	37	07:44 (113)	20:06			19:15	30	08:44 (119)	17:31			17:10	30	08:41 (118)
4	06:11		07:08 (113)	06:35		07:08 (113)	07:05			07:34		08:13 (119)	07:07			07:40		08:12 (118)
	21:08	29	07:37 (113)	20:48	35	07:43 (113)	20:05			19:14	31	08:44 (119)	17:30			17:10	30	08:42 (118)
5	06:11		07:07 (113)	06:36		07:09 (113)	07:06			07:35		08:12 (119)	07:08			07:41		08:12 (118)
	21:08	30	07:37 (113)	20:47	34	07:43 (113)	20:03			19:12	32	08:44 (119)	17:29			17:10	30	08:42 (118)
6	06:12		07:08 (113)	06:37		07:08 (113)	07:07			07:36		08:11 (119)	07:09			07:42		08:13 (118)
	21:08	30	07:38 (113)	20:45	33	07:41 (113)	20:01			19:11	34	08:45 (119)	17:28			17:09	29	08:42 (118)
7	06:12		07:08 (113)	06:38		07:09 (113)	07:08			07:37		08:11 (119)	07:10			07:43		08:13 (118)
	21:07	31	07:39 (113)	20:44	31	07:40 (113)	20:00			19:09	34	08:45 (119)	17:27			17:09	30	08:43 (118)
8	06:13		07:07 (113)	06:39		07:11 (113)	07:09			07:38		08:10 (119)	07:12			07:44		08:14 (118)
	21:07	32	07:39 (113)	20:43	28	07:39 (113)	19:57			19:07	34	08:44 (119)	17:26			17:09	29	08:43 (118)
9	06:14		07:07 (113)	06:40		07:12 (113)	07:10			07:39		08:10 (119)	07:13			07:45		08:14 (118)
	21:07	33	07:40 (113)	20:42	25	07:37 (113)	19:55			19:06	34	08:44 (119)	17:25			17:09	30	08:44 (118)
10	06:14		07:06 (113)	06:41		07:13 (113)	07:11			07:40		08:10 (119)	07:14			07:46		08:15 (118)
	21:06	34	07:40 (113)	20:41	23	07:36 (113)	19:53			19:04	34	08:44 (119)	17:24			17:09	29	08:44 (118)
11	06:15		07:06 (113)	06:42		07:15 (113)	07:11			07:41		08:10 (119)	07:15			07:47		08:16 (118)
	21:06	35	07:41 (113)	20:39	19	07:34 (113)	19:52			19:03	33	08:43 (119)	17:23			17:10	29	08:45 (118)
12	06:16		07:07 (113)	06:43		07:19 (113)	07:12			07:42		08:10 (119)	07:16			07:47		08:16 (118)
	21:06	35	07:42 (113)	20:38	11	07:30 (113)	19:50			19:01	32	08:42 (119)	17:22			17:10	28	08:44 (118)
13	06:17		07:06 (113)	06:44			07:13			07:43		08:11 (119)	07:17			07:48		08:16 (118)
	21:05	36	07:42 (113)	20:37			19:48			19:00	32	08:43 (119)	17:21			17:10	29	08:45 (118)
14	06:17		07:06 (113)	06:45			07:14			07:44		08:12 (119)	07:19			07:49		08:17 (118)
	21:05	36	07:42 (113)	20:36			19:47			18:58	30	08:42 (119)	17:20			17:10	28	08:45 (118)
15	06:18		07:06 (113)	06:46			07:15			07:45		08:12 (119)	07:20		08:20 (118)	07:50		08:18 (118)
	21:04	37	07:43 (113)	20:34			19:45			18:57	28	08:40 (119)	17:19	3	08:23 (118)	17:10	28	08:46 (118)
16	06:19		07:06 (113)	06:47			07:16			07:46		08:13 (119)	07:21		08:16 (118)	07:50		08:18 (118)
	21:04	38	07:44 (113)	20:33			19:43			18:55	26	08:39 (119)	17:18	11	08:27 (118)	17:11	28	08:46 (118)
17	06:20		07:05 (113)	06:48			07:17			07:47		08:14 (119)	07:22		08:14 (118)	07:51		08:19 (118)
	21:03	38	07:43 (113)	20:32			19:42			18:54	23	08:37 (119)	17:18	15	08:29 (118)	17:11	27	08:46 (118)
18	06:20		07:05 (113)	06:49			07:18			07:48		08:16 (119)	07:23		08:12 (118)	07:52		08:19 (118)
	21:02	39	07:44 (113)	20:30			19:40			18:52	19	08:35 (119)	17:17	19	08:31 (118)	17:11	27	08:46 (118)
19	06:21		07:05 (113)	06:50			07:19			07:49		08:18 (119)	07:24		08:12 (118)	07:52		08:20 (118)
	21:02	39	07:44 (113)	20:29			19:38			18:51	14	08:32 (119)	17:16	21	08:33 (118)	17:12	27	08:47 (118)
20	06:22		07:05 (113)	06:51			07:20			07:50		08:24 (119)	07:25		08:11 (118)	07:53		08:21 (118)
	21:01	40	07:45 (113)	20:27			19:37			18:49	2	08:26 (119)	17:15	23	08:34 (118)	17:12	27	08:48 (118)
21	06:23		07:06 (113)	06:52			07:21			07:51			07:27		08:11 (118)	07:53		08:20 (118)
	21:00	39	07:45 (113)	20:26			19:35			18:48			17:15	24	08:35 (118)	17:12	28	08:48 (118)
22	06:24		07:05 (113)	06:52			07:22			07:52			07:28		08:10 (118)	07:54		08:21 (118)
	21:00	40	07:45 (113)	20:25			19:33			18:46			17:14	25	08:35 (118)	17:13	28	08:49 (118)
23	06:24		07:05 (113)	06:53			07:23			07:53			07:29		08:10 (118)	07:54		08:21 (118)
	20:59	40	07:45 (113)	20:23			19:32			18:45			17:14	26	08:36 (118)	17:13	28	08:49 (118)
24	06:25		07:05 (113)	06:54			07:24			07:55			07:30		08:09 (118)	07:55		08:22 (118)
	20:58	41	07:46 (113)	20:22			19:30			18:44			17:13	28	08:37 (118)	17:14	27	08:49 (118)
25	06:26		07:05 (113)	06:55			07:25			07:56			07:31		08:10 (118)	07:55		08:23 (118)
	20:57	41	07:46 (113)	20:20			19:28			18:42			17:13	28	08:38 (118)	17:15	27	08:50 (118)
26	06:27		07:05 (113)	06:56			07:26			07:57			07:32		08:10 (118)	07:56		08:23 (118)
	20:56	41	07:46 (113)	20:19			19:27			18:41			17:12	29	08:39 (118)	17:15	27	08:50 (118)
27	06:28		07:06 (113)	06:57			07:27			07:58			07:33		08:10 (118)	07:56		08:23 (118)
	20:56	40	07:46 (113)	20:17			19:25			18:40			17:12	29	08:39 (118)	17:16	28	08:51 (118)
28	06:29		07:05 (113)	06:58			07:28		08:25 (119)	07:59			07:34		08:10 (118)	07:56		08:24 (118)
	20:55	40	07:45 (113)	20:16			19:23	10	08:35 (119)	18:38			17:11	30	08:40 (118)	17:17	28	08:52 (118)
29	06:30		07:05 (113)	06:59			07:29		08:22 (119)	08:00			07:35		08:10 (118)	07:57		08:24 (118)
	20:54	40	07:45 (113)	20:14			19:22	17	08:39 (119)	18:37			17:11	30	08:40 (118)	17:17	28	08:52 (118)
30	06:31		07:05 (113)	07:00			07:30		08:19 (119)	08:01			07:36		08:10 (118)	07:57		08:24 (118)
	20:53	40	07:45 (113)	20:13			19:20	21	08:40 (119)	18:36			17:11	30	08:40 (118)	17:18	29	08:53 (118)
31	06:32		07:06 (113)	07:01						08:02						07:57		08:24 (118)
	20:52	39	07:45 (113)	20:11						18:35						17:19	29	08:53 (118)
Potential sun hours	456			426			374			346			300			291		
Total, worst case		1116			352			48			554			371			883	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.68			0.68			0.63			0.63			0.61			0.61	
Total reduction		0.40			0.40			0.38			0.35			0.22			0.30	
Total, real		450			142			18			195			83			266	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 34

Licensed user:
EDR
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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 573 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5630)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March	April	May			June		
1	07:57			07:45		08:28 (109)	07:10	07:20	06:36			06:08		06:46 (108)
	17:20			17:53	49	09:17 (109)	18:26	19:59	20:28			20:57	38	07:24 (108)
2	07:58			07:44		08:28 (109)	07:08	07:19	06:35			06:08		06:46 (108)
	17:21			17:54	49	09:17 (109)	18:27	20:00	20:29			20:58	38	07:24 (108)
3	07:58		08:39 (109)	07:43		08:28 (109)	07:07	07:17	06:33			06:07		06:47 (108)
	17:21	6	08:45 (109)	17:56	49	09:17 (109)	18:28	20:00	20:30			20:58	38	07:25 (108)
4	07:58		08:37 (109)	07:42		08:29 (109)	07:05	07:15	06:32			06:07		06:46 (108)
	17:22	11	08:48 (109)	17:57	48	09:17 (109)	18:29	20:01	20:31			20:59	38	07:24 (108)
5	07:58		08:36 (109)	07:41		08:28 (109)	07:04	07:14	06:31			06:07		06:47 (108)
	17:23	15	08:51 (109)	17:58	48	09:16 (109)	18:31	20:02	20:32			21:00	37	07:24 (108)
6	07:58		08:35 (109)	07:40		08:29 (109)	07:02	07:12	06:30			06:06		06:47 (108)
	17:24	17	08:52 (109)	17:59	47	09:16 (109)	18:32	20:03	20:33			21:01	38	07:25 (108)
7	07:58		08:34 (109)	07:39		08:29 (109)	07:01	07:11	06:29			06:06		06:48 (108)
	17:25	20	08:54 (109)	18:01	46	09:15 (109)	18:33	20:04	20:34			21:01	37	07:25 (108)
8	07:58		08:34 (109)	07:37		08:30 (109)	07:59	07:09	06:27		06:59 (108)	06:06		06:47 (108)
	17:26	22	08:56 (109)	18:02	45	09:15 (109)	19:34	20:05	20:35	10	07:09 (108)	21:02	37	07:24 (108)
9	07:57		08:33 (109)	07:36		08:31 (109)	07:57	07:08	06:26		06:56 (108)	06:06		06:48 (108)
	17:27	25	08:58 (109)	18:03	44	09:15 (109)	19:35	20:06	20:36	16	07:12 (108)	21:02	36	07:24 (108)
10	07:57		08:33 (109)	07:35		08:31 (109)	07:56	07:06	06:25		06:54 (108)	06:06		06:48 (108)
	17:28	26	08:59 (109)	18:04	43	09:14 (109)	19:36	20:07	20:37	20	07:14 (108)	21:03	36	07:24 (108)
11	07:57		08:32 (109)	07:34		08:32 (109)	07:54	07:04	06:24		06:52 (108)	06:05		06:49 (108)
	17:29	28	09:00 (109)	18:05	42	09:14 (109)	19:37	20:08	20:38	24	07:16 (108)	21:03	36	07:25 (108)
12	07:57		08:31 (109)	07:33		08:33 (109)	07:53	07:03	06:23		06:51 (108)	06:05		06:49 (108)
	17:30	31	09:02 (109)	18:07	39	09:12 (109)	19:38	20:09	20:39	26	07:17 (108)	21:04	36	07:25 (108)
13	07:56		08:31 (109)	07:32		08:34 (109)	07:51	07:01	06:22		06:50 (108)	06:05		06:50 (108)
	17:31	32	09:03 (109)	18:08	37	09:11 (109)	19:39	20:10	20:40	28	07:18 (108)	21:04	35	07:25 (108)
14	07:56		08:30 (109)	07:30		08:35 (109)	07:49	07:00	06:21		06:49 (108)	06:05		06:50 (108)
	17:32	34	09:04 (109)	18:09	35	09:10 (109)	19:40	20:11	20:41	30	07:19 (108)	21:05	35	07:25 (108)
15	07:56		08:30 (109)	07:29		08:37 (109)	07:48	06:58	06:20		06:48 (108)	06:05		06:50 (108)
	17:33	35	09:05 (109)	18:10	32	09:09 (109)	19:41	20:12	20:42	31	07:19 (108)	21:05	35	07:25 (108)
16	07:55		08:29 (109)	07:28		08:38 (109)	07:46	06:57	06:19		06:47 (108)	06:05		06:50 (108)
	17:34	37	09:06 (109)	18:11	28	09:06 (109)	19:42	20:13	20:43	33	07:20 (108)	21:06	35	07:25 (108)
17	07:55		08:29 (109)	07:27		08:40 (109)	07:45	06:55	06:18		06:47 (108)	06:05		06:51 (108)
	17:36	39	09:08 (109)	18:12	24	09:04 (109)	19:43	20:14	20:44	34	07:21 (108)	21:06	34	07:25 (108)
18	07:55		08:29 (109)	07:25		08:43 (109)	07:43	06:54	06:17		06:47 (108)	06:05		06:51 (108)
	17:37	39	09:08 (109)	18:14	19	09:02 (109)	19:44	20:15	20:45	35	07:22 (108)	21:07	34	07:25 (108)
19	07:54		08:29 (109)	07:24		08:48 (109)	07:41	06:52	06:17		06:46 (108)	06:05		06:51 (108)
	17:38	41	09:10 (109)	18:15	8	08:56 (109)	19:45	20:16	20:46	36	07:22 (108)	21:07	34	07:25 (108)
20	07:54		08:28 (109)	07:23			07:40	06:51	06:16		06:46 (108)	06:06		06:52 (108)
	17:39	42	09:10 (109)	18:16			19:46	20:17	20:47	36	07:22 (108)	21:07	34	07:26 (108)
21	07:53		08:29 (109)	07:21			07:38	06:49	06:15		06:46 (108)	06:06		06:52 (108)
	17:40	43	09:12 (109)	18:17			19:48	20:18	20:48	37	07:23 (108)	21:07	34	07:26 (108)
22	07:52		08:28 (109)	07:20			07:37	06:48	06:14		06:46 (108)	06:06		06:52 (108)
	17:41	44	09:12 (109)	18:18			19:49	20:19	20:49	37	07:23 (108)	21:08	34	07:26 (108)
23	07:52		08:27 (109)	07:18			07:35	06:47	06:14		06:45 (108)	06:06		06:52 (108)
	17:42	45	09:12 (109)	18:19			19:50	20:20	20:50	38	07:23 (108)	21:08	34	07:26 (108)
24	07:51		08:27 (109)	07:17			07:33	06:45	06:13		06:46 (108)	06:07		06:53 (108)
	17:44	46	09:13 (109)	18:21			19:51	20:21	20:51	38	07:24 (108)	21:08	34	07:27 (108)
25	07:50		08:28 (109)	07:16			07:32	06:44	06:12		06:45 (108)	06:07		06:53 (108)
	17:45	46	09:14 (109)	18:22			19:52	20:22	20:51	39	07:24 (108)	21:08	34	07:27 (108)
26	07:50		08:27 (109)	07:14			07:30	06:42	06:11		06:45 (108)	06:07		06:52 (108)
	17:46	48	09:15 (109)	18:23			19:53	20:23	20:52	38	07:23 (108)	21:08	35	07:27 (108)
27	07:49		08:27 (109)	07:13			07:28	06:41	06:11		06:45 (108)	06:07		06:53 (108)
	17:47	48	09:15 (109)	18:24			19:54	20:24	20:53	39	07:24 (108)	21:08	35	07:28 (108)
28	07:48		08:27 (109)	07:11			07:27	06:40	06:10		06:45 (108)	06:08		06:53 (108)
	17:48	48	09:15 (109)	18:25			19:55	20:25	20:54	39	07:24 (108)	21:08	35	07:28 (108)
29	07:47		08:27 (109)				07:25	06:38	06:10		06:46 (108)	06:08		06:53 (108)
	17:50	48	09:15 (109)				19:56	20:26	20:55	38	07:24 (108)	21:08	35	07:28 (108)
30	07:46		08:27 (109)				07:23	06:37	06:09		06:45 (108)	06:09		06:53 (108)
	17:51	49	09:16 (109)				19:57	20:27	20:55	39	07:24 (108)	21:08	36	07:29 (108)
31	07:46		08:28 (109)				07:22		06:09		06:46 (108)			
	17:52	49	09:17 (109)				19:58		20:56	38	07:24 (108)			
Potential sun hours	300			299			370	397	446			449		
Total, worst case		1014			732					779			1067	
Sun reduction		0.36			0.42					0.56			0.60	
Oper. time red.		1.00			1.00					1.00			1.00	
Wind dir. red.		0.60			0.60					0.68			0.68	
Total reduction		0.21			0.25					0.38			0.40	
Total, real		218			183					293			431	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 35

Licensed user:
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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 573 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5630)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September	October		November			December		
1	06:09		06:53 (108)	06:32		07:02 (108)	07:02	07:31		07:04		08:00 (109)	07:37		08:14 (109)
	21:08	36	07:29 (108)	20:51	25	07:27 (108)	20:09	19:19		17:33	43	08:43 (109)	17:10	28	08:42 (109)
2	06:10		06:54 (108)	06:33		07:03 (108)	07:03	07:32		07:05		08:00 (109)	07:38		08:15 (109)
	21:08	36	07:30 (108)	20:50	23	07:26 (108)	20:08	19:17		17:32	45	08:45 (109)	17:10	27	08:42 (109)
3	06:10		06:53 (108)	06:34		07:05 (108)	07:04	07:33		07:06		07:59 (109)	07:39		08:16 (109)
	21:08	36	07:29 (108)	20:49	19	07:24 (108)	20:06	19:15		17:31	46	08:45 (109)	17:10	25	08:41 (109)
4	06:11		06:54 (108)	06:35		07:08 (108)	07:05	07:34		07:07		07:59 (109)	07:40		08:18 (109)
	21:08	36	07:30 (108)	20:48	14	07:22 (108)	20:05	19:14		17:30	46	08:45 (109)	17:10	22	08:40 (109)
5	06:11		06:53 (108)	06:36		07:12 (108)	07:06	07:35		07:08		07:58 (109)	07:41		08:19 (109)
	21:08	37	07:30 (108)	20:47	6	07:18 (108)	20:03	19:12		17:29	48	08:46 (109)	17:09	21	08:40 (109)
6	06:12		06:54 (108)	06:37			07:07	07:36		07:09		07:59 (109)	07:42		08:21 (109)
	21:08	37	07:31 (108)	20:45			20:01	19:10		17:28	48	08:47 (109)	17:09	18	08:39 (109)
7	06:12		06:53 (108)	06:38			07:08	07:37		07:11		07:58 (109)	07:43		08:23 (109)
	21:07	37	07:30 (108)	20:44			20:00	19:09		17:27	49	08:47 (109)	17:09	15	08:38 (109)
8	06:13		06:54 (108)	06:39			07:09	07:38		07:12		07:58 (109)	07:44		08:25 (109)
	21:07	37	07:31 (108)	20:43			19:57	19:07		17:26	49	08:47 (109)	17:09	12	08:37 (109)
9	06:14		06:54 (108)	06:40			07:10	07:39		07:13		07:58 (109)	07:45		08:28 (109)
	21:07	38	07:32 (108)	20:42			19:55	19:06		17:25	49	08:47 (109)	17:09	7	08:35 (109)
10	06:14		06:53 (108)	06:41			07:11	07:40		07:14		07:59 (109)	07:46		
	21:06	38	07:31 (108)	20:41			19:53	19:04		17:24	49	08:48 (109)	17:09		
11	06:15		06:54 (108)	06:42			07:11	07:41		07:15		07:59 (109)	07:47		
	21:06	38	07:32 (108)	20:39			19:52	19:03		17:23	49	08:48 (109)	17:09		
12	06:16		06:54 (108)	06:43			07:12	07:42		07:16		07:59 (109)	07:47		
	21:06	39	07:33 (108)	20:38			19:50	19:01		17:22	49	08:48 (109)	17:10		
13	06:16		06:54 (108)	06:44			07:13	07:43		07:17		07:59 (109)	07:48		
	21:05	38	07:32 (108)	20:37			19:48	19:00		17:21	48	08:47 (109)	17:10		
14	06:17		06:54 (108)	06:45			07:14	07:44		07:19		08:00 (109)	07:49		
	21:05	39	07:33 (108)	20:36			19:47	18:58		17:20	48	08:48 (109)	17:10		
15	06:18		06:54 (108)	06:46			07:15	07:45		07:20		08:00 (109)	07:50		
	21:04	39	07:33 (108)	20:34			19:45	18:57		17:19	48	08:48 (109)	17:10		
16	06:19		06:55 (108)	06:47			07:16	07:46		07:21		08:00 (109)	07:50		
	21:04	38	07:33 (108)	20:33			19:43	18:55		17:18	48	08:48 (109)	17:10		
17	06:19		06:54 (108)	06:48			07:17	07:47		07:22		08:01 (109)	07:51		
	21:03	39	07:33 (108)	20:32			19:42	18:54		17:18	46	08:47 (109)	17:11		
18	06:20		06:55 (108)	06:49			07:18	07:48		07:23		08:01 (109)	07:52		
	21:02	38	07:33 (108)	20:30			19:40	18:52		17:17	46	08:47 (109)	17:11		
19	06:21		06:55 (108)	06:50			07:19	07:49		07:24		08:02 (109)	07:52		
	21:02	38	07:33 (108)	20:29			19:38	18:51		17:16	45	08:47 (109)	17:12		
20	06:22		06:55 (108)	06:51			07:20	07:50		07:25		08:03 (109)	07:53		
	21:01	38	07:33 (108)	20:27			19:37	18:49		17:15	44	08:47 (109)	17:12		
21	06:23		06:55 (108)	06:51			07:21	07:51		07:27		08:04 (109)	07:53		
	21:00	37	07:32 (108)	20:26			19:35	18:48		17:15	43	08:47 (109)	17:12		
22	06:24		06:55 (108)	06:52			07:22	07:52		07:28		08:04 (109)	07:54		
	21:00	38	07:33 (108)	20:25			19:33	18:46		17:14	42	08:46 (109)	17:13		
23	06:24		06:56 (108)	06:53			07:23	07:54	09:16 (109)	07:29		08:05 (109)	07:54		
	20:59	37	07:33 (108)	20:23			19:32	18:45	12 09:28 (109)	17:14	41	08:46 (109)	17:13		
24	06:25		06:56 (108)	06:54			07:24	07:55	09:12 (109)	07:30		08:07 (109)	07:55		
	20:58	36	07:32 (108)	20:22			19:30	18:44	20 09:32 (109)	17:13	39	08:46 (109)	17:14		
25	06:26		06:57 (108)	06:55			07:25	07:56	09:09 (109)	07:31		08:07 (109)	07:55		
	20:57	35	07:32 (108)	20:20			19:28	18:42	25 09:34 (109)	17:13	39	08:46 (109)	17:15		
26	06:27		06:58 (108)	06:56			07:26	07:57	09:07 (109)	07:32		08:08 (109)	07:56		
	20:57	34	07:32 (108)	20:19			19:27	18:41	29 09:36 (109)	17:12	37	08:45 (109)	17:15		
27	06:28		06:58 (108)	06:57			07:27	07:58	09:05 (109)	07:33		08:09 (109)	07:56		
	20:56	34	07:32 (108)	20:17			19:25	18:40	33 09:38 (109)	17:12	36	08:45 (109)	17:16		
28	06:29		06:58 (108)	06:58			07:28	07:59	09:05 (109)	07:34		08:10 (109)	07:56		
	20:55	32	07:30 (108)	20:16			19:23	18:38	35 09:40 (109)	17:11	34	08:44 (109)	17:17		
29	06:30		06:59 (108)	06:59			07:29	08:00	09:03 (109)	07:35		08:11 (109)	07:57		
	20:54	31	07:30 (108)	20:14			19:22	18:37	38 09:41 (109)	17:11	32	08:43 (109)	17:17		
30	06:31		07:00 (108)	07:00			07:30	08:01	09:02 (109)	07:36		08:12 (109)	07:57		
	20:53	29	07:29 (108)	20:13			19:20	18:36	40 09:42 (109)	17:11	31	08:43 (109)	17:18		
31	06:32		07:01 (108)	07:01				08:02	09:01 (109)				07:57		
	20:52	27	07:28 (108)	20:11				18:35	42 09:43 (109)				17:19		
Potential sun hours	456			427			374	346		300			291		
Total, worst case		1122			87				274		1317			175	
Sun reduction		0.60			0.60				0.56		0.37			0.50	
Oper. time red.		1.00			1.00				1.00		1.00			1.00	
Wind dir. red.		0.68			0.68				0.60		0.60			0.60	
Total reduction		0.40			0.40				0.33		0.22			0.30	
Total, real		453			35				91		290			52	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 36

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 581 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5633)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March	April	May			June		
1	07:57		16:34 (109)	07:45		16:34 (109)	07:10	07:20	06:36			06:08		19:11 (108)
	17:20	13	16:47 (109)	17:53	35	17:09 (109)	18:26	19:59	20:28			20:57	56	20:07 (108)
2	07:57		16:33 (109)	07:44		16:35 (109)	07:08	07:19	06:35			06:08		19:11 (108)
	17:21	15	16:48 (109)	17:54	33	17:08 (109)	18:27	20:00	20:29			20:58	57	20:08 (108)
3	07:58		16:33 (109)	07:43		16:36 (109)	07:07	07:17	06:33			06:07		19:11 (108)
	17:21	16	16:49 (109)	17:56	32	17:08 (109)	18:28	20:00	20:30			20:58	58	20:09 (108)
4	07:58		16:32 (109)	07:42		16:36 (109)	07:05	07:15	06:32			06:07		19:11 (108)
	17:22	18	16:50 (109)	17:57	30	17:06 (109)	18:29	20:01	20:31			20:59	58	20:09 (108)
5	07:58		16:32 (109)	07:41		16:37 (109)	07:04	07:14	06:31			06:07		19:11 (108)
	17:23	20	16:52 (109)	17:58	28	17:05 (109)	18:31	20:02	20:32			21:00	59	20:10 (108)
6	07:58		16:32 (109)	07:40		16:39 (109)	07:02	07:12	06:30			06:06		19:11 (108)
	17:24	21	16:53 (109)	17:59	25	17:04 (109)	18:32	20:03	20:33			21:00	59	20:10 (108)
7	07:58		16:32 (109)	07:39		16:41 (109)	07:01	07:11	06:29			06:06		19:11 (108)
	17:25	22	16:54 (109)	18:00	22	17:03 (109)	18:33	20:04	20:34			21:01	60	20:11 (108)
8	07:57		16:31 (109)	07:37		16:43 (109)	07:59	07:09	06:27			06:06		19:10 (108)
	17:26	25	16:56 (109)	18:02	18	17:01 (109)	19:34	20:05	20:35			21:02	60	20:10 (108)
9	07:57		16:31 (109)	07:36		16:46 (109)	07:57	07:07	06:26			06:06		19:11 (108)
	17:27	26	16:57 (109)	18:03	12	16:58 (109)	19:35	20:06	20:36			21:02	60	20:11 (108)
10	07:57		16:31 (109)	07:35			07:56	07:06	06:25			06:06		19:11 (108)
	17:28	27	16:58 (109)	18:04			19:36	20:07	20:37			21:03	60	20:11 (108)
11	07:57		16:30 (109)	07:34			07:54	07:04	06:24			06:05		19:11 (108)
	17:29	28	16:58 (109)	18:05			19:37	20:08	20:38			21:03	61	20:12 (108)
12	07:57		16:31 (109)	07:33			07:53	07:03	06:23			06:05		19:11 (108)
	17:30	29	17:00 (109)	18:06			19:38	20:09	20:39			21:04	61	20:12 (108)
13	07:56		16:31 (109)	07:32			07:51	07:01	06:22		19:35 (108)	06:05		19:11 (108)
	17:31	30	17:01 (109)	18:08			19:39	20:10	20:40	6	19:41 (108)	21:04	62	20:13 (108)
14	07:56		16:30 (109)	07:30			07:49	07:00	06:21		19:29 (108)	06:05		19:11 (108)
	17:32	31	17:01 (109)	18:09			19:40	20:11	20:41	18	19:47 (108)	21:05	62	20:13 (108)
15	07:56		16:30 (109)	07:29			07:48	06:58	06:20		19:26 (108)	06:05		19:12 (108)
	17:33	33	17:03 (109)	18:10			19:41	20:12	20:42	24	19:50 (108)	21:05	61	20:13 (108)
16	07:55		16:30 (109)	07:28			07:46	06:57	06:19		19:24 (108)	06:05		19:12 (108)
	17:34	33	17:03 (109)	18:11			19:42	20:13	20:43	28	19:52 (108)	21:06	61	20:13 (108)
17	07:55		16:30 (109)	07:27			07:45	06:55	06:18		19:22 (108)	06:05		19:12 (108)
	17:36	34	17:04 (109)	18:12			19:43	20:14	20:44	32	19:54 (108)	21:06	62	20:14 (108)
18	07:54		16:30 (109)	07:25			07:43	06:54	06:17		19:21 (108)	06:05		19:12 (108)
	17:37	34	17:04 (109)	18:14			19:44	20:15	20:45	35	19:56 (108)	21:06	62	20:14 (108)
19	07:54		16:30 (109)	07:24			07:41	06:52	06:17		19:19 (108)	06:05		19:12 (108)
	17:38	36	17:06 (109)	18:15			19:45	20:16	20:46	38	19:57 (108)	21:07	62	20:14 (108)
20	07:53		16:30 (109)	07:23			07:40	06:51	06:16		19:18 (108)	06:06		19:12 (108)
	17:39	36	17:06 (109)	18:16			19:46	20:17	20:47	40	19:58 (108)	21:07	62	20:14 (108)
21	07:53		16:29 (109)	07:21			07:38	06:49	06:15		19:16 (108)	06:06		19:13 (108)
	17:40	37	17:06 (109)	18:17			19:47	20:18	20:48	43	19:59 (108)	21:07	62	20:15 (108)
22	07:52		16:30 (109)	07:20			07:36	06:48	06:14		19:16 (108)	06:06		19:13 (108)
	17:41	37	17:07 (109)	18:18			19:49	20:19	20:49	45	20:01 (108)	21:08	62	20:15 (108)
23	07:52		16:30 (109)	07:18			07:35	06:47	06:13		19:15 (108)	06:06		19:13 (108)
	17:42	37	17:07 (109)	18:19			19:50	20:20	20:50	46	20:01 (108)	21:08	62	20:15 (108)
24	07:51		16:30 (109)	07:17			07:33	06:45	06:13		19:14 (108)	06:06		19:13 (108)
	17:44	37	17:07 (109)	18:20			19:51	20:21	20:50	48	20:02 (108)	21:08	62	20:15 (108)
25	07:50		16:31 (109)	07:16			07:32	06:44	06:12		19:14 (108)	06:07		19:14 (108)
	17:45	37	17:08 (109)	18:22			19:52	20:22	20:51	49	20:03 (108)	21:08	62	20:16 (108)
26	07:50		16:31 (109)	07:14			07:30	06:42	06:11		19:13 (108)	06:07		19:14 (108)
	17:46	37	17:08 (109)	18:23			19:53	20:23	20:52	51	20:04 (108)	21:08	61	20:15 (108)
27	07:49		16:31 (109)	07:13			07:28	06:41	06:11		19:13 (108)	06:07		19:14 (108)
	17:47	37	17:08 (109)	18:24			19:54	20:24	20:53	52	20:05 (108)	21:08	61	20:15 (108)
28	07:48		16:31 (109)	07:11			07:27	06:40	06:10		19:12 (108)	06:08		19:15 (108)
	17:48	37	17:08 (109)	18:25			19:55	20:25	20:54	53	20:05 (108)	21:08	61	20:16 (108)
29	07:47		16:32 (109)				07:25	06:38	06:10		19:12 (108)	06:08		19:14 (108)
	17:50	36	17:08 (109)				19:56	20:26	20:55	54	20:06 (108)	21:08	62	20:16 (108)
30	07:46		16:32 (109)				07:23	06:37	06:09		19:12 (108)	06:09		19:15 (108)
	17:51	36	17:08 (109)				19:57	20:27	20:55	54	20:06 (108)	21:08	61	20:16 (108)
31	07:45		16:33 (109)				07:22		06:09		19:12 (108)			
	17:52	35	17:08 (109)				19:58		20:56	55	20:07 (108)			
Potential sun hours	300			299			370	397	446			449		
Total, worst case		930			235					771			1819	
Sun reduction		0.36			0.42					0.56			0.60	
Oper. time red.		1.00			1.00					1.00			1.00	
Wind dir. red.		0.68			0.68					0.63			0.63	
Total reduction		0.25			0.29					0.35			0.38	
Total, real		229			67					273			690	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 37

Licensed user:
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217 Montgomery St.
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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 581 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5633)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August	September	October	November			December		
1	06:09		19:15 (108)	06:32	07:02	07:31	07:04		16:21 (109)	07:37		16:12 (109)
	21:08	61	20:16 (108)	20:51	20:09	19:19	17:33	2	16:22 (109)	17:10	29	16:41 (109)
2	06:10		19:16 (108)	06:33	07:03	07:32	07:05		16:15 (109)	07:38		16:13 (109)
	21:08	61	20:17 (108)	20:50	20:08	19:17	17:32	14	16:29 (109)	17:10	27	16:40 (109)
3	06:10		19:16 (108)	06:34	07:04	07:33	07:06		16:12 (109)	07:39		16:14 (109)
	21:08	60	20:16 (108)	20:49	20:06	19:15	17:31	19	16:31 (109)	17:10	26	16:40 (109)
4	06:11		19:17 (108)	06:35	07:05	07:34	07:07		16:10 (109)	07:40		16:15 (109)
	21:08	60	20:17 (108)	20:48	20:05	19:14	17:30	23	16:33 (109)	17:10	25	16:40 (109)
5	06:11		19:16 (108)	06:36	07:06	07:35	07:08		16:09 (109)	07:41		16:17 (109)
	21:08	60	20:16 (108)	20:47	20:03	19:12	17:29	25	16:34 (109)	17:09	22	16:39 (109)
6	06:12		19:17 (108)	06:37	07:07	07:36	07:09		16:08 (109)	07:42		16:18 (109)
	21:08	59	20:16 (108)	20:45	20:01	19:10	17:28	28	16:36 (109)	17:09	21	16:39 (109)
7	06:12		19:17 (108)	06:38	07:08	07:37	07:10		16:07 (109)	07:43		16:19 (109)
	21:07	59	20:16 (108)	20:44	20:00	19:09	17:27	30	16:37 (109)	17:09	20	16:39 (109)
8	06:13		19:18 (108)	06:39	07:09	07:38	07:12		16:06 (109)	07:44		16:20 (109)
	21:07	58	20:16 (108)	20:43	19:57	19:07	17:26	31	16:37 (109)	17:09	19	16:39 (109)
9	06:14		19:19 (108)	06:40	07:10	07:39	07:13		16:05 (109)	07:45		16:22 (109)
	21:07	57	20:16 (108)	20:42	19:55	19:06	17:25	33	16:38 (109)	17:09	16	16:38 (109)
10	06:14		19:18 (108)	06:41	07:10	07:40	07:14		16:05 (109)	07:46		16:23 (109)
	21:06	58	20:16 (108)	20:41	19:53	19:04	17:24	34	16:39 (109)	17:09	15	16:38 (109)
11	06:15		19:19 (108)	06:42	07:11	07:41	07:15		16:05 (109)	07:47		16:25 (109)
	21:06	57	20:16 (108)	20:39	19:52	19:03	17:23	35	16:40 (109)	17:09	13	16:38 (109)
12	06:16		19:20 (108)	06:43	07:12	07:42	07:16		16:04 (109)	07:47		16:25 (109)
	21:06	56	20:16 (108)	20:38	19:50	19:01	17:22	36	16:40 (109)	17:10	11	16:36 (109)
13	06:16		19:20 (108)	06:44	07:13	07:43	07:17		16:04 (109)	07:48		16:27 (109)
	21:05	55	20:15 (108)	20:37	19:48	18:59	17:21	36	16:40 (109)	17:10	9	16:36 (109)
14	06:17		19:21 (108)	06:45	07:14	07:44	07:19		16:03 (109)	07:49		16:29 (109)
	21:05	54	20:15 (108)	20:36	19:47	18:58	17:20	37	16:40 (109)	17:10	6	16:35 (109)
15	06:18		19:21 (108)	06:46	07:15	07:45	07:20		16:04 (109)	07:50		16:32 (109)
	21:04	54	20:15 (108)	20:34	19:45	18:56	17:19	37	16:41 (109)	17:10	2	16:34 (109)
16	06:19		19:22 (108)	06:47	07:16	07:46	07:21		16:04 (109)	07:50		
	21:04	53	20:15 (108)	20:33	19:43	18:55	17:18	37	16:41 (109)	17:10		
17	06:19		19:22 (108)	06:48	07:17	07:47	07:22		16:04 (109)	07:51		
	21:03	51	20:13 (108)	20:32	19:42	18:53	17:17	37	16:41 (109)	17:11		
18	06:20		19:23 (108)	06:49	07:18	07:48	07:23		16:04 (109)	07:52		
	21:02	50	20:13 (108)	20:30	19:40	18:52	17:17	37	16:41 (109)	17:11		
19	06:21		19:24 (108)	06:50	07:19	07:49	07:24		16:05 (109)	07:52		
	21:02	49	20:13 (108)	20:29	19:38	18:51	17:16	37	16:42 (109)	17:11		
20	06:22		19:25 (108)	06:50	07:20	07:50	07:25		16:05 (109)	07:53		
	21:01	47	20:12 (108)	20:27	19:37	18:49	17:15	37	16:42 (109)	17:12		
21	06:23		19:25 (108)	06:51	07:21	07:51	07:27		16:05 (109)	07:53		
	21:00	46	20:11 (108)	20:26	19:35	18:48	17:15	37	16:42 (109)	17:12		
22	06:23		19:26 (108)	06:52	07:22	07:52	07:28		16:06 (109)	07:54		
	21:00	44	20:10 (108)	20:25	19:33	18:46	17:14	36	16:42 (109)	17:13		
23	06:24		19:28 (108)	06:53	07:23	07:53	07:29		16:06 (109)	07:54		
	20:59	41	20:09 (108)	20:23	19:32	18:45	17:14	36	16:42 (109)	17:13		
24	06:25		19:29 (108)	06:54	07:24	07:55	07:30		16:07 (109)	07:55		
	20:58	39	20:08 (108)	20:22	19:30	18:44	17:13	34	16:41 (109)	17:14		
25	06:26		19:30 (108)	06:55	07:25	07:56	07:31		16:08 (109)	07:55		
	20:57	37	20:07 (108)	20:20	19:28	18:42	17:12	34	16:42 (109)	17:14		
26	06:27		19:32 (108)	06:56	07:26	07:57	07:32		16:09 (109)	07:56		
	20:56	34	20:06 (108)	20:19	19:27	18:41	17:12	33	16:42 (109)	17:15		
27	06:28		19:33 (108)	06:57	07:27	07:58	07:33		16:09 (109)	07:56		
	20:56	30	20:03 (108)	20:17	19:25	18:40	17:12	33	16:42 (109)	17:16		
28	06:29		19:35 (108)	06:58	07:28	07:59	07:34		16:10 (109)	07:56		
	20:55	26	20:01 (108)	20:16	19:23	18:38	17:11	31	16:41 (109)	17:16		
29	06:30		19:38 (108)	06:59	07:29	08:00	07:35		16:11 (109)	07:57		16:37 (109)
	20:54	21	19:59 (108)	20:14	19:22	18:37	17:11	30	16:41 (109)	17:17	5	16:42 (109)
30	06:31		19:42 (108)	07:00	07:30	08:01	07:36		16:12 (109)	07:57		16:35 (109)
	20:53	13	19:55 (108)	20:12	19:20	18:36	17:10	29	16:41 (109)	17:18	8	16:43 (109)
31	06:31			07:01		08:02				07:57		16:34 (109)
	20:52			20:11		18:35				17:19	11	16:45 (109)
Potential sun hours	456			427	374	346	300			291		
Total, worst case		1450						938			285	
Sun reduction		0.60						0.37			0.50	
Oper. time red.		1.00						1.00			1.00	
Wind dir. red.		0.63						0.68			0.68	
Total reduction		0.38						0.25			0.34	
Total, real		550						237			97	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 38

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 616 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5648)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April			May			June		
1	07:57	07:44	07:09	07:20			06:36		18:38 (101)	06:08		18:31 (101)
	17:19	17:53	18:26	19:59			20:28	57	19:35 (101)	20:57	75	19:46 (101)
2	07:57	07:43	07:08	07:18			06:34		18:37 (101)	06:08		18:32 (101)
	17:20	17:54	18:27	20:00			20:29	60	19:37 (101)	20:57	74	19:46 (101)
3	07:57	07:42	07:06	07:17			06:33		18:35 (101)	06:07		18:31 (101)
	17:21	17:55	18:28	20:00			20:30	62	19:37 (101)	20:58	75	19:46 (101)
4	07:57	07:41	07:05	07:15			06:32		18:35 (101)	06:07		18:32 (101)
	17:22	17:57	18:29	20:01			20:31	63	19:38 (101)	20:59	74	19:46 (101)
5	07:57	07:40	07:03	07:14			06:31		18:34 (101)	06:06		18:33 (101)
	17:23	17:58	18:30	20:02			20:32	65	19:39 (101)	21:00	74	19:47 (101)
6	07:57	07:39	07:02	07:12			06:29		18:33 (101)	06:06		18:33 (101)
	17:24	17:59	18:31	20:03			20:33	66	19:39 (101)	21:00	74	19:47 (101)
7	07:57	07:38	07:00	07:10			06:28		18:33 (101)	06:06		18:33 (101)
	17:25	18:00	18:32	20:04			20:34	67	19:40 (101)	21:01	73	19:46 (101)
8	07:57	07:37	07:59	07:09			06:27		18:32 (101)	06:06		18:33 (101)
	17:26	18:01	19:34	20:05			20:35	69	19:41 (101)	21:01	74	19:47 (101)
9	07:57	07:36	07:57	07:07			06:26		18:32 (101)	06:05		18:34 (101)
	17:27	18:03	19:35	20:06			20:36	69	19:41 (101)	21:02	73	19:47 (101)
10	07:57	07:35	07:56	07:06			06:25		18:31 (101)	06:05		18:34 (101)
	17:28	18:04	19:36	20:07			20:37	71	19:42 (101)	21:03	73	19:47 (101)
11	07:57	07:34	07:54	07:04			06:24		18:31 (101)	06:05		18:34 (101)
	17:29	18:05	19:37	20:08			20:38	71	19:42 (101)	21:03	73	19:47 (101)
12	07:56	07:33	07:52	07:03			06:23		18:30 (101)	06:05		18:35 (101)
	17:30	18:06	19:38	20:09			20:39	73	19:43 (101)	21:04	73	19:48 (101)
13	07:56	07:31	07:51	07:01			06:22		18:30 (101)	06:05		18:35 (101)
	17:31	18:07	19:39	20:10			20:40	73	19:43 (101)	21:04	73	19:48 (101)
14	07:56	07:30	07:49	06:59			06:21		18:30 (101)	06:05		18:35 (101)
	17:32	18:09	19:40	20:11			20:41	73	19:43 (101)	21:05	73	19:48 (101)
15	07:56	07:29	07:48	06:58			06:20		18:30 (101)	06:05		18:36 (101)
	17:33	18:10	19:41	20:12			20:42	73	19:43 (101)	21:05	72	19:48 (101)
16	07:55	07:28	07:46	06:56			06:19		18:29 (101)	06:05		18:36 (101)
	17:34	18:11	19:42	20:13			20:43	74	19:43 (101)	21:06	72	19:48 (101)
17	07:55	07:26	07:44	06:55			06:18		18:29 (101)	06:05		18:36 (101)
	17:35	18:12	19:43	20:14			20:44	75	19:44 (101)	21:06	72	19:48 (101)
18	07:54	07:25	07:43	06:53			06:17		18:30 (101)	06:05		18:36 (101)
	17:36	18:13	19:44	20:15			20:45	75	19:45 (101)	21:06	72	19:48 (101)
19	07:54	07:24	07:41	06:52			06:16		18:30 (101)	06:05		18:36 (101)
	17:38	18:14	19:45	20:16			20:46	75	19:45 (101)	21:07	73	19:49 (101)
20	07:53	07:22	07:39	06:51			06:16		18:29 (101)	06:05		18:36 (101)
	17:39	18:16	19:46	20:17			20:47	76	19:45 (101)	21:07	73	19:49 (101)
21	07:53	07:21	07:38	06:49			06:15		18:29 (101)	06:06		18:36 (101)
	17:40	18:17	19:47	20:18			20:48	75	19:44 (101)	21:07	73	19:49 (101)
22	07:52	07:20	07:36	06:48		19:00 (101)	06:14		18:30 (101)	06:06		18:37 (101)
	17:41	18:18	19:48	20:19	17	19:17 (101)	20:48	75	19:45 (101)	21:07	73	19:50 (101)
23	07:51	07:18	07:35	06:46		18:55 (101)	06:13		18:30 (101)	06:06		18:37 (101)
	17:42	18:19	19:49	20:20	26	19:21 (101)	20:49	75	19:45 (101)	21:08	73	19:50 (101)
24	07:51	07:17	07:33	06:45		18:52 (101)	06:13		18:29 (101)	06:06		18:37 (101)
	17:43	18:20	19:50	20:21	32	19:24 (101)	20:50	76	19:45 (101)	21:08	73	19:50 (101)
25	07:50	07:15	07:31	06:43		18:49 (101)	06:12		18:30 (101)	06:07		18:38 (101)
	17:45	18:21	19:51	20:22	38	19:27 (101)	20:51	76	19:46 (101)	21:08	72	19:50 (101)
26	07:49	07:14	07:30	06:42		18:46 (101)	06:11		18:30 (101)	06:07		18:38 (101)
	17:46	18:22	19:52	20:23	42	19:28 (101)	20:52	75	19:45 (101)	21:08	72	19:50 (101)
27	07:49	07:12	07:28	06:41		18:44 (101)	06:11		18:30 (101)	06:07		18:38 (101)
	17:47	18:24	19:53	20:24	46	19:30 (101)	20:53	75	19:45 (101)	21:08	72	19:50 (101)
28	07:48	07:11	07:26	06:39		18:43 (101)	06:10		18:30 (101)	06:08		18:39 (101)
	17:48	18:25	19:54	20:25	49	19:32 (101)	20:54	76	19:46 (101)	21:08	72	19:51 (101)
29	07:47		07:25	06:38		18:40 (101)	06:09		18:30 (101)	06:08		18:38 (101)
	17:49		19:55	20:26	53	19:33 (101)	20:54	75	19:45 (101)	21:08	73	19:51 (101)
30	07:46		07:23	06:37		18:39 (101)	06:09		18:31 (101)	06:08		18:38 (101)
	17:51		19:56	20:27	55	19:34 (101)	20:55	75	19:46 (101)	21:08	73	19:51 (101)
31	07:45		07:22				06:08		18:31 (101)			
	17:52		19:57				20:56	75	19:46 (101)			
Potential sun hours	300	299	370	397			446			449		
Total, worst case				358			2215			2191		
Sun reduction				0.51			0.56			0.60		
Oper. time red.				1.00			1.00			1.00		
Wind dir. red.				0.63			0.63			0.63		
Total reduction				0.32			0.36			0.38		
Total, real				116			787			834		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

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4/30/2012 9:43 AM / 39

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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 616 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5648)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September	October	November	December
1	06:09		18:39 (101)	06:32		18:41 (101)	07:02	07:30	07:03	07:37
	21:08	73	19:52 (101)	20:51	72	19:53 (101)	20:09	19:18	17:33	17:10
2	06:09		18:38 (101)	06:33		18:42 (101)	07:03	07:31	07:04	07:38
	21:08	73	19:51 (101)	20:50	71	19:53 (101)	20:08	19:17	17:32	17:10
3	06:10		18:39 (101)	06:34		18:41 (101)	07:04	07:32	07:06	07:39
	21:08	73	19:52 (101)	20:49	70	19:51 (101)	20:06	19:15	17:31	17:10
4	06:10		18:38 (101)	06:35		18:41 (101)	07:05	07:33	07:07	07:40
	21:08	74	19:52 (101)	20:47	70	19:51 (101)	20:04	19:13	17:30	17:09
5	06:11		18:39 (101)	06:36		18:42 (101)	07:05	07:34	07:08	07:41
	21:08	74	19:53 (101)	20:46	68	19:50 (101)	20:03	19:12	17:28	17:09
6	06:12		18:39 (101)	06:37		18:43 (101)	07:06	07:35	07:09	07:42
	21:07	74	19:53 (101)	20:45	66	19:49 (101)	20:01	19:10	17:27	17:09
7	06:12		18:39 (101)	06:38		18:43 (101)	07:07	07:36	07:10	07:43
	21:07	74	19:53 (101)	20:44	66	19:49 (101)	20:00	19:09	17:26	17:09
8	06:13		18:39 (101)	06:39		18:44 (101)	07:08	07:37	07:11	07:44
	21:07	74	19:53 (101)	20:43	64	19:48 (101)	19:56	19:07	17:25	17:09
9	06:13		18:39 (101)	06:40		18:45 (101)	07:09	07:38	07:13	07:45
	21:07	74	19:53 (101)	20:42	62	19:47 (101)	19:55	19:05	17:24	17:09
10	06:14		18:39 (101)	06:41		18:45 (101)	07:10	07:39	07:14	07:46
	21:06	75	19:54 (101)	20:40	61	19:46 (101)	19:53	19:04	17:23	17:09
11	06:15		18:39 (101)	06:42		18:46 (101)	07:11	07:40	07:15	07:46
	21:06	75	19:54 (101)	20:39	59	19:45 (101)	19:51	19:02	17:22	17:09
12	06:15		18:39 (101)	06:43		18:47 (101)	07:12	07:42	07:16	07:47
	21:05	75	19:54 (101)	20:38	57	19:44 (101)	19:50	19:01	17:21	17:09
13	06:16		18:39 (101)	06:44		18:48 (101)	07:13	07:43	07:17	07:48
	21:05	75	19:54 (101)	20:37	55	19:43 (101)	19:48	18:59	17:21	17:09
14	06:17		18:39 (101)	06:44		18:49 (101)	07:14	07:44	07:18	07:49
	21:04	76	19:55 (101)	20:35	51	19:40 (101)	19:46	18:58	17:20	17:10
15	06:18		18:40 (101)	06:45		18:50 (101)	07:15	07:45	07:19	07:49
	21:04	75	19:55 (101)	20:34	49	19:39 (101)	19:45	18:56	17:19	17:10
16	06:18		18:39 (101)	06:46		18:51 (101)	07:16	07:46	07:21	07:50
	21:03	75	19:54 (101)	20:33	46	19:37 (101)	19:43	18:55	17:18	17:10
17	06:19		18:39 (101)	06:47		18:53 (101)	07:17	07:47	07:22	07:51
	21:03	76	19:55 (101)	20:31	42	19:35 (101)	19:41	18:53	17:17	17:10
18	06:20		18:40 (101)	06:48		18:55 (101)	07:18	07:48	07:23	07:51
	21:02	75	19:55 (101)	20:30	37	19:32 (101)	19:40	18:52	17:16	17:11
19	06:21		18:40 (101)	06:49		18:58 (101)	07:19	07:49	07:24	07:52
	21:02	75	19:55 (101)	20:29	31	19:29 (101)	19:38	18:50	17:16	17:11
20	06:22		18:39 (101)	06:50		19:01 (101)	07:20	07:50	07:25	07:53
	21:01	76	19:55 (101)	20:27	25	19:26 (101)	19:36	18:49	17:15	17:12
21	06:22		18:39 (101)	06:51		19:06 (101)	07:21	07:51	07:26	07:53
	21:00	76	19:55 (101)	20:26	14	19:20 (101)	19:35	18:47	17:14	17:12
22	06:23		18:39 (101)	06:52			07:22	07:52	07:27	07:54
	20:59	76	19:55 (101)	20:24			19:33	18:46	17:14	17:13
23	06:24		18:40 (101)	06:53			07:23	07:53	07:29	07:54
	20:59	75	19:55 (101)	20:23			19:31	18:45	17:13	17:13
24	06:25		18:40 (101)	06:54			07:24	07:54	07:30	07:55
	20:58	75	19:55 (101)	20:21			19:30	18:43	17:13	17:14
25	06:26		18:39 (101)	06:55			07:25	07:55	07:31	07:55
	20:57	75	19:54 (101)	20:20			19:28	18:42	17:12	17:14
26	06:27		18:39 (101)	06:56			07:25	07:57	07:32	07:55
	20:56	75	19:54 (101)	20:18			19:27	18:41	17:12	17:15
27	06:28		18:40 (101)	06:57			07:26	07:58	07:33	07:56
	20:55	74	19:54 (101)	20:17			19:25	18:39	17:11	17:16
28	06:28		18:40 (101)	06:58			07:27	07:59	07:34	07:56
	20:54	74	19:54 (101)	20:15			19:23	18:38	17:11	17:16
29	06:29		18:40 (101)	06:59			07:28	08:00	07:35	07:56
	20:54	74	19:54 (101)	20:14			19:22	18:37	17:11	17:17
30	06:30		18:41 (101)	07:00			07:29	08:01	07:36	07:57
	20:53	73	19:54 (101)	20:12			19:20	18:35	17:10	17:18
31	06:31		18:41 (101)	07:01				08:02		07:57
	20:52	72	19:53 (101)	20:11				18:34		17:18
Potential sun hours	456			427			374	346	300	291
Total, worst case		2310			1136					
Sun reduction		0.60			0.60					
Oper. time red.		1.00			1.00					
Wind dir. red.		0.63			0.63					
Total reduction		0.38			0.38					
Total, real		880			433					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 40

Licensed user:
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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 662 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5669)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57			07:45		08:23 (108)	07:10			07:20		08:32 (83)	06:36			06:08		06:50 (82)
	17:20			17:53	28	08:51 (108)	18:26			19:59	3	08:35 (83)	20:28			20:57	91	20:25 (107)
2	07:58			07:44		08:24 (108)	07:08			07:19			06:35			06:08		06:51 (82)
	17:21			17:54	27	08:51 (108)	18:27			20:00			20:29			20:58	92	20:26 (107)
3	07:58			07:43		08:25 (108)	07:07			07:17			06:33			06:07		06:51 (82)
	17:21			17:56	25	08:50 (108)	18:28			20:00			20:30			20:59	94	20:27 (107)
4	07:58			07:42		08:26 (108)	07:05			07:15			06:32			06:07		06:50 (82)
	17:22			17:57	23	08:49 (108)	18:29			20:01			20:31			20:59	93	20:26 (107)
5	07:58			07:41		08:26 (108)	07:04			07:14			06:31			06:07		06:50 (82)
	17:23			17:58	21	08:47 (108)	18:31			20:02			20:32			21:00	95	20:27 (107)
6	07:58			07:40		08:28 (108)	07:02			07:12			06:30			06:06		06:51 (82)
	17:24			17:59	18	08:46 (108)	18:32			20:03			20:33			21:01	94	20:27 (107)
7	07:58			07:39		08:30 (108)	07:01		07:38 (83)	07:11			06:29			06:06		06:51 (82)
	17:25			18:01	14	08:44 (108)	18:33	8	07:46 (83)	20:04			20:34			21:01	95	20:28 (107)
8	07:58		08:26 (108)	07:37		08:35 (108)	07:59		08:32 (83)	07:09			06:27			06:06		06:50 (82)
	17:26	8	08:34 (108)	18:02	5	08:40 (108)	19:34	18	08:50 (83)	20:05			20:35			21:02	95	20:27 (107)
9	07:57		08:24 (108)	07:36			07:57		08:29 (83)	07:08			06:26			06:06		06:51 (82)
	17:27	12	08:36 (108)	18:03			19:35	23	08:52 (83)	20:06			20:36			21:02	96	20:28 (107)
10	07:57		08:24 (108)	07:35			07:56		08:27 (83)	07:06			06:25			06:06		06:51 (82)
	17:28	14	08:38 (108)	18:04			19:36	27	08:54 (83)	20:07			20:37			21:03	96	20:28 (107)
11	07:57		08:22 (108)	07:34			07:54		08:25 (83)	07:04			06:24		07:10 (82)	06:05		06:51 (82)
	17:29	17	08:39 (108)	18:05			19:37	30	08:55 (83)	20:08			20:38	11	07:21 (82)	21:04	96	20:29 (107)
12	07:57		08:22 (108)	07:33			07:53		08:24 (83)	07:03			06:23		07:06 (82)	06:05		06:51 (82)
	17:30	19	08:41 (108)	18:07			19:38	33	08:57 (83)	20:09			20:39	19	07:25 (82)	21:04	97	20:29 (107)
13	07:57		08:22 (108)	07:32			07:51		08:23 (83)	07:01			06:22		07:03 (82)	06:05		06:51 (82)
	17:31	20	08:42 (108)	18:08			19:39	34	08:57 (83)	20:10			20:40	24	07:27 (82)	21:05	97	20:29 (107)
14	07:56		08:21 (108)	07:30			07:49		08:21 (83)	07:00			06:21		07:01 (82)	06:05		06:52 (82)
	17:32	22	08:43 (108)	18:09			19:40	36	08:57 (83)	20:11			20:41	28	07:29 (82)	21:05	96	20:29 (107)
15	07:56		08:21 (108)	07:29			07:48		08:21 (83)	06:58			06:20		07:00 (82)	06:05		06:52 (82)
	17:33	23	08:44 (108)	18:10			19:41	37	08:58 (83)	20:12			20:42	35	20:06 (107)	21:05	96	20:30 (107)
16	07:55		08:20 (108)	07:28			07:46		08:20 (83)	06:57			06:19		06:58 (82)	06:05		06:52 (82)
	17:34	25	08:45 (108)	18:11			19:42	38	08:58 (83)	20:13			20:43	48	20:11 (107)	21:06	97	20:30 (107)
17	07:55		08:20 (108)	07:27			07:45		08:19 (83)	06:55			06:18		06:58 (82)	06:05		06:52 (82)
	17:36	26	08:46 (108)	18:12			19:43	39	08:58 (83)	20:14			20:44	54	20:14 (107)	21:06	97	20:30 (107)
18	07:55		08:19 (108)	07:25			07:43		08:19 (83)	06:54			06:17		06:57 (82)	06:05		06:52 (82)
	17:37	28	08:47 (108)	18:14			19:44	39	08:58 (83)	20:15			20:45	60	20:16 (107)	21:07	97	20:30 (107)
19	07:54		08:20 (108)	07:24			07:41		08:18 (83)	06:52			06:17		06:56 (82)	06:05		06:52 (82)
	17:38	28	08:48 (108)	18:15			19:45	39	08:57 (83)	20:16			20:46	65	20:17 (107)	21:07	97	20:30 (107)
20	07:54		08:19 (108)	07:23			07:40		08:18 (83)	06:51			06:16		06:55 (82)	06:06		06:53 (82)
	17:39	29	08:48 (108)	18:16			19:46	40	08:58 (83)	20:17			20:47	68	20:18 (107)	21:07	97	20:31 (107)
21	07:53		08:20 (108)	07:21			07:38		08:18 (83)	06:49			06:15		06:55 (82)	06:06		06:53 (82)
	17:40	30	08:50 (108)	18:17			19:48	39	08:57 (83)	20:18			20:48	72	20:20 (107)	21:07	97	20:31 (107)
22	07:52		08:20 (108)	07:20			07:37		08:17 (83)	06:48			06:14		06:54 (82)	06:06		06:53 (82)
	17:41	30	08:50 (108)	18:18			19:49	39	08:56 (83)	20:19			20:49	74	20:20 (107)	21:08	97	20:31 (107)
23	07:52		08:19 (108)	07:18			07:35		08:18 (83)	06:47			06:14		06:53 (82)	06:06		06:53 (82)
	17:42	31	08:50 (108)	18:19			19:50	38	08:56 (83)	20:20			20:50	77	20:21 (107)	21:08	97	20:31 (107)
24	07:51		08:19 (108)	07:17			07:33		08:18 (83)	06:45			06:13		06:52 (82)	06:06		06:53 (82)
	17:44	31	08:50 (108)	18:21			19:51	36	08:54 (83)	20:21			20:51	80	20:21 (107)	21:08	97	20:31 (107)
25	07:50		08:20 (108)	07:16			07:32		08:18 (83)	06:44			06:12		06:52 (82)	06:07		06:54 (82)
	17:45	31	08:51 (108)	18:22			19:52	35	08:53 (83)	20:22			20:51	82	20:22 (107)	21:08	97	20:32 (107)
26	07:50		08:20 (108)	07:14			07:30		08:19 (83)	06:42			06:11		06:51 (82)	06:07		06:54 (82)
	17:46	31	08:51 (108)	18:23			19:53	33	08:52 (83)	20:23			20:52	85	20:23 (107)	21:08	97	20:32 (107)
27	07:49		08:20 (108)	07:13			07:28		08:19 (83)	06:41			06:11		06:52 (82)	06:07		06:55 (82)
	17:47	31	08:51 (108)	18:24			19:54	32	08:51 (83)	20:24			20:53	86	20:24 (107)	21:08	97	20:33 (107)
28	07:48		08:20 (108)	07:11			07:27		08:20 (83)	06:40			06:10		06:51 (82)	06:08		06:55 (82)
	17:48	31	08:51 (108)	18:25			19:55	28	08:48 (83)	20:25			20:54	88	20:24 (107)	21:08	96	20:32 (107)
29	07:47		08:20 (108)				07:25		08:22 (83)	06:38			06:10		06:51 (82)	06:08		06:55 (82)
	17:50	31	08:51 (108)				19:56	25	08:47 (83)	20:26			20:55	89	20:25 (107)	21:08	96	20:32 (107)
30	07:46		08:21 (108)				07:23		08:23 (83)	06:37			06:09		06:51 (82)	06:09		06:55 (82)
	17:51	30	08:51 (108)				19:57	21	08:44 (83)	20:27			20:56	90	20:25 (107)	21:08	97	20:33 (107)
31	07:46		08:22 (108)				07:22		08:26 (83)				06:09		06:51 (82)			
	17:52	30	08:52 (108)				19:58	16	08:42 (83)				20:56	91	20:25 (107)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		608			161			783			3			1326			2876	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.60			0.60			0.63			0.63			0.66			0.66	
Total reduction		0.22			0.25			0.28			0.32			0.37			0.39	
Total, real		131			40			217			1			488			1128	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 41

Licensed user:
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217 Montgomery St.
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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 662 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5669)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:55 (82)	06:32		07:18 (82)	07:02			07:31		08:02 (83)	07:04			07:37		08:04 (108)
	21:08	97	20:33 (107)	20:51	16	07:34 (82)	20:09			19:19	34	08:36 (83)	17:33			17:10	17	08:21 (108)
2	06:10		06:56 (82)	06:33		07:23 (82)	07:03			07:32		08:03 (83)	07:05			07:38		08:06 (108)
	21:08	95	20:33 (107)	20:50	6	07:29 (82)	20:08			19:17	31	08:34 (83)	17:32			17:10	14	08:20 (108)
3	06:10		06:56 (82)	06:34			07:04			07:33		08:04 (83)	07:06		08:04 (108)	07:39		08:07 (108)
	21:08	96	20:33 (107)	20:49			20:06			19:15	28	08:32 (83)	17:31	7	08:11 (108)	17:10	12	08:19 (108)
4	06:11		06:56 (82)	06:35			07:05			07:34		08:06 (83)	07:07		08:00 (108)	07:40		08:09 (108)
	21:08	97	20:34 (107)	20:48			20:05			19:14	24	08:30 (83)	17:30	14	08:14 (108)	17:10	9	08:18 (108)
5	06:11		06:56 (82)	06:36			07:06			07:35		08:08 (83)	07:08		07:58 (108)	07:41		08:13 (108)
	21:08	95	20:33 (107)	20:47			20:03			19:12	20	08:28 (83)	17:29	18	08:16 (108)	17:09	2	08:15 (108)
6	06:12		06:57 (82)	06:37			07:07			07:36		08:11 (83)	07:09		07:57 (108)	07:42		
	21:08	96	20:34 (107)	20:45			20:01			19:10	13	08:24 (83)	17:28	21	08:18 (108)	17:09		
7	06:12		06:57 (82)	06:38			07:08			07:37			07:11		07:56 (108)	07:43		
	21:07	94	20:33 (107)	20:44			20:00			19:09			17:27	23	08:19 (108)	17:09		
8	06:13		06:57 (82)	06:39			07:09			07:38			07:12		07:55 (108)	07:44		
	21:07	95	20:34 (107)	20:43			19:57			19:07			17:26	25	08:20 (108)	17:09		
9	06:14		06:58 (82)	06:40			07:10			07:39			07:13		07:54 (108)	07:45		
	21:07	94	20:34 (107)	20:42			19:55			19:06			17:25	27	08:21 (108)	17:09		
10	06:14		06:58 (82)	06:41			07:11			07:40			07:14		07:54 (108)	07:46		
	21:06	92	20:33 (107)	20:41			19:53			19:04			17:24	28	08:22 (108)	17:09		
11	06:15		06:58 (82)	06:42			07:11			07:41			07:15		07:53 (108)	07:47		
	21:06	93	20:34 (107)	20:39			19:52			19:03			17:23	30	08:23 (108)	17:09		
12	06:16		06:59 (82)	06:43			07:12		08:18 (83)	07:42			07:16		07:53 (108)	07:47		
	21:06	92	20:34 (107)	20:38			19:50	14	08:32 (83)	19:01			17:22	30	08:23 (108)	17:10		
13	06:16		06:59 (82)	06:44			07:13		08:15 (83)	07:43			07:17		07:52 (108)	07:48		
	21:05	90	20:33 (107)	20:37			19:48	20	08:35 (83)	19:00			17:21	31	08:23 (108)	17:10		
14	06:17		06:59 (82)	06:45			07:14		08:12 (83)	07:44			07:19		07:53 (108)	07:49		
	21:05	89	20:33 (107)	20:36			19:47	25	08:37 (83)	18:58			17:20	31	08:24 (108)	17:10		
15	06:18		07:00 (82)	06:46			07:15		08:11 (83)	07:45			07:20		07:53 (108)	07:50		
	21:04	87	20:33 (107)	20:34			19:45	27	08:38 (83)	18:57			17:19	31	08:24 (108)	17:10		
16	06:19		07:01 (82)	06:47			07:16		08:09 (83)	07:46			07:21		07:53 (108)	07:50		
	21:04	87	20:33 (107)	20:33			19:43	31	08:40 (83)	18:55			17:18	31	08:24 (108)	17:10		
17	06:19		07:01 (82)	06:48			07:17		08:07 (83)	07:47			07:22		07:53 (108)	07:51		
	21:03	85	20:32 (107)	20:32			19:42	33	08:40 (83)	18:54			17:17	31	08:24 (108)	17:11		
18	06:20		07:01 (82)	06:49			07:18		08:06 (83)	07:48			07:23		07:53 (108)	07:52		
	21:03	83	20:32 (107)	20:30			19:40	35	08:41 (83)	18:52			17:17	31	08:24 (108)	17:11		
19	06:21		07:02 (82)	06:50			07:19		08:05 (83)	07:49			07:24		07:54 (108)	07:52		
	21:02	81	20:32 (107)	20:29			19:38	37	08:42 (83)	18:51			17:16	31	08:25 (108)	17:11		
20	06:22		07:03 (82)	06:51			07:20		08:04 (83)	07:50			07:25		07:55 (108)	07:53		
	21:01	78	20:31 (107)	20:27			19:37	38	08:42 (83)	18:49			17:15	30	08:25 (108)	17:12		
21	06:23		07:03 (82)	06:51			07:21		08:04 (83)	07:51			07:27		07:55 (108)	07:53		
	21:01	76	20:30 (107)	20:26			19:35	38	08:42 (83)	18:48			17:15	30	08:25 (108)	17:12		
22	06:24		07:04 (82)	06:52			07:22		08:02 (83)	07:52			07:28		07:55 (108)	07:54		
	21:00	73	20:29 (107)	20:25			19:33	39	08:41 (83)	18:46			17:14	29	08:24 (108)	17:13		
23	06:24		07:05 (82)	06:53			07:23		08:02 (83)	07:54			07:29		07:56 (108)	07:55		
	20:59	70	20:29 (107)	20:23			19:32	39	08:41 (83)	18:45			17:14	28	08:24 (108)	17:13		
24	06:25		07:06 (82)	06:54			07:24		08:01 (83)	07:55			07:30		07:57 (108)	07:55		
	20:58	67	20:28 (107)	20:22			19:30	40	08:41 (83)	18:44			17:13	28	08:25 (108)	17:14		
25	06:26		07:07 (82)	06:55			07:25		08:01 (83)	07:56			07:31		07:58 (108)	07:55		
	20:57	62	20:27 (107)	20:20			19:28	40	08:41 (83)	18:42			17:13	26	08:24 (108)	17:15		
26	06:27		07:08 (82)	06:56			07:26		08:01 (83)	07:57			07:32		07:59 (108)	07:56		
	20:57	57	20:25 (107)	20:19			19:27	39	08:40 (83)	18:41			17:12	25	08:24 (108)	17:15		
27	06:28		07:08 (82)	06:57			07:27		08:01 (83)	07:58			07:33		08:00 (108)	07:56		
	20:56	52	20:23 (107)	20:17			19:25	38	08:39 (83)	18:40			17:12	23	08:23 (108)	17:16		
28	06:29		07:09 (82)	06:58			07:28		08:01 (83)	07:59			07:34		08:01 (108)	07:56		
	20:55	44	20:20 (107)	20:16			19:23	38	08:39 (83)	18:38			17:11	22	08:23 (108)	17:16		
29	06:30		07:11 (82)	06:59			07:29		08:01 (83)	08:00			07:35		08:02 (108)	07:57		
	20:54	30	07:41 (82)	20:14			19:22	37	08:38 (83)	18:37			17:11	20	08:22 (108)	17:17		
30	06:31		07:13 (82)	07:00			07:30		08:02 (83)	08:01			07:36		08:03 (108)	07:57		
	20:53	26	07:39 (82)	20:13			19:20	35	08:37 (83)	18:36			17:11	19	08:22 (108)	17:18		
31	06:31		07:15 (82)	07:01						08:02						07:57		
	20:52	22	07:37 (82)	20:11						18:35						17:19		
Potential sun hours	456			427			374			346			300			291		
Total, worst case		2395			22			643			150			720			54	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.66			0.68			0.63			0.63			0.60			0.60	
Total reduction		0.39			0.41			0.39			0.35			0.22			0.30	
Total, real		941			9			248			53			159			16	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 42

Licensed user:
EDR
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US-SYRACUSE, NY 13202
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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 719 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5685)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May	June
1	07:57		08:47 (81)	07:45		09:06 (81)	07:10			07:20			06:36	06:08
	17:20	74	16:13 (107)	17:53	36	09:42 (81)	18:26			19:59			20:28	20:57
2	07:58		08:48 (81)	07:44		09:08 (81)	07:08			07:19			06:35	06:08
	17:21	72	16:13 (107)	17:54	33	09:41 (81)	18:27			20:00			20:29	20:58
3	07:58		08:48 (81)	07:43		09:10 (81)	07:07			07:17			06:33	06:07
	17:21	72	16:13 (107)	17:56	29	09:39 (81)	18:28			20:00			20:30	20:59
4	07:58		08:49 (81)	07:42		09:12 (81)	07:05		07:28 (106)	07:15			06:32	06:07
	17:22	68	16:12 (107)	17:57	25	09:37 (81)	18:29	6	07:34 (106)	20:01			20:31	20:59
5	07:58		08:48 (81)	07:41		09:14 (81)	07:04		07:24 (106)	07:14			06:31	06:07
	17:23	66	16:10 (107)	17:58	21	09:35 (81)	18:31	14	07:38 (106)	20:02			20:32	21:00
6	07:58		08:49 (81)	07:40		09:18 (81)	07:02		07:22 (106)	07:12			06:30	06:06
	17:24	62	16:09 (107)	17:59	12	09:30 (81)	18:32	17	07:39 (106)	20:03			20:33	21:01
7	07:58		08:49 (81)	07:39			07:01		07:21 (106)	07:11			06:29	06:06
	17:25	56	09:45 (81)	18:00			18:33	20	07:41 (106)	20:04			20:34	21:01
8	07:58		08:50 (81)	07:37			07:59		08:19 (106)	07:09		07:37 (105)	06:27	06:06
	17:26	55	09:45 (81)	18:02			19:34	22	08:41 (106)	20:05	11	07:48 (105)	20:35	21:02
9	07:57		08:50 (81)	07:36			07:57		08:18 (106)	07:07		07:33 (105)	06:26	06:06
	17:27	56	09:46 (81)	18:03			19:35	23	08:41 (106)	20:06	17	07:50 (105)	20:36	21:02
10	07:57		08:51 (81)	07:35			07:56		08:18 (106)	07:06		07:31 (105)	06:25	06:06
	17:28	56	09:47 (81)	18:04			19:36	24	08:42 (106)	20:07	22	07:53 (105)	20:37	21:03
11	07:57		08:51 (81)	07:34			07:54		08:17 (106)	07:04		07:29 (105)	06:24	06:05
	17:29	55	09:46 (81)	18:05			19:37	24	08:41 (106)	20:08	24	07:53 (105)	20:38	21:04
12	07:57		08:51 (81)	07:33			07:53		08:18 (106)	07:03		07:28 (105)	06:23	06:05
	17:30	56	09:47 (81)	18:07			19:38	23	08:41 (106)	20:09	27	07:55 (105)	20:39	21:04
13	07:57		08:52 (81)	07:32			07:51		08:17 (106)	07:01		07:27 (105)	06:22	06:05
	17:31	56	09:48 (81)	18:08			19:39	24	08:41 (106)	20:10	28	07:55 (105)	20:40	21:05
14	07:56		08:52 (81)	07:30			07:49		08:17 (106)	07:00		07:26 (105)	06:21	06:05
	17:32	55	09:47 (81)	18:09			19:40	22	08:39 (106)	20:11	30	07:56 (105)	20:41	21:05
15	07:56		08:53 (81)	07:29			07:48		08:18 (106)	06:58		07:25 (105)	06:20	06:05
	17:33	55	09:48 (81)	18:10			19:41	21	08:39 (106)	20:12	31	07:56 (105)	20:42	21:05
16	07:55		08:53 (81)	07:28			07:46		08:18 (106)	06:57		07:25 (105)	06:19	06:05
	17:34	55	09:48 (81)	18:11			19:42	19	08:37 (106)	20:13	31	07:56 (105)	20:43	21:06
17	07:55		08:54 (81)	07:27			07:45		08:19 (106)	06:55		07:24 (105)	06:18	06:05
	17:36	54	09:48 (81)	18:12			19:43	16	08:35 (106)	20:14	31	07:55 (105)	20:44	21:06
18	07:55		08:54 (81)	07:25			07:43		08:22 (106)	06:54		07:24 (105)	06:17	06:05
	17:37	54	09:48 (81)	18:14			19:44	11	08:33 (106)	20:15	32	07:56 (105)	20:45	21:07
19	07:54		08:55 (81)	07:24			07:41		08:26 (106)	06:52		07:23 (105)	06:17	06:05
	17:38	53	09:48 (81)	18:15			19:45	2	08:28 (106)	20:16	32	07:55 (105)	20:46	21:07
20	07:54		08:55 (81)	07:23			07:40			06:51		07:23 (105)	06:16	06:06
	17:39	53	09:48 (81)	18:16			19:46			20:17	32	07:55 (105)	20:47	21:07
21	07:53		08:56 (81)	07:21			07:38			06:49		07:23 (105)	06:15	06:06
	17:40	53	09:49 (81)	18:17			19:48			20:18	31	07:54 (105)	20:48	21:07
22	07:52		08:56 (81)	07:20			07:37			06:48		07:23 (105)	06:14	06:06
	17:41	52	09:48 (81)	18:18			19:49			20:19	30	07:53 (105)	20:49	21:08
23	07:52		08:57 (81)	07:18			07:35			06:47		07:24 (105)	06:13	06:06
	17:42	51	09:48 (81)	18:19			19:50			20:20	29	07:53 (105)	20:50	21:08
24	07:51		08:57 (81)	07:17			07:33			06:45		07:24 (105)	06:13	06:06
	17:44	50	09:47 (81)	18:21			19:51			20:21	27	07:51 (105)	20:51	21:08
25	07:50		08:59 (81)	07:16			07:32			06:44		07:25 (105)	06:12	06:07
	17:45	49	09:48 (81)	18:22			19:52			20:22	26	07:51 (105)	20:51	21:08
26	07:50		08:59 (81)	07:14			07:30			06:42		07:26 (105)	06:11	06:07
	17:46	48	09:47 (81)	18:23			19:53			20:23	24	07:50 (105)	20:52	21:08
27	07:49		09:00 (81)	07:13			07:28			06:41		07:27 (105)	06:11	06:07
	17:47	46	09:46 (81)	18:24			19:54			20:24	21	07:48 (105)	20:53	21:08
28	07:48		09:01 (81)	07:11			07:27			06:40		07:28 (105)	06:10	06:08
	17:48	44	09:45 (81)	18:25			19:55			20:25	18	07:46 (105)	20:54	21:08
29	07:47		09:02 (81)				07:25			06:38		07:31 (105)	06:10	06:08
	17:50	43	09:45 (81)				19:56			20:26	13	07:44 (105)	20:55	21:08
30	07:46		09:03 (81)				07:23			06:37		07:34 (105)	06:09	06:09
	17:51	41	09:44 (81)				19:57			20:27	5	07:39 (105)	20:56	21:08
31	07:46		09:05 (81)				07:22						06:09	
	17:52	39	09:44 (81)				19:58						20:56	
Potential sun hours	300			299			370			397			446	449
Total, worst case		1699			156			288			572			
Sun reduction		0.36			0.42			0.44			0.51			
Oper. time red.		1.00			1.00			1.00			1.00			
Wind dir. red.		0.61			0.61			0.63			0.67			
Total reduction		0.22			0.25			0.28			0.34			
Total, real		372			40			80			194			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

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4/30/2012 9:43 AM / 43

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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 719 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5685)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July	August		September		October		November		December	
1	06:09	06:32		07:02	07:28 (105)	07:31	07:56 (106)	07:04		07:37	08:33 (81)
	21:08	20:51		20:09	24 07:52 (105)	19:19	24 08:20 (106)	17:33		17:10	55 09:28 (81)
2	06:10	06:33		07:03	07:29 (105)	07:32	07:56 (106)	07:05		07:38	08:33 (81)
	21:08	20:50		20:08	22 07:51 (105)	19:17	24 08:20 (106)	17:32		17:10	56 09:29 (81)
3	06:10	06:34		07:04	07:31 (105)	07:33	07:55 (106)	07:06		07:39	08:33 (81)
	21:08	20:49		20:06	17 07:48 (105)	19:15	24 08:19 (106)	17:31		17:10	56 09:29 (81)
4	06:11	06:35		07:05	07:34 (105)	07:34	07:55 (106)	07:07		07:40	08:34 (81)
	21:08	20:48		20:05	11 07:45 (105)	19:14	24 08:19 (106)	17:30		17:10	55 09:29 (81)
5	06:11	06:36		07:06		07:35	07:56 (106)	07:08	08:47 (81)	07:41	08:34 (81)
	21:08	20:47		20:03		19:12	22 08:18 (106)	17:29	13 09:00 (81)	17:09	56 09:30 (81)
6	06:12	06:37		07:07		07:36	07:56 (106)	07:09	08:44 (81)	07:42	08:35 (81)
	21:08	20:46		20:01		19:10	21 08:17 (106)	17:28	21 09:05 (81)	17:09	62 15:55 (107)
7	06:12	06:38		07:08		07:37	07:57 (106)	07:11	08:41 (81)	07:43	08:35 (81)
	21:07	20:44		20:00		19:09	18 08:15 (106)	17:27	26 09:07 (81)	17:09	66 15:57 (107)
8	06:13	06:39		07:09		07:38	07:58 (106)	07:12	08:39 (81)	07:44	08:36 (81)
	21:07	20:43		19:57		19:07	15 08:13 (106)	17:26	30 09:09 (81)	17:09	68 15:59 (107)
9	06:14	06:40		07:10		07:39	08:00 (106)	07:13	08:37 (81)	07:45	08:36 (81)
	21:07	20:42		19:55		19:06	11 08:11 (106)	17:25	34 09:11 (81)	17:09	72 16:01 (107)
10	06:14	06:41		07:11		07:40		07:14	08:37 (81)	07:46	08:37 (81)
	21:07	20:41		19:53		19:04		17:24	36 09:13 (81)	17:09	72 16:02 (107)
11	06:15	06:42		07:11		07:41		07:15	08:36 (81)	07:47	08:38 (81)
	21:06	20:40		19:52		19:03		17:23	39 09:15 (81)	17:09	73 16:03 (107)
12	06:16	06:43		07:12		07:42		07:16	08:35 (81)	07:48	08:38 (81)
	21:06	20:38		19:50		19:01		17:22	41 09:16 (81)	17:10	75 16:05 (107)
13	06:16	06:44		07:13	07:41 (105)	07:43		07:17	08:34 (81)	07:48	08:38 (81)
	21:05	20:37	8	19:48	07:49 (105)	19:00		17:21	43 09:17 (81)	17:10	76 16:05 (107)
14	06:17	06:45		07:14	07:38 (105)	07:44		07:19	08:34 (81)	07:49	08:39 (81)
	21:05	20:36	14	19:47	07:52 (105)	18:58		17:20	44 09:18 (81)	17:10	77 16:06 (107)
15	06:18	06:46		07:15	07:36 (105)	07:45		07:20	08:33 (81)	07:50	08:40 (81)
	21:04	20:34	18	19:45	07:54 (105)	18:57		17:19	46 09:19 (81)	17:10	76 16:07 (107)
16	06:19	06:47		07:16	07:34 (105)	07:46		07:21	08:32 (81)	07:50	08:39 (81)
	21:04	20:33	22	19:43	07:56 (105)	18:55		17:18	48 09:20 (81)	17:10	78 16:07 (107)
17	06:19	06:48		07:17	07:32 (105)	07:47		07:22	08:32 (81)	07:51	08:40 (81)
	21:03	20:32	24	19:42	07:56 (105)	18:54		17:17	49 09:21 (81)	17:11	78 16:08 (107)
18	06:20	06:49		07:18	07:31 (105)	07:48		07:23	08:31 (81)	07:52	08:41 (81)
	21:03	20:30	26	19:40	07:57 (105)	18:52		17:17	50 09:21 (81)	17:11	78 16:09 (107)
19	06:21	06:50		07:19	07:30 (105)	07:49		07:24	08:32 (81)	07:52	08:41 (81)
	21:02	20:29	27	19:38	07:57 (105)	18:51		17:16	51 09:23 (81)	17:11	79 16:09 (107)
20	06:22	06:50		07:20	07:29 (105)	07:50		07:26	08:31 (81)	07:53	08:42 (81)
	21:01	20:27	29	19:37	07:58 (105)	18:49		17:15	52 09:23 (81)	17:12	79 16:10 (107)
21	06:23	06:51		07:21	07:28 (105)	07:51		07:27	08:31 (81)	07:54	08:42 (81)
	21:01	20:26	30	19:35	07:58 (105)	18:48		17:15	53 09:24 (81)	17:12	78 16:10 (107)
22	06:23	06:52		07:22	07:28 (105)	07:52		07:28	08:31 (81)	07:54	08:43 (81)
	21:00	20:25	31	19:33	07:59 (105)	18:46		17:14	53 09:24 (81)	17:13	78 16:11 (107)
23	06:24	06:53		07:23	07:27 (105)	07:54		07:29	08:31 (81)	07:55	08:43 (81)
	20:59	20:23	32	19:32	07:59 (105)	18:45		17:14	54 09:25 (81)	17:13	78 16:11 (107)
24	06:25	06:54		07:24	07:27 (105)	07:55		07:30	08:32 (81)	07:55	08:44 (81)
	20:58	20:22	32	19:30	07:59 (105)	18:44		17:13	54 09:26 (81)	17:14	79 16:12 (107)
25	06:26	06:55		07:25	07:27 (105)	08:05 (106)	07:56	07:31	08:32 (81)	07:55	08:44 (81)
	20:57	20:20	32	19:28	07:59 (105)	10 08:15 (106)	18:42	17:12	54 09:26 (81)	17:15	79 16:12 (107)
26	06:27	06:56		07:26	07:27 (105)	08:02 (106)	07:57	07:32	08:32 (81)	07:56	08:44 (81)
	20:57	20:19	31	19:27	07:58 (105)	15 08:17 (106)	18:41	17:12	55 09:27 (81)	17:15	78 16:12 (107)
27	06:28	06:57		07:27	07:27 (105)	08:00 (106)	07:58	07:33	08:32 (81)	07:56	08:45 (81)
	20:56	20:17	31	19:25	07:58 (105)	18 08:18 (106)	18:40	17:12	55 09:27 (81)	17:16	78 16:13 (107)
28	06:29	06:58		07:28	07:27 (105)	07:59 (106)	07:59	07:34	08:32 (81)	07:56	08:45 (81)
	20:55	20:16	30	19:23	07:57 (105)	20 08:19 (106)	18:38	17:11	55 09:27 (81)	17:16	77 16:13 (107)
29	06:30	06:59		07:29	07:26 (105)	07:58 (106)	08:00	07:35	08:32 (81)	07:57	08:46 (81)
	20:54	20:14	30	19:22	07:56 (105)	22 08:20 (106)	18:37	17:11	56 09:28 (81)	17:17	77 16:13 (107)
30	06:31	07:00		07:30	07:27 (105)	07:57 (106)	08:01	07:36	08:32 (81)	07:57	08:46 (81)
	20:53	20:13	28	19:20	07:55 (105)	23 08:20 (106)	18:36	17:11	56 09:28 (81)	17:18	76 16:13 (107)
31	06:31	07:01			07:27 (105)		08:02			07:57	08:46 (81)
	20:52	20:11	27		07:54 (105)		18:35			17:19	75 16:13 (107)
Potential sun hours	456	427		374		346		300		291	
Total, worst case			502		182		183		1168		2240
Sun reduction			0.60		0.61		0.56		0.37		0.50
Oper. time red.			1.00		1.00		1.00		1.00		1.00
Wind dir. red.			0.67		0.65		0.63		0.61		0.62
Total reduction			0.40		0.39		0.35		0.22		0.31
Total, real			200		72		65		261		696

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 44

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 725 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5687)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April	May	June
1	07:57		08:31 (106)	07:45		08:40 (105)	07:10		08:15 (105)	07:20	06:36	06:08
	17:20	37	09:08 (106)	17:53	18	08:58 (105)	18:26	65	09:20 (105)	19:59	20:28	20:57
2	07:58		08:32 (106)	07:44		08:36 (105)	07:08		08:14 (105)	07:19	06:35	06:08
	17:21	38	09:10 (106)	17:54	26	09:02 (105)	18:27	65	09:19 (105)	20:00	20:29	20:58
3	07:58		08:33 (106)	07:43		08:34 (105)	07:07		08:15 (105)	07:17	06:33	06:07
	17:21	37	09:10 (106)	17:56	31	09:05 (105)	18:28	64	09:19 (105)	20:00	20:30	20:59
4	07:58		08:33 (106)	07:42		08:32 (105)	07:05		08:15 (105)	07:15	06:32	06:07
	17:22	38	09:11 (106)	17:57	35	09:07 (105)	18:29	63	09:18 (105)	20:01	20:31	20:59
5	07:58		08:33 (106)	07:41		08:29 (105)	07:04		08:16 (105)	07:14	06:31	06:07
	17:23	37	09:10 (106)	17:58	39	09:08 (105)	18:31	61	09:17 (105)	20:02	20:32	21:00
6	07:58		08:33 (106)	07:40		08:27 (105)	07:02		08:16 (105)	07:12	06:30	06:06
	17:24	38	09:11 (106)	17:59	43	09:10 (105)	18:32	60	09:16 (105)	20:03	20:33	21:01
7	07:58		08:34 (106)	07:39		08:26 (105)	07:01		08:17 (105)	07:11	06:29	06:06
	17:25	37	09:11 (106)	18:00	46	09:12 (105)	18:33	58	09:15 (105)	20:04	20:34	21:01
8	07:58		08:34 (106)	07:37		08:25 (105)	07:59		09:17 (105)	07:09	06:27	06:06
	17:26	38	09:12 (106)	18:02	48	09:13 (105)	19:34	56	10:13 (105)	20:05	20:35	21:02
9	07:57		08:35 (106)	07:36		08:24 (105)	07:57		09:17 (105)	07:07	06:26	06:06
	17:27	37	09:12 (106)	18:03	51	09:15 (105)	19:35	54	10:11 (105)	20:06	20:36	21:02
10	07:57		08:36 (106)	07:35		08:23 (105)	07:56		09:18 (105)	07:06	06:25	06:05
	17:28	37	09:13 (106)	18:04	53	09:16 (105)	19:36	52	10:10 (105)	20:07	20:37	21:03
11	07:57		08:35 (106)	07:34		08:22 (105)	07:54		09:19 (105)	07:04	06:24	06:05
	17:29	38	09:13 (106)	18:05	55	09:17 (105)	19:37	49	10:08 (105)	20:08	20:38	21:04
12	07:57		08:36 (106)	07:33		08:21 (105)	07:53		09:21 (105)	07:03	06:23	06:05
	17:30	37	09:13 (106)	18:06	57	09:18 (105)	19:38	46	10:07 (105)	20:09	20:39	21:04
13	07:57		08:37 (106)	07:32		08:20 (105)	07:51		09:22 (105)	07:01	06:22	06:05
	17:31	37	09:14 (106)	18:08	59	09:19 (105)	19:39	43	10:05 (105)	20:10	20:40	21:05
14	07:56		08:37 (106)	07:30		08:19 (105)	07:49		09:23 (105)	07:00	06:21	06:05
	17:32	36	09:13 (106)	18:09	61	09:20 (105)	19:40	39	10:02 (105)	20:11	20:41	21:05
15	07:56		08:38 (106)	07:29		08:19 (105)	07:48		09:25 (105)	06:58	06:20	06:05
	17:33	36	09:14 (106)	18:10	62	09:21 (105)	19:41	35	10:00 (105)	20:12	20:42	21:05
16	07:55		08:38 (106)	07:28		08:18 (105)	07:46		09:27 (105)	06:57	06:19	06:05
	17:34	35	09:13 (106)	18:11	62	09:20 (105)	19:42	29	09:56 (105)	20:13	20:43	21:06
17	07:55		08:39 (106)	07:27		08:17 (105)	07:45		09:29 (105)	06:55	06:18	06:05
	17:36	35	09:14 (106)	18:12	64	09:21 (105)	19:43	23	09:52 (105)	20:14	20:44	21:06
18	07:55		08:39 (106)	07:25		08:17 (105)	07:43		09:35 (105)	06:54	06:17	06:05
	17:37	34	09:13 (106)	18:14	65	09:22 (105)	19:44	12	09:47 (105)	20:15	20:45	21:07
19	07:54		08:41 (106)	07:24		08:16 (105)	07:41			06:52	06:17	06:05
	17:38	33	09:14 (106)	18:15	66	09:22 (105)	19:45			20:16	20:46	21:07
20	07:54		08:41 (106)	07:23		08:16 (105)	07:40			06:51	06:16	06:06
	17:39	32	09:13 (106)	18:16	66	09:22 (105)	19:46			20:17	20:47	21:07
21	07:53		08:43 (106)	07:21		08:16 (105)	07:38			06:49	06:15	06:06
	17:40	30	09:13 (106)	18:17	67	09:23 (105)	19:48			20:18	20:48	21:07
22	07:52		08:43 (106)	07:20		08:15 (105)	07:37			06:48	06:14	06:06
	17:41	30	09:13 (106)	18:18	67	09:22 (105)	19:49			20:19	20:49	21:08
23	07:52		08:44 (106)	07:18		08:15 (105)	07:35			06:47	06:13	06:06
	17:42	28	09:12 (106)	18:19	68	09:23 (105)	19:50			20:20	20:50	21:08
24	07:51		08:45 (106)	07:17		08:14 (105)	07:33			06:45	06:13	06:06
	17:44	26	09:11 (106)	18:20	68	09:22 (105)	19:51			20:21	20:51	21:08
25	07:50		08:47 (106)	07:16		08:15 (105)	07:32			06:44	06:12	06:07
	17:45	24	09:11 (106)	18:22	67	09:22 (105)	19:52			20:22	20:51	21:08
26	07:50		08:48 (106)	07:14		08:14 (105)	07:30			06:42	06:11	06:07
	17:46	21	09:09 (106)	18:23	67	09:21 (105)	19:53			20:23	20:52	21:08
27	07:49		08:50 (106)	07:13		08:14 (105)	07:28			06:41	06:11	06:07
	17:47	17	09:07 (106)	18:24	67	09:21 (105)	19:54			20:24	20:53	21:08
28	07:48		08:53 (106)	07:11		08:14 (105)	07:27			06:40	06:10	06:08
	17:48	12	09:05 (106)	18:25	66	09:20 (105)	19:55			20:25	20:54	21:08
29	07:47						07:25			06:38	06:10	06:08
	17:50						19:56			20:26	20:55	21:08
30	07:46						07:23			06:37	06:09	06:09
	17:51						19:57			20:27	20:56	21:08
31	07:46		08:46 (105)				07:22				06:09	
	17:52	5	08:51 (105)				19:58				20:56	
Potential sun hours	300			299			370			397	446	449
Total, worst case		920			1544			874				
Sun reduction		0.36			0.42			0.44				
Oper. time red.		1.00			1.00			1.00				
Wind dir. red.		0.61			0.62			0.62				
Total reduction		0.22			0.26			0.27				
Total, real		201			399			237				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 45

Licensed user:
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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 725 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5687)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July		August		September		October			November			December		
1	06:09		06:32		07:02		07:31		09:00 (105)	07:04		07:52 (105)	07:37		08:17 (106)
	21:08		20:51		20:09		19:19	45	09:45 (105)	17:33	53	08:45 (105)	17:10	38	08:55 (106)
2	06:10		06:33		07:03		07:32		08:58 (105)	07:05		07:54 (105)	07:38		08:18 (106)
	21:08		20:50		20:08		19:17	48	09:46 (105)	17:32	50	08:44 (105)	17:10	37	08:55 (106)
3	06:10		06:34		07:04		07:33		08:57 (105)	07:06		07:55 (105)	07:39		08:18 (106)
	21:08		20:49		20:06		19:15	50	09:47 (105)	17:31	48	08:43 (105)	17:10	37	08:55 (106)
4	06:11		06:35		07:05		07:34		08:55 (105)	07:07		07:56 (105)	07:40		08:18 (106)
	21:08		20:48		20:05		19:14	53	09:48 (105)	17:30	45	08:41 (105)	17:10	38	08:56 (106)
5	06:11		06:36		07:06		07:35		08:54 (105)	07:08		07:57 (105)	07:41		08:19 (106)
	21:08		20:47		20:03		19:12	55	09:49 (105)	17:29	43	08:40 (105)	17:09	37	08:56 (106)
6	06:12		06:37		07:07		07:36		08:53 (105)	07:09		08:00 (105)	07:42		08:19 (106)
	21:08		20:45		20:01		19:10	57	09:50 (105)	17:28	39	08:39 (105)	17:09	38	08:57 (106)
7	06:12		06:38		07:08		07:37		08:52 (105)	07:11		08:02 (105)	07:43		08:20 (106)
	21:07		20:44		20:00		19:09	59	09:51 (105)	17:27	35	08:37 (105)	17:09	37	08:57 (106)
8	06:13		06:39		07:09		07:38		08:51 (105)	07:12		08:04 (105)	07:44		08:20 (106)
	21:07		20:43		19:57		19:07	60	09:51 (105)	17:26	30	08:34 (105)	17:09	38	08:58 (106)
9	06:14		06:40		07:10		07:39		08:50 (105)	07:13		08:06 (105)	07:45		08:21 (106)
	21:07		20:42		19:55		19:06	62	09:52 (105)	17:25	25	08:31 (105)	17:09	37	08:58 (106)
10	06:14		06:41		07:10		07:40		08:49 (105)	07:14		08:11 (105)	07:46		08:21 (106)
	21:06		20:41		19:53		19:04	63	09:52 (105)	17:24	18	08:29 (105)	17:09	38	08:59 (106)
11	06:15		06:42		07:11		07:41		08:48 (105)	07:15		08:18 (105)	07:47		08:22 (106)
	21:06		20:39		19:52		19:03	65	09:53 (105)	17:23	3	08:21 (105)	17:09	37	08:59 (106)
12	06:16		06:43		07:12		07:42		08:47 (105)	07:16			07:47		08:22 (106)
	21:06		20:38		19:50		19:01	66	09:53 (105)	17:22			17:10	37	08:59 (106)
13	06:16		06:44		07:13		07:43		08:48 (105)	07:17		08:30 (106)	07:48		08:22 (106)
	21:05		20:37		19:48		19:00	66	09:54 (105)	17:21	2	08:32 (106)	17:10	37	08:59 (106)
14	06:17		06:45		07:14		07:44		08:47 (105)	07:19		08:25 (106)	07:49		08:23 (106)
	21:05		20:36		19:47		18:58	67	09:54 (105)	17:20	13	08:38 (106)	17:10	37	09:00 (106)
15	06:18		06:46		07:15		07:45		08:47 (105)	07:20		08:23 (106)	07:50		08:24 (106)
	21:04		20:34		19:45		18:56	67	09:54 (105)	17:19	18	08:41 (106)	17:10	37	09:01 (106)
16	06:19		06:47		07:16		07:46		08:47 (105)	07:21		08:21 (106)	07:50		08:24 (106)
	21:04		20:33		19:43		18:55	67	09:54 (105)	17:18	21	08:42 (106)	17:10	36	09:00 (106)
17	06:19		06:48		07:17		07:47		08:46 (105)	07:22		08:20 (106)	07:51		08:25 (106)
	21:03		20:32		19:42		18:54	68	09:54 (105)	17:17	24	08:44 (106)	17:11	36	09:01 (106)
18	06:20		06:49		07:18		07:48		08:46 (105)	07:23		08:19 (106)	07:52		08:26 (106)
	21:03		20:30		19:40		18:52	67	09:53 (105)	17:17	26	08:45 (106)	17:11	36	09:02 (106)
19	06:21		06:50		07:19		07:49		08:46 (105)	07:24		08:19 (106)	07:52		08:26 (106)
	21:02		20:29		19:38		18:51	67	09:53 (105)	17:16	28	08:47 (106)	17:11	36	09:02 (106)
20	06:22		06:50		07:20		07:50		08:46 (105)	07:25		08:18 (106)	07:53		08:26 (106)
	21:01		20:27		19:37		18:49	67	09:53 (105)	17:15	30	08:48 (106)	17:12	37	09:03 (106)
21	06:23		06:51		07:21		07:51		08:46 (105)	07:27		08:18 (106)	07:54		08:26 (106)
	21:01		20:26		19:35		18:48	66	09:52 (105)	17:15	30	08:48 (106)	17:12	37	09:03 (106)
22	06:23		06:52		07:22		07:52		08:47 (105)	07:28		08:17 (106)	07:54		08:27 (106)
	21:00		20:25		19:33		18:46	66	09:53 (105)	17:14	32	08:49 (106)	17:13	37	09:04 (106)
23	06:24		06:53		07:23		07:54		08:47 (105)	07:29		08:17 (106)	07:55		08:27 (106)
	20:59		20:23		19:32		18:45	65	09:52 (105)	17:14	33	08:50 (106)	17:13	37	09:04 (106)
24	06:25		06:54		07:24		07:55		08:47 (105)	07:30		08:17 (106)	07:55		08:29 (106)
	20:58		20:22		19:30		18:44	65	09:52 (105)	17:13	34	08:51 (106)	17:14	36	09:05 (106)
25	06:26		06:55		07:25		09:21 (105)	07:56		08:47 (105)	07:31		08:17 (106)	07:55		08:29 (106)
	20:57		20:20		19:28	5	09:26 (105)	18:42	64	09:51 (105)	17:12	35	08:52 (106)	17:14	36	09:05 (106)
26	06:27		06:56		07:26		09:13 (105)	07:57		08:47 (105)	07:32		08:17 (106)	07:56		08:29 (106)
	20:57		20:19		19:27	20	09:33 (105)	18:41	63	09:50 (105)	17:12	35	08:52 (106)	17:15	36	09:05 (106)
27	06:28		06:57		07:27		09:09 (105)	07:58		08:48 (105)	07:33		08:17 (106)	07:56		08:30 (106)
	20:56		20:17		19:25	28	09:37 (105)	18:40	61	09:49 (105)	17:12	36	08:53 (106)	17:16	36	09:06 (106)
28	06:29		06:58		07:28		09:06 (105)	07:59		08:49 (105)	07:34		08:17 (106)	07:56		08:30 (106)
	20:55		20:16		19:23	33	09:39 (105)	18:38	60	09:49 (105)	17:11	36	08:53 (106)	17:16	37	09:07 (106)
29	06:30		06:59		07:29		09:04 (105)	08:00		08:50 (105)	07:35		08:17 (106)	07:57		08:30 (106)
	20:54		20:14		19:22	38	09:42 (105)	18:37	58	09:48 (105)	17:11	37	08:54 (106)	17:17	37	09:07 (106)
30	06:31		07:00		07:30		09:02 (105)	08:01		08:50 (105)	07:36		08:17 (106)	07:57		08:30 (106)
	20:53		20:13		19:20	41	09:43 (105)	18:36	57	09:47 (105)	17:10	37	08:54 (106)	17:18	37	09:07 (106)
31	06:31		07:01					08:02		08:51 (105)				07:57		08:31 (106)
	20:52		20:11					18:35	55	09:46 (105)				17:19	37	09:08 (106)
Potential sun hours	456		427		374			346			300			291		
Total, worst case					165			1899			896			1144		
Sun reduction					0.61			0.56			0.37			0.50		
Oper. time red.					1.00			1.00			1.00			1.00		
Wind dir. red.					0.62			0.62			0.61			0.61		
Total reduction					0.38			0.34			0.23			0.30		
Total, real					62			654			203			347		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 46

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 727 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5689)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June
1	07:57		16:50 (81)	07:45		17:01 (81)	07:10		17:16 (105)	07:20		18:11 (105)	06:36		07:04 (77)	06:08
	17:20	4	16:54 (81)	17:53	10	17:11 (81)	18:26	33	17:49 (105)	19:59	29	18:40 (105)	20:28	26	07:30 (77)	20:57
2	07:58		16:50 (81)	07:44			07:08		17:14 (105)	07:19		18:13 (105)	06:35		07:05 (77)	06:08
	17:21	4	16:54 (81)	17:54			18:27	37	17:51 (105)	20:00	24	18:37 (105)	20:29	24	07:29 (77)	20:58
3	07:58		16:49 (81)	07:43			07:07		17:12 (105)	07:17		18:18 (105)	06:33		07:06 (77)	06:07
	17:21	6	16:55 (81)	17:56			18:28	41	17:53 (105)	20:00	15	18:33 (105)	20:30	22	07:28 (77)	20:58
4	07:58		16:49 (81)	07:42			07:05		17:10 (105)	07:15			06:32		07:07 (77)	06:07
	17:22	7	16:56 (81)	17:57			18:29	43	17:53 (105)	20:01			20:31	20	07:27 (77)	20:59
5	07:58		16:49 (81)	07:41			07:04		17:09 (105)	07:14			06:31		07:08 (77)	06:07
	17:23	8	16:57 (81)	17:58			18:30	46	17:55 (105)	20:02			20:32	17	07:25 (77)	21:00
6	07:58		16:49 (81)	07:40			07:02		17:08 (105)	07:12			06:30		07:10 (77)	06:06
	17:24	9	16:58 (81)	17:59			18:32	48	17:56 (105)	20:03			20:33	13	07:23 (77)	21:01
7	07:58		16:49 (81)	07:39			07:01		17:07 (105)	07:11			06:29		07:13 (77)	06:06
	17:25	10	16:59 (81)	18:00			18:33	50	17:57 (105)	20:04			20:34	7	07:20 (77)	21:01
8	07:58		16:49 (81)	07:37			07:59		18:05 (105)	07:09			06:27			06:06
	17:26	11	17:00 (81)	18:02			19:34	52	18:57 (105)	20:05			20:35			21:02
9	07:57		16:49 (81)	07:36			07:57		18:04 (105)	07:07			06:26			06:06
	17:27	13	17:02 (81)	18:03			19:35	53	18:57 (105)	20:06			20:36			21:02
10	07:57		16:49 (81)	07:35			07:56		18:04 (105)	07:06			06:25			06:05
	17:28	14	17:03 (81)	18:04			19:36	54	18:58 (105)	20:07			20:37			21:03
11	07:57		16:48 (81)	07:34			07:54		18:03 (105)	07:04			06:24			06:05
	17:29	15	17:03 (81)	18:05			19:37	55	18:58 (105)	20:08			20:38			21:03
12	07:57		16:48 (81)	07:33			07:53		18:03 (105)	07:03			06:23			06:05
	17:30	17	17:05 (81)	18:06			19:38	56	18:59 (105)	20:09			20:39			21:04
13	07:56		16:49 (81)	07:32			07:51		18:02 (105)	07:01			06:22			06:05
	17:31	17	17:06 (81)	18:08			19:39	57	18:59 (105)	20:10			20:40			21:04
14	07:56		16:48 (81)	07:30			07:49		18:01 (105)	07:00			06:21			06:05
	17:32	19	17:07 (81)	18:09			19:40	57	18:58 (105)	20:11			20:41			21:05
15	07:56		16:49 (81)	07:29			07:48		18:01 (105)	06:58			06:20			06:05
	17:33	19	17:08 (81)	18:10			19:41	58	18:59 (105)	20:12			20:42			21:05
16	07:55		16:48 (81)	07:28			07:46		08:05 (116)	06:57		07:15 (77)	06:19			06:05
	17:34	21	17:09 (81)	18:11			19:42	59	18:58 (105)	20:13	10	07:25 (77)	20:43			21:06
17	07:55		16:49 (81)	07:27			07:45		08:03 (116)	06:55		07:14 (77)	06:18			06:05
	17:35	22	17:11 (81)	18:12			19:43	65	18:58 (105)	20:14	14	07:28 (77)	20:44			21:06
18	07:55		16:48 (81)	07:25			07:43		08:02 (116)	06:54		07:13 (77)	06:17			06:05
	17:37	23	17:11 (81)	18:14			19:44	67	18:58 (105)	20:15	17	07:30 (77)	20:45			21:07
19	07:54		16:49 (81)	07:24			07:41		08:00 (116)	06:52		07:11 (77)	06:17			06:05
	17:38	24	17:13 (81)	18:15			19:45	69	18:57 (105)	20:16	20	07:31 (77)	20:46			21:07
20	07:54		16:49 (81)	07:23			07:40		07:58 (116)	06:51		07:10 (77)	06:16			06:06
	17:39	25	17:14 (81)	18:16			19:46	70	18:56 (105)	20:17	22	07:32 (77)	20:47			21:07
21	07:53		16:50 (81)	07:21			07:38		07:57 (116)	06:49		07:08 (77)	06:15			06:06
	17:40	26	17:16 (81)	18:17			19:47	71	18:56 (105)	20:18	24	07:32 (77)	20:48			21:07
22	07:52		16:50 (81)	07:20			07:36		07:55 (116)	06:48		07:07 (77)	06:14			06:06
	17:41	27	17:17 (81)	18:18			19:49	72	18:55 (105)	20:19	26	07:33 (77)	20:49			21:08
23	07:52		16:50 (81)	07:18			07:35		07:54 (116)	06:46		07:05 (77)	06:13			06:06
	17:42	27	17:17 (81)	18:19			19:50	72	18:55 (105)	20:20	27	07:32 (77)	20:50			21:08
24	07:51		16:51 (81)	07:17			07:33		07:52 (116)	06:45		07:04 (77)	06:13			06:06
	17:44	25	17:16 (81)	18:20			19:51	71	18:53 (105)	20:21	29	07:33 (77)	20:51			21:08
25	07:50		16:52 (81)	07:16			07:32		07:50 (116)	06:44		07:04 (77)	06:12			06:07
	17:45	25	17:17 (81)	18:22			19:52	71	18:52 (105)	20:22	29	07:33 (77)	20:51			21:08
26	07:50		16:52 (81)	07:14		17:28 (105)	07:30		07:51 (116)	06:42		07:03 (77)	06:11			06:07
	17:46	25	17:17 (81)	18:23	10	17:38 (105)	19:53	67	18:51 (105)	20:23	29	07:32 (77)	20:52			21:08
27	07:49		16:53 (81)	07:13		17:23 (105)	07:28		07:52 (116)	06:41		07:03 (77)	06:11			06:07
	17:47	23	17:16 (81)	18:24	21	17:44 (105)	19:54	63	18:50 (105)	20:24	29	07:32 (77)	20:53			21:08
28	07:48		16:54 (81)	07:11		17:19 (105)	07:27		07:52 (116)	06:40		07:04 (77)	06:10			06:08
	17:48	21	17:15 (81)	18:25	27	17:46 (105)	19:55	57	18:48 (105)	20:25	28	07:32 (77)	20:54			21:08
29	07:47		16:55 (81)				07:25		07:55 (116)	06:38		07:04 (77)	06:10			06:08
	17:50	20	17:15 (81)				19:56	50	18:47 (105)	20:26	28	07:32 (77)	20:55			21:08
30	07:46		16:56 (81)				07:23		18:07 (105)	06:37		07:04 (77)	06:09			06:09
	17:51	17	17:13 (81)				19:57	38	18:45 (105)	20:27	26	07:30 (77)	20:55			21:08
31	07:45		16:59 (81)				07:22		18:09 (105)				06:09			
	17:52	14	17:13 (81)				19:58	33	18:42 (105)				20:56			
Potential sun hours	300			299			370			397			446			449
Total, worst case		538			68			1735			426			129		
Sun reduction		0.36			0.42			0.44			0.51			0.56		
Oper. time red.		1.00			1.00			1.00			1.00			1.00		
Wind dir. red.		0.68			0.67			0.67			0.67			0.67		
Total reduction		0.25			0.28			0.29			0.34			0.37		
Total, real		132			19			509			145			48		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 47

Licensed user:
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217 Montgomery St.
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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 727 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5689)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July	August		September		October			November			December		
1	06:09	06:32		07:02		07:31		17:41 (105)	07:04			07:37		16:30 (81)
	21:08	20:51		20:09		19:19	57	18:38 (105)	17:33			17:10	15	16:45 (81)
2	06:10	06:33		07:03		07:32		17:41 (105)	07:05			07:38		16:31 (81)
	21:08	20:50		20:08		19:17	56	18:37 (105)	17:32			17:10	14	16:45 (81)
3	06:10	06:34		07:04		07:33		17:41 (105)	07:06			07:39		16:32 (81)
	21:08	20:49		20:06		19:15	55	18:36 (105)	17:31			17:10	13	16:45 (81)
4	06:11	06:35		07:05		07:34		17:41 (105)	07:07			07:40		16:33 (81)
	21:08	20:48		20:05		19:14	54	18:35 (105)	17:30			17:10	12	16:45 (81)
5	06:11	06:36		07:06		07:35		17:42 (105)	07:08			07:41		16:34 (81)
	21:08	20:47		20:03		19:12	52	18:34 (105)	17:29			17:09	10	16:44 (81)
6	06:12	06:37		07:21 (77)	07:07		07:36		17:42 (105)	07:09			07:42		16:35 (81)
	21:08	20:45	10	07:31 (77)	20:01		19:10	51	18:33 (105)	17:28			17:09	9	16:44 (81)
7	06:12	06:38		07:19 (77)	07:08		07:37		17:43 (105)	07:10			07:43		16:36 (81)
	21:07	20:44	14	07:33 (77)	20:00		19:09	49	18:32 (105)	17:27			17:09	8	16:44 (81)
8	06:13	06:39		07:17 (77)	07:09		07:38		17:43 (105)	07:12			07:44		16:37 (81)
	21:07	20:43	18	07:35 (77)	19:57		19:07	47	18:30 (105)	17:25			17:09	7	16:44 (81)
9	06:14	06:40		07:16 (77)	07:10	18:11 (105)	07:39		17:44 (105)	07:13			07:45		16:38 (81)
	21:07	20:42	20	07:36 (77)	19:55	15	18:26 (105)	19:06	45	18:29 (105)	17:24		17:09	6	16:44 (81)
10	06:14	06:41		07:15 (77)	07:10		18:07 (105)	07:40		17:45 (105)	07:14	16:32 (81)	07:46		16:40 (81)
	21:06	20:41	22	07:37 (77)	19:53	23	18:30 (105)	19:04	42	18:27 (105)	17:23	10	16:42 (81)	17:09	4	16:44 (81)
11	06:15	06:42		07:14 (77)	07:11		18:04 (105)	07:41		17:47 (105)	07:15		16:30 (81)	07:47		16:41 (81)
	21:06	20:39	24	07:38 (77)	19:52	28	18:32 (105)	19:03	38	18:25 (105)	17:23	14	16:44 (81)	17:09	4	16:45 (81)
12	06:16	06:43		07:13 (77)	07:12		18:01 (105)	07:42		17:48 (105)	07:16		16:28 (81)	07:47		16:42 (81)
	21:06	20:38	26	07:39 (77)	19:50	33	18:34 (105)	19:01	35	18:23 (105)	17:22	17	16:45 (81)	17:09	2	16:44 (81)
13	06:16	06:44		07:12 (77)	07:13		17:59 (105)	07:43		17:51 (105)	07:17		16:27 (81)	07:48		
	21:05	20:37	27	07:39 (77)	19:48	37	18:36 (105)	18:59	31	18:22 (105)	17:21	20	16:47 (81)	17:10		
14	06:17	06:45		07:12 (77)	07:14		07:46 (116)	07:44		17:53 (105)	07:19		16:27 (81)	07:49		
	21:05	20:36	27	07:39 (77)	19:47	48	18:37 (105)	18:58	26	18:19 (105)	17:20	21	16:48 (81)	17:10		
15	06:18	06:46		07:11 (77)	07:15		07:43 (116)	07:45		17:57 (105)	07:20		16:26 (81)	07:50		
	21:04	20:34	29	07:40 (77)	19:45	56	18:38 (105)	18:56	18	18:15 (105)	17:19	23	16:49 (81)	17:10		
16	06:19	06:47		07:11 (77)	07:16		07:41 (116)	07:46			07:21		16:25 (81)	07:50		
	21:04	20:33	29	07:40 (77)	19:43	63	18:39 (105)	18:55			17:18	25	16:50 (81)	17:10		
17	06:19	06:48		07:10 (77)	07:17		07:40 (116)	07:47			07:22		16:25 (81)	07:51		
	21:03	20:32	29	07:39 (77)	19:42	67	18:40 (105)	18:53			17:17	25	16:50 (81)	17:11		
18	06:20	06:49		07:10 (77)	07:18		07:39 (116)	07:48			07:23		16:25 (81)	07:52		
	21:02	20:30	29	07:39 (77)	19:40	69	18:40 (105)	18:52			17:17	25	16:50 (81)	17:11		
19	06:21	06:49		07:10 (77)	07:19		07:39 (116)	07:49			07:24		16:25 (81)	07:52		
	21:02	20:29	28	07:38 (77)	19:38	72	18:41 (105)	18:51			17:16	27	16:52 (81)	17:11		
20	06:22	06:50		07:11 (77)	07:20		07:40 (116)	07:50			07:25		16:25 (81)	07:53		
	21:01	20:27	27	07:38 (77)	19:37	72	18:41 (105)	18:49			17:15	27	16:52 (81)	17:12		
21	06:23	06:51		07:12 (77)	07:21		07:40 (116)	07:51			07:27		16:25 (81)	07:53		
	21:00	20:26	25	07:37 (77)	19:35	72	18:40 (105)	18:48			17:15	26	16:51 (81)	17:12		
22	06:23	06:52		07:13 (77)	07:22		07:41 (116)	07:52			07:28		16:25 (81)	07:54		
	21:00	20:25	23	07:36 (77)	19:33	72	18:40 (105)	18:46			17:14	25	16:50 (81)	17:13		
23	06:24	06:53		07:14 (77)	07:23		07:42 (116)	07:53			07:29		16:25 (81)	07:54		
	20:59	20:23	22	07:36 (77)	19:32	70	18:40 (105)	18:45			17:13	24	16:49 (81)	17:13		
24	06:25	06:54		07:15 (77)	07:24		07:43 (116)	07:55			07:30		16:26 (81)	07:55		
	20:58	20:22	19	07:34 (77)	19:30	69	18:40 (105)	18:44			17:13	23	16:49 (81)	17:14		
25	06:26	06:55		07:16 (77)	07:25		07:44 (116)	07:56			07:31		16:27 (81)	07:55		
	20:57	20:20	17	07:33 (77)	19:28	67	18:40 (105)	18:42			17:12	22	16:49 (81)	17:14		
26	06:27	06:56		07:17 (77)	07:26		07:45 (116)	07:57			07:32		16:27 (81)	07:56		
	20:57	20:19	14	07:31 (77)	19:27	65	18:40 (105)	18:41			17:12	21	16:48 (81)	17:15		
27	06:28	06:57		07:18 (77)	07:27		07:46 (116)	07:58			07:33		16:28 (81)	07:56		
	20:56	20:17	10	07:28 (77)	19:25	62	18:40 (105)	18:40			17:12	19	16:47 (81)	17:16		
28	06:29	06:58			07:28		17:42 (105)	07:59			07:34		16:28 (81)	07:56		
	20:55	20:16			19:23	57	18:39 (105)	18:38			17:11	19	16:47 (81)	17:16		
29	06:30	06:59			07:29		17:41 (105)	08:00			07:35		16:29 (81)	07:57		
	20:54	20:14			19:22	58	18:39 (105)	18:37			17:11	17	16:46 (81)	17:17		
30	06:31	07:00			07:30		17:41 (105)	08:01			07:36		16:29 (81)	07:57		
	20:53	20:13			19:20	57	18:38 (105)	18:36			17:10	17	16:46 (81)	17:18		
31	06:31	07:01						08:02						07:57		16:51 (81)
	20:52	20:11						18:34						17:19	2	16:53 (81)
Potential sun hours	456	427			374			346			300			291		
Total, worst case			489			1232			656			447			106	
Sun reduction			0.60			0.61			0.56			0.37			0.50	
Oper. time red.			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.			0.67			0.67			0.67			0.68			0.68	
Total reduction			0.40			0.41			0.37			0.25			0.34	
Total, real			196			500			245			113			36	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 48

Licensed user:
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US-SYRACUSE, NY 13202
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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 739 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5697)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January	February			March			April			May			June		
1	07:57	07:44			07:10		17:29 (116)	07:20		19:09 (77)	06:36		07:14 (72)	06:08		06:59 (72)
	17:20	17:53			18:26	29	17:58 (116)	19:59	23	19:32 (77)	20:28	31	07:45 (72)	20:57	61	08:00 (72)
2	07:57	07:44			07:08		17:28 (116)	07:18		19:09 (77)	06:34		07:12 (72)	06:08		06:59 (72)
	17:20	17:54			18:27	29	17:57 (116)	20:00	22	19:31 (77)	20:29	35	07:47 (72)	20:58	61	08:00 (72)
3	07:58	07:43			07:07		17:29 (116)	07:17		19:10 (77)	06:33		07:11 (72)	06:07		07:00 (72)
	17:21	17:56			18:28	28	17:57 (116)	20:00	20	19:30 (77)	20:30	38	07:49 (72)	20:58	60	08:00 (72)
4	07:58	07:42			07:05		17:28 (116)	07:15		19:10 (77)	06:32		07:08 (72)	06:07		06:59 (72)
	17:22	17:57			18:29	28	17:56 (116)	20:01	19	19:29 (77)	20:31	42	07:50 (72)	20:59	61	08:00 (72)
5	07:58	07:41			07:04		17:29 (116)	07:14		19:11 (77)	06:31		07:07 (72)	06:07		07:00 (72)
	17:23	17:58			18:30	27	17:56 (116)	20:02	16	19:27 (77)	20:32	44	07:51 (72)	21:00	60	08:00 (72)
6	07:58	07:40			07:02		17:29 (116)	07:12		19:13 (77)	06:30		07:06 (72)	06:06		07:00 (72)
	17:24	17:59			18:31	26	17:55 (116)	20:03	12	19:25 (77)	20:33	46	07:52 (72)	21:00	60	08:00 (72)
7	07:58	07:38			07:00		17:30 (116)	07:11		19:15 (77)	06:28		07:05 (72)	06:06		07:00 (72)
	17:25	18:00			18:33	23	17:53 (116)	20:04	6	19:21 (77)	20:34	48	07:53 (72)	21:01	60	08:00 (72)
8	07:57	07:37			07:59		18:31 (116)	07:09			06:27		07:04 (72)	06:06		07:00 (72)
	17:26	18:02			19:34	21	18:52 (116)	20:05			20:35	50	07:54 (72)	21:02	60	08:00 (72)
9	07:57	07:36			07:57		18:33 (116)	07:07			06:26		07:03 (72)	06:06		07:01 (72)
	17:27	18:03			19:35	17	18:50 (116)	20:06			20:36	52	07:55 (72)	21:02	59	08:00 (72)
10	07:57	07:35			07:56		18:36 (116)	07:06			06:25		07:02 (72)	06:05		07:01 (72)
	17:28	18:04			19:36	11	18:47 (116)	20:07			20:37	53	07:55 (72)	21:03	59	08:00 (72)
11	07:57	07:34			07:54			07:04			06:24		07:02 (72)	06:05		07:02 (72)
	17:29	18:05			19:37			20:08			20:38	54	07:56 (72)	21:03	59	08:01 (72)
12	07:57	07:33			07:53			07:03			06:23		07:01 (72)	06:05		07:02 (72)
	17:30	18:06			19:38			20:09			20:39	55	07:56 (72)	21:04	59	08:01 (72)
13	07:56	07:32			07:51			07:01			06:22		07:01 (72)	06:05		07:02 (72)
	17:31	18:08			19:39			20:10			20:40	56	07:57 (72)	21:04	59	08:01 (72)
14	07:56	07:30			07:49			07:00			06:21		07:00 (72)	06:05		07:02 (72)
	17:32	18:09			19:40			20:11			20:41	57	07:57 (72)	21:05	59	08:01 (72)
15	07:56	07:29			07:48			06:58			06:20		06:59 (72)	06:05		07:03 (72)
	17:33	18:10			19:41			20:12			20:42	58	07:57 (72)	21:05	58	08:01 (72)
16	07:55	07:28			07:46			06:57			06:19		06:59 (72)	06:05		07:03 (72)
	17:34	18:11			19:42			20:13			20:43	58	07:57 (72)	21:06	58	08:01 (72)
17	07:55	07:26			07:45			06:55			06:18		06:59 (72)	06:05		07:03 (72)
	17:35	18:12			19:43			20:14			20:44	59	07:58 (72)	21:06	58	08:01 (72)
18	07:54	07:25			07:43			06:54			06:17		06:59 (72)	06:05		07:03 (72)
	17:37	18:13			19:44			20:15			20:45	60	07:59 (72)	21:06	58	08:01 (72)
19	07:54	07:24			07:41			06:52			06:16		06:59 (72)	06:05		07:03 (72)
	17:38	18:15			19:45			20:16			20:46	60	07:59 (72)	21:07	58	08:01 (72)
20	07:53	07:22		17:41 (116)	07:40			06:51			06:16		06:58 (72)	06:05		07:03 (72)
	17:39	18:16	6	17:47 (116)	19:46			20:17			20:47	61	07:59 (72)	21:07	59	08:02 (72)
21	07:53	07:21		17:37 (116)	07:38			06:49			06:15		06:58 (72)	06:06		07:04 (72)
	17:40	18:17	13	17:50 (116)	19:47			20:18			20:48	60	07:58 (72)	21:07	59	08:03 (72)
22	07:52	07:20		17:35 (116)	07:36			06:48			06:14		06:59 (72)	06:06		07:04 (72)
	17:41	18:18	18	17:53 (116)	19:48			20:19			20:49	60	07:59 (72)	21:08	59	08:03 (72)
23	07:52	07:18		17:33 (116)	07:35			06:46			06:13		06:58 (72)	06:06		07:04 (72)
	17:42	18:19	22	17:55 (116)	19:49			20:20			20:50	61	07:59 (72)	21:08	59	08:03 (72)
24	07:51	07:17		17:32 (116)	07:33		19:19 (77)	06:45			06:13		06:58 (72)	06:06		07:04 (72)
	17:43	18:20	23	17:55 (116)	19:50	8	19:27 (77)	20:21			20:50	61	07:59 (72)	21:08	58	08:02 (72)
25	07:50	07:15		17:31 (116)	07:31		19:15 (77)	06:44			06:12		06:58 (72)	06:07		07:05 (72)
	17:45	18:21	26	17:57 (116)	19:52	14	19:29 (77)	20:22			20:51	62	08:00 (72)	21:08	58	08:03 (72)
26	07:50	07:14		17:30 (116)	07:30		19:14 (77)	06:42			06:11		06:58 (72)	06:07		07:05 (72)
	17:46	18:23	27	17:57 (116)	19:53	17	19:31 (77)	20:23			20:52	61	07:59 (72)	21:08	58	08:03 (72)
27	07:49	07:13		17:29 (116)	07:28		19:12 (77)	06:41			06:11		06:59 (72)	06:07		07:05 (72)
	17:47	18:24	28	17:57 (116)	19:54	20	19:32 (77)	20:24			20:53	61	08:00 (72)	21:08	58	08:03 (72)
28	07:48	07:11		17:28 (116)	07:27		19:11 (77)	06:40		07:25 (72)	06:10		06:58 (72)	06:08		07:06 (72)
	17:48	18:25	29	17:57 (116)	19:55	21	19:32 (77)	20:25	11	07:36 (72)	20:54	61	07:59 (72)	21:08	58	08:04 (72)
29	07:47				07:25		19:10 (77)	06:38		07:19 (72)	06:10		06:59 (72)	06:08		07:05 (72)
	17:49				19:56	23	19:33 (77)	20:26	21	07:40 (72)	20:55	61	08:00 (72)	21:08	59	08:04 (72)
30	07:46				07:23		19:09 (77)	06:37		07:16 (72)	06:09		06:59 (72)	06:09		07:06 (72)
	17:51				19:57	23	19:32 (77)	20:27	27	07:43 (72)	20:55	61	08:00 (72)	21:08	59	08:05 (72)
31	07:45				07:22		19:09 (77)				06:09		06:59 (72)			
	17:52				19:58	23	19:32 (77)				20:56	61	08:00 (72)			
Potential sun hours	300	299			370			397			446			449		
Total, worst case			192			388			177			1687			1771	
Sun reduction			0.42			0.44			0.51			0.56			0.60	
Oper. time red.			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.			0.67			0.67			0.66			0.67			0.67	
Total reduction			0.28			0.29			0.34			0.38			0.40	
Total, real			54			114			60			638			717	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

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4/30/2012 9:43 AM / 49

Licensed user:
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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 739 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5697)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November	December
1	06:09		07:06 (72)	06:32		07:12 (72)	07:02			07:31			07:03	07:37
	21:08	59	08:05 (72)	20:51	55	08:07 (72)	20:09			19:18			17:33	17:10
2	06:09		07:06 (72)	06:33		07:13 (72)	07:03			07:32			07:05	07:38
	21:08	60	08:06 (72)	20:50	53	08:06 (72)	20:08			19:17			17:32	17:10
3	06:10		07:06 (72)	06:34		07:13 (72)	07:04			07:33		18:15 (116)	07:06	07:39
	21:08	59	08:05 (72)	20:49	53	08:06 (72)	20:06			19:15	8	18:23 (116)	17:31	17:10
4	06:11		07:07 (72)	06:35		07:13 (72)	07:05			07:34		18:11 (116)	07:07	07:40
	21:08	59	08:06 (72)	20:48	51	08:04 (72)	20:05			19:14	15	18:26 (116)	17:30	17:09
5	06:11		07:06 (72)	06:36		07:14 (72)	07:06		19:13 (77)	07:35		18:09 (116)	07:08	07:41
	21:08	60	08:06 (72)	20:47	49	08:03 (72)	20:03	5	19:18 (77)	19:12	19	18:28 (116)	17:29	17:09
6	06:12		07:07 (72)	06:37		07:15 (72)	07:07		19:09 (77)	07:36		18:07 (116)	07:09	07:42
	21:08	60	08:07 (72)	20:45	47	08:02 (72)	20:01	12	19:21 (77)	19:10	22	18:29 (116)	17:27	17:09
7	06:12		07:06 (72)	06:38		07:16 (72)	07:08		19:06 (77)	07:37		18:05 (116)	07:10	07:43
	21:07	60	08:06 (72)	20:44	45	08:01 (72)	20:00	16	19:22 (77)	19:09	25	18:30 (116)	17:26	17:09
8	06:13		07:07 (72)	06:39		07:17 (72)	07:08		19:04 (77)	07:38		18:04 (116)	07:12	07:44
	21:07	60	08:07 (72)	20:43	43	08:00 (72)	19:56	19	19:23 (77)	19:07	26	18:30 (116)	17:25	17:09
9	06:13		07:06 (72)	06:40		07:18 (72)	07:09		19:03 (77)	07:39		18:03 (116)	07:13	07:45
	21:07	61	08:07 (72)	20:42	41	07:59 (72)	19:55	20	19:23 (77)	19:06	28	18:31 (116)	17:24	17:09
10	06:14		07:07 (72)	06:41		07:20 (72)	07:10		19:02 (77)	07:40		18:02 (116)	07:14	07:46
	21:06	60	08:07 (72)	20:41	37	07:57 (72)	19:53	22	19:24 (77)	19:04	29	18:31 (116)	17:23	17:09
11	06:15		07:07 (72)	06:42		07:21 (72)	07:11		19:01 (77)	07:41		18:02 (116)	07:15	07:47
	21:06	61	08:08 (72)	20:39	35	07:56 (72)	19:52	23	19:24 (77)	19:02	29	18:31 (116)	17:22	17:09
12	06:16		07:06 (72)	06:43		07:23 (72)	07:12		19:01 (77)	07:42		18:01 (116)	07:16	07:47
	21:06	61	08:07 (72)	20:38	30	07:53 (72)	19:50	23	19:24 (77)	19:01	29	18:30 (116)	17:22	17:09
13	06:16		07:07 (72)	06:44		07:26 (72)	07:13		19:01 (77)	07:43		18:01 (116)	07:17	07:48
	21:05	61	08:08 (72)	20:37	25	07:51 (72)	19:48	22	19:23 (77)	18:59	29	18:30 (116)	17:21	17:10
14	06:17		07:07 (72)	06:45		07:29 (72)	07:14		19:00 (77)	07:44		18:02 (116)	07:18	07:49
	21:05	61	08:08 (72)	20:36	18	07:47 (72)	19:47	23	19:23 (77)	18:58	28	18:30 (116)	17:20	17:10
15	06:18		07:08 (72)	06:46		07:34 (72)	07:15		19:01 (77)	07:45		18:02 (116)	07:20	07:50
	21:04	61	08:09 (72)	20:34	6	07:40 (72)	19:45	21	19:22 (77)	18:56	28	18:30 (116)	17:19	17:10
16	06:18		07:07 (72)	06:47			07:16		19:01 (77)	07:46		18:02 (116)	07:21	07:50
	21:04	61	08:08 (72)	20:33			19:43	20	19:21 (77)	18:55	27	18:29 (116)	17:18	17:10
17	06:19		07:07 (72)	06:47			07:17		19:02 (77)	07:47		18:03 (116)	07:22	07:51
	21:03	62	08:09 (72)	20:31			19:42	18	19:20 (77)	18:53	25	18:28 (116)	17:17	17:11
18	06:20		07:08 (72)	06:48			07:18		19:03 (77)	07:48		18:03 (116)	07:23	07:52
	21:02	61	08:09 (72)	20:30			19:40	15	19:18 (77)	18:52	23	18:26 (116)	17:17	17:11
19	06:21		07:08 (72)	06:49			07:19		19:05 (77)	07:49		18:04 (116)	07:24	07:52
	21:02	61	08:09 (72)	20:29			19:38	10	19:15 (77)	18:50	21	18:25 (116)	17:16	17:11
20	06:22		07:07 (72)	06:50			07:20			07:50		18:06 (116)	07:25	07:53
	21:01	62	08:09 (72)	20:27			19:37			18:49	17	18:23 (116)	17:15	17:12
21	06:22		07:08 (72)	06:51			07:21			07:51		18:08 (116)	07:27	07:53
	21:00	61	08:09 (72)	20:26			19:35			18:48	12	18:20 (116)	17:15	17:12
22	06:23		07:08 (72)	06:52			07:22			07:52			07:28	07:54
	21:00	61	08:09 (72)	20:24			19:33			18:46			17:14	17:13
23	06:24		07:09 (72)	06:53			07:23			07:53			07:29	07:54
	20:59	60	08:09 (72)	20:23			19:32			18:45			17:13	17:13
24	06:25		07:09 (72)	06:54			07:24			07:55			07:30	07:55
	20:58	60	08:09 (72)	20:22			19:30			18:43			17:13	17:14
25	06:26		07:09 (72)	06:55			07:25			07:56			07:31	07:55
	20:57	60	08:09 (72)	20:20			19:28			18:42			17:12	17:14
26	06:27		07:09 (72)	06:56			07:26			07:57			07:32	07:56
	20:56	59	08:08 (72)	20:19			19:27			18:41			17:12	17:15
27	06:28		07:09 (72)	06:57			07:27			07:58			07:33	07:56
	20:56	59	08:08 (72)	20:17			19:25			18:39			17:11	17:16
28	06:29		07:10 (72)	06:58			07:28			07:59			07:34	07:56
	20:55	58	08:08 (72)	20:16			19:23			18:38			17:11	17:16
29	06:30		07:10 (72)	06:59			07:29			08:00			07:35	07:57
	20:54	58	08:08 (72)	20:14			19:22			18:37			17:11	17:17
30	06:30		07:11 (72)	07:00			07:30			08:01			07:36	07:57
	20:53	56	08:07 (72)	20:12			19:20			18:36			17:10	17:18
31	06:31		07:11 (72)	07:01						08:02				07:57
	20:52	56	08:07 (72)	20:11						18:34				17:19
Potential sun hours	456			427			374			346			300	291
Total, worst case		1858			588			269			440			
Sun reduction		0.60			0.60			0.61			0.56			
Oper. time red.		1.00			1.00			1.00			1.00			
Wind dir. red.		0.67			0.67			0.66			0.67			
Total reduction		0.40			0.40			0.40			0.38			
Total, real		752			238			108			166			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

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4/30/2012 9:43 AM / 50

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 789 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5721)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January	February			March			April	May			June		
1	07:57	07:45			07:10		07:29 (116)	07:20	06:36			06:08		06:33 (76)
	17:20	17:53			18:26	19	07:48 (116)	19:59	20:28			20:57	38	07:11 (76)
2	07:58	07:44			07:08		07:27 (116)	07:19	06:34			06:08		06:33 (76)
	17:21	17:54			18:27	20	07:47 (116)	20:00	20:29			20:58	38	07:11 (76)
3	07:58	07:43			07:07		07:26 (116)	07:17	06:33			06:07		06:34 (76)
	17:21	17:56			18:28	21	07:47 (116)	20:00	20:30			20:58	38	07:12 (76)
4	07:58	07:42			07:05		07:25 (116)	07:15	06:32			06:07		06:33 (76)
	17:22	17:57			18:29	21	07:46 (116)	20:01	20:31			20:59	39	07:12 (76)
5	07:58	07:41			07:04		07:26 (116)	07:14	06:31			06:07		06:33 (76)
	17:23	17:58			18:30	19	07:45 (116)	20:02	20:32			21:00	39	07:12 (76)
6	07:58	07:40			07:02		07:26 (116)	07:12	06:30			06:06		06:34 (76)
	17:24	17:59			18:32	18	07:44 (116)	20:03	20:33			21:01	39	07:13 (76)
7	07:58	07:39			07:01		07:28 (116)	07:11	06:29			06:06		06:34 (76)
	17:25	18:00			18:33	14	07:42 (116)	20:04	20:34			21:01	39	07:13 (76)
8	07:58	07:37			07:59		08:30 (116)	07:09	06:27			06:06		06:33 (76)
	17:26	18:02			19:34	9	08:39 (116)	20:05	20:35			21:02	40	07:13 (76)
9	07:57	07:36			07:57			07:07	06:26			06:06		06:34 (76)
	17:27	18:03			19:35			20:06	20:36			21:02	39	07:13 (76)
10	07:57	07:35			07:56			07:06	06:25			06:05		06:34 (76)
	17:28	18:04			19:36			20:07	20:37			21:03	39	07:13 (76)
11	07:57	07:34			07:54			07:04	06:24			06:05		06:34 (76)
	17:29	18:05			19:37			20:08	20:38			21:03	40	07:14 (76)
12	07:57	07:33			07:53			07:03	06:23			06:05		06:34 (76)
	17:30	18:06			19:38			20:09	20:39			21:04	40	07:14 (76)
13	07:56	07:32			07:51			07:01	06:22			06:05		06:35 (76)
	17:31	18:08			19:39			20:10	20:40			21:04	39	07:14 (76)
14	07:56	07:30			07:49			07:00	06:21			06:05		06:35 (76)
	17:32	18:09			19:40			20:11	20:41			21:05	40	07:15 (76)
15	07:56	07:29			07:48			06:58	06:20			06:05		06:35 (76)
	17:33	18:10			19:41			20:12	20:42			21:05	40	07:15 (76)
16	07:55	07:28			07:46			06:57	06:19		06:46 (76)	06:05		06:35 (76)
	17:34	18:11			19:42			20:13	20:43	8	06:54 (76)	21:06	40	07:15 (76)
17	07:55	07:27			07:45			06:55	06:18		06:44 (76)	06:05		06:35 (76)
	17:35	18:12			19:43			20:14	20:44	15	06:59 (76)	21:06	40	07:15 (76)
18	07:55	07:25			07:43			06:54	06:17		06:42 (76)	06:05		06:35 (76)
	17:37	18:14			19:44			20:15	20:45	19	07:01 (76)	21:07	40	07:15 (76)
19	07:54	07:24			07:41			06:52	06:17		06:40 (76)	06:05		06:35 (76)
	17:38	18:15			19:45			20:16	20:46	22	07:02 (76)	21:07	40	07:15 (76)
20	07:54	07:23			07:40			06:51	06:16		06:39 (76)	06:06		06:35 (76)
	17:39	18:16			19:46			20:17	20:47	24	07:03 (76)	21:07	40	07:15 (76)
21	07:53	07:21			07:38			06:49	06:15		06:37 (76)	06:06		06:36 (76)
	17:40	18:17			19:47			20:18	20:48	27	07:04 (76)	21:07	40	07:16 (76)
22	07:52	07:20		07:39 (116)	07:36			06:48	06:14		06:37 (76)	06:06		06:36 (76)
	17:41	18:18	2	07:41 (116)	19:49			20:19	20:49	28	07:05 (76)	21:08	40	07:16 (76)
23	07:52	07:18		07:38 (116)	07:35			06:46	06:13		06:36 (76)	06:06		06:36 (76)
	17:42	18:19	6	07:44 (116)	19:50			20:20	20:50	30	07:06 (76)	21:08	40	07:16 (76)
24	07:51	07:17		07:36 (116)	07:33			06:45	06:13		06:35 (76)	06:06		06:36 (76)
	17:44	18:20	9	07:45 (116)	19:51			20:21	20:51	31	07:06 (76)	21:08	40	07:16 (76)
25	07:50	07:16		07:35 (116)	07:32			06:44	06:12		06:35 (76)	06:07		06:37 (76)
	17:45	18:22	12	07:47 (116)	19:52			20:22	20:51	33	07:08 (76)	21:08	40	07:17 (76)
26	07:50	07:14		07:33 (116)	07:30			06:42	06:11		06:35 (76)	06:07		06:37 (76)
	17:46	18:23	14	07:47 (116)	19:53			20:23	20:52	33	07:08 (76)	21:08	40	07:17 (76)
27	07:49	07:13		07:32 (116)	07:28			06:41	06:11		06:35 (76)	06:07		06:37 (76)
	17:47	18:24	16	07:48 (116)	19:54			20:24	20:53	34	07:09 (76)	21:08	40	07:17 (76)
28	07:48	07:11		07:30 (116)	07:27			06:40	06:10		06:34 (76)	06:08		06:38 (76)
	17:48	18:25	17	07:47 (116)	19:55			20:25	20:54	35	07:09 (76)	21:08	40	07:18 (76)
29	07:47				07:25			06:38	06:10		06:34 (76)	06:08		06:38 (76)
	17:50				19:56			20:26	20:55	36	07:10 (76)	21:08	39	07:17 (76)
30	07:46				07:23			06:37	06:09		06:34 (76)	06:09		06:38 (76)
	17:51				19:57			20:27	20:55	36	07:10 (76)	21:08	40	07:18 (76)
31	07:45				07:22				06:09		06:34 (76)			
	17:52				19:58				20:56	37	07:11 (76)			
Potential sun hours	300	299			370			397	446			449		
Total, worst case			76			141				448			1186	
Sun reduction			0.42			0.44				0.56			0.60	
Oper. time red.			1.00			1.00				1.00			1.00	
Wind dir. red.			0.63			0.63				0.68			0.68	
Total reduction			0.27			0.28				0.38			0.41	
Total, real			20			39				171			485	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

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4/30/2012 9:43 AM / 51

Licensed user:
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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 789 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5721)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August	September	October			November	December
1	06:09		06:38 (76)	06:32	07:02	07:31			07:04	07:37
	21:08	40	07:18 (76)	20:51	20:09	19:19			17:33	17:10
2	06:10		06:39 (76)	06:33	07:03	07:32			07:05	07:38
	21:08	40	07:19 (76)	20:50	20:08	19:17			17:32	17:10
3	06:10		06:39 (76)	06:34	07:04	07:33			07:06	07:39
	21:08	39	07:18 (76)	20:49	20:06	19:15			17:31	17:10
4	06:11		06:39 (76)	06:35	07:05	07:34			07:07	07:40
	21:08	40	07:19 (76)	20:48	20:05	19:14			17:30	17:10
5	06:11		06:39 (76)	06:36	07:06	07:35		08:09 (116)	07:08	07:41
	21:08	39	07:18 (76)	20:47	20:03	19:12	5	08:14 (116)	17:29	17:09
6	06:12		06:40 (76)	06:37	07:07	07:36		08:05 (116)	07:09	07:42
	21:08	39	07:19 (76)	20:45	20:01	19:10	12	08:17 (116)	17:28	17:09
7	06:12		06:40 (76)	06:38	07:08	07:37		08:03 (116)	07:10	07:43
	21:07	38	07:18 (76)	20:44	20:00	19:09	16	08:19 (116)	17:27	17:09
8	06:13		06:40 (76)	06:39	07:09	07:38		08:01 (116)	07:12	07:44
	21:07	39	07:19 (76)	20:43	19:57	19:07	19	08:20 (116)	17:25	17:09
9	06:14		06:41 (76)	06:40	07:10	07:39		08:00 (116)	07:13	07:45
	21:07	38	07:19 (76)	20:42	19:55	19:06	20	08:20 (116)	17:24	17:09
10	06:14		06:41 (76)	06:41	07:10	07:40		07:59 (116)	07:14	07:46
	21:06	38	07:19 (76)	20:41	19:53	19:04	22	08:21 (116)	17:23	17:09
11	06:15		06:41 (76)	06:42	07:11	07:41		08:00 (116)	07:15	07:47
	21:06	38	07:19 (76)	20:39	19:52	19:03	21	08:21 (116)	17:23	17:09
12	06:16		06:42 (76)	06:43	07:12	07:42		08:01 (116)	07:16	07:47
	21:06	37	07:19 (76)	20:38	19:50	19:01	20	08:21 (116)	17:22	17:09
13	06:16		06:42 (76)	06:44	07:13	07:43		08:03 (116)	07:17	07:48
	21:05	36	07:18 (76)	20:37	19:48	18:59	18	08:21 (116)	17:21	17:10
14	06:17		06:42 (76)	06:45	07:14	07:44		08:04 (116)	07:19	07:49
	21:05	37	07:19 (76)	20:36	19:47	18:58	17	08:21 (116)	17:20	17:10
15	06:18		06:43 (76)	06:46	07:15	07:45		08:05 (116)	07:20	07:50
	21:04	36	07:19 (76)	20:34	19:45	18:56	15	08:20 (116)	17:19	17:10
16	06:19		06:43 (76)	06:47	07:16	07:46		08:06 (116)	07:21	07:50
	21:04	35	07:18 (76)	20:33	19:43	18:55	13	08:19 (116)	17:18	17:10
17	06:19		06:44 (76)	06:48	07:17	07:47		08:07 (116)	07:22	07:51
	21:03	34	07:18 (76)	20:32	19:42	18:53	11	08:18 (116)	17:17	17:11
18	06:20		06:44 (76)	06:49	07:18	07:48		08:08 (116)	07:23	07:52
	21:02	33	07:17 (76)	20:30	19:40	18:52	8	08:16 (116)	17:17	17:11
19	06:21		06:45 (76)	06:49	07:19	07:49		08:09 (116)	07:24	07:52
	21:02	32	07:17 (76)	20:29	19:38	18:51	5	08:14 (116)	17:16	17:11
20	06:22		06:46 (76)	06:50	07:20	07:50			07:25	07:53
	21:01	31	07:17 (76)	20:27	19:37	18:49			17:15	17:12
21	06:23		06:46 (76)	06:51	07:21	07:51			07:27	07:53
	21:00	29	07:15 (76)	20:26	19:35	18:48			17:15	17:12
22	06:23		06:47 (76)	06:52	07:22	07:52			07:28	07:54
	21:00	28	07:15 (76)	20:25	19:33	18:46			17:14	17:13
23	06:24		06:49 (76)	06:53	07:23	07:53			07:29	07:54
	20:59	25	07:14 (76)	20:23	19:32	18:45			17:13	17:13
24	06:25		06:50 (76)	06:54	07:24	07:55			07:30	07:55
	20:58	23	07:13 (76)	20:22	19:30	18:44			17:13	17:14
25	06:26		06:51 (76)	06:55	07:25	07:56			07:31	07:55
	20:57	21	07:12 (76)	20:20	19:28	18:42			17:12	17:14
26	06:27		06:53 (76)	06:56	07:26	07:57			07:32	07:56
	20:57	17	07:10 (76)	20:19	19:27	18:41			17:12	17:15
27	06:28		06:55 (76)	06:57	07:27	07:58			07:33	07:56
	20:56	12	07:07 (76)	20:17	19:25	18:40			17:12	17:16
28	06:29			06:58	07:28	07:59			07:34	07:56
	20:55			20:16	19:23	18:38			17:11	17:16
29	06:30			06:59	07:29	08:00			07:35	07:57
	20:54			20:14	19:22	18:37			17:11	17:17
30	06:31			07:00	07:30	08:01			07:36	07:57
	20:53			20:13	19:20	18:36			17:10	17:18
31	06:31			07:01		08:02				07:57
	20:52			20:11		18:34				17:19
Potential sun hours	456			427	374	346			300	291
Total, worst case		894					222			
Sun reduction		0.60					0.56			
Oper. time red.		1.00					1.00			
Wind dir. red.		0.68					0.63			
Total reduction		0.41					0.35			
Total, real		366					79			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

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4/30/2012 9:43 AM / 52

Licensed user:
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(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 793 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5725)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:20 (77)	07:45		08:33 (77)	07:10		07:44 (76)	07:20			06:36		07:01 (74)	06:08		06:56 (75)
	17:20	24	08:44 (77)	17:53	20	08:53 (77)	18:26	47	08:31 (76)	19:59			20:28	22	07:23 (74)	20:57	49	07:45 (75)
2	07:58		08:20 (77)	07:44		08:35 (77)	07:08		07:43 (76)	07:19			06:34		07:01 (74)	06:08		06:56 (75)
	17:20	25	08:45 (116)	17:54	16	08:51 (77)	18:27	48	08:31 (76)	20:00			20:29	21	07:22 (74)	20:58	50	07:46 (75)
3	07:58		08:20 (77)	07:43		08:37 (77)	07:07		07:43 (76)	07:17			06:33		07:02 (74)	06:07		06:56 (75)
	17:21	25	08:45 (77)	17:56	11	08:48 (77)	18:28	49	08:32 (76)	20:00			20:30	20	07:22 (74)	20:58	51	07:47 (75)
4	07:58		08:20 (77)	07:42			07:05		07:42 (76)	07:15			06:32		07:03 (74)	06:07		06:55 (75)
	17:22	26	08:46 (77)	17:57			18:29	49	08:31 (76)	20:01			20:31	18	07:21 (74)	20:59	52	07:47 (75)
5	07:58		08:20 (77)	07:41			07:04		07:42 (76)	07:14			06:31		07:04 (74)	06:07		06:55 (75)
	17:23	27	08:47 (77)	17:58			18:30	50	08:32 (76)	20:02			20:32	14	07:18 (74)	21:00	53	07:48 (75)
6	07:58		08:20 (77)	07:40			07:02		07:42 (76)	07:12			06:30		07:06 (74)	06:06		06:55 (75)
	17:24	28	08:48 (77)	17:59			18:32	49	08:31 (76)	20:03			20:33	10	07:16 (74)	21:01	54	07:49 (75)
7	07:58		08:20 (77)	07:39			07:01		07:42 (76)	07:11			06:29		07:10 (74)	06:06		06:55 (75)
	17:25	29	08:49 (77)	18:00			18:33	50	08:32 (76)	20:04			20:34	2	07:12 (74)	21:01	55	07:50 (75)
8	07:58		08:21 (77)	07:37			07:59		08:41 (76)	07:09			06:27			06:06		06:54 (75)
	17:26	29	08:50 (77)	18:02			19:34	50	09:31 (76)	20:05			20:35			21:02	56	07:50 (75)
9	07:57		08:21 (77)	07:36			07:57		08:41 (76)	07:07			06:26			06:06		06:54 (75)
	17:27	30	08:51 (77)	18:03			19:35	49	09:30 (76)	20:06			20:36			21:02	56	07:50 (75)
10	07:57		08:21 (77)	07:35			07:56		08:42 (76)	07:06			06:25			06:05		06:54 (75)
	17:28	31	08:52 (77)	18:04			19:36	48	09:30 (76)	20:07			20:37			21:03	57	07:51 (75)
11	07:57		08:21 (77)	07:34			07:54		08:41 (76)	07:04			06:24			06:05		06:54 (75)
	17:29	30	08:51 (77)	18:05			19:37	48	09:29 (76)	20:08			20:38			21:03	57	07:51 (75)
12	07:57		08:21 (77)	07:33			07:53		08:42 (76)	07:03			06:23			06:05		06:54 (75)
	17:30	31	08:52 (77)	18:06			19:38	46	09:28 (76)	20:09			20:39			21:04	58	07:52 (75)
13	07:56		08:21 (77)	07:32			07:51		08:42 (76)	07:01			06:22			06:05		06:54 (75)
	17:31	32	08:53 (77)	18:08			19:39	45	09:27 (76)	20:10			20:40			21:04	58	07:52 (75)
14	07:56		08:21 (77)	07:30			07:49		08:42 (76)	07:00			06:21			06:05		06:54 (75)
	17:32	32	08:53 (77)	18:09			19:40	43	09:25 (76)	20:11			20:41			21:05	59	07:53 (75)
15	07:56		08:22 (77)	07:29			07:48		08:44 (76)	06:58			06:20			06:05		06:54 (75)
	17:33	32	08:54 (77)	18:10			19:41	41	09:25 (76)	20:12			20:42			21:05	59	07:53 (75)
16	07:55		08:21 (77)	07:28			07:46		08:44 (76)	06:57			06:19			06:05		06:54 (75)
	17:34	33	08:54 (77)	18:11			19:42	39	09:23 (76)	20:13			20:43			21:06	59	07:53 (75)
17	07:55		08:22 (77)	07:27			07:45		08:45 (76)	06:55			06:18			06:05		06:54 (75)
	17:35	33	08:55 (77)	18:12			19:43	36	09:21 (76)	20:14			20:44			21:06	60	07:54 (75)
18	07:55		08:22 (77)	07:25			07:43		08:46 (76)	06:54			06:17			06:05		06:54 (75)
	17:37	33	08:55 (77)	18:14			19:44	34	09:20 (76)	20:15			20:45			21:07	60	07:54 (75)
19	07:54		08:23 (77)	07:24		08:00 (76)	07:41		08:48 (76)	06:52		07:11 (74)	06:17			06:05		06:54 (75)
	17:38	33	08:56 (77)	18:15	17	08:17 (76)	19:45	29	09:17 (76)	20:16	9	07:20 (74)	20:46			21:07	60	07:54 (75)
20	07:54		08:23 (77)	07:23		07:57 (76)	07:40		08:49 (76)	06:51		07:10 (74)	06:16		07:15 (75)	06:06		06:54 (75)
	17:39	33	08:56 (77)	18:16	24	08:21 (76)	19:46	25	09:14 (76)	20:17	12	07:22 (74)	20:47	10	07:25 (75)	21:07	60	07:54 (75)
21	07:53		08:24 (77)	07:21		07:54 (76)	07:38		08:52 (76)	06:49		07:08 (74)	06:15		07:10 (75)	06:06		06:55 (75)
	17:40	33	08:57 (77)	18:17	28	08:22 (76)	19:47	19	09:11 (76)	20:18	15	07:23 (74)	20:48	19	07:29 (75)	21:07	60	07:55 (75)
22	07:52		08:24 (77)	07:20		07:53 (76)	07:36		08:57 (76)	06:48		07:07 (74)	06:14		07:08 (75)	06:06		06:55 (75)
	17:41	33	08:57 (77)	18:18	32	08:25 (76)	19:48	9	09:06 (76)	20:19	17	07:24 (74)	20:49	24	07:32 (75)	21:08	60	07:55 (75)
23	07:52		08:24 (77)	07:18		07:51 (76)	07:35			06:46		07:05 (74)	06:13		07:05 (75)	06:06		06:55 (75)
	17:42	33	08:57 (77)	18:19	36	08:27 (76)	19:50			20:20	19	07:24 (74)	20:50	29	07:34 (75)	21:08	60	07:55 (75)
24	07:51		08:24 (77)	07:17		07:49 (76)	07:33			06:45		07:04 (74)	06:13		07:03 (75)	06:06		06:55 (75)
	17:44	32	08:56 (77)	18:20	38	08:27 (76)	19:51			20:21	21	07:25 (74)	20:51	33	07:36 (75)	21:08	60	07:55 (75)
25	07:50		08:25 (77)	07:16		07:48 (76)	07:32			06:44		07:03 (74)	06:12		07:03 (75)	06:07		06:56 (75)
	17:45	32	08:57 (77)	18:22	41	08:29 (76)	19:52			20:22	22	07:25 (74)	20:51	35	07:38 (75)	21:08	60	07:56 (75)
26	07:50		08:26 (77)	07:14		07:47 (76)	07:30			06:42		07:01 (74)	06:11		07:01 (75)	06:07		06:56 (75)
	17:46	30	08:56 (77)	18:23	42	08:29 (76)	19:53			20:23	24	07:25 (74)	20:52	38	07:39 (75)	21:08	59	07:55 (75)
27	07:49		08:26 (77)	07:13		07:46 (76)	07:28			06:41		07:00 (74)	06:11		07:00 (75)	06:07		06:56 (75)
	17:47	30	08:56 (77)	18:24	44	08:30 (76)	19:54			20:24	25	07:25 (74)	20:53	41	07:41 (75)	21:08	59	07:55 (75)
28	07:48		08:27 (77)	07:11		07:45 (76)	07:27			06:40		07:00 (74)	06:10		06:59 (75)	06:08		06:57 (75)
	17:48	28	08:55 (77)	18:25	45	08:30 (76)	19:55			20:25	25	07:25 (74)	20:54	42	07:41 (75)	21:08	59	07:56 (75)
29	07:47		08:28 (77)				07:25			06:38		07:01 (74)	06:10		06:59 (75)	06:08		06:57 (75)
	17:50	27	08:55 (77)				19:56			20:26	24	07:25 (74)	20:55	44	07:43 (75)	21:08	59	07:56 (75)
30	07:46		08:29 (77)				07:23			06:37		07:00 (74)	06:09		06:57 (75)	06:09		06:58 (75)
	17:51	25	08:54 (77)				19:57			20:27	23	07:23 (74)	20:55	46	07:43 (75)	21:08	58	07:56 (75)
31	07:45		08:31 (77)				07:22						06:09		06:57 (75)			
	17:52	23	08:54 (77)				19:58						20:56	48	07:45 (75)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		922			394			903			236			516			1717	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.60			0.63			0.63			0.67			0.68			0.68	
Total reduction		0.22			0.26			0.28			0.34			0.38			0.41	
Total, real		199			103			250			80			195			699	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 53

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 793 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5725)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:58 (75)	06:32			07:02			07:31		08:21 (76)	07:04			07:37		08:03 (77)
	21:08	58	07:56 (75)	20:51			20:09			19:19	46	09:07 (76)	17:33			17:10	31	08:34 (77)
2	06:10		06:59 (75)	06:33			07:03			07:32		08:20 (76)	07:05			07:38		08:03 (77)
	21:08	57	07:56 (75)	20:50			20:08			19:17	47	09:07 (76)	17:32			17:10	31	08:34 (77)
3	06:10		06:59 (75)	06:34			07:04			07:33		08:19 (76)	07:06			07:39		08:04 (77)
	21:08	57	07:56 (75)	20:49			20:06			19:15	48	09:07 (76)	17:31			17:10	30	08:34 (77)
4	06:11		07:00 (75)	06:35			07:05			07:34		08:19 (76)	07:07			07:40		08:05 (77)
	21:08	56	07:56 (75)	20:48			20:05			19:14	48	09:07 (76)	17:30			17:10	29	08:34 (77)
5	06:11		07:00 (75)	06:36			07:06			07:35		08:18 (76)	07:08			07:41		08:05 (77)
	21:08	55	07:55 (75)	20:47			20:03			19:12	49	09:07 (76)	17:29			17:09	29	08:34 (77)
6	06:12		07:01 (75)	06:37		07:17 (74)	07:07			07:36		08:18 (76)	07:09			07:42		08:06 (77)
	21:08	54	07:55 (75)	20:45	7	07:24 (74)	20:01			19:10	49	09:07 (76)	17:28			17:09	28	08:34 (77)
7	06:12		07:01 (75)	06:38		07:15 (74)	07:08			07:37		08:17 (76)	07:10			07:43		08:07 (77)
	21:07	54	07:55 (75)	20:44	12	07:27 (74)	20:00			19:09	50	09:07 (76)	17:27			17:09	27	08:34 (77)
8	06:13		07:02 (75)	06:39		07:13 (74)	07:09			07:38		08:17 (76)	07:12		08:07 (77)	07:44		08:08 (77)
	21:07	53	07:55 (75)	20:43	15	07:28 (74)	19:57			19:07	50	09:07 (76)	17:25	12	08:19 (77)	17:09	26	08:34 (77)
9	06:14		07:03 (75)	06:40		07:12 (74)	07:10			07:39		08:17 (76)	07:13		08:04 (77)	07:45		08:09 (77)
	21:07	52	07:55 (75)	20:42	18	07:30 (74)	19:55			19:06	49	09:06 (76)	17:24	17	08:21 (77)	17:09	25	08:34 (77)
10	06:14		07:03 (75)	06:41		07:11 (74)	07:10			07:40		08:17 (76)	07:14		08:03 (77)	07:46		08:10 (77)
	21:06	51	07:54 (75)	20:41	20	07:31 (74)	19:53			19:04	49	09:06 (76)	17:23	21	08:24 (77)	17:09	25	08:35 (116)
11	06:15		07:04 (75)	06:42		07:10 (74)	07:11			07:41		08:17 (76)	07:15		08:02 (77)	07:47		08:11 (77)
	21:06	50	07:54 (75)	20:39	21	07:31 (74)	19:52			19:03	48	09:05 (76)	17:23	23	08:25 (77)	17:09	24	08:35 (77)
12	06:16		07:05 (75)	06:43		07:09 (74)	07:12			07:42		08:17 (76)	07:16		08:01 (77)	07:47		08:11 (77)
	21:06	48	07:53 (75)	20:38	23	07:32 (74)	19:50			19:01	47	09:04 (76)	17:22	25	08:26 (77)	17:09	24	08:35 (116)
13	06:16		07:05 (75)	06:44		07:09 (74)	07:13			07:43		08:18 (76)	07:17		08:00 (77)	07:48		08:12 (77)
	21:05	47	07:52 (75)	20:37	23	07:32 (74)	19:48			18:59	47	09:05 (76)	17:21	27	08:27 (77)	17:10	24	08:36 (116)
14	06:17		07:07 (75)	06:45		07:08 (74)	07:14			07:44		08:19 (76)	07:19		08:00 (77)	07:49		08:13 (77)
	21:05	45	07:52 (75)	20:36	24	07:32 (74)	19:47			18:58	45	09:04 (76)	17:20	28	08:28 (77)	17:10	24	08:37 (116)
15	06:18		07:08 (75)	06:46		07:08 (74)	07:15			07:45		08:19 (76)	07:20		07:59 (77)	07:50		08:14 (77)
	21:04	43	07:51 (75)	20:34	25	07:33 (74)	19:45			18:56	43	09:02 (76)	17:19	30	08:29 (77)	17:10	23	08:37 (116)
16	06:19		07:08 (75)	06:47		07:07 (74)	07:16			07:46		08:20 (76)	07:21		07:59 (77)	07:50		08:14 (77)
	21:04	42	07:50 (75)	20:33	24	07:31 (74)	19:43			18:55	41	09:01 (76)	17:18	30	08:29 (77)	17:10	23	08:37 (116)
17	06:19		07:10 (75)	06:48		07:08 (74)	07:17			07:47		08:20 (76)	07:22		07:58 (77)	07:51		08:15 (77)
	21:03	39	07:49 (75)	20:32	23	07:31 (74)	19:42			18:53	40	09:00 (76)	17:17	32	08:30 (77)	17:11	23	08:38 (116)
18	06:20		07:11 (75)	06:49		07:09 (74)	07:18			07:48		08:21 (76)	07:23		07:58 (77)	07:52		08:16 (77)
	21:02	37	07:48 (75)	20:30	22	07:31 (74)	19:40			18:52	37	08:58 (76)	17:17	32	08:30 (77)	17:11	23	08:39 (116)
19	06:21		07:13 (75)	06:49		07:10 (74)	07:19			07:49		08:22 (76)	07:24		07:59 (77)	07:52		08:15 (116)
	21:02	34	07:47 (75)	20:29	20	07:30 (74)	19:38			18:51	35	08:57 (76)	17:16	33	08:32 (77)	17:11	24	08:39 (116)
20	06:22		07:15 (75)	06:50		07:11 (74)	07:20			07:50		08:24 (76)	07:25		07:59 (77)	07:53		08:16 (116)
	21:01	31	07:46 (75)	20:27	19	07:30 (74)	19:37			18:49	31	08:55 (76)	17:15	33	08:32 (77)	17:12	24	08:40 (116)
21	06:23		07:16 (75)	06:51		07:12 (74)	07:21		08:46 (76)	07:51		08:26 (76)	07:27		07:59 (77)	07:53		08:16 (116)
	21:00	27	07:43 (75)	20:26	17	07:29 (74)	19:35	2	08:47 (76)	18:48	26	08:52 (76)	17:15	33	08:32 (77)	17:12	24	08:40 (116)
22	06:23		07:19 (75)	06:52		07:13 (74)	07:22		08:38 (76)	07:52		08:29 (76)	07:28		07:59 (77)	07:54		08:17 (116)
	21:00	22	07:41 (75)	20:25	14	07:27 (74)	19:33	17	08:55 (76)	18:46	21	08:50 (76)	17:14	33	08:32 (77)	17:13	24	08:41 (116)
23	06:24		07:22 (75)	06:53		07:14 (74)	07:23		08:34 (76)	07:53		08:32 (76)	07:29		07:59 (77)	07:54		08:17 (116)
	20:59	16	07:38 (75)	20:23	12	07:26 (74)	19:32	24	08:58 (76)	18:45	14	08:46 (76)	17:13	33	08:32 (77)	17:13	24	08:41 (116)
24	06:25			06:54		07:15 (74)	07:24		08:32 (76)	07:55			07:30		08:00 (77)	07:55		08:18 (116)
	20:58			20:22	8	07:23 (74)	19:30	28	09:00 (76)	18:44			17:13	33	08:33 (77)	17:14	24	08:42 (116)
25	06:26			06:55			07:25		08:29 (76)	07:56			07:31		08:00 (77)	07:55		08:19 (77)
	20:57			20:20			19:28	32	09:01 (76)	18:42			17:12	33	08:33 (77)	17:14	23	08:42 (116)
26	06:27			06:56			07:26		08:27 (76)	07:57			07:32		08:00 (77)	07:56		08:19 (77)
	20:57			20:19			19:27	36	09:03 (76)	18:41			17:12	33	08:33 (77)	17:15	23	08:42 (116)
27	06:28			06:57			07:27		08:26 (76)	07:58			07:33		08:01 (77)	07:56		08:20 (77)
	20:56			20:17			19:25	38	09:04 (76)	18:40			17:12	32	08:33 (77)	17:16	23	08:43 (116)
28	06:29			06:58			07:28		08:24 (76)	07:59			07:34		08:01 (77)	07:56		08:20 (77)
	20:55			20:16			19:23	41	09:05 (76)	18:38			17:11	32	08:33 (77)	17:16	23	08:43 (116)
29	06:30			06:59			07:29		08:23 (76)	08:00			07:35		08:02 (77)	07:57		08:20 (77)
	20:54			20:14			19:22	43	09:06 (76)	18:37			17:11	32	08:34 (77)	17:17	24	08:44 (116)
30	06:30			07:00			07:30		08:22 (76)	08:01			07:36		08:02 (77)	07:57		08:20 (77)
	20:53			20:13			19:20	44	09:06 (76)	18:36			17:10	32	08:34 (77)	17:18	24	08:44 (116)
31	06:31			07:01						08:02						07:57		08:20 (77)
	20:52			20:11						18:34						17:19	24	08:44 (116)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		1028			347			305			960			669			777	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.68			0.67			0.63			0.63			0.60			0.61	
Total reduction		0.41			0.40			0.38			0.35			0.22			0.30	
Total, real		418			138			117			338			148			234	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

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4/30/2012 9:43 AM / 54

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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 794 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5726)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:21 (77)	07:45		08:34 (77)	07:10		07:45 (76)	07:20			06:36		06:56 (74)	06:08		
	17:20	26	08:47 (77)	17:53	22	08:56 (77)	18:26	47	08:32 (76)	19:59			20:28	26	07:22 (74)	20:57		
2	07:58		08:21 (77)	07:44		08:36 (77)	07:08		07:44 (76)	07:19			06:34		06:57 (74)	06:08		
	17:20	27	08:48 (77)	17:54	18	08:54 (77)	18:27	49	08:33 (76)	20:00			20:29	25	07:22 (74)	20:58		
3	07:58		08:21 (77)	07:43		08:38 (77)	07:07		07:44 (76)	07:17			06:33		06:57 (74)	06:07		
	17:21	27	08:48 (77)	17:56	14	08:52 (77)	18:28	49	08:33 (76)	20:00			20:30	24	07:21 (74)	20:58		
4	07:58		08:21 (77)	07:42		08:42 (77)	07:05		07:42 (76)	07:15			06:32		06:57 (74)	06:07		
	17:22	28	08:49 (77)	17:57	6	08:48 (77)	18:29	51	08:33 (76)	20:01			20:31	24	07:21 (74)	20:59		
5	07:58		08:21 (77)	07:41			07:04		07:42 (76)	07:14			06:31		06:57 (74)	06:07		
	17:23	29	08:50 (77)	17:58			18:30	52	08:34 (76)	20:02			20:32	23	07:20 (74)	21:00		
6	07:58		08:21 (77)	07:40			07:02		07:41 (76)	07:12			06:30		06:58 (74)	06:06		
	17:24	30	08:51 (77)	17:59			18:32	53	08:34 (76)	20:03			20:33	21	07:19 (74)	21:01		
7	07:58		08:22 (77)	07:39			07:01		07:41 (76)	07:11			06:29		06:59 (74)	06:06		
	17:25	30	08:52 (77)	18:00			18:33	53	08:34 (76)	20:04			20:34	19	07:18 (74)	21:01		
8	07:58		08:22 (77)	07:37			07:59		08:41 (76)	07:09			06:27		07:00 (74)	06:06		
	17:26	31	08:53 (77)	18:02			19:34	53	09:34 (76)	20:05			20:35	17	07:17 (74)	21:02		
9	07:57		08:22 (77)	07:36			07:57		08:40 (76)	07:07			06:26		07:01 (74)	06:06		
	17:27	32	08:54 (77)	18:03			19:35	53	09:33 (76)	20:06			20:36	14	07:15 (74)	21:02		
10	07:57		08:22 (77)	07:35			07:56		08:40 (76)	07:06			06:25		07:03 (74)	06:05		
	17:28	33	08:55 (77)	18:04			19:36	53	09:33 (76)	20:07			20:37	10	07:13 (74)	21:03		
11	07:57		08:22 (77)	07:34			07:54		08:40 (76)	07:04			06:24		07:07 (74)	06:05		
	17:29	33	08:55 (77)	18:05			19:37	52	09:32 (76)	20:08			20:38	2	07:09 (74)	21:03		
12	07:57		08:22 (77)	07:33			07:53		08:40 (76)	07:03			06:23			06:05		
	17:30	33	08:55 (77)	18:06			19:38	52	09:32 (76)	20:09			20:39			21:04		
13	07:56		08:23 (77)	07:32			07:51		08:40 (76)	07:01			06:22			06:05		07:14 (75)
	17:31	33	08:56 (77)	18:08			19:39	51	09:31 (76)	20:10			20:40			21:04	3	07:17 (75)
14	07:56		08:22 (77)	07:30			07:49		08:40 (76)	07:00			06:21			06:05		07:11 (75)
	17:32	34	08:56 (77)	18:09			19:40	50	09:30 (76)	20:11			20:41			21:05	9	07:20 (75)
15	07:56		08:23 (77)	07:29			07:48		08:41 (76)	06:58			06:20			06:05		07:10 (75)
	17:33	34	08:57 (77)	18:10			19:41	49	09:30 (76)	20:12			20:42			21:05	12	07:22 (75)
16	07:55		08:23 (77)	07:28			07:46		08:41 (76)	06:57			06:19			06:05		07:09 (75)
	17:34	34	08:57 (77)	18:11			19:42	47	09:28 (76)	20:13			20:43			21:06	14	07:23 (75)
17	07:55		08:23 (77)	07:27			07:45		08:41 (76)	06:55			06:18			06:05		07:08 (75)
	17:35	35	08:58 (77)	18:12			19:43	46	09:27 (76)	20:14			20:44			21:06	16	07:24 (75)
18	07:55		08:23 (77)	07:25			07:43		08:42 (76)	06:54			06:17			06:05		07:08 (75)
	17:37	35	08:58 (77)	18:14			19:44	44	09:26 (76)	20:15			20:45			21:07	17	07:25 (75)
19	07:54		08:24 (77)	07:24			07:41		08:42 (76)	06:52			06:17			06:05		07:07 (75)
	17:38	35	08:59 (77)	18:15			19:45	42	09:24 (76)	20:16			20:46			21:07	18	07:25 (75)
20	07:54		08:24 (77)	07:23		08:04 (76)	07:40		08:43 (76)	06:51			06:16			06:06		07:07 (75)
	17:39	35	08:59 (77)	18:16	12	08:16 (76)	19:46	39	09:22 (76)	20:17			20:47			21:07	18	07:25 (75)
21	07:53		08:25 (77)	07:21		07:59 (76)	07:38		08:45 (76)	06:49		07:08 (74)	06:15			06:06		07:08 (75)
	17:40	35	09:00 (77)	18:17	21	08:20 (76)	19:47	36	09:21 (76)	20:18	6	07:14 (74)	20:48			21:07	19	07:27 (75)
22	07:52		08:25 (77)	07:20		07:56 (76)	07:36		08:46 (76)	06:48		07:07 (74)	06:14			06:06		07:08 (75)
	17:41	35	09:00 (77)	18:18	27	08:23 (76)	19:48	32	09:18 (76)	20:19	10	07:17 (74)	20:49			21:08	18	07:26 (75)
23	07:52		08:25 (77)	07:18		07:54 (76)	07:35		08:48 (76)	06:46		07:05 (74)	06:13			06:06		07:08 (75)
	17:42	34	08:59 (77)	18:19	32	08:26 (76)	19:50	28	09:16 (76)	20:20	13	07:18 (74)	20:50			21:08	18	07:26 (75)
24	07:51		08:25 (77)	07:17		07:52 (76)	07:33		08:50 (76)	06:45		07:04 (74)	06:13			06:06		07:09 (75)
	17:44	34	08:59 (77)	18:20	35	08:27 (76)	19:51	23	09:13 (76)	20:21	16	07:20 (74)	20:51			21:08	17	07:26 (75)
25	07:50		08:27 (77)	07:16		07:50 (76)	07:32		08:53 (76)	06:44		07:03 (74)	06:12			06:07		07:10 (75)
	17:45	33	09:00 (77)	18:22	39	08:29 (76)	19:52	15	09:08 (76)	20:22	18	07:21 (74)	20:51			21:08	16	07:26 (75)
26	07:50		08:27 (77)	07:14		07:48 (76)	07:30			06:42		07:01 (74)	06:11			06:07		07:11 (75)
	17:46	32	08:59 (77)	18:23	41	08:29 (76)	19:53			20:23	20	07:21 (74)	20:52			21:08	15	07:26 (75)
27	07:49		08:28 (77)	07:13		07:48 (76)	07:28			06:41		07:00 (74)	06:11			06:07		07:11 (75)
	17:47	31	08:59 (77)	18:24	43	08:31 (76)	19:54			20:24	22	07:22 (74)	20:53			21:08	13	07:24 (75)
28	07:48		08:28 (77)	07:11		07:46 (76)	07:27			06:40		06:59 (74)	06:10			06:08		07:13 (75)
	17:48	30	08:58 (77)	18:25	45	08:31 (76)	19:55			20:25	23	07:22 (74)	20:54			21:08	11	07:24 (75)
29	07:47		08:29 (77)				07:25			06:38		06:58 (74)	06:10			06:08		07:15 (75)
	17:50	29	08:58 (77)				19:56			20:26	25	07:23 (74)	20:55			21:08	7	07:22 (75)
30	07:46		08:30 (77)				07:23			06:37		06:56 (74)	06:09			06:09		
	17:51	27	08:57 (77)				19:57			20:27	26	07:22 (74)	20:55			21:08		
31	07:45		08:32 (77)				07:22						06:09					
	17:52	25	08:57 (77)				19:58						20:56					
Potential sun hours	300			299			370			397			446			449		
Total, worst case		979			355			1119			179			205			241	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.60			0.63			0.63			0.67			0.67			0.68	
Total reduction		0.22			0.26			0.28			0.34			0.37			0.41	
Total, real		212			93			310			61			77			98	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 794 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5726)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July	August			September			October			November			December		
1	06:09	06:32			07:02			07:31		08:19 (76)	07:04			07:37		08:04 (77)
	21:08	20:51			20:09			19:19	52	09:11 (76)	17:33			17:10	33	08:37 (77)
2	06:10	06:33		07:16 (74)	07:03			07:32		08:18 (76)	07:05			07:38		08:04 (77)
	21:08	20:50	6	07:22 (74)	20:08			19:17	53	09:11 (76)	17:32			17:10	33	08:37 (77)
3	06:10	06:34		07:13 (74)	07:04			07:33		08:18 (76)	07:06			07:39		08:05 (77)
	21:08	20:49	12	07:25 (74)	20:06			19:15	53	09:11 (76)	17:31			17:10	32	08:37 (77)
4	06:11	06:35		07:11 (74)	07:05			07:34		08:18 (76)	07:07			07:40		08:06 (77)
	21:08	20:48	16	07:27 (74)	20:05			19:14	52	09:10 (76)	17:30			17:10	31	08:37 (77)
5	06:11	06:36		07:09 (74)	07:06			07:35		08:17 (76)	07:08			07:41		08:07 (77)
	21:08	20:47	18	07:27 (74)	20:03			19:12	53	09:10 (76)	17:29			17:09	30	08:37 (77)
6	06:12	06:37		07:08 (74)	07:07			07:36		08:17 (76)	07:09			07:42		08:07 (77)
	21:08	20:45	20	07:28 (74)	20:01			19:10	53	09:10 (76)	17:28			17:09	30	08:37 (77)
7	06:12	06:38		07:07 (74)	07:08			07:37		08:17 (76)	07:10		08:11 (77)	07:43		08:08 (77)
	21:07	20:44	22	07:29 (74)	20:00			19:09	52	09:09 (76)	17:26	7	08:18 (77)	17:09	29	08:37 (77)
8	06:13	06:39		07:07 (74)	07:09			07:38		08:17 (76)	07:12		08:08 (77)	07:44		08:09 (77)
	21:07	20:43	22	07:29 (74)	19:57			19:07	52	09:09 (76)	17:25	14	08:22 (77)	17:09	28	08:37 (77)
9	06:14	06:40		07:06 (74)	07:10			07:39		08:17 (76)	07:13		08:05 (77)	07:45		08:10 (77)
	21:07	20:42	24	07:30 (74)	19:55			19:06	51	09:08 (76)	17:24	19	08:24 (77)	17:09	28	08:38 (77)
10	06:14	06:41		07:06 (74)	07:10			07:40		08:17 (76)	07:14		08:05 (77)	07:46		08:11 (77)
	21:06	20:41	24	07:30 (74)	19:53			19:04	50	09:07 (76)	17:23	22	08:27 (77)	17:09	27	08:38 (77)
11	06:15	06:42		07:05 (74)	07:11			07:41		08:17 (76)	07:15		08:03 (77)	07:47		08:12 (77)
	21:06	20:39	25	07:30 (74)	19:52			19:03	50	09:07 (76)	17:23	25	08:28 (77)	17:09	26	08:38 (77)
12	06:16	06:43		07:05 (74)	07:12			07:42		08:18 (76)	07:16		08:02 (77)	07:47		08:12 (77)
	21:06	20:38	25	07:30 (74)	19:50			19:01	48	09:06 (76)	17:22	27	08:29 (77)	17:09	25	08:37 (77)
13	06:16	06:44		07:05 (74)	07:13			07:43		08:19 (76)	07:17		08:01 (77)	07:48		08:13 (77)
	21:05	20:37	25	07:30 (74)	19:48			18:59	47	09:06 (76)	17:21	29	08:30 (77)	17:10	25	08:38 (77)
14	06:17	06:45		07:06 (74)	07:14			07:44		08:20 (76)	07:19		08:01 (77)	07:49		08:14 (77)
	21:05	20:36	24	07:30 (74)	19:47			18:58	44	09:04 (76)	17:20	30	08:31 (77)	17:10	24	08:38 (77)
15	06:18	06:46		07:07 (74)	07:15			07:45		08:20 (76)	07:20		08:01 (77)	07:50		08:15 (77)
	21:04	20:34	23	07:30 (74)	19:45			18:56	43	09:03 (76)	17:19	31	08:32 (77)	17:10	24	08:39 (77)
16	06:19	06:47		07:07 (74)	07:16			07:46		08:21 (76)	07:21		08:00 (77)	07:50		08:15 (77)
	21:04	20:33	21	07:28 (74)	19:43			18:55	41	09:02 (76)	17:18	32	08:32 (77)	17:10	24	08:39 (116)
17	06:19	06:48		07:08 (74)	07:17			07:47		08:23 (76)	07:22		08:00 (77)	07:51		08:16 (77)
	21:03	20:32	20	07:28 (74)	19:42			18:53	37	09:00 (76)	17:17	33	08:33 (77)	17:11	24	08:40 (116)
18	06:20	06:49		07:09 (74)	07:18		08:43 (76)	07:48		08:24 (76)	07:23		07:59 (77)	07:52		08:17 (77)
	21:02	20:30	18	07:27 (74)	19:40	12	08:55 (76)	18:52	34	08:58 (76)	17:17	34	08:33 (77)	17:11	24	08:41 (116)
19	06:21	06:49		07:10 (74)	07:19		08:38 (76)	07:49		08:25 (76)	07:24		08:00 (77)	07:52		08:17 (77)
	21:02	20:29	16	07:26 (74)	19:38	21	08:59 (76)	18:51	31	08:56 (76)	17:16	34	08:34 (77)	17:11	24	08:41 (116)
20	06:22	06:50		07:11 (74)	07:20		08:35 (76)	07:50		08:27 (76)	07:25		08:00 (77)	07:53		08:18 (77)
	21:01	20:27	13	07:24 (74)	19:37	27	09:02 (76)	18:49	26	08:53 (76)	17:15	35	08:35 (77)	17:12	24	08:42 (116)
21	06:23	06:51		07:12 (74)	07:21		08:32 (76)	07:51		08:30 (76)	07:27		08:00 (77)	07:53		08:18 (77)
	21:00	20:26	10	07:22 (74)	19:35	31	09:03 (76)	18:48	20	08:50 (76)	17:15	35	08:35 (77)	17:12	24	08:42 (116)
22	06:23	06:52		07:13 (74)	07:22		08:30 (76)	07:52		08:36 (76)	07:28		08:00 (77)	07:54		08:19 (77)
	21:00	20:25	5	07:18 (74)	19:33	35	09:05 (76)	18:46	9	08:45 (76)	17:14	35	08:35 (77)	17:13	24	08:43 (116)
23	06:24	06:53			07:23		08:28 (76)	07:53			07:29		08:00 (77)	07:54		08:19 (77)
	20:59	20:23			19:32	38	09:06 (76)	18:45			17:13	35	08:35 (77)	17:13	24	08:43 (116)
24	06:25	06:54			07:24		08:26 (76)	07:55			07:30		08:01 (77)	07:55		08:20 (77)
	20:58	20:22			19:30	41	09:07 (76)	18:44			17:13	35	08:36 (77)	17:14	24	08:44 (116)
25	06:26	06:55			07:25		08:25 (76)	07:56			07:31		08:01 (77)	07:55		08:20 (77)
	20:57	20:20			19:28	43	09:08 (76)	18:42			17:12	35	08:36 (77)	17:14	24	08:44 (116)
26	06:27	06:56			07:26		08:24 (76)	07:57			07:32		08:02 (77)	07:56		08:20 (77)
	20:57	20:19			19:27	45	09:09 (76)	18:41			17:12	34	08:36 (77)	17:15	24	08:44 (116)
27	06:28	06:57			07:27		08:22 (76)	07:58			07:33		08:02 (77)	07:56		08:21 (77)
	20:56	20:17			19:25	47	09:09 (76)	18:40			17:12	34	08:36 (77)	17:16	24	08:45 (116)
28	06:29	06:58			07:28		08:21 (76)	07:59			07:34		08:02 (77)	07:56		08:21 (77)
	20:55	20:16			19:23	49	09:10 (76)	18:38			17:11	34	08:36 (77)	17:16	24	08:45 (77)
29	06:30	06:59			07:29		08:21 (76)	08:00			07:35		08:03 (77)	07:57		08:21 (77)
	20:54	20:14			19:22	49	09:10 (76)	18:37			17:11	34	08:37 (77)	17:17	24	08:45 (77)
30	06:30	07:00			07:30		08:20 (76)	08:01			07:36		08:03 (77)	07:57		08:21 (77)
	20:53	20:13			19:20	50	09:10 (76)	18:36			17:10	34	08:37 (77)	17:18	25	08:46 (77)
31	06:31	07:01						08:02						07:57		08:21 (77)
	20:52	20:11						18:34						17:19	25	08:46 (77)
Potential sun hours	456	427			374			346			300			291		
Total, worst case			389			488			951			717			811	
Sun reduction			0.60			0.61			0.56			0.37			0.50	
Oper. time red.			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.			0.67			0.63			0.63			0.60			0.61	
Total reduction			0.40			0.38			0.35			0.22			0.30	
Total, real			156			188			336			160			245	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 56

Licensed user:
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217 Montgomery St.
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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 795 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5727)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57			07:45		16:39 (105)	07:10		07:46 (116)	07:20		08:09 (77)	06:36			06:08		06:38 (76)
	17:20			17:53	38	17:17 (105)	18:26	9	07:55 (116)	19:59	16	08:25 (77)	20:28			20:57	43	07:21 (76)
2	07:58			07:44		16:40 (105)	07:08			07:19		08:12 (77)	06:34			06:08		06:38 (76)
	17:20			17:54	37	17:17 (105)	18:27			20:00	8	08:20 (77)	20:29			20:58	44	07:22 (76)
3	07:58			07:43		16:40 (105)	07:07			07:17			06:33			06:07		06:39 (76)
	17:21			17:56	36	17:16 (105)	18:28			20:00			20:30			20:58	43	07:22 (76)
4	07:58			07:42		16:41 (105)	07:05			07:15			06:32			06:07		06:38 (76)
	17:22			17:57	35	17:16 (105)	18:29			20:01			20:31			20:59	44	07:22 (76)
5	07:58			07:41		16:41 (105)	07:04			07:14			06:31			06:07		06:38 (76)
	17:23			17:58	34	17:15 (105)	18:30			20:02			20:32			21:00	45	07:23 (76)
6	07:58			07:40		16:41 (105)	07:02			07:12			06:30			06:06		06:38 (76)
	17:24			17:59	33	17:14 (105)	18:32			20:03			20:33			21:01	45	07:23 (76)
7	07:58			07:39		16:42 (105)	07:01			07:11			06:29			06:06		06:38 (76)
	17:25			18:00	32	17:14 (105)	18:33			20:04			20:34			21:01	46	07:24 (76)
8	07:58			07:37		16:44 (105)	07:59			07:09			06:27			06:06		06:38 (76)
	17:26			18:02	29	17:13 (105)	19:34			20:05			20:35			21:02	45	07:23 (76)
9	07:57		16:47 (105)	07:36		16:45 (105)	07:57			07:07			06:26			06:06		06:38 (76)
	17:27	7	16:54 (105)	18:03	27	17:12 (105)	19:35			20:06			20:36			21:02	46	07:24 (76)
10	07:57		16:45 (105)	07:35		16:47 (105)	07:56			07:06			06:25			06:05		06:38 (76)
	17:28	12	16:57 (105)	18:04	24	17:11 (105)	19:36			20:07			20:37			21:03	46	07:24 (76)
11	07:57		16:43 (105)	07:34		16:49 (105)	07:54		08:17 (77)	07:04			06:24			06:05		06:38 (76)
	17:29	16	16:59 (105)	18:05	21	17:10 (105)	19:37	13	08:30 (77)	20:08			20:38			21:03	47	07:25 (76)
12	07:57		16:43 (105)	07:33		16:50 (105)	07:53		08:14 (77)	07:03			06:23			06:05		06:38 (76)
	17:30	18	17:01 (105)	18:06	17	17:07 (105)	19:38	19	08:33 (77)	20:09			20:39			21:04	47	07:25 (76)
13	07:56		16:42 (105)	07:32		07:51 (116)	07:51		08:12 (77)	07:01			06:22			06:05		06:38 (76)
	17:31	21	17:03 (105)	18:08	16	17:04 (105)	19:39	23	08:35 (77)	20:10			20:40			21:04	48	07:26 (76)
14	07:56		16:41 (105)	07:30		07:50 (116)	07:49		08:09 (77)	07:00			06:21			06:05		06:39 (76)
	17:32	23	17:04 (105)	18:09	10	08:00 (116)	19:40	27	08:36 (77)	20:11			20:41			21:05	47	07:26 (76)
15	07:56		16:41 (105)	07:29		07:49 (116)	07:48		08:08 (77)	06:58			06:20			06:05		06:39 (76)
	17:33	24	17:05 (105)	18:10	12	08:01 (116)	19:41	29	08:37 (77)	20:12			20:42			21:05	47	07:26 (76)
16	07:55		16:40 (105)	07:28		07:47 (116)	07:46		08:07 (77)	06:57			06:19			06:05		06:39 (76)
	17:34	26	17:06 (105)	18:11	15	08:02 (116)	19:42	31	08:38 (77)	20:13			20:43			21:06	47	07:26 (76)
17	07:55		16:40 (105)	07:27		07:46 (116)	07:45		08:05 (77)	06:55			06:18		06:54 (76)	06:05		06:39 (76)
	17:35	28	17:08 (105)	18:12	17	08:03 (116)	19:43	33	08:38 (77)	20:14			20:44	9	07:03 (76)	21:06	47	07:26 (76)
18	07:55		16:39 (105)	07:25		07:45 (116)	07:43		08:05 (77)	06:54			06:17		06:51 (76)	06:05		06:39 (76)
	17:37	29	17:08 (105)	18:14	19	08:04 (116)	19:44	34	08:39 (77)	20:15			20:45	16	07:07 (76)	21:07	48	07:27 (76)
19	07:54		16:39 (105)	07:24		07:43 (116)	07:41		08:04 (77)	06:52			06:17		06:48 (76)	06:05		06:39 (76)
	17:38	31	17:10 (105)	18:15	21	08:04 (116)	19:45	35	08:39 (77)	20:16			20:46	21	07:09 (76)	21:07	48	07:27 (76)
20	07:53		16:38 (105)	07:23		07:42 (116)	07:40		08:03 (77)	06:51			06:16		06:46 (76)	06:06		06:39 (76)
	17:39	32	17:10 (105)	18:16	22	08:04 (116)	19:46	35	08:38 (77)	20:17			20:47	25	07:11 (76)	21:07	48	07:27 (76)
21	07:53		16:39 (105)	07:21		07:40 (116)	07:38		08:03 (77)	06:49			06:15		06:45 (76)	06:06		06:40 (76)
	17:40	33	17:12 (105)	18:17	24	08:04 (116)	19:47	36	08:39 (77)	20:18			20:48	27	07:12 (76)	21:07	48	07:28 (76)
22	07:52		16:38 (105)	07:20		07:39 (116)	07:36		08:02 (77)	06:48			06:14		06:44 (76)	06:06		06:40 (76)
	17:41	34	17:12 (105)	18:18	25	08:04 (116)	19:49	36	08:38 (77)	20:19			20:49	30	07:14 (76)	21:08	48	07:28 (76)
23	07:52		16:38 (105)	07:18		07:39 (116)	07:35		08:03 (77)	06:46			06:13		06:43 (76)	06:06		06:40 (76)
	17:42	35	17:13 (105)	18:19	25	08:04 (116)	19:50	35	08:38 (77)	20:20			20:50	31	07:14 (76)	21:08	48	07:28 (76)
24	07:51		16:37 (105)	07:17		07:39 (116)	07:33		08:02 (77)	06:45			06:13		06:42 (76)	06:06		06:40 (76)
	17:44	36	17:13 (105)	18:20	24	08:03 (116)	19:51	35	08:37 (77)	20:21			20:51	33	07:15 (76)	21:08	48	07:28 (76)
25	07:50		16:38 (105)	07:16		07:40 (116)	07:32		08:02 (77)	06:44			06:12		06:42 (76)	06:07		06:41 (76)
	17:45	36	17:14 (105)	18:22	22	08:02 (116)	19:52	34	08:36 (77)	20:22			20:51	35	07:17 (76)	21:08	47	07:28 (76)
26	07:50		16:38 (105)	07:14		07:40 (116)	07:30		08:03 (77)	06:42			06:11		06:41 (76)	06:07		06:41 (76)
	17:46	37	17:15 (105)	18:23	21	08:01 (116)	19:53	33	08:36 (77)	20:23			20:52	36	07:17 (76)	21:08	47	07:28 (76)
27	07:49		16:38 (105)	07:13		07:42 (116)	07:28		08:03 (77)	06:41			06:11		06:41 (76)	06:07		06:41 (76)
	17:47	37	17:15 (105)	18:24	18	08:00 (116)	19:54	32	08:35 (77)	20:24			20:53	37	07:18 (76)	21:08	47	07:28 (76)
28	07:48		16:38 (105)	07:11		07:43 (116)	07:27		08:03 (77)	06:40			06:10		06:40 (76)	06:08		06:42 (76)
	17:48	37	17:15 (105)	18:25	14	07:57 (116)	19:55	30	08:33 (77)	20:25			20:54	39	07:19 (76)	21:08	47	07:29 (76)
29	07:47		16:38 (105)				07:25		08:04 (77)	06:38			06:10		06:40 (76)	06:08		06:41 (76)
	17:50	37	17:15 (105)				19:56	28	08:32 (77)	20:26			20:55	40	07:20 (76)	21:08	48	07:29 (76)
30	07:46		16:38 (105)				07:23		08:05 (77)	06:37			06:09		06:39 (76)	06:09		06:42 (76)
	17:51	38	17:16 (105)				19:57	25	08:30 (77)	20:27			20:55	41	07:20 (76)	21:08	47	07:29 (76)
31	07:45		16:39 (105)				07:22		08:06 (77)				06:09		06:39 (76)			
	17:52	38	17:17 (105)				19:58	21	08:27 (77)				20:56	42	07:21 (76)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		665			668			633			24			462			1396	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.68			0.66			0.65			0.65			0.68			0.68	
Total reduction		0.24			0.28			0.28			0.33			0.38			0.41	
Total, real		163			185			180			8			177			572	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 57

Licensed user:
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217 Montgomery St.
US-SYRACUSE, NY 13202
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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 795 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5727)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:42 (76)	06:32			07:02			07:31		07:52 (77)	07:04		16:15 (105)	07:37		16:25 (105)
	21:08	47	07:29 (76)	20:51			20:09			19:19	21	08:13 (77)	17:33	25	16:40 (105)	17:10	16	16:41 (105)
2	06:10		06:43 (76)	06:33			07:03			07:32		07:54 (77)	07:05		16:15 (105)	07:38		16:27 (105)
	21:08	47	07:30 (76)	20:50			20:08			19:17	16	08:10 (77)	17:32	27	16:42 (105)	17:10	13	16:40 (105)
3	06:10		06:43 (76)	06:34			07:04			07:33		07:59 (77)	07:06		16:13 (105)	07:39		16:30 (105)
	21:08	46	07:29 (76)	20:49			20:06			19:15	6	08:05 (77)	17:31	30	16:43 (105)	17:10	8	16:38 (105)
4	06:11		06:44 (76)	06:35			07:05			07:34			07:07		16:12 (105)	07:40		
	21:08	46	07:30 (76)	20:48			20:05			19:14			17:30	32	16:44 (105)	17:10		
5	06:11		06:43 (76)	06:36			07:06			07:35			07:08		16:11 (105)	07:41		
	21:08	46	07:29 (76)	20:47			20:03			19:12			17:29	33	16:44 (105)	17:09		
6	06:12		06:44 (76)	06:37			07:07			07:36			07:09		16:11 (105)	07:42		
	21:08	46	07:30 (76)	20:45			20:01			19:10			17:28	35	16:46 (105)	17:09		
7	06:12		06:44 (76)	06:38			07:08			07:37			07:10		16:11 (105)	07:43		
	21:07	45	07:29 (76)	20:44			20:00			19:09			17:27	35	16:46 (105)	17:09		
8	06:13		06:45 (76)	06:39			07:09			07:38			07:12		16:10 (105)	07:44		
	21:07	44	07:29 (76)	20:43			19:57			19:07			17:25	36	16:46 (105)	17:09		
9	06:14		06:46 (76)	06:40			07:10			07:39			07:13		16:10 (105)	07:45		
	21:07	44	07:30 (76)	20:42			19:55			19:06			17:24	36	16:46 (105)	17:09		
10	06:14		06:45 (76)	06:41			07:10		08:06 (77)	07:40			07:14		16:10 (105)	07:46		
	21:06	44	07:29 (76)	20:41			19:53	7	08:13 (77)	19:04			17:23	38	16:48 (105)	17:09		
11	06:15		06:46 (76)	06:42			07:11		08:01 (77)	07:41			07:15		16:10 (105)	07:47		
	21:06	43	07:29 (76)	20:39			19:52	16	08:17 (77)	19:03			17:23	38	16:48 (105)	17:09		
12	06:16		06:47 (76)	06:43			07:12		07:59 (77)	07:42			07:16		16:10 (105)	07:47		
	21:06	42	07:29 (76)	20:38			19:50	20	08:19 (77)	19:01			17:22	37	16:47 (105)	17:09		
13	06:16		06:47 (76)	06:44			07:13		07:57 (77)	07:43		08:18 (116)	07:17		16:10 (105)	07:48		
	21:05	41	07:28 (76)	20:37			19:48	24	08:21 (77)	18:59	11	08:29 (116)	17:21	37	16:47 (105)	17:10		
14	06:17		06:48 (76)	06:45			07:14		07:55 (77)	07:44		08:16 (116)	07:19		16:11 (105)	07:49		
	21:05	40	07:28 (76)	20:36			19:47	27	08:22 (77)	18:58	16	08:32 (116)	17:20	37	16:48 (105)	17:10		
15	06:18		06:49 (76)	06:46			07:15		07:53 (77)	07:45		08:14 (116)	07:20		16:11 (105)	07:50		
	21:04	39	07:28 (76)	20:34			19:45	30	08:23 (77)	18:56	19	08:33 (116)	17:19	37	16:48 (105)	17:10		
16	06:19		06:49 (76)	06:47			07:16		07:52 (77)	07:46		08:12 (116)	07:21		16:11 (105)	07:50		
	21:04	38	07:27 (76)	20:33			19:43	32	08:24 (77)	18:55	22	08:34 (116)	17:18	37	16:48 (105)	17:10		
17	06:19		06:50 (76)	06:48			07:17		07:51 (77)	07:47		08:11 (116)	07:22		16:11 (105)	07:51		
	21:03	37	07:27 (76)	20:32			19:42	33	08:24 (77)	18:53	23	08:34 (116)	17:17	36	16:47 (105)	17:11		
18	06:20		06:51 (76)	06:49			07:18		07:50 (77)	07:48		08:10 (116)	07:23		16:11 (105)	07:52		
	21:02	35	07:26 (76)	20:30			19:40	34	08:24 (77)	18:52	24	08:34 (116)	17:17	36	16:47 (105)	17:11		
19	06:21		06:52 (76)	06:49			07:19		07:49 (77)	07:49		08:10 (116)	07:24		16:13 (105)	07:52		
	21:02	34	07:26 (76)	20:29			19:38	36	08:25 (77)	18:51	25	08:35 (116)	17:16	35	16:48 (105)	17:11		
20	06:22		06:53 (76)	06:50			07:20		07:49 (77)	07:50		08:10 (116)	07:25		16:13 (105)	07:53		
	21:01	32	07:25 (76)	20:27			19:37	36	08:25 (77)	18:49	24	08:34 (116)	17:15	34	16:47 (105)	17:12		
21	06:23		06:53 (76)	06:51			07:21		07:47 (77)	07:51		08:11 (116)	07:27		16:14 (105)	07:53		
	21:00	31	07:24 (76)	20:26			19:35	36	08:23 (77)	18:48	23	08:34 (116)	17:15	33	16:47 (105)	17:12		
22	06:23		06:54 (76)	06:52			07:22		07:47 (77)	07:52		08:13 (116)	07:28		16:14 (105)	07:54		
	21:00	29	07:23 (76)	20:25			19:33	36	08:23 (77)	18:46	22	08:35 (116)	17:14	32	16:46 (105)	17:13		
23	06:24		06:56 (76)	06:53			07:23		07:47 (77)	07:53		08:14 (116)	07:29		16:15 (105)	07:54		
	20:59	26	07:22 (76)	20:23			19:32	36	08:23 (77)	18:45	20	08:34 (116)	17:13	31	16:46 (105)	17:13		
24	06:25		06:58 (76)	06:54			07:24		07:47 (77)	07:55		08:15 (116)	07:30		16:17 (105)	07:55		
	20:58	22	07:20 (76)	20:22			19:30	35	08:22 (77)	18:44	18	08:33 (116)	17:13	29	16:46 (105)	17:14		
25	06:26		07:00 (76)	06:55			07:25		07:47 (77)	07:56		08:16 (116)	07:31		16:18 (105)	07:55		
	20:57	19	07:19 (76)	20:20			19:28	35	08:22 (77)	18:42	17	08:33 (116)	17:12	28	16:46 (105)	17:14		
26	06:27		07:03 (76)	06:56			07:26		07:47 (77)	07:57		08:17 (116)	07:32		16:19 (105)	07:56		
	20:57	13	07:16 (76)	20:19			19:27	34	08:21 (77)	18:41	14	08:31 (116)	17:12	26	16:45 (105)	17:15		
27	06:28		07:08 (76)	06:57			07:27		07:48 (77)	07:58		08:18 (116)	07:33		16:20 (105)	07:56		
	20:56	2	07:09 (76)	20:17			19:25	32	08:20 (77)	18:40	12	08:30 (116)	17:12	24	16:44 (105)	17:16		
28	06:29			06:58			07:28		07:48 (77)	07:59		08:20 (116)	07:34		16:21 (105)	07:56		
	20:55			20:16			19:23	30	08:18 (77)	18:38	9	08:29 (116)	17:11	23	16:44 (105)	17:16		
29	06:30			06:59			07:29		07:49 (77)	08:00		08:21 (116)	07:35		16:22 (105)	07:57		
	20:54			20:14			19:22	28	08:17 (77)	18:37	16	17:34 (105)	17:11	21	16:43 (105)	17:17		
30	06:30			07:00			07:30		07:50 (77)	08:01		17:19 (105)	07:36		16:24 (105)	07:57		
	20:53			20:13			19:20	25	08:15 (77)	18:36	18	17:37 (105)	17:10	18	16:42 (105)	17:18		
31	06:31			07:01						08:02		17:17 (105)				07:57		
	20:52			20:11						18:34	22	17:39 (105)				17:19		
Potential sun hours	456			427			374			346			300			291		
Total, worst case		978						622			398			956			37	
Sun reduction		0.60						0.61			0.56			0.37			0.50	
Oper. time red.		1.00						1.00			1.00			1.00			1.00	
Wind dir. red.		0.68						0.65			0.64			0.68			0.68	
Total reduction		0.41						0.39			0.36			0.25			0.34	
Total, real		401						245			143			241			13	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 58

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 799 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5729)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:35 (72)	07:45		08:45 (72)	07:10			07:20		18:53 (117)	06:36			06:08		19:49 (74)
	17:20	54	09:29 (72)	17:53	53	09:38 (72)	18:26			19:59	36	19:29 (117)	20:28			20:57	25	20:14 (74)
2	07:57		08:35 (72)	07:44		08:46 (72)	07:08			07:18		18:52 (117)	06:34			06:08		19:50 (74)
	17:20	55	09:30 (72)	17:54	51	09:37 (72)	18:27			20:00	37	19:29 (117)	20:29			20:58	24	20:14 (74)
3	07:58		08:35 (72)	07:43		08:47 (72)	07:07			07:17		18:51 (117)	06:33			06:07		19:50 (74)
	17:21	55	09:30 (72)	17:55	49	09:36 (72)	18:28			20:00	39	19:30 (117)	20:30			20:58	24	20:14 (74)
4	07:58		08:35 (72)	07:42		08:48 (72)	07:05			07:15		18:50 (117)	06:32			06:07		19:50 (74)
	17:22	56	09:31 (72)	17:57	47	09:35 (72)	18:29			20:01	40	19:30 (117)	20:31			20:59	23	20:13 (74)
5	07:58		08:36 (72)	07:41		08:49 (72)	07:04			07:14		18:49 (117)	06:31			06:07		19:51 (74)
	17:23	56	09:32 (72)	17:58	46	09:35 (72)	18:30			20:02	41	19:30 (117)	20:32			21:00	22	20:13 (74)
6	07:58		08:36 (72)	07:40		08:50 (72)	07:02			07:12		18:49 (117)	06:30		19:54 (74)	06:06		19:52 (74)
	17:24	56	09:32 (72)	17:59	44	09:34 (72)	18:31			20:03	42	19:31 (117)	20:33	12	20:06 (74)	21:00	21	20:13 (74)
7	07:58		08:37 (72)	07:38		08:52 (72)	07:00			07:11		18:48 (117)	06:28		19:52 (74)	06:06		19:52 (74)
	17:25	56	09:33 (72)	18:00	40	09:32 (72)	18:33			20:04	42	19:30 (117)	20:34	16	20:08 (74)	21:01	20	20:12 (74)
8	07:57		08:37 (72)	07:37		08:53 (72)	07:59			07:09		18:48 (117)	06:27		19:50 (74)	06:06		19:53 (74)
	17:26	57	09:34 (72)	18:02	38	09:31 (72)	19:34			20:05	43	19:31 (117)	20:35	20	20:10 (74)	21:02	19	20:12 (74)
9	07:57		08:37 (72)	07:36		08:55 (72)	07:57			07:07		18:47 (117)	06:26		19:49 (74)	06:06		19:54 (74)
	17:27	58	09:35 (72)	18:03	35	09:30 (72)	19:35			20:06	43	19:30 (117)	20:36	22	20:11 (74)	21:02	18	20:12 (74)
10	07:57		08:37 (72)	07:35		08:57 (72)	07:56			07:06		18:47 (117)	06:25		19:48 (74)	06:05		19:55 (74)
	17:28	57	09:34 (72)	18:04	31	09:28 (72)	19:36			20:07	42	19:29 (117)	20:37	24	20:12 (74)	21:03	16	20:11 (74)
11	07:57		08:37 (72)	07:34		09:00 (72)	07:54			07:04		18:47 (117)	06:24		19:47 (74)	06:05		19:56 (74)
	17:29	58	09:35 (72)	18:05	26	09:26 (72)	19:37			20:08	42	19:29 (117)	20:38	26	20:13 (74)	21:03	15	20:11 (74)
12	07:57		08:38 (72)	07:33		09:02 (72)	07:53			07:03		18:47 (117)	06:23		19:46 (74)	06:05		19:56 (74)
	17:30	58	09:36 (72)	18:06	20	09:22 (72)	19:38			20:09	41	19:28 (117)	20:39	28	20:14 (74)	21:04	15	20:11 (74)
13	07:56		08:39 (72)	07:32		09:07 (72)	07:51			07:01		18:48 (117)	06:22		19:46 (74)	06:05		19:57 (74)
	17:31	58	09:37 (72)	18:08	10	09:17 (72)	19:39			20:10	40	19:28 (117)	20:40	28	20:14 (74)	21:04	14	20:11 (74)
14	07:56		08:38 (72)	07:30			07:49			07:00		18:47 (117)	06:21		19:45 (74)	06:05		19:58 (74)
	17:32	59	09:37 (72)	18:09			19:40			20:11	40	19:27 (117)	20:41	29	20:14 (74)	21:05	12	20:10 (74)
15	07:56		08:39 (72)	07:29			07:48			06:58		18:48 (117)	06:20		19:45 (74)	06:05		19:58 (74)
	17:33	59	09:38 (72)	18:10			19:41			20:12	39	19:27 (117)	20:42	30	20:15 (74)	21:05	12	20:10 (74)
16	07:55		08:39 (72)	07:28			07:46			06:57		18:48 (117)	06:19		19:44 (74)	06:05		19:59 (74)
	17:34	59	09:38 (72)	18:11			19:42			20:13	37	19:25 (117)	20:43	31	20:15 (74)	21:06	11	20:10 (74)
17	07:55		08:39 (72)	07:26			07:45			06:55		18:49 (117)	06:18		19:44 (74)	06:05		20:00 (74)
	17:35	59	09:38 (72)	18:12			19:43			20:14	36	19:25 (117)	20:44	31	20:15 (74)	21:06	10	20:10 (74)
18	07:54		08:39 (72)	07:25			07:43			06:54		18:50 (117)	06:17		19:45 (74)	06:05		20:00 (74)
	17:37	59	09:38 (72)	18:13			19:44			20:15	33	19:23 (117)	20:45	31	20:16 (74)	21:06	9	20:09 (74)
19	07:54		08:40 (72)	07:24			07:41			06:52		18:51 (117)	06:16		19:45 (74)	06:05		20:00 (74)
	17:38	59	09:39 (72)	18:15			19:45			20:16	31	19:22 (117)	20:46	31	20:16 (74)	21:07	9	20:09 (74)
20	07:53		08:40 (72)	07:22			07:40			06:51		18:53 (117)	06:16		19:44 (74)	06:05		20:01 (74)
	17:39	59	09:39 (72)	18:16			19:46			20:17	27	19:20 (117)	20:47	32	20:16 (74)	21:07	8	20:09 (74)
21	07:53		08:40 (72)	07:21			07:38			06:49		18:54 (117)	06:15		19:44 (74)	06:06		20:02 (74)
	17:40	59	09:39 (72)	18:17			19:47			20:18	24	19:18 (117)	20:48	31	20:15 (74)	21:07	8	20:10 (74)
22	07:52		08:41 (72)	07:20			07:36			06:48		18:56 (117)	06:14		19:45 (74)	06:06		20:02 (74)
	17:41	59	09:40 (72)	18:18			19:48			20:19	20	19:16 (117)	20:49	31	20:16 (74)	21:08	8	20:10 (74)
23	07:52		08:41 (72)	07:18			07:35			06:46		18:59 (117)	06:13		19:45 (74)	06:06		20:01 (74)
	17:42	59	09:40 (72)	18:19			19:49			20:20	13	19:12 (117)	20:50	31	20:16 (74)	21:08	9	20:10 (74)
24	07:51		08:41 (72)	07:17			07:33			06:45			06:13		19:45 (74)	06:06		20:01 (74)
	17:43	58	09:39 (72)	18:20			19:50			20:21			20:50	30	20:15 (74)	21:08	9	20:10 (74)
25	07:50		08:42 (72)	07:15			07:31			06:44			06:12		19:46 (74)	06:07		20:02 (74)
	17:45	58	09:40 (72)	18:21			19:52			20:22			20:51	30	20:16 (74)	21:08	10	20:12 (74)
26	07:50		08:42 (72)	07:14			07:30		19:11 (117)	06:42			06:11		19:46 (74)	06:07		20:01 (74)
	17:46	58	09:40 (72)	18:23			19:53	5	19:16 (117)	20:23			20:52	29	20:15 (74)	21:08	11	20:12 (74)
27	07:49		08:43 (72)	07:13			07:28		19:04 (117)	06:41			06:11		19:47 (74)	06:07		20:01 (74)
	17:47	57	09:40 (72)	18:24			19:54	17	19:21 (117)	20:24			20:53	29	20:16 (74)	21:08	11	20:12 (74)
28	07:48		08:43 (72)	07:11			07:27		19:01 (117)	06:40			06:10		19:47 (74)	06:08		20:01 (74)
	17:48	56	09:39 (72)	18:25			19:55	22	19:23 (117)	20:25			20:54	28	20:15 (74)	21:08	12	20:13 (74)
29	07:47		08:44 (72)				07:25		18:59 (117)	06:38			06:10		19:48 (74)	06:08		20:00 (74)
	17:49	55	09:39 (72)				19:56	27	19:26 (117)	20:26			20:55	27	20:15 (74)	21:08	14	20:14 (74)
30	07:46		08:44 (72)				07:23		18:56 (117)	06:37			06:09		19:48 (74)	06:09		20:01 (74)
	17:51	55	09:39 (72)				19:57	31	19:27 (117)	20:27			20:55	26	20:14 (74)	21:08	14	20:15 (74)
31	07:45		08:45 (72)				07:22		18:54 (117)				06:09		19:49 (74)			
	17:52	53	09:38 (72)				19:58	34	19:28 (117)				20:56	26	20:15 (74)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		1774			490			136			828			709			433	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.61			0.61			0.66			0.66			0.63			0.63	
Total reduction		0.22			0.25			0.29			0.33			0.35			0.38	
Total, real		387			125			39			276			249			163	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 59

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
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Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 799 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5729)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		20:00 (74)	06:32		19:57 (74)	07:02		18:46 (117)	07:31			07:04		08:26 (72)	07:37		08:19 (72)
	21:08	15	20:15 (74)	20:51	27	20:24 (74)	20:09	42	19:28 (117)	19:18			17:33	31	08:57 (72)	17:10	58	09:17 (72)
2	06:09		20:00 (74)	06:33		19:58 (74)	07:03		18:46 (117)	07:32			07:05		08:25 (72)	07:38		08:20 (72)
	21:08	16	20:16 (74)	20:50	25	20:23 (74)	20:08	42	19:28 (117)	19:17			17:32	35	09:00 (72)	17:10	57	09:17 (72)
3	06:10		19:59 (74)	06:34		19:59 (74)	07:04		18:45 (117)	07:33			07:06		08:23 (72)	07:39		08:20 (72)
	21:08	17	20:16 (74)	20:49	23	20:22 (74)	20:06	43	19:28 (117)	19:15			17:31	38	09:01 (72)	17:10	58	09:18 (72)
4	06:10		19:59 (74)	06:35		19:59 (74)	07:05		18:45 (117)	07:34			07:07		08:21 (72)	07:40		08:21 (72)
	21:08	19	20:18 (74)	20:48	21	20:20 (74)	20:05	43	19:28 (117)	19:14			17:30	41	09:02 (72)	17:09	57	09:18 (72)
5	06:11		19:59 (74)	06:36		20:01 (74)	07:06		18:45 (117)	07:35			07:08		08:20 (72)	07:41		08:22 (72)
	21:08	19	20:18 (74)	20:47	18	20:19 (74)	20:03	42	19:27 (117)	19:12			17:29	44	09:04 (72)	17:09	56	09:18 (72)
6	06:12		19:59 (74)	06:37		20:02 (74)	07:07		18:45 (117)	07:36			07:09		08:20 (72)	07:42		08:22 (72)
	21:08	20	20:19 (74)	20:45	15	20:17 (74)	20:01	42	19:27 (117)	19:10			17:27	46	09:06 (72)	17:09	56	09:18 (72)
7	06:12		19:58 (74)	06:38		20:05 (74)	07:08		18:44 (117)	07:37			07:10		08:19 (72)	07:43		08:23 (72)
	21:07	21	20:19 (74)	20:44	10	20:15 (74)	20:00	41	19:25 (117)	19:09			17:26	47	09:06 (72)	17:09	56	09:19 (72)
8	06:13		19:58 (74)	06:39			07:08		18:44 (117)	07:38			07:12		08:18 (72)	07:44		08:24 (72)
	21:07	22	20:20 (74)	20:43			19:56	40	19:24 (117)	19:07			17:25	49	09:07 (72)	17:09	55	09:19 (72)
9	06:13		19:57 (74)	06:40			07:09		18:44 (117)	07:39			07:13		08:17 (72)	07:45		08:24 (72)
	21:07	23	20:20 (74)	20:42			19:55	40	19:24 (117)	19:06			17:24	51	09:08 (72)	17:09	55	09:19 (72)
10	06:14		19:57 (74)	06:41			07:10		18:45 (117)	07:40			07:14		08:16 (72)	07:46		08:25 (72)
	21:06	24	20:21 (74)	20:41			19:53	38	19:23 (117)	19:04			17:23	52	09:08 (72)	17:09	55	09:20 (72)
11	06:15		19:57 (74)	06:42			07:11		18:46 (117)	07:41			07:15		08:17 (72)	07:47		08:26 (72)
	21:06	25	20:22 (74)	20:39			19:52	35	19:21 (117)	19:02			17:22	53	09:10 (72)	17:09	54	09:20 (72)
12	06:16		19:56 (74)	06:43			07:12		18:46 (117)	07:42			07:16		08:16 (72)	07:47		08:26 (72)
	21:06	26	20:22 (74)	20:38			19:50	34	19:20 (117)	19:01			17:22	54	09:10 (72)	17:09	54	09:20 (72)
13	06:16		19:56 (74)	06:44			07:13		18:47 (117)	07:43			07:17		08:16 (72)	07:48		08:26 (72)
	21:05	27	20:23 (74)	20:37			19:48	31	19:18 (117)	18:59			17:21	55	09:11 (72)	17:10	54	09:20 (72)
14	06:17		19:56 (74)	06:45			07:14		18:49 (117)	07:44			07:19		08:15 (72)	07:49		08:27 (72)
	21:05	27	20:23 (74)	20:36			19:47	27	19:16 (117)	18:58			17:20	56	09:11 (72)	17:10	54	09:21 (72)
15	06:18		19:56 (74)	06:46			07:15		18:51 (117)	07:45			07:20		08:16 (72)	07:50		08:28 (72)
	21:04	28	20:24 (74)	20:34			19:45	23	19:14 (117)	18:56			17:19	57	09:13 (72)	17:10	54	09:22 (72)
16	06:18		19:55 (74)	06:47			07:16		18:53 (117)	07:46			07:21		08:15 (72)	07:50		08:28 (72)
	21:04	29	20:24 (74)	20:33			19:43	18	19:11 (117)	18:55			17:18	58	09:13 (72)	17:10	53	09:21 (72)
17	06:19		19:55 (74)	06:47			07:17		18:57 (117)	07:47			07:22		08:15 (72)	07:51		08:29 (72)
	21:03	29	20:24 (74)	20:31			19:42	9	19:06 (117)	18:53			17:17	58	09:13 (72)	17:11	53	09:22 (72)
18	06:20		19:55 (74)	06:48			07:18			07:48			07:23		08:15 (72)	07:52		08:30 (72)
	21:02	30	20:25 (74)	20:30			19:40			18:52			17:17	58	09:13 (72)	17:11	53	09:23 (72)
19	06:21		19:55 (74)	06:49		19:10 (117)	07:19			07:49			07:24		08:16 (72)	07:52		08:30 (72)
	21:02	30	20:25 (74)	20:29	3	19:13 (117)	19:38			18:50			17:16	59	09:15 (72)	17:11	53	09:23 (72)
20	06:22		19:54 (74)	06:50		19:04 (117)	07:20			07:50			07:25		08:16 (72)	07:53		08:31 (72)
	21:01	31	20:25 (74)	20:27	14	19:18 (117)	19:37			18:49			17:15	59	09:15 (72)	17:12	52	09:23 (72)
21	06:22		19:55 (74)	06:51		19:01 (117)	07:21			07:51			07:27		08:16 (72)	07:53		08:31 (72)
	21:00	30	20:25 (74)	20:26	20	19:21 (117)	19:35			18:48			17:15	59	09:15 (72)	17:12	52	09:23 (72)
22	06:23		19:55 (74)	06:52		18:58 (117)	07:22			07:52			07:28		08:16 (72)	07:54		08:32 (72)
	21:00	31	20:26 (74)	20:24	25	19:23 (117)	19:33			18:46			17:14	59	09:15 (72)	17:13	52	09:24 (72)
23	06:24		19:55 (74)	06:53		18:56 (117)	07:23			07:53			07:29		08:16 (72)	07:54		08:32 (72)
	20:59	31	20:26 (74)	20:23	28	19:24 (117)	19:32			18:45			17:13	59	09:15 (72)	17:13	52	09:24 (72)
24	06:25		19:55 (74)	06:54		18:55 (117)	07:24			07:55			07:30		08:16 (72)	07:55		08:32 (72)
	20:58	31	20:26 (74)	20:22	31	19:26 (117)	19:30			18:43			17:13	59	09:15 (72)	17:14	52	09:24 (72)
25	06:26		19:55 (74)	06:55		18:53 (117)	07:25			07:56			07:31		08:17 (72)	07:55		08:33 (72)
	20:57	31	20:26 (74)	20:20	34	19:27 (117)	19:28			18:42			17:12	59	09:16 (72)	17:14	53	09:26 (72)
26	06:27		19:55 (74)	06:56		18:52 (117)	07:26			07:57			07:32		08:18 (72)	07:56		08:33 (72)
	20:56	30	20:25 (74)	20:19	35	19:27 (117)	19:27			18:41			17:12	59	09:17 (72)	17:15	53	09:26 (72)
27	06:28		19:55 (74)	06:57		18:50 (117)	07:27			07:58			07:33		08:18 (72)	07:56		08:33 (72)
	20:56	30	20:25 (74)	20:17	37	19:27 (117)	19:25			18:39			17:11	59	09:17 (72)	17:16	53	09:26 (72)
28	06:29		19:55 (74)	06:58		18:49 (117)	07:28			07:59			07:34		08:18 (72)	07:56		08:34 (72)
	20:55	30	20:25 (74)	20:16	39	19:28 (117)	19:23			18:38			17:11	59	09:17 (72)	17:16	53	09:27 (72)
29	06:29		19:56 (74)	06:59		18:48 (117)	07:29			08:00		09:35 (72)	07:35		08:19 (72)	07:57		08:34 (72)
	20:54	29	20:25 (74)	20:14	40	19:28 (117)	19:22			18:37	13	09:48 (72)	17:11	58	09:17 (72)	17:17	54	09:28 (72)
30	06:30		19:56 (74)	07:00		18:47 (117)	07:30			08:01		09:31 (72)	07:36		08:19 (72)	07:57		08:34 (72)
	20:53	29	20:25 (74)	20:12	41	19:28 (117)	19:20			18:36	21	09:52 (72)	17:10	58	09:17 (72)	17:18	54	09:28 (72)
31	06:31		19:57 (74)	07:01		18:47 (117)				08:02		09:28 (72)				07:57		08:34 (72)
	20:52	27	20:24 (74)	20:11	41	19:28 (117)				18:34	27	09:55 (72)				17:19	55	09:29 (72)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		807			527			590			61			1589			1680	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.63			0.65			0.66			0.61			0.61			0.61	
Total reduction		0.38			0.39			0.40			0.34			0.22			0.30	
Total, real		304			205			235			21			356			508	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 60

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 833 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5752)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February	March	April	May	June	July	August	September	October	November			December		
1	07:57		15:25 (117)	07:45	07:10	07:20	06:36	06:08	06:09	06:32	07:02	07:31	07:04			07:37		15:15 (117)
	17:20	47	16:12 (117)	17:53	18:26	19:59	20:28	20:57	21:08	20:51	20:09	19:18	17:33			17:10	40	15:55 (117)
2	07:57		15:26 (117)	07:44	07:08	07:18	06:34	06:08	06:09	06:33	07:03	07:32	07:05			07:38		15:15 (117)
	17:20	46	16:12 (117)	17:54	18:27	20:00	20:29	20:58	21:08	20:50	20:08	19:17	17:32			17:10	41	15:56 (117)
3	07:58		15:27 (117)	07:43	07:07	07:17	06:33	06:07	06:10	06:34	07:04	07:33	07:06			07:39		15:15 (117)
	17:21	45	16:12 (117)	17:55	18:28	20:00	20:30	20:58	21:08	20:49	20:06	19:15	17:31			17:10	42	15:57 (117)
4	07:58		15:27 (117)	07:42	07:05	07:15	06:32	06:07	06:10	06:35	07:05	07:34	07:07			07:40		15:15 (117)
	17:22	45	16:12 (117)	17:57	18:29	20:01	20:31	20:59	21:08	20:48	20:05	19:14	17:30			17:09	42	15:57 (117)
5	07:58		15:28 (117)	07:41	07:04	07:14	06:31	06:07	06:11	06:36	07:06	07:35	07:08			07:41		15:15 (117)
	17:23	45	16:13 (117)	17:58	18:30	20:02	20:32	21:00	21:08	20:47	20:03	19:12	17:29			17:09	43	15:58 (117)
6	07:58		15:29 (117)	07:40	07:02	07:12	06:30	06:06	06:12	06:37	07:07	07:36	07:09			07:42		15:15 (117)
	17:24	44	16:13 (117)	17:59	18:32	20:03	20:33	21:00	21:08	20:45	20:01	19:10	17:27			17:09	44	15:59 (117)
7	07:58		15:30 (117)	07:38	07:00	07:11	06:28	06:06	06:12	06:38	07:08	07:37	07:10			07:43		15:15 (117)
	17:25	43	16:13 (117)	18:00	18:33	20:04	20:34	21:01	21:07	20:44	20:00	19:09	17:26			17:09	45	16:00 (117)
8	07:57		15:31 (117)	07:37	07:59	07:09	06:27	06:06	06:13	06:39	07:08	07:38	07:12			07:44		15:15 (117)
	17:26	42	16:13 (117)	18:02	19:34	20:05	20:35	21:02	21:07	20:43	19:56	19:07	17:25			17:09	45	16:00 (117)
9	07:57		15:32 (117)	07:36	07:57	07:07	06:26	06:06	06:13	06:40	07:09	07:39	07:13			07:45		15:16 (117)
	17:27	42	16:14 (117)	18:03	19:35	20:06	20:36	21:02	21:07	20:42	19:55	19:06	17:24			17:09	45	16:01 (117)
10	07:57		15:33 (117)	07:35	07:56	07:06	06:25	06:05	06:14	06:41	07:10	07:40	07:14			07:46		15:16 (117)
	17:28	41	16:14 (117)	18:04	19:36	20:07	20:37	21:03	21:06	20:41	19:53	19:04	17:23			17:09	46	16:02 (117)
11	07:57		15:33 (117)	07:34	07:54	07:04	06:24	06:05	06:15	06:42	07:11	07:41	07:15			07:47		15:16 (117)
	17:29	40	16:13 (117)	18:05	19:37	20:08	20:38	21:03	21:06	20:39	19:52	19:02	17:22			17:09	47	16:03 (117)
12	07:57		15:35 (117)	07:33	07:53	07:03	06:23	06:05	06:16	06:43	07:12	07:42	07:16			07:47		15:16 (117)
	17:30	38	16:13 (117)	18:06	19:38	20:09	20:39	21:04	21:06	20:38	19:50	19:01	17:22			17:09	47	16:03 (117)
13	07:56		15:36 (117)	07:32	07:51	07:01	06:22	06:05	06:16	06:44	07:13	07:43	07:17			07:48		15:16 (117)
	17:31	37	16:13 (117)	18:08	19:39	20:10	20:40	21:04	21:05	20:37	19:48	18:59	17:21			17:10	47	16:03 (117)
14	07:56		15:37 (117)	07:30	07:49	07:00	06:21	06:05	06:17	06:45	07:14	07:44	07:19			07:49		15:17 (117)
	17:32	35	16:12 (117)	18:09	19:40	20:11	20:41	21:05	21:05	20:36	19:47	18:58	17:20			17:10	47	16:04 (117)
15	07:56		15:38 (117)	07:29	07:48	06:58	06:20	06:05	06:18	06:46	07:15	07:45	07:20			07:50		15:18 (117)
	17:33	34	16:12 (117)	18:10	19:41	20:12	20:42	21:05	21:04	20:34	19:45	18:56	17:19			17:10	47	16:05 (117)
16	07:55		15:39 (117)	07:28	07:46	06:57	06:19	06:05	06:18	06:47	07:16	07:46	07:21			07:50		15:17 (117)
	17:34	32	16:11 (117)	18:11	19:42	20:13	20:43	21:06	21:04	20:33	19:43	18:55	17:18			17:10	48	16:05 (117)
17	07:55		15:41 (117)	07:26	07:45	06:55	06:18	06:05	06:19	06:47	07:17	07:47	07:22			07:51		15:18 (117)
	17:35	30	16:11 (117)	18:12	19:43	20:14	20:44	21:06	21:03	20:32	19:42	18:53	17:17			17:11	48	16:06 (117)
18	07:54		15:42 (117)	07:25	07:43	06:54	06:17	06:05	06:20	06:48	07:18	07:48	07:23			07:52		15:19 (117)
	17:37	28	16:10 (117)	18:13	19:44	20:15	20:45	21:06	21:02	20:30	19:40	18:52	17:17			17:11	48	16:07 (117)
19	07:54		15:44 (117)	07:24	07:41	06:52	06:16	06:05	06:21	06:49	07:19	07:49	07:24			07:52		15:19 (117)
	17:38	25	16:09 (117)	18:15	19:45	20:16	20:46	21:07	21:02	20:29	19:38	18:50	17:16			17:11	48	16:07 (117)
20	07:53		15:46 (117)	07:22	07:40	06:51	06:16	06:05	06:22	06:50	07:20	07:50	07:25		15:28 (117)	07:53		15:20 (117)
	17:39	22	16:08 (117)	18:16	19:46	20:17	20:47	21:07	21:01	20:27	19:37	18:49	17:15	10	15:38 (117)	17:12	47	16:07 (117)
21	07:53		15:48 (117)	07:21	07:38	06:49	06:15	06:06	06:22	06:51	07:21	07:51	07:27		15:24 (117)	07:53		15:19 (117)
	17:40	17	16:05 (117)	18:17	19:47	20:18	20:48	21:07	21:00	20:26	19:35	18:48	17:15	17	15:41 (117)	17:12	48	16:07 (117)
22	07:52		15:53 (117)	07:20	07:36	06:48	06:14	06:06	06:23	06:52	07:22	07:52	07:28		15:22 (117)	07:54		15:20 (117)
	17:41	10	16:03 (117)	18:18	19:48	20:19	20:49	21:08	21:00	20:24	19:33	18:46	17:14	22	15:44 (117)	17:13	48	16:08 (117)
23	07:52			07:18	07:35	06:46	06:13	06:06	06:24	06:53	07:23	07:53	07:29		15:21 (117)	07:54		15:21 (117)
	17:42			18:19	19:49	20:20	20:50	21:08	20:59	20:23	19:32	18:45	17:13	24	15:45 (117)	17:13	47	16:08 (117)
24	07:51			07:17	07:33	06:45	06:13	06:06	06:25	06:54	07:24	07:55	07:30		15:19 (117)	07:55		15:21 (117)
	17:43			18:20	19:50	20:21	20:50	21:08	20:58	20:22	19:30	18:43	17:13	28	15:47 (117)	17:14	48	16:09 (117)
25	07:50			07:15	07:31	06:44	06:12	06:07	06:26	06:55	07:25	07:56	07:31		15:19 (117)	07:55		15:22 (117)
	17:45			18:21	19:52	20:22	20:51	21:08	20:57	20:20	19:28	18:42	17:12	30	15:49 (117)	17:14	48	16:10 (117)
26	07:50			07:14	07:30	06:42	06:11	06:07	06:27	06:56	07:26	07:57	07:32		15:18 (117)	07:56		15:22 (117)
	17:46			18:23	19:53	20:23	20:52	21:08	20:56	20:19	19:27	18:41	17:12	32	15:50 (117)	17:15	48	16:10 (117)
27	07:49			07:13	07:28	06:41	06:11	06:07	06:28	06:57	07:27	07:58	07:33		15:17 (117)	07:56		15:22 (117)
	17:47			18:24	19:54	20:24	20:53	21:08	20:56	20:17	19:25	18:39	17:11	34	15:51 (117)	17:16	48	16:10 (117)
28	07:48			07:11	07:27	06:40	06:10	06:08	06:29	06:58	07:28	07:59	07:34		15:17 (117)	07:56		15:23 (117)
	17:48			18:25	19:55	20:25	20:54	21:08	20:55	20:16	19:23	18:38	17:11	35	15:52 (117)	17:16	48	16:11 (117)
29	07:47				07:25	06:38	06:10	06:08	06:29	06:59	07:29	08:00	07:35		15:16 (117)	07:57		15:24 (117)
	17:49				19:56	20:26	20:55	21:08	20:54	20:14	19:22	18:37	17:11	37	15:53 (117)	17:17	47	16:11 (117)
30	07:46				07:23	06:37	06:09	06:09	06:30	07:00	07:30	08:01	07:36		15:16 (117)	07:57		15:24 (117)
	17:51				19:57	20:27	20:55	21:08	20:53	20:12	19:20	18:36	17:10	38	15:54 (117)	17:18	47	16:11 (117)
31	07:45				07:22		06:09		06:31	07:01		08:02				07:57		15:25 (117)
	17:52				19:58		20:56		20:52	20:11		18:34				17:19	46	16:11 (117)
Potential sun hours	300			299	370	397	446	449	456	427	374	346	300			291		
Total, worst case		788												307			1430	
Sun reduction		0.36												0.37			0.50	
Oper. time red.		1.00												1.00			1.00	
Wind dir. red.		0.68												0.68			0.68	
Total reduction		0.24												0.25			0.34	
Total, real		191												77			483	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 61

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 849 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5766)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June
1	07:57		08:19 (117)	07:45			07:10		08:02 (74)	07:20			06:36		07:26 (73)	06:08
	17:20	13	08:32 (117)	17:53			18:26	21	08:23 (74)	19:59			20:28	54	08:20 (73)	20:57
2	07:58		08:19 (117)	07:44			07:08		08:04 (74)	07:19			06:34		07:26 (73)	06:08
	17:20	14	08:33 (117)	17:54			18:27	15	08:19 (74)	20:00			20:29	54	08:20 (73)	20:58
3	07:58		08:19 (117)	07:43			07:07		08:11 (74)	07:17			06:33		07:27 (73)	06:07
	17:21	14	08:33 (117)	17:56			18:28	2	08:13 (74)	20:00			20:30	52	08:19 (73)	20:58
4	07:58		08:19 (117)	07:42		08:11 (74)	07:05			07:15			06:32		07:26 (73)	06:07
	17:22	15	08:34 (117)	17:57	5	08:16 (74)	18:29			20:01			20:31	52	08:18 (73)	20:59
5	07:58		08:19 (117)	07:41		08:06 (74)	07:04			07:14			06:31		07:27 (73)	06:07
	17:23	16	08:35 (117)	17:58	14	08:20 (74)	18:30			20:02			20:32	50	08:17 (73)	21:00
6	07:58		08:19 (117)	07:40		08:03 (74)	07:02			07:12		07:54 (73)	06:30		07:27 (73)	06:06
	17:24	17	08:36 (117)	17:59	20	08:23 (74)	18:32			20:03	12	08:06 (73)	20:33	50	08:17 (73)	21:01
7	07:58		08:19 (117)	07:39		08:02 (74)	07:00			07:11		07:48 (73)	06:28		07:28 (73)	06:06
	17:25	18	08:37 (117)	18:00	23	08:25 (74)	18:33			20:04	22	08:10 (73)	20:34	48	08:16 (73)	21:01
8	07:58		08:19 (117)	07:37		08:00 (74)	07:59			07:09		07:45 (73)	06:27		07:29 (73)	06:06
	17:26	19	08:38 (117)	18:02	27	08:27 (74)	19:34			20:05	28	08:13 (73)	20:35	46	08:15 (73)	21:02
9	07:57		08:19 (117)	07:36		07:59 (74)	07:57			07:07		07:42 (73)	06:26		07:29 (73)	06:06
	17:27	20	08:39 (117)	18:03	29	08:28 (74)	19:35			20:06	33	08:15 (73)	20:36	45	08:14 (73)	21:02
10	07:57		08:19 (117)	07:35		07:58 (74)	07:56			07:06		07:41 (73)	06:25		07:30 (73)	06:05
	17:28	21	08:40 (117)	18:04	32	08:30 (74)	19:36			20:07	36	08:17 (73)	20:37	43	08:13 (73)	21:03
11	07:57		08:18 (117)	07:34		07:58 (74)	07:54			07:04		07:38 (73)	06:24		07:31 (73)	06:05
	17:29	22	08:40 (117)	18:05	33	08:31 (74)	19:37			20:08	40	08:18 (73)	20:38	41	08:12 (73)	21:03
12	07:57		08:18 (117)	07:33		07:56 (74)	07:53			07:03		07:36 (73)	06:23		07:32 (73)	06:05
	17:30	23	08:41 (117)	18:06	35	08:31 (74)	19:38			20:09	43	08:19 (73)	20:39	39	08:11 (73)	21:04
13	07:56		08:18 (117)	07:32		07:56 (74)	07:51			07:01		07:35 (73)	06:22		07:33 (73)	06:05
	17:31	24	08:42 (117)	18:08	36	08:32 (74)	19:39			20:10	45	08:20 (73)	20:40	37	08:10 (73)	21:04
14	07:56		08:17 (117)	07:30		07:56 (74)	07:49			07:00		07:33 (73)	06:21		07:34 (73)	06:05
	17:32	25	08:42 (117)	18:09	36	08:32 (74)	19:40			20:11	47	08:20 (73)	20:41	35	08:09 (73)	21:05
15	07:56		08:17 (117)	07:29		07:55 (74)	07:48			06:58		07:33 (73)	06:20		07:35 (73)	06:05
	17:33	25	08:42 (117)	18:10	38	08:33 (74)	19:41			20:12	49	08:22 (73)	20:42	33	08:08 (73)	21:05
16	07:55		08:16 (117)	07:28		07:54 (74)	07:46			06:57		07:31 (73)	06:19		07:36 (73)	06:05
	17:34	26	08:42 (117)	18:11	39	08:33 (74)	19:42			20:13	51	08:22 (73)	20:43	30	08:06 (73)	21:06
17	07:55		08:16 (117)	07:27		07:55 (74)	07:45			06:55		07:30 (73)	06:18		07:39 (73)	06:05
	17:35	27	08:43 (117)	18:12	38	08:33 (74)	19:43			20:14	52	08:22 (73)	20:44	26	08:05 (73)	21:06
18	07:55		08:16 (117)	07:25		07:55 (74)	07:43			06:54		07:30 (73)	06:17		07:40 (73)	06:05
	17:37	27	08:43 (117)	18:13	38	08:33 (74)	19:44			20:15	53	08:23 (73)	20:45	23	08:03 (73)	21:07
19	07:54		08:17 (117)	07:24		07:54 (74)	07:41			06:52		07:29 (73)	06:17		07:42 (73)	06:05
	17:38	27	08:44 (117)	18:15	39	08:33 (74)	19:45			20:16	54	08:23 (73)	20:46	19	08:01 (73)	21:07
20	07:53		08:17 (117)	07:23		07:55 (74)	07:40			06:51		07:28 (73)	06:16		07:45 (73)	06:05
	17:39	27	08:44 (117)	18:16	38	08:33 (74)	19:46			20:17	55	08:23 (73)	20:47	13	07:58 (73)	21:07
21	07:53		08:18 (117)	07:21		07:54 (74)	07:38			06:49		07:27 (73)	06:15			06:06
	17:40	26	08:44 (117)	18:17	38	08:32 (74)	19:47			20:18	56	08:23 (73)	20:48			21:07
22	07:52		08:18 (117)	07:20		07:55 (74)	07:36			06:48		07:27 (73)	06:14			06:06
	17:41	26	08:44 (117)	18:18	37	08:32 (74)	19:48			20:19	56	08:23 (73)	20:49			21:08
23	07:52		08:19 (117)	07:18		07:56 (74)	07:35			06:46		07:26 (73)	06:13			06:06
	17:42	25	08:44 (117)	18:19	35	08:31 (74)	19:50			20:20	56	08:22 (73)	20:50			21:08
24	07:51		08:19 (117)	07:17		07:56 (74)	07:33			06:45		07:26 (73)	06:13			06:06
	17:44	24	08:43 (117)	18:20	34	08:30 (74)	19:51			20:21	57	08:23 (73)	20:51			21:08
25	07:50		08:21 (117)	07:16		07:57 (74)	07:32			06:44		07:26 (73)	06:12			06:07
	17:45	22	08:43 (117)	18:22	32	08:29 (74)	19:52			20:22	57	08:23 (73)	20:51			21:08
26	07:50		08:21 (117)	07:14		07:57 (74)	07:30			06:42		07:25 (73)	06:11			06:07
	17:46	22	08:43 (117)	18:23	31	08:28 (74)	19:53			20:23	57	08:22 (73)	20:52			21:08
27	07:49		08:22 (117)	07:13		07:59 (74)	07:28			06:41		07:26 (73)	06:11			06:07
	17:47	20	08:42 (117)	18:24	28	08:27 (74)	19:54			20:24	56	08:22 (73)	20:53			21:08
28	07:48		08:24 (117)	07:11		08:00 (74)	07:27			06:40		07:26 (73)	06:10			06:08
	17:48	17	08:41 (117)	18:25	24	08:24 (74)	19:55			20:25	56	08:22 (73)	20:54			21:08
29	07:47		08:25 (117)				07:25			06:38		07:26 (73)	06:10			06:08
	17:49	14	08:39 (117)				19:56			20:26	56	08:22 (73)	20:55			21:08
30	07:46		08:28 (117)				07:23			06:37		07:25 (73)	06:09			06:09
	17:51	9	08:37 (117)				19:57			20:27	55	08:20 (73)	20:55			21:08
31	07:45						07:22						06:09			
	17:52						19:58						20:56			
Potential sun hours	300			299			370			397			446			449
Total, worst case		625			779			38			1182			790		
Sun reduction		0.36			0.42			0.44			0.51			0.56		
Oper. time red.		1.00			1.00			1.00			1.00			1.00		
Wind dir. red.		0.60			0.63			0.63			0.67			0.67		
Total reduction		0.22			0.26			0.27			0.34			0.37		
Total, real		135			204			10			400			294		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 62

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m **Shadow receptor:** 849 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5766)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09			06:32		07:42 (73)	07:02		07:37 (73)	07:31			07:04		07:27 (74)	07:37		08:00 (117)
	21:08			20:51	40	08:22 (73)	20:09	40	08:17 (73)	19:18			17:33	31	07:58 (74)	17:10	22	08:22 (117)
2	06:09			06:33		07:41 (73)	07:03		07:39 (73)	07:32			07:05		07:29 (74)	07:38		08:01 (117)
	21:08			20:50	42	08:23 (73)	20:08	36	08:15 (73)	19:17			17:32	29	07:58 (74)	17:10	21	08:22 (117)
3	06:10			06:34		07:40 (73)	07:04		07:40 (73)	07:33			07:06		07:30 (74)	07:39		08:02 (117)
	21:08			20:49	44	08:24 (73)	20:06	33	08:13 (73)	19:15			17:31	26	07:56 (74)	17:10	20	08:22 (117)
4	06:11			06:35		07:39 (73)	07:05		07:42 (73)	07:34			07:07		07:32 (74)	07:40		08:03 (117)
	21:08			20:48	45	08:24 (73)	20:05	28	08:10 (73)	19:14			17:30	23	07:55 (74)	17:09	19	08:22 (117)
5	06:11			06:36		07:38 (73)	07:06		07:45 (73)	07:35			07:08		07:33 (74)	07:41		08:04 (117)
	21:08			20:47	47	08:25 (73)	20:03	22	08:07 (73)	19:12			17:29	19	07:52 (74)	17:09	18	08:22 (117)
6	06:12			06:37		07:37 (73)	07:07		07:50 (73)	07:36			07:09		07:37 (74)	07:42		08:05 (117)
	21:08			20:45	49	08:26 (73)	20:01	12	08:02 (73)	19:10			17:28	14	07:51 (74)	17:09	17	08:22 (117)
7	06:12			06:38		07:37 (73)	07:08			07:37			07:10		07:43 (74)	07:43		08:06 (117)
	21:07			20:44	50	08:27 (73)	20:00			19:09			17:26	2	07:45 (74)	17:09	16	08:22 (117)
8	06:13			06:39		07:36 (73)	07:09			07:38			07:12			07:44		08:07 (117)
	21:07			20:43	51	08:27 (73)	19:57			19:07			17:25			17:09	15	08:22 (117)
9	06:14			06:40		07:36 (73)	07:09			07:39			07:13			07:45		08:08 (117)
	21:07			20:42	52	08:28 (73)	19:55			19:06			17:24			17:09	15	08:23 (117)
10	06:14			06:41		07:35 (73)	07:10			07:40			07:14			07:46		08:09 (117)
	21:06			20:41	53	08:28 (73)	19:53			19:04			17:23			17:09	14	08:23 (117)
11	06:15			06:42		07:35 (73)	07:11			07:41		08:40 (74)	07:15			07:47		08:10 (117)
	21:06			20:39	54	08:29 (73)	19:52			19:03	10	08:50 (74)	17:22			17:09	13	08:23 (117)
12	06:16			06:43		07:34 (73)	07:12			07:42		08:36 (74)	07:16		08:00 (117)	07:47		08:10 (117)
	21:06			20:38	55	08:29 (73)	19:50			19:01	18	08:54 (74)	17:22	9	08:09 (117)	17:09	12	08:22 (117)
13	06:16			06:44		07:34 (73)	07:13			07:43		08:35 (74)	07:17		07:57 (117)	07:48		08:11 (117)
	21:05			20:37	55	08:29 (73)	19:48			18:59	22	08:57 (74)	17:21	14	08:11 (117)	17:10	12	08:23 (117)
14	06:17			06:45		07:34 (73)	07:14			07:44		08:33 (74)	07:19		07:57 (117)	07:49		08:12 (117)
	21:05			20:36	55	08:29 (73)	19:47			18:58	25	08:58 (74)	17:20	17	08:14 (117)	17:10	11	08:23 (117)
15	06:18			06:46		07:34 (73)	07:15			07:45		08:31 (74)	07:20		07:55 (117)	07:50		08:13 (117)
	21:04			20:34	56	08:30 (73)	19:45			18:56	29	09:00 (74)	17:19	20	08:15 (117)	17:10	10	08:23 (117)
16	06:19			06:47		07:32 (73)	07:16			07:46		08:29 (74)	07:21		07:54 (117)	07:50		08:13 (117)
	21:04			20:33	57	08:29 (73)	19:43			18:55	32	09:01 (74)	17:18	22	08:16 (117)	17:10	10	08:23 (117)
17	06:19			06:48		07:32 (73)	07:17			07:47		08:28 (74)	07:22		07:54 (117)	07:51		08:14 (117)
	21:03			20:32	57	08:29 (73)	19:42			18:53	33	09:01 (74)	17:17	22	08:16 (117)	17:11	9	08:23 (117)
18	06:20			06:48		07:32 (73)	07:18			07:48		08:27 (74)	07:23		07:53 (117)	07:52		08:15 (117)
	21:02			20:30	57	08:29 (73)	19:40			18:52	35	09:02 (74)	17:17	24	08:17 (117)	17:11	9	08:24 (117)
19	06:21			06:49		07:32 (73)	07:19			07:49		08:26 (74)	07:24		07:54 (117)	07:52		08:15 (117)
	21:02			20:29	56	08:28 (73)	19:38			18:51	36	09:02 (74)	17:16	25	08:19 (117)	17:11	9	08:24 (117)
20	06:22			06:50		07:32 (73)	07:20			07:50		08:25 (74)	07:25		07:53 (117)	07:53		08:16 (117)
	21:01			20:27	56	08:28 (73)	19:37			18:49	37	09:02 (74)	17:15	26	08:19 (117)	17:12	9	08:25 (117)
21	06:23			06:51		07:32 (73)	07:21			07:51		08:25 (74)	07:27		07:53 (117)	07:53		08:16 (117)
	21:00			20:26	56	08:28 (73)	19:35			18:48	37	09:02 (74)	17:15	26	08:19 (117)	17:12	8	08:24 (117)
22	06:23			06:52		07:32 (73)	07:22			07:52		08:25 (74)	07:28		07:53 (117)	07:54		08:17 (117)
	21:00			20:25	56	08:28 (73)	19:33			18:46	38	09:03 (74)	17:14	27	08:20 (117)	17:13	8	08:25 (117)
23	06:24		07:57 (73)	06:53		07:32 (73)	07:23			07:53		08:25 (74)	07:29		07:53 (117)	07:54		08:17 (117)
	20:59	9	08:06 (73)	20:23	55	08:27 (73)	19:32			18:45	38	09:03 (74)	17:13	27	08:20 (117)	17:13	9	08:26 (117)
24	06:25		07:54 (73)	06:54		07:33 (73)	07:24			07:55		08:24 (74)	07:30		07:54 (117)	07:55		08:18 (117)
	20:58	16	08:10 (73)	20:22	54	08:27 (73)	19:30			18:43	39	09:03 (74)	17:13	27	08:21 (117)	17:14	9	08:27 (117)
25	06:26		07:52 (73)	06:55		07:33 (73)	07:25			07:56		08:24 (74)	07:31		07:54 (117)	07:55		08:18 (117)
	20:57	21	08:13 (73)	20:20	53	08:26 (73)	19:28			18:42	39	09:03 (74)	17:12	27	08:21 (117)	17:14	9	08:27 (117)
26	06:27		07:50 (73)	06:56		07:33 (73)	07:26			07:57		08:24 (74)	07:32		07:55 (117)	07:56		08:18 (117)
	20:57	25	08:15 (73)	20:19	52	08:25 (73)	19:27			18:41	38	09:02 (74)	17:12	26	08:21 (117)	17:15	9	08:27 (117)
27	06:28		07:48 (73)	06:57		07:34 (73)	07:27			07:58		08:24 (74)	07:33		07:56 (117)	07:56		08:19 (117)
	20:56	28	08:16 (73)	20:17	50	08:24 (73)	19:25			18:39	38	09:02 (74)	17:11	25	08:21 (117)	17:16	10	08:29 (117)
28	06:29		07:46 (73)	06:58		07:33 (73)	07:28			07:59		08:25 (74)	07:34		07:57 (117)	07:56		08:19 (117)
	20:55	31	08:17 (73)	20:16	49	08:22 (73)	19:23			18:38	37	09:02 (74)	17:11	25	08:22 (117)	17:16	10	08:29 (117)
29	06:30		07:45 (73)	06:59		07:34 (73)	07:29			08:00		08:26 (74)	07:35		07:58 (117)	07:57		08:19 (117)
	20:54	34	08:19 (73)	20:14	47	08:21 (73)	19:22			18:37	35	09:01 (74)	17:11	24	08:22 (117)	17:17	11	08:30 (117)
30	06:30		07:44 (73)	07:00		07:35 (73)	07:30			08:01		08:26 (74)	07:36		07:59 (117)	07:57		08:19 (117)
	20:53	36	08:20 (73)	20:12	45	08:20 (73)	19:20			18:36	34	09:00 (74)	17:10	23	08:22 (117)	17:18	11	08:30 (117)
31	06:31		07:43 (73)	07:01		07:36 (73)				08:02		08:27 (74)				07:57		08:19 (117)
	20:52	38	08:21 (73)	20:11	43	08:19 (73)				18:34	32	08:59 (74)				17:19	12	08:31 (117)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		238			1591			171			682			580			387	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.67			0.67			0.67			0.63			0.61			0.60	
Total reduction		0.40			0.40			0.40			0.35			0.22			0.30	
Total, real		95			634			69			238			130			116	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 63

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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m**Shadow receptor:** 3380 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5894)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March	April			May			June		
1	07:57		15:48 (108)	07:45		15:47 (108)	07:10	07:20			06:36		18:59 (83)	06:08		18:54 (83)
	17:20	40	16:28 (108)	17:53	64	16:51 (108)	18:26	19:59			20:28	45	19:44 (83)	20:57	57	19:51 (83)
2	07:58		15:48 (108)	07:44		15:48 (108)	07:08	07:19			06:35		18:58 (83)	06:08		18:55 (83)
	17:21	41	16:29 (108)	17:54	64	16:52 (108)	18:27	20:00			20:29	47	19:45 (83)	20:58	56	19:51 (83)
3	07:58		15:48 (108)	07:43		15:48 (108)	07:07	07:17			06:33		18:57 (83)	06:07		18:56 (83)
	17:21	42	16:30 (108)	17:56	64	16:52 (108)	18:28	20:00			20:30	49	19:46 (83)	20:58	56	19:52 (83)
4	07:58		15:48 (108)	07:42		15:48 (108)	07:05	07:15			06:32		18:56 (83)	06:07		18:55 (83)
	17:22	43	16:31 (108)	17:57	64	16:52 (108)	18:29	20:01			20:31	51	19:47 (83)	20:59	56	19:51 (83)
5	07:58		15:48 (108)	07:41		15:48 (108)	07:04	07:14			06:31		18:55 (83)	06:07		18:56 (83)
	17:23	44	16:32 (108)	17:58	63	16:51 (108)	18:31	20:02			20:32	52	19:47 (83)	21:00	55	19:51 (83)
6	07:58		15:48 (108)	07:40		15:48 (108)	07:02	07:12			06:30		18:54 (83)	06:06		18:57 (83)
	17:24	45	16:33 (108)	17:59	63	16:51 (108)	18:32	20:03			20:33	54	19:48 (83)	21:00	55	19:52 (83)
7	07:58		15:48 (108)	07:39		15:49 (108)	07:01	07:11			06:29		18:53 (83)	06:06		18:57 (83)
	17:25	46	16:34 (108)	18:00	62	16:51 (108)	18:33	20:04			20:34	55	19:48 (83)	21:01	55	19:52 (83)
8	07:57		15:48 (108)	07:37		15:49 (108)	07:59	07:09			06:27		18:53 (83)	06:06		18:57 (83)
	17:26	47	16:35 (108)	18:02	62	16:51 (108)	19:34	20:05			20:35	56	19:49 (83)	21:02	54	19:51 (83)
9	07:57		15:48 (108)	07:36		15:50 (108)	07:57	07:07			06:26		18:53 (83)	06:06		18:57 (83)
	17:27	48	16:36 (108)	18:03	61	16:51 (108)	19:35	20:06			20:36	56	19:49 (83)	21:02	54	19:51 (83)
10	07:57		15:48 (108)	07:35		15:51 (108)	07:56	07:06			06:25		18:52 (83)	06:06		18:58 (83)
	17:28	49	16:37 (108)	18:04	59	16:50 (108)	19:36	20:07			20:37	58	19:50 (83)	21:03	53	19:51 (83)
11	07:57		15:47 (108)	07:34		15:52 (108)	07:54	07:04			06:24		18:52 (83)	06:05		18:58 (83)
	17:29	51	16:38 (108)	18:05	58	16:50 (108)	19:37	20:08			20:38	58	19:50 (83)	21:03	54	19:52 (83)
12	07:57		15:47 (108)	07:33		15:52 (108)	07:53	07:03			06:23		18:52 (83)	06:05		18:59 (83)
	17:30	52	16:39 (108)	18:06	57	16:49 (108)	19:38	20:09			20:39	58	19:50 (83)	21:04	53	19:52 (83)
13	07:56		15:47 (108)	07:32		15:53 (108)	07:51	07:01			06:22		18:51 (83)	06:05		18:59 (83)
	17:31	53	16:40 (108)	18:08	55	16:48 (108)	19:39	20:10			20:40	59	19:50 (83)	21:04	53	19:52 (83)
14	07:56		15:47 (108)	07:30		15:54 (108)	07:49	07:00			06:21		18:51 (83)	06:05		18:59 (83)
	17:32	53	16:40 (108)	18:09	54	16:48 (108)	19:40	20:11			20:41	59	19:50 (83)	21:05	53	19:52 (83)
15	07:56		15:47 (108)	07:29		15:56 (108)	07:48	06:58			06:20		18:51 (83)	06:05		19:00 (83)
	17:33	55	16:42 (108)	18:10	51	16:47 (108)	19:41	20:12			20:42	60	19:51 (83)	21:05	52	19:52 (83)
16	07:55		15:46 (108)	07:28		15:56 (108)	07:46	06:57			06:19		18:51 (83)	06:05		19:00 (83)
	17:34	56	16:42 (108)	18:11	49	16:45 (108)	19:42	20:13			20:43	60	19:51 (83)	21:06	52	19:52 (83)
17	07:55		15:47 (108)	07:27		15:58 (108)	07:45	06:55			06:18		18:51 (83)	06:05		19:00 (83)
	17:36	56	16:43 (108)	18:12	47	16:45 (108)	19:43	20:14			20:44	61	19:52 (83)	21:06	52	19:52 (83)
18	07:55		15:46 (108)	07:25		16:00 (108)	07:43	06:54			06:17		18:51 (83)	06:05		19:00 (83)
	17:37	58	16:44 (108)	18:14	44	16:44 (108)	19:44	20:15			20:45	60	19:51 (83)	21:07	52	19:52 (83)
19	07:54		15:47 (108)	07:24		16:01 (108)	07:41	06:52			06:17		18:51 (83)	06:05		19:01 (83)
	17:38	58	16:45 (108)	18:15	41	16:42 (108)	19:45	20:16			20:46	60	19:51 (83)	21:07	51	19:52 (83)
20	07:53		15:46 (108)	07:23		16:03 (108)	07:40	06:51			06:16		18:51 (83)	06:06		19:01 (83)
	17:39	59	16:45 (108)	18:16	37	16:40 (108)	19:46	20:17			20:47	60	19:51 (83)	21:07	51	19:52 (83)
21	07:53		15:46 (108)	07:21		16:05 (108)	07:38	06:49			06:15		18:51 (83)	06:06		19:02 (83)
	17:40	60	16:46 (108)	18:17	33	16:38 (108)	19:47	20:18			20:48	60	19:51 (83)	21:07	51	19:53 (83)
22	07:52		15:46 (108)	07:20		16:08 (108)	07:36	06:48			06:14		18:52 (83)	06:06		19:02 (83)
	17:41	61	16:47 (108)	18:18	27	16:35 (108)	19:49	20:19			20:49	60	19:52 (83)	21:08	51	19:53 (83)
23	07:52		15:46 (108)	07:18		16:12 (108)	07:35	06:47			06:13		18:52 (83)	06:06		19:02 (83)
	17:42	61	16:47 (108)	18:19	20	16:32 (108)	19:50	20:20			20:50	59	19:51 (83)	21:08	51	19:53 (83)
24	07:51		15:46 (108)	07:17		16:17 (108)	07:33	06:45		19:15 (83)	06:13		18:51 (83)	06:06		19:01 (83)
	17:44	62	16:48 (108)	18:20	9	16:26 (108)	19:51	20:21	15	19:30 (83)	20:50	60	19:51 (83)	21:08	52	19:53 (83)
25	07:50		15:46 (108)	07:16			07:32	06:44		19:11 (83)	06:12		18:52 (83)	06:07		19:02 (83)
	17:45	63	16:49 (108)	18:22			19:52	20:22	23	19:34 (83)	20:51	60	19:52 (83)	21:08	52	19:54 (83)
26	07:50		15:46 (108)	07:14			07:30	06:42		19:08 (83)	06:11		18:52 (83)	06:07		19:02 (83)
	17:46	63	16:49 (108)	18:23			19:53	20:23	28	19:36 (83)	20:52	59	19:51 (83)	21:08	52	19:54 (83)
27	07:49		15:46 (108)	07:13			07:28	06:41		19:05 (83)	06:11		18:53 (83)	06:07		19:02 (83)
	17:47	63	16:49 (108)	18:24			19:54	20:24	33	19:38 (83)	20:53	59	19:52 (83)	21:08	52	19:54 (83)
28	07:48		15:46 (108)	07:11			07:27	06:40		19:04 (83)	06:10		18:53 (83)	06:08		19:03 (83)
	17:48	64	16:50 (108)	18:25			19:55	20:25	36	19:40 (83)	20:54	58	19:51 (83)	21:08	52	19:55 (83)
29	07:47		15:46 (108)				07:25	06:38		19:02 (83)	06:10		18:54 (83)	06:08		19:02 (83)
	17:50	64	16:50 (108)				19:56	20:26	40	19:42 (83)	20:55	58	19:52 (83)	21:08	53	19:55 (83)
30	07:46		15:46 (108)				07:23	06:37		19:00 (83)	06:09		18:54 (83)	06:09		19:03 (83)
	17:51	64	16:50 (108)				19:57	20:27	43	19:43 (83)	20:55	57	19:51 (83)	21:08	53	19:56 (83)
31	07:45		15:46 (108)				07:22				06:09		18:54 (83)			
	17:52	64	16:50 (108)				19:58				20:56	58	19:52 (83)			
Potential sun hours	300			299			370	397			446			449		
Total, worst case		1685			1208				218			1766			1593	
Sun reduction		0.36			0.42				0.51			0.56			0.60	
Oper. time red.		1.00			1.00				1.00			1.00			1.00	
Wind dir. red.		0.68			0.68				0.63			0.63			0.63	
Total reduction		0.24			0.29				0.33			0.36			0.38	
Total, real		413			345				71			631			610	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 64

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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m**Shadow receptor:** 3380 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5894)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		19:02 (83)	06:32		19:02 (83)	07:02			07:31			07:04		15:20 (108)	07:37		15:29 (108)
	21:08	54	19:56 (83)	20:51	59	20:01 (83)	20:09			19:19			17:33	59	16:19 (108)	17:10	51	16:20 (108)
2	06:10		19:03 (83)	06:33		19:03 (83)	07:03			07:32			07:05		15:20 (108)	07:38		15:30 (108)
	21:08	53	19:56 (83)	20:50	57	20:00 (83)	20:08			19:17			17:32	60	16:20 (108)	17:10	49	16:19 (108)
3	06:10		19:03 (83)	06:34		19:03 (83)	07:04			07:33			07:06		15:19 (108)	07:39		15:31 (108)
	21:08	53	19:56 (83)	20:49	57	20:00 (83)	20:06			19:15			17:31	62	16:21 (108)	17:10	48	16:19 (108)
4	06:11		19:03 (83)	06:35		19:03 (83)	07:05			07:34			07:07		15:19 (108)	07:40		15:32 (108)
	21:08	54	19:57 (83)	20:48	57	20:00 (83)	20:05			19:14			17:30	62	16:21 (108)	17:10	47	16:19 (108)
5	06:11		19:02 (83)	06:36		19:03 (83)	07:06			07:35			07:08		15:18 (108)	07:41		15:33 (108)
	21:08	55	19:57 (83)	20:47	55	19:58 (83)	20:03			19:12			17:29	63	16:21 (108)	17:09	46	16:19 (108)
6	06:12		19:03 (83)	06:37		19:03 (83)	07:07			07:36			07:09		15:18 (108)	07:42		15:34 (108)
	21:08	55	19:58 (83)	20:45	55	19:58 (83)	20:01			19:10			17:28	64	16:22 (108)	17:09	45	16:19 (108)
7	06:12		19:02 (83)	06:38		19:04 (83)	07:08			07:37			07:10		15:18 (108)	07:43		15:35 (108)
	21:07	55	19:57 (83)	20:44	53	19:57 (83)	20:00			19:09			17:27	64	16:22 (108)	17:09	44	16:19 (108)
8	06:13		19:03 (83)	06:39		19:04 (83)	07:09			07:38			07:12		15:18 (108)	07:44		15:36 (108)
	21:07	55	19:58 (83)	20:43	52	19:56 (83)	19:57			19:07			17:26	64	16:22 (108)	17:09	43	16:19 (108)
9	06:14		19:03 (83)	06:40		19:05 (83)	07:10			07:39			07:13		15:17 (108)	07:45		15:37 (108)
	21:07	56	19:59 (83)	20:42	50	19:55 (83)	19:55			19:06			17:24	65	16:22 (108)	17:09	42	16:19 (108)
10	06:14		19:02 (83)	06:41		19:06 (83)	07:10			07:40			07:14		15:18 (108)	07:46		15:38 (108)
	21:06	57	19:59 (83)	20:41	48	19:54 (83)	19:53			19:04			17:24	64	16:22 (108)	17:09	41	16:19 (108)
11	06:15		19:02 (83)	06:42		19:07 (83)	07:11			07:41			07:15		15:18 (108)	07:47		15:39 (108)
	21:06	57	19:59 (83)	20:39	46	19:53 (83)	19:52			19:03			17:23	64	16:22 (108)	17:09	40	16:19 (108)
12	06:16		19:03 (83)	06:43		19:08 (83)	07:12			07:42			07:16		15:18 (108)	07:47		15:39 (108)
	21:06	57	20:00 (83)	20:38	44	19:52 (83)	19:50			19:01			17:22	64	16:22 (108)	17:10	39	16:18 (108)
13	06:16		19:02 (83)	06:44		19:09 (83)	07:13			07:43			07:17		15:18 (108)	07:48		15:40 (108)
	21:05	57	19:59 (83)	20:37	42	19:51 (83)	19:48			18:59			17:21	64	16:22 (108)	17:10	38	16:18 (108)
14	06:17		19:02 (83)	06:45		19:10 (83)	07:14			07:44			07:19		15:18 (108)	07:49		15:41 (108)
	21:05	58	20:00 (83)	20:36	39	19:49 (83)	19:47			18:58			17:20	64	16:22 (108)	17:10	38	16:19 (108)
15	06:18		19:02 (83)	06:46		19:12 (83)	07:15			07:45			07:20		15:19 (108)	07:50		15:42 (108)
	21:04	59	20:01 (83)	20:34	36	19:48 (83)	19:45			18:56			17:19	63	16:22 (108)	17:10	37	16:19 (108)
16	06:19		19:02 (83)	06:47		19:14 (83)	07:16			07:46			07:21		15:19 (108)	07:50		15:42 (108)
	21:04	59	20:01 (83)	20:33	32	19:46 (83)	19:43			18:55			17:18	63	16:22 (108)	17:10	37	16:19 (108)
17	06:19		19:02 (83)	06:48		19:15 (83)	07:17			07:47			07:22		15:19 (108)	07:51		15:43 (108)
	21:03	59	20:01 (83)	20:32	27	19:42 (83)	19:42			18:53			17:17	63	16:22 (108)	17:11	36	16:19 (108)
18	06:20		19:02 (83)	06:49		19:18 (83)	07:18			07:48		16:46 (108)	07:23		15:20 (108)	07:52		15:44 (108)
	21:02	59	20:01 (83)	20:30	21	19:39 (83)	19:40			18:52	14	17:00 (108)	17:17	62	16:22 (108)	17:11	36	16:20 (108)
19	06:21		19:02 (83)	06:50		19:22 (83)	07:19			07:49		16:41 (108)	07:24		15:21 (108)	07:52		15:44 (108)
	21:02	59	20:01 (83)	20:29	12	19:34 (83)	19:38			18:51	23	17:04 (108)	17:16	61	16:22 (108)	17:11	36	16:20 (108)
20	06:22		19:02 (83)	06:50			07:20			07:50		16:37 (108)	07:25		15:21 (108)	07:53		15:45 (108)
	21:01	60	20:02 (83)	20:27			19:37			18:49	30	17:07 (108)	17:15	61	16:22 (108)	17:12	35	16:20 (108)
21	06:23		19:01 (83)	06:51			07:21			07:51		16:35 (108)	07:27		15:22 (108)	07:53		15:45 (108)
	21:00	60	20:01 (83)	20:26			19:35			18:48	34	17:09 (108)	17:15	60	16:22 (108)	17:12	35	16:20 (108)
22	06:23		19:01 (83)	06:52			07:22			07:52		16:33 (108)	07:28		15:22 (108)	07:54		15:46 (108)
	21:00	60	20:01 (83)	20:25			19:33			18:46	38	17:11 (108)	17:14	59	16:21 (108)	17:13	35	16:21 (108)
23	06:24		19:01 (83)	06:53			07:23			07:53		16:31 (108)	07:29		15:23 (108)	07:54		15:46 (108)
	20:59	61	20:02 (83)	20:23			19:32			18:45	42	17:13 (108)	17:14	58	16:21 (108)	17:13	35	16:21 (108)
24	06:25		19:02 (83)	06:54			07:24			07:55		16:29 (108)	07:30		15:24 (108)	07:55		15:46 (108)
	20:58	60	20:02 (83)	20:22			19:30			18:44	45	17:14 (108)	17:13	58	16:22 (108)	17:14	35	16:21 (108)
25	06:26		19:02 (83)	06:55			07:25			07:56		16:27 (108)	07:31		15:25 (108)	07:55		15:47 (108)
	20:57	60	20:02 (83)	20:20			19:28			18:42	48	17:15 (108)	17:12	56	16:21 (108)	17:14	36	16:23 (108)
26	06:27		19:02 (83)	06:56			07:26			07:57		16:26 (108)	07:32		15:25 (108)	07:56		15:47 (108)
	20:57	60	20:02 (83)	20:19			19:27			18:41	49	17:15 (108)	17:12	56	16:21 (108)	17:15	36	16:23 (108)
27	06:28		19:01 (83)	06:57			07:27			07:58		16:24 (108)	07:33		15:26 (108)	07:56		15:47 (108)
	20:56	60	20:01 (83)	20:17			19:25			18:40	52	17:16 (108)	17:12	55	16:21 (108)	17:16	36	16:23 (108)
28	06:29		19:01 (83)	06:58			07:28			07:59		16:24 (108)	07:34		15:27 (108)	07:56		15:48 (108)
	20:55	60	20:01 (83)	20:16			19:23			18:38	54	17:18 (108)	17:11	53	16:20 (108)	17:16	37	16:25 (108)
29	06:30		19:02 (83)	06:59			07:29			08:00		16:23 (108)	07:35		15:27 (108)	07:57		15:48 (108)
	20:54	59	20:01 (83)	20:14			19:22			18:37	55	17:18 (108)	17:11	53	16:20 (108)	17:17	38	16:26 (108)
30	06:31		19:02 (83)	07:00			07:30			08:01		16:22 (108)	07:36		15:28 (108)	07:57		15:48 (108)
	20:53	59	20:01 (83)	20:13			19:20			18:36	57	17:19 (108)	17:10	52	16:20 (108)	17:18	38	16:26 (108)
31	06:31		19:02 (83)	07:01						08:02		16:21 (108)				07:57		15:48 (108)
	20:52	59	20:01 (83)	20:11						18:35	58	17:19 (108)				17:19	39	16:27 (108)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		1789			842						599			1816			1228	
Sun reduction		0.60			0.60						0.56			0.37			0.50	
Oper. time red.		1.00			1.00						1.00			1.00			1.00	
Wind dir. red.		0.63			0.63						0.68			0.68			0.68	
Total reduction		0.38			0.38						0.38			0.25			0.34	
Total, real		685			322						228			457			418	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 65

Licensed user:
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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m**Shadow receptor:** 3417 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5907)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March	April	May	June		
1	07:58		15:53 (133)	07:45		15:56 (133)	07:10	07:20	06:36	06:08		
	17:20	51	16:44 (133)	17:53	66	17:02 (133)	18:26	19:59	20:28	20:57		
2	07:58		15:53 (133)	07:44		15:56 (133)	07:08	07:19	06:35	06:08		
	17:21	51	16:44 (133)	17:55	66	17:02 (133)	18:27	20:00	20:29	20:58		
3	07:58		15:53 (133)	07:43		15:57 (133)	07:07	07:17	06:33	06:07		
	17:22	52	16:45 (133)	17:56	65	17:02 (133)	18:28	20:00	20:30	20:59		
4	07:58		15:53 (133)	07:42		15:57 (133)	07:05	07:16	06:32	06:07		
	17:22	53	16:46 (133)	17:57	65	17:02 (133)	18:30	20:01	20:31	20:59		
5	07:58		15:53 (133)	07:41		15:58 (133)	07:04	07:14	06:31	06:07		
	17:23	54	16:47 (133)	17:58	64	17:02 (133)	18:31	20:02	20:33	21:00		
6	07:58		15:52 (133)	07:40		15:58 (133)	07:02	07:12	06:30	06:06		07:20 (87)
	17:24	55	16:47 (133)	17:59	63	17:01 (133)	18:32	20:03	20:34	21:01	4	07:24 (87)
7	07:58		15:53 (133)	07:39		15:58 (133)	07:01	07:11	06:29	06:06		07:15 (87)
	17:25	55	16:48 (133)	18:01	62	17:00 (133)	18:33	20:04	20:35	21:01	14	07:29 (87)
8	07:58		15:53 (133)	07:38		15:59 (133)	07:59	07:09	06:28	06:06		07:12 (87)
	17:26	56	16:49 (133)	18:02	61	17:00 (133)	19:34	20:05	20:36	21:02	19	07:31 (87)
9	07:58		15:53 (133)	07:36		16:00 (133)	07:58	07:08	06:26	06:06		07:11 (87)
	17:27	57	16:50 (133)	18:03	60	17:00 (133)	19:35	20:06	20:37	21:02	22	07:33 (87)
10	07:57		15:53 (133)	07:35		16:01 (133)	07:56	07:06	06:25	06:06		07:10 (87)
	17:28	58	16:51 (133)	18:04	58	16:59 (133)	19:36	20:07	20:38	21:03	25	07:35 (87)
11	07:57		15:53 (133)	07:34		16:02 (133)	07:54	07:04	06:24	06:05		07:09 (87)
	17:29	58	16:51 (133)	18:05	57	16:59 (133)	19:37	20:08	20:38	21:04	27	07:36 (87)
12	07:57		15:53 (133)	07:33		16:02 (133)	07:53	07:03	06:23	06:05		07:08 (87)
	17:30	59	16:52 (133)	18:07	55	16:57 (133)	19:38	20:09	20:39	21:04	29	07:37 (87)
13	07:57		15:53 (133)	07:32		16:04 (133)	07:51	07:01	06:22	06:05		07:08 (87)
	17:31	60	16:53 (133)	18:08	53	16:57 (133)	19:39	20:10	20:40	21:05	30	07:38 (87)
14	07:56		15:53 (133)	07:30		16:05 (133)	07:50	07:00	06:21	06:05		07:07 (87)
	17:32	60	16:53 (133)	18:09	51	16:56 (133)	19:40	20:11	20:41	21:05	32	07:39 (87)
15	07:56		15:53 (133)	07:29		16:07 (133)	07:48	06:58	06:20	06:05		07:07 (87)
	17:33	61	16:54 (133)	18:10	48	16:55 (133)	19:41	20:12	20:42	21:06	33	07:40 (87)
16	07:56		15:53 (133)	07:28		16:07 (133)	07:46	06:57	06:19	06:05		07:07 (87)
	17:35	61	16:54 (133)	18:11	46	16:53 (133)	19:42	20:13	20:43	21:06	33	07:40 (87)
17	07:55		15:53 (133)	07:27		16:09 (133)	07:45	06:55	06:18	06:05		07:07 (87)
	17:36	63	16:56 (133)	18:13	43	16:52 (133)	19:43	20:14	20:44	21:06	34	07:41 (87)
18	07:55		15:53 (133)	07:25		16:12 (133)	07:43	06:54	06:18	06:05		07:06 (87)
	17:37	63	16:56 (133)	18:14	39	16:51 (133)	19:44	20:15	20:45	21:07	35	07:41 (87)
19	07:54		15:53 (133)	07:24		16:13 (133)	07:41	06:52	06:17	06:06		07:06 (87)
	17:38	64	16:57 (133)	18:15	35	16:48 (133)	19:46	20:16	20:46	21:07	36	07:42 (87)
20	07:54		15:53 (133)	07:23		16:16 (133)	07:40	06:51	06:16	06:06		07:07 (87)
	17:39	64	16:57 (133)	18:16	30	16:46 (133)	19:47	20:17	20:47	21:07	36	07:43 (87)
21	07:53		15:54 (133)	07:21		16:20 (133)	07:38	06:49	06:15	06:06		07:07 (87)
	17:40	64	16:58 (133)	18:17	23	16:43 (133)	19:48	20:18	20:48	21:08	36	07:43 (87)
22	07:52		15:53 (133)	07:20		16:24 (133)	07:37	06:48	06:14	06:06		07:07 (87)
	17:41	66	16:59 (133)	18:18	14	16:38 (133)	19:49	20:19	20:49	21:08	36	07:43 (87)
23	07:52		15:53 (133)	07:19			07:35	06:47	06:14	06:06		07:07 (87)
	17:43	66	16:59 (133)	18:19			19:50	20:20	20:50	21:08	36	07:43 (87)
24	07:51		15:54 (133)	07:17			07:33	06:45	06:13	06:07		07:08 (87)
	17:44	66	17:00 (133)	18:21			19:51	20:21	20:51	21:08	35	07:43 (87)
25	07:50		15:54 (133)	07:16			07:32	06:44	06:12	06:07		07:08 (87)
	17:45	66	17:00 (133)	18:22			19:52	20:22	20:52	21:08	35	07:43 (87)
26	07:50		15:54 (133)	07:14			07:30	06:42	06:12	06:07		07:09 (87)
	17:46	66	17:00 (133)	18:23			19:53	20:23	20:52	21:08	34	07:43 (87)
27	07:49		15:54 (133)	07:13			07:28	06:41	06:11	06:08		07:10 (87)
	17:47	66	17:00 (133)	18:24			19:54	20:24	20:53	21:09	33	07:43 (87)
28	07:48		15:54 (133)	07:11			07:27	06:40	06:10	06:08		07:10 (87)
	17:48	66	17:00 (133)	18:25			19:55	20:25	20:54	21:09	32	07:42 (87)
29	07:47		15:54 (133)				07:25	06:38	06:10	06:08		07:11 (87)
	17:50	67	17:01 (133)				19:56	20:26	20:55	21:09	31	07:42 (87)
30	07:46		15:55 (133)				07:24	06:37	06:09	06:09		07:12 (87)
	17:51	67	17:02 (133)				19:57	20:27	20:56	21:09	30	07:42 (87)
31	07:46		15:56 (133)				07:22		06:09			
	17:52	66	17:02 (133)				19:58		20:56			
Potential sun hours	300			299			370	397	446	449		
Total, worst case		1881			1124						747	
Sun reduction		0.36			0.42						0.60	
Oper. time red.		1.00			1.00						1.00	
Wind dir. red.		0.68			0.68						0.68	
Total reduction		0.24			0.28						0.41	
Total, real		457			319						306	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

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4/30/2012 9:43 AM / 66

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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m**Shadow receptor:** 3417 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5907)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August	September	October			November			December		
1	06:09		07:13 (87)	06:32	07:02	07:31			07:04		15:31 (133)	07:38		15:35 (133)
	21:09	28	07:41 (87)	20:51	20:10	19:19			17:33	58	16:29 (133)	17:10	58	16:33 (133)
2	06:10		07:15 (87)	06:33	07:03	07:32			07:05		15:30 (133)	07:39		15:35 (133)
	21:08	25	07:40 (87)	20:50	20:08	19:17			17:32	60	16:30 (133)	17:10	58	16:33 (133)
3	06:10		07:16 (87)	06:34	07:04	07:33			07:06		15:29 (133)	07:40		15:36 (133)
	21:08	23	07:39 (87)	20:49	20:06	19:15			17:31	61	16:30 (133)	17:10	57	16:33 (133)
4	06:11		07:18 (87)	06:35	07:05	07:34			07:07		15:28 (133)	07:41		15:37 (133)
	21:08	20	07:38 (87)	20:48	20:05	19:14			17:30	62	16:30 (133)	17:10	56	16:33 (133)
5	06:11		07:19 (87)	06:36	07:06	07:35			07:08		15:27 (133)	07:41		15:38 (133)
	21:08	16	07:35 (87)	20:47	20:03	19:12			17:29	63	16:30 (133)	17:10	55	16:33 (133)
6	06:12		07:23 (87)	06:37	07:07	07:36			07:09		15:28 (133)	07:42		15:38 (133)
	21:08	10	07:33 (87)	20:46	20:02	19:11			17:28	63	16:31 (133)	17:09	55	16:33 (133)
7	06:12			06:38	07:08	07:37			07:11		15:27 (133)	07:43		15:39 (133)
	21:08			20:44	20:00	19:09			17:27	65	16:32 (133)	17:09	54	16:33 (133)
8	06:13			06:39	07:09	07:38			07:12		15:27 (133)	07:44		15:40 (133)
	21:07			20:43	19:57	19:07			17:26	65	16:32 (133)	17:09	53	16:33 (133)
9	06:14			06:40	07:10	07:39			07:13		15:26 (133)	07:45		15:41 (133)
	21:07			20:42	19:55	19:06			17:25	66	16:32 (133)	17:09	52	16:33 (133)
10	06:14			06:41	07:11	07:40			07:14		15:27 (133)	07:46		15:42 (133)
	21:07			20:41	19:53	19:04			17:24	66	16:33 (133)	17:09	52	16:34 (133)
11	06:15			06:42	07:12	07:41			07:15		15:26 (133)	07:47		15:43 (133)
	21:06			20:40	19:52	19:03			17:23	67	16:33 (133)	17:10	51	16:34 (133)
12	06:16			06:43	07:12	07:42			07:16		15:26 (133)	07:48		15:44 (133)
	21:06			20:38	19:50	19:01			17:22	67	16:33 (133)	17:10	50	16:34 (133)
13	06:16			06:44	07:13	07:43			07:18		15:26 (133)	07:48		15:44 (133)
	21:05			20:37	19:48	19:00			17:21	67	16:33 (133)	17:10	50	16:34 (133)
14	06:17			06:45	07:14	07:44			07:19		15:27 (133)	07:49		15:45 (133)
	21:05			20:36	19:47	18:58			17:20	66	16:33 (133)	17:10	49	16:34 (133)
15	06:18			06:46	07:15	07:45			07:20		15:27 (133)	07:50		15:46 (133)
	21:04			20:34	19:45	18:57			17:19	66	16:33 (133)	17:10	49	16:35 (133)
16	06:19			06:47	07:16	07:46			07:21		15:27 (133)	07:51		15:46 (133)
	21:04			20:33	19:43	18:55			17:18	66	16:33 (133)	17:11	48	16:34 (133)
17	06:19			06:48	07:17	07:47			07:22		15:27 (133)	07:51		15:47 (133)
	21:03			20:32	19:42	18:54			17:18	66	16:33 (133)	17:11	48	16:35 (133)
18	06:20			06:49	07:18	07:48			07:23		15:28 (133)	07:52		15:48 (133)
	21:03			20:30	19:40	18:52			17:17	66	16:34 (133)	17:11	47	16:35 (133)
19	06:21			06:50	07:19	07:49			07:24		15:28 (133)	07:52		15:48 (133)
	21:02			20:29	19:39	18:51			17:16	66	16:34 (133)	17:12	47	16:35 (133)
20	06:22			06:51	07:20	07:50		16:52 (133)	07:26		15:28 (133)	07:53		15:49 (133)
	21:01			20:28	19:37	18:49	18	17:10 (133)	17:15	66	16:34 (133)	17:12	47	16:36 (133)
21	06:23			06:52	07:21	07:51		16:49 (133)	07:27		15:29 (133)	07:54		15:49 (133)
	21:01			20:26	19:35	18:48	26	17:15 (133)	17:15	64	16:33 (133)	17:12	47	16:36 (133)
22	06:24			06:52	07:22	07:53		16:46 (133)	07:28		15:29 (133)	07:54		15:50 (133)
	21:00			20:25	19:34	18:46	31	17:17 (133)	17:14	64	16:33 (133)	17:13	47	16:37 (133)
23	06:24			06:53	07:23	07:54		16:43 (133)	07:29		15:29 (133)	07:55		15:50 (133)
	20:59			20:23	19:32	18:45	36	17:19 (133)	17:14	64	16:33 (133)	17:13	47	16:37 (133)
24	06:25			06:54	07:24	07:55		16:41 (133)	07:30		15:31 (133)	07:55		15:51 (133)
	20:58			20:22	19:30	18:44	40	17:21 (133)	17:13	63	16:34 (133)	17:14	47	16:38 (133)
25	06:26			06:55	07:25	07:56		16:39 (133)	07:31		15:31 (133)	07:55		15:51 (133)
	20:58			20:20	19:29	18:42	43	17:22 (133)	17:13	63	16:34 (133)	17:15	47	16:38 (133)
26	06:27			06:56	07:26	07:57		16:37 (133)	07:32		15:32 (133)	07:56		15:51 (133)
	20:57			20:19	19:27	18:41	46	17:23 (133)	17:12	61	16:33 (133)	17:15	48	16:39 (133)
27	06:28			06:57	07:27	07:58		16:36 (133)	07:33		15:32 (133)	07:56		15:52 (133)
	20:56			20:17	19:25	18:40	49	17:25 (133)	17:12	61	16:33 (133)	17:16	48	16:40 (133)
28	06:29			06:58	07:28	07:59		16:35 (133)	07:34		15:33 (133)	07:57		15:52 (133)
	20:55			20:16	19:24	18:38	51	17:26 (133)	17:11	60	16:33 (133)	17:17	48	16:40 (133)
29	06:30			06:59	07:29	08:00		16:33 (133)	07:35		15:33 (133)	07:57		15:52 (133)
	20:54			20:14	19:22	18:37	54	17:27 (133)	17:11	60	16:33 (133)	17:17	49	16:41 (133)
30	06:31			07:00	07:30	08:01		16:32 (133)	07:36		15:34 (133)	07:57		15:52 (133)
	20:53			20:13	19:20	18:36	55	17:27 (133)	17:11	59	16:33 (133)	17:18	49	16:41 (133)
31	06:32			07:01		08:03		16:31 (133)				07:57		15:52 (133)
	20:52			20:11		18:35	57	17:28 (133)				17:19	50	16:42 (133)
Potential sun hours	456			427	374	346			300			291		
Total, worst case		122					506			1911			1563	
Sun reduction		0.60					0.56			0.37			0.50	
Oper. time red.		1.00					1.00			1.00			1.00	
Wind dir. red.		0.68					0.68			0.68			0.68	
Total reduction		0.41					0.38			0.25			0.34	
Total, real		50					191			477			528	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 67

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m**Shadow receptor:** 3429 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5916)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April	May	June
1	07:57		09:36 (129)	07:44		09:35 (129)	07:09		09:40 (129)	07:20	06:36	06:08
	17:19	92	11:08 (129)	17:53	114	11:29 (129)	18:26	93	11:13 (129)	19:59	20:28	20:57
2	07:57		09:36 (129)	07:43		09:35 (129)	07:08		09:40 (129)	07:18	06:34	06:08
	17:20	92	11:08 (129)	17:54	114	11:29 (129)	18:27	91	11:11 (129)	20:00	20:29	20:58
3	07:57		09:36 (129)	07:42		09:34 (129)	07:06		09:41 (129)	07:17	06:33	06:07
	17:21	93	11:09 (129)	17:55	116	11:30 (129)	18:28	88	11:09 (129)	20:00	20:30	20:58
4	07:57		09:36 (129)	07:41		09:34 (129)	07:05		09:42 (129)	07:15	06:32	06:07
	17:22	94	11:10 (129)	17:57	116	11:30 (129)	18:29	85	11:07 (129)	20:01	20:31	20:59
5	07:57		09:37 (129)	07:40		09:34 (129)	07:03		09:42 (129)	07:14	06:31	06:06
	17:23	94	11:11 (129)	17:58	116	11:30 (129)	18:30	82	11:04 (129)	20:02	20:32	21:00
6	07:57		09:37 (129)	07:39		09:35 (129)	07:02		09:43 (129)	07:12	06:29	06:06
	17:24	95	11:12 (129)	17:59	115	11:30 (129)	18:31	79	11:02 (129)	20:03	20:33	21:00
7	07:57		09:37 (129)	07:38		09:35 (129)	07:00		09:44 (129)	07:10	06:28	06:06
	17:25	96	11:13 (129)	18:00	116	11:31 (129)	18:32	75	10:59 (129)	20:04	20:34	21:01
8	07:57		09:37 (129)	07:37		09:35 (129)	07:59		10:46 (129)	07:09	06:27	06:06
	17:26	97	11:14 (129)	18:01	116	11:31 (129)	19:34	71	11:57 (129)	20:05	20:35	21:02
9	07:57		09:37 (129)	07:36		09:35 (129)	07:57		10:46 (129)	07:07	06:26	06:05
	17:27	98	11:15 (129)	18:03	116	11:31 (129)	19:35	67	11:53 (129)	20:06	20:36	21:02
10	07:57		09:37 (129)	07:35		09:35 (129)	07:56		10:48 (129)	07:06	06:25	06:05
	17:28	98	11:15 (129)	18:04	116	11:31 (129)	19:36	63	11:51 (129)	20:07	20:37	21:03
11	07:57		09:37 (129)	07:34		09:34 (129)	07:54		10:49 (129)	07:04	06:24	06:05
	17:29	99	11:16 (129)	18:05	116	11:30 (129)	19:37	58	11:47 (129)	20:08	20:38	21:03
12	07:57		09:37 (129)	07:33		09:35 (129)	07:52		10:51 (129)	07:03	06:23	06:05
	17:30	100	11:17 (129)	18:06	115	11:30 (129)	19:38	52	11:43 (129)	20:09	20:39	21:04
13	07:56		09:36 (129)	07:31		09:35 (129)	07:51		10:53 (129)	07:01	06:22	06:05
	17:31	101	11:17 (129)	18:07	115	11:30 (129)	19:39	46	11:39 (129)	20:10	20:40	21:04
14	07:56		09:37 (129)	07:30		09:35 (129)	07:49		10:56 (129)	06:59	06:21	06:05
	17:32	101	11:18 (129)	18:09	115	11:30 (129)	19:40	39	11:35 (129)	20:11	20:41	21:05
15	07:56		09:37 (129)	07:29		09:35 (129)	07:48		10:58 (129)	06:58	06:20	06:05
	17:33	102	11:19 (129)	18:10	114	11:29 (129)	19:41	31	11:29 (129)	20:12	20:42	21:05
16	07:55		09:36 (129)	07:28		09:35 (129)	07:46		11:04 (129)	06:56	06:19	06:05
	17:34	104	11:20 (129)	18:11	113	11:28 (129)	19:42	19	11:23 (129)	20:13	20:43	21:06
17	07:55		09:37 (129)	07:26		09:36 (129)	07:44			06:55	06:18	06:05
	17:35	104	11:21 (129)	18:12	112	11:28 (129)	19:43			20:14	20:44	21:06
18	07:54		09:36 (129)	07:25		09:35 (129)	07:43			06:53	06:17	06:05
	17:36	105	11:21 (129)	18:13	112	11:27 (129)	19:44			20:15	20:45	21:06
19	07:54		09:37 (129)	07:24		09:36 (129)	07:41			06:52	06:16	06:05
	17:38	106	11:23 (129)	18:14	110	11:26 (129)	19:45			20:16	20:46	21:07
20	07:53		09:36 (129)	07:22		09:36 (129)	07:40			06:51	06:16	06:05
	17:39	107	11:23 (129)	18:16	110	11:26 (129)	19:46			20:17	20:47	21:07
21	07:53		09:36 (129)	07:21		09:36 (129)	07:38			06:49	06:15	06:05
	17:40	107	11:23 (129)	18:17	108	11:24 (129)	19:47			20:18	20:48	21:07
22	07:52		09:36 (129)	07:20		09:37 (129)	07:36			06:48	06:14	06:06
	17:41	109	11:25 (129)	18:18	107	11:24 (129)	19:48			20:19	20:49	21:07
23	07:51		09:36 (129)	07:18		09:36 (129)	07:35			06:46	06:13	06:06
	17:42	109	11:25 (129)	18:19	106	11:22 (129)	19:49			20:20	20:49	21:08
24	07:51		09:36 (129)	07:17		09:37 (129)	07:33			06:45	06:12	06:06
	17:43	109	11:25 (129)	18:20	104	11:21 (129)	19:50			20:21	20:50	21:08
25	07:50		09:35 (129)	07:15		09:38 (129)	07:31			06:43	06:12	06:06
	17:45	111	11:26 (129)	18:21	102	11:20 (129)	19:51			20:22	20:51	21:08
26	07:49		09:36 (129)	07:14		09:38 (129)	07:30			06:42	06:11	06:07
	17:46	111	11:27 (129)	18:22	100	11:18 (129)	19:52			20:23	20:52	21:08
27	07:49		09:36 (129)	07:12		09:39 (129)	07:28			06:41	06:11	06:07
	17:47	111	11:27 (129)	18:24	98	11:17 (129)	19:53			20:24	20:53	21:08
28	07:48		09:35 (129)	07:11		09:39 (129)	07:26			06:39	06:10	06:08
	17:48	113	11:28 (129)	18:25	96	11:15 (129)	19:54			20:25	20:54	21:08
29	07:47		09:35 (129)				07:25			06:38	06:09	06:08
	17:49	113	11:28 (129)				19:55			20:26	20:54	21:08
30	07:46		09:35 (129)				07:23			06:37	06:09	06:08
	17:51	113	11:28 (129)				19:56			20:27	20:55	21:08
31	07:45		09:35 (129)				07:22				06:08	
	17:52	114	11:29 (129)				19:58				20:56	
Potential sun hours	300			299			370			397	446	449
Total, worst case		3198			3108			1039				
Sun reduction		0.36			0.42			0.44				
Oper. time red.		1.00			1.00			1.00				
Wind dir. red.		0.60			0.60			0.60				
Total reduction		0.21			0.25			0.26				
Total, real		686			778			272				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

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4/30/2012 9:43 AM / 68

Licensed user:
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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m**Shadow receptor:** 3429 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5916)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July	August	September			October			November			December		
1	06:09	06:32	07:02			07:30		10:31 (129)	07:03		09:04 (129)	07:37		09:19 (129)
	21:08	20:51	20:09			19:18	50	11:21 (129)	17:33	116	11:00 (129)	17:10	99	10:58 (129)
2	06:09	06:33	07:03			07:31		10:29 (129)	07:05		09:04 (129)	07:38		09:20 (129)
	21:08	20:50	20:08			19:17	55	11:24 (129)	17:32	116	11:00 (129)	17:10	98	10:58 (129)
3	06:10	06:34	07:04			07:32		10:27 (129)	07:06		09:05 (129)	07:39		09:20 (129)
	21:08	20:49	20:06			19:15	60	11:27 (129)	17:31	116	11:01 (129)	17:09	98	10:58 (129)
4	06:10	06:35	07:05			07:33		10:25 (129)	07:07		09:04 (129)	07:40		09:21 (129)
	21:08	20:47	20:04			19:13	64	11:29 (129)	17:30	116	11:00 (129)	17:09	97	10:58 (129)
5	06:11	06:36	07:06			07:34		10:23 (129)	07:08		09:04 (129)	07:41		09:22 (129)
	21:08	20:46	20:03			19:12	69	11:32 (129)	17:28	116	11:00 (129)	17:09	96	10:58 (129)
6	06:12	06:37	07:06			07:35		10:21 (129)	07:09		09:04 (129)	07:42		09:23 (129)
	21:07	20:45	20:01			19:10	73	11:34 (129)	17:27	116	11:00 (129)	17:09	95	10:58 (129)
7	06:12	06:38	07:07			07:36		10:20 (129)	07:10		09:05 (129)	07:43		09:24 (129)
	21:07	20:44	20:00			19:09	76	11:36 (129)	17:26	116	11:01 (129)	17:09	94	10:58 (129)
8	06:13	06:39	07:08			07:37		10:18 (129)	07:11		09:05 (129)	07:44		09:24 (129)
	21:07	20:43	19:56			19:07	80	11:38 (129)	17:25	116	11:01 (129)	17:09	94	10:58 (129)
9	06:13	06:40	07:09			07:38		10:17 (129)	07:13		09:05 (129)	07:45		09:25 (129)
	21:07	20:42	19:55			19:05	83	11:40 (129)	17:24	115	11:00 (129)	17:09	93	10:58 (129)
10	06:14	06:41	07:10			07:39		10:15 (129)	07:14		09:06 (129)	07:46		09:26 (129)
	21:06	20:40	19:53			19:04	87	11:42 (129)	17:23	114	11:00 (129)	17:09	92	10:58 (129)
11	06:15	06:42	07:11			07:41		10:14 (129)	07:15		09:07 (129)	07:46		09:26 (129)
	21:06	20:39	19:51			19:02	90	11:44 (129)	17:22	114	11:01 (129)	17:09	92	10:58 (129)
12	06:15	06:43	07:12			07:42		10:13 (129)	07:16		09:07 (129)	07:47		09:27 (129)
	21:05	20:38	19:50			19:01	92	11:45 (129)	17:21	113	11:00 (129)	17:09	91	10:58 (129)
13	06:16	06:44	07:13			07:43		10:12 (129)	07:17		09:07 (129)	07:48		09:28 (129)
	21:05	20:37	19:48			18:59	95	11:47 (129)	17:20	113	11:00 (129)	17:09	90	10:58 (129)
14	06:17	06:44	07:14			07:44		10:11 (129)	07:18		09:07 (129)	07:49		09:29 (129)
	21:05	20:35	19:46			18:58	97	11:48 (129)	17:20	113	11:00 (129)	17:10	90	10:59 (129)
15	06:18	06:45	07:15			07:45		10:10 (129)	07:20		09:09 (129)	07:50		09:29 (129)
	21:04	20:34	19:45			18:56	99	11:49 (129)	17:19	111	11:00 (129)	17:10	89	10:58 (129)
16	06:18	06:46	07:16			07:46		10:10 (129)	07:21		09:09 (129)	07:50		09:30 (129)
	21:03	20:33	19:43			18:55	101	11:51 (129)	17:18	111	11:00 (129)	17:10	89	10:59 (129)
17	06:19	06:47	07:17			07:47		10:09 (129)	07:22		09:09 (129)	07:51		09:31 (129)
	21:03	20:31	19:41			18:53	103	11:52 (129)	17:17	111	11:00 (129)	17:10	89	11:00 (129)
18	06:20	06:48	07:18			07:48		10:09 (129)	07:23		09:10 (129)	07:52		09:31 (129)
	21:02	20:30	19:40			18:52	104	11:53 (129)	17:16	109	10:59 (129)	17:11	88	10:59 (129)
19	06:21	06:49	07:19			07:49		10:08 (129)	07:24		09:10 (129)	07:52		09:32 (129)
	21:02	20:29	19:38			18:50	106	11:54 (129)	17:16	109	10:59 (129)	17:11	88	11:00 (129)
20	06:22	06:50	07:20			07:50		10:07 (129)	07:25		09:11 (129)	07:53		09:32 (129)
	21:01	20:27	19:36			18:49	107	11:54 (129)	17:15	109	11:00 (129)	17:12	88	11:00 (129)
21	06:22	06:51	07:21			07:51		10:06 (129)	07:26		09:12 (129)	07:53		09:33 (129)
	21:00	20:26	19:35			18:47	109	11:55 (129)	17:14	107	10:59 (129)	17:12	88	11:01 (129)
22	06:23	06:52	07:22			07:52		10:06 (129)	07:27		09:12 (129)	07:54		09:33 (129)
	21:00	20:24	19:33			18:46	110	11:56 (129)	17:14	107	10:59 (129)	17:13	88	11:01 (129)
23	06:24	06:53	07:23			07:53		10:06 (129)	07:29		09:13 (129)	07:54		09:34 (129)
	20:59	20:23	19:31			18:45	111	11:57 (129)	17:13	106	10:59 (129)	17:13	88	11:02 (129)
24	06:25	06:54	07:24			07:54		10:06 (129)	07:30		09:13 (129)	07:55		09:34 (129)
	20:58	20:21	19:30			18:43	112	11:58 (129)	17:13	105	10:58 (129)	17:14	88	11:02 (129)
25	06:26	06:55	07:25			07:55		10:05 (129)	07:31		09:14 (129)	07:55		09:35 (129)
	20:57	20:20	19:28			18:42	113	11:58 (129)	17:12	104	10:58 (129)	17:14	88	11:03 (129)
26	06:27	06:56	07:26			07:57		10:05 (129)	07:32		09:15 (129)	07:56		09:35 (129)
	20:56	20:18	19:27			18:41	113	11:58 (129)	17:12	104	10:59 (129)	17:15	89	11:04 (129)
27	06:28	06:57	07:26		10:49 (129)	07:58		10:04 (129)	07:33		09:16 (129)	07:56		09:35 (129)
	20:55	20:17	19:25	11	11:00 (129)	18:39	114	11:58 (129)	17:11	103	10:59 (129)	17:16	89	11:04 (129)
28	06:28	06:58	07:27		10:42 (129)	07:59		10:04 (129)	07:34		09:17 (129)	07:56		09:36 (129)
	20:55	20:15	19:23	26	11:08 (129)	18:38	115	11:59 (129)	17:11	101	10:58 (129)	17:16	89	11:05 (129)
29	06:29	06:59	07:28		10:37 (129)	08:00		10:05 (129)	07:35		09:17 (129)	07:56		09:36 (129)
	20:54	20:14	19:22	36	11:13 (129)	18:37	115	12:00 (129)	17:11	101	10:58 (129)	17:17	90	11:06 (129)
30	06:30	07:00	07:29		10:34 (129)	08:01		10:04 (129)	07:36		09:18 (129)	07:57		09:36 (129)
	20:53	20:12	19:20	43	11:17 (129)	18:35	116	12:00 (129)	17:10	100	10:58 (129)	17:18	90	11:06 (129)
31	06:31	07:01				08:02		10:04 (129)				07:57		09:36 (129)
	20:52	20:11				18:34	116	12:00 (129)				17:18	91	11:07 (129)
Potential sun hours	456	427	374			346			300			291		
Total, worst case				116			2935			3308			2828	
Sun reduction				0.61			0.56			0.37			0.50	
Oper. time red.				1.00			1.00			1.00			1.00	
Wind dir. red.				0.60			0.60			0.60			0.60	
Total reduction				0.36			0.33			0.22			0.30	
Total, real				42			980			730			843	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

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4/30/2012 9:43 AM / 69

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m**Shadow receptor:** 3431 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5918)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March	April			May			June		
1	07:57			07:44		08:06 (129)	07:09	07:20			06:36		07:04 (100)	06:08		07:00 (100)
	17:19			17:53	19	08:25 (129)	18:26	19:59			20:28	31	07:35 (100)	20:57	38	07:38 (100)
2	07:57			07:43		08:04 (129)	07:08	07:18			06:34		07:03 (100)	06:08		07:01 (100)
	17:20			17:54	23	08:27 (129)	18:27	20:00			20:29	33	07:36 (100)	20:58	37	07:38 (100)
3	07:57			07:42		08:03 (129)	07:06	07:17			06:33		07:02 (100)	06:07		07:01 (100)
	17:21			17:55	25	08:28 (129)	18:28	20:00			20:30	36	07:38 (100)	20:58	37	07:38 (100)
4	07:57			07:41		08:03 (129)	07:05	07:15			06:32		07:00 (100)	06:07		07:02 (100)
	17:22			17:57	26	08:29 (129)	18:29	20:01			20:31	38	07:38 (100)	20:59	36	07:38 (100)
5	07:58			07:40		08:02 (129)	07:03	07:14			06:31		06:59 (100)	06:06		07:02 (100)
	17:23			17:58	28	08:30 (129)	18:30	20:02			20:32	39	07:38 (100)	21:00	36	07:38 (100)
6	07:57			07:39		08:01 (129)	07:02	07:12			06:29		06:58 (100)	06:06		07:03 (100)
	17:24			17:59	30	08:31 (129)	18:31	20:03			20:33	41	07:39 (100)	21:00	35	07:38 (100)
7	07:57			07:38		08:01 (129)	07:00	07:10			06:28		06:58 (100)	06:06		07:03 (100)
	17:25			18:00	30	08:31 (129)	18:32	20:04			20:34	42	07:40 (100)	21:01	34	07:37 (100)
8	07:57			07:37		08:01 (129)	07:59	07:09			06:27		06:57 (100)	06:06		07:04 (100)
	17:26			18:01	31	08:32 (129)	19:34	20:05			20:35	43	07:40 (100)	21:02	33	07:37 (100)
9	07:57			07:36		08:01 (129)	07:57	07:07			06:26		06:57 (100)	06:05		07:04 (100)
	17:27			18:03	32	08:33 (129)	19:35	20:06			20:36	44	07:41 (100)	21:02	33	07:37 (100)
10	07:57			07:35		08:01 (129)	07:56	07:06			06:25		06:56 (100)	06:05		07:05 (100)
	17:28			18:04	32	08:33 (129)	19:36	20:07			20:37	45	07:41 (100)	21:03	32	07:37 (100)
11	07:57			07:34		08:00 (129)	07:54	07:04			06:24		06:56 (100)	06:05		07:06 (100)
	17:29			18:05	32	08:32 (129)	19:37	20:08			20:38	45	07:41 (100)	21:03	31	07:37 (100)
12	07:57			07:33		08:01 (129)	07:52	07:03			06:23		06:56 (100)	06:05		07:06 (100)
	17:30			18:06	31	08:32 (129)	19:38	20:09			20:39	45	07:41 (100)	21:04	31	07:37 (100)
13	07:56			07:31		08:01 (129)	07:51	07:01			06:22		06:56 (100)	06:05		07:07 (100)
	17:31			18:07	31	08:32 (129)	19:39	20:10			20:40	45	07:41 (100)	21:04	29	07:36 (100)
14	07:56			07:30		08:02 (129)	07:49	07:00			06:21		06:55 (100)	06:05		07:07 (100)
	17:32			18:09	30	08:32 (129)	19:40	20:11			20:41	46	07:41 (100)	21:05	29	07:36 (100)
15	07:56			07:29		08:01 (129)	07:48	06:58			06:20		06:55 (100)	06:05		07:08 (100)
	17:33			18:10	30	08:31 (129)	19:41	20:12			20:42	46	07:41 (100)	21:05	28	07:36 (100)
16	07:55			07:28		08:02 (129)	07:46	06:56			06:19		06:55 (100)	06:05		07:08 (100)
	17:34			18:11	29	08:31 (129)	19:42	20:13			20:43	46	07:41 (100)	21:06	28	07:36 (100)
17	07:55			07:26		08:03 (129)	07:44	06:55			06:18		06:55 (100)	06:05		07:08 (100)
	17:35			18:12	27	08:30 (129)	19:43	20:14			20:44	46	07:41 (100)	21:06	28	07:36 (100)
18	07:54			07:25		08:04 (129)	07:43	06:54			06:17		06:56 (100)	06:05		07:09 (100)
	17:36			18:13	24	08:28 (129)	19:44	20:15			20:45	46	07:42 (100)	21:06	27	07:36 (100)
19	07:54			07:24		08:05 (129)	07:41	06:52			06:16		06:56 (100)	06:05		07:09 (100)
	17:38			18:15	22	08:27 (129)	19:45	20:16			20:46	45	07:41 (100)	21:07	27	07:36 (100)
20	07:53			07:22		08:07 (129)	07:40	06:51			06:16		06:56 (100)	06:05		07:09 (100)
	17:39			18:16	19	08:26 (129)	19:46	20:17			20:47	45	07:41 (100)	21:07	27	07:36 (100)
21	07:53			07:21		08:09 (129)	07:38	06:49			06:15		06:55 (100)	06:06		07:09 (100)
	17:40			18:17	14	08:23 (129)	19:47	20:18			20:48	46	07:41 (100)	21:07	27	07:36 (100)
22	07:52			07:20		08:13 (129)	07:36	06:48			06:14		06:56 (100)	06:06		07:10 (100)
	17:41			18:18	6	08:19 (129)	19:48	20:19			20:49	45	07:41 (100)	21:07	27	07:37 (100)
23	07:52			07:18			07:35	06:46			06:13		06:56 (100)	06:06		07:10 (100)
	17:42			18:19			19:49	20:20			20:49	45	07:41 (100)	21:08	27	07:37 (100)
24	07:51			07:17			07:33	06:45			06:13		06:56 (100)	06:06		07:10 (100)
	17:43			18:20			19:50	20:21			20:50	44	07:40 (100)	21:08	27	07:37 (100)
25	07:50			07:15			07:31	06:44			06:12		06:57 (100)	06:07		07:10 (100)
	17:45			18:21			19:51	20:22			20:51	43	07:40 (100)	21:08	28	07:38 (100)
26	07:49			07:14			07:30	06:42			06:11		06:57 (100)	06:07		07:10 (100)
	17:46			18:23			19:52	20:23			20:52	43	07:40 (100)	21:08	28	07:38 (100)
27	07:49			07:12			07:28	06:41		07:13 (100)	06:11		06:57 (100)	06:07		07:10 (100)
	17:47			18:24			19:53	20:24	14	07:27 (100)	20:53	42	07:39 (100)	21:08	28	07:38 (100)
28	07:48			07:11			07:26	06:39		07:10 (100)	06:10		06:58 (100)	06:08		07:10 (100)
	17:48			18:25			19:54	20:25	20	07:30 (100)	20:54	41	07:39 (100)	21:08	29	07:39 (100)
29	07:47						07:25	06:38		07:07 (100)	06:09		06:58 (100)	06:08		07:10 (100)
	17:49						19:55	20:26	25	07:32 (100)	20:55	41	07:39 (100)	21:08	29	07:39 (100)
30	07:46		08:09 (129)				07:23	06:37		07:05 (100)	06:09		06:59 (100)	06:08		07:09 (100)
	17:51	12	08:21 (129)				19:57	20:27	28	07:33 (100)	20:55	40	07:39 (100)	21:08	31	07:40 (100)
31	07:45		08:07 (129)				07:22				06:08		07:00 (100)			
	17:52	16	08:23 (129)				19:58				20:56	39	07:39 (100)			
Potential sun hours	300			299			370	397			446			449		
Total, worst case		28			571				87			1316			917	
Sun reduction		0.36			0.42				0.51			0.56			0.60	
Oper. time red.		1.00			1.00				1.00			1.00			1.00	
Wind dir. red.		0.62			0.62				0.67			0.67			0.67	
Total reduction		0.22			0.26				0.34			0.38			0.40	
Total, real		6			148				30			495			370	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

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4/30/2012 9:43 AM / 70

Licensed user:
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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m**Shadow receptor:** 3431 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (5918)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September	October			November			December
1	06:09		07:10 (100)	06:32		07:06 (100)	07:02	07:30			07:03		07:30 (129)	07:37
	21:08	31	07:41 (100)	20:51	46	07:52 (100)	20:09	19:18			17:33	32	08:02 (129)	17:10
2	06:09		07:09 (100)	06:33		07:07 (100)	07:03	07:31			07:05		07:31 (129)	07:38
	21:08	32	07:41 (100)	20:50	45	07:52 (100)	20:08	19:17			17:32	31	08:02 (129)	17:10
3	06:10		07:10 (100)	06:34		07:06 (100)	07:04	07:32			07:06		07:31 (129)	07:39
	21:08	32	07:42 (100)	20:49	44	07:50 (100)	20:06	19:15			17:31	31	08:02 (129)	17:10
4	06:10		07:09 (100)	06:35		07:07 (100)	07:05	07:33			07:07		07:31 (129)	07:40
	21:08	33	07:42 (100)	20:48	43	07:50 (100)	20:04	19:13			17:30	30	08:01 (129)	17:09
5	06:11		07:09 (100)	06:36		07:07 (100)	07:06	07:34			07:08		07:31 (129)	07:41
	21:08	34	07:43 (100)	20:46	43	07:50 (100)	20:03	19:12			17:28	30	08:01 (129)	17:09
6	06:12		07:09 (100)	06:37		07:08 (100)	07:06	07:35			07:09		07:32 (129)	07:42
	21:07	35	07:44 (100)	20:45	41	07:49 (100)	20:01	19:10			17:27	28	08:00 (129)	17:09
7	06:12		07:09 (100)	06:38		07:08 (100)	07:07	07:36			07:10		07:33 (129)	07:43
	21:07	35	07:44 (100)	20:44	41	07:49 (100)	20:00	19:09			17:26	27	08:00 (129)	17:09
8	06:13		07:09 (100)	06:39		07:09 (100)	07:08	07:37			07:11		07:34 (129)	07:44
	21:07	36	07:45 (100)	20:43	39	07:48 (100)	19:56	19:07			17:25	25	07:59 (129)	17:09
9	06:13		07:08 (100)	06:40		07:10 (100)	07:09	07:38			07:13		07:35 (129)	07:45
	21:07	37	07:45 (100)	20:42	37	07:47 (100)	19:55	19:05			17:24	22	07:57 (129)	17:09
10	06:14		07:08 (100)	06:41		07:11 (100)	07:10	07:40			07:14		07:37 (129)	07:46
	21:06	37	07:45 (100)	20:41	35	07:46 (100)	19:53	19:04			17:23	19	07:56 (129)	17:09
11	06:15		07:08 (100)	06:42		07:12 (100)	07:11	07:41			07:15		07:39 (129)	07:46
	21:06	38	07:46 (100)	20:39	33	07:45 (100)	19:51	19:02			17:22	16	07:55 (129)	17:09
12	06:15		07:07 (100)	06:43		07:13 (100)	07:12	07:42			07:16		07:42 (129)	07:47
	21:05	39	07:46 (100)	20:38	30	07:43 (100)	19:50	19:01			17:21	10	07:52 (129)	17:09
13	06:16		07:07 (100)	06:44		07:14 (100)	07:13	07:43			07:17			07:48
	21:05	40	07:47 (100)	20:37	28	07:42 (100)	19:48	18:59			17:21			17:09
14	06:17		07:08 (100)	06:44		07:15 (100)	07:14	07:44			07:18			07:49
	21:05	40	07:48 (100)	20:35	24	07:39 (100)	19:46	18:58			17:20			17:10
15	06:18		07:08 (100)	06:45		07:18 (100)	07:15	07:45			07:20			07:50
	21:04	41	07:49 (100)	20:34	18	07:36 (100)	19:45	18:56			17:19			17:10
16	06:18		07:07 (100)	06:46		07:21 (100)	07:16	07:46			07:21			07:50
	21:03	41	07:48 (100)	20:33	11	07:32 (100)	19:43	18:55			17:18			17:10
17	06:19		07:07 (100)	06:47			07:17	07:47			07:22			07:51
	21:03	42	07:49 (100)	20:31			19:42	18:53			17:17			17:10
18	06:20		07:07 (100)	06:48			07:18	07:48			07:23			07:52
	21:02	43	07:50 (100)	20:30			19:40	18:52			17:16			17:11
19	06:21		07:07 (100)	06:49			07:19	07:49			07:24			07:52
	21:02	43	07:50 (100)	20:29			19:38	18:50			17:16			17:11
20	06:22		07:06 (100)	06:50			07:20	07:50		08:42 (129)	07:25			07:53
	21:01	44	07:50 (100)	20:27			19:37	18:49	9	08:51 (129)	17:15			17:12
21	06:22		07:06 (100)	06:51			07:21	07:51		08:39 (129)	07:26			07:53
	21:00	44	07:50 (100)	20:26			19:35	18:47	15	08:54 (129)	17:14			17:12
22	06:23		07:06 (100)	06:52			07:22	07:52		08:36 (129)	07:28			07:54
	21:00	45	07:51 (100)	20:24			19:33	18:46	20	08:56 (129)	17:14			17:13
23	06:24		07:06 (100)	06:53			07:23	07:53		08:35 (129)	07:29			07:54
	20:59	45	07:51 (100)	20:23			19:32	18:45	23	08:58 (129)	17:13			17:13
24	06:25		07:06 (100)	06:54			07:24	07:54		08:34 (129)	07:30			07:55
	20:58	46	07:52 (100)	20:21			19:30	18:43	25	08:59 (129)	17:13			17:14
25	06:26		07:06 (100)	06:55			07:25	07:56		08:33 (129)	07:31			07:55
	20:57	46	07:52 (100)	20:20			19:28	18:42	27	09:00 (129)	17:12			17:14
26	06:27		07:05 (100)	06:56			07:26	07:57		08:32 (129)	07:32			07:56
	20:56	46	07:51 (100)	20:18			19:27	18:41	29	09:01 (129)	17:12			17:15
27	06:28		07:05 (100)	06:57			07:27	07:58		08:31 (129)	07:33			07:56
	20:55	47	07:52 (100)	20:17			19:25	18:39	30	09:01 (129)	17:11			17:16
28	06:28		07:06 (100)	06:58			07:27	07:59		08:30 (129)	07:34			07:56
	20:55	46	07:52 (100)	20:15			19:23	18:38	31	09:01 (129)	17:11			17:16
29	06:29		07:06 (100)	06:59			07:28	08:00		08:31 (129)	07:35			07:57
	20:54	46	07:52 (100)	20:14			19:22	18:37	31	09:02 (129)	17:11			17:17
30	06:30		07:06 (100)	07:00			07:29	08:01		08:30 (129)	07:36			07:57
	20:53	46	07:52 (100)	20:12			19:20	18:36	32	09:02 (129)	17:10			17:18
31	06:31		07:06 (100)	07:01				08:02		08:30 (129)				07:57
	20:52	46	07:52 (100)	20:11				18:34	32	09:02 (129)				17:18
Potential sun hours	456			427			374	346			300			291
Total, worst case		1256			558				304			301		
Sun reduction		0.60			0.60				0.56			0.37		
Oper. time red.		1.00			1.00				1.00			1.00		
Wind dir. red.		0.67			0.67				0.62			0.62		
Total reduction		0.40			0.40				0.35			0.23		
Total, real		506			225				105			69		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

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4/30/2012 9:43 AM / 71

Licensed user:
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217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m**Shadow receptor:** 6175 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6031)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57			07:44		08:21 (128)	07:09		08:31 (128)	07:20			06:36		19:42 (94)	06:08		19:35 (94)
	17:20			17:53	56	09:17 (128)	18:26	32	09:03 (128)	19:58			20:28	14	19:56 (94)	20:57	28	20:03 (94)
2	07:57			07:43		08:21 (128)	07:08		08:33 (128)	07:18			06:34		19:39 (94)	06:08		19:36 (94)
	17:20			17:54	57	09:18 (128)	18:27	28	09:01 (128)	19:59			20:29	19	19:58 (94)	20:57	28	20:04 (94)
3	07:57			07:42		08:20 (128)	07:06		08:36 (128)	07:17			06:33		19:37 (94)	06:07		19:36 (94)
	17:21			17:55	58	09:18 (128)	18:28	21	08:57 (128)	20:00			20:30	22	19:59 (94)	20:58	27	20:03 (94)
4	07:57			07:41		08:20 (128)	07:05		08:42 (128)	07:15			06:32		19:35 (94)	06:07		19:37 (94)
	17:22			17:57	59	09:19 (128)	18:29	10	08:52 (128)	20:00			20:31	26	20:01 (94)	20:59	25	20:02 (94)
5	07:57			07:40		08:20 (128)	07:03			07:14			06:31		19:34 (94)	06:06		19:38 (94)
	17:23			17:58	59	09:19 (128)	18:30			20:01			20:32	28	20:02 (94)	20:59	24	20:02 (94)
6	07:57			07:39		08:20 (128)	07:02			07:12			06:29		19:33 (94)	06:06		19:39 (94)
	17:24			17:59	60	09:20 (128)	18:31			20:03			20:33	30	20:03 (94)	21:00	23	20:02 (94)
7	07:57			07:38		08:20 (128)	07:00			07:10			06:28		19:32 (94)	06:06		19:39 (94)
	17:25			18:00	60	09:20 (128)	18:32			20:04			20:34	32	20:04 (94)	21:01	22	20:01 (94)
8	07:57			07:37		08:20 (128)	07:59			07:09			06:27		19:32 (94)	06:06		19:40 (94)
	17:26			18:01	61	09:21 (128)	19:33			20:05			20:35	32	20:04 (94)	21:01	21	20:01 (94)
9	07:57			07:36		08:20 (128)	07:57			07:07			06:26		19:31 (94)	06:05		19:41 (94)
	17:27			18:03	61	09:21 (128)	19:35			20:06			20:36	34	20:05 (94)	21:02	20	20:01 (94)
10	07:57			07:35		08:19 (128)	07:55			07:06			06:25		19:30 (94)	06:05		19:42 (94)
	17:28			18:04	61	09:20 (128)	19:36			20:07			20:37	35	20:05 (94)	21:02	19	20:01 (94)
11	07:57			07:34		08:19 (128)	07:54			07:04			06:24		19:30 (94)	06:05		19:42 (94)
	17:29			18:05	62	09:21 (128)	19:37			20:08			20:38	36	20:06 (94)	21:03	18	20:00 (94)
12	07:56			07:32		08:19 (128)	07:52			07:03			06:23		19:30 (94)	06:05		19:43 (94)
	17:30			18:06	62	09:21 (128)	19:38			20:09			20:39	36	20:06 (94)	21:04	17	20:00 (94)
13	07:56			07:31		08:20 (128)	07:51			07:01			06:22		19:29 (94)	06:05		19:44 (94)
	17:31			18:07	61	09:21 (128)	19:39			20:10			20:40	37	20:06 (94)	21:04	16	20:00 (94)
14	07:56			07:30		08:19 (128)	07:49			06:59			06:21		19:29 (94)	06:05		19:45 (94)
	17:32			18:09	61	09:20 (128)	19:40			20:11			20:41	37	20:06 (94)	21:05	14	19:59 (94)
15	07:55		08:39 (128)	07:29		08:19 (128)	07:48			06:58			06:20		19:29 (94)	06:05		19:45 (94)
	17:33	11	08:50 (128)	18:10	61	09:20 (128)	19:41			20:12			20:42	37	20:06 (94)	21:05	14	19:59 (94)
16	07:55		08:37 (128)	07:27		08:20 (128)	07:46			06:56			06:19		19:29 (94)	06:05		19:46 (94)
	17:34	17	08:54 (128)	18:11	60	09:20 (128)	19:42			20:13			20:43	37	20:06 (94)	21:05	13	19:59 (94)
17	07:55		08:34 (128)	07:26		08:21 (128)	07:44			06:55			06:18		19:29 (94)	06:05		19:47 (94)
	17:35	22	08:56 (128)	18:12	59	09:20 (128)	19:43			20:14			20:44	37	20:06 (94)	21:06	12	19:59 (94)
18	07:54		08:33 (128)	07:25		08:20 (128)	07:43			06:53			06:17		19:30 (94)	06:05		19:47 (94)
	17:36	26	08:59 (128)	18:13	58	09:18 (128)	19:44			20:15			20:45	37	20:07 (94)	21:06	11	19:58 (94)
19	07:54		08:31 (128)	07:24		08:21 (128)	07:41			06:52			06:16		19:30 (94)	06:05		19:47 (94)
	17:38	30	09:01 (128)	18:14	57	09:18 (128)	19:45			20:16			20:46	37	20:07 (94)	21:06	11	19:58 (94)
20	07:53		08:30 (128)	07:22		08:21 (128)	07:39			06:51			06:16		19:30 (94)	06:05		19:47 (94)
	17:39	33	09:03 (128)	18:16	56	09:17 (128)	19:46			20:17			20:47	36	20:06 (94)	21:07	11	19:58 (94)
21	07:53		08:29 (128)	07:21		08:22 (128)	07:38			06:49			06:15		19:30 (94)	06:06		19:48 (94)
	17:40	35	09:04 (128)	18:17	54	09:16 (128)	19:47			20:18			20:47	36	20:06 (94)	21:07	10	19:58 (94)
22	07:52		08:28 (128)	07:19		08:23 (128)	07:36			06:48			06:14		19:31 (94)	06:06		19:49 (94)
	17:41	38	09:06 (128)	18:18	53	09:16 (128)	19:48			20:19			20:48	36	20:07 (94)	21:07	10	19:59 (94)
23	07:51		08:27 (128)	07:18		08:23 (128)	07:35			06:46			06:13		19:31 (94)	06:06		19:48 (94)
	17:42	41	09:08 (128)	18:19	51	09:14 (128)	19:49			20:20			20:49	35	20:06 (94)	21:07	11	19:59 (94)
24	07:51		08:26 (128)	07:17		08:24 (128)	07:33			06:45			06:13		19:31 (94)	06:06		19:48 (94)
	17:43	43	09:09 (128)	18:20	49	09:13 (128)	19:50			20:21			20:50	35	20:06 (94)	21:08	11	19:59 (94)
25	07:50		08:25 (128)	07:15		08:25 (128)	07:31			06:43			06:12		19:32 (94)	06:07		19:49 (94)
	17:45	45	09:10 (128)	18:21	46	09:11 (128)	19:51			20:22			20:51	34	20:06 (94)	21:08	12	20:01 (94)
26	07:49		08:24 (128)	07:14		08:26 (128)	07:30			06:42			06:11		19:32 (94)	06:07		19:48 (94)
	17:46	47	09:11 (128)	18:22	44	09:10 (128)	19:52			20:23			20:52	33	20:05 (94)	21:08	13	20:01 (94)
27	07:48		08:24 (128)	07:12		08:27 (128)	07:28			06:41			06:11		19:32 (94)	06:07		19:48 (94)
	17:47	49	09:13 (128)	18:24	41	09:08 (128)	19:53			20:24			20:53	33	20:05 (94)	21:08	13	20:01 (94)
28	07:48		08:24 (128)	07:11		08:29 (128)	07:26			06:39			06:10		19:33 (94)	06:08		19:48 (94)
	17:48	50	09:14 (128)	18:25	37	09:06 (128)	19:54			20:25			20:53	32	20:05 (94)	21:08	14	20:02 (94)
29	07:47		08:23 (128)				07:25			06:38			06:09		19:33 (94)	06:08		19:47 (94)
	17:49	52	09:15 (128)				19:55			20:26			20:54	31	20:04 (94)	21:08	16	20:03 (94)
30	07:46		08:22 (128)				07:23			06:37		19:47 (94)	06:09		19:34 (94)	06:08		19:47 (94)
	17:51	53	09:15 (128)				19:56			20:27	3	19:50 (94)	20:55	30	20:04 (94)	21:08	16	20:03 (94)
31	07:45		08:22 (128)				07:22						06:08		19:35 (94)			
	17:52	54	09:16 (128)				19:57						20:56	29	20:04 (94)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		646			1564			91			3			1003			500	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.61			0.61			0.61			0.63			0.63			0.63	
Total reduction		0.22			0.25			0.27			0.32			0.35			0.38	
Total, real		140			396			24			1			354			189	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 72

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m**Shadow receptor:** 6175 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6031)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September		October			November			December
1	06:09		19:47 (94)	06:32		19:40 (94)	07:02		07:30			07:03		07:49 (128)	07:37
	21:08	17	20:04 (94)	20:50	37	20:17 (94)	20:09		19:18			17:33	61	08:50 (128)	17:10
2	06:09		19:46 (94)	06:33		19:41 (94)	07:03		07:31			07:04		07:49 (128)	07:38
	21:08	18	20:04 (94)	20:49	35	20:16 (94)	20:07		19:17			17:32	61	08:50 (128)	17:10
3	06:10		19:46 (94)	06:34		19:40 (94)	07:04		07:32			07:05		07:50 (128)	07:39
	21:08	20	20:06 (94)	20:48	35	20:15 (94)	20:06		19:15			17:31	61	08:51 (128)	17:10
4	06:10		19:45 (94)	06:35		19:41 (94)	07:05		07:33			07:07		07:50 (128)	07:40
	21:08	21	20:06 (94)	20:47	33	20:14 (94)	20:04		19:13			17:30	60	08:50 (128)	17:09
5	06:11		19:45 (94)	06:36		19:41 (94)	07:05		07:34			07:08		07:50 (128)	07:41
	21:07	22	20:07 (94)	20:46	33	20:14 (94)	20:03		19:12			17:28	60	08:50 (128)	17:09
6	06:12		19:45 (94)	06:37		19:42 (94)	07:06		07:35			07:09		07:50 (128)	07:42
	21:07	23	20:08 (94)	20:45	31	20:13 (94)	20:01		19:10			17:27	59	08:49 (128)	17:09
7	06:12		19:44 (94)	06:38		19:43 (94)	07:07		07:36			07:10		07:50 (128)	07:43
	21:07	24	20:08 (94)	20:44	29	20:12 (94)	19:58		19:09			17:26	59	08:49 (128)	17:09
8	06:13		19:44 (94)	06:39		19:44 (94)	07:08		07:37			07:11		07:51 (128)	07:44
	21:07	25	20:09 (94)	20:43	27	20:11 (94)	19:56		19:07			17:25	58	08:49 (128)	17:09
9	06:13		19:43 (94)	06:40		19:45 (94)	07:09		07:38			07:12		07:52 (128)	07:45
	21:06	26	20:09 (94)	20:42	25	20:10 (94)	19:55		19:05			17:24	56	08:48 (128)	17:09
10	06:14		19:43 (94)	06:41		19:47 (94)	07:10		07:39		09:13 (128)	07:14		07:52 (128)	07:45
	21:06	28	20:11 (94)	20:40	21	20:08 (94)	19:53		19:04	16	09:29 (128)	17:23	56	08:48 (128)	17:09
11	06:15		19:43 (94)	06:42		19:49 (94)	07:11		07:40		09:09 (128)	07:15		07:53 (128)	07:46
	21:06	28	20:11 (94)	20:39	17	20:06 (94)	19:51		19:02	24	09:33 (128)	17:22	54	08:47 (128)	17:09
12	06:15		19:42 (94)	06:43		19:51 (94)	07:12		07:41		09:06 (128)	07:16		07:54 (128)	07:47
	21:05	29	20:11 (94)	20:38	12	20:03 (94)	19:50		19:01	30	09:36 (128)	17:21	53	08:47 (128)	17:09
13	06:16		19:42 (94)	06:44			07:13		07:42		09:03 (128)	07:17		07:55 (128)	07:48
	21:05	30	20:12 (94)	20:37			19:48		18:59	35	09:38 (128)	17:21	52	08:47 (128)	17:10
14	06:17		19:42 (94)	06:44			07:14		07:44		09:01 (128)	07:18		07:56 (128)	07:49
	21:04	31	20:13 (94)	20:35			19:46		18:58	38	09:39 (128)	17:20	50	08:46 (128)	17:10
15	06:18		19:42 (94)	06:45			07:15		07:45		08:59 (128)	07:19		07:56 (128)	07:49
	21:04	32	20:14 (94)	20:34			19:45		18:56	42	09:41 (128)	17:19	49	08:45 (128)	17:10
16	06:18		19:41 (94)	06:46			07:16		07:46		08:57 (128)	07:20		07:58 (128)	07:50
	21:03	33	20:14 (94)	20:33			19:43		18:55	45	09:42 (128)	17:18	47	08:45 (128)	17:10
17	06:19		19:41 (94)	06:47			07:17		07:47		08:57 (128)	07:22		07:59 (128)	07:51
	21:03	34	20:15 (94)	20:31			19:41		18:53	47	09:44 (128)	17:17	45	08:44 (128)	17:11
18	06:20		19:41 (94)	06:48			07:18		07:48		08:56 (128)	07:23		08:00 (128)	07:51
	21:02	34	20:15 (94)	20:30			19:40		18:52	49	09:45 (128)	17:17	43	08:43 (128)	17:11
19	06:21		19:41 (94)	06:49			07:19		07:49		08:54 (128)	07:24		08:01 (128)	07:52
	21:01	35	20:16 (94)	20:28			19:38		18:50	52	09:46 (128)	17:16	41	08:42 (128)	17:11
20	06:22		19:40 (94)	06:50			07:20		07:50		08:53 (128)	07:25		08:03 (128)	07:52
	21:01	35	20:15 (94)	20:27			19:36		18:49	54	09:47 (128)	17:15	38	08:41 (128)	17:12
21	06:22		19:40 (94)	06:51			07:21		07:51		08:52 (128)	07:26		08:05 (128)	07:53
	21:00	36	20:16 (94)	20:26			19:35		18:47	55	09:47 (128)	17:14	36	08:41 (128)	17:12
22	06:23		19:40 (94)	06:52			07:22		07:52		08:51 (128)	07:27		08:06 (128)	07:54
	20:59	36	20:16 (94)	20:24			19:33		18:46	57	09:48 (128)	17:14	33	08:39 (128)	17:13
23	06:24		19:40 (94)	06:53			07:23		07:53		08:51 (128)	07:28		08:08 (128)	07:54
	20:59	37	20:17 (94)	20:23			19:31		18:45	57	09:48 (128)	17:13	30	08:38 (128)	17:13
24	06:25		19:40 (94)	06:54			07:24		07:54		08:51 (128)	07:30		08:10 (128)	07:55
	20:58	37	20:17 (94)	20:21			19:30		18:43	58	09:49 (128)	17:13	26	08:36 (128)	17:14
25	06:26		19:40 (94)	06:55			07:24		07:55		08:50 (128)	07:31		08:12 (128)	07:55
	20:57	37	20:17 (94)	20:20			19:28		18:42	59	09:49 (128)	17:12	22	08:34 (128)	17:14
26	06:27		19:39 (94)	06:56			07:25		07:56		08:50 (128)	07:32		08:14 (128)	07:55
	20:56	38	20:17 (94)	20:18			19:26		18:41	60	09:50 (128)	17:12	18	08:32 (128)	17:15
27	06:28		19:39 (94)	06:57			07:26		07:58		08:49 (128)	07:33		08:19 (128)	07:56
	20:55	38	20:17 (94)	20:17			19:25		18:39	61	09:50 (128)	17:11	11	08:30 (128)	17:16
28	06:29		19:39 (94)	06:58			07:27		07:59		08:49 (128)	07:34			07:56
	20:54	38	20:17 (94)	20:15			19:23		18:38	61	09:50 (128)	17:11			17:16
29	06:29		19:40 (94)	06:59			07:28		08:00		08:48 (128)	07:35			07:56
	20:53	37	20:17 (94)	20:14			19:22		18:37	62	09:50 (128)	17:11			17:17
30	06:30		19:40 (94)	07:00			07:29		08:01		08:49 (128)	07:36			07:57
	20:52	37	20:17 (94)	20:12			19:20		18:35	62	09:51 (128)	17:10			17:18
31	06:31		19:40 (94)	07:01					08:02		08:49 (128)				07:57
	20:51	37	20:17 (94)	20:11					18:34	61	09:50 (128)				17:18
Potential sun hours	456			426			374		346			300			291
Total, worst case		953			335					1085			1239		
Sun reduction		0.60			0.60					0.56			0.37		
Oper. time red.		1.00			1.00					1.00			1.00		
Wind dir. red.		0.63			0.63					0.61			0.61		
Total reduction		0.38			0.38					0.34			0.22		
Total, real		361			127					366			276		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 73

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m**Shadow receptor:** 6538 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6044)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May		June			July			August			September	October	November	December
1	07:57	07:44	07:09	07:20	06:36		06:08		06:46 (130)	06:09		06:49 (130)	06:32		07:22 (130)	07:02	07:30	07:03	07:37
	17:19	17:53	18:26	19:58	20:28		20:57	63	07:49 (130)	21:08	69	07:58 (130)	20:50	11	07:33 (130)	20:09	19:18	17:33	17:10
2	07:57	07:43	07:08	07:18	06:34		06:08		06:46 (130)	06:09		06:49 (130)	06:33			07:03	07:31	07:04	07:38
	17:20	17:54	18:27	19:59	20:29		20:57	64	07:50 (130)	21:08	68	07:57 (130)	20:49			20:07	19:17	17:32	17:10
3	07:57	07:42	07:06	07:17	06:33		06:07		06:45 (130)	06:10		06:50 (130)	06:34			07:04	07:32	07:06	07:39
	17:21	17:55	18:28	20:00	20:30		20:58	65	07:50 (130)	21:08	68	07:58 (130)	20:48			20:06	19:15	17:31	17:10
4	07:57	07:41	07:05	07:15	06:32		06:07		06:45 (130)	06:10		06:50 (130)	06:35			07:05	07:33	07:07	07:40
	17:22	17:57	18:29	20:00	20:31		20:59	66	07:51 (130)	21:08	67	07:57 (130)	20:47			20:04	19:13	17:30	17:09
5	07:57	07:40	07:03	07:14	06:31		06:06		06:45 (130)	06:11		06:51 (130)	06:36			07:05	07:34	07:08	07:41
	17:23	17:58	18:30	20:01	20:32		20:59	66	07:51 (130)	21:07	67	07:58 (130)	20:46			20:03	19:12	17:28	17:09
6	07:57	07:39	07:02	07:12	06:29		06:06		06:46 (130)	06:12		06:52 (130)	06:37			07:06	07:35	07:09	07:42
	17:24	17:59	18:31	20:03	20:33		21:00	66	07:52 (130)	21:07	66	07:58 (130)	20:45			20:01	19:10	17:27	17:09
7	07:57	07:38	07:00	07:10	06:28		06:06		06:45 (130)	06:12		06:52 (130)	06:38			07:07	07:36	07:10	07:43
	17:25	18:00	18:32	20:04	20:34		21:01	67	07:52 (130)	21:07	66	07:58 (130)	20:44			19:58	19:09	17:26	17:09
8	07:57	07:37	07:59	07:09	06:27		06:06		06:45 (130)	06:13		06:52 (130)	06:39			07:08	07:37	07:11	07:44
	17:26	18:01	19:33	20:05	20:35		21:01	67	07:52 (130)	21:07	66	07:58 (130)	20:43			19:56	19:07	17:25	17:09
9	07:57	07:36	07:57	07:07	06:26		06:05		06:45 (130)	06:13		06:52 (130)	06:40			07:09	07:38	07:12	07:45
	17:27	18:03	19:35	20:06	20:36		21:02	68	07:53 (130)	21:06	65	07:57 (130)	20:42			19:55	19:05	17:24	17:09
10	07:57	07:35	07:55	07:06	06:25		06:05		06:45 (130)	06:14		06:53 (130)	06:41			07:10	07:39	07:14	07:45
	17:28	18:04	19:36	20:07	20:37		21:03	68	07:53 (130)	21:06	65	07:58 (130)	20:40			19:53	19:04	17:23	17:09
11	07:57	07:34	07:54	07:04	06:24		06:05		06:45 (130)	06:15		06:54 (130)	06:42			07:11	07:40	07:15	07:46
	17:29	18:05	19:37	20:08	20:38		21:03	69	07:54 (130)	21:06	64	07:58 (130)	20:39			19:51	19:02	17:22	17:09
12	07:56	07:32	07:52	07:03	06:23		07:09 (130)	06:05	06:46 (130)	06:15		06:54 (130)	06:43			07:12	07:41	07:16	07:47
	17:30	18:06	19:38	20:09	20:39	15	07:24 (130)	21:04	07:54 (130)	21:05	63	07:57 (130)	20:38			19:50	19:01	17:21	17:09
13	07:56	07:31	07:51	07:01	06:22		07:05 (130)	06:05	06:46 (130)	06:16		06:55 (130)	06:43			07:13	07:42	07:17	07:48
	17:31	18:07	19:39	20:10	20:40	23	07:28 (130)	21:04	07:54 (130)	21:05	62	07:57 (130)	20:37			19:48	18:59	17:20	17:09
14	07:56	07:30	07:49	06:59	06:21		07:02 (130)	06:05	06:46 (130)	06:17		06:55 (130)	06:44			07:14	07:44	07:18	07:49
	17:32	18:09	19:40	20:11	20:41	29	07:31 (130)	21:05	07:55 (130)	21:04	62	07:57 (130)	20:35			19:46	18:58	17:20	17:10
15	07:55	07:29	07:48	06:58	06:20		07:00 (130)	06:05	06:46 (130)	06:18		06:56 (130)	06:45			07:15	07:45	07:19	07:49
	17:33	18:10	19:41	20:12	20:42	33	07:33 (130)	21:05	07:55 (130)	21:04	61	07:57 (130)	20:34			19:45	18:56	17:19	17:10
16	07:55	07:27	07:46	06:56	06:19		06:58 (130)	06:05	06:46 (130)	06:18		06:56 (130)	06:46			07:16	07:46	07:20	07:50
	17:34	18:11	19:42	20:13	20:43	37	07:35 (130)	21:05	07:55 (130)	21:03	60	07:56 (130)	20:33			19:43	18:55	17:18	17:10
17	07:55	07:26	07:44	06:55	06:18		06:56 (130)	06:05	06:46 (130)	06:19		06:57 (130)	06:47			07:17	07:47	07:22	07:51
	17:35	18:12	19:43	20:14	20:44	40	07:36 (130)	21:06	07:55 (130)	21:03	59	07:56 (130)	20:31			19:41	18:53	17:17	17:11
18	07:54	07:25	07:43	06:53	06:17		06:55 (130)	06:05	06:46 (130)	06:20		06:58 (130)	06:48			07:18	07:48	07:23	07:51
	17:36	18:13	19:44	20:15	20:45	44	07:39 (130)	21:06	07:56 (130)	21:02	57	07:55 (130)	20:30			19:40	18:52	17:16	17:11
19	07:54	07:24	07:41	06:52	06:16		06:54 (130)	06:05	06:46 (130)	06:21		06:59 (130)	06:49			07:19	07:49	07:24	07:52
	17:38	18:14	19:45	20:16	20:46	46	07:40 (130)	21:06	07:56 (130)	21:01	56	07:55 (130)	20:28			19:38	18:50	17:16	17:11
20	07:53	07:22	07:39	06:51	06:16		06:53 (130)	06:05	06:46 (130)	06:22		06:59 (130)	06:50			07:20	07:50	07:25	07:53
	17:39	18:16	19:46	20:17	20:47	48	07:41 (130)	21:07	07:56 (130)	21:01	54	07:53 (130)	20:27			19:36	18:49	17:15	17:12
21	07:53	07:21	07:38	06:49	06:15		06:51 (130)	06:06	06:46 (130)	06:22		07:00 (130)	06:51			07:21	07:51	07:26	07:53
	17:40	18:17	19:47	20:18	20:47	50	07:41 (130)	21:07	07:56 (130)	21:00	53	07:53 (130)	20:26			19:35	18:47	17:14	17:12
22	07:52	07:19	07:36	06:48	06:14		06:51 (130)	06:06	06:47 (130)	06:23		07:01 (130)	06:52			07:22	07:52	07:27	07:54
	17:41	18:18	19:48	20:19	20:48	52	07:43 (130)	21:07	07:57 (130)	20:59	51	07:52 (130)	20:24			19:33	18:46	17:14	17:13
23	07:51	07:18	07:35	06:46	06:13		06:50 (130)	06:06	06:47 (130)	06:24		07:02 (130)	06:53			07:23	07:53	07:28	07:54
	17:42	18:19	19:49	20:20	20:49	54	07:44 (130)	21:07	07:57 (130)	20:59	50	07:52 (130)	20:23			19:31	18:45	17:13	17:13
24	07:51	07:17	07:33	06:45	06:13		06:49 (130)	06:06	06:47 (130)	06:25		07:04 (130)	06:54			07:23	07:54	07:30	07:55
	17:43	18:20	19:50	20:21	20:50	55	07:44 (130)	21:08	07:57 (130)	20:58	47	07:51 (130)	20:21			19:30	18:43	17:13	17:14
25	07:50	07:15	07:31	06:43	06:12		06:49 (130)	06:07	06:48 (130)	06:26		07:04 (130)	06:55			07:24	07:55	07:31	07:55
	17:45	18:21	19:51	20:22	20:51	57	07:46 (130)	21:08	07:57 (130)	20:57	45	07:49 (130)	20:20			19:28	18:42	17:12	17:14
26	07:49	07:14	07:30	06:42	06:11		06:48 (130)	06:07	06:48 (130)	06:27		07:06 (130)	06:56			07:25	07:56	07:32	07:55
	17:46	18:22	19:52	20:23	20:52	58	07:46 (130)	21:08	07:57 (130)	20:56	42	07:48 (130)	20:18			19:26	18:41	17:12	17:15
27	07:48	07:12	07:28	06:41	06:11		06:47 (130)	06:07	06:48 (130)	06:28		07:07 (130)	06:57			07:26	07:58	07:33	07:56
	17:47	18:24	19:53	20:24	20:53	59	07:46 (130)	21:08	07:57 (130)	20:55	39	07:46 (130)	20:17			19:25	18:39	17:11	17:16
28	07:48	07:11	07:26	06:39	06:10		06:47 (130)	06:08	06:49 (130)	06:28		07:09 (130)	06:58			07:27	07:59	07:34	07:56
	17:48	18:25	19:54	20:25	20:53	60	07:47 (130)	21:08	07:58 (130)	20:54	36	07:45 (130)	20:15			19:23	18:38	17:11	17:16
29	07:47		07:25	06:38	06:09		06:46 (130)	06:08	06:49 (130)	06:29		07:11 (130)	06:59			07:28	08:00	07:35	07:56
	17:49		19:55	20:26	20:54	61	07:47 (130)	21:08	07:58 (130)	20:53	32	07:43 (130)	20:14			19:22	18:37	17:11	17:17
30	07:46		07:23	06:37	06:09		06:46 (130)	06:08	06:49 (130)	06:30		07:14 (130)	07:00			07:29	08:01	07:36	07:57
	17:51		19:56	20:27	20:55	62	07:48 (130)	21:08	07:57 (130)	20:52	27	07:41 (130)	20:12			19:20	18:35	17:10	17:18
31	07:45		07:22		06:08		06:47 (130)			06:31		07:17 (130)	07:01				08:02		07:57
	17:52		19:57		20:56	62	07:49 (130)			20:51	21	07:38 (130)	20:11				18:34		17:18
Potential sun hours	300	299	370	397	446			449		456			426			374	346	300	291
Total, worst case						945			2044			1708			11				
Sun reduction						0.56			0.60			0.60			0.60				
Oper. time red.						1.00			1.00			1.00			1.00				
Wind dir. red.						0.68			0.68			0.68			0.68				
Total reduction						0.38			0.41			0.41			0.41				
Total, real						361			837			699			5				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 74

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m**Shadow receptor:** 7825 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6113)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		15:10 (83)	07:45			07:10		17:27 (82)	07:20			06:36		19:28 (81)	06:08		
	17:20	44	15:54 (83)	17:53			18:26	25	17:52 (82)	19:59			20:28	37	20:05 (81)	20:57		
2	07:58		15:10 (83)	07:44			07:08		17:24 (82)	07:19			06:35		19:28 (81)	06:08		
	17:21	44	15:54 (83)	17:54			18:27	30	17:54 (82)	20:00			20:29	37	20:05 (81)	20:58		
3	07:58		15:11 (83)	07:43			07:07		17:23 (82)	07:17			06:33		19:27 (81)	06:07		
	17:21	43	15:54 (83)	17:56			18:28	33	17:56 (82)	20:00			20:30	38	20:05 (81)	20:58		
4	07:58		15:12 (83)	07:42			07:05		17:21 (82)	07:15			06:32		19:27 (81)	06:07		
	17:22	42	15:54 (83)	17:57			18:29	36	17:57 (82)	20:01			20:31	39	20:06 (81)	20:59		
5	07:58		15:13 (83)	07:41			07:04		17:19 (82)	07:14			06:31		19:26 (81)	06:07		
	17:23	41	15:54 (83)	17:58			18:31	40	17:59 (82)	20:02			20:32	39	20:05 (81)	21:00		
6	07:58		15:14 (83)	07:40			07:02		17:18 (82)	07:12			06:30		19:26 (81)	06:06		
	17:24	40	15:54 (83)	17:59			18:32	42	18:00 (82)	20:03			20:33	39	20:05 (81)	21:01		
7	07:58		15:15 (83)	07:39			07:01		17:17 (82)	07:11			06:29		19:26 (81)	06:06		
	17:25	40	15:55 (83)	18:00			18:33	44	18:01 (82)	20:04			20:34	39	20:05 (81)	21:01		
8	07:58		15:16 (83)	07:37			07:59		18:16 (82)	07:09			06:27		19:26 (81)	06:06		
	17:26	39	15:55 (83)	18:02			19:34	45	19:01 (82)	20:05			20:35	39	20:05 (81)	21:02		
9	07:57		15:18 (83)	07:36			07:57		18:14 (82)	07:07			06:26		19:26 (81)	06:06		
	17:27	37	15:55 (83)	18:03			19:35	47	19:01 (82)	20:06			20:36	39	20:05 (81)	21:02		
10	07:57		15:19 (83)	07:35			07:56		18:14 (82)	07:06			06:25		19:27 (81)	06:05		
	17:28	36	15:55 (83)	18:04			19:36	48	19:02 (82)	20:07			20:37	38	20:05 (81)	21:03		
11	07:57		15:20 (83)	07:34			07:54		18:13 (82)	07:04			06:24		19:27 (81)	06:05		
	17:29	33	15:53 (83)	18:05			19:37	49	19:02 (82)	20:08			20:38	38	20:05 (81)	21:03		
12	07:57		15:22 (83)	07:33			07:53		18:13 (82)	07:03			06:23		19:27 (81)	06:05		
	17:30	31	15:53 (83)	18:06			19:38	50	19:03 (82)	20:09			20:39	37	20:04 (81)	21:04		
13	07:56		15:23 (83)	07:32			07:51		18:12 (82)	07:01			06:22		19:27 (81)	06:05		
	17:31	30	15:53 (83)	18:08			19:39	51	19:03 (82)	20:10			20:40	37	20:04 (81)	21:04		
14	07:56		15:25 (83)	07:30			07:49		18:11 (82)	07:00			06:21		19:28 (81)	06:05		
	17:32	26	15:51 (83)	18:09			19:40	51	19:02 (82)	20:11			20:41	35	20:03 (81)	21:05		
15	07:56		15:27 (83)	07:29			07:48		18:12 (82)	06:58			06:20		19:28 (81)	06:05		
	17:33	24	15:51 (83)	18:10			19:41	51	19:03 (82)	20:12			20:42	35	20:03 (81)	21:05		
16	07:55		15:29 (83)	07:28			07:46		18:11 (82)	06:57			06:19		19:29 (81)	06:05		
	17:34	20	15:49 (83)	18:11			19:42	51	19:02 (82)	20:13			20:43	33	20:02 (81)	21:06		
17	07:55		15:32 (83)	07:27			07:45		18:11 (82)	06:55			06:18		19:30 (81)	06:05		
	17:36	15	15:47 (83)	18:12			19:43	50	19:01 (82)	20:14			20:44	32	20:02 (81)	21:06		
18	07:55		15:36 (83)	07:25			07:43		18:11 (82)	06:54			06:17		19:31 (81)	06:05		
	17:37	7	15:43 (83)	18:14			19:44	50	19:01 (82)	20:15			20:45	31	20:02 (81)	21:07		
19	07:54			07:24			07:41		18:11 (82)	06:52			06:17		19:31 (81)	06:05		
	17:38			18:15			19:45	49	19:00 (82)	20:16			20:46	30	20:01 (81)	21:07		
20	07:53			07:23			07:40		18:12 (82)	06:51			06:16		19:32 (81)	06:06		
	17:39			18:16			19:46	48	19:00 (82)	20:17			20:47	28	20:00 (81)	21:07		
21	07:53			07:21			07:38		18:12 (82)	06:49			06:15		19:32 (81)	06:06		
	17:40			18:17			19:47	47	18:59 (82)	20:18			20:48	27	19:59 (81)	21:07		
22	07:52			07:20			07:36		18:12 (82)	06:48		19:43 (81)	06:14		19:34 (81)	06:06		
	17:41			18:18			19:49	46	18:58 (82)	20:19	10	19:53 (81)	20:49	24	19:58 (81)	21:08		
23	07:52			07:18			07:35		18:13 (82)	06:47		19:40 (81)	06:13		19:35 (81)	06:06		
	17:42			18:19			19:50	44	18:57 (82)	20:20	17	19:57 (81)	20:50	22	19:57 (81)	21:08		
24	07:51			07:17			07:33		18:13 (82)	06:45		19:37 (81)	06:13		19:36 (81)	06:06		
	17:44			18:20			19:51	43	18:56 (82)	20:21	21	19:58 (81)	20:51	20	19:56 (81)	21:08		
25	07:50			07:16			07:32		18:14 (82)	06:44		19:35 (81)	06:12		19:38 (81)	06:07		
	17:45			18:22			19:52	40	18:54 (82)	20:22	25	20:00 (81)	20:51	17	19:55 (81)	21:08		
26	07:50			07:14			07:30		18:16 (82)	06:42		19:33 (81)	06:11		19:40 (81)	06:07		
	17:46			18:23			19:53	37	18:53 (82)	20:23	28	20:01 (81)	20:52	13	19:53 (81)	21:08		
27	07:49			07:13		17:37 (82)	07:28		18:16 (82)	06:41		19:32 (81)	06:11		19:43 (81)	06:07		
	17:47			18:24	6	17:43 (82)	19:54	35	18:51 (82)	20:24	30	20:02 (81)	20:53	8	19:51 (81)	21:08		
28	07:48			07:11		17:30 (82)	07:27		18:18 (82)	06:40		19:31 (81)	06:10			06:08		
	17:48			18:25	19	17:49 (82)	19:55	31	18:49 (82)	20:25	32	20:03 (81)	20:54			21:08		
29	07:47						07:25		18:20 (82)	06:38		19:30 (81)	06:10			06:08		
	17:50						19:56	27	18:47 (82)	20:26	34	20:04 (81)	20:55			21:08		
30	07:46						07:23		18:22 (82)	06:37		19:29 (81)	06:09			06:09		
	17:51						19:57	21	18:43 (82)	20:27	35	20:04 (81)	20:55			21:08		
31	07:45						07:22		18:25 (82)				06:09					
	17:52						19:58	14	18:39 (82)				20:56					
Potential sun hours	300			299			370			397			446			449		
Total, worst case		592			25			1275			232			851				
Sun reduction		0.36			0.42			0.44			0.51			0.56				
Oper. time red.		1.00			1.00			1.00			1.00			1.00				
Wind dir. red.		0.67			0.67			0.67			0.63			0.63				
Total reduction		0.24			0.28			0.29			0.32			0.36				
Total, real		143			7			375			75			303				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 75

Licensed user:
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217 Montgomery St.
US-SYRACUSE, NY 13202
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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m**Shadow receptor:** 7825 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6113)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09			06:32		19:38 (81)	07:02			07:31		17:51 (82)	07:04			07:37		15:02 (83)
	21:08			20:51	37	20:15 (81)	20:09			19:19	51	18:42 (82)	17:33			17:10	33	15:35 (83)
2	06:10			06:33		19:37 (81)	07:03			07:32		17:51 (82)	07:05			07:38		15:01 (83)
	21:08			20:50	38	20:15 (81)	20:08			19:17	50	18:41 (82)	17:32			17:10	36	15:37 (83)
3	06:10			06:34		19:37 (81)	07:04			07:33		17:51 (82)	07:06			07:39		15:01 (83)
	21:08			20:49	39	20:16 (81)	20:06			19:15	49	18:40 (82)	17:31			17:10	37	15:38 (83)
4	06:11			06:35		19:37 (81)	07:05			07:34		17:52 (82)	07:07			07:40		15:00 (83)
	21:08			20:48	39	20:16 (81)	20:05			19:14	47	18:39 (82)	17:30			17:10	39	15:39 (83)
5	06:11			06:36		19:36 (81)	07:06			07:35		17:52 (82)	07:08			07:41		15:00 (83)
	21:08			20:47	39	20:15 (81)	20:03			19:12	46	18:38 (82)	17:29			17:09	40	15:40 (83)
6	06:12			06:37		19:36 (81)	07:07			07:36		17:52 (82)	07:09			07:42		15:00 (83)
	21:08			20:45	39	20:15 (81)	20:01			19:10	45	18:37 (82)	17:28			17:09	41	15:41 (83)
7	06:12			06:38		19:36 (81)	07:08			07:37		17:53 (82)	07:10			07:43		15:00 (83)
	21:07			20:44	39	20:15 (81)	20:00			19:09	43	18:36 (82)	17:27			17:09	41	15:41 (83)
8	06:13			06:39		19:36 (81)	07:09			07:38		17:54 (82)	07:12			07:44		15:00 (83)
	21:07			20:43	39	20:15 (81)	19:57			19:07	40	18:34 (82)	17:26			17:09	42	15:42 (83)
9	06:14			06:40		19:36 (81)	07:10			07:39		17:54 (82)	07:13			07:45		15:00 (83)
	21:07			20:42	38	20:14 (81)	19:55			19:06	39	18:33 (82)	17:24			17:09	43	15:43 (83)
10	06:14			06:41		19:36 (81)	07:10			07:40		17:56 (82)	07:14			07:46		15:00 (83)
	21:06			20:41	38	20:14 (81)	19:53			19:04	35	18:31 (82)	17:24			17:09	44	15:44 (83)
11	06:15			06:42		19:37 (81)	07:11			07:41		17:57 (82)	07:15			07:47		15:01 (83)
	21:06			20:39	37	20:14 (81)	19:52			19:03	32	18:29 (82)	17:23			17:09	44	15:45 (83)
12	06:16			06:43		19:37 (81)	07:12		18:18 (82)	07:42		17:59 (82)	07:16			07:47		15:00 (83)
	21:06			20:38	36	20:13 (81)	19:50	12	18:30 (82)	19:01	28	18:27 (82)	17:22			17:10	45	15:45 (83)
13	06:16			06:44		19:37 (81)	07:13		18:14 (82)	07:43		18:02 (82)	07:17			07:48		15:00 (83)
	21:05			20:37	35	20:12 (81)	19:48	20	18:34 (82)	18:59	23	18:25 (82)	17:21			17:10	46	15:46 (83)
14	06:17			06:45		19:38 (81)	07:14		18:11 (82)	07:44		18:06 (82)	07:19			07:49		15:01 (83)
	21:05			20:36	34	20:12 (81)	19:47	26	18:37 (82)	18:58	14	18:20 (82)	17:20			17:10	46	15:47 (83)
15	06:18			06:46		19:39 (81)	07:15		18:08 (82)	07:45			07:20			07:50		15:02 (83)
	21:04			20:34	32	20:11 (81)	19:45	30	18:38 (82)	18:56			17:19			17:10	46	15:48 (83)
16	06:19		19:53 (81)	06:47		19:40 (81)	07:16		18:06 (82)	07:46			07:21			07:50		15:01 (83)
	21:04	4	19:57 (81)	20:33	30	20:10 (81)	19:43	34	18:40 (82)	18:55			17:18			17:10	47	15:48 (83)
17	06:19		19:50 (81)	06:48		19:40 (81)	07:17		18:04 (82)	07:47			07:22			07:51		15:02 (83)
	21:03	11	20:01 (81)	20:32	27	20:07 (81)	19:42	37	18:41 (82)	18:53			17:17			17:11	46	15:48 (83)
18	06:20		19:48 (81)	06:49		19:41 (81)	07:18		18:02 (82)	07:48			07:23			07:52		15:03 (83)
	21:02	15	20:03 (81)	20:30	25	20:06 (81)	19:40	40	18:42 (82)	18:52			17:17			17:11	46	15:49 (83)
19	06:21		19:47 (81)	06:49		19:43 (81)	07:19		18:01 (82)	07:49			07:24			07:52		15:02 (83)
	21:02	18	20:05 (81)	20:29	21	20:04 (81)	19:38	42	18:43 (82)	18:51			17:16			17:11	47	15:49 (83)
20	06:22		19:46 (81)	06:50		19:45 (81)	07:20		18:00 (82)	07:50			07:25			07:53		15:03 (83)
	21:01	21	20:07 (81)	20:27	16	20:01 (81)	19:37	43	18:43 (82)	18:49			17:15			17:12	47	15:50 (83)
21	06:23		19:44 (81)	06:51		19:49 (81)	07:21		17:57 (82)	07:51			07:27			07:53		15:03 (83)
	21:00	23	20:07 (81)	20:26	8	19:57 (81)	19:35	46	18:43 (82)	18:48			17:15			17:12	47	15:50 (83)
22	06:23		19:43 (81)	06:52			07:22		17:56 (82)	07:52			07:28			07:54		15:04 (83)
	21:00	25	20:08 (81)	20:25			19:33	47	18:43 (82)	18:46			17:14			17:13	47	15:51 (83)
23	06:24		19:43 (81)	06:53			07:23		17:55 (82)	07:53			07:29			07:54		15:04 (83)
	20:59	27	20:10 (81)	20:23			19:32	48	18:43 (82)	18:45			17:14			17:13	47	15:51 (83)
24	06:25		19:42 (81)	06:54			07:24		17:54 (82)	07:55			07:30		15:14 (83)	07:55		15:05 (83)
	20:58	29	20:11 (81)	20:22			19:30	50	18:44 (82)	18:44			17:13	7	15:21 (83)	17:14	47	15:52 (83)
25	06:26		19:41 (81)	06:55			07:25		17:54 (82)	07:56			07:31		15:10 (83)	07:55		15:05 (83)
	20:57	31	20:12 (81)	20:20			19:28	50	18:44 (82)	18:42			17:12	15	15:25 (83)	17:14	47	15:52 (83)
26	06:27		19:41 (81)	06:56			07:26		17:53 (82)	07:57			07:32		15:08 (83)	07:56		15:06 (83)
	20:57	31	20:12 (81)	20:19			19:27	51	18:44 (82)	18:41			17:12	20	15:28 (83)	17:15	46	15:52 (83)
27	06:28		19:39 (81)	06:57			07:27		17:53 (82)	07:58			07:33		15:06 (83)	07:56		15:06 (83)
	20:56	33	20:12 (81)	20:17			19:25	50	18:43 (82)	18:40			17:12	24	15:30 (83)	17:16	46	15:52 (83)
28	06:29		19:39 (81)	06:58			07:28		17:52 (82)	07:59			07:34		15:05 (83)	07:56		15:07 (83)
	20:55	34	20:13 (81)	20:16			19:23	51	18:43 (82)	18:38			17:11	26	15:31 (83)	17:16	47	15:54 (83)
29	06:30		19:39 (81)	06:59			07:29		17:52 (82)	08:00			07:35		15:04 (83)	07:57		15:08 (83)
	20:54	35	20:14 (81)	20:14			19:22	51	18:43 (82)	18:37			17:11	29	15:33 (83)	17:17	46	15:54 (83)
30	06:31		19:38 (81)	07:00			07:30		17:51 (82)	08:01			07:36		15:03 (83)	07:57		15:08 (83)
	20:53	36	20:14 (81)	20:13			19:20	51	18:42 (82)	18:36			17:10	31	15:34 (83)	17:18	46	15:54 (83)
31	06:31		19:38 (81)	07:01						08:02						07:57		15:09 (83)
	20:52	37	20:15 (81)	20:11						18:35						17:19	45	15:54 (83)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		410			686			779			542			152			1367	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.63			0.63			0.67			0.67			0.67			0.67	
Total reduction		0.38			0.38			0.41			0.37			0.25			0.34	
Total, real		156			262			317			203			38			458	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 76

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m**Shadow receptor:** 8351 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6151)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:25 (108)	07:45			07:10		07:44 (83)	07:20			06:36		07:24 (82)	06:08		06:29 (106)
	17:20	29	08:54 (108)	17:53			18:26	38	08:22 (83)	19:59			20:28	89	19:58 (107)	20:57	45	19:53 (107)
2	07:58		08:25 (108)	07:44			07:08		07:44 (83)	07:19			06:35		07:24 (82)	06:08		06:29 (106)
	17:21	29	08:54 (108)	17:54			18:27	37	08:21 (83)	20:00			20:29	91	19:59 (107)	20:58	43	19:52 (107)
3	07:58		08:26 (108)	07:43			07:07		07:44 (83)	07:17			06:33		07:24 (82)	06:07		06:29 (106)
	17:21	30	08:56 (108)	17:56			18:28	37	08:21 (83)	20:00			20:30	92	20:00 (107)	20:59	43	19:52 (107)
4	07:58		08:26 (108)	07:42			07:05		07:44 (83)	07:15			06:32		07:25 (82)	06:07		06:28 (106)
	17:22	29	08:55 (108)	17:57			18:29	36	08:20 (83)	20:01			20:31	91	20:00 (107)	20:59	43	19:51 (107)
5	07:58		08:26 (108)	07:41			07:04		07:44 (83)	07:14			06:31		07:24 (82)	06:07		06:29 (106)
	17:23	30	08:56 (108)	17:58			18:31	36	08:20 (83)	20:02			20:32	92	20:00 (107)	21:00	40	19:50 (107)
6	07:58		08:27 (108)	07:40			07:02		07:44 (83)	07:12			06:30		07:24 (82)	06:06		06:29 (106)
	17:24	29	08:56 (108)	17:59			18:32	35	08:19 (83)	20:03			20:33	91	20:00 (107)	21:01	39	19:50 (107)
7	07:58		08:27 (108)	07:39			07:01		07:45 (83)	07:11			06:29		07:25 (82)	06:06		06:29 (106)
	17:25	30	08:57 (108)	18:01			18:33	34	08:19 (83)	20:04			20:34	91	20:01 (107)	21:01	37	19:49 (107)
8	07:58		08:28 (108)	07:37			07:59		08:45 (83)	07:09			06:27		07:25 (82)	06:06		06:28 (106)
	17:26	29	08:57 (108)	18:02			19:34	32	09:17 (83)	20:05			20:35	91	20:01 (107)	21:02	36	19:47 (107)
9	07:57		08:29 (108)	07:36			07:57		08:46 (83)	07:08			06:26		07:26 (82)	06:06		06:28 (106)
	17:27	29	08:58 (108)	18:03			19:35	29	09:15 (83)	20:06			20:36	90	20:01 (107)	21:02	33	19:46 (107)
10	07:57		08:29 (108)	07:35			07:56		08:47 (83)	07:06		07:50 (82)	06:25		07:27 (82)	06:06		06:29 (106)
	17:28	29	08:58 (108)	18:04			19:36	27	09:14 (83)	20:07	11	08:01 (82)	20:37	88	20:01 (107)	21:03	27	19:44 (107)
11	07:57		08:29 (108)	07:34			07:54		08:48 (83)	07:04		07:44 (82)	06:24		07:27 (82)	06:05		06:29 (106)
	17:29	29	08:58 (108)	18:05			19:37	24	09:12 (83)	20:08	21	08:05 (82)	20:38	87	20:01 (107)	21:04	24	06:53 (106)
12	07:57		08:30 (108)	07:33			07:53		08:51 (83)	07:03		07:41 (82)	06:23		07:28 (82)	06:05		06:29 (106)
	17:30	29	08:59 (108)	18:07			19:38	19	09:10 (83)	20:09	27	08:08 (82)	20:39	85	20:01 (107)	21:04	24	06:53 (106)
13	07:57		08:31 (108)	07:32			07:51		08:53 (83)	07:01		07:38 (82)	06:22		07:29 (82)	06:05		06:29 (106)
	17:31	28	08:59 (108)	18:08			19:39	13	09:06 (83)	20:10	31	08:09 (82)	20:40	83	20:01 (107)	21:05	25	06:54 (106)
14	07:56		08:31 (108)	07:30			07:49			07:00		07:37 (82)	06:21		07:30 (82)	06:05		06:29 (106)
	17:32	28	08:59 (108)	18:09			19:40			20:11	34	08:11 (82)	20:41	80	20:00 (107)	21:05	25	06:54 (106)
15	07:56		08:32 (108)	07:29			07:48			06:58		07:35 (82)	06:20		07:31 (82)	06:05		06:30 (106)
	17:33	27	08:59 (108)	18:10			19:41			20:12	37	08:12 (82)	20:42	77	20:00 (107)	21:05	24	06:54 (106)
16	07:55		08:32 (108)	07:28			07:46			06:57		07:33 (82)	06:19		07:32 (82)	06:05		06:30 (106)
	17:34	27	08:59 (108)	18:11			19:42			20:13	41	08:14 (82)	20:43	75	20:00 (107)	21:06	24	06:54 (106)
17	07:55		08:33 (108)	07:27			07:45			06:55		07:32 (82)	06:18		07:34 (82)	06:05		06:30 (106)
	17:36	26	08:59 (108)	18:12			19:43			20:14	42	08:14 (82)	20:44	71	20:00 (107)	21:06	24	06:54 (106)
18	07:55		08:34 (108)	07:25		07:59 (83)	07:43			06:54		07:31 (82)	06:17		07:35 (82)	06:05		06:30 (106)
	17:37	24	08:58 (108)	18:14	11	08:10 (83)	19:44			20:15	44	08:15 (82)	20:45	69	20:00 (107)	21:07	24	06:54 (106)
19	07:54		08:35 (108)	07:24		07:55 (83)	07:41			06:52		07:29 (82)	06:17		07:36 (82)	06:05		06:30 (106)
	17:38	24	08:59 (108)	18:15	18	08:13 (83)	19:45			20:16	46	08:15 (82)	20:46	65	19:59 (107)	21:07	25	06:55 (106)
20	07:54		08:36 (108)	07:23		07:53 (83)	07:40			06:51		07:29 (82)	06:16		07:38 (82)	06:06		06:31 (106)
	17:39	22	08:58 (108)	18:16	22	08:15 (83)	19:46			20:17	47	08:16 (82)	20:47	60	19:59 (107)	21:07	25	06:56 (106)
21	07:53		08:37 (108)	07:21		07:52 (83)	07:38			06:49		07:27 (82)	06:15		07:41 (82)	06:06		06:31 (106)
	17:40	21	08:58 (108)	18:17	25	08:17 (83)	19:48			20:18	49	08:16 (82)	20:48	55	19:59 (107)	21:07	25	06:56 (106)
22	07:52		08:38 (108)	07:20		07:50 (83)	07:37			06:48		07:27 (82)	06:14		07:43 (82)	06:06		06:31 (106)
	17:41	19	08:57 (108)	18:18	28	08:18 (83)	19:49			20:19	49	08:16 (82)	20:49	48	19:58 (107)	21:08	25	06:56 (106)
23	07:52		08:40 (108)	07:18		07:49 (83)	07:35			06:47		07:27 (82)	06:14		19:20 (107)	06:06		06:31 (106)
	17:42	15	08:55 (108)	18:19	31	08:20 (83)	19:50			20:20	60	19:46 (107)	20:50	38	19:58 (107)	21:08	25	06:56 (106)
24	07:51		08:42 (108)	07:17		07:47 (83)	07:33			06:45		07:25 (82)	06:13		19:21 (107)	06:06		06:31 (106)
	17:44	11	08:53 (108)	18:21	33	08:20 (83)	19:51			20:21	69	19:49 (107)	20:51	36	19:57 (107)	21:08	25	06:56 (106)
25	07:50		08:46 (108)	07:16		07:47 (83)	07:32			06:44		07:25 (82)	06:12		19:22 (107)	06:07		06:32 (106)
	17:45	5	08:51 (108)	18:22	34	08:21 (83)	19:52			20:22	75	19:52 (107)	20:51	35	19:57 (107)	21:08	24	06:56 (106)
26	07:50			07:14		07:45 (83)	07:30			06:42		07:25 (82)	06:11		06:34 (106)	06:07		06:32 (106)
	17:46			18:23	36	08:21 (83)	19:53			20:23	79	19:54 (107)	20:52	42	19:56 (107)	21:08	24	06:56 (106)
27	07:49			07:13		07:45 (83)	07:28			06:41		07:24 (82)	06:11		06:33 (106)	06:07		06:32 (106)
	17:47			18:24	36	08:21 (83)	19:54			20:24	82	19:55 (107)	20:53	43	19:56 (107)	21:08	24	06:56 (106)
28	07:48			07:11		07:44 (83)	07:27			06:40		07:24 (82)	06:10		06:32 (106)	06:08		06:32 (106)
	17:48			18:25	37	08:21 (83)	19:55			20:25	85	19:56 (107)	20:54	44	19:55 (107)	21:08	25	06:57 (106)
29	07:47						07:25			06:38		07:24 (82)	06:10		06:31 (106)	06:08		06:32 (106)
	17:50						19:56			20:26	87	19:57 (107)	20:55	46	19:55 (107)	21:08	25	06:57 (106)
30	07:46						07:23			06:37		07:24 (82)	06:09		06:30 (106)	06:09		06:33 (106)
	17:51						19:57			20:27	88	19:58 (107)	20:56	46	19:54 (107)	21:08	24	06:57 (106)
31	07:46						07:22						06:09		06:30 (106)			
	17:52						19:58						20:56	45	19:54 (107)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		628			311			397			1104			2136			876	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.61			0.63			0.63			0.66			0.65			0.67	
Total reduction		0.22			0.26			0.28			0.34			0.36			0.40	
Total, real		137			82			110			371			774			353	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 77

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m**Shadow receptor:** 8351 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6151)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:33 (106)	06:32		07:38 (82)	07:02		07:43 (82)	07:31		08:30 (83)	07:04			07:37		08:11 (108)
	21:08	24	06:57 (106)	20:51	85	20:11 (107)	20:09	21	08:04 (82)	19:19	17	08:47 (83)	17:33			17:10	29	08:40 (108)
2	06:10		06:34 (106)	06:33		07:38 (82)	07:03		07:48 (82)	07:32		08:28 (83)	07:05			07:38		08:11 (108)
	21:08	24	06:58 (106)	20:50	86	20:11 (107)	20:08	11	07:59 (82)	19:17	22	08:50 (83)	17:32			17:10	29	08:40 (108)
3	06:10		06:34 (106)	06:34		07:37 (82)	07:04			07:33		08:26 (83)	07:06			07:39		08:12 (108)
	21:08	30	19:50 (107)	20:49	88	20:11 (107)	20:06			19:15	25	08:51 (83)	17:31			17:10	29	08:41 (108)
4	06:11		06:34 (106)	06:35		07:36 (82)	07:05			07:34		08:24 (83)	07:07			07:40		08:12 (108)
	21:08	34	19:52 (107)	20:48	89	20:11 (107)	20:05			19:14	28	08:52 (83)	17:30			17:10	29	08:41 (108)
5	06:11		06:34 (106)	06:36		07:35 (82)	07:06			07:35		08:22 (83)	07:08			07:41		08:12 (108)
	21:08	36	19:53 (107)	20:47	90	20:10 (107)	20:03			19:12	31	08:53 (83)	17:29			17:09	30	08:42 (108)
6	06:12		06:35 (106)	06:37		07:34 (82)	07:07			07:36		08:21 (83)	07:09			07:42		08:13 (108)
	21:08	38	19:55 (107)	20:45	92	20:10 (107)	20:01			19:10	33	08:54 (83)	17:28			17:09	29	08:42 (108)
7	06:12		06:35 (106)	06:38		07:34 (82)	07:08			07:37		08:20 (83)	07:11			07:43		08:13 (108)
	21:07	40	19:56 (107)	20:44	91	20:10 (107)	20:00			19:09	34	08:54 (83)	17:27			17:09	30	08:43 (108)
8	06:13		06:36 (106)	06:39		07:34 (82)	07:09			07:38		08:19 (83)	07:12			07:44		08:14 (108)
	21:07	40	19:57 (107)	20:43	91	20:09 (107)	19:57			19:07	36	08:55 (83)	17:26			17:09	29	08:43 (108)
9	06:14		06:36 (106)	06:40		07:33 (82)	07:10			07:39		08:19 (83)	07:13			07:45		08:14 (108)
	21:07	43	19:59 (107)	20:42	92	20:09 (107)	19:55			19:06	36	08:55 (83)	17:25			17:09	30	08:44 (108)
10	06:14		06:36 (106)	06:41		07:33 (82)	07:11			07:40		08:18 (83)	07:14			07:46		08:15 (108)
	21:06	44	19:59 (107)	20:41	90	20:08 (107)	19:53			19:04	37	08:55 (83)	17:24			17:09	29	08:44 (108)
11	06:15		06:37 (106)	06:42		07:33 (82)	07:11			07:41		08:18 (83)	07:15			07:47		08:16 (108)
	21:06	45	20:01 (107)	20:39	91	20:08 (107)	19:52			19:03	37	08:55 (83)	17:23			17:09	29	08:45 (108)
12	06:16		06:38 (106)	06:43		07:32 (82)	07:12			07:42		08:17 (83)	07:16			07:47		08:16 (108)
	21:06	46	20:02 (107)	20:38	90	20:07 (107)	19:50			19:01	37	08:54 (83)	17:22			17:10	28	08:44 (108)
13	06:16		06:38 (106)	06:44		07:32 (82)	07:13			07:43		08:18 (83)	07:17			07:48		08:16 (108)
	21:05	46	20:02 (107)	20:37	89	20:06 (107)	19:48			19:00	37	08:55 (83)	17:21			17:10	29	08:45 (108)
14	06:17		06:39 (106)	06:45		07:32 (82)	07:14			07:44		08:18 (83)	07:19			07:49		08:17 (108)
	21:05	45	20:03 (107)	20:36	87	20:05 (107)	19:47			18:58	36	08:54 (83)	17:20			17:10	28	08:45 (108)
15	06:18		06:40 (106)	06:46		07:32 (82)	07:15			07:45		08:18 (83)	07:20			07:50		08:18 (108)
	21:04	46	20:04 (107)	20:34	85	20:04 (107)	19:45			18:57	36	08:54 (83)	17:19			17:10	28	08:46 (108)
16	06:19		06:42 (106)	06:47		07:32 (82)	07:16			07:46		08:18 (83)	07:21			07:50		08:18 (108)
	21:04	44	20:05 (107)	20:33	81	20:02 (107)	19:43			18:55	35	08:53 (83)	17:18			17:10	28	08:46 (108)
17	06:19		06:43 (106)	06:48		07:31 (82)	07:17			07:47		08:18 (83)	07:22		08:19 (108)	07:51		08:19 (108)
	21:03	42	20:05 (107)	20:32	79	20:00 (107)	19:42			18:54	34	08:52 (83)	17:17	5	08:24 (108)	17:11	28	08:47 (108)
18	06:20		06:45 (106)	06:49		07:31 (82)	07:18			07:48		08:19 (83)	07:23		08:16 (108)	07:52		08:19 (108)
	21:03	39	20:06 (107)	20:30	73	19:57 (107)	19:40			18:52	32	08:51 (83)	17:17	11	08:27 (108)	17:11	28	08:47 (108)
19	06:21		19:31 (107)	06:50		07:31 (82)	07:19			07:49		08:20 (83)	07:24		08:15 (108)	07:52		08:19 (108)
	21:02	36	20:07 (107)	20:29	68	19:55 (107)	19:38			18:51	30	08:50 (83)	17:16	15	08:30 (108)	17:11	28	08:47 (108)
20	06:22		19:31 (107)	06:51		07:31 (82)	07:20			07:50		08:21 (83)	07:25		08:13 (108)	07:53		08:20 (108)
	21:01	37	20:08 (107)	20:27	59	19:50 (107)	19:37			18:49	27	08:48 (83)	17:15	19	08:32 (108)	17:12	28	08:48 (108)
21	06:23		07:56 (82)	06:51		07:32 (82)	07:21			07:51		08:22 (83)	07:27		08:12 (108)	07:54		08:20 (108)
	21:01	41	20:08 (107)	20:26	49	08:21 (82)	19:35			18:48	24	08:46 (83)	17:15	21	08:33 (108)	17:12	28	08:48 (108)
22	06:24		07:51 (82)	06:52		07:32 (82)	07:22			07:52		08:24 (83)	07:28		08:12 (108)	07:54		08:21 (108)
	21:00	52	20:08 (107)	20:25	48	08:20 (82)	19:33			18:46	21	08:45 (83)	17:14	22	08:34 (108)	17:13	28	08:49 (108)
23	06:24		07:49 (82)	06:53		07:33 (82)	07:23			07:54		08:26 (83)	07:29		08:11 (108)	07:55		08:21 (108)
	20:59	58	20:09 (107)	20:23	47	08:20 (82)	19:32			18:45	17	08:43 (83)	17:14	24	08:35 (108)	17:13	28	08:49 (108)
24	06:25		07:47 (82)	06:54		07:33 (82)	07:24			07:55		08:30 (83)	07:30		08:12 (108)	07:55		08:22 (108)
	20:58	63	20:10 (107)	20:22	46	08:19 (82)	19:30			18:44	8	08:38 (83)	17:13	24	08:36 (108)	17:14	28	08:50 (108)
25	06:26		07:46 (82)	06:55		07:34 (82)	07:25			07:56			07:31		08:11 (108)	07:55		08:22 (108)
	20:57	66	20:10 (107)	20:20	44	08:18 (82)	19:28			18:42			17:13	26	08:37 (108)	17:15	28	08:50 (108)
26	06:27		07:45 (82)	06:56		07:35 (82)	07:26			07:57			07:32		08:11 (108)	07:56		08:23 (108)
	20:57	70	20:11 (107)	20:19	42	08:17 (82)	19:27			18:41			17:12	27	08:38 (108)	17:15	27	08:50 (108)
27	06:28		07:43 (82)	06:57		07:35 (82)	07:27			07:58			07:33		08:11 (108)	07:56		08:24 (108)
	20:56	73	20:10 (107)	20:17	40	08:15 (82)	19:25			18:40			17:12	27	08:38 (108)	17:16	28	08:52 (108)
28	06:29		07:42 (82)	06:58		07:37 (82)	07:28			07:59			07:34		08:11 (108)	07:56		08:24 (108)
	20:55	76	20:10 (107)	20:16	37	08:14 (82)	19:23			18:38			17:11	28	08:39 (108)	17:16	28	08:52 (108)
29	06:30		07:41 (82)	06:59		07:37 (82)	07:29			08:00			07:35		08:11 (108)	07:57		08:24 (108)
	20:54	79	20:11 (107)	20:14	34	08:11 (82)	19:22			18:37			17:11	28	08:39 (108)	17:17	28	08:52 (108)
30	06:31		07:40 (82)	07:00		07:38 (82)	07:30		08:35 (83)	08:01			07:36		08:11 (108)	07:57		08:24 (108)
	20:53	81	20:11 (107)	20:13	31	08:09 (82)	19:20	9	08:44 (83)	18:36			17:11	29	08:40 (108)	17:18	29	08:53 (108)
31	06:31		07:39 (82)	07:01		07:41 (82)				08:02						07:57		08:24 (108)
	20:52	83	20:11 (107)	20:11	26	08:07 (82)				18:35						17:19	29	08:53 (108)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		1521			2140			41			710			306			884	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.65			0.66			0.66			0.63			0.61			0.61	
Total reduction		0.39			0.39			0.40			0.35			0.22			0.30	
Total, real		593			840			16			251			68			267	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 78

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m**Shadow receptor:** 8352 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6152)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:26 (108)	07:45			07:10		07:45 (83)	07:20			06:36		07:23 (82)	06:08		06:29 (106)
	17:20	29	08:55 (108)	17:53			18:26	37	08:22 (83)	19:59			20:28	92	19:59 (107)	20:57	41	19:52 (107)
2	07:58		08:26 (108)	07:44			07:08		07:44 (83)	07:19			06:35		07:23 (82)	06:08		06:29 (106)
	17:21	29	08:55 (108)	17:54			18:27	38	08:22 (83)	20:00			20:29	93	20:00 (107)	20:58	39	19:51 (107)
3	07:58		08:27 (108)	07:43			07:07		07:45 (83)	07:17			06:33		07:23 (82)	06:07		06:29 (106)
	17:21	30	08:57 (108)	17:56			18:28	37	08:22 (83)	20:00			20:30	93	20:00 (107)	20:59	39	19:51 (107)
4	07:58		08:27 (108)	07:42			07:05		07:44 (83)	07:15			06:32		07:23 (82)	06:07		06:28 (106)
	17:22	29	08:56 (108)	17:57			18:29	37	08:21 (83)	20:01			20:31	94	20:01 (107)	20:59	37	19:49 (107)
5	07:58		08:27 (108)	07:41			07:04		07:45 (83)	07:14			06:31		07:23 (82)	06:07		06:28 (106)
	17:23	30	08:57 (108)	17:58			18:31	36	08:21 (83)	20:02			20:32	93	20:00 (107)	21:00	34	19:48 (107)
6	07:58		08:28 (108)	07:40			07:02		07:45 (83)	07:12			06:30		07:23 (82)	06:06		06:29 (106)
	17:24	29	08:57 (108)	17:59			18:32	35	08:20 (83)	20:03			20:33	93	20:00 (107)	21:01	32	19:47 (107)
7	07:58		08:28 (108)	07:39			07:01		07:45 (83)	07:11			06:29		07:23 (82)	06:06		06:29 (106)
	17:25	30	08:58 (108)	18:01			18:33	35	08:20 (83)	20:04			20:34	94	20:01 (107)	21:01	28	19:45 (107)
8	07:58		08:29 (108)	07:37			07:59		08:46 (83)	07:09			06:27		07:24 (82)	06:06		06:28 (106)
	17:26	29	08:58 (108)	18:02			19:34	32	09:18 (83)	20:05			20:35	93	20:01 (107)	21:02	22	06:50 (106)
9	07:57		08:29 (108)	07:36			07:57		08:46 (83)	07:08			06:26		07:24 (82)	06:06		06:28 (106)
	17:27	30	08:59 (108)	18:03			19:35	30	09:16 (83)	20:06			20:36	92	20:01 (107)	21:02	23	06:51 (106)
10	07:57		08:30 (108)	07:35			07:56		08:48 (83)	07:06			06:25		07:25 (82)	06:06		06:28 (106)
	17:28	29	08:59 (108)	18:04			19:36	27	09:15 (83)	20:07			20:37	90	20:01 (107)	21:03	23	06:51 (106)
11	07:57		08:30 (108)	07:34			07:54		08:48 (83)	07:04		07:48 (82)	06:24		07:25 (82)	06:05		06:28 (106)
	17:29	29	08:59 (108)	18:05			19:37	25	09:13 (83)	20:08	12	08:00 (82)	20:38	90	20:01 (107)	21:04	24	06:52 (106)
12	07:57		08:31 (108)	07:33			07:53		08:51 (83)	07:03		07:44 (82)	06:23		07:26 (82)	06:05		06:28 (106)
	17:30	29	09:00 (108)	18:07			19:38	20	09:11 (83)	20:09	21	08:05 (82)	20:39	88	20:01 (107)	21:04	24	06:52 (106)
13	07:57		08:32 (108)	07:32			07:51		08:53 (83)	07:01		07:40 (82)	06:22		07:26 (82)	06:05		06:29 (106)
	17:31	28	09:00 (108)	18:08			19:39	15	09:08 (83)	20:10	27	08:07 (82)	20:40	87	20:01 (107)	21:05	23	06:52 (106)
14	07:56		08:32 (108)	07:30			07:49		08:58 (83)	07:00		07:38 (82)	06:21		07:27 (82)	06:05		06:29 (106)
	17:32	28	09:00 (108)	18:09			19:40	3	09:01 (83)	20:11	31	08:09 (82)	20:41	84	20:00 (107)	21:05	24	06:53 (106)
15	07:56		08:33 (108)	07:29			07:48			06:58		07:36 (82)	06:20		07:28 (82)	06:05		06:29 (106)
	17:33	27	09:00 (108)	18:10			19:41			20:12	35	08:11 (82)	20:42	81	20:00 (107)	21:05	24	06:53 (106)
16	07:55		08:33 (108)	07:28			07:46			06:57		07:34 (82)	06:19		07:28 (82)	06:05		06:29 (106)
	17:34	26	08:59 (108)	18:11			19:42			20:13	38	08:12 (82)	20:43	80	20:00 (107)	21:06	24	06:53 (106)
17	07:55		08:34 (108)	07:27			07:45			06:55		07:32 (82)	06:18		07:30 (82)	06:05		06:29 (106)
	17:36	26	09:00 (108)	18:12			19:43			20:14	41	08:13 (82)	20:44	77	20:00 (107)	21:06	24	06:53 (106)
18	07:55		08:35 (108)	07:25		07:59 (83)	07:43			06:54		07:31 (82)	06:17		07:31 (82)	06:05		06:29 (106)
	17:37	24	08:59 (108)	18:14	12	08:11 (83)	19:44			20:15	43	08:14 (82)	20:45	75	20:00 (107)	21:07	25	06:54 (106)
19	07:54		08:36 (108)	07:24		07:55 (83)	07:41			06:52		07:29 (82)	06:17		07:32 (82)	06:05		06:29 (106)
	17:38	23	08:59 (108)	18:15	19	08:14 (83)	19:45			20:16	45	08:14 (82)	20:46	72	19:59 (107)	21:07	25	06:54 (106)
20	07:54		08:37 (108)	07:23		07:53 (83)	07:40			06:51		07:29 (82)	06:16		07:33 (82)	06:06		06:30 (106)
	17:39	21	08:58 (108)	18:16	23	08:16 (83)	19:46			20:17	46	08:15 (82)	20:47	68	19:59 (107)	21:07	25	06:55 (106)
21	07:53		08:39 (108)	07:21		07:52 (83)	07:38			06:49		07:27 (82)	06:15		07:35 (82)	06:06		06:30 (106)
	17:40	19	08:58 (108)	18:17	26	08:18 (83)	19:48			20:18	48	08:15 (82)	20:48	65	19:59 (107)	21:07	25	06:55 (106)
22	07:52		08:40 (108)	07:20		07:50 (83)	07:37			06:48		07:27 (82)	06:14		07:36 (82)	06:06		06:30 (106)
	17:41	17	08:57 (108)	18:18	29	08:19 (83)	19:49			20:19	49	08:16 (82)	20:49	61	19:58 (107)	21:08	25	06:55 (106)
23	07:52		08:41 (108)	07:18		07:49 (83)	07:35			06:47		07:26 (82)	06:14		07:38 (82)	06:06		06:30 (106)
	17:42	15	08:56 (108)	18:19	31	08:20 (83)	19:50			20:20	62	19:47 (107)	20:50	55	19:57 (107)	21:08	25	06:55 (106)
24	07:51		08:44 (108)	07:17		07:48 (83)	07:33			06:45		07:25 (82)	06:13		07:39 (82)	06:06		06:30 (106)
	17:44	9	08:53 (108)	18:21	33	08:21 (83)	19:51			20:21	70	19:50 (107)	20:51	51	19:56 (107)	21:08	25	06:55 (106)
25	07:50			07:16		07:47 (83)	07:32			06:44		07:25 (82)	06:12		07:43 (82)	06:07		06:31 (106)
	17:45			18:22	35	08:22 (83)	19:52			20:22	76	19:53 (107)	20:51	45	19:57 (107)	21:08	24	06:55 (106)
26	07:50			07:14		07:46 (83)	07:30			06:42		07:25 (82)	06:11		19:24 (107)	06:07		06:31 (106)
	17:46			18:23	36	08:22 (83)	19:53			20:23	80	19:55 (107)	20:52	32	19:56 (107)	21:08	24	06:55 (106)
27	07:49			07:13		07:46 (83)	07:28			06:41		07:24 (82)	06:11		06:35 (106)	06:07		06:31 (106)
	17:47			18:24	36	08:22 (83)	19:54			20:24	82	19:55 (107)	20:53	36	19:56 (107)	21:08	24	06:55 (106)
28	07:48			07:11		07:45 (83)	07:27			06:40		07:24 (82)	06:10		06:33 (106)	06:08		06:32 (106)
	17:48			18:25	37	08:22 (83)	19:55			20:25	85	19:57 (107)	20:54	39	19:55 (107)	21:08	24	06:56 (106)
29	07:47						07:25			06:38		07:24 (82)	06:10		06:32 (106)	06:08		06:32 (106)
	17:50						19:56			20:26	88	19:58 (107)	20:55	39	19:54 (107)	21:08	24	06:56 (106)
30	07:46						07:23			06:37		07:23 (82)	06:09		06:31 (106)	06:09		06:33 (106)
	17:51						19:57			20:27	90	19:58 (107)	20:56	40	19:53 (107)	21:08	23	06:56 (106)
31	07:46						07:22						06:09		06:30 (106)			
	17:52						19:58						20:56	40	19:53 (107)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		615			317			407			1069			2232			803	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.61			0.63			0.63			0.66			0.65			0.68	
Total reduction		0.22			0.26			0.28			0.34			0.36			0.40	
Total, real		134			84			113			359			810			325	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 79

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m**Shadow receptor:** 8352 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6152)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:32 (106)	06:32		07:36 (82)	07:02		07:47 (82)	07:31		08:30 (83)	07:04			07:37		08:12 (108)
	21:08	24	06:56 (106)	20:51	88	20:11 (107)	20:09	12	07:59 (82)	19:19	19	08:49 (83)	17:33			17:10	29	08:41 (108)
2	06:10		06:33 (106)	06:33		07:36 (82)	07:03			07:32		08:28 (83)	07:05			07:38		08:12 (108)
	21:08	24	06:57 (106)	20:50	90	20:12 (107)	20:08			19:17	23	08:51 (83)	17:32			17:10	30	08:42 (108)
3	06:10		06:33 (106)	06:34		07:35 (82)	07:04			07:33		08:26 (83)	07:06			07:39		08:13 (108)
	21:08	23	06:56 (106)	20:49	91	20:12 (107)	20:06			19:15	26	08:52 (83)	17:31			17:10	29	08:42 (108)
4	06:11		06:34 (106)	06:35		07:35 (82)	07:05			07:34		08:24 (83)	07:07			07:40		08:13 (108)
	21:08	23	06:57 (106)	20:48	92	20:12 (107)	20:05			19:14	29	08:53 (83)	17:30			17:10	29	08:42 (108)
5	06:11		06:34 (106)	06:36		07:33 (82)	07:06			07:35		08:23 (83)	07:08			07:41		08:13 (108)
	21:08	25	19:49 (107)	20:47	92	20:10 (107)	20:03			19:12	31	08:54 (83)	17:29			17:09	30	08:43 (108)
6	06:12		06:35 (106)	06:37		07:33 (82)	07:07			07:36		08:21 (83)	07:09			07:42		08:14 (108)
	21:08	30	19:52 (107)	20:45	93	20:10 (107)	20:01			19:10	34	08:55 (83)	17:28			17:09	29	08:43 (108)
7	06:12		06:34 (106)	06:38		07:33 (82)	07:08			07:37		08:20 (83)	07:11			07:43		08:14 (108)
	21:07	35	19:54 (107)	20:44	93	20:10 (107)	20:00			19:09	35	08:55 (83)	17:27			17:09	30	08:44 (108)
8	06:13		06:35 (106)	06:39		07:32 (82)	07:09			07:38		08:20 (83)	07:12			07:44		08:15 (108)
	21:07	36	19:56 (107)	20:43	95	20:10 (107)	19:57			19:07	35	08:55 (83)	17:26			17:09	29	08:44 (108)
9	06:14		06:36 (106)	06:40		07:32 (82)	07:10			07:39		08:19 (83)	07:13			07:45		08:15 (108)
	21:07	37	19:57 (107)	20:42	93	20:09 (107)	19:55			19:06	37	08:56 (83)	17:25			17:09	30	08:45 (108)
10	06:14		06:36 (106)	06:41		07:32 (82)	07:11			07:40		08:18 (83)	07:14			07:46		08:16 (108)
	21:06	39	19:58 (107)	20:41	93	20:09 (107)	19:53			19:04	38	08:56 (83)	17:24			17:09	29	08:45 (108)
11	06:15		06:37 (106)	06:42		07:32 (82)	07:11			07:41		08:18 (83)	07:15			07:47		08:17 (108)
	21:06	39	19:59 (107)	20:39	91	20:08 (107)	19:52			19:03	37	08:55 (83)	17:23			17:09	29	08:46 (108)
12	06:16		06:38 (106)	06:43		07:31 (82)	07:12			07:42		08:18 (83)	07:16			07:47		08:16 (108)
	21:06	41	20:01 (107)	20:38	91	20:07 (107)	19:50			19:01	37	08:55 (83)	17:22			17:10	29	08:45 (108)
13	06:16		06:38 (106)	06:44		07:31 (82)	07:13			07:43		08:18 (83)	07:17			07:48		08:17 (108)
	21:05	41	20:01 (107)	20:37	89	20:06 (107)	19:48			19:00	38	08:56 (83)	17:21			17:10	29	08:46 (108)
14	06:17		06:40 (106)	06:45		07:31 (82)	07:14			07:44		08:18 (83)	07:19			07:49		08:18 (108)
	21:05	40	20:02 (107)	20:36	87	20:05 (107)	19:47			18:58	37	08:55 (83)	17:20			17:10	29	08:47 (108)
15	06:18		06:41 (106)	06:46		07:31 (82)	07:15			07:45		08:18 (83)	07:20			07:50		08:19 (108)
	21:04	39	20:03 (107)	20:34	85	20:04 (107)	19:45			18:57	37	08:55 (83)	17:19			17:10	28	08:47 (108)
16	06:19		06:43 (106)	06:47		07:31 (82)	07:16			07:46		08:19 (83)	07:21			07:50		08:18 (108)
	21:04	38	20:05 (107)	20:33	83	20:03 (107)	19:43			18:55	35	08:54 (83)	17:18			17:10	29	08:47 (108)
17	06:19		19:33 (107)	06:48		07:30 (82)	07:17			07:47		08:19 (83)	07:22			07:51		08:19 (108)
	21:03	32	20:05 (107)	20:32	80	20:00 (107)	19:42			18:54	34	08:53 (83)	17:17			17:11	29	08:48 (108)
18	06:20		07:54 (82)	06:49		07:31 (82)	07:18			07:48		08:19 (83)	07:23		08:18 (108)	07:52		08:20 (108)
	21:03	40	20:06 (107)	20:30	74	19:58 (107)	19:40			18:52	33	08:52 (83)	17:17	9	08:27 (108)	17:11	29	08:49 (108)
19	06:21		07:51 (82)	06:50		07:31 (82)	07:19			07:49		08:20 (83)	07:24		08:16 (108)	07:52		08:20 (108)
	21:02	48	20:07 (107)	20:29	68	19:55 (107)	19:38			18:51	31	08:51 (83)	17:16	15	08:31 (108)	17:11	29	08:49 (108)
20	06:22		07:49 (82)	06:51		07:31 (82)	07:20			07:50		08:21 (83)	07:25		08:15 (108)	07:53		08:21 (108)
	21:01	53	20:07 (107)	20:27	60	19:51 (107)	19:37			18:49	28	08:49 (83)	17:15	17	08:32 (108)	17:12	28	08:49 (108)
21	06:23		07:46 (82)	06:51		07:32 (82)	07:21			07:51		08:22 (83)	07:27		08:14 (108)	07:54		08:21 (108)
	21:01	58	20:07 (107)	20:26	49	08:21 (82)	19:35			18:48	25	08:47 (83)	17:15	19	08:33 (108)	17:12	28	08:49 (108)
22	06:24		07:45 (82)	06:52		07:32 (82)	07:22			07:52		08:25 (83)	07:28		08:13 (108)	07:54		08:22 (108)
	21:00	62	20:08 (107)	20:25	48	08:20 (82)	19:33			18:46	21	08:46 (83)	17:14	21	08:34 (108)	17:13	28	08:50 (108)
23	06:24		07:44 (82)	06:53		07:33 (82)	07:23			07:54		08:27 (83)	07:29		08:12 (108)	07:55		08:22 (108)
	20:59	67	20:09 (107)	20:23	46	08:19 (82)	19:32			18:45	17	08:44 (83)	17:14	23	08:35 (108)	17:13	28	08:50 (108)
24	06:25		07:43 (82)	06:54		07:33 (82)	07:24			07:55		08:30 (83)	07:30		08:13 (108)	07:55		08:23 (108)
	20:58	69	20:09 (107)	20:22	45	08:18 (82)	19:30			18:44	10	08:40 (83)	17:13	24	08:37 (108)	17:14	29	08:52 (108)
25	06:26		07:42 (82)	06:55		07:34 (82)	07:25			07:56			07:31		08:12 (108)	07:55		08:23 (108)
	20:57	73	20:10 (107)	20:20	43	08:17 (82)	19:28			18:42			17:13	26	08:38 (108)	17:15	29	08:52 (108)
26	06:27		07:41 (82)	06:56		07:35 (82)	07:26			07:57			07:32		08:12 (108)	07:56		08:23 (108)
	20:57	75	20:10 (107)	20:19	41	08:16 (82)	19:27			18:41			17:12	27	08:39 (108)	17:15	29	08:52 (108)
27	06:28		07:39 (82)	06:57		07:36 (82)	07:27			07:58			07:33		08:12 (108)	07:56		08:24 (108)
	20:56	79	20:10 (107)	20:17	38	08:14 (82)	19:25			18:40			17:12	27	08:39 (108)	17:16	29	08:53 (108)
28	06:29		07:39 (82)	06:58		07:38 (82)	07:28			07:59			07:34		08:12 (108)	07:56		08:25 (108)
	20:55	80	20:10 (107)	20:16	34	08:12 (82)	19:23			18:38			17:11	28	08:40 (108)	17:16	28	08:53 (108)
29	06:30		07:38 (82)	06:59		07:38 (82)	07:29			08:00			07:35		08:12 (108)	07:57		08:25 (108)
	20:54	83	20:11 (107)	20:14	31	08:09 (82)	19:22			18:37			17:11	28	08:40 (108)	17:17	29	08:54 (108)
30	06:31		07:37 (82)	07:00		07:40 (82)	07:30		08:34 (83)	08:01			07:36		08:12 (108)	07:57		08:25 (108)
	20:53	85	20:11 (107)	20:13	27	08:07 (82)	19:20	12	08:46 (83)	18:36			17:11	29	08:41 (108)	17:18	29	08:54 (108)
31	06:31		07:37 (82)	07:01		07:43 (82)				08:02						07:57		08:25 (108)
	20:52	86	20:11 (107)	20:11	21	08:04 (82)				18:35						17:19	29	08:54 (108)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		1524			2151			24			727			293			897	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.65			0.66			0.65			0.63			0.61			0.61	
Total reduction		0.39			0.39			0.40			0.35			0.22			0.30	
Total, real		595			845			9			257			66			271	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 80

Licensed user:
EDR
217 Montgomery St.
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(315) 471 0688
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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m**Shadow receptor:** 8353 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6153)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:30 (108)	07:45			07:10		07:49 (83)	07:20			06:36		07:26 (82)	06:08		06:30 (106)
	17:20	30	09:00 (108)	17:53			18:26	38	08:27 (83)	19:59			20:28	96	19:57 (107)	20:57	17	06:47 (106)
2	07:58		08:30 (108)	07:44			07:08		07:49 (83)	07:19			06:35		07:26 (82)	06:08		06:30 (106)
	17:21	30	09:00 (108)	17:54			18:27	37	08:26 (83)	20:00			20:29	97	19:58 (107)	20:58	19	06:49 (106)
3	07:58		08:31 (108)	07:43			07:07		07:49 (83)	07:17			06:33		07:27 (82)	06:07		06:30 (106)
	17:21	30	09:01 (108)	17:56			18:28	37	08:26 (83)	20:00			20:30	95	19:58 (107)	20:59	20	06:50 (106)
4	07:58		08:31 (108)	07:42			07:05		07:49 (83)	07:15			06:32		07:27 (82)	06:07		06:29 (106)
	17:22	30	09:01 (108)	17:57			18:29	36	08:25 (83)	20:01			20:31	95	19:58 (107)	20:59	20	06:49 (106)
5	07:58		08:32 (108)	07:41			07:04		07:50 (83)	07:14			06:31		07:26 (82)	06:07		06:29 (106)
	17:23	29	09:01 (108)	17:58			18:31	35	08:25 (83)	20:02			20:32	95	19:57 (107)	21:00	21	06:50 (106)
6	07:58		08:32 (108)	07:40			07:02		07:50 (83)	07:12			06:30		07:27 (82)	06:06		06:29 (106)
	17:24	29	09:01 (108)	17:59			18:32	33	08:23 (83)	20:03			20:33	93	19:57 (107)	21:01	22	06:51 (106)
7	07:58		08:33 (108)	07:39			07:01		07:52 (83)	07:11			06:29		07:27 (82)	06:06		06:29 (106)
	17:25	29	09:02 (108)	18:01			18:33	30	08:22 (83)	20:04			20:34	93	19:57 (107)	21:01	23	06:52 (106)
8	07:58		08:34 (108)	07:37			07:59		08:52 (83)	07:09			06:27		07:28 (82)	06:06		06:28 (106)
	17:26	28	09:02 (108)	18:02			19:34	28	09:20 (83)	20:05			20:35	91	19:57 (107)	21:02	23	06:51 (106)
9	07:57		08:34 (108)	07:36			07:57		08:53 (83)	07:08		07:54 (82)	06:26		07:28 (82)	06:06		06:28 (106)
	17:27	29	09:03 (108)	18:03			19:35	25	09:18 (83)	20:06	10	08:04 (82)	20:36	91	19:57 (107)	21:02	24	06:52 (106)
10	07:57		08:35 (108)	07:35			07:56		08:56 (83)	07:06		07:49 (82)	06:25		07:29 (82)	06:06		06:29 (106)
	17:28	28	09:03 (108)	18:04			19:36	20	09:16 (83)	20:07	21	08:10 (82)	20:37	87	19:56 (107)	21:03	23	06:52 (106)
11	07:57		08:35 (108)	07:34			07:54		08:58 (83)	07:04		07:45 (82)	06:24		07:29 (82)	06:05		06:29 (106)
	17:29	27	09:02 (108)	18:05			19:37	15	09:13 (83)	20:08	27	08:12 (82)	20:38	86	19:56 (107)	21:04	24	06:53 (106)
12	07:57		08:36 (108)	07:33			07:53			07:03		07:43 (82)	06:23		07:30 (82)	06:05		06:29 (106)
	17:30	27	09:03 (108)	18:07			19:38			20:09	32	08:15 (82)	20:39	84	19:56 (107)	21:04	24	06:53 (106)
13	07:57		08:37 (108)	07:32			07:51			07:01		07:40 (82)	06:22		07:31 (82)	06:05		06:29 (106)
	17:31	26	09:03 (108)	18:08			19:39			20:10	36	08:16 (82)	20:40	80	19:55 (107)	21:05	24	06:53 (106)
14	07:56		08:38 (108)	07:30			07:49			07:00		07:39 (82)	06:21		07:31 (82)	06:05		06:29 (106)
	17:32	24	09:02 (108)	18:09			19:40			20:11	39	08:18 (82)	20:41	79	19:55 (107)	21:05	25	06:54 (106)
15	07:56		08:39 (108)	07:29		08:04 (83)	07:48			06:58		07:37 (82)	06:20		07:32 (82)	06:05		06:29 (106)
	17:33	24	09:03 (108)	18:10	12	08:16 (83)	19:41			20:12	41	08:18 (82)	20:42	75	19:54 (107)	21:05	25	06:54 (106)
16	07:55		08:40 (108)	07:28		08:00 (83)	07:46			06:57		07:36 (82)	06:19		07:33 (82)	06:05		06:29 (106)
	17:34	22	09:02 (108)	18:11	18	08:18 (83)	19:42			20:13	44	08:20 (82)	20:43	72	19:53 (107)	21:06	25	06:54 (106)
17	07:55		08:41 (108)	07:27		07:58 (83)	07:45			06:55		07:34 (82)	06:18		07:35 (82)	06:05		06:29 (106)
	17:36	21	09:02 (108)	18:12	23	08:21 (83)	19:43			20:14	46	08:20 (82)	20:44	69	19:54 (107)	21:06	25	06:54 (106)
18	07:55		08:42 (108)	07:25		07:57 (83)	07:43			06:54		07:33 (82)	06:17		07:36 (82)	06:05		06:30 (106)
	17:37	19	09:01 (108)	18:14	26	08:23 (83)	19:44			20:15	48	08:21 (82)	20:45	66	19:53 (107)	21:07	24	06:54 (106)
19	07:54		08:44 (108)	07:24		07:55 (83)	07:41			06:52		07:32 (82)	06:17		07:37 (82)	06:05		06:30 (106)
	17:38	16	09:00 (108)	18:15	29	08:24 (83)	19:45			20:16	49	08:21 (82)	20:46	61	19:52 (107)	21:07	24	06:54 (106)
20	07:54		08:46 (108)	07:23		07:54 (83)	07:40			06:51		07:31 (82)	06:16		07:38 (82)	06:06		06:31 (106)
	17:39	12	08:58 (108)	18:16	31	08:25 (83)	19:46			20:17	66	19:46 (107)	20:47	57	19:51 (107)	21:07	24	06:55 (106)
21	07:53		08:49 (108)	07:21		07:53 (83)	07:38			06:49		07:30 (82)	06:15		07:40 (82)	06:06		06:31 (106)
	17:40	8	08:57 (108)	18:17	33	08:26 (83)	19:48			20:18	73	19:49 (107)	20:48	52	19:50 (107)	21:07	25	06:56 (106)
22	07:52			07:20		07:52 (83)	07:37			06:48		07:29 (82)	06:14		07:42 (82)	06:06		06:31 (106)
	17:41			18:18	34	08:26 (83)	19:49			20:19	78	19:51 (107)	20:49	46	19:49 (107)	21:08	25	06:56 (106)
23	07:52			07:18		07:51 (83)	07:35			06:47		07:29 (82)	06:14		07:43 (82)	06:06		06:31 (106)
	17:42			18:19	36	08:27 (83)	19:50			20:20	83	19:53 (107)	20:50	41	19:48 (107)	21:08	24	06:55 (106)
24	07:51			07:17		07:50 (83)	07:33			06:45		07:28 (82)	06:13		07:46 (82)	06:06		06:31 (106)
	17:44			18:21	37	08:27 (83)	19:51			20:21	85	19:53 (107)	20:51	32	19:46 (107)	21:08	24	06:55 (106)
25	07:50			07:16		07:50 (83)	07:32			06:44		07:28 (82)	06:12		19:28 (107)	06:07		06:31 (106)
	17:45			18:22	38	08:28 (83)	19:52			20:22	88	19:55 (107)	20:51	17	19:45 (107)	21:08	25	06:56 (106)
26	07:50			07:14		07:49 (83)	07:30			06:42		07:28 (82)	06:11		19:30 (107)	06:07		06:31 (106)
	17:46			18:23	38	08:27 (83)	19:53			20:23	91	19:56 (107)	20:52	13	19:43 (107)	21:08	25	06:56 (106)
27	07:49			07:13		07:49 (83)	07:28			06:41		07:27 (82)	06:11		06:35 (106)	06:07		06:31 (106)
	17:47			18:24	39	08:28 (83)	19:54			20:24	92	19:56 (107)	20:53	15	19:41 (107)	21:08	25	06:56 (106)
28	07:48			07:11		07:49 (83)	07:27			06:40		07:27 (82)	06:10		06:33 (106)	06:08		06:32 (106)
	17:48			18:25	38	08:27 (83)	19:55			20:25	93	19:56 (107)	20:54	10	06:43 (106)	21:08	25	06:57 (106)
29	07:47						07:25			06:38		07:27 (82)	06:10		06:32 (106)	06:08		06:32 (106)
	17:50						19:56			20:26	94	19:57 (107)	20:55	13	06:45 (106)	21:08	24	06:56 (106)
30	07:46						07:23			06:37		07:26 (82)	06:09		06:31 (106)	06:09		06:33 (106)
	17:51						19:57			20:27	96	19:57 (107)	20:56	15	06:46 (106)	21:08	24	06:57 (106)
31	07:46						07:22						06:09		06:31 (106)			
	17:52						19:58						20:56	16	06:47 (106)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		518			432			334			1332			1932			702	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.61			0.63			0.63			0.66			0.65			0.68	
Total reduction		0.22			0.26			0.28			0.34			0.36			0.41	
Total, real		113			114			92			446			704			287	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 81

Licensed user:
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217 Montgomery St.
US-SYRACUSE, NY 13202
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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m**Shadow receptor:** 8353 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6153)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:33 (106)	06:32		07:40 (82)	07:02		07:44 (82)	07:31			07:04			07:37		08:17 (108)
	21:08	24	06:57 (106)	20:51	85	20:07 (107)	20:09	27	08:11 (82)	19:19			17:33			17:10	28	08:45 (108)
2	06:10		06:34 (106)	06:33		07:40 (82)	07:03		07:47 (82)	07:32		08:38 (83)	07:05			07:38		08:17 (108)
	21:08	23	06:57 (106)	20:50	87	20:07 (107)	20:08	21	08:08 (82)	19:17	11	08:49 (83)	17:32			17:10	28	08:45 (108)
3	06:10		06:33 (106)	06:34		07:39 (82)	07:04		07:52 (82)	07:33		08:34 (83)	07:06			07:39		08:18 (108)
	21:08	24	06:57 (106)	20:49	89	20:07 (107)	20:06	11	08:03 (82)	19:15	19	08:53 (83)	17:31			17:10	28	08:46 (108)
4	06:11		06:34 (106)	06:35		07:39 (82)	07:05			07:34		08:32 (83)	07:07			07:40		08:18 (108)
	21:08	23	06:57 (106)	20:48	89	20:07 (107)	20:05			19:14	23	08:55 (83)	17:30			17:10	28	08:46 (108)
5	06:11		06:34 (106)	06:36		07:37 (82)	07:06			07:35		08:30 (83)	07:08			07:41		08:18 (108)
	21:08	23	06:57 (106)	20:47	92	20:07 (107)	20:03			19:12	26	08:56 (83)	17:29			17:09	29	08:47 (108)
6	06:12		06:35 (106)	06:37		07:37 (82)	07:07			07:36		08:28 (83)	07:09			07:42		08:18 (108)
	21:08	22	06:57 (106)	20:45	93	20:07 (107)	20:01			19:10	29	08:57 (83)	17:28			17:09	30	08:48 (108)
7	06:12		06:35 (106)	06:38		07:36 (82)	07:08			07:37		08:26 (83)	07:11			07:43		08:19 (108)
	21:07	22	06:57 (106)	20:44	95	20:07 (107)	20:00			19:09	32	08:58 (83)	17:27			17:09	29	08:48 (108)
8	06:13		06:36 (106)	06:39		07:36 (82)	07:09			07:38		08:25 (83)	07:12			07:44		08:19 (108)
	21:07	21	06:57 (106)	20:43	95	20:07 (107)	19:57			19:07	34	08:59 (83)	17:26			17:09	30	08:49 (108)
9	06:14		06:37 (106)	06:40		07:36 (82)	07:10			07:39		08:24 (83)	07:13			07:45		08:20 (108)
	21:07	20	06:57 (106)	20:42	96	20:07 (107)	19:55			19:06	35	08:59 (83)	17:25			17:09	29	08:49 (108)
10	06:14		06:37 (106)	06:41		07:35 (82)	07:11			07:40		08:23 (83)	07:14			07:46		08:20 (108)
	21:06	19	06:56 (106)	20:41	96	20:06 (107)	19:53			19:04	37	09:00 (83)	17:24			17:09	30	08:50 (108)
11	06:15		06:38 (106)	06:42		07:35 (82)	07:11			07:41		08:23 (83)	07:15			07:47		08:21 (108)
	21:06	18	06:56 (106)	20:39	95	20:06 (107)	19:52			19:03	37	09:00 (83)	17:23			17:09	30	08:51 (108)
12	06:16		06:39 (106)	06:43		07:35 (82)	07:12			07:42		08:22 (83)	07:16			07:47		08:20 (108)
	21:06	17	06:56 (106)	20:38	96	20:06 (107)	19:50			19:01	38	09:00 (83)	17:22			17:10	30	08:50 (108)
13	06:16		06:39 (106)	06:44		07:35 (82)	07:13			07:43		08:22 (83)	07:17			07:48		08:21 (108)
	21:05	16	06:55 (106)	20:37	95	20:05 (107)	19:48			19:00	39	09:01 (83)	17:21			17:10	30	08:51 (108)
14	06:17		06:40 (106)	06:45		07:35 (82)	07:14			07:44		08:22 (83)	07:19			07:49		08:22 (108)
	21:05	14	06:54 (106)	20:36	95	20:05 (107)	19:47			18:58	39	09:01 (83)	17:20			17:10	30	08:52 (108)
15	06:18		06:42 (106)	06:46		07:34 (82)	07:15			07:45		08:22 (83)	07:20			07:50		08:22 (108)
	21:04	11	06:53 (106)	20:34	94	20:04 (107)	19:45			18:57	38	09:00 (83)	17:19			17:10	30	08:52 (108)
16	06:19		06:44 (106)	06:47		07:34 (82)	07:16			07:46		08:22 (83)	07:21			07:50		08:22 (108)
	21:04	10	19:48 (107)	20:33	93	20:03 (107)	19:43			18:55	38	09:00 (83)	17:18			17:10	30	08:52 (108)
17	06:19		19:41 (107)	06:48		07:33 (82)	07:17			07:47		08:22 (83)	07:22			07:51		08:23 (108)
	21:03	10	19:51 (107)	20:32	90	20:01 (107)	19:42			18:54	37	08:59 (83)	17:17			17:11	30	08:53 (108)
18	06:20		19:39 (107)	06:49		07:34 (82)	07:18			07:48		08:22 (83)	07:23			07:52		08:24 (108)
	21:03	15	19:54 (107)	20:30	87	20:00 (107)	19:40			18:52	37	08:59 (83)	17:17			17:11	30	08:54 (108)
19	06:21		07:58 (82)	06:50		07:34 (82)	07:19			07:49		08:22 (83)	07:24			07:52		08:24 (108)
	21:02	27	19:56 (107)	20:29	85	19:59 (107)	19:38			18:51	36	08:58 (83)	17:16			17:11	30	08:54 (108)
20	06:22		07:55 (82)	06:51		07:34 (82)	07:20			07:50		08:22 (83)	07:25			07:53		08:25 (108)
	21:01	37	19:58 (107)	20:27	81	19:57 (107)	19:37			18:49	35	08:57 (83)	17:15			17:12	30	08:55 (108)
21	06:23		07:52 (82)	06:51		07:34 (82)	07:21			07:51		08:23 (83)	07:27		08:24 (108)	07:53		08:25 (108)
	21:01	43	19:58 (107)	20:26	77	19:55 (107)	19:35			18:48	33	08:56 (83)	17:15	8	08:32 (108)	17:12	30	08:55 (108)
22	06:24		07:50 (82)	06:52		07:35 (82)	07:22			07:52		08:25 (83)	07:28		08:22 (108)	07:54		08:26 (108)
	21:00	50	19:59 (107)	20:25	71	19:53 (107)	19:33			18:46	30	08:55 (83)	17:14	12	08:34 (108)	17:13	30	08:56 (108)
23	06:24		07:49 (82)	06:53		07:35 (82)	07:23			07:54		08:26 (83)	07:29		08:20 (108)	07:55		08:26 (108)
	20:59	54	20:01 (107)	20:23	65	19:50 (107)	19:32			18:45	28	08:54 (83)	17:14	16	08:36 (108)	17:13	30	08:56 (108)
24	06:25		07:48 (82)	06:54		07:35 (82)	07:24			07:55		08:27 (83)	07:30		08:20 (108)	07:55		08:27 (108)
	20:58	59	20:02 (107)	20:22	50	08:25 (82)	19:30			18:44	25	08:52 (83)	17:13	19	08:39 (108)	17:14	30	08:57 (108)
25	06:26		07:47 (82)	06:55		07:36 (82)	07:25			07:56		08:28 (83)	07:31		08:19 (108)	07:55		08:27 (108)
	20:57	64	20:03 (107)	20:20	48	08:24 (82)	19:28			18:42	22	08:50 (83)	17:13	21	08:40 (108)	17:15	30	08:57 (108)
26	06:27		07:46 (82)	06:56		07:37 (82)	07:26			07:57		08:31 (83)	07:32		08:19 (108)	07:56		08:27 (108)
	20:57	67	20:04 (107)	20:19	46	08:23 (82)	19:27			18:41	16	08:47 (83)	17:12	22	08:41 (108)	17:15	30	08:57 (108)
27	06:28		07:44 (82)	06:57		07:38 (82)	07:27			07:58		08:34 (83)	07:33		08:18 (108)	07:56		08:28 (108)
	20:56	70	20:03 (107)	20:17	44	08:22 (82)	19:25			18:40	9	08:43 (83)	17:12	24	08:42 (108)	17:16	30	08:58 (108)
28	06:29		07:43 (82)	06:58		07:39 (82)	07:28			07:59			07:34		08:18 (108)	07:56		08:28 (108)
	20:55	74	20:04 (107)	20:16	41	08:20 (82)	19:23			18:38			17:11	24	08:42 (108)	17:16	30	08:58 (108)
29	06:30		07:42 (82)	06:59		07:39 (82)	07:29			08:00			07:35		08:18 (108)	07:57		08:28 (108)
	20:54	77	20:05 (107)	20:14	39	08:18 (82)	19:22			18:37			17:11	25	08:43 (108)	17:17	31	08:59 (108)
30	06:31		07:42 (82)	07:00		07:40 (82)	07:30			08:01			07:36		08:17 (108)	07:57		08:29 (108)
	20:53	79	20:06 (107)	20:13	36	08:16 (82)	19:20			18:36			17:11	27	08:44 (108)	17:18	30	08:59 (108)
31	06:31		07:41 (82)	07:01		07:42 (82)				08:02						07:57		08:29 (108)
	20:52	82	20:06 (107)	20:11	32	08:14 (82)				18:35						17:19	30	08:59 (108)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		1115			2377			59			783			198			920	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.66			0.66			0.67			0.63			0.61			0.61	
Total reduction		0.39			0.39			0.41			0.35			0.22			0.30	
Total, real		440			933			24			276			44			279	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 82

Licensed user:
EDR
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US-SYRACUSE, NY 13202
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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m**Shadow receptor:** 8354 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6154)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:28 (108)	07:45			07:10		07:47 (83)	07:20			06:36		07:24 (82)	06:08		06:30 (106)
	17:20	30	08:58 (108)	17:53			18:26	38	08:25 (83)	19:59			20:28	93	19:58 (107)	20:57	23	19:43 (107)
2	07:58		08:28 (108)	07:44			07:08		07:46 (83)	07:19			06:35		07:24 (82)	06:08		06:29 (106)
	17:21	30	08:58 (108)	17:54			18:27	38	08:24 (83)	20:00			20:29	95	19:59 (107)	20:58	18	06:47 (106)
3	07:58		08:29 (108)	07:43			07:07		07:47 (83)	07:17			06:33		07:24 (82)	06:07		06:29 (106)
	17:21	30	08:59 (108)	17:56			18:28	37	08:24 (83)	20:00			20:30	95	19:59 (107)	20:59	19	06:48 (106)
4	07:58		08:29 (108)	07:42			07:05		07:46 (83)	07:15			06:32		07:24 (82)	06:07		06:28 (106)
	17:22	30	08:59 (108)	17:57			18:29	37	08:23 (83)	20:01			20:31	96	20:00 (107)	20:59	20	06:48 (106)
5	07:58		08:29 (108)	07:41			07:04		07:47 (83)	07:14			06:31		07:23 (82)	06:07		06:28 (106)
	17:23	30	08:59 (108)	17:58			18:31	36	08:23 (83)	20:02			20:32	95	19:59 (107)	21:00	21	06:49 (106)
6	07:58		08:30 (108)	07:40			07:02		07:47 (83)	07:12			06:30		07:24 (82)	06:06		06:29 (106)
	17:24	30	09:00 (108)	17:59			18:32	35	08:22 (83)	20:03			20:33	94	19:59 (107)	21:01	21	06:50 (106)
7	07:58		08:30 (108)	07:39			07:01		07:48 (83)	07:11			06:29		07:24 (82)	06:06		06:29 (106)
	17:25	30	09:00 (108)	18:01			18:33	33	08:21 (83)	20:04			20:34	94	19:59 (107)	21:01	21	06:50 (106)
8	07:58		08:31 (108)	07:37			07:59		08:48 (83)	07:09			06:27		07:24 (82)	06:06		06:28 (106)
	17:26	30	09:01 (108)	18:02			19:34	32	09:20 (83)	20:05			20:35	93	19:59 (107)	21:02	22	06:50 (106)
9	07:57		08:32 (108)	07:36			07:57		08:49 (83)	07:08			06:26		07:25 (82)	06:06		06:28 (106)
	17:27	29	09:01 (108)	18:03			19:35	29	09:18 (83)	20:06			20:36	92	19:59 (107)	21:02	22	06:50 (106)
10	07:57		08:33 (108)	07:35			07:56		08:51 (83)	07:06			06:25		07:25 (82)	06:06		06:28 (106)
	17:28	29	09:02 (108)	18:04			19:36	26	09:17 (83)	20:07			20:37	91	19:59 (107)	21:03	23	06:51 (106)
11	07:57		08:33 (108)	07:34			07:54		08:52 (83)	07:04		07:48 (82)	06:24		07:26 (82)	06:05		06:28 (106)
	17:29	28	09:01 (108)	18:05			19:37	22	09:14 (83)	20:08	15	08:03 (82)	20:38	89	19:59 (107)	21:04	23	06:51 (106)
12	07:57		08:34 (108)	07:33			07:53		08:55 (83)	07:03		07:45 (82)	06:23		07:26 (82)	06:05		06:28 (106)
	17:30	28	09:02 (108)	18:07			19:38	17	09:12 (83)	20:09	22	08:07 (82)	20:39	89	19:59 (107)	21:04	24	06:52 (106)
13	07:57		08:35 (108)	07:32			07:51		08:58 (83)	07:01		07:41 (82)	06:22		07:27 (82)	06:05		06:29 (106)
	17:31	27	09:02 (108)	18:08			19:39	9	09:07 (83)	20:10	28	08:09 (82)	20:40	87	19:59 (107)	21:05	23	06:52 (106)
14	07:56		08:35 (108)	07:30			07:49			07:00		07:39 (82)	06:21		07:27 (82)	06:05		06:29 (106)
	17:32	26	09:01 (108)	18:09			19:40			20:11	33	08:12 (82)	20:41	84	19:58 (107)	21:05	23	06:52 (106)
15	07:56		08:36 (108)	07:29			07:48			06:58		07:37 (82)	06:20		07:28 (82)	06:05		06:29 (106)
	17:33	26	09:02 (108)	18:10			19:41			20:12	36	08:13 (82)	20:42	82	19:58 (107)	21:05	24	06:53 (106)
16	07:55		08:36 (108)	07:28			07:46			06:57		07:35 (82)	06:19		07:29 (82)	06:05		06:29 (106)
	17:34	25	09:01 (108)	18:11			19:42			20:13	40	08:15 (82)	20:43	79	19:57 (107)	21:06	24	06:53 (106)
17	07:55		08:38 (108)	07:27		08:00 (83)	07:45			06:55		07:33 (82)	06:18		07:30 (82)	06:05		06:29 (106)
	17:36	23	09:01 (108)	18:12	14	08:14 (83)	19:43			20:14	42	08:15 (82)	20:44	77	19:58 (107)	21:06	24	06:53 (106)
18	07:55		08:38 (108)	07:25		07:58 (83)	07:43			06:54		07:32 (82)	06:17		07:31 (82)	06:05		06:29 (106)
	17:37	22	09:00 (108)	18:14	19	08:17 (83)	19:44			20:15	44	08:16 (82)	20:45	74	19:57 (107)	21:07	24	06:53 (106)
19	07:54		08:40 (108)	07:24		07:55 (83)	07:41			06:52		07:30 (82)	06:17		07:32 (82)	06:05		06:29 (106)
	17:38	20	09:00 (108)	18:15	24	08:19 (83)	19:45			20:16	47	08:17 (82)	20:46	71	19:56 (107)	21:07	24	06:53 (106)
20	07:54		08:41 (108)	07:23		07:53 (83)	07:40			06:51		07:30 (82)	06:16		07:33 (82)	06:06		06:30 (106)
	17:39	18	08:59 (108)	18:16	28	08:21 (83)	19:46			20:17	48	08:18 (82)	20:47	66	19:55 (107)	21:07	24	06:54 (106)
21	07:53		08:43 (108)	07:21		07:52 (83)	07:38			06:49		07:28 (82)	06:15		07:35 (82)	06:06		06:30 (106)
	17:40	16	08:59 (108)	18:17	30	08:22 (83)	19:48			20:18	53	19:42 (107)	20:48	64	19:56 (107)	21:07	24	06:54 (106)
22	07:52		08:45 (108)	07:20		07:51 (83)	07:37			06:48		07:28 (82)	06:14		07:36 (82)	06:06		06:30 (106)
	17:41	12	08:57 (108)	18:18	32	08:23 (83)	19:49			20:19	65	19:48 (107)	20:49	60	19:55 (107)	21:08	24	06:54 (106)
23	07:52		08:48 (108)	07:18		07:50 (83)	07:35			06:47		07:27 (82)	06:14		07:37 (82)	06:06		06:30 (106)
	17:42	6	08:54 (108)	18:19	34	08:24 (83)	19:50			20:20	73	19:51 (107)	20:50	56	19:54 (107)	21:08	24	06:54 (106)
24	07:51			07:17		07:49 (83)	07:33			06:45		07:26 (82)	06:13		07:38 (82)	06:06		06:30 (106)
	17:44			18:21	35	08:24 (83)	19:51			20:21	77	19:52 (107)	20:51	51	19:53 (107)	21:08	24	06:54 (106)
25	07:50			07:16		07:48 (83)	07:32			06:44		07:26 (82)	06:12		07:40 (82)	06:07		06:31 (106)
	17:45			18:22	37	08:25 (83)	19:52			20:22	82	19:54 (107)	20:51	46	19:52 (107)	21:08	24	06:55 (106)
26	07:50			07:14		07:47 (83)	07:30			06:42		07:26 (82)	06:11		07:42 (82)	06:07		06:31 (106)
	17:46			18:23	38	08:25 (83)	19:53			20:23	85	19:56 (107)	20:52	39	19:51 (107)	21:08	24	06:55 (106)
27	07:49			07:13		07:47 (83)	07:28			06:41		07:24 (82)	06:11		07:46 (82)	06:07		06:31 (106)
	17:47			18:24	38	08:25 (83)	19:54			20:24	89	19:56 (107)	20:53	31	19:51 (107)	21:08	24	06:55 (106)
28	07:48			07:11		07:46 (83)	07:27			06:40		07:24 (82)	06:10		06:34 (106)	06:08		06:32 (106)
	17:48			18:25	39	08:25 (83)	19:55			20:25	91	19:57 (107)	20:54	27	19:49 (107)	21:08	24	06:56 (106)
29	07:47						07:25			06:38		07:24 (82)	06:10		06:33 (106)	06:08		06:32 (106)
	17:50						19:56			20:26	92	19:58 (107)	20:55	29	19:49 (107)	21:08	23	06:55 (106)
30	07:46						07:23			06:37		07:23 (82)	06:09		06:31 (106)	06:09		06:32 (106)
	17:51						19:57			20:27	94	19:58 (107)	20:56	29	19:47 (107)	21:08	24	06:56 (106)
31	07:46						07:22						06:09		06:31 (106)			
	17:52						19:58						20:56	27	19:46 (107)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		575			368			389			1156			2195			686	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.61			0.63			0.63			0.66			0.65			0.68	
Total reduction		0.22			0.26			0.28			0.34			0.36			0.41	
Total, real		125			97			108			388			799			280	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 83

Licensed user:
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Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m**Shadow receptor:** 8354 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6154)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:32 (106)	06:32		07:37 (82)	07:02		07:48 (82)	07:31		08:35 (83)	07:04			07:37		08:15 (108)
	21:08	24	06:56 (106)	20:51	88	20:10 (107)	20:09	14	08:02 (82)	19:19	14	08:49 (83)	17:33			17:10	28	08:43 (108)
2	06:10		06:33 (106)	06:33		07:36 (82)	07:03			07:32		08:31 (83)	07:05			07:38		08:15 (108)
	21:08	23	06:56 (106)	20:50	91	20:10 (107)	20:08			19:17	21	08:52 (83)	17:32			17:10	29	08:44 (108)
3	06:10		06:33 (106)	06:34		07:36 (82)	07:04			07:33		08:29 (83)	07:06			07:39		08:15 (108)
	21:08	23	06:56 (106)	20:49	92	20:10 (107)	20:06			19:15	24	08:53 (83)	17:31			17:10	29	08:44 (108)
4	06:11		06:34 (106)	06:35		07:35 (82)	07:05			07:34		08:27 (83)	07:07			07:40		08:15 (108)
	21:08	22	06:56 (106)	20:48	93	20:10 (107)	20:05			19:14	28	08:55 (83)	17:30			17:10	30	08:45 (108)
5	06:11		06:34 (106)	06:36		07:34 (82)	07:06			07:35		08:25 (83)	07:08			07:41		08:16 (108)
	21:08	22	06:56 (106)	20:47	94	20:09 (107)	20:03			19:12	31	08:56 (83)	17:29			17:09	29	08:45 (108)
6	06:12		06:35 (106)	06:37		07:34 (82)	07:07			07:36		08:24 (83)	07:09			07:42		08:16 (108)
	21:08	21	06:56 (106)	20:45	94	20:09 (107)	20:01			19:10	33	08:57 (83)	17:28			17:09	30	08:46 (108)
7	06:12		06:35 (106)	06:38		07:33 (82)	07:08			07:37		08:23 (83)	07:11			07:43		08:16 (108)
	21:07	20	06:55 (106)	20:44	96	20:09 (107)	20:00			19:09	34	08:57 (83)	17:27			17:09	30	08:46 (108)
8	06:13		06:35 (106)	06:39		07:33 (82)	07:09			07:38		08:22 (83)	07:12			07:44		08:17 (108)
	21:07	20	06:55 (106)	20:43	96	20:09 (107)	19:57			19:07	36	08:58 (83)	17:26			17:09	30	08:47 (108)
9	06:14		06:36 (106)	06:40		07:33 (82)	07:10			07:39		08:21 (83)	07:13			07:45		08:17 (108)
	21:07	20	06:56 (106)	20:42	94	20:08 (107)	19:55			19:06	37	08:58 (83)	17:25			17:09	30	08:47 (108)
10	06:14		06:36 (106)	06:41		07:33 (82)	07:11			07:40		08:20 (83)	07:14			07:46		08:18 (108)
	21:06	19	06:55 (106)	20:41	94	20:08 (107)	19:53			19:04	38	08:58 (83)	17:24			17:09	30	08:48 (108)
11	06:15		06:38 (106)	06:42		07:32 (82)	07:11			07:41		08:20 (83)	07:15			07:47		08:19 (108)
	21:06	16	06:54 (106)	20:39	96	20:08 (107)	19:52			19:03	38	08:58 (83)	17:23			17:09	30	08:49 (108)
12	06:16		06:39 (106)	06:43		07:32 (82)	07:12			07:42		08:19 (83)	07:16			07:47		08:18 (108)
	21:06	25	19:53 (107)	20:38	94	20:07 (107)	19:50			19:01	39	08:58 (83)	17:22			17:10	30	08:48 (108)
13	06:16		06:39 (106)	06:44		07:32 (82)	07:13			07:43		08:20 (83)	07:17			07:48		08:19 (108)
	21:05	27	19:54 (107)	20:37	93	20:06 (107)	19:48			19:00	38	08:58 (83)	17:21			17:10	30	08:49 (108)
14	06:17		06:40 (106)	06:45		07:32 (82)	07:14			07:44		08:20 (83)	07:19			07:49		08:20 (108)
	21:05	29	19:56 (107)	20:36	91	20:05 (107)	19:47			18:58	38	08:58 (83)	17:20			17:10	30	08:50 (108)
15	06:18		06:42 (106)	06:46		07:32 (82)	07:15			07:45		08:20 (83)	07:20			07:50		08:20 (108)
	21:04	29	19:58 (107)	20:34	90	20:05 (107)	19:45			18:57	38	08:58 (83)	17:19			17:10	30	08:50 (108)
16	06:19		06:46 (106)	06:47		07:32 (82)	07:16			07:46		08:20 (83)	07:21			07:50		08:20 (108)
	21:04	24	20:00 (107)	20:33	87	20:03 (107)	19:43			18:55	37	08:57 (83)	17:18			17:10	30	08:50 (108)
17	06:19		07:53 (82)	06:48		07:31 (82)	07:17			07:47		08:20 (83)	07:22			07:51		08:21 (108)
	21:03	35	20:00 (107)	20:32	85	20:01 (107)	19:42			18:54	36	08:56 (83)	17:17			17:11	30	08:51 (108)
18	06:20		07:51 (82)	06:49		07:32 (82)	07:18			07:48		08:20 (83)	07:23			07:52		08:22 (108)
	21:03	42	20:01 (107)	20:30	81	20:00 (107)	19:40			18:52	35	08:55 (83)	17:17			17:11	30	08:52 (108)
19	06:21		07:49 (82)	06:50		07:32 (82)	07:19			07:49		08:21 (83)	07:24		08:23 (108)	07:52		08:22 (108)
	21:02	48	20:02 (107)	20:29	77	19:58 (107)	19:38			18:51	33	08:54 (83)	17:16	6	08:29 (108)	17:11	29	08:51 (108)
20	06:22		07:48 (82)	06:51		07:32 (82)	07:20			07:50		08:22 (83)	07:25		08:20 (108)	07:53		08:23 (108)
	21:01	54	20:04 (107)	20:27	72	19:55 (107)	19:37			18:49	31	08:53 (83)	17:15	12	08:32 (108)	17:12	29	08:52 (108)
21	06:23		07:46 (82)	06:51		07:33 (82)	07:21			07:51		08:22 (83)	07:27		08:18 (108)	07:53		08:23 (108)
	21:01	57	20:04 (107)	20:26	64	19:52 (107)	19:35			18:48	29	08:51 (83)	17:15	16	08:34 (108)	17:12	29	08:52 (108)
22	06:24		07:45 (82)	06:52		07:33 (82)	07:22			07:52		08:25 (83)	07:28		08:17 (108)	07:54		08:24 (108)
	21:00	62	20:05 (107)	20:25	49	08:22 (82)	19:33			18:46	26	08:51 (83)	17:14	18	08:35 (108)	17:13	29	08:53 (108)
23	06:24		07:44 (82)	06:53		07:34 (82)	07:23			07:54		08:26 (83)	07:29		08:16 (108)	07:55		08:24 (108)
	20:59	64	20:05 (107)	20:23	47	08:21 (82)	19:32			18:45	23	08:49 (83)	17:14	20	08:36 (108)	17:13	29	08:53 (108)
24	06:25		07:43 (82)	06:54		07:34 (82)	07:24			07:55		08:28 (83)	07:30		08:16 (108)	07:55		08:25 (108)
	20:58	69	20:06 (107)	20:22	46	08:20 (82)	19:30			18:44	18	08:46 (83)	17:13	22	08:38 (108)	17:14	29	08:54 (108)
25	06:26		07:42 (82)	06:55		07:35 (82)	07:25			07:56		08:31 (83)	07:31		08:16 (108)	07:55		08:25 (108)
	20:57	72	20:07 (107)	20:20	44	08:19 (82)	19:28			18:42	12	08:43 (83)	17:13	23	08:39 (108)	17:15	30	08:55 (108)
26	06:27		07:41 (82)	06:56		07:36 (82)	07:26			07:57			07:32		08:15 (108)	07:56		08:25 (108)
	20:57	76	20:08 (107)	20:19	42	08:18 (82)	19:27			18:41			17:12	25	08:40 (108)	17:15	30	08:55 (108)
27	06:28		07:40 (82)	06:57		07:37 (82)	07:27			07:58			07:33		08:15 (108)	07:56		08:26 (108)
	20:56	77	20:07 (107)	20:17	39	08:16 (82)	19:25			18:40			17:12	26	08:41 (108)	17:16	30	08:56 (108)
28	06:29		07:39 (82)	06:58		07:39 (82)	07:28			07:59			07:34		08:15 (108)	07:56		08:26 (108)
	20:55	80	20:08 (107)	20:16	36	08:15 (82)	19:23			18:38			17:11	26	08:41 (108)	17:16	30	08:56 (108)
29	06:30		07:38 (82)	06:59		07:39 (82)	07:29			08:00			07:35		08:15 (108)	07:57		08:27 (108)
	20:54	83	20:08 (107)	20:14	33	08:12 (82)	19:22			18:37			17:11	27	08:42 (108)	17:17	29	08:56 (108)
30	06:31		07:38 (82)	07:00		07:41 (82)	07:30			08:01			07:36		08:15 (108)	07:57		08:27 (108)
	20:53	85	20:09 (107)	20:13	28	08:09 (82)	19:20			18:36			17:11	28	08:43 (108)	17:18	30	08:57 (108)
31	06:31		07:37 (82)	07:01		07:44 (82)				08:02						07:57		08:27 (108)
	20:52	87	20:09 (107)	20:11	22	08:06 (82)				18:35						17:19	30	08:57 (108)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		1355			2248			14			767			249			918	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.66			0.66			0.67			0.63			0.61			0.61	
Total reduction		0.39			0.39			0.41			0.35			0.22			0.30	
Total, real		532			883			6			271			56			278	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 84

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m**Shadow receptor:** 8355 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6155)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:24 (108)	07:45			07:10		07:45 (83)	07:20			06:36		07:29 (82)	06:08		06:30 (106)
	17:20	29	08:53 (108)	17:53			18:26	37	08:22 (83)	19:59			20:28	88	19:57 (107)	20:57	47	19:49 (107)
2	07:58		08:25 (108)	07:44			07:08		07:45 (83)	07:19			06:35		07:30 (82)	06:08		06:30 (106)
	17:21	28	08:53 (108)	17:54			18:27	36	08:21 (83)	20:00			20:29	88	19:58 (107)	20:58	45	19:49 (107)
3	07:58		08:26 (108)	07:43			07:07		07:46 (83)	07:17			06:33		07:30 (82)	06:07		06:31 (106)
	17:21	29	08:55 (108)	17:56			18:28	35	08:21 (83)	20:00			20:30	87	19:58 (107)	20:59	43	19:48 (107)
4	07:58		08:26 (108)	07:42			07:05		07:45 (83)	07:15			06:32		07:31 (82)	06:07		06:30 (106)
	17:22	28	08:54 (108)	17:57			18:29	35	08:20 (83)	20:01			20:31	87	19:59 (107)	20:59	42	19:47 (107)
5	07:58		08:26 (108)	07:41			07:04		07:46 (83)	07:14			06:31		07:31 (82)	06:07		06:30 (106)
	17:23	29	08:55 (108)	17:58			18:31	33	08:19 (83)	20:02			20:32	85	19:58 (107)	21:00	40	19:46 (107)
6	07:58		08:26 (108)	07:40			07:02		07:46 (83)	07:12			06:30		07:32 (82)	06:06		06:31 (106)
	17:24	29	08:55 (108)	17:59			18:32	32	08:18 (83)	20:03			20:33	83	19:58 (107)	21:01	37	19:45 (107)
7	07:58		08:27 (108)	07:39			07:01		07:48 (83)	07:11		07:50 (82)	06:29		07:33 (82)	06:06		06:31 (106)
	17:25	29	08:56 (108)	18:01			18:33	29	08:17 (83)	20:04	16	08:06 (82)	20:34	82	19:59 (107)	21:01	34	19:44 (107)
8	07:58		08:28 (108)	07:37			07:59		08:48 (83)	07:09		07:47 (82)	06:27		07:34 (82)	06:06		06:30 (106)
	17:26	28	08:56 (108)	18:02			19:34	27	09:15 (83)	20:05	23	08:10 (82)	20:35	80	19:59 (107)	21:02	30	19:41 (107)
9	07:57		08:28 (108)	07:36			07:57		08:49 (83)	07:08		07:44 (82)	06:26		07:35 (82)	06:06		06:31 (106)
	17:27	29	08:57 (108)	18:03			19:35	24	09:13 (83)	20:06	28	08:12 (82)	20:36	78	19:59 (107)	21:02	24	06:55 (106)
10	07:57		08:29 (108)	07:35			07:56		08:51 (83)	07:06		07:42 (82)	06:25		07:36 (82)	06:06		06:31 (106)
	17:28	28	08:57 (108)	18:04			19:36	20	09:11 (83)	20:07	32	08:14 (82)	20:37	76	19:59 (107)	21:03	24	06:55 (106)
11	07:57		08:29 (108)	07:34			07:54		08:53 (83)	07:04		07:40 (82)	06:24		07:38 (82)	06:05		06:31 (106)
	17:29	28	08:57 (108)	18:05			19:37	15	09:08 (83)	20:08	35	08:15 (82)	20:38	72	19:59 (107)	21:04	25	06:56 (106)
12	07:57		08:30 (108)	07:33			07:53		08:59 (83)	07:03		07:38 (82)	06:23		07:39 (82)	06:05		06:31 (106)
	17:30	28	08:58 (108)	18:07			19:38	4	09:03 (83)	20:09	39	08:17 (82)	20:39	68	19:58 (107)	21:04	25	06:56 (106)
13	07:57		08:31 (108)	07:32			07:51			07:01		07:36 (82)	06:22		07:42 (82)	06:05		06:32 (106)
	17:31	27	08:58 (108)	18:08			19:39			20:10	41	08:17 (82)	20:40	63	19:58 (107)	21:05	24	06:56 (106)
14	07:56		08:31 (108)	07:30			07:49			07:00		07:36 (82)	06:21		07:44 (82)	06:05		06:32 (106)
	17:32	27	08:58 (108)	18:09			19:40			20:11	42	08:18 (82)	20:41	58	19:58 (107)	21:05	24	06:56 (106)
15	07:56		08:32 (108)	07:29			07:48			06:58		07:34 (82)	06:20		19:13 (107)	06:05		06:32 (106)
	17:33	26	08:58 (108)	18:10			19:41			20:12	44	08:18 (82)	20:42	45	19:58 (107)	21:05	25	06:57 (106)
16	07:55		08:32 (108)	07:28			07:46			06:57		07:33 (82)	06:19		19:14 (107)	06:05		06:32 (106)
	17:34	25	08:57 (108)	18:11			19:42			20:13	46	08:19 (82)	20:43	43	19:57 (107)	21:06	25	06:57 (106)
17	07:55		08:33 (108)	07:27		07:59 (83)	07:45			06:55		07:32 (82)	06:18		19:15 (107)	06:05		06:32 (106)
	17:36	25	08:58 (108)	18:12	12	08:11 (83)	19:43			20:14	47	08:19 (82)	20:44	43	19:58 (107)	21:06	25	06:57 (106)
18	07:55		08:34 (108)	07:25		07:56 (83)	07:43			06:54		07:32 (82)	06:17		19:15 (107)	06:05		06:32 (106)
	17:37	23	08:57 (108)	18:14	18	08:14 (83)	19:44			20:15	48	08:20 (82)	20:45	42	19:57 (107)	21:07	25	06:57 (106)
19	07:54		08:35 (108)	07:24		07:53 (83)	07:41			06:52		07:30 (82)	06:17		19:15 (107)	06:05		06:33 (106)
	17:38	22	08:57 (108)	18:15	23	08:16 (83)	19:45			20:16	49	08:19 (82)	20:46	42	19:57 (107)	21:07	24	06:57 (106)
20	07:54		08:36 (108)	07:23		07:52 (83)	07:40			06:51		07:30 (82)	06:16		19:16 (107)	06:06		06:34 (106)
	17:39	20	08:56 (108)	18:16	26	08:18 (83)	19:46			20:17	50	08:20 (82)	20:47	40	19:56 (107)	21:07	24	06:58 (106)
21	07:53		08:38 (108)	07:21		07:51 (83)	07:38			06:49		07:29 (82)	06:15		19:17 (107)	06:06		06:34 (106)
	17:40	18	08:56 (108)	18:17	28	08:19 (83)	19:48			20:18	50	08:19 (82)	20:48	39	19:56 (107)	21:07	24	06:58 (106)
22	07:52		08:39 (108)	07:20		07:49 (83)	07:37			06:48		07:29 (82)	06:14		06:37 (106)	06:06		06:34 (106)
	17:41	16	08:55 (108)	18:18	31	08:20 (83)	19:49			20:19	66	19:46 (107)	20:49	46	19:56 (107)	21:08	24	06:58 (106)
23	07:52		08:40 (108)	07:18		07:48 (83)	07:35			06:47		07:29 (82)	06:14		06:35 (106)	06:06		06:34 (106)
	17:42	13	08:53 (108)	18:19	33	08:21 (83)	19:50			20:20	73	19:49 (107)	20:50	48	19:55 (107)	21:08	24	06:58 (106)
24	07:51		08:43 (108)	07:17		07:47 (83)	07:33			06:45		07:28 (82)	06:13		06:33 (106)	06:06		06:33 (106)
	17:44	8	08:51 (108)	18:21	34	08:21 (83)	19:51			20:21	77	19:50 (107)	20:51	50	19:54 (107)	21:08	25	06:58 (106)
25	07:50			07:16		07:47 (83)	07:32			06:44		07:29 (82)	06:12		06:33 (106)	06:07		06:34 (106)
	17:45			18:22	35	08:22 (83)	19:52			20:22	79	19:52 (107)	20:51	51	19:54 (107)	21:08	25	06:59 (106)
26	07:50			07:14		07:46 (83)	07:30			06:42		07:29 (82)	06:11		06:32 (106)	06:07		06:34 (106)
	17:46			18:23	35	08:21 (83)	19:53			20:23	83	19:54 (107)	20:52	50	19:53 (107)	21:08	25	06:59 (106)
27	07:49			07:13		07:46 (83)	07:28			06:41		07:28 (82)	06:11		06:32 (106)	06:07		06:34 (106)
	17:47			18:24	36	08:22 (83)	19:54			20:24	84	19:54 (107)	20:53	51	19:53 (107)	21:08	25	06:59 (106)
28	07:48			07:11		07:45 (83)	07:27			06:40		07:29 (82)	06:10		06:31 (106)	06:08		06:35 (106)
	17:48			18:25	36	08:21 (83)	19:55			20:25	85	19:55 (107)	20:54	51	19:52 (107)	21:08	24	06:59 (106)
29	07:47						07:25			06:38		07:29 (82)	06:10		06:31 (106)	06:08		06:35 (106)
	17:50						19:56			20:26	86	19:56 (107)	20:55	50	19:52 (107)	21:08	24	06:59 (106)
30	07:46						07:23			06:37		07:29 (82)	06:09		06:30 (106)	06:09		06:35 (106)
	17:51						19:57			20:27	87	19:56 (107)	20:56	50	19:51 (107)	21:08	25	07:00 (106)
31	07:46						07:22						06:09		06:31 (106)			
	17:52						19:58						20:56	47	19:50 (107)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		592			347			327			1310			1883			857	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.61			0.63			0.63			0.66			0.65			0.68	
Total reduction		0.22			0.26			0.28			0.34			0.36			0.40	
Total, real		129			92			91			440			680			347	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 85

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m**Shadow receptor:** 8355 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6155)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:35 (106)	06:32		07:49 (82)	07:02		07:39 (82)	07:31			07:04			07:37		08:11 (108)
	21:08	25	07:00 (106)	20:51	71	20:09 (107)	20:09	35	08:14 (82)	19:19			17:33			17:10	28	08:39 (108)
2	06:10		06:36 (106)	06:33		07:48 (82)	07:03		07:40 (82)	07:32		08:33 (83)	07:05			07:38		08:11 (108)
	21:08	24	07:00 (106)	20:50	73	20:09 (107)	20:08	32	08:12 (82)	19:17	12	08:45 (83)	17:32			17:10	28	08:39 (108)
3	06:10		06:36 (106)	06:34		07:46 (82)	07:04		07:42 (82)	07:33		08:30 (83)	07:06			07:39		08:11 (108)
	21:08	24	07:00 (106)	20:49	77	20:09 (107)	20:06	28	08:10 (82)	19:15	18	08:48 (83)	17:31			17:10	29	08:40 (108)
4	06:11		06:36 (106)	06:35		07:45 (82)	07:05		07:44 (82)	07:34		08:27 (83)	07:07			07:40		08:12 (108)
	21:08	25	07:01 (106)	20:48	79	20:09 (107)	20:05	23	08:07 (82)	19:14	23	08:50 (83)	17:30			17:10	28	08:40 (108)
5	06:11		06:36 (106)	06:36		07:43 (82)	07:06		07:47 (82)	07:35		08:25 (83)	07:08			07:41		08:12 (108)
	21:08	32	19:48 (107)	20:47	81	20:08 (107)	20:03	16	08:03 (82)	19:12	26	08:51 (83)	17:29			17:09	29	08:41 (108)
6	06:12		06:37 (106)	06:37		07:42 (82)	07:07			07:36		08:24 (83)	07:09			07:42		08:13 (108)
	21:08	35	19:50 (107)	20:45	83	20:08 (107)	20:01			19:10	28	08:52 (83)	17:28			17:09	28	08:41 (108)
7	06:12		06:36 (106)	06:38		07:41 (82)	07:08			07:37		08:22 (83)	07:11			07:43		08:13 (108)
	21:07	38	19:51 (107)	20:44	84	20:08 (107)	20:00			19:09	31	08:53 (83)	17:27			17:09	29	08:42 (108)
8	06:13		06:37 (106)	06:39		07:40 (82)	07:09			07:38		08:21 (83)	07:12			07:44		08:14 (108)
	21:07	41	19:53 (107)	20:43	86	20:08 (107)	19:57			19:07	33	08:54 (83)	17:26			17:09	28	08:42 (108)
9	06:14		06:38 (106)	06:40		07:40 (82)	07:10			07:39		08:20 (83)	07:13			07:45		08:14 (108)
	21:07	42	19:55 (107)	20:42	86	20:07 (107)	19:55			19:06	34	08:54 (83)	17:25			17:09	29	08:43 (108)
10	06:14		06:37 (106)	06:41		07:39 (82)	07:11			07:40		08:19 (83)	07:14			07:46		08:15 (108)
	21:06	45	19:55 (107)	20:41	88	20:07 (107)	19:53			19:04	35	08:54 (83)	17:24			17:09	28	08:43 (108)
11	06:15		06:38 (106)	06:42		07:38 (82)	07:11			07:41		08:19 (83)	07:15			07:47		08:15 (108)
	21:06	46	19:57 (107)	20:39	87	20:06 (107)	19:52			19:03	35	08:54 (83)	17:23			17:09	29	08:44 (108)
12	06:16		06:39 (106)	06:43		07:38 (82)	07:12			07:42		08:18 (83)	07:16			07:47		08:15 (108)
	21:06	47	19:58 (107)	20:38	88	20:06 (107)	19:50			19:01	36	08:54 (83)	17:22			17:10	28	08:43 (108)
13	06:16		06:38 (106)	06:44		07:37 (82)	07:13			07:43		08:19 (83)	07:17			07:48		08:16 (108)
	21:05	48	19:58 (107)	20:37	87	20:05 (107)	19:48			19:00	36	08:55 (83)	17:21			17:10	28	08:44 (108)
14	06:17		06:39 (106)	06:45		07:37 (82)	07:14			07:44		08:19 (83)	07:19			07:49		08:17 (108)
	21:05	50	20:00 (107)	20:36	87	20:04 (107)	19:47			18:58	36	08:55 (83)	17:20			17:10	28	08:45 (108)
15	06:18		06:40 (106)	06:46		07:36 (82)	07:15			07:45		08:18 (83)	07:20			07:50		08:17 (108)
	21:04	50	20:01 (107)	20:34	86	20:03 (107)	19:45			18:57	36	08:54 (83)	17:19			17:10	28	08:45 (108)
16	06:19		06:41 (106)	06:47		07:36 (82)	07:16			07:46		08:18 (83)	07:21			07:50		08:17 (108)
	21:04	50	20:02 (107)	20:33	84	20:02 (107)	19:43			18:55	36	08:54 (83)	17:18			17:10	28	08:45 (108)
17	06:19		06:41 (106)	06:48		07:35 (82)	07:17			07:47		08:19 (83)	07:22			07:51		08:18 (108)
	21:03	51	20:02 (107)	20:32	81	19:59 (107)	19:42			18:54	34	08:53 (83)	17:17			17:11	28	08:46 (108)
18	06:20		06:42 (106)	06:49		07:34 (82)	07:18			07:48		08:19 (83)	07:23		08:17 (108)	07:52		08:19 (108)
	21:03	51	20:03 (107)	20:30	79	19:58 (107)	19:40			18:52	33	08:52 (83)	17:17	8	08:25 (108)	17:11	28	08:47 (108)
19	06:21		06:43 (106)	06:50		07:34 (82)	07:19			07:49		08:19 (83)	07:24		08:15 (108)	07:52		08:19 (108)
	21:02	50	20:04 (107)	20:29	76	19:56 (107)	19:38			18:51	32	08:51 (83)	17:16	13	08:28 (108)	17:11	27	08:46 (108)
20	06:22		06:45 (106)	06:51		07:34 (82)	07:20			07:50		08:20 (83)	07:25		08:14 (108)	07:53		08:20 (108)
	21:01	49	20:05 (107)	20:27	70	19:53 (107)	19:37			18:49	30	08:50 (83)	17:15	16	08:30 (108)	17:12	27	08:47 (108)
21	06:23		06:45 (106)	06:51		07:34 (82)	07:21			07:51		08:21 (83)	07:27		08:13 (108)	07:54		08:20 (108)
	21:01	48	20:05 (107)	20:26	64	19:50 (107)	19:35			18:48	27	08:48 (83)	17:15	18	08:31 (108)	17:12	27	08:47 (108)
22	06:24		06:49 (106)	06:52		07:34 (82)	07:22			07:52		08:23 (83)	07:28		08:12 (108)	07:54		08:21 (108)
	21:00	41	20:05 (107)	20:25	50	08:24 (82)	19:33			18:46	25	08:48 (83)	17:14	20	08:32 (108)	17:13	27	08:48 (108)
23	06:24		19:26 (107)	06:53		07:34 (82)	07:23			07:54		08:24 (83)	07:29		08:11 (108)	07:55		08:21 (108)
	20:59	40	20:06 (107)	20:23	49	08:23 (82)	19:32			18:45	22	08:46 (83)	17:14	22	08:33 (108)	17:13	27	08:48 (108)
24	06:25		19:26 (107)	06:54		07:34 (82)	07:24			07:55		08:26 (83)	07:30		08:12 (108)	07:55		08:22 (108)
	20:58	41	20:07 (107)	20:22	49	08:23 (82)	19:30			18:44	17	08:43 (83)	17:13	23	08:35 (108)	17:14	27	08:49 (108)
25	06:26		19:26 (107)	06:55		07:35 (82)	07:25			07:56		08:29 (83)	07:31		08:11 (108)	07:55		08:22 (108)
	20:57	41	20:07 (107)	20:20	47	08:22 (82)	19:28			18:42	11	08:40 (83)	17:13	25	08:36 (108)	17:15	27	08:49 (108)
26	06:27		19:25 (107)	06:56		07:35 (82)	07:26			07:57			07:32		08:11 (108)	07:56		08:22 (108)
	20:57	43	20:08 (107)	20:19	47	08:22 (82)	19:27			18:41			17:12	25	08:36 (108)	17:15	28	08:50 (108)
27	06:28		19:24 (107)	06:57		07:35 (82)	07:27			07:58			07:33		08:11 (108)	07:56		08:23 (108)
	20:56	43	20:07 (107)	20:17	46	08:21 (82)	19:25			18:40			17:12	26	08:37 (108)	17:16	28	08:51 (108)
28	06:29		19:24 (107)	06:58		07:36 (82)	07:28			07:59			07:34		08:11 (108)	07:56		08:23 (108)
	20:55	44	20:08 (107)	20:16	44	08:20 (82)	19:23			18:38			17:11	27	08:38 (108)	17:16	28	08:51 (108)
29	06:30		07:58 (82)	06:59		07:36 (82)	07:29			08:00			07:35		08:11 (108)	07:57		08:24 (108)
	20:54	51	20:08 (107)	20:14	42	08:18 (82)	19:22			18:37			17:11	27	08:38 (108)	17:17	27	08:51 (108)
30	06:31		07:54 (82)	07:00		07:36 (82)	07:30			08:01			07:36		08:11 (108)	07:57		08:24 (108)
	20:53	60	20:09 (107)	20:13	41	08:17 (82)	19:20			18:36			17:11	28	08:39 (108)	17:18	28	08:52 (108)
31	06:31		07:51 (82)	07:01		07:37 (82)				08:02						07:57		08:24 (108)
	20:52	66	20:09 (107)	20:11	39	08:16 (82)				18:35						17:19	28	08:52 (108)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		1341			2151			134			686			278			865	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.65			0.65			0.67			0.63			0.61			0.61	
Total reduction		0.39			0.39			0.41			0.35			0.22			0.30	
Total, real		523			843			54			242			62			261	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 86

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m**Shadow receptor:** 8356 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6156)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:24 (108)	07:45			07:10		07:44 (83)	07:20			06:36		07:25 (82)	06:08		06:29 (106)
	17:20	28	08:52 (108)	17:53			18:26	36	08:20 (83)	19:59			20:28	88	19:58 (107)	20:57	50	19:54 (107)
2	07:58		08:24 (108)	07:44			07:08		07:43 (83)	07:19			06:35		07:25 (82)	06:08		06:29 (106)
	17:21	29	08:53 (108)	17:54			18:27	37	08:20 (83)	20:00			20:29	89	19:59 (107)	20:58	50	19:54 (107)
3	07:58		08:26 (108)	07:43			07:07		07:44 (83)	07:17			06:33		07:26 (82)	06:07		06:30 (106)
	17:21	28	08:54 (108)	17:56			18:28	36	08:20 (83)	20:00			20:30	90	20:00 (107)	20:59	48	19:53 (107)
4	07:58		08:25 (108)	07:42			07:05		07:43 (83)	07:15			06:32		07:26 (82)	06:07		06:29 (106)
	17:22	29	08:54 (108)	17:57			18:29	36	08:19 (83)	20:01			20:31	89	20:00 (107)	20:59	47	19:52 (107)
5	07:58		08:25 (108)	07:41			07:04		07:44 (83)	07:14			06:31		07:26 (82)	06:07		06:29 (106)
	17:23	29	08:54 (108)	17:58			18:31	35	08:19 (83)	20:02			20:32	90	20:00 (107)	21:00	46	19:52 (107)
6	07:58		08:26 (108)	07:40			07:02		07:44 (83)	07:12			06:30		07:26 (82)	06:06		06:29 (106)
	17:24	29	08:55 (108)	17:59			18:32	34	08:18 (83)	20:03			20:33	89	20:00 (107)	21:01	46	19:52 (107)
7	07:58		08:26 (108)	07:39			07:01		07:45 (83)	07:11			06:29		07:27 (82)	06:06		06:30 (106)
	17:25	29	08:55 (108)	18:01			18:33	32	08:17 (83)	20:04			20:34	87	20:00 (107)	21:01	43	19:51 (107)
8	07:58		08:27 (108)	07:37			07:59		08:45 (83)	07:09			06:27		07:28 (82)	06:06		06:29 (106)
	17:26	29	08:56 (108)	18:02			19:34	31	09:16 (83)	20:05			20:35	87	20:01 (107)	21:02	42	19:50 (107)
9	07:57		08:28 (108)	07:36			07:57		08:45 (83)	07:08		07:49 (82)	06:26		07:28 (82)	06:06		06:29 (106)
	17:27	28	08:56 (108)	18:03			19:35	29	09:14 (83)	20:06	12	08:01 (82)	20:36	87	20:01 (107)	21:02	40	19:49 (107)
10	07:57		08:28 (108)	07:35			07:56		08:47 (83)	07:06		07:45 (82)	06:25		07:29 (82)	06:06		06:29 (106)
	17:28	29	08:57 (108)	18:04			19:36	26	09:13 (83)	20:07	21	08:06 (82)	20:37	85	20:01 (107)	21:03	40	19:49 (107)
11	07:57		08:28 (108)	07:34			07:54		08:48 (83)	07:04		07:41 (82)	06:24		07:30 (82)	06:05		06:30 (106)
	17:29	29	08:57 (108)	18:05			19:37	22	09:10 (83)	20:08	27	08:08 (82)	20:38	83	20:01 (107)	21:04	37	19:48 (107)
12	07:57		08:29 (108)	07:33			07:53		08:51 (83)	07:03		07:40 (82)	06:23		07:31 (82)	06:05		06:30 (106)
	17:30	28	08:57 (108)	18:07			19:38	17	09:08 (83)	20:09	30	08:10 (82)	20:39	81	20:01 (107)	21:04	34	19:47 (107)
13	07:57		08:30 (108)	07:32			07:51		08:54 (83)	07:01		07:37 (82)	06:22		07:32 (82)	06:05		06:30 (106)
	17:31	28	08:58 (108)	18:08			19:39	10	09:04 (83)	20:10	34	08:11 (82)	20:40	78	20:01 (107)	21:05	33	19:46 (107)
14	07:56		08:30 (108)	07:30			07:49			07:00		07:36 (82)	06:21		07:33 (82)	06:05		06:30 (106)
	17:32	27	08:57 (108)	18:09			19:40			20:11	37	08:13 (82)	20:41	75	20:00 (107)	21:05	30	19:45 (107)
15	07:56		08:31 (108)	07:29			07:48			06:58		07:34 (82)	06:20		07:35 (82)	06:05		06:30 (106)
	17:33	27	08:58 (108)	18:10			19:41			20:12	40	08:14 (82)	20:42	70	20:00 (107)	21:05	25	06:55 (106)
16	07:55		08:31 (108)	07:28			07:46			06:57		07:33 (82)	06:19		07:36 (82)	06:05		06:31 (106)
	17:34	26	08:57 (108)	18:11			19:42			20:13	42	08:15 (82)	20:43	68	20:00 (107)	21:06	24	06:55 (106)
17	07:55		08:32 (108)	07:27			07:45			06:55		07:31 (82)	06:18		07:39 (82)	06:05		06:31 (106)
	17:36	26	08:58 (108)	18:12			19:43			20:14	44	08:15 (82)	20:44	64	20:01 (107)	21:06	24	06:55 (106)
18	07:55		08:32 (108)	07:25		07:59 (83)	07:43			06:54		07:30 (82)	06:17		07:41 (82)	06:05		06:31 (106)
	17:37	25	08:57 (108)	18:14	10	08:09 (83)	19:44			20:15	46	08:16 (82)	20:45	58	20:00 (107)	21:07	24	06:55 (106)
19	07:54		08:34 (108)	07:24		07:55 (83)	07:41			06:52		07:29 (82)	06:17		07:45 (82)	06:05		06:31 (106)
	17:38	24	08:58 (108)	18:15	17	08:12 (83)	19:45			20:16	47	08:16 (82)	20:46	50	20:00 (107)	21:07	24	06:55 (106)
20	07:54		08:34 (108)	07:23		07:53 (83)	07:40			06:51		07:29 (82)	06:16		19:17 (107)	06:06		06:32 (106)
	17:39	23	08:57 (108)	18:16	21	08:14 (83)	19:46			20:17	47	08:16 (82)	20:47	42	19:59 (107)	21:07	25	06:57 (106)
21	07:53		08:36 (108)	07:21		07:51 (83)	07:38			06:49		07:27 (82)	06:15		19:18 (107)	06:06		06:32 (106)
	17:40	21	08:57 (108)	18:17	25	08:16 (83)	19:48			20:18	49	08:16 (82)	20:48	42	20:00 (107)	21:07	25	06:57 (106)
22	07:52		08:37 (108)	07:20		07:49 (83)	07:37			06:48		07:27 (82)	06:14		19:19 (107)	06:06		06:32 (106)
	17:41	19	08:56 (108)	18:18	28	08:17 (83)	19:49			20:19	50	08:17 (82)	20:49	40	19:59 (107)	21:08	25	06:57 (106)
23	07:52		08:38 (108)	07:18		07:48 (83)	07:35			06:47		07:27 (82)	06:14		19:19 (107)	06:06		06:32 (106)
	17:42	17	08:55 (108)	18:19	30	08:18 (83)	19:50			20:20	58	19:45 (107)	20:50	39	19:58 (107)	21:08	25	06:57 (106)
24	07:51		08:40 (108)	07:17		07:47 (83)	07:33			06:45		07:26 (82)	06:13		06:36 (106)	06:06		06:32 (106)
	17:44	13	08:53 (108)	18:21	32	08:19 (83)	19:51			20:21	67	19:48 (107)	20:51	44	19:58 (107)	21:08	24	06:56 (106)
25	07:50		08:43 (108)	07:16		07:46 (83)	07:32			06:44		07:26 (82)	06:12		06:34 (106)	06:07		06:33 (106)
	17:45	9	08:52 (108)	18:22	34	08:20 (83)	19:52			20:22	73	19:51 (107)	20:51	48	19:58 (107)	21:08	24	06:57 (106)
26	07:50			07:14		07:45 (83)	07:30			06:42		07:26 (82)	06:11		06:33 (106)	06:07		06:33 (106)
	17:46			18:23	35	08:20 (83)	19:53			20:23	77	19:53 (107)	20:52	49	19:57 (107)	21:08	24	06:57 (106)
27	07:49			07:13		07:45 (83)	07:28			06:41		07:25 (82)	06:11		06:32 (106)	06:07		06:32 (106)
	17:47			18:24	35	08:20 (83)	19:54			20:24	81	19:54 (107)	20:53	50	19:57 (107)	21:08	25	06:57 (106)
28	07:48			07:11		07:44 (83)	07:27			06:40		07:25 (82)	06:10		06:31 (106)	06:08		06:33 (106)
	17:48			18:25	36	08:20 (83)	19:55			20:25	84	19:56 (107)	20:54	51	19:56 (107)	21:08	30	19:48 (107)
29	07:47						07:25			06:38		07:25 (82)	06:10		06:31 (106)	06:08		06:33 (106)
	17:50						19:56			20:26	86	19:57 (107)	20:55	51	19:56 (107)	21:08	32	19:49 (107)
30	07:46						07:23			06:37		07:25 (82)	06:09		06:30 (106)	06:09		06:34 (106)
	17:51						19:57			20:27	87	19:57 (107)	20:56	50	19:55 (107)	21:08	34	19:51 (107)
31	07:46						07:22						06:09		06:30 (106)			
	17:52						19:58						20:56	50	19:55 (107)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		629			303			381			1139			2064			1000	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.61			0.63			0.63			0.66			0.65			0.67	
Total reduction		0.22			0.26			0.28			0.34			0.36			0.40	
Total, real		137			80			106			383			747			401	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 87

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m**Shadow receptor:** 8356 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6156)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:34 (106)	06:32		07:41 (82)	07:02		07:41 (82)	07:31		08:31 (83)	07:04			07:37		08:10 (108)
	21:08	36	19:52 (107)	20:51	81	20:11 (107)	20:09	26	08:07 (82)	19:19	15	08:46 (83)	17:33			17:10	29	08:39 (108)
2	06:10		06:34 (106)	06:33		07:40 (82)	07:03		07:43 (82)	07:32		08:28 (83)	07:05			07:38		08:10 (108)
	21:08	38	19:53 (107)	20:50	83	20:11 (107)	20:08	21	08:04 (82)	19:17	20	08:48 (83)	17:32			17:10	29	08:39 (108)
3	06:10		06:34 (106)	06:34		07:40 (82)	07:04		07:47 (82)	07:33		08:25 (83)	07:06			07:39		08:11 (108)
	21:08	40	19:54 (107)	20:49	84	20:11 (107)	20:06	12	07:59 (82)	19:15	25	08:50 (83)	17:31			17:10	29	08:40 (108)
4	06:11		06:35 (106)	06:35		07:39 (82)	07:05			07:34		08:24 (83)	07:07			07:40		08:11 (108)
	21:08	42	19:56 (107)	20:48	86	20:11 (107)	20:05			19:14	27	08:51 (83)	17:30			17:10	29	08:40 (108)
5	06:11		06:35 (106)	06:36		07:37 (82)	07:06			07:35		08:22 (83)	07:08			07:41		08:11 (108)
	21:08	43	19:56 (107)	20:47	87	20:10 (107)	20:03			19:12	30	08:52 (83)	17:29			17:09	29	08:40 (108)
6	06:12		06:35 (106)	06:37		07:36 (82)	07:07			07:36		08:21 (83)	07:09			07:42		08:12 (108)
	21:08	44	19:57 (107)	20:45	88	20:10 (107)	20:01			19:10	32	08:53 (83)	17:28			17:09	29	08:41 (108)
7	06:12		06:35 (106)	06:38		07:36 (82)	07:08			07:37		08:20 (83)	07:11			07:43		08:12 (108)
	21:07	46	19:58 (107)	20:44	89	20:10 (107)	20:00			19:09	33	08:53 (83)	17:27			17:09	29	08:41 (108)
8	06:13		06:36 (106)	06:39		07:35 (82)	07:09			07:38		08:19 (83)	07:12			07:44		08:13 (108)
	21:07	47	19:59 (107)	20:43	89	20:09 (107)	19:57			19:07	34	08:53 (83)	17:26			17:09	29	08:42 (108)
9	06:14		06:37 (106)	06:40		07:35 (82)	07:10			07:39		08:18 (83)	07:13			07:45		08:14 (108)
	21:07	47	20:00 (107)	20:42	90	20:09 (107)	19:55			19:06	36	08:54 (83)	17:25			17:09	28	08:42 (108)
10	06:14		06:36 (106)	06:41		07:34 (82)	07:11			07:40		08:18 (83)	07:14			07:46		08:14 (108)
	21:06	49	20:01 (107)	20:41	89	20:08 (107)	19:53			19:04	36	08:54 (83)	17:24			17:09	29	08:43 (108)
11	06:15		06:37 (106)	06:42		07:34 (82)	07:11			07:41		08:17 (83)	07:15			07:47		08:15 (108)
	21:06	50	20:02 (107)	20:39	88	20:07 (107)	19:52			19:03	36	08:53 (83)	17:23			17:09	28	08:43 (108)
12	06:16		06:38 (106)	06:43		07:34 (82)	07:12			07:42		08:17 (83)	07:16			07:47		08:15 (108)
	21:06	51	20:03 (107)	20:38	88	20:07 (107)	19:50			19:01	36	08:53 (83)	17:22			17:10	28	08:43 (108)
13	06:16		06:38 (106)	06:44		07:33 (82)	07:13			07:43		08:18 (83)	07:17			07:48		08:15 (108)
	21:05	51	20:03 (107)	20:37	87	20:06 (107)	19:48			19:00	36	08:54 (83)	17:21			17:10	28	08:43 (108)
14	06:17		06:39 (106)	06:45		07:33 (82)	07:14			07:44		08:17 (83)	07:19			07:49		08:16 (108)
	21:05	51	20:04 (107)	20:36	84	20:04 (107)	19:47			18:58	36	08:53 (83)	17:20			17:10	28	08:44 (108)
15	06:18		06:40 (106)	06:46		07:33 (82)	07:15			07:45		08:17 (83)	07:20			07:50		08:17 (108)
	21:04	50	20:05 (107)	20:34	83	20:03 (107)	19:45			18:57	36	08:53 (83)	17:19			17:10	28	08:45 (108)
16	06:19		06:41 (106)	06:47		07:33 (82)	07:16			07:46		08:18 (83)	07:21			07:50		08:17 (108)
	21:04	51	20:06 (107)	20:33	81	20:02 (107)	19:43			18:55	34	08:52 (83)	17:18			17:10	27	08:44 (108)
17	06:19		06:41 (106)	06:48		07:32 (82)	07:17			07:47		08:18 (83)	07:22		08:16 (108)	07:51		08:18 (108)
	21:03	50	20:06 (107)	20:32	76	19:59 (107)	19:42			18:54	33	08:51 (83)	17:17	9	08:25 (108)	17:11	27	08:45 (108)
18	06:20		06:43 (106)	06:49		07:32 (82)	07:18			07:48		08:18 (83)	07:23		08:14 (108)	07:52		08:19 (108)
	21:03	49	20:07 (107)	20:30	72	19:57 (107)	19:40			18:52	32	08:50 (83)	17:17	13	08:27 (108)	17:11	27	08:46 (108)
19	06:21		06:45 (106)	06:50		07:32 (82)	07:19			07:49		08:19 (83)	07:24		08:13 (108)	07:52		08:19 (108)
	21:02	46	20:08 (107)	20:29	66	19:54 (107)	19:38			18:51	30	08:49 (83)	17:16	17	08:30 (108)	17:11	27	08:46 (108)
20	06:22		19:30 (107)	06:51		07:32 (82)	07:20			07:50		08:20 (83)	07:25		08:12 (108)	07:53		08:20 (108)
	21:01	38	20:08 (107)	20:27	54	19:47 (107)	19:37			18:49	27	08:47 (83)	17:15	19	08:31 (108)	17:12	26	08:46 (108)
21	06:23		19:28 (107)	06:51		07:32 (82)	07:21			07:51		08:21 (83)	07:27		08:11 (108)	07:54		08:20 (108)
	21:01	40	20:08 (107)	20:26	49	08:21 (82)	19:35			18:48	24	08:45 (83)	17:15	21	08:32 (108)	17:12	26	08:46 (108)
22	06:24		19:28 (107)	06:52		07:32 (82)	07:22			07:52		08:24 (83)	07:28		08:10 (108)	07:54		08:21 (108)
	21:00	41	20:09 (107)	20:25	49	08:21 (82)	19:33			18:46	20	08:44 (83)	17:14	23	08:33 (108)	17:13	26	08:47 (108)
23	06:24		19:28 (107)	06:53		07:33 (82)	07:23			07:54		08:26 (83)	07:29		08:10 (108)	07:55		08:21 (108)
	20:59	41	20:09 (107)	20:23	47	08:20 (82)	19:32			18:45	15	08:41 (83)	17:14	24	08:34 (108)	17:13	26	08:47 (108)
24	06:25		19:28 (107)	06:54		07:33 (82)	07:24			07:55		08:30 (83)	07:30		08:10 (108)	07:55		08:22 (108)
	20:58	42	20:10 (107)	20:22	47	08:20 (82)	19:30			18:44	7	08:37 (83)	17:13	25	08:35 (108)	17:14	27	08:49 (108)
25	06:26		07:53 (82)	06:55		07:33 (82)	07:25			07:56			07:31		08:10 (108)	07:55		08:22 (108)
	20:57	54	20:10 (107)	20:20	46	08:19 (82)	19:28			18:42			17:13	26	08:36 (108)	17:15	27	08:49 (108)
26	06:27		07:51 (82)	06:56		07:34 (82)	07:26			07:57			07:32		08:10 (108)	07:56		08:22 (108)
	20:57	61	20:11 (107)	20:19	44	08:18 (82)	19:27			18:41			17:12	26	08:36 (108)	17:15	27	08:49 (108)
27	06:28		07:48 (82)	06:57		07:35 (82)	07:27			07:58			07:33		08:10 (108)	07:56		08:23 (108)
	20:56	65	20:10 (107)	20:17	42	08:17 (82)	19:25			18:40			17:12	27	08:37 (108)	17:16	27	08:50 (108)
28	06:29		07:46 (82)	06:58		07:36 (82)	07:28			07:59			07:34		08:10 (108)	07:56		08:23 (108)
	20:55	70	20:11 (107)	20:16	39	08:15 (82)	19:23			18:38			17:11	27	08:37 (108)	17:16	27	08:50 (108)
29	06:30		07:45 (82)	06:59		07:36 (82)	07:29			08:00			07:35		08:10 (108)	07:57		08:23 (108)
	20:54	73	20:11 (107)	20:14	37	08:13 (82)	19:22			18:37			17:11	28	08:38 (108)	17:17	28	08:51 (108)
30	06:31		07:43 (82)	07:00		07:37 (82)	07:30		08:36 (83)	08:01			07:36		08:10 (108)	07:57		08:23 (108)
	20:53	76	20:11 (107)	20:13	34	08:11 (82)	19:20	5	08:41 (83)	18:36			17:11	28	08:38 (108)	17:18	28	08:51 (108)
31	06:31		07:42 (82)	07:01		07:39 (82)				08:02						07:57		08:24 (108)
	20:52	78	20:11 (107)	20:11	30	08:09 (82)				18:35						17:19	27	08:51 (108)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		1560			2109			64			690			313			859	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.65			0.66			0.66			0.63			0.61			0.61	
Total reduction		0.39			0.39			0.40			0.35			0.22			0.30	
Total, real		607			828			26			244			70			260	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 88

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m**Shadow receptor:** 8386 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6164)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:42 (72)	07:45		16:16 (117)	07:10		16:26 (117)	07:20			06:36		18:59 (74)	06:08		20:08 (73)
	17:20	45	16:53 (77)	17:53	52	17:08 (117)	18:26	36	17:02 (117)	19:59			20:28	32	19:31 (74)	20:57	20	20:28 (73)
2	07:57		08:43 (72)	07:44		16:17 (117)	07:08		16:27 (117)	07:19			06:34		19:00 (74)	06:08		20:07 (73)
	17:20	45	16:54 (77)	17:54	52	17:09 (117)	18:27	33	17:00 (117)	20:00			20:29	30	19:30 (74)	20:58	22	20:29 (73)
3	07:58		08:44 (72)	07:43		16:16 (117)	07:07		16:30 (117)	07:17			06:33		19:02 (74)	06:07		20:07 (73)
	17:21	44	16:55 (77)	17:56	54	17:10 (117)	18:28	28	16:58 (117)	20:00			20:30	27	19:29 (74)	20:58	23	20:30 (73)
4	07:58		08:45 (72)	07:42		16:15 (117)	07:05		16:33 (117)	07:15			06:32		19:02 (74)	06:07		20:06 (73)
	17:22	44	16:56 (77)	17:57	55	17:10 (117)	18:29	21	16:54 (117)	20:01			20:31	24	19:26 (74)	20:59	24	20:30 (73)
5	07:58		08:46 (72)	07:41		16:15 (117)	07:04		16:38 (117)	07:14			06:31		19:04 (74)	06:07		20:06 (73)
	17:23	44	16:57 (77)	17:58	56	17:11 (117)	18:30	12	16:50 (117)	20:02			20:32	21	19:25 (74)	21:00	25	20:31 (73)
6	07:58		08:47 (72)	07:40		16:14 (117)	07:02			07:12		19:15 (74)	06:30		19:07 (74)	06:06		20:06 (73)
	17:24	44	16:58 (77)	17:59	57	17:11 (117)	18:32			20:03	12	19:27 (74)	20:33	15	19:22 (74)	21:00	26	20:32 (73)
7	07:58		08:48 (72)	07:38		16:14 (117)	07:00			07:11		19:10 (74)	06:28		19:11 (74)	06:06		20:05 (73)
	17:25	43	16:59 (77)	18:00	58	17:12 (117)	18:33			20:04	20	19:30 (74)	20:34	7	19:18 (74)	21:01	26	20:31 (73)
8	07:57		08:49 (72)	07:37		16:14 (117)	07:59			07:09		19:08 (74)	06:27			06:06		20:05 (73)
	17:26	43	17:00 (77)	18:02	59	17:13 (117)	19:34			20:05	25	19:33 (74)	20:35			21:02	27	20:32 (73)
9	07:57		08:50 (72)	07:36		16:14 (117)	07:57			07:07		19:05 (74)	06:26			06:06		20:05 (73)
	17:27	44	17:02 (77)	18:03	59	17:13 (117)	19:35			20:06	29	19:34 (74)	20:36			21:02	28	20:33 (73)
10	07:57		08:51 (72)	07:35		16:14 (117)	07:56			07:06		19:03 (74)	06:25			06:05		20:06 (73)
	17:28	41	17:02 (77)	18:04	60	17:14 (117)	19:36			20:07	32	19:35 (74)	20:37			21:03	27	20:33 (73)
11	07:57		08:53 (72)	07:34		16:14 (117)	07:54			07:04		19:02 (74)	06:24			06:05		20:06 (73)
	17:29	40	17:03 (77)	18:05	60	17:14 (117)	19:37			20:08	34	19:36 (74)	20:38			21:03	28	20:34 (73)
12	07:57		08:55 (72)	07:33		16:14 (117)	07:53			07:03		19:00 (74)	06:23			06:05		20:06 (73)
	17:30	36	17:03 (77)	18:06	59	17:13 (117)	19:38			20:09	36	19:36 (74)	20:39			21:04	28	20:34 (73)
13	07:56		08:58 (72)	07:32		16:14 (117)	07:51			07:01		18:59 (74)	06:22			06:05		20:06 (73)
	17:31	32	17:04 (77)	18:08	60	17:14 (117)	19:39			20:10	39	19:38 (74)	20:40			21:04	29	20:35 (73)
14	07:56		16:40 (77)	07:30		16:14 (117)	07:49			07:00		18:58 (74)	06:21			06:05		20:06 (73)
	17:32	24	17:04 (77)	18:09	60	17:14 (117)	19:40			20:11	40	19:38 (74)	20:41			21:05	29	20:35 (73)
15	07:56		16:41 (77)	07:29		16:14 (117)	07:48			06:58		18:58 (74)	06:20			06:05		20:06 (73)
	17:33	24	17:05 (77)	18:10	59	17:13 (117)	19:41			20:12	40	19:38 (74)	20:42			21:05	29	20:35 (73)
16	07:55		16:41 (77)	07:28		16:14 (117)	07:46			06:57		18:56 (74)	06:19			06:05		20:06 (73)
	17:34	24	17:05 (77)	18:11	59	17:13 (117)	19:42			20:13	42	19:38 (74)	20:43			21:06	30	20:36 (73)
17	07:55		16:42 (77)	07:26		16:15 (117)	07:45			06:55		18:56 (74)	06:18			06:05		20:06 (73)
	17:35	23	17:05 (77)	18:12	59	17:14 (117)	19:43			20:14	43	19:39 (74)	20:44			21:06	30	20:36 (73)
18	07:54		16:42 (77)	07:25		16:16 (117)	07:43			06:54		18:55 (74)	06:17			06:05		20:06 (73)
	17:37	23	17:05 (77)	18:13	58	17:14 (117)	19:44			20:15	43	19:38 (74)	20:45			21:06	30	20:36 (73)
19	07:54		16:34 (117)	07:24		16:15 (117)	07:41			06:52		18:55 (74)	06:16			06:05		20:06 (73)
	17:38	32	17:06 (77)	18:15	58	17:13 (117)	19:45			20:16	44	19:39 (74)	20:46			21:07	30	20:36 (73)
20	07:53		16:30 (117)	07:22		16:16 (117)	07:40			06:51		18:56 (74)	06:16			06:05		20:06 (73)
	17:39	35	17:05 (77)	18:16	56	17:12 (117)	19:46			20:17	43	19:39 (74)	20:47			21:07	30	20:36 (73)
21	07:53		16:28 (117)	07:21		16:16 (117)	07:38			06:49		18:55 (74)	06:15			06:06		20:07 (73)
	17:40	37	17:05 (77)	18:17	55	17:11 (117)	19:47			20:18	43	19:38 (74)	20:48			21:07	30	20:37 (73)
22	07:52		16:27 (117)	07:20		16:17 (117)	07:36			06:48		18:55 (74)	06:14			06:06		20:07 (73)
	17:41	38	17:05 (77)	18:18	54	17:11 (117)	19:48			20:19	43	19:38 (74)	20:49			21:08	30	20:37 (73)
23	07:52		16:25 (117)	07:18		16:18 (117)	07:35			06:46		18:55 (74)	06:13			06:06		20:07 (73)
	17:42	39	17:04 (77)	18:19	53	17:11 (117)	19:49			20:20	42	19:37 (74)	20:50			21:08	30	20:37 (73)
24	07:51		16:23 (117)	07:17		16:19 (117)	07:33			06:45		18:55 (74)	06:13			06:06		20:07 (73)
	17:43	40	17:03 (77)	18:20	50	17:09 (117)	19:50			20:21	42	19:37 (74)	20:50			21:08	30	20:37 (73)
25	07:50		16:23 (117)	07:15		16:20 (117)	07:31			06:44		18:56 (74)	06:12			06:07		20:08 (73)
	17:45	40	17:03 (77)	18:21	48	17:08 (117)	19:52			20:22	41	19:37 (74)	20:51			21:08	30	20:38 (73)
26	07:50		16:22 (117)	07:14		16:21 (117)	07:30			06:42		18:55 (74)	06:11			06:07		20:08 (73)
	17:46	39	17:01 (77)	18:23	46	17:07 (117)	19:53			20:23	40	19:35 (74)	20:52			21:08	30	20:38 (73)
27	07:49		16:21 (117)	07:13		16:23 (117)	07:28			06:41		18:56 (74)	06:11		20:15 (73)	06:07		20:08 (73)
	17:47	41	17:02 (117)	18:24	43	17:06 (117)	19:54			20:24	39	19:35 (74)	20:53	5	20:20 (73)	21:08	29	20:37 (73)
28	07:48		16:20 (117)	07:11		16:24 (117)	07:27			06:40		18:57 (74)	06:10		20:12 (73)	06:08		20:09 (73)
	17:48	44	17:04 (117)	18:25	40	17:04 (117)	19:55			20:25	38	19:35 (74)	20:54	11	20:23 (73)	21:08	29	20:38 (73)
29	07:47		16:19 (117)				07:25			06:38		18:57 (74)	06:10		20:11 (73)	06:08		20:09 (73)
	17:49	46	17:05 (117)				19:56			20:26	36	19:33 (74)	20:55	14	20:25 (73)	21:08	29	20:38 (73)
30	07:46		16:18 (117)				07:23			06:37		18:58 (74)	06:09		20:09 (73)	06:09		20:10 (73)
	17:51	48	17:06 (117)				19:57			20:27	34	19:32 (74)	20:55	17	20:26 (73)	21:08	28	20:38 (73)
31	07:45		16:17 (117)				07:22						06:09		20:09 (73)			
	17:52	50	17:07 (117)				19:58						20:56	18	20:27 (73)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		1192			1539			130			920			221			836	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.66			0.68			0.68			0.64			0.64			0.62	
Total reduction		0.24			0.29			0.30			0.33			0.36			0.37	
Total, real		285			442			39			304			79			311	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 89

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m**Shadow receptor:** 8386 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6164)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		20:10 (73)	06:32			07:02		19:01 (74)	07:31			07:04		15:43 (117)	07:37		08:35 (72)
	21:08	28	20:38 (73)	20:51			20:09	34	19:35 (74)	19:18			17:33	59	16:42 (117)	17:10	40	16:45 (77)
2	06:09		20:11 (73)	06:33			07:03		19:02 (74)	07:32			07:05		15:44 (117)	07:38		08:34 (72)
	21:08	28	20:39 (73)	20:50			20:08	32	19:34 (74)	19:17			17:32	59	16:43 (117)	17:10	41	16:45 (77)
3	06:10		20:10 (73)	06:34			07:04		19:03 (74)	07:33			07:06		15:44 (117)	07:39		08:34 (72)
	21:08	28	20:38 (73)	20:49			20:06	29	19:32 (74)	19:15			17:31	58	16:42 (117)	17:10	43	16:45 (77)
4	06:10		20:11 (73)	06:35			07:05		19:05 (74)	07:34			07:07		15:44 (117)	07:40		08:33 (72)
	21:08	27	20:38 (73)	20:48			20:05	25	19:30 (74)	19:14			17:30	58	16:42 (117)	17:09	43	16:44 (77)
5	06:11		20:11 (73)	06:36			07:06		19:07 (74)	07:35			07:08		15:44 (117)	07:41		08:33 (72)
	21:08	27	20:38 (73)	20:47			20:03	20	19:27 (74)	19:12			17:29	57	16:41 (117)	17:09	43	16:44 (77)
6	06:12		20:12 (73)	06:37		19:19 (74)	07:07		19:10 (74)	07:36			07:09		15:46 (117)	07:42		08:33 (72)
	21:08	26	20:38 (73)	20:45	11	19:30 (74)	20:01	13	19:23 (74)	19:10			17:27	56	16:42 (117)	17:09	44	16:44 (77)
7	06:12		20:12 (73)	06:38		19:16 (74)	07:08			07:37			07:10		15:46 (117)	07:43		08:33 (72)
	21:07	25	20:37 (73)	20:44	17	19:33 (74)	20:00			19:09			17:26	55	16:41 (117)	17:09	44	16:44 (77)
8	06:13		20:13 (73)	06:39		19:13 (74)	07:08			07:38			07:12		15:46 (117)	07:44		08:33 (72)
	21:07	24	20:37 (73)	20:43	22	19:35 (74)	19:56			19:07			17:25	54	16:40 (117)	17:09	44	16:44 (77)
9	06:13		20:13 (73)	06:40		19:12 (74)	07:09			07:39		17:10 (117)	07:13		15:47 (117)	07:45		08:33 (72)
	21:07	23	20:36 (73)	20:42	25	19:37 (74)	19:55			19:06	17	17:27 (117)	17:24	52	16:39 (117)	17:09	44	16:44 (77)
10	06:14		20:14 (73)	06:41		19:10 (74)	07:10			07:40		17:06 (117)	07:14		15:47 (117)	07:46		08:33 (72)
	21:06	22	20:36 (73)	20:41	28	19:38 (74)	19:53			19:04	24	17:30 (117)	17:23	51	16:38 (117)	17:09	44	16:44 (77)
11	06:15		20:15 (73)	06:42		19:09 (74)	07:11			07:41		17:02 (117)	07:15		15:49 (117)	07:47		08:33 (72)
	21:06	21	20:36 (73)	20:39	30	19:39 (74)	19:52			19:02	30	17:32 (117)	17:22	50	16:39 (117)	17:09	46	16:45 (77)
12	06:16		20:16 (73)	06:43		19:07 (74)	07:12			07:42		17:00 (117)	07:16		15:50 (117)	07:47		08:33 (72)
	21:06	19	20:35 (73)	20:38	33	19:40 (74)	19:50			19:01	34	17:34 (117)	17:22	48	16:38 (117)	17:09	45	16:44 (77)
13	06:16		20:17 (73)	06:44		19:06 (74)	07:13			07:43		16:57 (117)	07:17		15:51 (117)	07:48		08:33 (72)
	21:05	18	20:35 (73)	20:37	35	19:41 (74)	19:48			18:59	39	17:36 (117)	17:21	46	16:37 (117)	17:10	45	16:44 (77)
14	06:17		20:18 (73)	06:45		19:05 (74)	07:14			07:44		16:56 (117)	07:19		15:52 (117)	07:49		08:34 (72)
	21:05	16	20:34 (73)	20:36	37	19:42 (74)	19:47			18:58	42	17:38 (117)	17:20	43	16:35 (117)	17:10	45	16:45 (77)
15	06:18		20:20 (73)	06:46		19:03 (74)	07:15			07:45		16:55 (117)	07:20		15:54 (117)	07:50		08:34 (72)
	21:04	13	20:33 (73)	20:34	38	19:41 (74)	19:45			18:56	44	17:39 (117)	17:19	41	16:35 (117)	17:10	45	16:45 (77)
16	06:18		20:22 (73)	06:47		19:03 (74)	07:16			07:46		16:53 (117)	07:21		15:55 (117)	07:50		08:34 (72)
	21:04	8	20:30 (73)	20:33	39	19:42 (74)	19:43			18:55	47	17:40 (117)	17:18	40	16:35 (77)	17:10	45	16:45 (77)
17	06:19			06:47		19:02 (74)	07:17			07:47		16:51 (117)	07:22		15:56 (117)	07:51		08:35 (72)
	21:03			20:32	40	19:42 (74)	19:42			18:53	49	17:40 (117)	17:17	40	16:36 (77)	17:11	43	16:45 (77)
18	06:20			06:48		19:01 (74)	07:18			07:48		16:50 (117)	07:23		15:57 (117)	07:52		08:35 (72)
	21:02			20:30	42	19:43 (74)	19:40			18:52	51	17:41 (117)	17:17	40	16:37 (77)	17:11	44	16:46 (77)
19	06:21			06:49		19:01 (74)	07:19			07:49		16:49 (117)	07:24		16:00 (117)	07:52		08:35 (72)
	21:02			20:29	42	19:43 (74)	19:38			18:50	52	17:41 (117)	17:16	39	16:39 (77)	17:11	44	16:46 (77)
20	06:22			06:50		19:00 (74)	07:20			07:50		16:48 (117)	07:25		16:02 (117)	07:53		08:36 (72)
	21:01			20:27	43	19:43 (74)	19:37			18:49	54	17:42 (117)	17:15	38	16:40 (77)	17:12	44	16:47 (77)
21	06:22			06:51		19:00 (74)	07:21			07:51		16:47 (117)	07:27		16:04 (117)	07:53		08:36 (72)
	21:00			20:26	43	19:43 (74)	19:35			18:48	55	17:42 (117)	17:15	37	16:41 (77)	17:12	44	16:47 (77)
22	06:23			06:52		19:00 (74)	07:22			07:52		16:47 (117)	07:28		16:06 (117)	07:54		08:37 (72)
	21:00			20:24	43	19:43 (74)	19:33			18:46	56	17:43 (117)	17:14	35	16:41 (77)	17:13	43	16:47 (77)
23	06:24			06:53		18:59 (74)	07:23			07:53		16:46 (117)	07:29		16:10 (117)	07:54		08:37 (72)
	20:59			20:23	44	19:43 (74)	19:32			18:45	57	17:43 (117)	17:13	32	16:42 (77)	17:13	44	16:48 (77)
24	06:25			06:54		18:59 (74)	07:24			07:55		16:45 (117)	07:30		16:19 (77)	07:55		08:37 (72)
	20:58			20:22	43	19:42 (74)	19:30			18:43	58	17:43 (117)	17:13	23	16:42 (77)	17:14	44	16:48 (77)
25	06:26			06:55		18:59 (74)	07:25			07:56		16:44 (117)	07:31		16:20 (77)	07:55		08:38 (72)
	20:57			20:20	43	19:42 (74)	19:28			18:42	59	17:43 (117)	17:12	23	16:43 (77)	17:14	44	16:49 (77)
26	06:27			06:56		18:59 (74)	07:26			07:57		16:44 (117)	07:32		16:20 (77)	07:56		08:39 (72)
	20:56			20:19	43	19:42 (74)	19:27			18:41	59	17:43 (117)	17:12	24	16:44 (77)	17:15	43	16:49 (77)
27	06:28			06:57		18:58 (74)	07:27			07:58		16:43 (117)	07:33		16:20 (77)	07:56		08:39 (72)
	20:56			20:17	42	19:40 (74)	19:25			18:39	60	17:43 (117)	17:11	24	16:44 (77)	17:16	45	16:50 (77)
28	06:29			06:58		18:59 (74)	07:28			07:59		16:44 (117)	07:34		16:20 (77)	07:56		08:40 (72)
	20:55			20:16	40	19:39 (74)	19:23			18:38	60	17:44 (117)	17:11	24	16:44 (77)	17:16	45	16:51 (77)
29	06:29			06:59		18:59 (74)	07:29			08:00		16:44 (117)	07:35		08:39 (72)	07:57		08:41 (72)
	20:54			20:14	39	19:38 (74)	19:22			18:37	60	17:44 (117)	17:11	31	16:44 (77)	17:17	44	16:51 (77)
30	06:30			07:00		18:59 (74)	07:30			08:01		16:43 (117)	07:36		08:36 (72)	07:57		08:41 (72)
	20:53			20:12	38	19:37 (74)	19:20			18:36	60	17:43 (117)	17:10	36	16:44 (77)	17:18	45	16:52 (77)
31	06:31			07:01		19:00 (74)				08:02		16:43 (117)				07:57		08:42 (72)
	20:52			20:11	36	19:36 (74)				18:34	60	17:43 (117)				17:19	45	16:53 (77)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		353			936			153			1127			1273			1362	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.62			0.64			0.64			0.68			0.68			0.63	
Total reduction		0.37			0.39			0.39			0.38			0.25			0.32	
Total, real		131			363			60			431			321			433	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 90

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m**Shadow receptor:** 9758 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6246)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January	February	March			April			May			June
1	07:57	07:44	07:10			07:20		08:02 (131)	06:36		06:55 (80)	06:08
	17:20	17:53	18:26			19:59	56	08:58 (131)	20:28	41	19:54 (86)	20:57
2	07:57	07:43	07:08			07:19		08:01 (131)	06:35		06:55 (80)	06:08
	17:21	17:54	18:27			20:00	57	08:58 (131)	20:29	38	19:52 (86)	20:58
3	07:57	07:43	07:07			07:17		08:00 (131)	06:33		06:54 (80)	06:07
	17:21	17:56	18:28			20:00	58	08:58 (131)	20:30	34	19:50 (86)	20:58
4	07:57	07:42	07:05			07:15		07:59 (131)	06:32		06:54 (80)	06:07
	17:22	17:57	18:29			20:01	59	08:58 (131)	20:31	27	07:21 (80)	20:59
5	07:57	07:40	07:03			07:14		07:58 (131)	06:31		06:53 (80)	06:07
	17:23	17:58	18:30			20:02	59	08:57 (131)	20:32	27	07:20 (80)	21:00
6	07:57	07:39	07:02			07:12		07:58 (131)	06:30		06:53 (80)	06:06
	17:24	17:59	18:32			20:03	60	08:58 (131)	20:33	27	07:20 (80)	21:00
7	07:57	07:38	07:00			07:11		07:57 (131)	06:29		06:53 (80)	06:06
	17:25	18:00	18:33			20:04	60	08:57 (131)	20:34	27	07:20 (80)	21:01
8	07:57	07:37	07:59			07:09		07:58 (131)	06:27		06:53 (80)	06:06
	17:26	18:02	19:34			20:05	59	08:57 (131)	20:35	27	07:20 (80)	21:02
9	07:57	07:36	07:57			07:07		07:57 (131)	06:26		06:53 (80)	06:06
	17:27	18:03	19:35			20:06	60	08:57 (131)	20:36	27	07:20 (80)	21:02
10	07:57	07:35	07:56			07:06		07:57 (131)	06:25		06:53 (80)	06:06
	17:28	18:04	19:36			20:07	60	08:57 (131)	20:37	26	07:19 (80)	21:03
11	07:57	07:34	07:54			07:04		07:57 (131)	06:24		06:54 (80)	06:05
	17:29	18:05	19:37			20:08	59	08:56 (131)	20:38	25	07:19 (80)	21:03
12	07:57	07:33	07:53			07:03		07:56 (131)	06:23		06:54 (80)	06:05
	17:30	18:06	19:38			20:09	58	08:54 (131)	20:39	24	07:18 (80)	21:04
13	07:56	07:31	07:51		08:11 (90)	07:01		07:57 (131)	06:22		06:54 (80)	06:05
	17:31	18:08	19:39	10	08:21 (90)	20:10	57	08:54 (131)	20:40	24	07:18 (80)	21:04
14	07:56	07:30	07:49		08:08 (90)	07:00		07:56 (131)	06:21		06:55 (80)	06:05
	17:32	18:09	19:40	15	08:23 (90)	20:11	57	08:53 (131)	20:41	22	07:17 (80)	21:05
15	07:56	07:29	07:48		08:07 (90)	06:58		07:57 (131)	06:20		06:56 (80)	06:05
	17:33	18:10	19:41	18	08:25 (90)	20:12	56	08:53 (131)	20:42	20	07:16 (80)	21:05
16	07:55	07:28	07:46		08:05 (90)	06:57		07:57 (131)	06:19		06:57 (80)	06:05
	17:34	18:11	19:42	20	08:25 (90)	20:13	63	19:52 (86)	20:43	18	07:15 (80)	21:06
17	07:55	07:26	07:45		08:03 (90)	06:55		07:57 (131)	06:18		06:59 (80)	06:05
	17:36	18:12	19:43	22	08:25 (90)	20:14	66	19:53 (86)	20:44	16	07:15 (80)	21:06
18	07:54	07:25	07:43		08:02 (90)	06:54		07:58 (131)	06:17		07:00 (80)	06:05
	17:37	18:14	19:44	24	08:26 (90)	20:15	67	19:54 (86)	20:45	13	07:13 (80)	21:06
19	07:54	07:24	07:41		08:01 (90)	06:52		07:58 (131)	06:17		07:02 (80)	06:05
	17:38	18:15	19:45	25	08:26 (90)	20:16	68	19:55 (86)	20:46	9	07:11 (80)	21:07
20	07:53	07:22	07:40		08:01 (90)	06:51		07:59 (131)	06:16			06:06
	17:39	18:16	19:46	30	08:36 (131)	20:17	68	19:56 (86)	20:47			21:07
21	07:53	07:21	07:38		08:01 (90)	06:49		07:59 (131)	06:15			06:06
	17:40	18:17	19:47	43	08:44 (131)	20:18	69	19:57 (86)	20:48			21:07
22	07:52	07:20	07:36		08:01 (90)	06:48		08:01 (131)	06:14			06:06
	17:41	18:18	19:48	46	08:47 (131)	20:19	67	19:58 (86)	20:49			21:07
23	07:52	07:18	07:35		08:00 (90)	06:46		08:01 (131)	06:13			06:06
	17:42	18:19	19:49	49	08:49 (131)	20:20	66	19:58 (86)	20:49			21:08
24	07:51	07:17	07:33		08:02 (90)	06:45		08:03 (131)	06:13			06:06
	17:44	18:20	19:50	49	08:51 (131)	20:21	63	19:59 (86)	20:50			21:08
25	07:50	07:15	07:32		08:02 (90)	06:44		08:04 (131)	06:12			06:07
	17:45	18:22	19:52	50	08:52 (131)	20:22	60	19:59 (86)	20:51			21:08
26	07:49	07:14	07:30		08:04 (90)	06:42		07:04 (80)	06:11			06:07
	17:46	18:23	19:53	50	08:54 (131)	20:23	63	19:58 (86)	20:52			21:08
27	07:49	07:12	07:28		08:05 (90)	06:41		07:01 (80)	06:11			06:07
	17:47	18:24	19:54	50	08:55 (131)	20:24	65	19:58 (86)	20:53			21:08
28	07:48	07:11	07:27		08:06 (131)	06:40		06:59 (80)	06:10			06:08
	17:48	18:25	19:55	50	08:56 (131)	20:25	62	19:57 (86)	20:54			21:08
29	07:47		07:25		08:05 (131)	06:38		06:58 (80)	06:10			06:08
	17:50		19:56	52	08:57 (131)	20:26	57	19:57 (86)	20:54			21:08
30	07:46		07:23		08:04 (131)	06:37		06:56 (80)	06:09			06:09
	17:51		19:57	53	08:57 (131)	20:27	41	19:55 (86)	20:55			21:08
31	07:45		07:22		08:02 (131)				06:09			
	17:52		19:58	55	08:57 (131)				20:56			
Potential sun hours	300	299	370			397			446			449
Total, worst case				711			1820			472		
Sun reduction				0.44			0.51			0.56		
Oper. time red.				1.00			1.00			1.00		
Wind dir. red.				0.65			0.65			0.67		
Total reduction				0.29			0.33			0.38		
Total, real				204			605			177		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 91

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m**Shadow receptor:** 9758 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6246)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November	December
1	06:09			06:32		07:04 (80)	07:02		07:56 (131)	07:31		07:53 (90)	07:03	07:37
	21:08			20:51	25	07:29 (80)	20:09	59	08:55 (131)	19:18	4	07:57 (90)	17:33	17:10
2	06:10			06:33		07:04 (80)	07:03		07:55 (131)	07:32			07:05	07:38
	21:08			20:50	26	07:30 (80)	20:08	60	08:55 (131)	19:17			17:32	17:10
3	06:10			06:34		07:04 (80)	07:04		07:55 (131)	07:33			07:06	07:39
	21:08			20:49	26	07:30 (80)	20:06	60	08:55 (131)	19:15			17:31	17:10
4	06:11			06:35		07:04 (80)	07:05		07:55 (131)	07:34			07:07	07:40
	21:08			20:48	26	07:30 (80)	20:05	59	08:54 (131)	19:14			17:30	17:10
5	06:11			06:36		07:02 (80)	07:06		07:54 (131)	07:35			07:08	07:41
	21:08			20:46	28	07:30 (80)	20:03	60	08:54 (131)	19:12			17:29	17:09
6	06:12			06:37		07:02 (80)	07:07		07:54 (131)	07:36			07:09	07:42
	21:07			20:45	28	07:30 (80)	20:01	60	08:54 (131)	19:10			17:28	17:09
7	06:12			06:38		07:02 (80)	07:08		07:54 (131)	07:37			07:10	07:43
	21:07			20:44	28	07:30 (80)	20:00	60	08:54 (131)	19:09			17:27	17:09
8	06:13			06:39		07:03 (80)	07:09		07:53 (131)	07:38			07:11	07:44
	21:07			20:43	26	07:29 (80)	19:56	59	08:52 (131)	19:07			17:25	17:09
9	06:14			06:40		07:03 (80)	07:09		07:54 (131)	07:39			07:13	07:45
	21:07			20:42	26	07:29 (80)	19:55	58	08:52 (131)	19:06			17:24	17:09
10	06:14			06:41		07:03 (80)	07:10		07:54 (131)	07:40			07:14	07:46
	21:06			20:41	36	19:59 (86)	19:53	57	08:51 (131)	19:04			17:24	17:09
11	06:15			06:42		07:04 (80)	07:11		07:54 (131)	07:41			07:15	07:46
	21:06			20:39	38	20:01 (86)	19:52	56	08:50 (131)	19:03			17:23	17:09
12	06:16			06:43		07:04 (80)	07:12		07:54 (131)	07:42			07:16	07:47
	21:05			20:38	41	20:03 (86)	19:50	55	08:49 (131)	19:01			17:22	17:10
13	06:16			06:44		07:05 (80)	07:13		07:55 (131)	07:43			07:17	07:48
	21:05			20:37	50	20:04 (86)	19:48	53	08:48 (131)	18:59			17:21	17:10
14	06:17			06:45		07:06 (80)	07:14		07:55 (131)	07:44			07:18	07:49
	21:05			20:35	59	20:05 (86)	19:47	52	08:47 (131)	18:58			17:20	17:10
15	06:18			06:46		07:07 (80)	07:15		07:56 (131)	07:45			07:20	07:49
	21:04			20:34	63	20:05 (86)	19:45	50	08:46 (131)	18:56			17:19	17:10
16	06:19			06:47		07:08 (80)	07:16		07:55 (90)	07:46			07:21	07:50
	21:03			20:33	66	20:05 (86)	19:43	50	08:45 (131)	18:55			17:18	17:10
17	06:19			06:48		07:12 (80)	07:17		07:52 (90)	07:47			07:22	07:51
	21:03			20:31	62	20:05 (86)	19:42	51	08:43 (131)	18:53			17:17	17:11
18	06:20			06:49		08:10 (131)	07:18		07:50 (90)	07:48			07:23	07:52
	21:02			20:30	61	20:05 (86)	19:40	51	08:41 (131)	18:52			17:17	17:11
19	06:21			06:49		08:08 (131)	07:19		07:49 (90)	07:49			07:24	07:52
	21:02			20:29	64	20:05 (86)	19:38	50	08:39 (131)	18:51			17:16	17:11
20	06:22			06:50		08:07 (131)	07:20		07:47 (90)	07:50			07:25	07:53
	21:01			20:27	66	20:04 (86)	19:37	49	08:36 (131)	18:49			17:15	17:12
21	06:23			06:51		08:05 (131)	07:21		07:46 (90)	07:51			07:26	07:53
	21:00			20:26	67	20:02 (86)	19:35	47	08:33 (131)	18:48			17:15	17:12
22	06:23			06:52		08:04 (131)	07:22		07:45 (90)	07:52			07:28	07:54
	21:00			20:24	68	20:01 (86)	19:33	44	08:29 (131)	18:46			17:14	17:13
23	06:24			06:53		08:03 (131)	07:23		07:45 (90)	07:53			07:29	07:54
	20:59			20:23	68	20:00 (86)	19:32	37	08:24 (131)	18:45			17:14	17:13
24	06:25		07:14 (80)	06:54		08:02 (131)	07:24		07:45 (90)	07:54			07:30	07:55
	20:58	5	07:19 (80)	20:21	67	19:58 (86)	19:30	24	08:09 (90)	18:44			17:13	17:14
25	06:26		07:11 (80)	06:55		08:01 (131)	07:25		07:45 (90)	07:56			07:31	07:55
	20:57	11	07:22 (80)	20:20	67	19:57 (86)	19:28	24	08:09 (90)	18:42			17:12	17:15
26	06:27		07:10 (80)	06:56		08:00 (131)	07:26		07:45 (90)	07:57			07:32	07:56
	20:56	14	07:24 (80)	20:18	66	19:56 (86)	19:27	23	08:08 (90)	18:41			17:12	17:15
27	06:28		07:08 (80)	06:57		07:59 (131)	07:27		07:46 (90)	07:58			07:33	07:56
	20:55	17	07:25 (80)	20:17	63	19:54 (86)	19:25	21	08:07 (90)	18:40			17:12	17:16
28	06:29		07:07 (80)	06:58		07:58 (131)	07:28		07:47 (90)	07:59			07:34	07:56
	20:55	19	07:26 (80)	20:15	56	08:54 (131)	19:23	19	08:06 (90)	18:38			17:11	17:16
29	06:30		07:06 (80)	06:59		07:57 (131)	07:29		07:48 (90)	08:00			07:35	07:56
	20:54	21	07:27 (80)	20:14	57	08:54 (131)	19:22	16	08:04 (90)	18:37			17:11	17:17
30	06:31		07:05 (80)	07:00		07:56 (131)	07:30		07:49 (90)	08:01			07:36	07:57
	20:53	23	07:28 (80)	20:12	58	08:54 (131)	19:20	12	08:01 (90)	18:36			17:11	17:18
31	06:31		07:05 (80)	07:01		07:56 (131)				08:02				07:57
	20:52	24	07:29 (80)	20:11	58	08:54 (131)				18:34				17:19
Potential sun hours	456			426			374			346			300	291
Total, worst case		134			1540			1376			4			
Sun reduction		0.60			0.60			0.61			0.56			
Oper. time red.		1.00			1.00			1.00			1.00			
Wind dir. red.		0.67			0.66			0.65			0.65			
Total reduction		0.40			0.39			0.40			0.36			
Total, real		54			605			548			1			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 92

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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m**Shadow receptor:** 10055 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6276)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January	February			March			April	May			June		
1	07:57	07:45			07:10		08:07 (108)	07:20	06:36			06:08		07:01 (83)
	17:20	17:53			18:26	36	08:43 (108)	19:59	20:28			20:57	64	08:05 (83)
2	07:58	07:44			07:08		08:07 (108)	07:19	06:35		07:28 (83)	06:08		07:02 (83)
	17:21	17:54			18:27	34	08:41 (108)	20:00	20:29	11	07:39 (83)	20:58	63	08:05 (83)
3	07:58	07:43		08:19 (108)	07:07		08:09 (108)	07:17	06:33		07:23 (83)	06:07		07:02 (83)
	17:21	17:56	15	08:34 (108)	18:28	31	08:40 (108)	20:00	20:30	21	07:44 (83)	20:58	64	08:06 (83)
4	07:58	07:42		08:16 (108)	07:05		08:10 (108)	07:15	06:32		07:20 (83)	06:07		07:02 (83)
	17:22	17:57	21	08:37 (108)	18:29	27	08:37 (108)	20:01	20:31	27	07:47 (83)	20:59	63	08:05 (83)
5	07:58	07:41		08:13 (108)	07:04		08:13 (108)	07:14	06:31		07:17 (83)	06:07		07:02 (83)
	17:23	17:58	25	08:38 (108)	18:31	22	08:35 (108)	20:02	20:32	32	07:49 (83)	21:00	64	08:06 (83)
6	07:58	07:40		08:11 (108)	07:02		08:15 (108)	07:12	06:30		07:15 (83)	06:06		07:02 (83)
	17:24	17:59	29	08:40 (108)	18:32	16	08:31 (108)	20:03	20:33	36	07:51 (83)	21:01	64	08:06 (83)
7	07:58	07:39		08:10 (108)	07:01			07:11	06:29		07:13 (83)	06:06		07:03 (83)
	17:25	18:01	32	08:42 (108)	18:33			20:04	20:34	39	07:52 (83)	21:01	64	08:07 (83)
8	07:58	07:37		08:09 (108)	07:59			07:09	06:27		07:12 (83)	06:06		07:02 (83)
	17:26	18:02	34	08:43 (108)	19:34			20:05	20:35	42	07:54 (83)	21:02	64	08:06 (83)
9	07:57	07:36		08:08 (108)	07:57			07:07	06:26		07:11 (83)	06:06		07:03 (83)
	17:27	18:03	37	08:45 (108)	19:35			20:06	20:36	44	07:55 (83)	21:02	63	08:06 (83)
10	07:57	07:35		08:07 (108)	07:56			07:06	06:25		07:10 (83)	06:06		07:03 (83)
	17:28	18:04	39	08:46 (108)	19:36			20:07	20:37	46	07:56 (83)	21:03	64	08:07 (83)
11	07:57	07:34		08:07 (108)	07:54			07:04	06:24		07:09 (83)	06:05		07:03 (83)
	17:29	18:05	40	08:47 (108)	19:37			20:08	20:38	48	07:57 (83)	21:03	64	08:07 (83)
12	07:57	07:33		08:05 (108)	07:53			07:03	06:23		07:08 (83)	06:05		07:03 (83)
	17:30	18:07	42	08:47 (108)	19:38			20:09	20:39	50	07:58 (83)	21:04	64	08:07 (83)
13	07:56	07:32		08:05 (108)	07:51			07:01	06:22		07:07 (83)	06:05		07:04 (83)
	17:31	18:08	43	08:48 (108)	19:39			20:10	20:40	52	07:59 (83)	21:04	63	08:07 (83)
14	07:56	07:30		08:05 (108)	07:49			07:00	06:21		07:06 (83)	06:05		07:04 (83)
	17:32	18:09	44	08:49 (108)	19:40			20:11	20:41	53	07:59 (83)	21:05	64	08:08 (83)
15	07:56	07:29		08:04 (108)	07:48			06:58	06:20		07:05 (83)	06:05		07:04 (83)
	17:33	18:10	46	08:50 (108)	19:41			20:12	20:42	55	08:00 (83)	21:05	64	08:08 (83)
16	07:55	07:28		08:03 (108)	07:46			06:57	06:19		07:04 (83)	06:05		07:04 (83)
	17:34	18:11	46	08:49 (108)	19:42			20:13	20:43	56	08:00 (83)	21:06	64	08:08 (83)
17	07:55	07:27		08:03 (108)	07:45			06:55	06:18		07:05 (83)	06:05		07:04 (83)
	17:36	18:12	47	08:50 (108)	19:43			20:14	20:44	56	08:01 (83)	21:06	64	08:08 (83)
18	07:55	07:25		08:03 (108)	07:43			06:54	06:17		07:04 (83)	06:05		07:05 (83)
	17:37	18:14	47	08:50 (108)	19:44			20:15	20:45	58	08:02 (83)	21:07	63	08:08 (83)
19	07:54	07:24		08:03 (108)	07:41			06:52	06:17		07:03 (83)	06:05		07:05 (83)
	17:38	18:15	46	08:49 (108)	19:45			20:16	20:46	59	08:02 (83)	21:07	63	08:08 (83)
20	07:54	07:23		08:03 (108)	07:40			06:51	06:16		07:03 (83)	06:06		07:06 (83)
	17:39	18:16	47	08:50 (108)	19:46			20:17	20:47	59	08:02 (83)	21:07	63	08:09 (83)
21	07:53	07:21		08:02 (108)	07:38			06:49	06:15		07:03 (83)	06:06		07:06 (83)
	17:40	18:17	47	08:49 (108)	19:48			20:18	20:48	60	08:03 (83)	21:07	63	08:09 (83)
22	07:52	07:20		08:03 (108)	07:37			06:48	06:14		07:03 (83)	06:06		07:06 (83)
	17:41	18:18	46	08:49 (108)	19:49			20:19	20:49	60	08:03 (83)	21:08	63	08:09 (83)
23	07:52	07:18		08:03 (108)	07:35			06:47	06:13		07:02 (83)	06:06		07:06 (83)
	17:42	18:19	46	08:49 (108)	19:50			20:20	20:50	61	08:03 (83)	21:08	63	08:09 (83)
24	07:51	07:17		08:03 (108)	07:33			06:45	06:13		07:01 (83)	06:06		07:06 (83)
	17:44	18:20	45	08:48 (108)	19:51			20:21	20:51	62	08:03 (83)	21:08	63	08:09 (83)
25	07:50	07:16		08:04 (108)	07:32			06:44	06:12		07:02 (83)	06:07		07:06 (83)
	17:45	18:22	43	08:47 (108)	19:52			20:22	20:51	62	08:04 (83)	21:08	64	08:10 (83)
26	07:50	07:14		08:04 (108)	07:30			06:42	06:11		07:01 (83)	06:07		07:06 (83)
	17:46	18:23	42	08:46 (108)	19:53			20:23	20:52	63	08:04 (83)	21:08	64	08:10 (83)
27	07:49	07:13		08:05 (108)	07:28			06:41	06:11		07:02 (83)	06:07		07:06 (83)
	17:47	18:24	41	08:46 (108)	19:54			20:24	20:53	63	08:05 (83)	21:08	64	08:10 (83)
28	07:48	07:11		08:05 (108)	07:27			06:40	06:10		07:01 (83)	06:08		07:07 (83)
	17:48	18:25	39	08:44 (108)	19:55			20:25	20:54	63	08:04 (83)	21:08	64	08:11 (83)
29	07:47				07:25			06:38	06:10		07:02 (83)	06:08		07:07 (83)
	17:50				19:56			20:26	20:55	63	08:05 (83)	21:08	63	08:10 (83)
30	07:46				07:23			06:37	06:09		07:01 (83)	06:09		07:08 (83)
	17:51				19:57			20:27	20:55	64	08:05 (83)	21:08	63	08:11 (83)
31	07:46				07:22				06:09		07:02 (83)			
	17:52				19:58				20:56	63	08:05 (83)			
Potential sun hours	300	299			370			397	446			449		
Total, worst case			1029			166				1528			1907	
Sun reduction			0.42			0.44				0.56			0.60	
Oper. time red.			1.00			1.00				1.00			1.00	
Wind dir. red.			0.62			0.62				0.68			0.68	
Total reduction			0.26			0.27				0.38			0.40	
Total, real			268			45				576			771	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 93

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m**Shadow receptor:** 10055 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6276)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September	October			November			December
1	06:09		07:07 (83)	06:32		07:19 (83)	07:02	07:31			07:04		07:36 (108)	07:37
	21:08	64	08:11 (83)	20:51	49	08:08 (83)	20:09	19:19			17:33	39	08:15 (108)	17:10
2	06:10		07:08 (83)	06:33		07:20 (83)	07:03	07:32			07:05		07:38 (108)	07:38
	21:08	64	08:12 (83)	20:50	47	08:07 (83)	20:08	19:17			17:32	36	08:14 (108)	17:10
3	06:10		07:08 (83)	06:34		07:21 (83)	07:04	07:33			07:06		07:39 (108)	07:39
	21:08	63	08:11 (83)	20:49	45	08:06 (83)	20:06	19:15			17:31	34	08:13 (108)	17:10
4	06:11		07:08 (83)	06:35		07:22 (83)	07:05	07:34			07:07		07:40 (108)	07:40
	21:08	64	08:12 (83)	20:48	43	08:05 (83)	20:05	19:14			17:30	31	08:11 (108)	17:10
5	06:11		07:08 (83)	06:36		07:22 (83)	07:06	07:35			07:08		07:42 (108)	07:41
	21:08	64	08:12 (83)	20:47	41	08:03 (83)	20:03	19:12			17:29	28	08:10 (108)	17:09
6	06:12		07:09 (83)	06:37		07:24 (83)	07:07	07:36			07:09		07:44 (108)	07:42
	21:08	63	08:12 (83)	20:45	37	08:01 (83)	20:01	19:10			17:28	25	08:09 (108)	17:09
7	06:12		07:08 (83)	06:38		07:25 (83)	07:08	07:37		08:53 (108)	07:11		07:46 (108)	07:43
	21:07	64	08:12 (83)	20:44	35	08:00 (83)	20:00	19:09	11	09:04 (108)	17:27	20	08:06 (108)	17:09
8	06:13		07:09 (83)	06:39		07:27 (83)	07:09	07:38		08:49 (108)	07:12		07:49 (108)	07:44
	21:07	64	08:13 (83)	20:43	31	07:58 (83)	19:57	19:07	19	09:08 (108)	17:26	14	08:03 (108)	17:09
9	06:14		07:09 (83)	06:40		07:30 (83)	07:10	07:39		08:46 (108)	07:13			07:45
	21:07	64	08:13 (83)	20:42	25	07:55 (83)	19:55	19:06	25	09:11 (108)	17:25			17:09
10	06:14		07:09 (83)	06:41		07:33 (83)	07:11	07:40		08:44 (108)	07:14			07:46
	21:06	64	08:13 (83)	20:41	19	07:52 (83)	19:53	19:04	29	09:13 (108)	17:24			17:09
11	06:15		07:10 (83)	06:42		07:40 (83)	07:11	07:41		08:42 (108)	07:15			07:47
	21:06	63	08:13 (83)	20:39	5	07:45 (83)	19:52	19:03	32	09:14 (108)	17:23			17:09
12	06:16		07:10 (83)	06:43			07:12	07:42		08:40 (108)	07:16			07:47
	21:06	64	08:14 (83)	20:38			19:50	19:01	35	09:15 (108)	17:22			17:10
13	06:16		07:10 (83)	06:44			07:13	07:43		08:39 (108)	07:17			07:48
	21:05	63	08:13 (83)	20:37			19:48	19:00	38	09:17 (108)	17:21			17:10
14	06:17		07:10 (83)	06:45			07:14	07:44		08:38 (108)	07:19			07:49
	21:05	63	08:13 (83)	20:36			19:47	18:58	40	09:18 (108)	17:20			17:10
15	06:18		07:11 (83)	06:46			07:15	07:45		08:37 (108)	07:20			07:50
	21:04	63	08:14 (83)	20:34			19:45	18:57	41	09:18 (108)	17:19			17:10
16	06:19		07:11 (83)	06:47			07:16	07:46		08:36 (108)	07:21			07:50
	21:04	63	08:14 (83)	20:33			19:43	18:55	43	09:19 (108)	17:18			17:10
17	06:19		07:11 (83)	06:48			07:17	07:47		08:35 (108)	07:22			07:51
	21:03	62	08:13 (83)	20:32			19:42	18:54	44	09:19 (108)	17:17			17:11
18	06:20		07:11 (83)	06:49			07:18	07:48		08:34 (108)	07:23			07:52
	21:02	62	08:13 (83)	20:30			19:40	18:52	45	09:19 (108)	17:17			17:11
19	06:21		07:12 (83)	06:50			07:19	07:49		08:34 (108)	07:24			07:52
	21:02	62	08:14 (83)	20:29			19:38	18:51	46	09:20 (108)	17:16			17:11
20	06:22		07:12 (83)	06:50			07:20	07:50		08:33 (108)	07:25			07:53
	21:01	62	08:14 (83)	20:27			19:37	18:49	47	09:20 (108)	17:15			17:12
21	06:23		07:12 (83)	06:51			07:21	07:51		08:33 (108)	07:27			07:53
	21:00	61	08:13 (83)	20:26			19:35	18:48	46	09:19 (108)	17:15			17:12
22	06:24		07:12 (83)	06:52			07:22	07:52		08:34 (108)	07:28			07:54
	21:00	61	08:13 (83)	20:25			19:33	18:46	46	09:20 (108)	17:14			17:13
23	06:24		07:13 (83)	06:53			07:23	07:54		08:33 (108)	07:29			07:54
	20:59	60	08:13 (83)	20:23			19:32	18:45	47	09:20 (108)	17:14			17:13
24	06:25		07:14 (83)	06:54			07:24	07:55		08:33 (108)	07:30			07:55
	20:58	59	08:13 (83)	20:22			19:30	18:44	47	09:20 (108)	17:13			17:14
25	06:26		07:14 (83)	06:55			07:25	07:56		08:33 (108)	07:31			07:55
	20:57	58	08:12 (83)	20:20			19:28	18:42	46	09:19 (108)	17:13			17:15
26	06:27		07:15 (83)	06:56			07:26	07:57		08:33 (108)	07:32			07:56
	20:57	57	08:12 (83)	20:19			19:27	18:41	46	09:19 (108)	17:12			17:15
27	06:28		07:14 (83)	06:57			07:27	07:58		08:33 (108)	07:33			07:56
	20:56	57	08:11 (83)	20:17			19:25	18:40	45	09:18 (108)	17:12			17:16
28	06:29		07:15 (83)	06:58			07:28	07:59		08:34 (108)	07:34			07:56
	20:55	56	08:11 (83)	20:16			19:23	18:38	44	09:18 (108)	17:11			17:16
29	06:30		07:16 (83)	06:59			07:29	08:00		08:35 (108)	07:35			07:57
	20:54	54	08:10 (83)	20:14			19:22	18:37	43	09:18 (108)	17:11			17:17
30	06:31		07:17 (83)	07:00			07:30	08:01		08:35 (108)	07:36			07:57
	20:53	52	08:09 (83)	20:13			19:20	18:36	42	09:17 (108)	17:11			17:18
31	06:31		07:18 (83)	07:01				08:02		08:36 (108)				07:57
	20:52	51	08:09 (83)	20:11				18:35	40	09:16 (108)				17:19
Potential sun hours	456			427			374	346			300			291
Total, worst case		1891			377				987			227		
Sun reduction		0.60			0.60				0.56			0.37		
Oper. time red.		1.00			1.00				1.00			1.00		
Wind dir. red.		0.68			0.68				0.62			0.62		
Total reduction		0.40			0.40				0.35			0.23		
Total, real		764			152				343			52		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

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4/30/2012 9:43 AM / 94

Licensed user:
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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m**Shadow receptor:** 10206 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6301)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May	June
1	07:57		08:34 (72)	07:44		08:38 (72)	07:10			07:20		19:07 (117)	06:36	06:08
	17:20	68	16:54 (116)	17:53	59	09:37 (72)	18:26			19:59	20	19:27 (117)	20:28	20:57
2	07:57		08:34 (72)	07:44		08:38 (72)	07:08			07:18		19:04 (117)	06:34	06:08
	17:20	68	16:54 (116)	17:54	59	09:37 (72)	18:27			20:00	24	19:28 (117)	20:29	20:58
3	07:58		08:34 (72)	07:43		08:39 (72)	07:07			07:17		19:02 (117)	06:33	06:07
	17:21	70	16:55 (116)	17:55	58	09:37 (72)	18:28			20:00	29	19:31 (117)	20:30	20:58
4	07:58		08:34 (72)	07:42		08:39 (72)	07:05			07:15		19:00 (117)	06:32	06:07
	17:22	72	16:56 (116)	17:57	57	09:36 (72)	18:29			20:01	31	19:31 (117)	20:31	20:59
5	07:58		08:34 (72)	07:41		08:40 (72)	07:04			07:14		18:58 (117)	06:31	06:07
	17:23	73	16:57 (116)	17:58	56	09:36 (72)	18:30			20:02	34	19:32 (117)	20:32	21:00
6	07:58		08:35 (72)	07:40		08:41 (72)	07:02			07:12		18:57 (117)	06:30	06:06
	17:24	74	16:58 (116)	17:59	55	09:36 (72)	18:31			20:03	36	19:33 (117)	20:33	21:00
7	07:58		08:35 (72)	07:38		08:41 (72)	07:00			07:11		18:56 (117)	06:28	06:06
	17:25	76	16:59 (116)	18:00	54	09:35 (72)	18:33			20:04	38	19:34 (117)	20:34	21:01
8	07:57		08:35 (72)	07:37		08:42 (72)	07:59			07:09		18:55 (117)	06:27	06:06
	17:26	77	17:00 (116)	18:02	53	09:35 (72)	19:34			20:05	40	19:35 (117)	20:35	21:02
9	07:57		08:35 (72)	07:36		08:43 (72)	07:57			07:07		18:54 (117)	06:26	06:06
	17:27	78	17:01 (116)	18:03	51	09:34 (72)	19:35			20:06	40	19:34 (117)	20:36	21:02
10	07:57		08:35 (72)	07:35		08:44 (72)	07:56			07:06		18:53 (117)	06:25	06:05
	17:28	78	17:01 (116)	18:04	49	09:33 (72)	19:36			20:07	41	19:34 (117)	20:37	21:03
11	07:57		08:35 (72)	07:34		08:46 (72)	07:54			07:04		18:53 (117)	06:24	06:05
	17:29	78	17:01 (116)	18:05	46	09:32 (72)	19:37			20:08	42	19:35 (117)	20:38	21:03
12	07:57		08:35 (72)	07:33		08:46 (72)	07:53			07:03		18:52 (117)	06:23	06:05
	17:30	81	17:02 (116)	18:06	44	09:30 (72)	19:38			20:09	42	19:34 (117)	20:39	21:04
13	07:56		08:36 (72)	07:32		08:48 (72)	07:51			07:01		18:52 (117)	06:22	06:05
	17:31	81	17:03 (116)	18:08	41	09:29 (72)	19:39			20:10	42	19:34 (117)	20:40	21:04
14	07:56		08:35 (72)	07:30		08:49 (72)	07:49			07:00		18:51 (117)	06:21	06:05
	17:32	81	17:02 (116)	18:09	38	09:27 (72)	19:40			20:11	43	19:34 (117)	20:41	21:05
15	07:56		08:36 (72)	07:29		08:50 (72)	07:48			06:58		18:52 (117)	06:20	06:05
	17:33	81	17:03 (116)	18:10	35	09:25 (72)	19:41			20:12	42	19:34 (117)	20:42	21:05
16	07:55		08:35 (72)	07:28		08:53 (72)	07:46			06:57		18:51 (117)	06:19	06:05
	17:34	82	17:03 (116)	18:11	30	09:23 (72)	19:42			20:13	42	19:33 (117)	20:43	21:06
17	07:55		08:36 (72)	07:26		08:55 (72)	07:45			06:55		18:52 (117)	06:18	06:05
	17:35	81	17:03 (116)	18:12	25	09:20 (72)	19:43			20:14	41	19:33 (117)	20:44	21:06
18	07:54		08:35 (72)	07:25		08:59 (72)	07:43			06:54		18:51 (117)	06:17	06:05
	17:37	82	17:03 (116)	18:13	18	09:17 (72)	19:44			20:15	41	19:32 (117)	20:45	21:06
19	07:54		08:36 (72)	07:24			07:41			06:52		18:52 (117)	06:16	06:05
	17:38	80	17:03 (116)	18:15			19:45			20:16	39	19:31 (117)	20:46	21:07
20	07:53		08:36 (72)	07:22			07:40			06:51		18:53 (117)	06:16	06:05
	17:39	80	17:03 (116)	18:16			19:46			20:17	38	19:31 (117)	20:47	21:07
21	07:53		08:35 (72)	07:21			07:38			06:49		18:53 (117)	06:15	06:06
	17:40	79	17:02 (116)	18:17			19:47			20:18	36	19:29 (117)	20:48	21:07
22	07:52		08:36 (72)	07:20			07:36			06:48		18:54 (117)	06:14	06:06
	17:41	77	17:02 (116)	18:18			19:48			20:19	35	19:29 (117)	20:49	21:08
23	07:52		08:36 (72)	07:18			07:35			06:46		18:55 (117)	06:13	06:06
	17:42	76	17:01 (116)	18:19			19:49			20:20	32	19:27 (117)	20:50	21:08
24	07:51		08:36 (72)	07:17			07:33			06:45		18:56 (117)	06:13	06:06
	17:43	73	16:59 (116)	18:20			19:50			20:21	30	19:26 (117)	20:50	21:08
25	07:50		08:37 (72)	07:15			07:31			06:44		18:57 (117)	06:12	06:07
	17:45	68	16:58 (116)	18:21			19:52			20:22	28	19:25 (117)	20:51	21:08
26	07:50		08:37 (72)	07:14			07:30			06:42		18:58 (117)	06:11	06:07
	17:46	61	09:38 (72)	18:23			19:53			20:23	24	19:22 (117)	20:52	21:08
27	07:49		08:37 (72)	07:13			07:28			06:41		19:01 (117)	06:11	06:07
	17:47	61	09:38 (72)	18:24			19:54			20:24	19	19:20 (117)	20:53	21:08
28	07:48		08:37 (72)	07:11			07:27			06:40		19:04 (117)	06:10	06:08
	17:48	61	09:38 (72)	18:25			19:55			20:25	13	19:17 (117)	20:54	21:08
29	07:47		08:37 (72)				07:25			06:38			06:10	06:08
	17:49	61	09:38 (72)				19:56			20:26			20:55	21:08
30	07:46		08:37 (72)				07:23			06:37			06:09	06:09
	17:51	60	09:37 (72)				19:57			20:27			20:55	21:08
31	07:45		08:37 (72)				07:22		19:10 (117)				06:09	
	17:52	60	09:37 (72)				19:58	13	19:23 (117)				20:56	
Potential sun hours	300			299			370			397			446	449
Total, worst case		2278			828			13			962			
Sun reduction		0.36			0.42			0.44			0.51			
Oper. time red.		1.00			1.00			1.00			1.00			
Wind dir. red.		0.62			0.61			0.65			0.65			
Total reduction		0.22			0.25			0.29			0.33			
Total, real		509			210			4			319			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 95

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m**Shadow receptor:** 10206 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6301)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July	August			September			October			November			December		
1	06:09	06:32			07:02		18:52 (117)	07:31			07:04		08:13 (72)	07:37		08:17 (72)
	21:08	20:51			20:09	42	19:34 (117)	19:18			17:33	49	09:02 (72)	17:10	79	16:43 (116)
2	06:09	06:33			07:03		18:52 (117)	07:32			07:05		08:13 (72)	07:38		08:18 (72)
	21:08	20:50			20:08	41	19:33 (117)	19:17			17:32	51	09:04 (72)	17:10	79	16:44 (116)
3	06:10	06:34			07:04		18:52 (117)	07:33			07:06		08:12 (72)	07:39		08:18 (72)
	21:08	20:49			20:06	40	19:32 (117)	19:15			17:31	52	09:04 (72)	17:10	78	16:44 (116)
4	06:10	06:35			07:05		18:52 (117)	07:34			07:07		08:11 (72)	07:40		08:19 (72)
	21:08	20:48			20:05	40	19:32 (117)	19:14			17:30	54	09:05 (72)	17:09	77	16:44 (116)
5	06:11	06:36			07:06		18:53 (117)	07:35			07:08		08:10 (72)	07:41		08:20 (72)
	21:08	20:47			20:03	38	19:31 (117)	19:12			17:29	56	09:06 (72)	17:09	75	16:44 (116)
6	06:12	06:37			07:07		18:53 (117)	07:36			07:09		08:11 (72)	07:42		08:21 (72)
	21:08	20:45			20:01	36	19:29 (117)	19:10			17:27	56	09:07 (72)	17:09	74	16:44 (116)
7	06:12	06:38			07:08		18:53 (117)	07:37			07:10		08:10 (72)	07:43		08:21 (72)
	21:07	20:44			20:00	34	19:27 (117)	19:09			17:26	57	09:07 (72)	17:09	73	16:44 (116)
8	06:13	06:39			07:08		18:54 (117)	07:38			07:12		08:10 (72)	07:44		08:22 (72)
	21:07	20:43			19:56	32	19:26 (117)	19:07			17:25	58	09:08 (72)	17:09	72	16:44 (116)
9	06:13	06:40			07:09		18:55 (117)	07:39			07:13		08:09 (72)	07:45		08:23 (72)
	21:07	20:42			19:55	29	19:24 (117)	19:06			17:24	59	09:08 (72)	17:09	70	16:44 (116)
10	06:14	06:41			07:10		18:57 (117)	07:40			07:14		08:09 (72)	07:46		08:24 (72)
	21:06	20:41			19:53	25	19:22 (117)	19:04			17:23	59	09:08 (72)	17:09	69	16:44 (116)
11	06:15	06:42			07:11		18:59 (117)	07:41			07:15		08:09 (72)	07:47		08:25 (72)
	21:06	20:39			19:52	20	19:19 (117)	19:02			17:22	60	09:09 (72)	17:09	68	16:45 (116)
12	06:16	06:43			07:12		19:02 (117)	07:42			07:16		08:09 (72)	07:47		08:25 (72)
	21:06	20:38			19:50	13	19:15 (117)	19:01			17:22	60	09:09 (72)	17:09	67	16:44 (116)
13	06:16	06:44			07:13			07:43			07:17		08:09 (72)	07:48		08:26 (72)
	21:05	20:37			19:48			18:59			17:21	61	09:10 (72)	17:10	66	16:44 (116)
14	06:17	06:45		19:15 (117)	07:14			07:44			07:19		08:09 (72)	07:49		08:27 (72)
	21:05	20:36	6	19:21 (117)	19:47			18:58			17:20	61	09:10 (72)	17:10	65	16:45 (116)
15	06:18	06:46		19:10 (117)	07:15			07:45			07:20		08:10 (72)	07:50		08:28 (72)
	21:04	20:34	15	19:25 (117)	19:45			18:56			17:19	61	09:11 (72)	17:10	64	16:45 (116)
16	06:18	06:47		19:07 (117)	07:16			07:46			07:21		08:10 (72)	07:50		08:28 (72)
	21:04	20:33	20	19:27 (117)	19:43			18:55			17:18	61	09:11 (72)	17:10	63	16:45 (116)
17	06:19	06:47		19:05 (117)	07:17			07:47			07:22		08:10 (72)	07:51		08:29 (72)
	21:03	20:31	24	19:29 (117)	19:42			18:53			17:17	68	16:31 (116)	17:11	62	16:45 (116)
18	06:20	06:48		19:03 (117)	07:18			07:48			07:23		08:10 (72)	07:52		08:30 (72)
	21:02	20:30	28	19:31 (117)	19:40			18:52			17:17	73	16:33 (116)	17:11	62	16:46 (116)
19	06:21	06:49		19:01 (117)	07:19			07:49			07:24		08:11 (72)	07:52		08:30 (72)
	21:02	20:29	31	19:32 (117)	19:38			18:50			17:16	76	16:36 (116)	17:11	61	16:46 (116)
20	06:22	06:50		19:00 (117)	07:20			07:50			07:25		08:11 (72)	07:53		08:31 (72)
	21:01	20:27	33	19:33 (117)	19:37			18:49			17:15	77	16:37 (116)	17:12	61	16:47 (116)
21	06:22	06:51		18:59 (117)	07:21			07:51			07:27		08:11 (72)	07:53		08:31 (72)
	21:00	20:26	35	19:34 (117)	19:35			18:48			17:15	79	16:38 (116)	17:12	61	16:47 (116)
22	06:23	06:52		18:58 (117)	07:22			07:52			07:28		08:12 (72)	07:54		08:32 (72)
	21:00	20:24	36	19:34 (117)	19:33			18:46			17:14	80	16:39 (116)	17:13	61	16:48 (116)
23	06:24	06:53		18:57 (117)	07:23			07:53		09:33 (72)	07:29		08:12 (72)	07:54		08:32 (72)
	20:59	20:23	38	19:35 (117)	19:32			18:45	10	09:43 (72)	17:13	80	16:39 (116)	17:13	61	16:48 (116)
24	06:25	06:54		18:56 (117)	07:24			07:55		09:28 (72)	07:30		08:12 (72)	07:55		08:32 (72)
	20:58	20:22	39	19:35 (117)	19:30			18:43	20	09:48 (72)	17:13	82	16:40 (116)	17:14	61	16:48 (116)
25	06:26	06:55		18:55 (117)	07:25			07:56		09:24 (72)	07:31		08:14 (72)	07:55		08:33 (72)
	20:57	20:20	41	19:36 (117)	19:28			18:42	27	09:51 (72)	17:12	81	16:41 (116)	17:14	62	16:49 (116)
26	06:27	06:56		18:55 (117)	07:26			07:57		09:22 (72)	07:32		08:14 (72)	07:56		08:33 (72)
	20:56	20:19	41	19:36 (117)	19:27			18:41	31	09:53 (72)	17:12	82	16:42 (116)	17:15	62	16:49 (116)
27	06:28	06:57		18:53 (117)	07:27			07:58		09:20 (72)	07:33		08:15 (72)	07:56		08:33 (72)
	20:56	20:17	42	19:35 (117)	19:25			18:39	35	09:55 (72)	17:11	81	16:42 (116)	17:16	63	16:50 (116)
28	06:29	06:58		18:53 (117)	07:28			07:59		09:19 (72)	07:34		08:15 (72)	07:56		08:34 (72)
	20:55	20:16	42	19:35 (117)	19:23			18:38	39	09:58 (72)	17:11	81	16:42 (116)	17:16	64	16:51 (116)
29	06:29	06:59		18:52 (117)	07:29			08:00		09:17 (72)	07:35		08:16 (72)	07:57		08:34 (72)
	20:54	20:14	43	19:35 (117)	19:22			18:37	42	09:59 (72)	17:11	81	16:43 (116)	17:17	64	16:51 (116)
30	06:30	07:00		18:52 (117)	07:30			08:01		09:16 (72)	07:36		08:16 (72)	07:57		08:34 (72)
	20:53	20:12	42	19:34 (117)	19:20			18:36	44	10:00 (72)	17:10	81	16:43 (116)	17:18	65	16:52 (116)
31	06:31	07:01		18:52 (117)				08:02		09:14 (72)				07:57		08:34 (72)
	20:52	20:11	42	19:34 (117)				18:34	47	10:01 (72)				17:19	67	16:53 (116)
Potential sun hours	456	427			374			346			300			291		
Total, worst case			598				390			295			2017			2076
Sun reduction			0.60				0.61			0.56			0.37			0.50
Oper. time red.			1.00				1.00			1.00			1.00			1.00
Wind dir. red.			0.65				0.65			0.61			0.62			0.63
Total reduction			0.39				0.40			0.34			0.23			0.31
Total, real			233				155			100			459			649

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 96

Licensed user:
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217 Montgomery St.
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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m**Shadow receptor:** 10280 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6302)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:25 (108)	07:45			07:10		07:43 (83)	07:20			06:36		07:20 (82)	06:08		06:30 (106)
	17:20	29	08:54 (108)	17:53			18:26	38	08:21 (83)	19:59			20:28	88	19:59 (107)	20:57	47	19:57 (107)
2	07:58		08:25 (108)	07:44			07:08		07:43 (83)	07:19			06:35		07:20 (82)	06:08		06:30 (106)
	17:21	29	08:54 (108)	17:54			18:27	37	08:20 (83)	20:00			20:29	89	20:00 (107)	20:58	40	19:56 (107)
3	07:58		08:26 (108)	07:43			07:07		07:43 (83)	07:17			06:33		07:20 (82)	06:07		06:29 (106)
	17:21	30	08:56 (108)	17:56			18:28	38	08:21 (83)	20:00			20:30	91	20:01 (107)	20:59	41	19:56 (107)
4	07:58		08:26 (108)	07:42			07:05		07:42 (83)	07:15			06:32		07:20 (82)	06:07		06:28 (106)
	17:22	29	08:55 (108)	17:57			18:29	38	08:20 (83)	20:01			20:31	93	20:02 (107)	20:59	41	19:55 (107)
5	07:58		08:26 (108)	07:41			07:04		07:43 (83)	07:14			06:31		07:19 (82)	06:07		06:28 (106)
	17:23	30	08:56 (108)	17:58			18:31	37	08:20 (83)	20:02			20:32	93	20:01 (107)	21:00	40	19:55 (107)
6	07:58		08:27 (108)	07:40			07:02		07:42 (83)	07:12			06:30		07:19 (82)	06:06		06:28 (106)
	17:24	29	08:56 (108)	17:59			18:32	37	08:19 (83)	20:03			20:33	94	20:02 (107)	21:01	39	19:54 (107)
7	07:58		08:27 (108)	07:39			07:01		07:43 (83)	07:11			06:29		07:19 (82)	06:06		06:28 (106)
	17:25	30	08:57 (108)	18:01			18:33	36	08:19 (83)	20:04			20:34	95	20:02 (107)	21:01	39	19:54 (107)
8	07:58		08:28 (108)	07:37			07:59		08:43 (83)	07:09			06:27		07:19 (82)	06:06		06:27 (106)
	17:26	30	08:58 (108)	18:02			19:34	35	09:18 (83)	20:05			20:35	95	20:03 (107)	21:02	39	19:53 (107)
9	07:57		08:28 (108)	07:36			07:57		08:43 (83)	07:08			06:26		07:20 (82)	06:06		06:27 (106)
	17:27	30	08:58 (108)	18:03			19:35	33	09:16 (83)	20:06			20:36	94	20:03 (107)	21:02	37	19:52 (107)
10	07:57		08:29 (108)	07:35			07:56		08:44 (83)	07:06			06:25		07:20 (82)	06:06		06:27 (106)
	17:28	30	08:59 (108)	18:04			19:36	32	09:16 (83)	20:07			20:37	94	20:03 (107)	21:03	35	19:51 (107)
11	07:57		08:29 (108)	07:34			07:54		08:45 (83)	07:04			06:24		07:20 (82)	06:05		06:28 (106)
	17:29	29	08:58 (108)	18:05			19:37	29	09:14 (83)	20:08			20:38	93	20:03 (107)	21:04	33	19:51 (107)
12	07:57		08:30 (108)	07:33			07:53		08:46 (83)	07:03			06:23		07:21 (82)	06:05		06:28 (106)
	17:30	29	08:59 (108)	18:07			19:38	27	09:13 (83)	20:09			20:39	92	20:03 (107)	21:04	32	19:50 (107)
13	07:57		08:30 (108)	07:32			07:51		08:47 (83)	07:01			06:22		07:21 (82)	06:05		06:28 (106)
	17:31	30	09:00 (108)	18:08			19:39	23	09:10 (83)	20:10			20:40	91	20:03 (107)	21:05	29	19:49 (107)
14	07:56		08:30 (108)	07:30			07:49		08:49 (83)	07:00		07:43 (82)	06:21		07:21 (82)	06:05		06:28 (106)
	17:32	29	08:59 (108)	18:09			19:40	18	09:07 (83)	20:11	16	07:59 (82)	20:41	90	20:03 (107)	21:05	27	19:48 (107)
15	07:56		08:31 (108)	07:29			07:48		08:53 (83)	06:58		07:38 (82)	06:20		07:22 (82)	06:05		06:28 (106)
	17:33	29	09:00 (108)	18:10			19:41	11	09:04 (83)	20:12	24	08:02 (82)	20:42	89	20:03 (107)	21:05	23	06:51 (106)
16	07:55		08:32 (108)	07:28			07:46			06:57		07:36 (82)	06:19		07:22 (82)	06:05		06:28 (106)
	17:34	27	08:59 (108)	18:11			19:42			20:13	29	08:05 (82)	20:43	87	20:02 (107)	21:06	23	06:51 (106)
17	07:55		08:33 (108)	07:27			07:45			06:55		07:33 (82)	06:18		07:24 (82)	06:05		06:28 (106)
	17:36	27	09:00 (108)	18:12			19:43			20:14	33	08:06 (82)	20:44	85	20:03 (107)	21:06	23	06:51 (106)
18	07:55		08:33 (108)	07:25			07:43			06:54		07:32 (82)	06:17		07:24 (82)	06:05		06:28 (106)
	17:37	26	08:59 (108)	18:14			19:44			20:15	36	08:08 (82)	20:45	84	20:03 (107)	21:07	23	06:51 (106)
19	07:54		08:34 (108)	07:24		07:59 (83)	07:41			06:52		07:29 (82)	06:17		07:25 (82)	06:05		06:28 (106)
	17:38	25	08:59 (108)	18:15	8	08:07 (83)	19:45			20:16	40	08:09 (82)	20:46	81	20:02 (107)	21:07	23	06:51 (106)
20	07:54		08:35 (108)	07:23		07:55 (83)	07:40			06:51		07:28 (82)	06:16		07:25 (82)	06:06		06:29 (106)
	17:39	24	08:59 (108)	18:16	16	08:11 (83)	19:46			20:17	42	08:10 (82)	20:47	80	20:02 (107)	21:07	24	06:53 (106)
21	07:53		08:37 (108)	07:21		07:53 (83)	07:38			06:49		07:27 (82)	06:15		07:27 (82)	06:06		06:29 (106)
	17:40	22	08:59 (108)	18:17	21	08:14 (83)	19:48			20:18	43	08:10 (82)	20:48	77	20:02 (107)	21:07	24	06:53 (106)
22	07:52		08:38 (108)	07:20		07:50 (83)	07:37			06:48		07:26 (82)	06:14		07:27 (82)	06:06		06:29 (106)
	17:41	20	08:58 (108)	18:18	25	08:15 (83)	19:49			20:19	45	08:11 (82)	20:49	74	20:01 (107)	21:08	24	06:53 (106)
23	07:52		08:39 (108)	07:18		07:49 (83)	07:35			06:47		07:25 (82)	06:14		07:28 (82)	06:06		06:29 (106)
	17:42	18	08:57 (108)	18:19	28	08:17 (83)	19:50			20:20	47	08:12 (82)	20:50	72	20:01 (107)	21:08	24	06:53 (106)
24	07:51		08:40 (108)	07:17		07:47 (83)	07:33			06:45		07:24 (82)	06:13		07:29 (82)	06:06		06:29 (106)
	17:44	15	08:55 (108)	18:21	31	08:18 (83)	19:51			20:21	48	08:12 (82)	20:51	69	20:00 (107)	21:08	23	06:52 (106)
25	07:50		08:43 (108)	07:16		07:47 (83)	07:32			06:44		07:23 (82)	06:12		07:30 (82)	06:07		06:30 (106)
	17:45	11	08:54 (108)	18:22	32	08:19 (83)	19:52			20:22	64	19:50 (107)	20:51	66	20:00 (107)	21:08	23	06:53 (106)
26	07:50		08:48 (108)	07:14		07:45 (83)	07:30			06:42		07:23 (82)	06:11		07:31 (82)	06:07		06:30 (106)
	17:46	2	08:50 (108)	18:23	34	08:19 (83)	19:53			20:23	70	19:53 (107)	20:52	64	20:00 (107)	21:08	23	06:53 (106)
27	07:49			07:13		07:45 (83)	07:28			06:41		07:21 (82)	06:11		07:33 (82)	06:07		06:30 (106)
	17:47			18:24	35	08:20 (83)	19:54			20:24	77	19:55 (107)	20:53	59	20:00 (107)	21:08	23	06:53 (106)
28	07:48			07:11		07:44 (83)	07:27			06:40		07:21 (82)	06:10		07:34 (82)	06:08		06:31 (106)
	17:48			18:25	36	08:20 (83)	19:55			20:25	80	19:57 (107)	20:54	56	19:59 (107)	21:08	25	19:49 (107)
29	07:47						07:25			06:38		07:21 (82)	06:10		07:36 (82)	06:08		06:31 (106)
	17:50						19:56			20:26	84	19:58 (107)	20:55	52	19:59 (107)	21:08	29	19:52 (107)
30	07:46						07:23			06:37		07:20 (82)	06:09		06:32 (106)	06:09		06:32 (106)
	17:51						19:57			20:27	86	19:58 (107)	20:56	56	19:58 (107)	21:08	31	19:54 (107)
31	07:46						07:22						06:09		06:31 (106)			
	17:52						19:58						20:56	53	19:58 (107)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		659			266			469			864			2496			907	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.61			0.63			0.63			0.66			0.65			0.67	
Total reduction		0.22			0.27			0.28			0.34			0.36			0.40	
Total, real		143			71			130			291			908			363	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 97

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m**Shadow receptor:** 10280 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6302)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:32 (106)	06:32		07:31 (82)	07:02			07:31		08:26 (83)	07:04			07:37		08:11 (108)
	21:08	33	19:54 (107)	20:51	93	20:14 (107)	20:09			19:19	25	08:51 (83)	17:33			17:10	30	08:41 (108)
2	06:10		06:33 (106)	06:33		07:31 (82)	07:03			07:32		08:24 (83)	07:05			07:38		08:11 (108)
	21:08	34	19:56 (107)	20:50	94	20:14 (107)	20:08			19:17	28	08:52 (83)	17:32			17:10	30	08:41 (108)
3	06:10		06:32 (106)	06:34		07:30 (82)	07:04			07:33		08:22 (83)	07:06			07:39		08:11 (108)
	21:08	37	19:57 (107)	20:49	95	20:14 (107)	20:06			19:15	31	08:53 (83)	17:31			17:10	30	08:41 (108)
4	06:11		06:33 (106)	06:35		07:30 (82)	07:05			07:34		08:21 (83)	07:07			07:40		08:12 (108)
	21:08	37	19:58 (107)	20:48	94	20:13 (107)	20:05			19:14	33	08:54 (83)	17:30			17:10	30	08:42 (108)
5	06:11		06:33 (106)	06:36		07:29 (82)	07:06			07:35		08:20 (83)	07:08			07:41		08:12 (108)
	21:08	39	19:59 (107)	20:47	94	20:12 (107)	20:03			19:12	34	08:54 (83)	17:29			17:09	30	08:42 (108)
6	06:12		06:34 (106)	06:37		07:29 (82)	07:07			07:36		08:19 (83)	07:09			07:42		08:13 (108)
	21:08	40	20:00 (107)	20:45	94	20:12 (107)	20:01			19:10	35	08:54 (83)	17:28			17:09	30	08:43 (108)
7	06:12		06:34 (106)	06:38		07:29 (82)	07:08			07:37		08:18 (83)	07:11			07:43		08:13 (108)
	21:07	41	20:01 (107)	20:44	94	20:11 (107)	20:00			19:09	37	08:55 (83)	17:27			17:09	30	08:43 (108)
8	06:13		06:35 (106)	06:39		07:29 (82)	07:09			07:38		08:17 (83)	07:12			07:44		08:14 (108)
	21:07	41	20:02 (107)	20:43	93	20:11 (107)	19:57			19:07	38	08:55 (83)	17:26			17:09	29	08:43 (108)
9	06:14		06:36 (106)	06:40		07:28 (82)	07:10			07:39		08:17 (83)	07:13			07:45		08:14 (108)
	21:07	41	20:03 (107)	20:42	93	20:10 (107)	19:55			19:06	38	08:55 (83)	17:25			17:09	30	08:44 (108)
10	06:14		06:36 (106)	06:41		07:28 (82)	07:11			07:40		08:16 (83)	07:14			07:46		08:15 (108)
	21:06	42	20:03 (107)	20:41	92	20:10 (107)	19:53			19:04	38	08:54 (83)	17:24			17:09	29	08:44 (108)
11	06:15		06:38 (106)	06:42		07:28 (82)	07:11			07:41		08:16 (83)	07:15			07:47		08:16 (108)
	21:06	41	20:05 (107)	20:39	90	20:09 (107)	19:52			19:03	38	08:54 (83)	17:23			17:09	29	08:45 (108)
12	06:16		06:39 (106)	06:43		07:28 (82)	07:12			07:42		08:16 (83)	07:16			07:47		08:16 (108)
	21:06	51	20:06 (107)	20:38	89	20:08 (107)	19:50			19:01	38	08:54 (83)	17:22			17:10	28	08:44 (108)
13	06:16		06:40 (106)	06:44		07:29 (82)	07:13			07:43		08:17 (83)	07:17			07:48		08:16 (108)
	21:05	54	20:06 (107)	20:37	86	20:07 (107)	19:48			19:00	37	08:54 (83)	17:21			17:10	29	08:45 (108)
14	06:17		06:43 (106)	06:45		07:29 (82)	07:14			07:44		08:17 (83)	07:19			07:49		08:17 (108)
	21:05	53	20:07 (107)	20:36	82	20:05 (107)	19:47			18:58	36	08:53 (83)	17:20			17:10	29	08:46 (108)
15	06:18		07:44 (82)	06:46		07:29 (82)	07:15			07:45		08:17 (83)	07:20			07:50		08:18 (108)
	21:04	54	20:08 (107)	20:34	79	20:04 (107)	19:45			18:57	36	08:53 (83)	17:19			17:10	28	08:46 (108)
16	06:19		07:43 (82)	06:47		07:29 (82)	07:16			07:46		08:18 (83)	07:21		08:20 (108)	07:50		08:18 (108)
	21:04	58	20:09 (107)	20:33	75	20:02 (107)	19:43			18:55	34	08:52 (83)	17:18	3	08:23 (108)	17:10	28	08:46 (108)
17	06:19		07:41 (82)	06:48		07:29 (82)	07:17			07:47		08:18 (83)	07:22		08:16 (108)	07:51		08:19 (108)
	21:03	62	20:09 (107)	20:32	69	19:59 (107)	19:42			18:54	32	08:50 (83)	17:17	11	08:27 (108)	17:11	28	08:47 (108)
18	06:20		07:40 (82)	06:49		07:29 (82)	07:18			07:48		08:19 (83)	07:23		08:14 (108)	07:52		08:20 (108)
	21:03	64	20:09 (107)	20:30	62	19:55 (107)	19:40			18:52	30	08:49 (83)	17:17	15	08:29 (108)	17:11	28	08:48 (108)
19	06:21		07:40 (82)	06:50		07:29 (82)	07:19			07:49		08:20 (83)	07:24		08:14 (108)	07:52		08:19 (108)
	21:02	67	20:10 (107)	20:29	49	08:18 (82)	19:38			18:51	27	08:47 (83)	17:16	18	08:32 (108)	17:11	28	08:47 (108)
20	06:22		07:39 (82)	06:51		07:30 (82)	07:20			07:50		08:21 (83)	07:25		08:13 (108)	07:53		08:20 (108)
	21:01	71	20:11 (107)	20:27	47	08:17 (82)	19:37			18:49	24	08:45 (83)	17:15	20	08:33 (108)	17:12	28	08:48 (108)
21	06:23		07:37 (82)	06:51		07:31 (82)	07:21			07:51		08:23 (83)	07:27		08:12 (108)	07:53		08:20 (108)
	21:01	74	20:11 (107)	20:26	45	08:16 (82)	19:35			18:48	20	08:43 (83)	17:15	22	08:34 (108)	17:12	28	08:48 (108)
22	06:24		07:37 (82)	06:52		07:31 (82)	07:22			07:52		08:27 (83)	07:28		08:11 (108)	07:54		08:21 (108)
	21:00	75	20:11 (107)	20:25	44	08:15 (82)	19:33			18:46	14	08:41 (83)	17:14	24	08:35 (108)	17:13	28	08:49 (108)
23	06:24		07:36 (82)	06:53		07:32 (82)	07:23			07:54			07:29		08:10 (108)	07:55		08:21 (108)
	20:59	78	20:12 (107)	20:23	42	08:14 (82)	19:32			18:45			17:14	26	08:36 (108)	17:13	28	08:49 (108)
24	06:25		07:36 (82)	06:54		07:33 (82)	07:24			07:55			07:30		08:11 (108)	07:55		08:22 (108)
	20:58	79	20:12 (107)	20:22	39	08:12 (82)	19:30			18:44			17:13	26	08:37 (108)	17:14	28	08:50 (108)
25	06:26		07:35 (82)	06:55		07:35 (82)	07:25			07:56			07:31		08:11 (108)	07:55		08:23 (108)
	20:57	83	20:13 (107)	20:20	36	08:11 (82)	19:28			18:42			17:13	27	08:38 (108)	17:15	28	08:51 (108)
26	06:27		07:35 (82)	06:56		07:36 (82)	07:26			07:57			07:32		08:11 (108)	07:56		08:23 (108)
	20:57	84	20:13 (107)	20:19	33	08:09 (82)	19:27			18:41			17:12	27	08:38 (108)	17:15	28	08:51 (108)
27	06:28		07:33 (82)	06:57		07:38 (82)	07:27			07:58			07:33		08:10 (108)	07:56		08:24 (108)
	20:56	87	20:13 (107)	20:17	29	08:07 (82)	19:25			18:40			17:12	29	08:39 (108)	17:16	28	08:52 (108)
28	06:29		07:33 (82)	06:58		07:41 (82)	07:28		08:36 (83)	07:59			07:34		08:10 (108)	07:56		08:24 (108)
	20:55	88	20:13 (107)	20:16	23	08:04 (82)	19:23	6	08:42 (83)	18:38			17:11	29	08:39 (108)	17:16	28	08:52 (108)
29	06:30		07:32 (82)	06:59		07:43 (82)	07:29		08:31 (83)	08:00			07:35		08:11 (108)	07:57		08:24 (108)
	20:54	90	20:13 (107)	20:14	16	07:59 (82)	19:22	16	08:47 (83)	18:37			17:11	29	08:40 (108)	17:17	29	08:53 (108)
30	06:31		07:32 (82)	07:00			07:30		08:28 (83)	08:01			07:36		08:11 (108)	07:57		08:24 (108)
	20:53	90	20:13 (107)	20:13			19:20	21	08:49 (83)	18:36			17:11	29	08:40 (108)	17:18	29	08:53 (108)
31	06:31		07:31 (82)	07:01						08:02						07:57		08:24 (108)
	20:52	93	20:14 (107)	20:11						18:35						17:19	29	08:53 (108)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		1881			1971			43			703			335			892	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.65			0.66			0.63			0.63			0.61			0.61	
Total reduction		0.39			0.39			0.38			0.35			0.22			0.30	
Total, real		734			775			17			248			75			270	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

Printed/Page
4/30/2012 9:43 AM / 98

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m**Shadow receptor:** 10308 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6304)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January	February			March			April	May			June		
1	07:57	07:44			07:10		07:32 (131)	07:20	06:36			06:08		19:57 (98)
	17:20	17:53			18:26	25	07:57 (131)	19:59	20:28			20:57	33	20:30 (98)
2	07:57	07:44			07:08		07:32 (131)	07:19	06:35			06:08		19:58 (98)
	17:21	17:54			18:27	24	07:56 (131)	20:00	20:29			20:58	33	20:31 (98)
3	07:57	07:43			07:07		07:33 (131)	07:17	06:33			06:07		19:58 (98)
	17:21	17:56			18:28	23	07:56 (131)	20:00	20:30			20:58	33	20:31 (98)
4	07:57	07:42			07:05		07:33 (131)	07:15	06:32			06:07		19:58 (98)
	17:22	17:57			18:29	21	07:54 (131)	20:01	20:31			20:59	32	20:30 (98)
5	07:58	07:41			07:04		07:34 (131)	07:14	06:31			06:07		19:58 (98)
	17:23	17:58			18:30	20	07:54 (131)	20:02	20:32			21:00	33	20:31 (98)
6	07:57	07:39			07:02		07:35 (131)	07:12	06:30			06:06		19:59 (98)
	17:24	17:59			18:32	17	07:52 (131)	20:03	20:33			21:00	32	20:31 (98)
7	07:57	07:38			07:00		07:36 (131)	07:11	06:29			06:06		19:59 (98)
	17:25	18:00			18:33	13	07:49 (131)	20:04	20:34			21:01	35	20:37 (85)
8	07:57	07:37			07:59		08:41 (131)	07:09	06:27			06:06		19:59 (98)
	17:26	18:02			19:34	4	08:45 (131)	20:05	20:35			21:02	36	20:37 (85)
9	07:57	07:36			07:57			07:07	06:26			06:06		19:59 (98)
	17:27	18:03			19:35			20:06	20:36			21:02	36	20:37 (85)
10	07:57	07:35			07:56			07:06	06:25			06:06		19:59 (98)
	17:28	18:04			19:36			20:07	20:37			21:03	37	20:38 (85)
11	07:57	07:34			07:54			07:04	06:24			06:05		20:00 (98)
	17:29	18:05			19:37			20:08	20:38			21:03	39	20:39 (85)
12	07:57	07:33			07:53			07:03	06:23			06:05		20:00 (98)
	17:30	18:06			19:38			20:09	20:39			21:04	39	20:39 (85)
13	07:56	07:31			07:51			07:01	06:22		20:08 (98)	06:05		20:01 (98)
	17:31	18:08			19:39			20:10	20:40	9	20:17 (98)	21:04	39	20:40 (85)
14	07:56	07:30			07:49			07:00	06:21		20:05 (98)	06:05		20:01 (98)
	17:32	18:09			19:40			20:11	20:41	13	20:18 (98)	21:05	39	20:40 (85)
15	07:56	07:29			07:48			06:58	06:20		20:03 (98)	06:05		20:01 (98)
	17:33	18:10			19:41			20:12	20:42	16	20:19 (98)	21:05	40	20:41 (85)
16	07:55	07:28			07:46			06:57	06:19		20:02 (98)	06:05		20:01 (98)
	17:34	18:11			19:42			20:13	20:43	18	20:20 (98)	21:06	40	20:41 (85)
17	07:55	07:26			07:45			06:55	06:18		20:02 (98)	06:05		20:01 (98)
	17:36	18:12			19:43			20:14	20:44	19	20:21 (98)	21:06	40	20:41 (85)
18	07:54	07:25			07:43			06:54	06:17		20:01 (98)	06:05		20:02 (98)
	17:37	18:14			19:44			20:15	20:45	21	20:22 (98)	21:06	39	20:41 (85)
19	07:54	07:24			07:41			06:52	06:17		20:00 (98)	06:05		20:02 (98)
	17:38	18:15			19:45			20:16	20:46	23	20:23 (98)	21:07	39	20:41 (85)
20	07:53	07:22		07:44 (131)	07:40			06:51	06:16		19:59 (98)	06:06		20:03 (98)
	17:39	18:16	4	07:48 (131)	19:46			20:17	20:47	24	20:23 (98)	21:07	40	20:43 (85)
21	07:53	07:21		07:40 (131)	07:38			06:49	06:15		19:58 (98)	06:06		20:03 (98)
	17:40	18:17	11	07:51 (131)	19:47			20:18	20:48	26	20:24 (98)	21:07	40	20:43 (85)
22	07:52	07:20		07:39 (131)	07:36			06:48	06:14		19:58 (98)	06:06		20:03 (98)
	17:41	18:18	14	07:53 (131)	19:48			20:19	20:49	27	20:25 (98)	21:07	40	20:43 (85)
23	07:52	07:18		07:38 (131)	07:35			06:47	06:13		19:58 (98)	06:06		20:03 (98)
	17:42	18:19	17	07:55 (131)	19:49			20:20	20:49	28	20:26 (98)	21:08	40	20:43 (85)
24	07:51	07:17		07:36 (131)	07:33			06:45	06:13		19:57 (98)	06:07		20:03 (98)
	17:44	18:20	20	07:56 (131)	19:51			20:21	20:50	29	20:26 (98)	21:08	39	20:42 (85)
25	07:50	07:15		07:35 (131)	07:32			06:44	06:12		19:57 (98)	06:07		20:04 (98)
	17:45	18:22	22	07:57 (131)	19:52			20:22	20:51	31	20:28 (98)	21:08	39	20:43 (85)
26	07:49	07:14		07:33 (131)	07:30			06:42	06:11		19:57 (98)	06:07		20:03 (98)
	17:46	18:23	24	07:57 (131)	19:53			20:23	20:52	31	20:28 (98)	21:08	40	20:43 (85)
27	07:49	07:13		07:33 (131)	07:28			06:41	06:11		19:57 (98)	06:07		20:03 (98)
	17:47	18:24	24	07:57 (131)	19:54			20:24	20:53	33	20:30 (98)	21:08	40	20:43 (85)
28	07:48	07:11		07:32 (131)	07:27			06:40	06:10		19:57 (98)	06:08		20:04 (98)
	17:48	18:25	25	07:57 (131)	19:55			20:25	20:54	32	20:29 (98)	21:08	39	20:43 (85)
29	07:47				07:25			06:38	06:10		19:57 (98)	06:08		20:04 (98)
	17:50				19:56			20:26	20:55	33	20:30 (98)	21:08	39	20:43 (85)
30	07:46				07:23			06:37	06:09		19:57 (98)	06:09		20:04 (98)
	17:51				19:57			20:27	20:55	33	20:30 (98)	21:08	39	20:43 (85)
31	07:45				07:22				06:09		19:58 (98)			
	17:52				19:58				20:56	32	20:30 (98)			
Potential sun hours	300	299			370			397	446			449		
Total, worst case			161			147				478			1129	
Sun reduction			0.42			0.44				0.56			0.60	
Oper. time red.			1.00			1.00				1.00			1.00	
Wind dir. red.			0.63			0.63				0.62			0.62	
Total reduction			0.27			0.28				0.35			0.37	
Total, real			43			41				167			421	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m

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4/30/2012 9:43 AM / 99

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Calculated:
4/27/2012 4:24 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind II ASFA_w-Obstacles_3-GE_1100m**Shadow receptor:** 10308 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6304)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August	September	October			November	December
1	06:09		20:04 (98)	06:32	07:02	07:31			07:03	07:37
	21:08	39	20:43 (85)	20:51	20:09	19:18			17:33	17:10
2	06:10		20:05 (98)	06:33	07:03	07:32			07:05	07:38
	21:08	37	20:43 (85)	20:50	20:08	19:17			17:32	17:10
3	06:10		20:04 (98)	06:34	07:04	07:33			07:06	07:39
	21:08	37	20:43 (85)	20:49	20:06	19:15			17:31	17:10
4	06:11		20:05 (98)	06:35	07:05	07:34			07:07	07:40
	21:08	36	20:43 (85)	20:48	20:05	19:14			17:30	17:10
5	06:11		20:04 (98)	06:36	07:06	07:35			07:08	07:41
	21:08	36	20:42 (85)	20:46	20:03	19:12			17:29	17:09
6	06:12		20:05 (98)	06:37	07:07	07:36		08:14 (131)	07:09	07:42
	21:07	34	20:43 (85)	20:45	20:01	19:10	10	08:24 (131)	17:28	17:09
7	06:12		20:04 (98)	06:38	07:08	07:37		08:11 (131)	07:10	07:43
	21:07	33	20:37 (98)	20:44	20:00	19:09	15	08:26 (131)	17:27	17:09
8	06:13		20:05 (98)	06:39	07:09	07:38		08:10 (131)	07:12	07:44
	21:07	33	20:38 (98)	20:43	19:56	19:07	18	08:28 (131)	17:26	17:09
9	06:14		20:05 (98)	06:40	07:09	07:39		08:08 (131)	07:13	07:45
	21:07	33	20:38 (98)	20:42	19:55	19:06	21	08:29 (131)	17:25	17:09
10	06:14		20:05 (98)	06:41	07:10	07:40		08:07 (131)	07:14	07:46
	21:06	33	20:38 (98)	20:41	19:53	19:04	22	08:29 (131)	17:24	17:09
11	06:15		20:05 (98)	06:42	07:11	07:41		08:06 (131)	07:15	07:46
	21:06	33	20:38 (98)	20:39	19:52	19:03	23	08:29 (131)	17:23	17:09
12	06:16		20:06 (98)	06:43	07:12	07:42		08:05 (131)	07:16	07:47
	21:05	33	20:39 (98)	20:38	19:50	19:01	24	08:29 (131)	17:22	17:10
13	06:16		20:05 (98)	06:44	07:13	07:43		08:05 (131)	07:17	07:48
	21:05	33	20:38 (98)	20:37	19:48	18:59	24	08:29 (131)	17:21	17:10
14	06:17		20:06 (98)	06:45	07:14	07:44		08:04 (131)	07:18	07:49
	21:05	33	20:39 (98)	20:35	19:47	18:58	25	08:29 (131)	17:20	17:10
15	06:18		20:06 (98)	06:46	07:15	07:45		08:05 (131)	07:20	07:50
	21:04	33	20:39 (98)	20:34	19:45	18:56	25	08:30 (131)	17:19	17:10
16	06:19		20:07 (98)	06:47	07:16	07:46		08:06 (131)	07:21	07:50
	21:03	32	20:39 (98)	20:33	19:43	18:55	23	08:29 (131)	17:18	17:10
17	06:19		20:06 (98)	06:48	07:17	07:47		08:07 (131)	07:22	07:51
	21:03	32	20:38 (98)	20:31	19:42	18:53	21	08:28 (131)	17:17	17:11
18	06:20		20:07 (98)	06:49	07:18	07:48		08:08 (131)	07:23	07:52
	21:02	31	20:38 (98)	20:30	19:40	18:52	19	08:27 (131)	17:17	17:11
19	06:21		20:07 (98)	06:49	07:19	07:49		08:09 (131)	07:24	07:52
	21:02	30	20:37 (98)	20:29	19:38	18:51	16	08:25 (131)	17:16	17:11
20	06:22		20:08 (98)	06:50	07:20	07:50		08:10 (131)	07:25	07:53
	21:01	29	20:37 (98)	20:27	19:37	18:49	13	08:23 (131)	17:15	17:12
21	06:23		20:07 (98)	06:51	07:21	07:51		08:11 (131)	07:26	07:53
	21:00	28	20:35 (98)	20:26	19:35	18:48	10	08:21 (131)	17:15	17:12
22	06:23		20:08 (98)	06:52	07:22	07:52			07:28	07:54
	21:00	27	20:35 (98)	20:24	19:33	18:46			17:14	17:13
23	06:24		20:09 (98)	06:53	07:23	07:53			07:29	07:54
	20:59	25	20:34 (98)	20:23	19:32	18:45			17:14	17:13
24	06:25		20:10 (98)	06:54	07:24	07:54			07:30	07:55
	20:58	24	20:34 (98)	20:21	19:30	18:44			17:13	17:14
25	06:26		20:11 (98)	06:55	07:25	07:56			07:31	07:55
	20:57	22	20:33 (98)	20:20	19:28	18:42			17:12	17:15
26	06:27		20:12 (98)	06:56	07:26	07:57			07:32	07:56
	20:56	20	20:32 (98)	20:19	19:27	18:41			17:12	17:15
27	06:28		20:12 (98)	06:57	07:27	07:58			07:33	07:56
	20:55	19	20:31 (98)	20:17	19:25	18:40			17:12	17:16
28	06:29		20:13 (98)	06:58	07:28	07:59			07:34	07:56
	20:55	17	20:30 (98)	20:15	19:23	18:38			17:11	17:16
29	06:30		20:15 (98)	06:59	07:29	08:00			07:35	07:57
	20:54	14	20:29 (98)	20:14	19:22	18:37			17:11	17:17
30	06:31		20:17 (98)	07:00	07:30	08:01			07:36	07:57
	20:53	11	20:28 (98)	20:12	19:20	18:36			17:11	17:18
31	06:31		20:20 (98)	07:01		08:02				07:57
	20:52	6	20:26 (98)	20:11		18:34				17:19
Potential sun hours	456			426	374	346			300	291
Total, worst case		883					309			
Sun reduction		0.60					0.56			
Oper. time red.		1.00					1.00			
Wind dir. red.		0.62					0.63			
Total reduction		0.37					0.36			
Total, real		331					110			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Attachment F

Cumulative Analysis WindPRO Overview Reports and Calendars (Initial Analysis)

Project:
11052 Buckeye Wind I and II SFA_4_1100m_cumulative

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3/2/2012 8:52 AM / 1

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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Main Result

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
280	307	482	420	473	385	412	385	596	797	832	727

W	WNW	NW	NNW	Sum
858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: 11052 contours.wpo (2)
Obstacles not used in calculation
Eye height: 1.5 m
Grid resolution: 10 m

WTGs

	UTM NAD83 Zone: 17				WTG type						
	East	North	Z	Row data/Description	Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	RPM
	UTM NAD83 Zone: 17		[m]					[kW]	[m]	[m]	[RPM]
1	272,137	4,451,125	353.4	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
2	271,815	4,450,540	350.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
3	271,790	4,449,793	350.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
4	272,475	4,449,775	357.1	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
5	271,998	4,449,433	353.5	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
6	272,189	4,449,097	356.6	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
7	276,356	4,448,726	405.6	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
8	274,759	4,448,413	400.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
9	272,467	4,448,109	358.2	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
10	280,861	4,448,148	350.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
11	278,853	4,448,045	380.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
12	281,025	4,447,874	348.2	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
13	272,409	4,447,677	356.7	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
14	281,211	4,447,602	343.2	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
15	280,402	4,447,595	358.3	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
16	278,976	4,447,472	380.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
17	272,450	4,446,720	354.2	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
18	278,950	4,446,644	380.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
20	277,948	4,446,172	380.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
21	278,885	4,446,040	378.9	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
22	280,328	4,445,995	360.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
23	278,159	4,445,871	376.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
25	277,581	4,445,687	377.9	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
27	270,872	4,445,505	350.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
28	276,213	4,445,379	386.3	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9

To be continued on next page...

Project:
11052 Buckeye Wind I and II SFA_4_1100m_cumulative

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3/2/2012 8:52 AM / 2

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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Main Result

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative

...continued from previous page

	UTM NAD83 Zone: 17 East	North	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	RPM
	UTM NAD83 Zone: 17		[m]					[kW]	[m]	[m]	[RPM]
31	271,144	4,445,247	350.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
32	274,049	4,445,130	388.9	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
33	276,230	4,445,089	385.1	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
35	270,571	4,445,044	350.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
36	271,391	4,444,931	350.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
37	273,288	4,444,967	377.8	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
39	274,008	4,444,795	390.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
40	270,750	4,444,754	350.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
41	273,398	4,444,672	380.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
42	270,156	4,444,618	350.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
43	271,010	4,444,452	350.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
44	273,956	4,444,420	382.3	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
45	270,336	4,444,343	350.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
47	276,514	4,443,784	370.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
49	273,998	4,441,382	360.5	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
51	279,750	4,440,899	350.5	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
52	274,190	4,440,661	360.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
53	279,803	4,440,602	350.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
54	278,006	4,440,399	390.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
55	274,318	4,440,370	357.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
56	280,319	4,440,297	350.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
59	273,971	4,439,914	352.5	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
64	278,921	4,438,883	350.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
65	279,038	4,438,635	350.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
67	277,778	4,437,551	341.5	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
69	276,370	4,437,086	340.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
70	275,472	4,436,907	330.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
71	279,368	4,445,092	360.8	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
72	277,985	4,446,737	380.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
73	276,767	4,447,605	399.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
74	276,919	4,447,310	395.2	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
75	276,272	4,447,236	402.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
76	276,392	4,446,951	400.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
77	276,558	4,446,666	396.2	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
78	279,498	4,440,175	352.5	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
79	278,190	4,442,124	383.9	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
80	278,158	4,441,799	390.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
81	274,913	4,446,038	390.1	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
82	275,069	4,445,768	395.5	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
83	275,215	4,445,504	400.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
84	276,290	4,442,736	379.6	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
85	275,852	4,442,363	375.3	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
86	276,329	4,441,802	384.9	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
87	273,127	4,446,337	368.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
88	276,592	4,438,677	390.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
89	275,778	4,438,425	380.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
90	278,236	4,441,453	390.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
91	281,835	4,443,472	341.3	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
92	281,137	4,443,883	347.8	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
93	280,804	4,444,251	350.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
94	281,156	4,441,420	350.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
95	282,198	4,441,581	340.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0

To be continued on next page...

Project:
11052 Buckeye Wind I and II SFA_4_1100m_cumulative

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative

...continued from previous page

	UTM NAD83 Zone: 17 East	North	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	RPM
	UTM NAD83 Zone: 17		[m]					[kW]	[m]	[m]	[RPM]
96	282,065	4,442,739	347.1	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
97	276,789	4,442,289	381.2	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
98	276,034	4,442,154	380.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
99	276,489	4,442,477	379.4	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
100	280,316	4,446,937	360.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
101	280,472	4,445,042	351.6	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
105	275,340	4,446,427	400.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
106	275,561	4,446,153	400.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
107	274,088	4,445,876	388.2	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
108	275,300	4,445,175	395.3	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
109	275,088	4,444,675	390.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
110	272,661	4,447,412	358.7	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
112	275,073	4,442,766	370.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
113	275,193	4,442,396	367.4	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
114	279,563	4,439,098	342.9	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
115	276,812	4,445,897	387.5	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
116	276,801	4,446,428	390.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
117	277,119	4,447,042	390.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
118	275,271	4,441,707	366.2	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
119	275,266	4,442,026	367.1	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
122	268,302	4,438,216	348.7	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
123	268,534	4,437,137	342.9	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
125	267,824	4,438,274	350.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
126	280,855	4,447,117	350.4	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
127	280,863	4,445,374	350.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
128	282,108	4,440,994	335.2	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
129	280,479	4,446,456	360.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
130	282,325	4,442,257	340.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
131	277,665	4,441,538	390.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
132	278,636	4,438,180	350.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
133	272,570	4,446,003	355.5	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0

Shadow receptor-Input

No.	UTM NAD83 Zone: 17 East	North	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
			[m]	[m]	[m]	[m]	[°]	[°]	
13	278,006	4,438,802	364.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
14	277,992	4,438,751	361.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
16	279,523	4,438,426	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
18	279,769	4,438,510	341.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
19	279,934	4,438,626	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
20	280,046	4,438,714	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
22	280,517	4,439,354	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
23	280,354	4,439,346	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
24	280,490	4,439,321	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
28	280,344	4,439,262	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
30	280,359	4,439,214	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
40	280,243	4,439,304	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
41	280,212	4,439,268	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
42	280,192	4,439,229	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"

To be continued on next page...

Project:
11052 Buckeye Wind I and II SFA_4_1100m_cumulative

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative

...continued from previous page

UTM NAD83 Zone: 17

No.	East	North	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode
49	280,269	4,439,243	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
57	279,234	4,439,617	351.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
58	279,135	4,439,596	357.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
61	279,771	4,439,603	346.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
63	280,593	4,439,405	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
66	279,004	4,439,444	356.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
67	278,949	4,439,490	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
68	278,856	4,439,482	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
69	278,806	4,439,592	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
70	278,003	4,439,028	372.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
85	278,094	4,439,063	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
237	279,807	4,439,728	347.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
241	280,706	4,440,827	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
244	280,680	4,440,718	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
245	280,455	4,441,143	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
246	279,076	4,441,058	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
248	278,713	4,440,951	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
249	279,385	4,441,169	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
250	278,771	4,440,951	382.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
252	278,606	4,440,944	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
256	278,392	4,440,907	382.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
257	278,132	4,440,817	389.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
261	277,345	4,440,549	395.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
262	277,339	4,440,756	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
269	275,082	4,440,880	362.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
270	274,804	4,440,996	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
271	274,762	4,440,992	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
272	274,714	4,440,995	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
273	274,668	4,441,010	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
274	274,740	4,441,082	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
275	274,605	4,441,092	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
276	274,596	4,440,973	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
333	274,692	4,441,496	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
334	274,543	4,441,621	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
335	274,646	4,441,944	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
350	279,234	4,441,728	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
356	280,300	4,441,348	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
357	280,330	4,441,320	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
358	280,350	4,441,284	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
408	274,670	4,442,135	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
410	274,603	4,442,172	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
411	274,606	4,442,229	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
417	274,423	4,442,352	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
421	274,493	4,442,342	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
478	276,374	4,443,191	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
479	276,426	4,443,229	370.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
480	276,065	4,443,432	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
484	275,854	4,443,233	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
530	275,708	4,444,114	376.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
532	275,639	4,443,932	373.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
533	275,734	4,444,017	374.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"

To be continued on next page...

Project:
11052 Buckeye Wind I and II SFA_4_1100m_cumulative

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative

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UTM NAD83 Zone: 17

No.	East	North	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode
534	275,448	4,443,868	376.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
541	274,515	4,443,934	388.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
543	274,515	4,443,902	386.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
557	272,398	4,444,951	359.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
559	272,241	4,445,045	355.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
560	272,363	4,445,106	358.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
561	272,286	4,445,104	356.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
562	272,210	4,445,100	354.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
563	272,116	4,445,145	351.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
564	272,285	4,444,971	357.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
565	272,382	4,445,015	359.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
566	272,481	4,444,992	364.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
567	272,576	4,445,018	364.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
568	272,449	4,445,172	366.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
569	272,366	4,445,172	359.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
570	272,568	4,445,100	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
573	274,681	4,444,963	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
575	274,731	4,444,518	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
579	275,489	4,444,690	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
581	275,654	4,445,023	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
591	276,940	4,444,810	376.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
597	277,149	4,445,063	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
598	277,145	4,445,008	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
603	277,023	4,445,061	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
626	280,782	4,445,693	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
627	280,841	4,445,731	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
629	280,085	4,445,496	363.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
630	280,004	4,445,643	366.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
639	279,464	4,445,838	374.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
641	279,675	4,445,649	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
646	277,251	4,445,166	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
647	277,210	4,445,252	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
652	276,853	4,445,391	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
655	276,833	4,445,125	380.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
656	275,931	4,445,875	392.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
658	275,621	4,445,255	391.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
662	274,637	4,445,617	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
672	273,339	4,445,785	379.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
677	272,578	4,445,436	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
680	272,232	4,445,397	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
681	272,160	4,445,330	353.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
682	272,155	4,445,378	354.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
683	272,301	4,445,394	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
684	272,266	4,445,195	356.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
685	272,187	4,445,204	353.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
686	272,361	4,445,401	365.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
687	272,526	4,445,451	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
688	272,241	4,445,271	355.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
693	272,318	4,445,288	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
694	272,117	4,445,426	350.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
714	273,675	4,445,958	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"

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Project:
11052 Buckeye Wind I and II SFA_4_1100m_cumulative

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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Main Result

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative

...continued from previous page

UTM NAD83 Zone: 17

No.	East	North	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode
732	277,485	4,446,339	382.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
733	277,193	4,446,189	385.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
734	277,172	4,446,206	385.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
736	277,422	4,446,104	381.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
739	277,597	4,446,632	382.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
741	278,455	4,446,519	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
742	278,554	4,446,158	379.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
743	278,559	4,446,129	379.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
746	279,804	4,446,667	364.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
747	279,797	4,446,294	367.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
748	279,791	4,446,405	366.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
749	279,791	4,446,371	367.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
750	279,800	4,446,215	367.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
752	279,874	4,446,107	369.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
754	279,834	4,446,023	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
755	279,818	4,445,954	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
763	273,012	4,447,192	368.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
767	273,048	4,446,838	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
797	277,513	4,446,761	383.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
799	277,669	4,447,012	389.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
803	278,426	4,447,194	382.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
804	278,434	4,447,362	381.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
805	278,184	4,447,352	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
806	278,361	4,446,989	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
807	278,374	4,446,889	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
811	279,810	4,447,006	362.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
812	279,892	4,447,076	361.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
816	278,370	4,447,478	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
829	277,107	4,448,098	392.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
830	277,078	4,448,080	392.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
835	276,856	4,448,052	396.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
836	276,717	4,448,099	399.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
837	276,658	4,448,089	400.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
838	276,423	4,448,046	401.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
839	276,350	4,448,040	403.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
841	276,098	4,447,997	407.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
842	276,191	4,447,990	408.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
844	276,268	4,447,675	402.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
845	276,285	4,447,646	402.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
846	276,311	4,447,648	402.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
847	276,341	4,447,670	401.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
848	275,810	4,447,856	401.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
852	275,582	4,447,820	400.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
854	275,679	4,447,899	400.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
855	275,710	4,447,922	400.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
856	275,690	4,447,938	400.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
857	275,578	4,447,763	400.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
858	275,567	4,447,747	400.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
859	275,362	4,447,777	400.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
926	277,310	4,448,236	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
932	277,303	4,448,189	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"

To be continued on next page...

Project:
11052 Buckeye Wind I and II SFA_4_1100m_cumulative

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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Main Result

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative

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UTM NAD83 Zone: 17

No.	East	North	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode
3067	279,409	4,438,231	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3068	279,531	4,438,304	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3069	279,564	4,438,340	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3071	279,600	4,438,375	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3072	279,671	4,438,425	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3073	279,719	4,438,473	341.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3090	279,794	4,438,644	341.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3091	278,099	4,438,866	367.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3106	280,417	4,439,353	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3107	280,410	4,439,268	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3108	280,457	4,439,294	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3109	280,555	4,439,246	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3115	280,508	4,439,236	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3182	278,455	4,440,126	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3185	278,696	4,439,632	364.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3186	278,906	4,439,954	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3202	277,318	4,440,654	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3208	278,586	4,441,011	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3209	278,482	4,440,939	380.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3210	278,794	4,440,960	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3212	280,379	4,441,239	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3213	279,518	4,441,244	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3214	279,153	4,441,115	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3219	274,723	4,441,301	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3220	274,747	4,441,395	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3221	274,632	4,441,312	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3222	274,623	4,441,278	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3223	274,726	4,441,259	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3224	274,710	4,441,211	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3225	274,619	4,441,223	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3226	274,612	4,441,176	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3227	274,706	4,441,164	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3228	274,569	4,441,136	366.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3269	277,149	4,443,000	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3270	277,142	4,442,913	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3292	277,215	4,443,322	373.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3301	277,215	4,443,241	375.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3304	277,116	4,443,149	377.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3305	277,133	4,443,172	377.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3330	275,588	4,444,127	377.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3345	278,517	4,445,089	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3346	278,706	4,444,957	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3352	278,383	4,445,037	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3364	277,006	4,445,017	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3368	272,376	4,444,963	358.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3369	272,317	4,445,030	357.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3370	272,211	4,445,339	356.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3371	272,197	4,445,157	353.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3372	272,290	4,445,158	356.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3373	272,456	4,445,220	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3380	275,601	4,445,395	394.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"

To be continued on next page...

Project:
11052 Buckeye Wind I and II SFA_4_1100m_cumulative

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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Main Result

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative

...continued from previous page

UTM NAD83 Zone: 17

No.	East	North	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode
3384	278,275	4,445,152	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3385	278,295	4,445,169	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3386	278,342	4,445,144	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3387	278,387	4,445,179	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3388	278,438	4,445,213	370.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3389	278,418	4,445,328	371.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3390	278,525	4,445,162	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3391	278,888	4,445,460	372.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3396	279,740	4,445,639	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3397	279,872	4,445,593	369.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3398	279,864	4,445,621	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3402	271,885	4,445,794	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3417	272,870	4,446,213	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3425	279,751	4,446,137	369.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3426	279,786	4,446,250	368.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3427	279,796	4,446,577	365.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3428	279,786	4,446,490	366.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3429	280,369	4,446,608	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3430	279,793	4,446,714	363.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3431	279,798	4,446,799	361.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3432	279,798	4,446,854	361.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3434	279,399	4,446,849	376.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3436	279,534	4,447,087	372.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3439	278,973	4,446,935	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3441	278,344	4,446,973	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3452	271,665	4,447,583	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3461	275,528	4,447,690	400.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3463	276,000	4,447,952	403.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3464	276,044	4,447,977	405.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3465	277,192	4,448,105	390.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3466	277,761	4,447,949	391.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3482	279,694	4,447,785	368.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3483	279,751	4,447,677	368.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3484	279,815	4,447,584	367.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3517	277,233	4,448,498	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3519	277,261	4,448,586	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3520	276,852	4,448,247	396.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3521	276,898	4,448,162	396.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3524	275,719	4,448,136	400.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3525	276,516	4,448,292	407.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
4535	275,486	4,437,685	348.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
4544	275,166	4,437,913	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
4545	275,177	4,437,930	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
4546	275,313	4,437,950	375.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
4555	275,080	4,437,912	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
4686	277,867	4,438,002	352.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
4687	278,143	4,437,925	346.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
4688	278,236	4,437,790	341.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
4689	278,207	4,437,822	343.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
4691	278,213	4,437,700	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
4692	278,227	4,437,741	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"

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Project:
11052 Buckeye Wind I and II SFA_4_1100m_cumulative

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3/1/2012 4:26 PM/2.7.490

SHADOW - Main Result

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative

...continued from previous page

UTM NAD83 Zone: 17

No.	East	North	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode
4693	278,233	4,437,624	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
4695	278,342	4,437,407	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
4716	278,484	4,437,265	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
4717	278,531	4,437,260	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6088	279,373	4,437,668	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6091	279,492	4,437,696	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6099	281,128	4,440,723	349.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6100	281,178	4,440,759	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6101	281,212	4,440,835	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6103	281,265	4,440,832	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6105	280,962	4,440,502	345.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6106	280,995	4,440,466	345.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6107	281,024	4,440,424	344.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6108	281,043	4,440,422	344.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6109	281,060	4,440,388	344.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6110	281,006	4,440,346	343.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6124	281,115	4,440,367	344.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
6129	281,386	4,440,171	345.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
7769	279,887	4,447,850	364.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
7808	280,266	4,440,978	356.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
7816	274,675	4,445,472	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
7825	275,516	4,445,853	400.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8054	278,347	4,437,439	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8056	278,345	4,437,456	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8058	278,317	4,437,411	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8086	279,068	4,438,121	346.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8087	279,077	4,438,104	345.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8088	279,094	4,438,095	345.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8089	279,119	4,438,031	346.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8090	279,156	4,437,929	344.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8158	278,466	4,440,140	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8168	278,109	4,440,930	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8169	278,109	4,440,919	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8170	277,345	4,440,564	394.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8214	274,730	4,441,101	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8215	274,687	4,441,497	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8216	274,675	4,441,503	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8217	274,786	4,441,526	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8224	274,559	4,441,798	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8225	274,544	4,441,811	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8226	274,502	4,441,762	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8227	274,556	4,441,713	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8228	274,548	4,441,670	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8229	274,536	4,441,656	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8244	279,164	4,441,155	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8245	278,925	4,441,009	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8247	278,960	4,440,995	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8248	279,373	4,441,163	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8323	280,883	4,445,972	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8324	281,010	4,445,919	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8325	281,022	4,445,907	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"

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Project:
11052 Buckeye Wind I and II SFA_4_1100m_cumulative

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative

...continued from previous page

UTM NAD83 Zone: 17

No.	East	North	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode
8326	280,944	4,445,846	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8334	280,260	4,445,537	359.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8335	279,905	4,445,455	368.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8342	279,790	4,446,440	366.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8343	279,807	4,447,339	365.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8345	279,810	4,447,496	367.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8348	279,688	4,445,878	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8351	274,616	4,445,718	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8352	274,625	4,445,716	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8353	274,644	4,445,726	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8354	274,638	4,445,718	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8355	274,600	4,445,730	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8356	274,605	4,445,721	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8370	278,347	4,446,989	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8371	278,433	4,447,260	387.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8373	278,432	4,447,401	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8377	278,169	4,447,369	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8378	277,909	4,447,326	385.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8383	277,728	4,447,169	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8384	277,646	4,447,190	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8414	272,179	4,445,293	353.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9420	275,070	4,440,877	361.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9443	274,593	4,442,079	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9501	278,680	4,437,611	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9502	278,757	4,437,585	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9509	276,699	4,437,674	345.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9510	276,708	4,437,643	344.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9511	276,674	4,437,614	343.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9513	275,873	4,437,637	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9514	275,888	4,437,633	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9540	274,937	4,437,751	379.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9541	274,933	4,437,770	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9543	275,026	4,437,745	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9544	275,005	4,437,807	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9548	275,061	4,437,836	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9549	275,109	4,437,828	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9550	275,100	4,437,838	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9551	275,165	4,437,842	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9552	275,197	4,437,839	379.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9553	275,238	4,437,830	376.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9557	275,309	4,437,826	370.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9558	275,351	4,437,825	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9559	275,418	4,437,798	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9560	275,356	4,437,761	362.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9569	275,614	4,437,790	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9570	275,930	4,437,803	346.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9571	276,145	4,437,865	356.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9572	276,082	4,437,854	349.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9576	276,618	4,438,088	365.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9577	276,761	4,437,846	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9585	279,130	4,437,809	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"

To be continued on next page...

Project:
11052 Buckeye Wind I and II SFA_4_1100m_cumulative

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative

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UTM NAD83 Zone: 17

No.	East	North	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode
9586	279,126	4,437,847	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9587	279,198	4,437,764	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9588	279,190	4,437,691	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9589	278,987	4,437,628	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9605	277,950	4,438,487	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9606	278,131	4,438,426	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9607	278,120	4,438,335	356.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9608	278,151	4,438,255	350.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9609	278,245	4,438,477	353.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9616	280,267	4,439,734	342.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9617	280,366	4,439,508	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9618	280,333	4,439,533	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9619	280,171	4,439,589	340.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9625	279,402	4,439,603	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9626	279,501	4,439,616	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9627	279,501	4,439,405	349.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9628	279,507	4,439,479	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9633	278,739	4,439,597	361.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9671	278,655	4,439,725	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9672	278,704	4,439,755	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9673	278,734	4,439,743	369.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9674	278,777	4,439,789	367.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9679	279,296	4,439,758	352.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9688	278,625	4,440,178	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9709	277,502	4,440,875	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9710	277,690	4,441,067	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9712	277,849	4,440,827	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9713	277,711	4,440,836	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9714	277,862	4,440,818	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9724	280,134	4,441,600	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9725	280,162	4,441,661	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9726	280,205	4,441,704	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9727	280,249	4,441,701	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9728	280,310	4,441,746	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9729	280,360	4,441,765	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9730	280,502	4,441,678	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9731	280,434	4,441,717	359.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9747	280,148	4,441,783	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9748	280,155	4,441,838	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9759	277,411	4,441,311	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9816	276,671	4,448,102	400.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9818	275,529	4,447,707	400.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9997	271,566	4,446,275	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9998	271,690	4,446,353	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
9999	271,764	4,446,207	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10005	271,919	4,446,088	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10008	271,863	4,446,312	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10013	271,785	4,446,689	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10014	271,795	4,446,625	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10015	271,783	4,446,579	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10016	271,802	4,446,519	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"

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Project:
11052 Buckeye Wind I and II SFA_4_1100m_cumulative

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative

...continued from previous page

No.	East	North	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
	UTM NAD83 Zone: 17								
			[m]	[m]	[m]	[m]	[°]	[°]	
10017	272,404	4,445,340	363.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10018	272,398	4,445,235	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10021	272,468	4,445,350	364.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10026	272,664	4,445,581	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10027	272,901	4,445,646	370.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10028	272,974	4,445,517	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10029	273,021	4,445,580	379.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10035	273,007	4,445,636	375.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10036	273,048	4,445,660	379.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10037	273,102	4,445,673	379.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10041	273,389	4,445,832	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10042	273,522	4,445,827	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10043	273,632	4,445,876	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10055	274,845	4,445,400	394.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10056	274,798	4,445,323	392.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10062	274,649	4,445,225	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10064	274,353	4,443,533	383.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10097	275,748	4,443,989	373.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10104	276,826	4,442,907	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10110	276,897	4,442,793	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10133	277,163	4,444,881	376.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10134	277,282	4,444,931	376.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10135	277,177	4,445,142	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10152	279,655	4,445,581	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10153	279,465	4,445,539	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10159	279,242	4,445,581	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10163	279,854	4,445,358	367.5	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10164	279,907	4,445,069	363.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10168	281,070	4,445,633	348.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10176	281,210	4,446,015	350.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10191	279,781	4,446,090	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10202	279,796	4,447,003	362.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10203	279,521	4,447,093	373.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10206	277,674	4,446,991	388.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10280	274,629	4,445,707	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10281	275,034	4,440,934	361.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"

Calculation Results

Shadow receptor

No.	Shadow, worst case: Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow, expected values: Shadow hours per year [h/year]
13	17:17	63	0:25	6:08
14	32:46	106	0:26	10:37
16	62:24	112	0:47	22:48
18	48:03	126	0:32	17:30
19	21:15	66	0:26	7:33
20	8:36	29	0:23	3:00
22	10:09	32	0:25	3:22

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Project:
11052 Buckeye Wind I and II SFA_4_1100m_cumulative

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative

...continued from previous page

No.	Shadow, worst case: Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow, expected values: Shadow hours per year [h/year]
23	14:51	40	0:29	4:57
24	10:42	33	0:25	3:34
28	15:07	39	0:30	5:03
30	14:33	38	0:30	4:58
40	19:42	45	0:34	6:35
41	21:22	46	0:36	7:09
42	22:41	47	0:37	7:40
49	18:08	42	0:33	6:06
57	0:00	0	0:00	0:00
58	0:00	0	0:00	0:00
61	0:00	0	0:00	0:00
63	8:33	31	0:23	2:50
66	33:39	71	0:38	7:51
67	29:35	74	0:35	6:46
68	18:35	52	0:31	4:35
69	20:13	71	0:27	4:37
70	8:32	31	0:24	2:50
85	19:23	69	0:27	5:53
237	0:00	0	0:00	0:00
241	20:36	65	0:25	7:09
244	25:18	85	0:26	8:45
245	67:13	157	0:34	25:08
246	65:36	173	0:34	20:39
248	20:01	52	0:28	6:09
249	81:06	112	0:53	20:05
250	34:59	115	0:27	10:49
252	7:34	28	0:20	2:29
256	0:00	0	0:00	0:00
257	0:00	0	0:00	0:00
261	19:12	44	0:34	6:13
262	19:43	49	0:31	5:12
269	38:13	104	0:28	11:30
270	56:41	133	0:35	18:18
271	58:06	132	0:37	18:08
272	64:40	153	0:39	19:24
273	70:06	134	0:42	21:11
274	71:41	165	0:36	23:40
275	11:58	34	0:27	3:52
276	66:05	96	0:48	18:27
333	67:49	124	0:42	26:14
334	49:28	105	0:40	16:45
335	56:59	130	0:39	19:44
350	17:46	61	0:24	6:10
356	38:34	92	0:34	12:41
357	51:44	114	0:35	16:13
358	57:57	132	0:35	17:38
408	66:09	161	0:39	18:53
410	93:59	197	0:41	31:13
411	108:57	223	0:41	36:53
417	52:37	144	0:31	16:13
421	56:52	143	0:34	18:04

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11052 Buckeye Wind I and II SFA_4_1100m_cumulative

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative

...continued from previous page

	Shadow, worst case			Shadow, expected values
No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
478	0:00	0	0:00	0:00
479	0:00	0	0:00	0:00
480	0:00	0	0:00	0:00
484	34:32	86	0:30	9:24
530	13:11	38	0:27	4:02
532	11:15	34	0:26	3:43
533	13:49	37	0:29	4:21
534	7:02	27	0:21	2:24
541	0:00	0	0:00	0:00
543	0:00	0	0:00	0:00
557	19:37	63	0:26	7:05
559	19:57	60	0:27	6:51
560	18:32	57	0:25	6:13
561	19:07	59	0:26	6:24
562	28:03	93	0:28	9:36
563	26:03	73	0:31	8:59
564	19:46	58	0:28	7:03
565	27:16	89	0:26	9:15
566	19:58	62	0:29	7:08
567	29:42	77	0:32	9:56
568	28:18	85	0:37	8:26
569	18:22	56	0:27	6:00
570	28:52	78	0:31	8:48
573	175:50	292	0:55	56:41
575	80:40	136	0:58	30:47
579	58:06	86	0:58	21:08
581	138:16	226	1:02	47:21
591	38:28	93	0:32	14:15
597	24:12	75	0:25	8:46
598	27:31	87	0:26	10:02
603	38:08	104	0:29	13:55
626	0:00	0	0:00	0:00
627	23:13	49	0:35	8:36
629	41:32	117	0:31	11:55
630	15:50	59	0:27	5:04
639	66:00	138	0:40	24:31
641	52:36	122	0:46	17:31
646	17:32	61	0:23	6:09
647	18:36	62	0:24	6:29
652	79:34	174	0:36	28:34
655	23:55	48	0:38	8:30
656	54:33	136	0:42	17:38
658	134:33	157	1:40	47:36
662	183:26	233	1:37	63:47
672	44:55	97	0:53	15:43
677	20:52	58	0:29	4:40
680	22:07	81	0:25	6:07
681	25:44	79	0:28	7:22
682	29:44	91	0:28	8:19
683	20:45	75	0:24	5:45
684	19:20	62	0:26	6:20

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Project:
11052 Buckeye Wind I and II SFA_4_1100m_cumulative

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative

...continued from previous page

	Shadow, worst case			Shadow, expected values
No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
685	21:48	68	0:28	7:25
686	19:20	65	0:29	5:18
687	17:26	51	0:26	3:56
688	26:59	95	0:26	8:39
693	18:56	64	0:24	5:55
694	38:29	100	0:29	11:30
714	49:51	70	0:55	16:49
732	141:12	244	1:02	42:42
733	101:11	173	0:52	29:45
734	94:31	161	0:53	28:02
736	103:39	178	1:05	36:59
739	122:50	178	1:02	47:27
741	183:25	206	1:24	63:59
742	173:21	216	1:09	53:06
743	168:56	213	1:22	52:42
746	35:24	98	0:34	11:57
747	94:25	201	0:51	31:27
748	93:52	207	0:37	28:30
749	93:05	221	0:40	28:15
750	108:09	162	0:58	39:13
752	54:59	93	1:10	18:26
754	46:16	60	1:09	16:34
755	49:08	74	1:01	18:13
763	16:13	42	0:29	5:09
767	23:55	48	0:38	8:03
797	72:35	138	0:50	24:41
799	182:54	261	1:23	54:27
803	15:23	49	0:29	5:41
804	42:52	78	0:43	16:23
805	17:35	54	0:30	6:28
806	105:12	120	1:28	28:21
807	79:06	76	1:32	25:53
811	91:28	216	0:46	29:27
812	91:42	220	0:52	30:48
816	24:52	50	0:38	9:05
829	0:00	0	0:00	0:00
830	0:00	0	0:00	0:00
835	0:00	0	0:00	0:00
836	0:00	0	0:00	0:00
837	0:00	0	0:00	0:00
838	4:11	19	0:17	1:15
839	27:18	52	0:39	7:32
841	33:14	94	0:32	8:24
842	35:37	80	0:36	8:10
844	79:12	175	0:47	23:20
845	84:51	185	0:48	25:45
846	92:16	186	0:51	28:00
847	97:59	181	0:54	29:02
848	9:28	32	0:25	2:59
852	22:14	56	0:29	6:04
854	13:23	47	0:22	4:55

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Project:
11052 Buckeye Wind I and II SFA_4_1100m_cumulative

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative

...continued from previous page

	Shadow, worst case			Shadow, expected values
No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
855	20:50	63	0:24	7:41
856	22:11	65	0:24	8:11
857	31:45	74	0:30	8:07
858	31:50	82	0:30	7:54
859	12:49	44	0:24	2:55
926	19:52	58	0:24	7:20
932	8:56	36	0:18	3:17
3067	15:25	39	0:31	5:24
3068	11:30	34	0:27	3:56
3069	17:20	59	0:26	6:04
3071	48:49	101	0:40	17:46
3072	45:49	113	0:36	16:36
3073	46:29	112	0:34	16:57
3090	29:44	80	0:31	10:39
3091	21:00	67	0:28	7:16
3106	12:52	36	0:27	4:17
3107	12:50	35	0:28	4:17
3108	11:30	33	0:27	3:49
3109	9:08	30	0:24	3:05
3115	10:13	31	0:25	3:28
3182	6:07	28	0:19	2:16
3185	12:15	50	0:23	2:44
3186	75:25	91	1:04	29:37
3202	17:30	42	0:32	5:27
3208	10:01	38	0:20	3:41
3209	0:00	0	0:00	0:00
3210	36:21	120	0:26	11:12
3212	46:26	112	0:34	14:30
3213	22:42	42	0:41	6:18
3214	68:12	164	0:37	20:56
3219	17:53	43	0:32	6:28
3220	15:52	40	0:31	5:37
3221	23:38	50	0:37	8:32
3222	25:41	54	0:37	9:10
3223	18:41	46	0:32	6:38
3224	21:09	51	0:32	7:34
3225	29:30	61	0:37	10:40
3226	38:17	83	0:37	14:05
3227	25:37	71	0:33	9:18
3228	51:10	87	0:40	18:58
3269	32:14	87	0:29	10:18
3270	50:03	115	0:33	14:43
3292	21:33	70	0:24	6:06
3301	14:06	48	0:24	3:32
3304	15:58	47	0:27	4:10
3305	15:42	46	0:26	4:02
3330	9:31	33	0:24	2:56
3345	12:54	38	0:28	4:41
3346	27:38	59	0:36	10:28
3352	9:20	32	0:24	3:28
3364	47:39	118	0:30	17:32

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Project:
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SHADOW - Main Result

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative

...continued from previous page

	Shadow, worst case			Shadow, expected values
No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
3368	27:31	89	0:25	9:32
3369	19:10	58	0:25	6:39
3370	22:00	74	0:26	6:20
3371	21:11	66	0:28	7:18
3372	19:02	62	0:25	6:17
3373	23:13	73	0:27	6:21
3380	258:24	299	1:33	84:32
3384	6:40	28	0:21	2:17
3385	7:06	29	0:22	2:26
3386	8:01	30	0:23	2:47
3387	8:45	30	0:24	3:00
3388	23:59	78	0:25	8:33
3389	38:12	118	0:27	13:38
3390	25:41	82	0:28	9:11
3391	68:05	131	0:42	18:29
3396	46:19	122	0:27	15:27
3397	40:05	145	0:23	13:32
3398	27:19	107	0:23	9:27
3402	71:48	186	0:35	25:58
3417	130:54	157	1:07	38:48
3425	68:06	122	1:03	24:51
3426	99:41	182	0:52	35:03
3427	47:37	133	0:34	15:02
3428	71:14	178	0:34	22:08
3429	275:32	171	1:56	72:10
3430	71:52	147	0:44	26:38
3431	100:55	195	0:47	36:37
3432	87:44	166	1:05	29:34
3434	50:36	102	0:47	16:44
3436	50:20	110	0:34	15:08
3439	21:00	57	0:35	6:39
3441	102:32	120	1:29	28:04
3452	27:51	76	0:31	9:57
3461	19:16	52	0:29	4:24
3463	15:34	42	0:29	4:31
3464	36:36	102	0:31	9:46
3465	0:00	0	0:00	0:00
3466	6:48	28	0:21	2:31
3482	50:39	132	0:32	16:46
3483	54:37	145	0:35	19:04
3484	63:14	157	0:39	23:03
3517	14:08	42	0:26	5:04
3519	11:41	35	0:26	4:10
3520	0:00	0	0:00	0:00
3521	0:00	0	0:00	0:00
3524	11:29	38	0:24	4:07
3525	0:00	0	0:00	0:00
4535	16:49	76	0:23	3:58
4544	0:00	0	0:00	0:00
4545	0:00	0	0:00	0:00
4546	0:00	0	0:00	0:00

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Project:
11052 Buckeye Wind I and II SFA_4_1100m_cumulative

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative

...continued from previous page

	Shadow, worst case			Shadow, expected values
No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
4555	0:00	0	0:00	0:00
4686	21:15	53	0:32	8:08
4687	29:34	60	0:41	9:09
4688	41:10	70	0:46	12:04
4689	55:23	96	0:47	14:48
4691	41:46	66	0:49	14:08
4692	40:08	66	0:47	13:06
4693	39:46	63	0:49	13:52
4695	37:12	72	0:41	13:30
4716	38:58	92	0:33	14:25
4717	27:38	74	0:30	10:09
6088	0:00	0	0:00	0:00
6091	12:08	40	0:23	4:28
6099	27:41	89	0:26	8:35
6100	27:20	90	0:25	8:33
6101	30:25	107	0:27	9:22
6103	28:05	94	0:29	8:53
6105	20:28	46	0:34	6:51
6106	18:35	43	0:33	6:14
6107	17:08	42	0:32	5:49
6108	16:19	41	0:31	5:33
6109	15:41	39	0:31	5:26
6110	18:23	43	0:33	6:28
6124	13:41	36	0:29	4:46
6129	8:03	29	0:22	2:55
7769	63:05	134	1:04	20:12
7808	87:14	173	0:44	28:35
7816	84:49	154	0:54	26:55
7825	142:23	225	0:58	45:15
8054	32:43	63	0:40	11:41
8056	31:43	60	0:41	11:22
8058	42:01	77	0:43	15:17
8086	59:17	86	0:54	21:35
8087	60:17	89	0:53	21:51
8088	56:16	87	0:52	20:20
8089	74:56	114	0:49	27:48
8090	39:35	67	0:43	14:39
8158	9:17	45	0:19	3:25
8168	0:00	0	0:00	0:00
8169	0:00	0	0:00	0:00
8170	19:04	43	0:34	6:07
8214	60:11	137	0:36	20:08
8215	68:52	126	0:41	26:37
8216	71:34	132	0:41	27:35
8217	67:25	115	0:49	26:18
8224	99:30	214	0:36	34:15
8225	84:31	188	0:36	28:51
8226	99:54	210	0:39	33:50
8227	80:18	176	0:37	26:49
8228	60:55	143	0:38	20:16
8229	57:44	136	0:39	19:07

To be continued on next page...

Project:
11052 Buckeye Wind I and II SFA_4_1100m_cumulative

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative

...continued from previous page

	Shadow, worst case			Shadow, expected values
No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
8244	55:17	142	0:37	17:12
8245	18:52	71	0:26	5:49
8247	21:06	74	0:28	6:32
8248	75:53	117	0:52	18:40
8323	29:44	56	0:41	10:51
8324	20:21	47	0:34	7:21
8325	19:57	46	0:33	7:10
8326	29:55	62	0:37	10:49
8334	38:07	93	0:38	11:25
8335	101:16	121	1:16	27:25
8342	86:34	196	0:36	26:31
8343	106:12	221	0:40	33:59
8345	44:19	98	0:40	16:24
8348	41:39	62	1:04	15:17
8351	184:14	265	1:32	64:24
8352	184:19	262	1:35	64:28
8353	178:22	261	1:37	62:32
8354	182:00	260	1:36	63:42
8355	179:31	268	1:28	62:43
8356	185:11	267	1:30	64:47
8370	109:53	119	1:27	29:56
8371	48:56	79	0:43	19:46
8373	36:24	67	0:43	13:43
8377	23:59	72	0:29	8:34
8378	32:47	103	0:29	11:20
8383	64:55	172	0:38	23:01
8384	80:07	177	0:43	28:24
8414	23:27	72	0:28	7:08
9420	38:54	101	0:28	11:45
9443	40:58	95	0:35	12:29
9501	10:48	33	0:26	3:47
9502	9:10	30	0:24	3:12
9509	6:56	26	0:21	2:21
9510	7:14	28	0:21	2:28
9511	0:00	0	0:00	0:00
9513	0:00	0	0:00	0:00
9514	0:00	0	0:00	0:00
9540	0:00	0	0:00	0:00
9541	0:00	0	0:00	0:00
9543	0:00	0	0:00	0:00
9544	0:00	0	0:00	0:00
9548	0:00	0	0:00	0:00
9549	0:00	0	0:00	0:00
9550	0:00	0	0:00	0:00
9551	0:00	0	0:00	0:00
9552	0:00	0	0:00	0:00
9553	0:00	0	0:00	0:00
9557	0:00	0	0:00	0:00
9558	0:00	0	0:00	0:00
9559	0:00	0	0:00	0:00
9560	0:00	0	0:00	0:00

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Project:
11052 Buckeye Wind I and II SFA_4_1100m_cumulative

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative

...continued from previous page

	Shadow, worst case			Shadow, expected values
No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
9569	0:00	0	0:00	0:00
9570	0:00	0	0:00	0:00
9571	0:00	0	0:00	0:00
9572	0:00	0	0:00	0:00
9576	25:22	74	0:28	9:20
9577	7:27	29	0:22	2:20
9585	0:00	0	0:00	0:00
9586	0:00	0	0:00	0:00
9587	0:00	0	0:00	0:00
9588	0:00	0	0:00	0:00
9589	0:00	0	0:00	0:00
9605	49:05	155	0:33	17:22
9606	34:46	62	0:43	9:59
9607	48:34	108	0:44	16:42
9608	63:47	130	0:48	23:23
9609	91:41	158	0:50	24:46
9616	9:12	33	0:21	3:23
9617	17:12	48	0:28	4:28
9618	20:46	56	0:28	5:15
9619	24:07	54	0:32	7:22
9625	0:00	0	0:00	0:00
9626	0:00	0	0:00	0:00
9627	7:55	30	0:20	2:36
9628	0:00	0	0:00	0:00
9633	13:57	52	0:25	3:09
9671	4:48	33	0:12	1:57
9672	20:58	86	0:21	6:34
9673	14:59	48	0:22	4:09
9674	6:01	35	0:15	2:26
9679	0:00	0	0:00	0:00
9688	57:23	134	0:37	21:12
9709	27:47	58	0:35	7:33
9710	0:00	0	0:00	0:00
9712	0:00	0	0:00	0:00
9713	0:00	0	0:00	0:00
9714	0:00	0	0:00	0:00
9724	7:38	30	0:22	2:29
9725	8:06	30	0:23	2:34
9726	9:03	33	0:24	2:50
9727	10:08	34	0:25	3:10
9728	11:52	36	0:27	3:40
9729	13:58	41	0:28	4:08
9730	20:51	47	0:34	6:26
9731	17:10	44	0:31	5:13
9747	7:49	32	0:22	2:25
9748	7:59	32	0:22	2:23
9759	16:39	44	0:29	6:13
9816	0:00	0	0:00	0:00
9818	20:14	55	0:28	4:33
9997	17:17	63	0:23	6:13
9998	25:44	77	0:26	9:19

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Project:
11052 Buckeye Wind I and II SFA_4_1100m_cumulative

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative

...continued from previous page

	Shadow, worst case			Shadow, expected values
No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
9999	13:44	37	0:29	4:23
10005	21:34	46	0:36	7:22
10008	17:50	44	0:31	5:24
10013	33:01	86	0:35	11:16
10014	47:47	115	0:35	15:25
10015	54:12	135	0:35	17:05
10016	67:17	160	0:36	22:56
10017	18:37	54	0:38	5:39
10018	18:15	54	0:33	5:53
10021	12:38	37	0:26	3:41
10026	6:19	26	0:18	1:52
10027	0:00	0	0:00	0:00
10028	0:00	0	0:00	0:00
10029	0:00	0	0:00	0:00
10035	0:00	0	0:00	0:00
10036	10:38	36	0:23	3:59
10037	32:27	112	0:25	10:29
10041	33:59	53	0:57	12:22
10042	42:07	62	1:04	15:33
10043	54:12	73	1:08	19:57
10055	165:27	215	1:15	59:16
10056	106:09	189	1:09	36:10
10062	89:59	188	0:57	29:20
10064	0:00	0	0:00	0:00
10097	14:19	38	0:29	4:32
10104	30:37	56	0:42	10:17
10110	96:02	143	0:53	28:51
10133	30:36	92	0:25	11:06
10134	8:36	30	0:22	3:04
10135	21:06	66	0:25	7:26
10152	19:09	87	0:25	4:39
10153	4:41	29	0:12	1:55
10159	0:00	0	0:00	0:00
10163	75:07	110	1:18	21:10
10164	76:38	117	1:24	28:04
10168	128:05	159	1:15	38:22
10176	11:27	34	0:26	4:01
10191	47:38	86	1:06	16:40
10202	88:04	208	0:45	28:00
10203	46:55	104	0:35	14:15
10206	194:53	265	1:22	57:45
10280	191:26	260	1:35	67:03
10281	25:38	76	0:27	8:21

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
1	NORDEX N100 2500 99.8 !O! hub: 100.0 m (114)	0:00	0:00
2	NORDEX N100 2500 99.8 !O! hub: 100.0 m (115)	0:00	0:00
3	NORDEX N100 2500 99.8 !O! hub: 100.0 m (116)	0:00	0:00

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Project:
11052 Buckeye Wind I and II SFA_4_1100m_cumulative

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative

...continued from previous page

No.	Name	Worst case [h/year]	Expected [h/year]
4	NORDEX N100 2500 99.8 !O! hub: 100.0 m (117)	0:00	0:00
5	NORDEX N100 2500 99.8 !O! hub: 100.0 m (118)	0:00	0:00
6	NORDEX N100 2500 99.8 !O! hub: 100.0 m (119)	0:00	0:00
7	NORDEX N100 2500 99.8 !O! hub: 100.0 m (120)	47:14	17:09
8	NORDEX N100 2500 99.8 !O! hub: 100.0 m (121)	35:32	12:59
9	NORDEX N100 2500 99.8 !O! hub: 100.0 m (122)	0:00	0:00
10	NORDEX N100 2500 99.8 !O! hub: 100.0 m (123)	11:46	4:37
11	NORDEX N100 2500 99.8 !O! hub: 100.0 m (124)	68:53	25:12
12	NORDEX N100 2500 99.8 !O! hub: 100.0 m (125)	0:00	0:00
13	NORDEX N100 2500 99.8 !O! hub: 100.0 m (126)	18:36	6:55
14	NORDEX N100 2500 99.8 !O! hub: 100.0 m (127)	0:00	0:00
15	NORDEX N100 2500 99.8 !O! hub: 100.0 m (128)	159:54	56:53
16	NORDEX N100 2500 99.8 !O! hub: 100.0 m (129)	242:30	89:26
17	NORDEX N100 2500 99.8 !O! hub: 100.0 m (130)	149:14	55:44
18	NORDEX N100 2500 99.8 !O! hub: 100.0 m (131)	352:48	120:00
20	NORDEX N100 2500 99.8 !O! hub: 100.0 m (132)	179:10	58:57
21	NORDEX N100 2500 99.8 !O! hub: 100.0 m (133)	294:17	99:43
22	NORDEX N100 2500 99.8 !O! hub: 100.0 m (134)	356:18	117:50
23	NORDEX N100 2500 99.8 !O! hub: 100.0 m (135)	150:19	43:03
25	NORDEX N100 2500 99.8 !O! hub: 100.0 m (136)	91:38	33:39
27	NORDEX N100 2500 99.8 !O! hub: 100.0 m (137)	8:22	2:46
28	NORDEX N100 2500 99.8 !O! hub: 100.0 m (138)	190:07	66:39
31	NORDEX N100 2500 99.8 !O! hub: 100.0 m (139)	60:59	20:20
32	NORDEX N100 2500 99.8 !O! hub: 100.0 m (140)	140:51	43:48
33	NORDEX N100 2500 99.8 !O! hub: 100.0 m (141)	210:05	72:34
35	NORDEX N100 2500 99.8 !O! hub: 100.0 m (142)	0:00	0:00
36	NORDEX N100 2500 99.8 !O! hub: 100.0 m (143)	113:36	34:45
37	NORDEX N100 2500 99.8 !O! hub: 100.0 m (144)	108:48	33:24
39	NORDEX N100 2500 99.8 !O! hub: 100.0 m (145)	88:01	28:35
40	NORDEX N100 2500 99.8 !O! hub: 100.0 m (146)	0:00	0:00
41	NORDEX N100 2500 99.8 !O! hub: 100.0 m (147)	42:37	12:05
42	NORDEX N100 2500 99.8 !O! hub: 100.0 m (148)	0:00	0:00
43	NORDEX N100 2500 99.8 !O! hub: 100.0 m (149)	0:00	0:00
44	NORDEX N100 2500 99.8 !O! hub: 100.0 m (150)	33:18	10:41
45	NORDEX N100 2500 99.8 !O! hub: 100.0 m (151)	0:00	0:00
47	NORDEX N100 2500 99.8 !O! hub: 100.0 m (152)	47:09	15:08
49	NORDEX N100 2500 99.8 !O! hub: 100.0 m (153)	268:58	89:53
51	NORDEX N100 2500 99.8 !O! hub: 100.0 m (154)	324:36	95:04
52	NORDEX N100 2500 99.8 !O! hub: 100.0 m (155)	132:05	38:00
53	NORDEX N100 2500 99.8 !O! hub: 100.0 m (156)	129:56	37:00
54	NORDEX N100 2500 99.8 !O! hub: 100.0 m (157)	192:18	62:29
55	NORDEX N100 2500 99.8 !O! hub: 100.0 m (158)	35:47	10:33
56	NORDEX N100 2500 99.8 !O! hub: 100.0 m (159)	97:10	31:02
59	NORDEX N100 2500 99.8 !O! hub: 100.0 m (160)	0:00	0:00
64	NORDEX N100 2500 99.8 !O! hub: 100.0 m (161)	126:55	46:29
65	NORDEX N100 2500 99.8 !O! hub: 100.0 m (162)	213:02	78:06
67	NORDEX N100 2500 99.8 !O! hub: 100.0 m (163)	305:39	101:11
69	NORDEX N100 2500 99.8 !O! hub: 100.0 m (164)	16:47	3:58
70	NORDEX N100 2500 99.8 !O! hub: 100.0 m (165)	0:00	0:00
71	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (58)	245:08	74:29
72	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (59)	460:59	149:37
73	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (60)	195:07	60:19
74	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (61)	137:57	43:17

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Project:
11052 Buckeye Wind I and II SFA_4_1100m_cumulative

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative

...continued from previous page

No.	Name	Worst case [h/year]	Expected [h/year]
75	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (62)	60:42	15:07
76	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (63)	0:00	0:00
77	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (64)	34:53	12:30
78	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (65)	80:31	31:13
79	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (66)	0:00	0:00
80	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (67)	8:25	3:02
81	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (68)	45:25	16:31
82	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (69)	193:43	71:51
83	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (70)	361:02	129:35
84	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (71)	117:51	36:58
85	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (72)	0:00	0:00
86	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (73)	0:00	0:00
87	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (74)	14:29	5:56
88	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (75)	0:00	0:00
89	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (76)	25:22	9:20
90	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (77)	76:44	28:02
91	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (78)	0:00	0:00
92	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (79)	0:00	0:00
93	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (80)	0:00	0:00
94	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (81)	126:41	46:19
95	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (82)	0:00	0:00
96	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (83)	0:00	0:00
97	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (84)	0:00	0:00
98	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (85)	13:14	4:12
99	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (86)	86:00	24:08
100	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (87)	265:01	91:50
101	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (88)	110:02	32:06
105	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (89)	0:00	0:00
106	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (90)	24:42	9:51
107	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (91)	232:50	85:47
108	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (92)	454:07	147:01
109	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (93)	191:59	60:05
110	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (94)	9:15	3:03
112	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (95)	23:41	6:08
113	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (96)	100:15	39:25
114	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (97)	156:04	44:44
115	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (98)	149:42	44:02
116	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (99)	107:57	34:51
117	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (100)	122:18	40:02
118	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (101)	215:09	71:30
119	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (102)	166:28	61:01
122	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (103)	0:00	0:00
123	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (104)	0:00	0:00
125	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (105)	0:00	0:00
126	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (109)	30:45	11:08
127	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (106)	165:56	50:31
128	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (107)	24:58	9:30
129	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (108)	514:26	153:21
130	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (110)	0:00	0:00
131	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (111)	10:01	3:41
132	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (112)	399:36	132:11
133	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (113)	299:33	93:30

Project:
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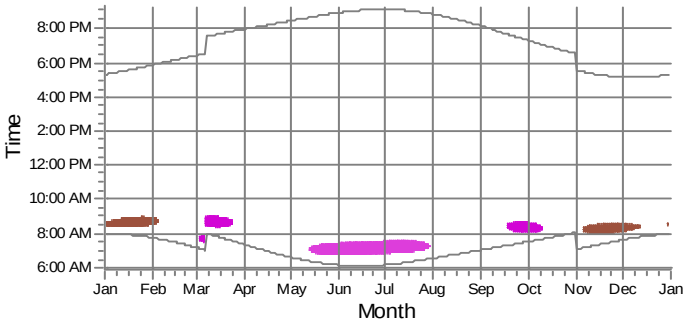
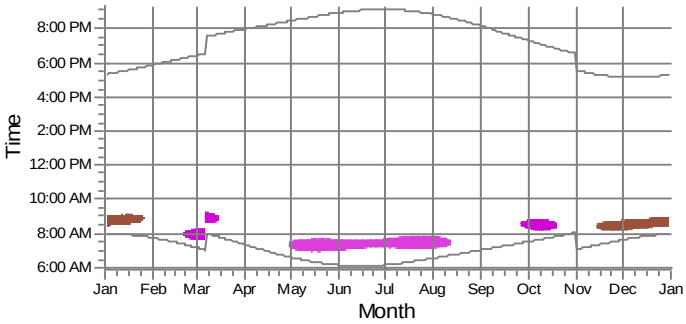
SHADOW - Calendar, graphical

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative

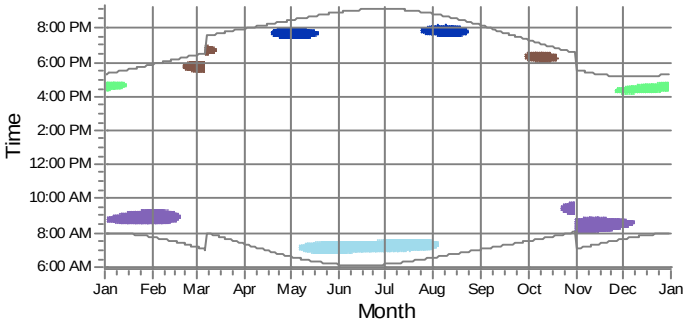
410: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6360)



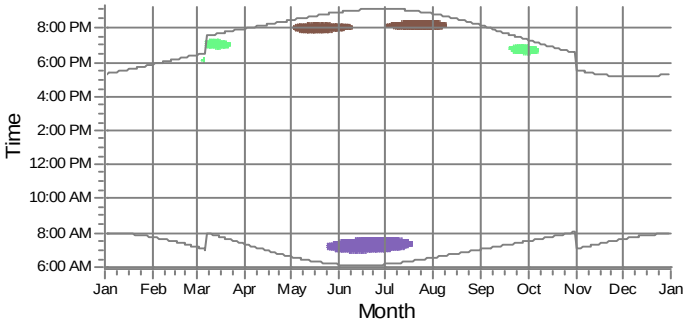
411: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6361)



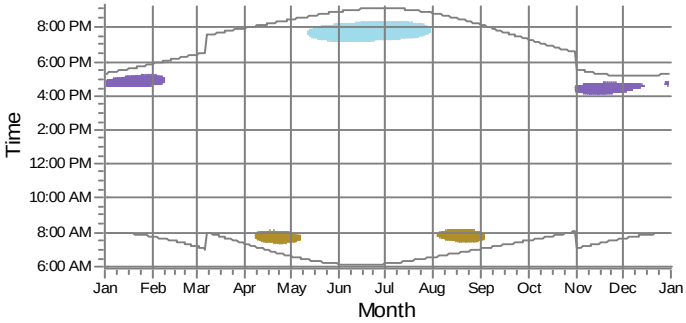
573: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6387)



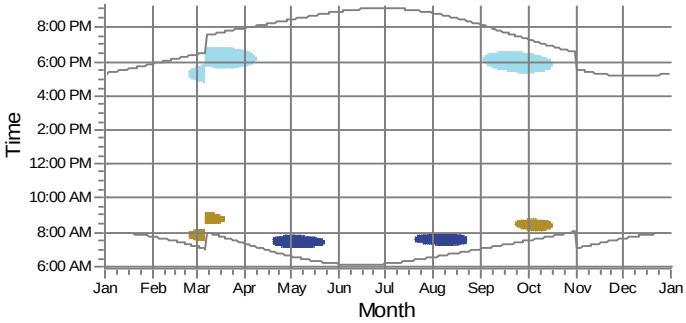
575: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6388)



581: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6390)



658: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6406)



WTGs

108: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (92)
109: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (93)
113: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (96)
118: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (101)
119: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (102)
28: NORDEX N100 2500 99.8 IOI hub: 100.0 m (138)
32: NORDEX N100 2500 99.8 IOI hub: 100.0 m (140)
33: NORDEX N100 2500 99.8 IOI hub: 100.0 m (141)
39: NORDEX N100 2500 99.8 IOI hub: 100.0 m (145)
44: NORDEX N100 2500 99.8 IOI hub: 100.0 m (150)

Project:

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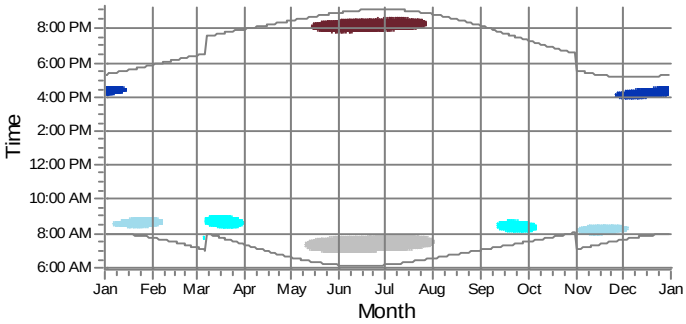
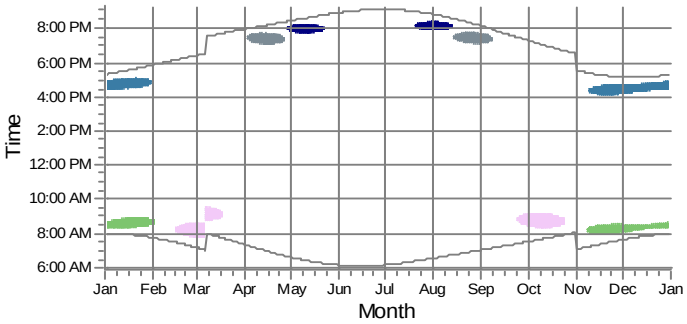
SHADOW - Calendar, graphical

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative

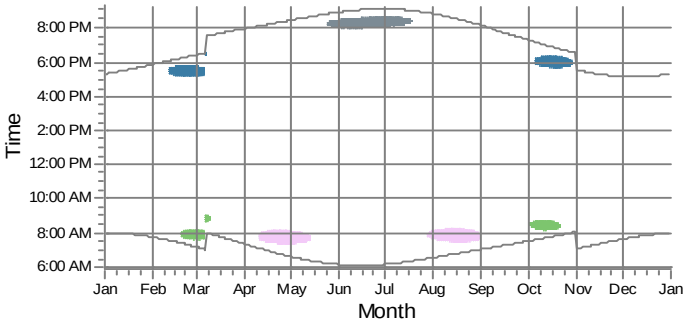
662: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6407)



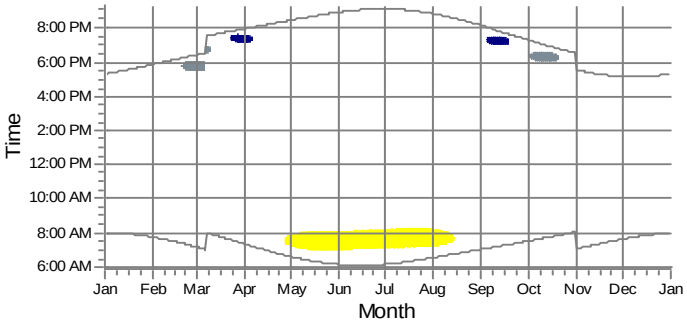
732: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6422)



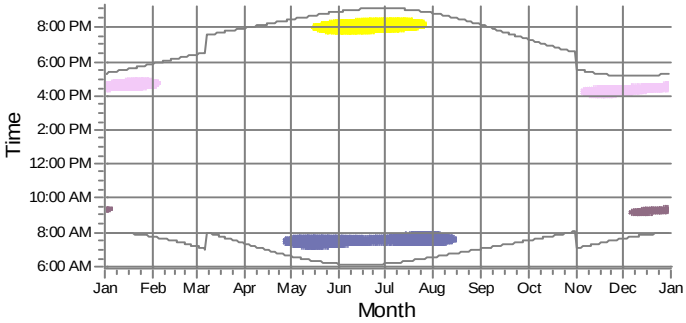
736: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6425)



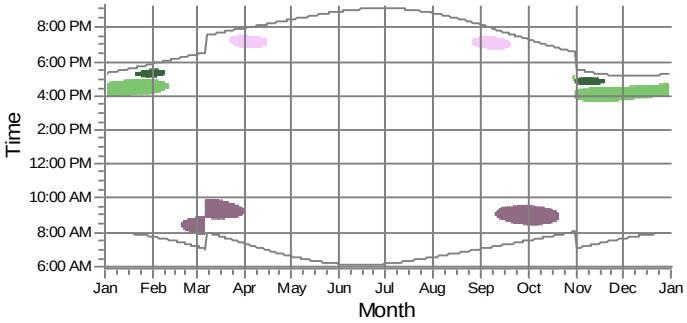
739: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6426)



741: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6427)



742: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6428)



WTGs

72: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (59)
77: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (64)
82: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (69)
83: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (70)
107: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (91)
108: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (92)
115: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (98)
116: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (99)
18: NORDEX N100 2500 99.8 IOI hub: 100.0 m (131)
20: NORDEX N100 2500 99.8 IOI hub: 100.0 m (132)
21: NORDEX N100 2500 99.8 IOI hub: 100.0 m (133)
23: NORDEX N100 2500 99.8 IOI hub: 100.0 m (135)
25: NORDEX N100 2500 99.8 IOI hub: 100.0 m (136)
32: NORDEX N100 2500 99.8 IOI hub: 100.0 m (140)

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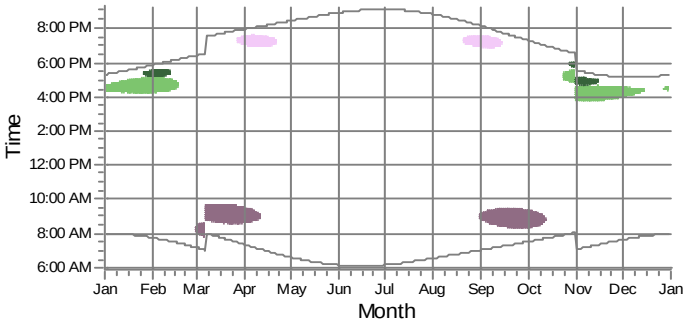
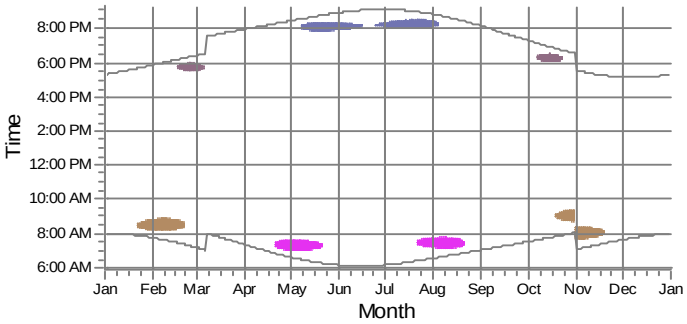
SHADOW - Calendar, graphical

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative

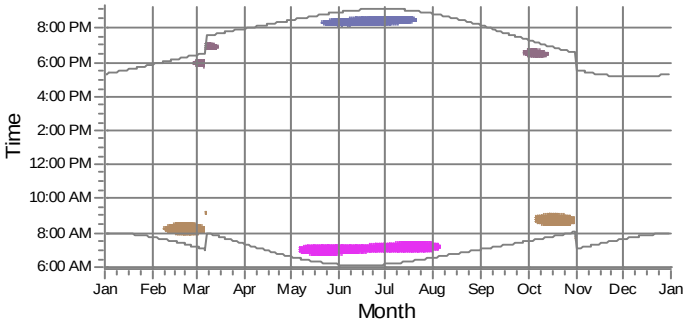
743: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6429)



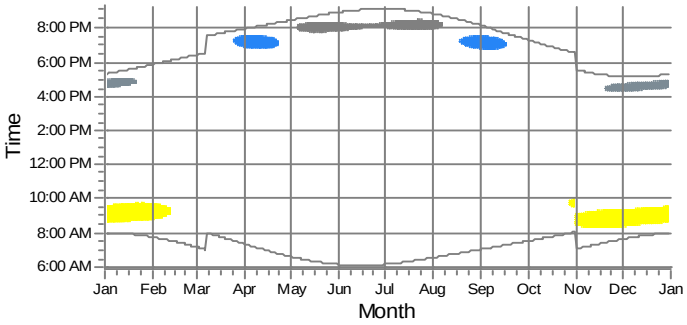
747: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6431)



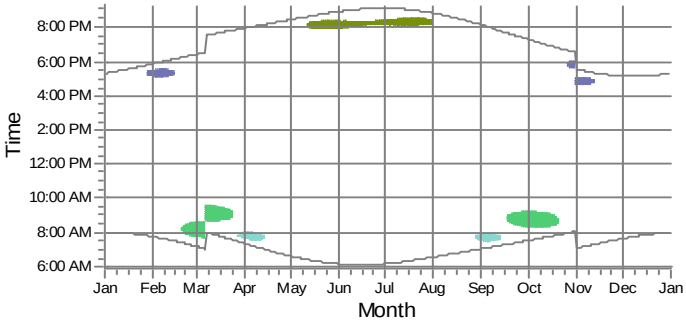
750: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6434)



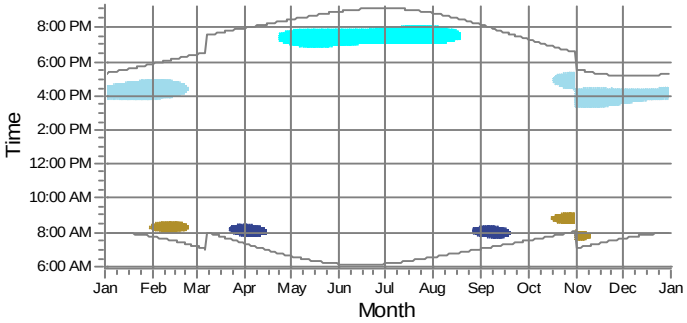
799: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6441)



812: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6448)



3380: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6523)



WTGs

72: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (59)
74: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (61)
83: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (70)
100: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (87)
108: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (92)
116: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (99)
117: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (100)
129: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (108)
126: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (109)
16: NORDEX N100 2500 99.8 IOI hub: 100.0 m (129)
18: NORDEX N100 2500 99.8 IOI hub: 100.0 m (131)
20: NORDEX N100 2500 99.8 IOI hub: 100.0 m (132)
21: NORDEX N100 2500 99.8 IOI hub: 100.0 m (133)
22: NORDEX N100 2500 99.8 IOI hub: 100.0 m (134)
23: NORDEX N100 2500 99.8 IOI hub: 100.0 m (135)
25: NORDEX N100 2500 99.8 IOI hub: 100.0 m (136)
28: NORDEX N100 2500 99.8 IOI hub: 100.0 m (138)
33: NORDEX N100 2500 99.8 IOI hub: 100.0 m (141)

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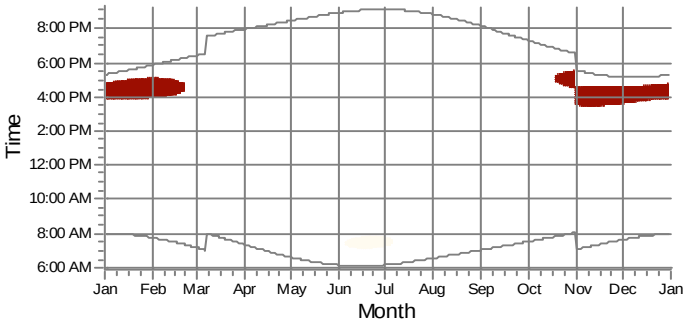
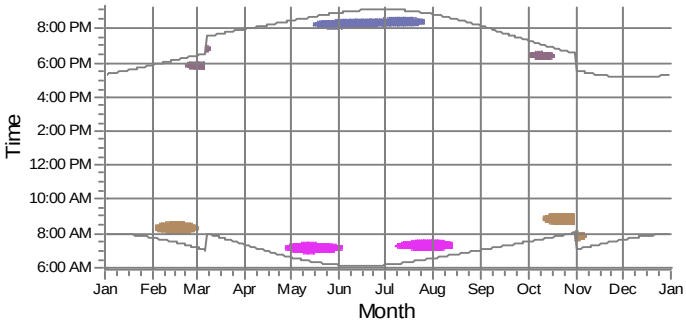
SHADOW - Calendar, graphical

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative

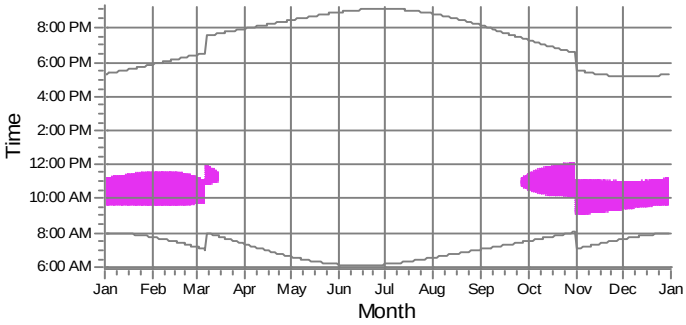
3417: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6536)



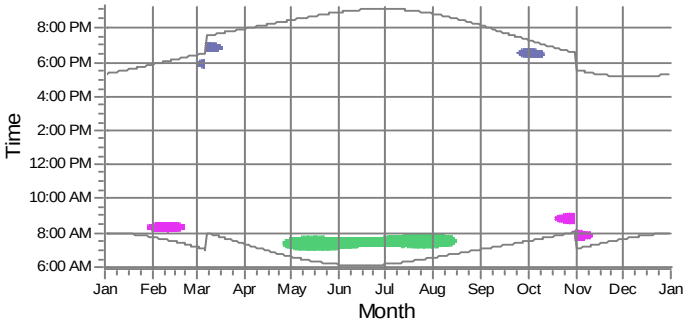
3426: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6538)



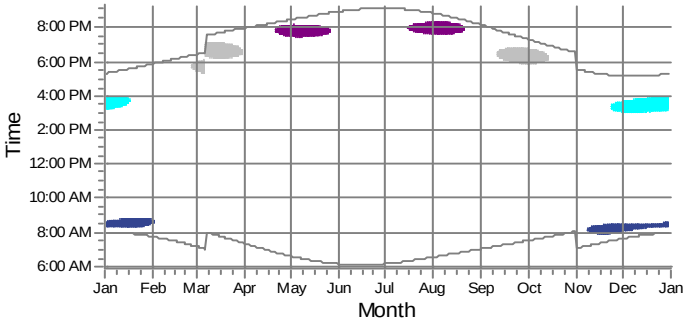
3429: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6541)



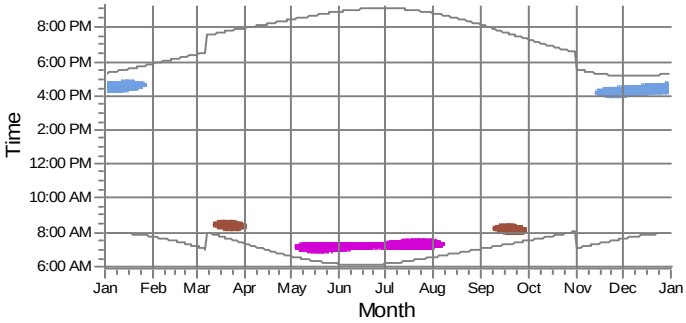
3431: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6543)



7825: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6596)



8224: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6613)



WTGs

81: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (68)
82: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (69)
83: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (70)
87: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (74)
100: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (87)
118: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (101)
119: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (102)
129: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (108)
133: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (113)
18: NORDEX N100 2500 99.8 IOI hub: 100.0 m (131)
21: NORDEX N100 2500 99.8 IOI hub: 100.0 m (133)
22: NORDEX N100 2500 99.8 IOI hub: 100.0 m (134)
28: NORDEX N100 2500 99.8 IOI hub: 100.0 m (138)
49: NORDEX N100 2500 99.8 IOI hub: 100.0 m (153)

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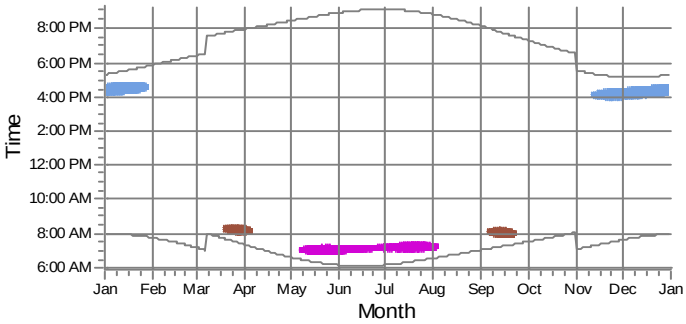
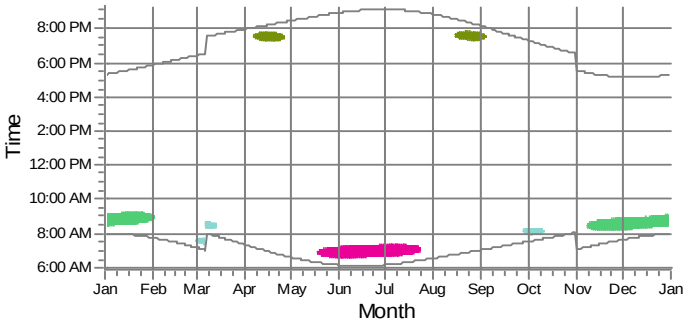
SHADOW - Calendar, graphical

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative

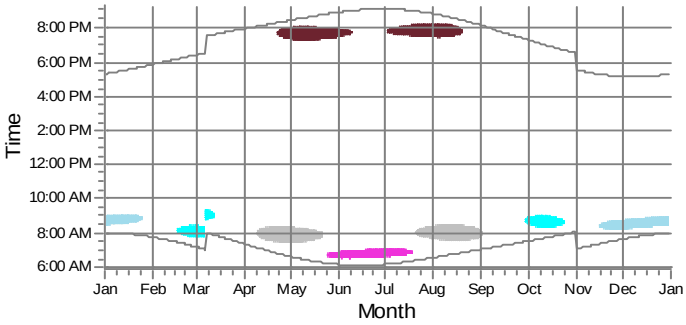
8226: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6615)



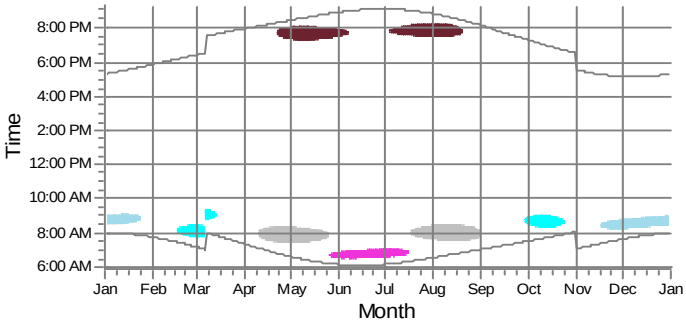
8343: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6630)



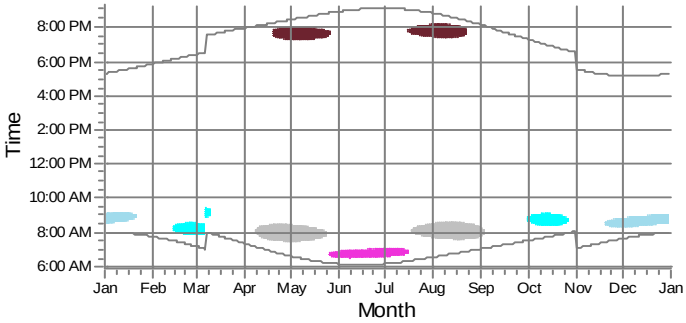
8351: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6633)



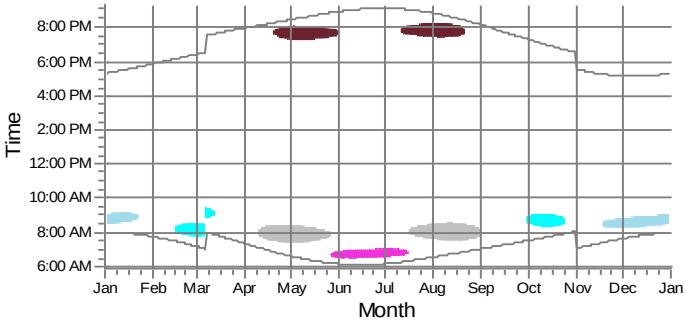
8352: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6634)



8353: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6635)



8354: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6636)



WTGs

82: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (69)
83: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (70)
100: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (87)
106: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (90)
107: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (91)
108: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (92)
118: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (101)
119: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (102)
126: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (109)
15: NORDEX N100 2500 99.8 IOI hub: 100.0 m (128)
16: NORDEX N100 2500 99.8 IOI hub: 100.0 m (129)
49: NORDEX N100 2500 99.8 IOI hub: 100.0 m (153)

Project:
11052 Buckeye Wind I and II SFA_4_1100m_cumulative

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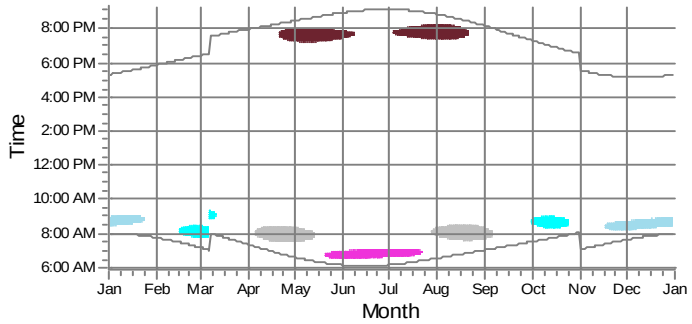
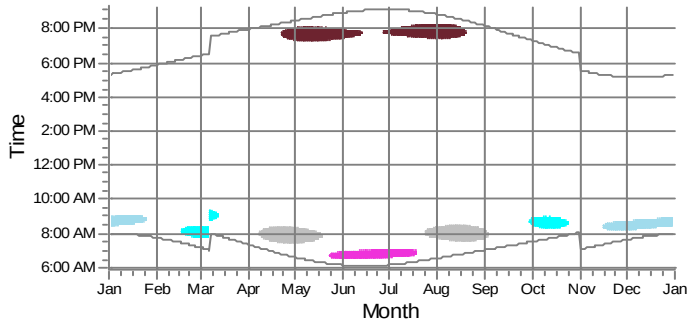
SHADOW - Calendar, graphical

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative

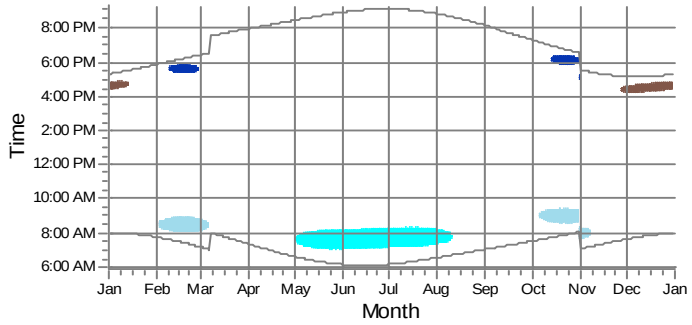
8355: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6637)



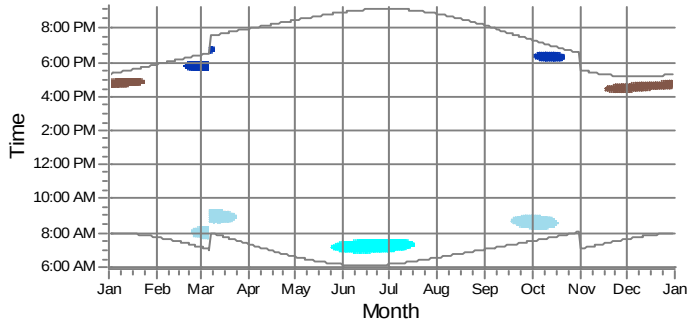
8356: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6638)



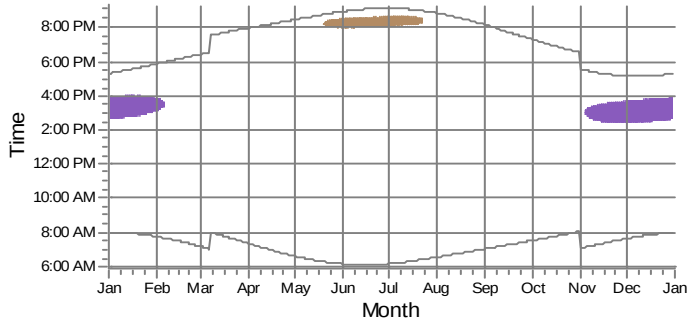
10055: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6741)



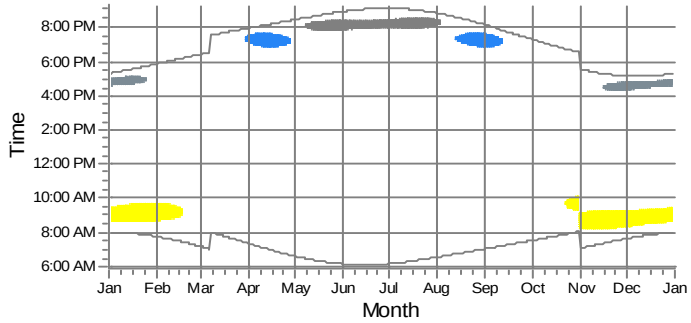
10056: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6742)



10168: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6756)



10206: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6761)



WTGs

72: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (59)
74: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (61)
82: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (69)
83: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (70)
106: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (90)
107: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (91)
108: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (92)
116: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (99)
117: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (100)
127: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (106)
22: NORDEX N100 2500 99.8 IOI hub: 100.0 m (134)
32: NORDEX N100 2500 99.8 IOI hub: 100.0 m (140)
39: NORDEX N100 2500 99.8 IOI hub: 100.0 m (145)

Project:
11052 Buckeye Wind I and II SFA_4_1100m_cumulative

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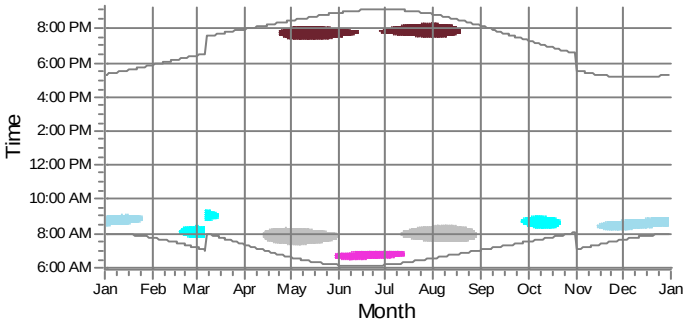
SHADOW - Calendar, graphical

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative

10280: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6762)



WTGs

82: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (69)
83: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (70)
106: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (90)
107: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (91)
108: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (92)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

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SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative**Shadow receptor:** 410 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6360)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April	May			June		
1	07:57		08:25 (118)	07:45		08:29 (118)	07:10			07:20	06:36			06:08		06:42 (113)
	17:20	9	08:34 (118)	17:53	23	08:52 (118)	18:26			19:59	20:28			20:57	39	07:21 (113)
2	07:57		08:24 (118)	07:44		08:30 (118)	07:08			07:19	06:35			06:08		06:42 (113)
	17:21	12	08:36 (118)	17:55	21	08:51 (118)	18:27			20:00	20:29			20:58	40	07:22 (113)
3	07:58		08:24 (118)	07:43		08:32 (118)	07:07			07:17	06:33			06:08		06:43 (113)
	17:22	13	08:37 (118)	17:56	17	08:49 (118)	18:28			20:00	20:30			20:58	39	07:22 (113)
4	07:58		08:23 (118)	07:42		08:34 (118)	07:05		07:33 (119)	07:15	06:32			06:07		06:42 (113)
	17:22	15	08:38 (118)	17:57	12	08:46 (118)	18:29	14	07:47 (119)	20:01	20:31			20:59	40	07:22 (113)
5	07:58		08:23 (118)	07:41		08:38 (118)	07:04		07:31 (119)	07:14	06:31			06:07		06:42 (113)
	17:23	17	08:40 (118)	17:58	4	08:42 (118)	18:31	20	07:51 (119)	20:02	20:32			21:00	40	07:22 (113)
6	07:58		08:23 (118)	07:40			07:02		07:28 (119)	07:12	06:30			06:07		06:43 (113)
	17:24	18	08:41 (118)	17:59			18:32	24	07:52 (119)	20:03	20:33			21:00	40	07:23 (113)
7	07:58		08:23 (118)	07:39			07:01		07:27 (119)	07:11	06:29			06:06		06:43 (113)
	17:25	19	08:42 (118)	18:01			18:33	27	07:54 (119)	20:04	20:34			21:01	40	07:23 (113)
8	07:57		08:23 (118)	07:37			07:59		08:25 (119)	07:09	06:28			06:06		06:43 (113)
	17:26	20	08:43 (118)	18:02			19:34	29	08:54 (119)	20:05	20:35			21:02	41	07:24 (113)
9	07:57		08:23 (118)	07:36			07:57		08:24 (119)	07:08	06:26			06:06		06:43 (113)
	17:27	22	08:45 (118)	18:03			19:35	31	08:55 (119)	20:06	20:36			21:02	40	07:23 (113)
10	07:57		08:22 (118)	07:35			07:56		08:23 (119)	07:06	06:25			06:06		06:43 (113)
	17:28	23	08:45 (118)	18:04			19:36	33	08:56 (119)	20:07	20:37			21:03	40	07:23 (113)
11	07:57		08:22 (118)	07:34			07:54		08:22 (119)	07:04	06:24			06:06		06:43 (113)
	17:29	24	08:46 (118)	18:05			19:37	33	08:55 (119)	20:08	20:38			21:03	41	07:24 (113)
12	07:57		08:22 (118)	07:33			07:53		08:22 (119)	07:03	06:23			06:05		06:43 (113)
	17:30	25	08:47 (118)	18:07			19:38	34	08:56 (119)	20:09	20:39			21:04	41	07:24 (113)
13	07:56		08:22 (118)	07:32			07:51		08:21 (119)	07:01	06:22			06:05		06:44 (113)
	17:31	26	08:48 (118)	18:08			19:39	35	08:56 (119)	20:10	20:40			21:04	40	07:24 (113)
14	07:56		08:22 (118)	07:30			07:49		08:20 (119)	07:00	06:21		06:56 (113)	06:05		06:44 (113)
	17:32	27	08:49 (118)	18:09			19:40	35	08:55 (119)	20:11	20:41	8	07:04 (113)	21:05	40	07:24 (113)
15	07:56		08:22 (118)	07:29			07:48		08:21 (119)	06:58	06:20		06:53 (113)	06:05		06:44 (113)
	17:33	28	08:50 (118)	18:10			19:41	34	08:55 (119)	20:12	20:42	15	07:08 (113)	21:05	40	07:24 (113)
16	07:55		08:21 (118)	07:28			07:46		08:20 (119)	06:57	06:19		06:51 (113)	06:05		06:44 (113)
	17:35	29	08:50 (118)	18:11			19:42	34	08:54 (119)	20:13	20:43	20	07:11 (113)	21:06	41	07:25 (113)
17	07:55		08:22 (118)	07:27			07:45		08:20 (119)	06:55	06:18		06:50 (113)	06:05		06:44 (113)
	17:36	29	08:51 (118)	18:12			19:43	33	08:53 (119)	20:14	20:44	22	07:12 (113)	21:06	41	07:25 (113)
18	07:54		08:21 (118)	07:25			07:43		08:21 (119)	06:54	06:18		06:48 (113)	06:05		06:44 (113)
	17:37	30	08:51 (118)	18:14			19:44	32	08:53 (119)	20:15	20:45	25	07:13 (113)	21:06	41	07:25 (113)
19	07:54		08:22 (118)	07:24			07:41		08:21 (119)	06:52	06:17		06:47 (113)	06:06		06:45 (113)
	17:38	30	08:52 (118)	18:15			19:45	31	08:52 (119)	20:16	20:46	27	07:14 (113)	21:07	40	07:25 (113)
20	07:53		08:22 (118)	07:23			07:40		08:22 (119)	06:51	06:16		06:46 (113)	06:06		06:46 (113)
	17:39	30	08:52 (118)	18:16			19:46	29	08:51 (119)	20:17	20:47	29	07:15 (113)	21:07	40	07:26 (113)
21	07:53		08:22 (118)	07:21			07:38		08:23 (119)	06:49	06:15		06:46 (113)	06:06		06:46 (113)
	17:40	30	08:52 (118)	18:17			19:48	26	08:49 (119)	20:18	20:48	30	07:16 (113)	21:07	40	07:26 (113)
22	07:52		08:23 (118)	07:20			07:37		08:23 (119)	06:48	06:14		06:45 (113)	06:06		06:46 (113)
	17:41	30	08:53 (118)	18:18			19:49	24	08:47 (119)	20:19	20:49	32	07:17 (113)	21:08	40	07:26 (113)
23	07:52		08:23 (118)	07:18			07:35		08:26 (119)	06:47	06:14		06:44 (113)	06:06		06:46 (113)
	17:43	30	08:53 (118)	18:19			19:50	20	08:46 (119)	20:20	20:50	33	07:17 (113)	21:08	40	07:26 (113)
24	07:51		08:23 (118)	07:17			07:33		08:27 (119)	06:45	06:13		06:44 (113)	06:07		06:47 (113)
	17:44	30	08:53 (118)	18:21			19:51	15	08:42 (119)	20:21	20:50	35	07:19 (113)	21:08	40	07:27 (113)
25	07:50		08:24 (118)	07:16			07:32		08:32 (119)	06:44	06:12		06:43 (113)	06:07		06:46 (113)
	17:45	30	08:54 (118)	18:22			19:52	5	08:37 (119)	20:22	20:51	36	07:19 (113)	21:08	41	07:27 (113)
26	07:50		08:24 (118)	07:14			07:30			06:42	06:12		06:43 (113)	06:07		06:46 (113)
	17:46	30	08:54 (118)	18:23			19:53			20:23	20:52	36	07:19 (113)	21:08	41	07:27 (113)
27	07:49		08:24 (118)	07:13			07:28			06:41	06:11		06:43 (113)	06:08		06:47 (113)
	17:47	30	08:54 (118)	18:24			19:54			20:24	20:53	37	07:20 (113)	21:08	40	07:27 (113)
28	07:48		08:25 (118)	07:11			07:27			06:40	06:10		06:42 (113)	06:08		06:47 (113)
	17:48	28	08:53 (118)	18:25			19:55			20:25	20:54	38	07:20 (113)	21:08	40	07:27 (113)
29	07:47		08:25 (118)				07:25			06:38	06:10		06:43 (113)	06:08		06:47 (113)
	17:50	28	08:53 (118)				19:56			20:26	20:55	38	07:21 (113)	21:08	40	07:27 (113)
30	07:46		08:26 (118)				07:24			06:37	06:09		06:42 (113)	06:09		06:48 (113)
	17:51	26	08:52 (118)				19:57			20:27	20:55	38	07:20 (113)	21:08	40	07:28 (113)
31	07:45		08:27 (118)				07:22				06:09		06:42 (113)			
	17:52	25	08:52 (118)				19:58				20:56	39	07:21 (113)			
Potential sun hours	300			299			370			397	446			449		
Total, worst case		763			77			598				538			1206	
Sun reduction		0.36			0.42			0.44				0.56			0.60	
Oper. time red.		1.00			1.00			1.00				1.00			1.00	
Wind dir. red.		0.60			0.60			0.63				0.68			0.68	
Total reduction		0.21			0.25			0.28				0.38			0.41	
Total, real		164			19			165				204			489	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative**Shadow receptor:** 410 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6360)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August		September			October			November			December		
1	06:09		06:47 (113)	06:32		07:02			07:31		08:01 (119)	07:04			07:37		08:04 (118)
	21:08	41	07:28 (113)	20:51		20:09			19:19	34	08:35 (119)	17:33			17:10	24	08:28 (118)
2	06:10		06:48 (113)	06:33		07:03			07:32		08:01 (119)	07:05			07:38		08:05 (118)
	21:08	40	07:28 (113)	20:50		20:08			19:17	33	08:34 (119)	17:32			17:10	23	08:28 (118)
3	06:10		06:48 (113)	06:34		07:04			07:33		08:01 (119)	07:06			07:39		08:06 (118)
	21:08	40	07:28 (113)	20:49		20:06			19:15	32	08:33 (119)	17:31			17:10	22	08:28 (118)
4	06:11		06:48 (113)	06:35		07:05			07:34		08:01 (119)	07:07			07:40		08:07 (118)
	21:08	41	07:29 (113)	20:48		20:05			19:14	31	08:32 (119)	17:30			17:10	20	08:27 (118)
5	06:11		06:48 (113)	06:36		07:06			07:35		08:02 (119)	07:08			07:41		08:08 (118)
	21:08	40	07:28 (113)	20:47		20:03			19:12	29	08:31 (119)	17:29			17:10	19	08:27 (118)
6	06:12		06:49 (113)	06:37		07:07			07:36		08:02 (119)	07:09		08:08 (118)	07:42		08:09 (118)
	21:08	40	07:29 (113)	20:45		20:01			19:11	28	08:30 (119)	17:28	6	08:14 (118)	17:09	18	08:27 (118)
7	06:13		06:49 (113)	06:38		07:08			07:37		08:03 (119)	07:10		08:04 (118)	07:43		08:10 (118)
	21:07	40	07:29 (113)	20:44		20:00			19:09	25	08:28 (119)	17:27	13	08:17 (118)	17:09	17	08:27 (118)
8	06:13		06:49 (113)	06:39		07:09			07:38		08:05 (119)	07:12		08:02 (118)	07:44		08:11 (118)
	21:07	40	07:29 (113)	20:43		19:57			19:07	21	08:26 (119)	17:26	17	08:19 (118)	17:09	15	08:26 (118)
9	06:14		06:50 (113)	06:40		07:10			07:39		08:07 (119)	07:13		08:00 (118)	07:45		08:13 (118)
	21:07	39	07:29 (113)	20:42		19:55			19:06	17	08:24 (119)	17:25	21	08:21 (118)	17:09	13	08:26 (118)
10	06:14		06:49 (113)	06:41		07:11			07:40		08:10 (119)	07:14		08:00 (118)	07:46		08:14 (118)
	21:06	40	07:29 (113)	20:41		19:53			19:04	10	08:20 (119)	17:24	23	08:23 (118)	17:09	12	08:26 (118)
11	06:15		06:50 (113)	06:42		07:11			07:41			07:15		07:59 (118)	07:47		08:16 (118)
	21:06	39	07:29 (113)	20:39		19:52			19:03			17:23	25	08:24 (118)	17:10	9	08:25 (118)
12	06:16		06:51 (113)	06:43		07:12			07:42			07:16		07:58 (118)	07:47		08:17 (118)
	21:06	39	07:30 (113)	20:38		19:50			19:01			17:22	26	08:24 (118)	17:10	7	08:24 (118)
13	06:17		06:50 (113)	06:44		07:13			07:43			07:17		07:57 (118)	07:48		08:19 (118)
	21:05	39	07:29 (113)	20:37		19:48			19:00			17:21	28	08:25 (118)	17:10	4	08:23 (118)
14	06:17		06:51 (113)	06:45		07:14			07:44			07:19		07:57 (118)	07:49		
	21:05	38	07:29 (113)	20:36		19:47			18:58			17:20	28	08:25 (118)	17:10		
15	06:18		06:52 (113)	06:46		07:15			07:45			07:20		07:57 (118)	07:50		
	21:04	37	07:29 (113)	20:34		19:45			18:57			17:19	30	08:27 (118)	17:10		
16	06:19		06:52 (113)	06:47		07:16			07:46			07:21		07:57 (118)	07:50		
	21:04	37	07:29 (113)	20:33		19:43			18:55			17:18	30	08:27 (118)	17:11		
17	06:20		06:52 (113)	06:48		07:17			07:47			07:22		07:57 (118)	07:51		
	21:03	36	07:28 (113)	20:32		19:42			18:54			17:18	30	08:27 (118)	17:11		
18	06:20		06:53 (113)	06:49		07:18			07:48			07:23		07:57 (118)	07:52		
	21:02	35	07:28 (113)	20:30		19:40			18:52			17:17	30	08:27 (118)	17:11		
19	06:21		06:53 (113)	06:50		07:19		08:15 (119)	07:49			07:24		07:58 (118)	07:52		
	21:02	35	07:28 (113)	20:29		19:38	14	08:29 (119)	18:51			17:16	30	08:28 (118)	17:12		
20	06:22		06:54 (113)	06:51		07:20		08:12 (119)	07:50			07:25		07:58 (118)	07:53		
	21:01	34	07:28 (113)	20:27		19:37	19	08:31 (119)	18:49			17:15	30	08:28 (118)	17:12		
21	06:23		06:55 (113)	06:52		07:21		08:10 (119)	07:51			07:27		07:58 (118)	07:53		
	21:00	33	07:28 (113)	20:26		19:35	23	08:33 (119)	18:48			17:15	30	08:28 (118)	17:12		
22	06:24		06:55 (113)	06:52		07:22		08:07 (119)	07:52			07:28		07:58 (118)	07:54		
	21:00	31	07:26 (113)	20:25		19:33	26	08:33 (119)	18:46			17:14	30	08:28 (118)	17:13		
23	06:24		06:56 (113)	06:53		07:23		08:06 (119)	07:53			07:29		07:58 (118)	07:54		
	20:59	30	07:26 (113)	20:23		19:32	28	08:34 (119)	18:45			17:14	30	08:28 (118)	17:13		
24	06:25		06:57 (113)	06:54		07:24		08:05 (119)	07:55			07:30		07:59 (118)	07:55		
	20:58	28	07:25 (113)	20:22		19:30	30	08:35 (119)	18:44			17:13	29	08:28 (118)	17:14		
25	06:26		06:58 (113)	06:55		07:25		08:04 (119)	07:56			07:31		08:00 (118)	07:55		
	20:57	26	07:24 (113)	20:20		19:28	31	08:35 (119)	18:42			17:13	29	08:29 (118)	17:15		
26	06:27		06:59 (113)	06:56		07:26		08:03 (119)	07:57			07:32		08:00 (118)	07:56		
	20:56	24	07:23 (113)	20:19		19:27	33	08:36 (119)	18:41			17:12	29	08:29 (118)	17:15		
27	06:28		07:01 (113)	06:57		07:27		08:02 (119)	07:58			07:33		08:01 (118)	07:56		
	20:56	21	07:22 (113)	20:17		19:25	34	08:36 (119)	18:40			17:12	28	08:29 (118)	17:16		
28	06:29		07:02 (113)	06:58		07:28		08:01 (119)	07:59			07:34		08:02 (118)	07:56		
	20:55	17	07:19 (113)	20:16		19:23	35	08:36 (119)	18:38			17:11	27	08:29 (118)	17:17		
29	06:30		07:04 (113)	06:59		07:29		08:01 (119)	08:00			07:35		08:02 (118)	07:57		
	20:54	13	07:17 (113)	20:14		19:22	35	08:36 (119)	18:37			17:11	27	08:29 (118)	17:17		
30	06:31		07:10 (113)	07:00		07:30		08:01 (119)	08:01			07:36		08:03 (118)	07:57		
	20:53	2	07:12 (113)	20:13		19:20	34	08:35 (119)	18:36			17:11	25	08:28 (118)	17:18		
31	06:32			07:01					08:02						07:57		08:26 (118)
	20:52			20:11					18:35						17:19	6	08:32 (118)
Potential sun hours	456			426		374			346			300			291		
Total, worst case		995					342			260			651			209	
Sun reduction		0.60					0.61			0.56			0.37			0.50	
Oper. time red.		1.00					1.00			1.00			1.00			1.00	
Wind dir. red.		0.68					0.63			0.63			0.60			0.60	
Total reduction		0.41					0.38			0.35			0.22			0.30	
Total, real		404					131			91			144			62	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 3

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
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Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative**Shadow receptor:** 411 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6361)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April	May			June		
1	07:57		08:25 (118)	07:45			07:10		07:37 (119)	07:20	06:36		07:09 (113)	06:08		06:58 (113)
	17:20	29	08:54 (118)	17:53			18:26	32	08:09 (119)	19:59	20:28	14	07:23 (113)	20:57	35	07:33 (113)
2	07:57		08:25 (118)	07:44			07:08		07:36 (119)	07:19	06:35		07:06 (113)	06:08		06:59 (113)
	17:21	29	08:54 (118)	17:55			18:27	33	08:09 (119)	20:00	20:29	19	07:25 (113)	20:58	34	07:33 (113)
3	07:58		08:25 (118)	07:43			07:07		07:36 (119)	07:17	06:33		07:04 (113)	06:07		07:00 (113)
	17:22	30	08:55 (118)	17:56			18:28	34	08:10 (119)	20:00	20:30	24	07:28 (113)	20:58	33	07:33 (113)
4	07:58		08:26 (118)	07:42			07:05		07:35 (119)	07:15	06:32		07:03 (113)	06:07		07:00 (113)
	17:22	29	08:55 (118)	17:57			18:29	34	08:09 (119)	20:01	20:31	26	07:29 (113)	20:59	32	07:32 (113)
5	07:58		08:26 (118)	07:41			07:04		07:36 (119)	07:14	06:31		07:01 (113)	06:07		07:00 (113)
	17:23	30	08:56 (118)	17:58			18:31	34	08:10 (119)	20:02	20:32	29	07:30 (113)	21:00	32	07:32 (113)
6	07:58		08:27 (118)	07:40			07:02		07:35 (119)	07:12	06:30		06:59 (113)	06:07		07:01 (113)
	17:24	29	08:56 (118)	17:59			18:32	34	08:09 (119)	20:03	20:33	32	07:31 (113)	21:00	31	07:32 (113)
7	07:58		08:27 (118)	07:39			07:01		07:36 (119)	07:11	06:29		06:58 (113)	06:06		07:02 (113)
	17:25	30	08:57 (118)	18:01			18:33	33	08:09 (119)	20:04	20:34	34	07:32 (113)	21:01	30	07:32 (113)
8	07:57		08:28 (118)	07:37			07:59		08:35 (119)	07:09	06:28		06:58 (113)	06:06		07:03 (113)
	17:26	30	08:58 (118)	18:02			19:34	33	09:08 (119)	20:05	20:35	34	07:32 (113)	21:02	29	07:32 (113)
9	07:57		08:28 (118)	07:36			07:57		08:35 (119)	07:08	06:26		06:57 (113)	06:06		07:02 (113)
	17:27	30	08:58 (118)	18:03			19:35	32	09:07 (119)	20:06	20:36	36	07:33 (113)	21:02	29	07:31 (113)
10	07:57		08:28 (118)	07:35			07:56		08:36 (119)	07:06	06:25		06:56 (113)	06:06		07:03 (113)
	17:28	30	08:58 (118)	18:04			19:36	30	09:06 (119)	20:07	20:37	37	07:33 (113)	21:03	28	07:31 (113)
11	07:57		08:28 (118)	07:34			07:54		08:36 (119)	07:04	06:24		06:56 (113)	06:06		07:04 (113)
	17:29	31	08:59 (118)	18:05			19:37	29	09:05 (119)	20:08	20:38	38	07:34 (113)	21:03	27	07:31 (113)
12	07:57		08:29 (118)	07:33			07:53		08:38 (119)	07:03	06:23		06:55 (113)	06:05		07:04 (113)
	17:30	30	08:59 (118)	18:07			19:38	26	09:04 (119)	20:09	20:39	39	07:34 (113)	21:04	27	07:31 (113)
13	07:56		08:30 (118)	07:32			07:51		08:39 (119)	07:01	06:22		06:55 (113)	06:05		07:05 (113)
	17:31	30	09:00 (118)	18:08			19:39	23	09:02 (119)	20:10	20:40	39	07:34 (113)	21:04	26	07:31 (113)
14	07:56		08:30 (118)	07:30			07:49		08:40 (119)	07:00	06:21		06:55 (113)	06:05		07:05 (113)
	17:32	29	08:59 (118)	18:09			19:40	19	08:59 (119)	20:11	20:41	39	07:34 (113)	21:05	26	07:31 (113)
15	07:56		08:31 (118)	07:29			07:48		08:43 (119)	06:58	06:20		06:54 (113)	06:05		07:06 (113)
	17:33	29	09:00 (118)	18:10			19:41	13	08:56 (119)	20:12	20:42	41	07:35 (113)	21:05	25	07:31 (113)
16	07:55		08:31 (118)	07:28			07:46			06:57	06:19		06:55 (113)	06:05		07:06 (113)
	17:35	29	09:00 (118)	18:11			19:42			20:13	20:43	41	07:36 (113)	21:06	25	07:31 (113)
17	07:55		08:32 (118)	07:27			07:45			06:55	06:18		06:55 (113)	06:05		07:06 (113)
	17:36	28	09:00 (118)	18:12			19:43			20:14	20:44	40	07:35 (113)	21:06	25	07:31 (113)
18	07:54		08:32 (118)	07:25			07:43			06:54	06:18		06:55 (113)	06:05		07:07 (113)
	17:37	28	09:00 (118)	18:14			19:44			20:15	20:45	40	07:35 (113)	21:06	24	07:31 (113)
19	07:54		08:34 (118)	07:24			07:41			06:52	06:17		06:54 (113)	06:06		07:07 (113)
	17:38	26	09:00 (118)	18:15			19:45			20:16	20:46	41	07:35 (113)	21:07	24	07:31 (113)
20	07:53		08:34 (118)	07:23			07:40			06:51	06:16		06:54 (113)	06:06		07:08 (113)
	17:39	25	08:59 (118)	18:16			19:46			20:17	20:47	41	07:35 (113)	21:07	24	07:32 (113)
21	07:53		08:35 (118)	07:21			07:38			06:49	06:15		06:55 (113)	06:06		07:08 (113)
	17:40	24	08:59 (118)	18:17			19:48			20:18	20:48	41	07:36 (113)	21:07	24	07:32 (113)
22	07:52		08:36 (118)	07:20		07:50 (119)	07:37			06:48	06:14		06:55 (113)	06:06		07:08 (113)
	17:41	23	08:59 (118)	18:18	8	07:58 (119)	19:49			20:19	20:49	40	07:35 (113)	21:08	24	07:32 (113)
23	07:52		08:37 (118)	07:18		07:46 (119)	07:35			06:47	06:14		06:55 (113)	06:06		07:08 (113)
	17:43	21	08:58 (118)	18:19	16	08:02 (119)	19:50			20:20	20:50	40	07:35 (113)	21:08	24	07:32 (113)
24	07:51		08:38 (118)	07:17		07:43 (119)	07:33			06:45	06:13		06:56 (113)	06:07		07:09 (113)
	17:44	19	08:57 (118)	18:21	21	08:04 (119)	19:51			20:21	20:50	39	07:35 (113)	21:08	24	07:33 (113)
25	07:50		08:41 (118)	07:16		07:42 (119)	07:32			06:44	06:12		06:56 (113)	06:07		07:08 (113)
	17:45	15	08:56 (118)	18:22	24	08:06 (119)	19:52			20:22	20:51	39	07:35 (113)	21:08	25	07:33 (113)
26	07:50		08:43 (118)	07:14		07:40 (119)	07:30			06:42	06:12		06:56 (113)	06:07		07:08 (113)
	17:46	11	08:54 (118)	18:23	27	08:07 (119)	19:53			20:23	20:52	38	07:34 (113)	21:08	25	07:33 (113)
27	07:49		08:47 (118)	07:13		07:39 (119)	07:28			06:41	06:11		06:57 (113)	06:08		07:09 (113)
	17:47	3	08:50 (118)	18:24	29	08:08 (119)	19:54			20:24	20:53	38	07:35 (113)	21:08	25	07:34 (113)
28	07:48			07:11		07:38 (119)	07:27			06:40	06:10		06:56 (113)	06:08		07:08 (113)
	17:48			18:25	30	08:08 (119)	19:55			20:25	20:54	38	07:34 (113)	21:08	26	07:34 (113)
29	07:47						07:25			06:38	06:10		06:57 (113)	06:08		07:08 (113)
	17:50						19:56			20:26	20:55	37	07:34 (113)	21:08	26	07:34 (113)
30	07:46						07:24			06:37	06:09		06:57 (113)	06:09		07:08 (113)
	17:51						19:57			20:27	20:55	36	07:33 (113)	21:08	27	07:35 (113)
31	07:45						07:22				06:09		06:58 (113)			
	17:52						19:58				20:56	36	07:34 (113)			
Potential sun hours	300			299			370			397	446			449		
Total, worst case		697			155			439				1106			816	
Sun reduction		0.36			0.42			0.44				0.56			0.60	
Oper. time red.		1.00			1.00			1.00				1.00			1.00	
Wind dir. red.		0.61			0.63			0.63				0.68			0.68	
Total reduction		0.22			0.26			0.28				0.38			0.40	
Total, real		151			41			122				416			329	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 4

Licensed user:
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US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative**Shadow receptor:** 411 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6361)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		07:08 (113)	06:32		07:06 (113)	07:02			07:31		08:17 (119)	07:04			07:37		08:10 (118)
	21:08	27	07:35 (113)	20:51	39	07:45 (113)	20:09			19:19	25	08:42 (119)	17:33			17:10	31	08:41 (118)
2	06:10		07:08 (113)	06:33		07:07 (113)	07:03			07:32		08:16 (119)	07:05			07:38		08:11 (118)
	21:08	28	07:36 (113)	20:50	37	07:44 (113)	20:08			19:17	27	08:43 (119)	17:32			17:10	30	08:41 (118)
3	06:10		07:08 (113)	06:34		07:07 (113)	07:04			07:33		08:14 (119)	07:06			07:39		08:11 (118)
	21:08	28	07:36 (113)	20:49	37	07:44 (113)	20:06			19:15	30	08:44 (119)	17:31			17:10	30	08:41 (118)
4	06:11		07:08 (113)	06:35		07:08 (113)	07:05			07:34		08:13 (119)	07:07			07:40		08:12 (118)
	21:08	29	07:37 (113)	20:48	35	07:43 (113)	20:05			19:14	31	08:44 (119)	17:30			17:10	30	08:42 (118)
5	06:11		07:07 (113)	06:36		07:09 (113)	07:06			07:35		08:12 (119)	07:08			07:41		08:12 (118)
	21:08	30	07:37 (113)	20:47	34	07:43 (113)	20:03			19:12	32	08:44 (119)	17:29			17:10	30	08:42 (118)
6	06:12		07:08 (113)	06:37		07:08 (113)	07:07			07:36		08:11 (119)	07:09			07:42		08:13 (118)
	21:08	30	07:38 (113)	20:45	33	07:41 (113)	20:01			19:11	34	08:45 (119)	17:28			17:09	29	08:42 (118)
7	06:12		07:08 (113)	06:38		07:09 (113)	07:08			07:37		08:11 (119)	07:10			07:43		08:13 (118)
	21:07	31	07:39 (113)	20:44	31	07:40 (113)	20:00			19:09	34	08:45 (119)	17:27			17:09	30	08:43 (118)
8	06:13		07:07 (113)	06:39		07:11 (113)	07:09			07:38		08:10 (119)	07:12			07:44		08:14 (118)
	21:07	32	07:39 (113)	20:43	28	07:39 (113)	19:57			19:07	34	08:44 (119)	17:26			17:09	29	08:43 (118)
9	06:14		07:07 (113)	06:40		07:12 (113)	07:10			07:39		08:10 (119)	07:13			07:45		08:14 (118)
	21:07	33	07:40 (113)	20:42	25	07:37 (113)	19:55			19:06	34	08:44 (119)	17:25			17:09	30	08:44 (118)
10	06:14		07:06 (113)	06:41		07:13 (113)	07:11			07:40		08:10 (119)	07:14			07:46		08:15 (118)
	21:06	34	07:40 (113)	20:41	23	07:36 (113)	19:53			19:04	34	08:44 (119)	17:24			17:09	29	08:44 (118)
11	06:15		07:06 (113)	06:42		07:15 (113)	07:11			07:41		08:10 (119)	07:15			07:47		08:16 (118)
	21:06	35	07:41 (113)	20:39	19	07:34 (113)	19:52			19:03	33	08:43 (119)	17:23			17:10	29	08:45 (118)
12	06:16		07:07 (113)	06:43		07:19 (113)	07:12			07:42		08:10 (119)	07:16			07:47		08:16 (118)
	21:06	35	07:42 (113)	20:38	11	07:30 (113)	19:50			19:01	32	08:42 (119)	17:22			17:10	28	08:44 (118)
13	06:17		07:06 (113)	06:44			07:13			07:43		08:11 (119)	07:17			07:48		08:16 (118)
	21:05	36	07:42 (113)	20:37			19:48			19:00	32	08:43 (119)	17:21			17:10	29	08:45 (118)
14	06:17		07:06 (113)	06:45			07:14			07:44		08:12 (119)	07:19			07:49		08:17 (118)
	21:05	36	07:42 (113)	20:36			19:47			18:58	30	08:42 (119)	17:20			17:10	28	08:45 (118)
15	06:18		07:06 (113)	06:46			07:15			07:45		08:12 (119)	07:20		08:20 (118)	07:50		08:18 (118)
	21:04	37	07:43 (113)	20:34			19:45			18:57	28	08:40 (119)	17:19	3	08:23 (118)	17:10	28	08:46 (118)
16	06:19		07:06 (113)	06:47			07:16			07:46		08:13 (119)	07:21		08:16 (118)	07:50		08:18 (118)
	21:04	38	07:44 (113)	20:33			19:43			18:55	26	08:39 (119)	17:18	11	08:27 (118)	17:11	28	08:46 (118)
17	06:20		07:05 (113)	06:48			07:17			07:47		08:14 (119)	07:22		08:14 (118)	07:51		08:19 (118)
	21:03	38	07:43 (113)	20:32			19:42			18:54	23	08:37 (119)	17:18	15	08:29 (118)	17:11	27	08:46 (118)
18	06:20		07:05 (113)	06:49			07:18			07:48		08:16 (119)	07:23		08:12 (118)	07:52		08:19 (118)
	21:02	39	07:44 (113)	20:30			19:40			18:52	19	08:35 (119)	17:17	19	08:31 (118)	17:11	27	08:46 (118)
19	06:21		07:05 (113)	06:50			07:19			07:49		08:18 (119)	07:24		08:12 (118)	07:52		08:20 (118)
	21:02	39	07:44 (113)	20:29			19:38			18:51	14	08:32 (119)	17:16	21	08:33 (118)	17:12	27	08:47 (118)
20	06:22		07:05 (113)	06:51			07:20			07:50		08:24 (119)	07:25		08:11 (118)	07:53		08:21 (118)
	21:01	40	07:45 (113)	20:27			19:37			18:49	2	08:26 (119)	17:15	23	08:34 (118)	17:12	27	08:48 (118)
21	06:23		07:06 (113)	06:52			07:21			07:51			07:27		08:11 (118)	07:53		08:20 (118)
	21:00	39	07:45 (113)	20:26			19:35			18:48			17:15	24	08:35 (118)	17:12	28	08:48 (118)
22	06:24		07:05 (113)	06:52			07:22			07:52			07:28		08:10 (118)	07:54		08:21 (118)
	21:00	40	07:45 (113)	20:25			19:33			18:46			17:14	25	08:35 (118)	17:13	28	08:49 (118)
23	06:24		07:05 (113)	06:53			07:23			07:53			07:29		08:10 (118)	07:54		08:21 (118)
	20:59	40	07:45 (113)	20:23			19:32			18:45			17:14	26	08:36 (118)	17:13	28	08:49 (118)
24	06:25		07:05 (113)	06:54			07:24			07:55			07:30		08:09 (118)	07:55		08:22 (118)
	20:58	41	07:46 (113)	20:22			19:30			18:44			17:13	28	08:37 (118)	17:14	27	08:49 (118)
25	06:26		07:05 (113)	06:55			07:25			07:56			07:31		08:10 (118)	07:55		08:23 (118)
	20:57	41	07:46 (113)	20:20			19:28			18:42			17:13	28	08:38 (118)	17:15	27	08:50 (118)
26	06:27		07:05 (113)	06:56			07:26			07:57			07:32		08:10 (118)	07:56		08:23 (118)
	20:56	41	07:46 (113)	20:19			19:27			18:41			17:12	29	08:39 (118)	17:15	27	08:50 (118)
27	06:28		07:06 (113)	06:57			07:27			07:58			07:33		08:10 (118)	07:56		08:23 (118)
	20:56	40	07:46 (113)	20:17			19:25			18:40			17:12	29	08:39 (118)	17:16	28	08:51 (118)
28	06:29		07:05 (113)	06:58			07:28		08:25 (119)	07:59			07:34		08:10 (118)	07:56		08:24 (118)
	20:55	40	07:45 (113)	20:16			19:23	10	08:35 (119)	18:38			17:11	30	08:40 (118)	17:17	28	08:52 (118)
29	06:30		07:05 (113)	06:59			07:29		08:22 (119)	08:00			07:35		08:10 (118)	07:57		08:24 (118)
	20:54	40	07:45 (113)	20:14			19:22	17	08:39 (119)	18:37			17:11	30	08:40 (118)	17:17	28	08:52 (118)
30	06:31		07:05 (113)	07:00			07:30		08:19 (119)	08:01			07:36		08:10 (118)	07:57		08:24 (118)
	20:53	40	07:45 (113)	20:13			19:20	21	08:40 (119)	18:36			17:11	30	08:40 (118)	17:18	29	08:53 (118)
31	06:32		07:06 (113)	07:01						08:02						07:57		08:24 (118)
	20:52	39	07:45 (113)	20:11						18:35						17:19	29	08:53 (118)
Potential sun hours	456			426			374			346			300			291		
Total, worst case		1116			352			48			554			371			883	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.68			0.68			0.63			0.63			0.61			0.61	
Total reduction		0.40			0.40			0.38			0.35			0.22			0.30	
Total, real		450			142			18			195			83			266	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 5

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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative**Shadow receptor:** 573 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6387)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		16:18 (44)	07:45		08:28 (109)	07:10		17:26 (39)	07:20			06:36		19:21 (32)	06:08		06:46 (108)
	17:20	26	16:44 (44)	17:53	49	09:17 (109)	18:26	32	17:58 (39)	19:59			20:28	36	19:57 (32)	20:57	38	07:24 (108)
2	07:58		16:19 (44)	07:44		08:28 (109)	07:08		17:25 (39)	07:19			06:35		19:21 (32)	06:08		06:46 (108)
	17:21	25	16:44 (44)	17:54	49	09:17 (109)	18:27	32	17:57 (39)	20:00			20:29	36	19:57 (32)	20:58	38	07:24 (108)
3	07:58		08:39 (109)	07:43		08:28 (109)	07:07		17:25 (39)	07:17			06:33		19:21 (32)	06:07		06:47 (108)
	17:21	31	16:44 (44)	17:56	49	09:17 (109)	18:28	33	17:58 (39)	20:00			20:30	36	19:57 (32)	20:58	38	07:25 (108)
4	07:58		08:37 (109)	07:42		08:29 (109)	07:05		17:24 (39)	07:15			06:32		19:21 (32)	06:07		06:46 (108)
	17:22	36	16:45 (44)	17:57	48	09:17 (109)	18:29	33	17:57 (39)	20:01			20:31	36	19:57 (32)	20:59	38	07:24 (108)
5	07:58		08:36 (109)	07:41		08:28 (109)	07:04		17:25 (39)	07:14			06:31		19:20 (32)	06:07		06:47 (108)
	17:23	39	16:45 (44)	17:58	48	09:16 (109)	18:31	33	17:58 (39)	20:02			20:32	36	19:56 (32)	21:00	37	07:24 (108)
6	07:58		08:35 (109)	07:40		08:29 (109)	07:02		17:24 (39)	07:12			06:30		19:20 (32)	06:06		06:47 (108)
	17:24	40	16:45 (44)	17:59	47	09:16 (109)	18:32	33	17:57 (39)	20:03			20:33	35	19:55 (32)	21:01	38	07:25 (108)
7	07:58		08:34 (109)	07:39		08:29 (109)	07:01		17:25 (39)	07:11			06:29		19:21 (32)	06:06		06:48 (108)
	17:25	43	16:45 (44)	18:01	46	09:15 (109)	18:33	32	17:57 (39)	20:04			20:34	34	19:55 (32)	21:01	37	07:25 (108)
8	07:58		08:34 (109)	07:37		08:30 (109)	07:59		18:25 (39)	07:09			06:27		06:59 (108)	06:06		06:47 (108)
	17:26	43	16:45 (44)	18:02	45	09:15 (109)	19:34	30	18:55 (39)	20:05			20:35	44	19:55 (32)	21:02	37	07:24 (108)
9	07:57		08:33 (109)	07:36		08:31 (109)	07:57		18:25 (39)	07:08			06:26		06:56 (108)	06:06		06:48 (108)
	17:27	45	16:45 (44)	18:03	44	09:15 (109)	19:35	29	18:54 (39)	20:06			20:36	48	19:54 (32)	21:02	36	07:24 (108)
10	07:57		08:33 (109)	07:35		08:31 (109)	07:56		18:27 (39)	07:06			06:25		06:54 (108)	06:06		06:48 (108)
	17:28	46	16:46 (44)	18:04	43	09:14 (109)	19:36	26	18:53 (39)	20:07			20:37	52	19:54 (32)	21:03	36	07:24 (108)
11	07:57		08:32 (109)	07:34		08:32 (109)	07:54		18:28 (39)	07:04			06:24		06:52 (108)	06:05		06:49 (108)
	17:29	47	16:45 (44)	18:05	42	09:14 (109)	19:37	23	18:51 (39)	20:08			20:38	54	19:53 (32)	21:03	36	07:25 (108)
12	07:57		08:31 (109)	07:33		08:33 (109)	07:53		18:30 (39)	07:03			06:23		06:51 (108)	06:05		06:49 (108)
	17:30	47	16:44 (44)	18:07	39	09:12 (109)	19:38	20	18:50 (39)	20:09			20:39	54	19:52 (32)	21:04	36	07:25 (108)
13	07:56		08:31 (109)	07:32		08:34 (109)	07:51		18:31 (39)	07:01			06:22		06:50 (108)	06:05		06:50 (108)
	17:31	46	16:44 (44)	18:08	37	09:11 (109)	19:39	16	18:47 (39)	20:10			20:40	54	19:51 (32)	21:04	35	07:25 (108)
14	07:56		08:30 (109)	07:30		08:35 (109)	07:49		18:35 (39)	07:00			06:21		06:49 (108)	06:05		06:50 (108)
	17:32	46	16:43 (44)	18:09	35	09:10 (109)	19:40	7	18:42 (39)	20:11			20:41	55	19:50 (32)	21:05	35	07:25 (108)
15	07:56		08:30 (109)	07:29		08:37 (109)	07:48			06:58			06:20		06:48 (108)	06:05		06:50 (108)
	17:33	42	16:41 (44)	18:10	32	09:09 (109)	19:41			20:12			20:42	53	19:49 (32)	21:05	35	07:25 (108)
16	07:55		08:29 (109)	07:28		08:38 (109)	07:46			06:57			06:19		06:47 (108)	06:05		06:50 (108)
	17:34	37	09:06 (109)	18:11	28	09:06 (109)	19:42			20:13			20:43	53	19:48 (32)	21:06	35	07:25 (108)
17	07:55		08:29 (109)	07:27		08:40 (109)	07:45			06:55			06:18		06:47 (108)	06:05		06:51 (108)
	17:36	39	09:08 (109)	18:12	24	09:04 (109)	19:43			20:14			20:44	51	19:47 (32)	21:06	34	07:25 (108)
18	07:55		08:29 (109)	07:25		08:43 (109)	07:43			06:54			06:17		06:47 (108)	06:05		06:51 (108)
	17:37	39	09:08 (109)	18:14	19	09:02 (109)	19:44			20:15			20:45	48	19:45 (32)	21:07	34	07:25 (108)
19	07:54		08:29 (109)	07:24		08:48 (109)	07:41			06:52		19:37 (32)	06:17		06:46 (108)	06:05		06:51 (108)
	17:38	41	09:10 (109)	18:15	8	08:56 (109)	19:45			20:16	7	19:44 (32)	20:46	42	19:41 (32)	21:07	34	07:25 (108)
20	07:54		08:28 (109)	07:23			07:40			06:51		19:33 (32)	06:16		06:46 (108)	06:06		06:52 (108)
	17:39	42	09:10 (109)	18:16			19:46			20:17	16	19:49 (32)	20:47	36	07:22 (108)	21:07	34	07:26 (108)
21	07:53		08:29 (109)	07:21		17:38 (39)	07:38			06:49		19:30 (32)	06:15		06:46 (108)	06:06		06:52 (108)
	17:40	43	09:12 (109)	18:17	8	17:46 (39)	19:48			20:18	20	19:50 (32)	20:48	37	07:23 (108)	21:07	34	07:26 (108)
22	07:52		08:28 (109)	07:20		17:35 (39)	07:37			06:48		19:28 (32)	06:14		06:46 (108)	06:06		06:52 (108)
	17:41	44	09:12 (109)	18:18	15	17:50 (39)	19:49			20:19	24	19:52 (32)	20:49	37	07:23 (108)	21:08	34	07:26 (108)
23	07:52		08:27 (109)	07:18		17:33 (39)	07:35			06:47		19:27 (32)	06:14		06:45 (108)	06:06		06:52 (108)
	17:42	45	09:12 (109)	18:19	20	17:53 (39)	19:50			20:20	27	19:54 (32)	20:50	38	07:23 (108)	21:08	34	07:26 (108)
24	07:51		08:27 (109)	07:17		17:30 (39)	07:33			06:45		19:25 (32)	06:13		06:46 (108)	06:07		06:53 (108)
	17:44	46	09:13 (109)	18:21	24	17:54 (39)	19:51			20:21	29	19:54 (32)	20:51	38	07:24 (108)	21:08	34	07:27 (108)
25	07:50		08:28 (109)	07:16		17:29 (39)	07:32			06:44		19:24 (32)	06:12		06:45 (108)	06:07		06:53 (108)
	17:45	46	09:14 (109)	18:22	26	17:55 (39)	19:52			20:22	31	19:55 (32)	20:51	39	07:24 (108)	21:08	34	07:27 (108)
26	07:50		08:27 (109)	07:14		17:28 (39)	07:30			06:42		19:24 (32)	06:11		06:45 (108)	06:07		06:52 (108)
	17:46	48	09:15 (109)	18:23	28	17:56 (39)	19:53			20:23	32	19:56 (32)	20:52	38	07:23 (108)	21:08	35	07:27 (108)
27	07:49		08:27 (109)	07:13		17:27 (39)	07:28			06:41		19:22 (32)	06:11		06:45 (108)	06:07		06:53 (108)
	17:47	48	09:15 (109)	18:24	30	17:57 (39)	19:54			20:24	34	19:56 (32)	20:53	39	07:24 (108)	21:08	35	07:28 (108)
28	07:48		08:27 (109)	07:11		17:26 (39)	07:27			06:40		19:22 (32)	06:10		06:45 (108)	06:08		06:53 (108)
	17:48	48	09:15 (109)	18:25	31	17:57 (39)	19:55			20:25	34	19:56 (32)	20:54	39	07:24 (108)	21:08	35	07:28 (108)
29	07:47		08:27 (109)				07:25			06:38		19:22 (32)	06:10		06:46 (108)	06:08		06:53 (108)
	17:50	48	09:15 (109)				19:56			20:26	35	19:57 (32)	20:55	38	07:24 (108)	21:08	35	07:28 (108)
30	07:46		08:27 (109)				07:23			06:37		19:21 (32)	06:09		06:45 (108)	06:09		06:53 (108)
	17:51	49	09:16 (109)				19:57			20:27	35	19:56 (32)	20:55	39	07:24 (108)	21:08	36	07:29 (108)
31	07:46		08:28 (109)				07:22						06:09		06:46 (108)			
	17:52	49	09:17 (109)				19:58						20:56	38	07:24 (108)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		1314			914			379			324			1313			1067	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.62			0.62			0.67			0.63			0.66			0.68	
Total reduction		0.22			0.26			0.29			0.32			0.37			0.41	
Total, real		291			235			111			104			484			433	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 6

Licensed user:
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Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative**Shadow receptor:** 573 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6387)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:53 (108)	06:32		07:02 (108)	07:02			07:31		18:09 (39)	07:04		08:00 (109)	07:37		08:14 (109)
	21:08	36	07:29 (108)	20:51	54	20:03 (32)	20:09			19:19	19	18:28 (39)	17:33	43	08:43 (109)	17:10	47	16:27 (44)
2	06:10		06:54 (108)	06:33		07:03 (108)	07:03			07:32		18:07 (39)	07:05		08:00 (109)	07:38		08:15 (109)
	21:08	36	07:30 (108)	20:50	54	20:04 (32)	20:08			19:17	22	18:29 (39)	17:32	45	08:45 (109)	17:10	47	16:28 (44)
3	06:10		06:53 (108)	06:34		07:05 (108)	07:04			07:33		18:05 (39)	07:06		07:59 (109)	07:39		08:16 (109)
	21:08	36	07:29 (108)	20:49	51	20:05 (32)	20:06			19:15	25	18:30 (39)	17:31	46	08:45 (109)	17:10	45	16:28 (44)
4	06:11		06:54 (108)	06:35		07:08 (108)	07:05			07:34		18:04 (39)	07:07		07:59 (109)	07:40		08:18 (109)
	21:08	36	07:30 (108)	20:48	47	20:05 (32)	20:05			19:14	27	18:31 (39)	17:30	46	08:45 (109)	17:10	43	16:29 (44)
5	06:11		06:53 (108)	06:36		07:12 (108)	07:06			07:35		18:02 (39)	07:08		07:58 (109)	07:41		08:19 (109)
	21:08	37	07:30 (108)	20:47	40	20:06 (32)	20:03			19:12	30	18:32 (39)	17:29	48	08:46 (109)	17:09	43	16:30 (44)
6	06:12		06:54 (108)	06:37		19:30 (32)	07:07			07:36		18:01 (39)	07:09		07:59 (109)	07:42		08:21 (109)
	21:08	37	07:31 (108)	20:45	35	20:05 (32)	20:01			19:10	31	18:32 (39)	17:28	48	08:47 (109)	17:09	41	16:31 (44)
7	06:12		06:53 (108)	06:38		19:30 (32)	07:08			07:37		18:00 (39)	07:11		07:58 (109)	07:43		08:23 (109)
	21:07	37	07:30 (108)	20:44	35	20:05 (32)	20:00			19:09	32	18:32 (39)	17:27	49	08:47 (109)	17:09	39	16:32 (44)
8	06:13		06:54 (108)	06:39		19:30 (32)	07:09			07:38		18:00 (39)	07:12		07:58 (109)	07:44		08:25 (109)
	21:07	37	07:31 (108)	20:43	35	20:05 (32)	19:57			19:07	32	18:32 (39)	17:26	49	08:47 (109)	17:09	37	16:33 (44)
9	06:14		06:54 (108)	06:40		19:30 (32)	07:10			07:39		17:59 (39)	07:13		07:58 (109)	07:45		08:28 (109)
	21:07	38	07:32 (108)	20:42	36	20:06 (32)	19:55			19:06	33	18:32 (39)	17:25	49	08:47 (109)	17:09	32	16:33 (44)
10	06:14		06:53 (108)	06:41		19:29 (32)	07:11			07:40		17:59 (39)	07:14		07:59 (109)	07:46		16:09 (44)
	21:06	38	07:31 (108)	20:41	37	20:06 (32)	19:53			19:04	33	18:32 (39)	17:24	49	08:48 (109)	17:09	25	16:34 (44)
11	06:15		06:54 (108)	06:42		19:29 (32)	07:11			07:41		17:58 (39)	07:15		07:59 (109)	07:47		16:09 (44)
	21:06	38	07:32 (108)	20:39	36	20:05 (32)	19:52			19:03	33	18:31 (39)	17:23	49	08:48 (109)	17:09	26	16:35 (44)
12	06:16		06:54 (108)	06:43		19:29 (32)	07:12			07:42		17:58 (39)	07:16		07:59 (109)	07:47		16:09 (44)
	21:06	39	07:33 (108)	20:38	36	20:05 (32)	19:50			19:01	33	18:31 (39)	17:22	49	08:48 (109)	17:10	26	16:35 (44)
13	06:16		06:54 (108)	06:44		19:29 (32)	07:13			07:43		17:59 (39)	07:17		07:59 (109)	07:48		16:09 (44)
	21:05	38	07:32 (108)	20:37	36	20:05 (32)	19:48			19:00	32	18:31 (39)	17:21	48	08:47 (109)	17:10	26	16:35 (44)
14	06:17		06:54 (108)	06:45		19:30 (32)	07:14			07:44		17:59 (39)	07:19		08:00 (109)	07:49		16:10 (44)
	21:05	39	07:33 (108)	20:36	35	20:05 (32)	19:47			18:58	31	18:30 (39)	17:20	48	08:48 (109)	17:10	26	16:36 (44)
15	06:18		06:54 (108)	06:46		19:30 (32)	07:15			07:45		18:00 (39)	07:20		08:00 (109)	07:50		16:10 (44)
	21:04	39	07:33 (108)	20:34	34	20:04 (32)	19:45			18:57	29	18:29 (39)	17:19	48	08:48 (109)	17:10	27	16:37 (44)
16	06:19		06:55 (108)	06:47		19:30 (32)	07:16			07:46		18:00 (39)	07:21		08:00 (109)	07:50		16:10 (44)
	21:04	38	07:33 (108)	20:33	33	20:03 (32)	19:43			18:55	28	18:28 (39)	17:18	48	08:48 (109)	17:10	27	16:37 (44)
17	06:19		06:54 (108)	06:48		19:30 (32)	07:17			07:47		18:01 (39)	07:22		08:01 (109)	07:51		16:11 (44)
	21:03	39	07:33 (108)	20:32	32	20:02 (32)	19:42			18:54	25	18:26 (39)	17:18	46	08:47 (109)	17:11	27	16:38 (44)
18	06:20		06:55 (108)	06:49		19:30 (32)	07:18			07:48		18:02 (39)	07:23		08:01 (109)	07:52		16:12 (44)
	21:02	38	07:33 (108)	20:30	31	20:01 (32)	19:40			18:52	23	18:25 (39)	17:17	46	08:47 (109)	17:11	27	16:39 (44)
19	06:21		06:55 (108)	06:50		19:31 (32)	07:19			07:49		18:04 (39)	07:24		08:02 (109)	07:52		16:12 (44)
	21:02	38	07:33 (108)	20:29	29	20:00 (32)	19:38			18:51	19	18:23 (39)	17:16	45	08:47 (109)	17:12	27	16:39 (44)
20	06:22		06:55 (108)	06:51		19:32 (32)	07:20			07:50		18:06 (39)	07:25		08:03 (109)	07:53		16:13 (44)
	21:01	38	07:33 (108)	20:27	26	19:58 (32)	19:37			18:49	14	18:20 (39)	17:15	44	08:47 (109)	17:12	27	16:40 (44)
21	06:23		06:55 (108)	06:51		19:34 (32)	07:21			07:51		18:12 (39)	07:27		08:04 (109)	07:53		16:12 (44)
	21:00	37	07:32 (108)	20:26	23	19:57 (32)	19:35			18:48	2	18:13 (39)	17:15	43	08:47 (109)	17:12	27	16:39 (44)
22	06:24		06:55 (108)	06:52		19:35 (32)	07:22			07:52			07:28		08:04 (109)	07:54		16:13 (44)
	21:00	38	07:33 (108)	20:25	20	19:55 (32)	19:33			18:46			17:14	42	08:46 (109)	17:13	27	16:40 (44)
23	06:24		06:56 (108)	06:53		19:38 (32)	07:23			07:54		09:16 (109)	07:29		08:05 (109)	07:54		16:13 (44)
	20:59	37	07:33 (108)	20:23	14	19:52 (32)	19:32			18:45	12	09:28 (109)	17:14	41	08:46 (109)	17:13	27	16:40 (44)
24	06:25		06:56 (108)	06:54		19:42 (32)	07:24			07:55		09:12 (109)	07:30		08:07 (109)	07:55		16:15 (44)
	20:58	36	07:32 (108)	20:22	5	19:47 (32)	19:30			18:44	20	09:32 (109)	17:13	39	08:46 (109)	17:14	27	16:42 (44)
25	06:26		06:57 (108)	06:55			07:25			07:56		09:09 (109)	07:31		08:07 (109)	07:55		16:15 (44)
	20:57	45	19:54 (32)	20:20			19:28			18:42	25	09:34 (109)	17:13	39	08:46 (109)	17:15	27	16:42 (44)
26	06:27		06:58 (108)	06:56			07:26			07:57		09:07 (109)	07:32		08:08 (109)	07:56		16:15 (44)
	20:57	48	19:56 (32)	20:19			19:27			18:41	29	09:36 (109)	17:12	37	08:45 (109)	17:15	27	16:42 (44)
27	06:28		06:58 (108)	06:57			07:27			07:58		09:05 (109)	07:33		08:09 (109)	07:56		16:16 (44)
	20:56	52	19:58 (32)	20:17			19:25			18:40	33	09:38 (109)	17:12	43	16:20 (44)	17:16	27	16:43 (44)
28	06:29		06:58 (108)	06:58			07:28			07:59		09:05 (109)	07:34		08:10 (109)	07:56		16:16 (44)
	20:55	53	19:59 (32)	20:16			19:23			18:38	35	09:40 (109)	17:11	45	16:22 (44)	17:17	27	16:43 (44)
29	06:30		06:59 (108)	06:59			07:29			08:00		09:03 (109)	07:35		08:11 (109)	07:57		16:17 (44)
	20:54	54	20:00 (32)	20:14			19:22			18:37	38	09:41 (109)	17:11	46	16:24 (44)	17:17	26	16:43 (44)
30	06:31		07:00 (108)	07:00			07:30		18:12 (39)	08:01		09:02 (109)	07:36		08:12 (109)	07:57		16:17 (44)
	20:53	54	20:01 (32)	20:13			19:20	13	18:25 (39)	18:36	40	09:42 (109)	17:11	47	16:25 (44)	17:18	26	16:43 (44)
31	06:32		07:01 (108)	07:01						08:02		09:01 (109)				07:57		16:17 (44)
	20:52	54	20:02 (32)	20:11						18:35	42	09:43 (109)				17:19	27	16:44 (44)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		1260			814			13			827			1365			960	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.68			0.64			0.67			0.65			0.61			0.66	
Total reduction		0.40			0.38			0.41			0.36			0.22			0.33	
Total, real		508			310			5			299			304			316	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 7

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative**Shadow receptor:** 575 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6388)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January	February	March			April	May			June		
1	07:57	07:45	07:10			07:20	06:36			06:08		06:52 (109)
	17:20	17:53	18:26			19:59	20:28			20:57	56	20:10 (39)
2	07:58	07:44	07:08			07:19	06:35			06:08		06:51 (109)
	17:21	17:54	18:27			20:00	20:29			20:58	57	20:10 (39)
3	07:58	07:43	07:07			07:17	06:33			06:07		06:51 (109)
	17:21	17:56	18:28			20:00	20:30			20:58	57	20:10 (39)
4	07:58	07:42	07:05			07:15	06:32		19:53 (39)	06:07		06:50 (109)
	17:22	17:57	18:29			20:01	20:31	12	20:05 (39)	20:59	56	20:08 (39)
5	07:58	07:41	07:04		18:01 (44)	07:14	06:31		19:50 (39)	06:07		06:49 (109)
	17:23	17:58	18:31	5	18:06 (44)	20:02	20:32	16	20:06 (39)	21:00	57	20:08 (39)
6	07:58	07:40	07:02		17:56 (44)	07:12	06:30		19:48 (39)	06:06		06:49 (109)
	17:24	17:59	18:32	14	18:10 (44)	20:03	20:33	20	20:08 (39)	21:01	57	20:08 (39)
7	07:58	07:39	07:01		17:54 (44)	07:11	06:29		19:47 (39)	06:06		06:49 (109)
	17:25	18:01	18:33	18	18:12 (44)	20:04	20:34	22	20:09 (39)	21:01	55	20:07 (39)
8	07:58	07:37	07:59		18:51 (44)	07:09	06:27		19:46 (39)	06:06		06:48 (109)
	17:26	18:02	19:34	22	19:13 (44)	20:05	20:35	24	20:10 (39)	21:02	55	20:06 (39)
9	07:57	07:36	07:57		18:50 (44)	07:08	06:26		19:45 (39)	06:06		06:48 (109)
	17:27	18:03	19:35	23	19:13 (44)	20:06	20:36	26	20:11 (39)	21:02	54	20:05 (39)
10	07:57	07:35	07:56		18:49 (44)	07:06	06:25		19:44 (39)	06:06		06:48 (109)
	17:28	18:04	19:36	26	19:15 (44)	20:07	20:37	28	20:12 (39)	21:03	52	20:04 (39)
11	07:57	07:34	07:54		18:48 (44)	07:04	06:24		19:44 (39)	06:05		06:48 (109)
	17:29	18:05	19:37	27	19:15 (44)	20:08	20:38	28	20:12 (39)	21:03	46	07:34 (109)
12	07:57	07:33	07:53		18:48 (44)	07:03	06:23		19:43 (39)	06:05		06:48 (109)
	17:30	18:07	19:38	28	19:16 (44)	20:09	20:39	30	20:13 (39)	21:04	47	07:35 (109)
13	07:56	07:32	07:51		18:47 (44)	07:01	06:22		19:43 (39)	06:05		06:48 (109)
	17:31	18:08	19:39	29	19:16 (44)	20:10	20:40	30	20:13 (39)	21:04	47	07:35 (109)
14	07:56	07:30	07:49		18:46 (44)	07:00	06:21		19:43 (39)	06:05		06:48 (109)
	17:32	18:09	19:40	29	19:15 (44)	20:11	20:41	30	20:13 (39)	21:05	48	07:36 (109)
15	07:56	07:29	07:48		18:46 (44)	06:58	06:20		19:42 (39)	06:05		06:48 (109)
	17:33	18:10	19:41	30	19:16 (44)	20:12	20:42	31	20:13 (39)	21:05	48	07:36 (109)
16	07:55	07:28	07:46		18:46 (44)	06:57	06:19		19:42 (39)	06:05		06:48 (109)
	17:34	18:11	19:42	29	19:15 (44)	20:13	20:43	31	20:13 (39)	21:06	49	07:37 (109)
17	07:55	07:27	07:45		18:46 (44)	06:55	06:18		19:43 (39)	06:05		06:48 (109)
	17:36	18:12	19:43	28	19:14 (44)	20:14	20:44	31	20:14 (39)	21:06	49	07:37 (109)
18	07:55	07:25	07:43		18:47 (44)	06:54	06:18		19:43 (39)	06:05		06:48 (109)
	17:37	18:14	19:44	26	19:13 (44)	20:15	20:45	31	20:14 (39)	21:07	49	07:37 (109)
19	07:54	07:24	07:41		18:47 (44)	06:52	06:17		19:43 (39)	06:05		06:48 (109)
	17:38	18:15	19:45	25	19:12 (44)	20:16	20:46	31	20:14 (39)	21:07	49	07:37 (109)
20	07:53	07:23	07:40		18:48 (44)	06:51	06:16		19:43 (39)	06:06		06:49 (109)
	17:39	18:16	19:46	23	19:11 (44)	20:17	20:47	30	20:13 (39)	21:07	49	07:38 (109)
21	07:53	07:21	07:38		18:49 (44)	06:49	06:15		19:44 (39)	06:06		06:49 (109)
	17:40	18:17	19:48	20	19:09 (44)	20:18	20:48	30	20:14 (39)	21:07	49	07:38 (109)
22	07:52	07:20	07:37		18:50 (44)	06:48	06:14		19:44 (39)	06:06		06:49 (109)
	17:41	18:18	19:49	16	19:06 (44)	20:19	20:49	30	20:14 (39)	21:08	49	07:38 (109)
23	07:52	07:18	07:35		18:54 (44)	06:47	06:14		19:44 (39)	06:06		06:49 (109)
	17:42	18:19	19:50	10	19:04 (44)	20:20	20:50	29	20:13 (39)	21:08	49	07:38 (109)
24	07:51	07:17	07:33			06:45	06:13		19:45 (39)	06:07		06:50 (109)
	17:44	18:21	19:51			20:21	20:51	29	20:14 (39)	21:08	49	07:39 (109)
25	07:50	07:16	07:32			06:44	06:12		07:06 (109)	06:07		06:50 (109)
	17:45	18:22	19:52			20:22	20:51	33	20:13 (39)	21:08	49	07:39 (109)
26	07:50	07:14	07:30			06:42	06:11		07:01 (109)	06:07		06:50 (109)
	17:46	18:23	19:53			20:23	20:52	42	20:12 (39)	21:08	49	07:39 (109)
27	07:49	07:13	07:28			06:41	06:11		06:59 (109)	06:07		06:51 (109)
	17:47	18:24	19:54			20:24	20:53	47	20:13 (39)	21:08	48	07:39 (109)
28	07:48	07:11	07:27			06:40	06:10		06:57 (109)	06:08		06:51 (109)
	17:48	18:25	19:55			20:25	20:54	50	20:12 (39)	21:08	48	07:39 (109)
29	07:47		07:25			06:38	06:10		06:56 (109)	06:08		06:51 (109)
	17:50		19:56			20:26	20:55	52	20:12 (39)	21:08	48	07:39 (109)
30	07:46		07:23			06:37	06:09		06:54 (109)	06:09		06:52 (109)
	17:51		19:57			20:27	20:55	54	20:11 (39)	21:08	47	07:39 (109)
31	07:45		07:22				06:09		06:53 (109)			
	17:52		19:58				20:56	56	20:11 (39)			
Potential sun hours	300	299	370			397	446			449		
Total, worst case				428				903			1522	
Sun reduction				0.44				0.56			0.60	
Oper. time red.				1.00				1.00			1.00	
Wind dir. red.				0.67				0.64			0.68	
Total reduction				0.29				0.36			0.41	
Total, real				126				324			619	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

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3/2/2012 10:01 AM / 8

Licensed user:
EDR
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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative**Shadow receptor:** 575 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6388)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November	December
1	06:09		06:52 (109)	06:32		19:54 (39)	07:02			07:31		18:26 (44)	07:04	07:37
	21:08	47	07:39 (109)	20:51	29	20:23 (39)	20:09			19:19	29	18:55 (44)	17:33	17:10
2	06:10		06:53 (109)	06:33		19:55 (39)	07:03			07:32		18:26 (44)	07:05	07:38
	21:08	50	20:08 (39)	20:50	28	20:23 (39)	20:08			19:17	28	18:54 (44)	17:32	17:10
3	06:10		06:53 (109)	06:34		19:55 (39)	07:04			07:33		18:26 (44)	07:06	07:39
	21:08	53	20:10 (39)	20:49	27	20:22 (39)	20:06			19:15	27	18:53 (44)	17:31	17:10
4	06:11		06:54 (109)	06:35		19:56 (39)	07:05			07:34		18:27 (44)	07:07	07:40
	21:08	54	20:11 (39)	20:48	25	20:21 (39)	20:05			19:14	25	18:52 (44)	17:30	17:10
5	06:11		06:54 (109)	06:36		19:57 (39)	07:06			07:35		18:27 (44)	07:08	07:41
	21:08	56	20:12 (39)	20:47	24	20:21 (39)	20:03			19:12	23	18:50 (44)	17:29	17:09
6	06:12		06:55 (109)	06:37		19:57 (39)	07:07			07:36		18:29 (44)	07:09	07:42
	21:08	57	20:14 (39)	20:45	22	20:19 (39)	20:01			19:10	19	18:48 (44)	17:28	17:09
7	06:12		06:55 (109)	06:38		19:58 (39)	07:08			07:37		18:30 (44)	07:10	07:43
	21:07	57	20:14 (39)	20:44	19	20:17 (39)	20:00			19:09	17	18:47 (44)	17:27	17:09
8	06:13		06:57 (109)	06:39		20:00 (39)	07:09			07:38		18:33 (44)	07:12	07:44
	21:07	57	20:15 (39)	20:43	15	20:15 (39)	19:57			19:07	11	18:44 (44)	17:26	17:09
9	06:14		06:58 (109)	06:40		20:03 (39)	07:10			07:39			07:13	07:45
	21:07	58	20:17 (39)	20:42	10	20:13 (39)	19:55			19:06			17:25	17:09
10	06:14		06:58 (109)	06:41			07:11			07:40			07:14	07:46
	21:06	57	20:17 (39)	20:41			19:53			19:04			17:24	17:09
11	06:15		06:59 (109)	06:42			07:11			07:41			07:15	07:47
	21:06	57	20:18 (39)	20:39			19:52			19:03			17:23	17:09
12	06:16		07:01 (109)	06:43			07:12			07:42			07:16	07:47
	21:06	56	20:19 (39)	20:38			19:50			19:01			17:22	17:10
13	06:16		07:01 (109)	06:44			07:13			07:43			07:17	07:48
	21:05	55	20:19 (39)	20:37			19:48			19:00			17:21	17:10
14	06:17		07:03 (109)	06:45			07:14			07:44			07:19	07:49
	21:05	53	20:20 (39)	20:36			19:47			18:58			17:20	17:10
15	06:18		07:05 (109)	06:46			07:15			07:45			07:20	07:50
	21:04	52	20:21 (39)	20:34			19:45			18:57			17:19	17:10
16	06:19		07:07 (109)	06:47			07:16			07:46			07:21	07:50
	21:04	50	20:22 (39)	20:33			19:43			18:55			17:18	17:10
17	06:19		07:09 (109)	06:48			07:17			07:47			07:22	07:51
	21:03	45	20:21 (39)	20:32			19:42			18:54			17:18	17:11
18	06:20		07:12 (109)	06:49			07:18			07:48			07:23	07:52
	21:02	40	20:22 (39)	20:30			19:40			18:52			17:17	17:11
19	06:21		19:54 (39)	06:50			07:19			07:49			07:24	07:52
	21:02	29	20:23 (39)	20:29			19:38			18:51			17:16	17:12
20	06:22		19:54 (39)	06:51			07:20		18:42 (44)	07:50			07:25	07:53
	21:01	29	20:23 (39)	20:27			19:37	7	18:49 (44)	18:49			17:15	17:12
21	06:23		19:53 (39)	06:51			07:21		18:38 (44)	07:51			07:27	07:53
	21:00	30	20:23 (39)	20:26			19:35	14	18:52 (44)	18:48			17:15	17:12
22	06:24		19:53 (39)	06:52			07:22		18:34 (44)	07:52			07:28	07:54
	21:00	30	20:23 (39)	20:25			19:33	19	18:53 (44)	18:46			17:14	17:13
23	06:24		19:53 (39)	06:53			07:23		18:32 (44)	07:54			07:29	07:54
	20:59	31	20:24 (39)	20:23			19:32	22	18:54 (44)	18:45			17:14	17:13
24	06:25		19:53 (39)	06:54			07:24		18:31 (44)	07:55			07:30	07:55
	20:58	31	20:24 (39)	20:22			19:30	24	18:55 (44)	18:44			17:13	17:14
25	06:26		19:53 (39)	06:55			07:25		18:29 (44)	07:56			07:31	07:55
	20:57	31	20:24 (39)	20:20			19:28	27	18:56 (44)	18:42			17:13	17:15
26	06:27		19:53 (39)	06:56			07:26		18:28 (44)	07:57			07:32	07:56
	20:57	32	20:25 (39)	20:19			19:27	28	18:56 (44)	18:41			17:12	17:15
27	06:28		19:53 (39)	06:57			07:27		18:27 (44)	07:58			07:33	07:56
	20:56	32	20:25 (39)	20:17			19:25	29	18:56 (44)	18:40			17:12	17:16
28	06:29		19:53 (39)	06:58			07:28		18:27 (44)	07:59			07:34	07:56
	20:55	31	20:24 (39)	20:16			19:23	29	18:56 (44)	18:38			17:11	17:17
29	06:30		19:53 (39)	06:59			07:29		18:26 (44)	08:00			07:35	07:57
	20:54	31	20:24 (39)	20:14			19:22	30	18:56 (44)	18:37			17:11	17:17
30	06:31		19:53 (39)	07:00			07:30		18:26 (44)	08:01			07:36	07:57
	20:53	31	20:24 (39)	20:13			19:20	29	18:55 (44)	18:36			17:11	17:18
31	06:32		19:54 (39)	07:01						08:02				07:57
	20:52	29	20:23 (39)	20:11						18:35				17:19
Potential sun hours	456			427			374			346			300	291
Total, worst case		1351			199			258			179			
Sun reduction		0.60			0.60			0.61			0.56			
Oper. time red.		1.00			1.00			1.00			1.00			
Wind dir. red.		0.66			0.63			0.67			0.67			
Total reduction		0.39			0.38			0.41			0.37			
Total, real		532			75			105			67			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

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3/2/2012 10:01 AM / 9

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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative**Shadow receptor:** 581 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6390)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March	April			May			June		
1	07:57		16:34 (109)	07:45		16:34 (109)	07:10	07:20			06:36		07:22 (33)	06:08		19:11 (108)
	17:20	13	16:47 (109)	17:53	35	17:09 (109)	18:26	19:59			20:28	32	07:54 (33)	20:57	56	20:07 (108)
2	07:57		16:33 (109)	07:44		16:35 (109)	07:08	07:19			06:35		07:23 (33)	06:08		19:11 (108)
	17:21	15	16:48 (109)	17:54	33	17:08 (109)	18:27	20:00			20:29	30	07:53 (33)	20:58	57	20:08 (108)
3	07:58		16:33 (109)	07:43		16:36 (109)	07:07	07:17			06:33		07:24 (33)	06:07		19:11 (108)
	17:21	16	16:49 (109)	17:56	32	17:08 (109)	18:28	20:00			20:30	28	07:52 (33)	20:58	58	20:09 (108)
4	07:58		16:32 (109)	07:42		16:36 (109)	07:05	07:15			06:32		07:26 (33)	06:07		19:11 (108)
	17:22	18	16:50 (109)	17:57	30	17:06 (109)	18:29	20:01			20:31	24	07:50 (33)	20:59	58	20:09 (108)
5	07:58		16:32 (109)	07:41		16:37 (109)	07:04	07:14			06:31		07:26 (33)	06:07		19:11 (108)
	17:23	20	16:52 (109)	17:58	28	17:05 (109)	18:31	20:02			20:32	22	07:48 (33)	21:00	59	20:10 (108)
6	07:58		16:32 (109)	07:40		16:39 (109)	07:02	07:12			06:30		07:28 (33)	06:06		19:11 (108)
	17:24	21	16:53 (109)	17:59	25	17:04 (109)	18:32	20:03			20:33	18	07:46 (33)	21:00	59	20:10 (108)
7	07:58		16:32 (109)	07:39		16:41 (109)	07:01	07:11			06:29		07:31 (33)	06:06		19:11 (108)
	17:25	22	16:54 (109)	18:00	22	17:03 (109)	18:33	20:04			20:34	12	07:43 (33)	21:01	60	20:11 (108)
8	07:57		16:31 (109)	07:37		16:43 (109)	07:59	07:09			06:27			06:06		19:10 (108)
	17:26	25	16:56 (109)	18:02	18	17:01 (109)	19:34	20:05			20:35			21:02	60	20:10 (108)
9	07:57		16:31 (109)	07:36		16:46 (109)	07:57	07:07		07:36 (33)	06:26			06:06		19:11 (108)
	17:27	26	16:57 (109)	18:03	12	16:58 (109)	19:35	20:06	15	07:51 (33)	20:36			21:02	60	20:11 (108)
10	07:57		16:31 (109)	07:35			07:56	07:06		07:33 (33)	06:25			06:06		19:11 (108)
	17:28	27	16:58 (109)	18:04			19:36	20:07	21	07:54 (33)	20:37			21:03	60	20:11 (108)
11	07:57		16:30 (109)	07:34			07:54	07:04		07:30 (33)	06:24			06:05		19:11 (108)
	17:29	28	16:58 (109)	18:05			19:37	20:08	25	07:55 (33)	20:38			21:03	61	20:12 (108)
12	07:57		16:31 (109)	07:33			07:53	07:03		07:29 (33)	06:23			06:05		19:11 (108)
	17:30	29	17:00 (109)	18:06			19:38	20:09	28	07:57 (33)	20:39			21:04	61	20:12 (108)
13	07:56		16:31 (109)	07:32			07:51	07:01		07:27 (33)	06:22		19:35 (108)	06:05		19:11 (108)
	17:31	30	17:01 (109)	18:08			19:39	20:10	31	07:58 (33)	20:40	6	19:41 (108)	21:04	62	20:13 (108)
14	07:56		16:30 (109)	07:30			07:49	07:00		07:25 (33)	06:21		19:29 (108)	06:05		19:11 (108)
	17:32	31	17:01 (109)	18:09			19:40	20:11	33	07:58 (33)	20:41	18	19:47 (108)	21:05	62	20:13 (108)
15	07:56		16:30 (109)	07:29			07:48	06:58		07:24 (33)	06:20		19:26 (108)	06:05		19:12 (108)
	17:33	33	17:03 (109)	18:10			19:41	20:12	35	07:59 (33)	20:42	24	19:50 (108)	21:05	61	20:13 (108)
16	07:55		16:30 (109)	07:28			07:46	06:57		07:23 (33)	06:19		19:24 (108)	06:05		19:12 (108)
	17:34	33	17:03 (109)	18:11			19:42	20:13	36	07:59 (33)	20:43	28	19:52 (108)	21:06	61	20:13 (108)
17	07:55		16:30 (109)	07:27			07:45	06:55		07:22 (33)	06:18		19:22 (108)	06:05		19:12 (108)
	17:36	34	17:04 (109)	18:12			19:43	20:14	38	08:00 (33)	20:44	32	19:54 (108)	21:06	62	20:14 (108)
18	07:54		16:30 (109)	07:25			07:43	06:54		07:22 (33)	06:17		19:21 (108)	06:05		19:12 (108)
	17:37	34	17:04 (109)	18:14			19:44	20:15	39	08:01 (33)	20:45	35	19:56 (108)	21:06	62	20:14 (108)
19	07:54		16:30 (109)	07:24			07:41	06:52		07:21 (33)	06:17		19:19 (108)	06:05		19:12 (108)
	17:38	36	17:06 (109)	18:15			19:45	20:16	39	08:00 (33)	20:46	38	19:57 (108)	21:07	62	20:14 (108)
20	07:53		16:30 (109)	07:23			07:40	06:51		07:21 (33)	06:16		19:18 (108)	06:06		19:12 (108)
	17:39	36	17:06 (109)	18:16			19:46	20:17	40	08:01 (33)	20:47	40	19:58 (108)	21:07	62	20:14 (108)
21	07:53		16:29 (109)	07:21			07:38	06:49		07:20 (33)	06:15		19:16 (108)	06:06		19:13 (108)
	17:40	37	17:06 (109)	18:17			19:47	20:18	40	08:00 (33)	20:48	43	19:59 (108)	21:07	62	20:15 (108)
22	07:52		16:30 (109)	07:20			07:36	06:48		07:20 (33)	06:14		19:16 (108)	06:06		19:13 (108)
	17:41	37	17:07 (109)	18:18			19:49	20:19	40	08:00 (33)	20:49	45	20:01 (108)	21:08	62	20:15 (108)
23	07:52		16:30 (109)	07:18			07:35	06:47		07:20 (33)	06:13		19:15 (108)	06:06		19:13 (108)
	17:42	37	17:07 (109)	18:19			19:50	20:20	40	08:00 (33)	20:50	46	20:01 (108)	21:08	62	20:15 (108)
24	07:51		16:30 (109)	07:17			07:33	06:45		07:19 (33)	06:13		19:14 (108)	06:06		19:13 (108)
	17:44	37	17:07 (109)	18:20			19:51	20:21	40	07:59 (33)	20:50	48	20:02 (108)	21:08	62	20:15 (108)
25	07:50		16:31 (109)	07:16			07:32	06:44		07:20 (33)	06:12		19:14 (108)	06:07		19:14 (108)
	17:45	37	17:08 (109)	18:22			19:52	20:22	39	07:59 (33)	20:51	49	20:03 (108)	21:08	62	20:16 (108)
26	07:50		16:31 (109)	07:14			07:30	06:42		07:19 (33)	06:11		19:13 (108)	06:07		19:14 (108)
	17:46	37	17:08 (109)	18:23			19:53	20:23	39	07:58 (33)	20:52	51	20:04 (108)	21:08	61	20:15 (108)
27	07:49		16:31 (109)	07:13			07:28	06:41		07:20 (33)	06:11		19:13 (108)	06:07		19:14 (108)
	17:47	37	17:08 (109)	18:24			19:54	20:24	37	07:57 (33)	20:53	52	20:05 (108)	21:08	61	20:15 (108)
28	07:48		16:31 (109)	07:11			07:27	06:40		07:20 (33)	06:10		19:12 (108)	06:08		19:15 (108)
	17:48	37	17:08 (109)	18:25			19:55	20:25	37	07:57 (33)	20:54	53	20:05 (108)	21:08	61	20:16 (108)
29	07:47		16:32 (109)				07:25	06:38		07:21 (33)	06:10		19:12 (108)	06:08		19:14 (108)
	17:50	36	17:08 (109)				19:56	20:26	35	07:56 (33)	20:55	54	20:06 (108)	21:08	62	20:16 (108)
30	07:46		16:32 (109)				07:23	06:37		07:21 (33)	06:09		19:12 (108)	06:09		19:15 (108)
	17:51	36	17:08 (109)				19:57	20:27	34	07:55 (33)	20:55	54	20:06 (108)	21:08	61	20:16 (108)
31	07:45		16:33 (109)				07:22				06:09		19:12 (108)			
	17:52	35	17:08 (109)				19:58				20:56	55	20:07 (108)			
Potential sun hours	300			299			370	397			446			449		
Total, worst case		930			235				761			937			1819	
Sun reduction		0.36			0.42				0.51			0.56			0.60	
Oper. time red.		1.00			1.00				1.00			1.00			1.00	
Wind dir. red.		0.68			0.68				0.67			0.64			0.63	
Total reduction		0.25			0.29				0.34			0.36			0.38	
Total, real		228			67				260			335			689	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative**Shadow receptor:** 581 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6390)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October	November			December		
1	06:09		19:15 (108)	06:32			07:02		07:29 (33)	07:31	07:04		16:21 (109)	07:37		16:12 (109)
	21:08	61	20:16 (108)	20:51			20:09	25	07:54 (33)	19:19	17:33	2	16:22 (109)	17:10	29	16:41 (109)
2	06:10		19:16 (108)	06:33			07:03		07:31 (33)	07:32	07:05		16:15 (109)	07:38		16:13 (109)
	21:08	61	20:17 (108)	20:50			20:08	21	07:52 (33)	19:17	17:32	14	16:29 (109)	17:10	27	16:40 (109)
3	06:10		19:16 (108)	06:34			07:04		07:34 (33)	07:33	07:06		16:12 (109)	07:39		16:14 (109)
	21:08	60	20:16 (108)	20:49			20:06	15	07:49 (33)	19:15	17:31	19	16:31 (109)	17:10	26	16:40 (109)
4	06:11		19:17 (108)	06:35			07:05			07:34	07:07		16:10 (109)	07:40		16:15 (109)
	21:08	60	20:17 (108)	20:48			20:05			19:14	17:30	23	16:33 (109)	17:10	25	16:40 (109)
5	06:11		19:16 (108)	06:36		07:44 (33)	07:06			07:35	07:08		16:09 (109)	07:41		16:17 (109)
	21:08	60	20:16 (108)	20:47	6	07:50 (33)	20:03			19:12	17:29	25	16:34 (109)	17:09	22	16:39 (109)
6	06:12		19:17 (108)	06:37		07:40 (33)	07:07			07:36	07:09		16:08 (109)	07:42		16:18 (109)
	21:08	59	20:16 (108)	20:45	14	07:54 (33)	20:01			19:10	17:28	28	16:36 (109)	17:09	21	16:39 (109)
7	06:12		19:17 (108)	06:38		07:37 (33)	07:08			07:37	07:10		16:07 (109)	07:43		16:19 (109)
	21:07	59	20:16 (108)	20:44	19	07:56 (33)	20:00			19:09	17:27	30	16:37 (109)	17:09	20	16:39 (109)
8	06:13		19:18 (108)	06:39		07:35 (33)	07:09			07:38	07:12		16:06 (109)	07:44		16:20 (109)
	21:07	58	20:16 (108)	20:43	23	07:58 (33)	19:57			19:07	17:26	31	16:37 (109)	17:09	19	16:39 (109)
9	06:14		19:19 (108)	06:40		07:34 (33)	07:10			07:39	07:13		16:05 (109)	07:45		16:22 (109)
	21:07	57	20:16 (108)	20:42	26	08:00 (33)	19:55			19:06	17:25	33	16:38 (109)	17:09	16	16:38 (109)
10	06:14		19:18 (108)	06:41		07:33 (33)	07:10			07:40	07:14		16:05 (109)	07:46		16:23 (109)
	21:06	58	20:16 (108)	20:41	28	08:01 (33)	19:53			19:04	17:24	34	16:39 (109)	17:09	15	16:38 (109)
11	06:15		19:19 (108)	06:42		07:31 (33)	07:11			07:41	07:15		16:05 (109)	07:47		16:25 (109)
	21:06	57	20:16 (108)	20:39	31	08:02 (33)	19:52			19:03	17:23	35	16:40 (109)	17:09	13	16:38 (109)
12	06:16		19:20 (108)	06:43		07:30 (33)	07:12			07:42	07:16		16:04 (109)	07:47		16:25 (109)
	21:06	56	20:16 (108)	20:38	33	08:03 (33)	19:50			19:01	17:22	36	16:40 (109)	17:10	11	16:36 (109)
13	06:16		19:20 (108)	06:44		07:29 (33)	07:13			07:43	07:17		16:04 (109)	07:48		16:27 (109)
	21:05	55	20:15 (108)	20:37	35	08:04 (33)	19:48			18:59	17:21	36	16:40 (109)	17:10	9	16:36 (109)
14	06:17		19:21 (108)	06:45		07:29 (33)	07:14			07:44	07:19		16:03 (109)	07:49		16:29 (109)
	21:05	54	20:15 (108)	20:36	35	08:04 (33)	19:47			18:58	17:20	37	16:40 (109)	17:10	6	16:35 (109)
15	06:18		19:21 (108)	06:46		07:28 (33)	07:15			07:45	07:20		16:04 (109)	07:50		16:32 (109)
	21:04	54	20:15 (108)	20:34	37	08:05 (33)	19:45			18:56	17:19	37	16:41 (109)	17:10	2	16:34 (109)
16	06:19		19:22 (108)	06:47		07:27 (33)	07:16			07:46	07:21		16:04 (109)	07:50		
	21:04	53	20:15 (108)	20:33	38	08:05 (33)	19:43			18:55	17:18	37	16:41 (109)	17:10		
17	06:19		19:22 (108)	06:48		07:26 (33)	07:17			07:47	07:22		16:04 (109)	07:51		
	21:03	51	20:13 (108)	20:32	38	08:04 (33)	19:42			18:53	17:17	37	16:41 (109)	17:11		
18	06:20		19:23 (108)	06:49		07:25 (33)	07:18			07:48	07:23		16:04 (109)	07:52		
	21:02	50	20:13 (108)	20:30	40	08:05 (33)	19:40			18:52	17:17	37	16:41 (109)	17:11		
19	06:21		19:24 (108)	06:50		07:25 (33)	07:19			07:49	07:24		16:05 (109)	07:52		
	21:02	49	20:13 (108)	20:29	40	08:05 (33)	19:38			18:51	17:16	37	16:42 (109)	17:11		
20	06:22		19:25 (108)	06:50		07:25 (33)	07:20			07:50	07:25		16:05 (109)	07:53		
	21:01	47	20:12 (108)	20:27	40	08:05 (33)	19:37			18:49	17:15	37	16:42 (109)	17:12		
21	06:23		19:25 (108)	06:51		07:25 (33)	07:21			07:51	07:27		16:05 (109)	07:53		
	21:00	46	20:11 (108)	20:26	40	08:05 (33)	19:35			18:48	17:15	37	16:42 (109)	17:12		
22	06:23		19:26 (108)	06:52		07:25 (33)	07:22			07:52	07:28		16:06 (109)	07:54		
	21:00	44	20:10 (108)	20:25	40	08:05 (33)	19:33			18:46	17:14	36	16:42 (109)	17:13		
23	06:24		19:28 (108)	06:53		07:25 (33)	07:23			07:53	07:29		16:06 (109)	07:54		
	20:59	41	20:09 (108)	20:23	39	08:04 (33)	19:32			18:45	17:14	36	16:42 (109)	17:13		
24	06:25		19:29 (108)	06:54		07:25 (33)	07:24			07:55	07:30		16:07 (109)	07:55		
	20:58	39	20:08 (108)	20:22	39	08:04 (33)	19:30			18:44	17:13	34	16:41 (109)	17:14		
25	06:26		19:30 (108)	06:55		07:25 (33)	07:25			07:56	07:31		16:08 (109)	07:55		
	20:57	37	20:07 (108)	20:20	38	08:03 (33)	19:28			18:42	17:12	34	16:42 (109)	17:14		
26	06:27		19:32 (108)	06:56		07:25 (33)	07:26			07:57	07:32		16:09 (109)	07:56		
	20:56	34	20:06 (108)	20:19	38	08:03 (33)	19:27			18:41	17:12	33	16:42 (109)	17:15		
27	06:28		19:33 (108)	06:57		07:26 (33)	07:27			07:58	07:33		16:09 (109)	07:56		
	20:56	30	20:03 (108)	20:17	36	08:02 (33)	19:25			18:40	17:12	33	16:42 (109)	17:16		
28	06:29		19:35 (108)	06:58		07:26 (33)	07:28			07:59	07:34		16:10 (109)	07:56		
	20:55	26	20:01 (108)	20:16	35	08:01 (33)	19:23			18:38	17:11	31	16:41 (109)	17:16		
29	06:30		19:38 (108)	06:59		07:26 (33)	07:29			08:00	07:35		16:11 (109)	07:57		16:37 (109)
	20:54	21	19:59 (108)	20:14	33	07:59 (33)	19:22			18:37	17:11	30	16:41 (109)	17:17	5	16:42 (109)
30	06:31		19:42 (108)	07:00		07:27 (33)	07:30			08:01	07:36		16:12 (109)	07:57		16:35 (109)
	20:53	13	19:55 (108)	20:12	31	07:58 (33)	19:20			18:36	17:10	29	16:41 (109)	17:18	8	16:43 (109)
31	06:31			07:01		07:28 (33)				08:02				07:57		16:34 (109)
	20:52			20:11	28	07:56 (33)				18:35				17:19	11	16:45 (109)
Potential sun hours	456			427			374			346	300			291		
Total, worst case		1450			880			61				938			285	
Sun reduction		0.60			0.60			0.61				0.37			0.50	
Oper. time red.		1.00			1.00			1.00				1.00			1.00	
Wind dir. red.		0.63			0.67			0.67				0.68			0.68	
Total reduction		0.38			0.40			0.41				0.25			0.34	
Total, real		549			354			25				236			97	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 11

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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative**Shadow receptor:** 658 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6406)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January	February			March			April			May			June
1	07:57	07:45			07:10		07:33 (33)	07:20		17:43 (108)	06:36		07:04 (28)	06:08
	17:20	17:53			18:26	70	17:36 (108)	19:59	51	18:34 (108)	20:28	38	07:42 (28)	20:57
2	07:58	07:44			07:08		07:32 (33)	07:19		17:44 (108)	06:35		07:04 (28)	06:08
	17:21	17:54			18:27	76	17:37 (108)	20:00	49	18:33 (108)	20:29	39	07:43 (28)	20:58
3	07:58	07:43			07:07		07:31 (33)	07:17		17:46 (108)	06:33		07:04 (28)	06:07
	17:21	17:56			18:28	81	17:39 (108)	20:00	45	18:31 (108)	20:30	39	07:43 (28)	20:58
4	07:58	07:42			07:05		07:30 (33)	07:15		17:47 (108)	06:32		07:04 (28)	06:07
	17:22	17:57			18:29	85	17:40 (108)	20:01	42	18:29 (108)	20:31	39	07:43 (28)	20:59
5	07:58	07:41			07:04		07:30 (33)	07:14		17:48 (108)	06:31		07:03 (28)	06:07
	17:23	17:58			18:31	88	17:41 (108)	20:02	39	18:27 (108)	20:32	39	07:42 (28)	21:00
6	07:58	07:40			07:02		07:29 (33)	07:12		17:51 (108)	06:30		07:03 (28)	06:06
	17:24	17:59			18:32	91	17:42 (108)	20:03	34	18:25 (108)	20:33	39	07:42 (28)	21:00
7	07:58	07:39			07:01		07:29 (33)	07:11		17:53 (108)	06:29		07:03 (28)	06:06
	17:25	18:00			18:33	94	17:43 (108)	20:04	29	18:22 (108)	20:34	39	07:42 (28)	21:01
8	07:57	07:37			07:59		08:28 (33)	07:09		17:56 (108)	06:27		07:03 (28)	06:06
	17:26	18:02			19:34	96	18:44 (108)	20:05	23	18:19 (108)	20:35	38	07:41 (28)	21:02
9	07:57	07:36			07:57		08:27 (33)	07:07		18:01 (108)	06:26		07:04 (28)	06:06
	17:27	18:03			19:35	99	18:44 (108)	20:06	12	18:13 (108)	20:36	37	07:41 (28)	21:02
10	07:57	07:35			07:56		08:28 (33)	07:06			06:25		07:04 (28)	06:06
	17:28	18:04			19:36	99	18:45 (108)	20:07			20:37	37	07:41 (28)	21:03
11	07:57	07:34			07:54		08:28 (33)	07:04			06:24		07:04 (28)	06:05
	17:29	18:05			19:37	99	18:45 (108)	20:08			20:38	36	07:40 (28)	21:03
12	07:57	07:33			07:53		08:28 (33)	07:03			06:23		07:05 (28)	06:05
	17:30	18:06			19:38	99	18:46 (108)	20:09			20:39	34	07:39 (28)	21:04
13	07:56	07:32			07:51		08:28 (33)	07:01			06:22		07:05 (28)	06:05
	17:31	18:08			19:39	99	18:46 (108)	20:10			20:40	34	07:39 (28)	21:04
14	07:56	07:30			07:49		08:29 (33)	07:00			06:21		07:06 (28)	06:05
	17:32	18:09			19:40	96	18:45 (108)	20:11			20:41	32	07:38 (28)	21:05
15	07:56	07:29			07:48		08:30 (33)	06:58			06:20		07:06 (28)	06:05
	17:33	18:10			19:41	96	18:46 (108)	20:12			20:42	31	07:37 (28)	21:05
16	07:55	07:28			07:46		08:31 (33)	06:57			06:19		07:07 (28)	06:05
	17:34	18:11			19:42	94	18:46 (108)	20:13			20:43	29	07:36 (28)	21:06
17	07:55	07:27			07:45		08:32 (33)	06:55			06:18		07:09 (28)	06:05
	17:36	18:12			19:43	89	18:45 (108)	20:14			20:44	27	07:36 (28)	21:06
18	07:55	07:25			07:43		08:34 (33)	06:54			06:17		07:10 (28)	06:05
	17:37	18:14			19:44	86	18:46 (108)	20:15			20:45	25	07:35 (28)	21:07
19	07:54	07:24			07:41		08:37 (33)	06:52			06:17		07:11 (28)	06:05
	17:38	18:15			19:45	79	18:45 (108)	20:16			20:46	23	07:34 (28)	21:07
20	07:53	07:23			07:40		17:38 (108)	06:51		07:19 (28)	06:16		07:12 (28)	06:06
	17:39	18:16			19:46	67	18:45 (108)	20:17	13	07:32 (28)	20:47	20	07:32 (28)	21:07
21	07:53	07:21			07:38		17:38 (108)	06:49		07:15 (28)	06:15		07:13 (28)	06:06
	17:40	18:17			19:47	66	18:44 (108)	20:18	20	07:35 (28)	20:48	17	07:30 (28)	21:07
22	07:52	07:20			07:36		17:37 (108)	06:48		07:13 (28)	06:14		07:16 (28)	06:06
	17:41	18:18			19:49	67	18:44 (108)	20:19	24	07:37 (28)	20:49	13	07:29 (28)	21:08
23	07:52	07:18			07:35		17:38 (108)	06:47		07:12 (28)	06:13		07:18 (28)	06:06
	17:42	18:19			19:50	66	18:44 (108)	20:20	27	07:39 (28)	20:50	8	07:26 (28)	21:08
24	07:51	07:17			07:33		17:38 (108)	06:45		07:10 (28)	06:13			06:06
	17:44	18:20			19:51	65	18:43 (108)	20:21	29	07:39 (28)	20:50			21:08
25	07:50	07:16		07:42 (33)	07:32		17:38 (108)	06:44		07:09 (28)	06:12			06:07
	17:45	18:22	27	17:23 (108)	19:52	64	18:42 (108)	20:22	31	07:40 (28)	20:51			21:08
26	07:50	07:14		07:38 (33)	07:30		17:39 (108)	06:42		07:07 (28)	06:11			06:07
	17:46	18:23	43	17:27 (108)	19:53	62	18:41 (108)	20:23	33	07:40 (28)	20:52			21:08
27	07:49	07:13		07:36 (33)	07:28		17:39 (108)	06:41		07:06 (28)	06:11			06:07
	17:47	18:24	55	17:31 (108)	19:54	61	18:40 (108)	20:24	35	07:41 (28)	20:53			21:08
28	07:48	07:11		07:34 (33)	07:27		17:39 (108)	06:40		07:06 (28)	06:10			06:08
	17:48	18:25	63	17:33 (108)	19:55	60	18:39 (108)	20:25	36	07:42 (28)	20:54			21:08
29	07:47				07:25		17:41 (108)	06:38		07:05 (28)	06:10			06:08
	17:50				19:56	57	18:38 (108)	20:26	38	07:43 (28)	20:55			21:08
30	07:46				07:23		17:41 (108)	06:37		07:04 (28)	06:09			06:09
	17:51				19:57	56	18:37 (108)	20:27	38	07:42 (28)	20:55			21:08
31	07:45				07:22		17:42 (108)				06:09			
	17:52				19:58	53	18:35 (108)				20:56			
Potential sun hours	300	299			370			397			446			449
Total, worst case			188			2460			648			713		
Sun reduction			0.42			0.44			0.51			0.56		
Oper. time red.			1.00			1.00			1.00			1.00		
Wind dir. red.			0.66			0.66			0.67			0.67		
Total reduction			0.28			0.29			0.34			0.37		
Total, real			52			718			221			267		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

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3/2/2012 10:01 AM / 12

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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative**Shadow receptor:** 658 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6406)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November	December
1	06:09			06:32		07:15 (28)	07:02			07:31		08:07 (33)	07:04	07:37
	21:08			20:51	35	07:50 (28)	20:09			19:19	100	18:25 (108)	17:33	17:10
2	06:10			06:33		07:15 (28)	07:03			07:32		08:06 (33)	07:05	07:38
	21:08			20:50	36	07:51 (28)	20:08			19:17	100	18:24 (108)	17:32	17:10
3	06:10			06:34		07:14 (28)	07:04		17:59 (108)	07:33		08:06 (33)	07:06	07:39
	21:08			20:49	37	07:51 (28)	20:06	12	18:11 (108)	19:15	99	18:23 (108)	17:31	17:10
4	06:11			06:35		07:14 (28)	07:05		17:53 (108)	07:34		08:05 (33)	07:07	07:40
	21:08			20:48	38	07:52 (28)	20:05	23	18:16 (108)	19:14	98	18:22 (108)	17:30	17:10
5	06:11			06:36		07:13 (28)	07:06		17:50 (108)	07:35		08:05 (33)	07:08	07:41
	21:08			20:47	38	07:51 (28)	20:03	29	18:19 (108)	19:12	97	18:21 (108)	17:29	17:09
6	06:12			06:37		07:13 (28)	07:07		17:47 (108)	07:36		08:04 (33)	07:09	07:42
	21:08			20:45	38	07:51 (28)	20:01	34	18:21 (108)	19:10	95	18:19 (108)	17:28	17:09
7	06:12			06:38		07:13 (28)	07:08		17:44 (108)	07:37		08:04 (33)	07:10	07:43
	21:07			20:44	38	07:51 (28)	20:00	39	18:23 (108)	19:09	93	18:18 (108)	17:27	17:09
8	06:13			06:39		07:12 (28)	07:09		17:42 (108)	07:38		08:04 (33)	07:12	07:44
	21:07			20:43	40	07:52 (28)	19:57	42	18:24 (108)	19:07	91	18:17 (108)	17:26	17:09
9	06:14			06:40		07:12 (28)	07:10		17:39 (108)	07:39		08:04 (33)	07:13	07:45
	21:07			20:42	40	07:52 (28)	19:55	45	18:24 (108)	19:06	87	18:15 (108)	17:25	17:09
10	06:14			06:41		07:12 (28)	07:10		17:37 (108)	07:40		08:04 (33)	07:14	07:46
	21:06			20:41	39	07:51 (28)	19:53	49	18:26 (108)	19:04	83	18:13 (108)	17:24	17:09
11	06:15			06:42		07:13 (28)	07:11		17:36 (108)	07:41		08:05 (33)	07:15	07:47
	21:06			20:39	38	07:51 (28)	19:52	50	18:26 (108)	19:03	79	18:12 (108)	17:23	17:09
12	06:16			06:43		07:13 (28)	07:12		17:34 (108)	07:42		08:05 (33)	07:16	07:47
	21:06			20:38	38	07:51 (28)	19:50	53	18:27 (108)	19:01	74	18:09 (108)	17:22	17:10
13	06:16			06:44		07:13 (28)	07:13		17:33 (108)	07:43		08:07 (33)	07:17	07:48
	21:05			20:37	38	07:51 (28)	19:48	55	18:28 (108)	18:59	67	18:08 (108)	17:21	17:10
14	06:17			06:45		07:13 (28)	07:14		17:31 (108)	07:44		08:08 (33)	07:19	07:49
	21:05			20:36	37	07:50 (28)	19:47	57	18:28 (108)	18:58	60	18:05 (108)	17:20	17:10
15	06:18			06:46		07:14 (28)	07:15		17:30 (108)	07:45		08:10 (33)	07:20	07:50
	21:04			20:34	36	07:50 (28)	19:45	59	18:29 (108)	18:56	50	18:02 (108)	17:19	17:10
16	06:19			06:47		07:14 (28)	07:16		17:29 (108)	07:46		08:12 (33)	07:21	07:50
	21:04			20:33	35	07:49 (28)	19:43	60	18:29 (108)	18:55	38	17:58 (108)	17:18	17:10
17	06:19			06:48		07:14 (28)	07:17		17:28 (108)	07:47		08:15 (33)	07:22	07:51
	21:03			20:32	33	07:47 (28)	19:42	62	18:30 (108)	18:53	16	17:50 (108)	17:17	17:11
18	06:20			06:49		07:15 (28)	07:18		17:27 (108)	07:48			07:23	07:52
	21:02			20:30	31	07:46 (28)	19:40	63	18:30 (108)	18:52			17:17	17:11
19	06:21			06:50		07:16 (28)	07:19		17:26 (108)	07:49			07:24	07:52
	21:02			20:29	29	07:45 (28)	19:38	64	18:30 (108)	18:51			17:16	17:11
20	06:22			06:50		07:17 (28)	07:20		17:25 (108)	07:50			07:25	07:53
	21:01			20:27	26	07:43 (28)	19:37	65	18:30 (108)	18:49			17:15	17:12
21	06:23		07:26 (28)	06:51		07:18 (28)	07:21		17:23 (108)	07:51			07:27	07:53
	21:00	11	07:37 (28)	20:26	23	07:41 (28)	19:35	66	18:29 (108)	18:48			17:15	17:12
22	06:23		07:24 (28)	06:52		07:20 (28)	07:22		17:22 (108)	07:52			07:28	07:54
	21:00	16	07:40 (28)	20:25	19	07:39 (28)	19:33	67	18:29 (108)	18:46			17:14	17:13
23	06:24		07:23 (28)	06:53		07:23 (28)	07:23		17:22 (108)	07:53			07:29	07:54
	20:59	19	07:42 (28)	20:23	13	07:36 (28)	19:32	67	18:29 (108)	18:45			17:14	17:13
24	06:25		07:22 (28)	06:54			07:24		08:23 (33)	07:55			07:30	07:55
	20:58	21	07:43 (28)	20:22			19:30	73	18:28 (108)	18:44			17:13	17:14
25	06:26		07:21 (28)	06:55			07:25		08:18 (33)	07:56			07:31	07:55
	20:57	24	07:45 (28)	20:20			19:28	84	18:28 (108)	18:42			17:12	17:14
26	06:27		07:20 (28)	06:56			07:26		08:15 (33)	07:57			07:32	07:56
	20:57	26	07:46 (28)	20:19			19:27	89	18:28 (108)	18:41			17:12	17:15
27	06:28		07:18 (28)	06:57			07:27		08:13 (33)	07:58			07:33	07:56
	20:56	28	07:46 (28)	20:17			19:25	91	18:27 (108)	18:40			17:12	17:16
28	06:29		07:17 (28)	06:58			07:28		08:11 (33)	07:59			07:34	07:56
	20:55	30	07:47 (28)	20:16			19:23	96	18:27 (108)	18:38			17:11	17:16
29	06:30		07:17 (28)	06:59			07:29		08:10 (33)	08:00			07:35	07:57
	20:54	31	07:48 (28)	20:14			19:22	97	18:26 (108)	18:37			17:11	17:17
30	06:31		07:16 (28)	07:00			07:30		08:08 (33)	08:01			07:36	07:57
	20:53	33	07:49 (28)	20:13			19:20	98	18:25 (108)	18:36			17:10	17:18
31	06:31		07:16 (28)	07:01						08:02				07:57
	20:52	34	07:50 (28)	20:11						18:35				17:19
Potential sun hours	456			427			374			346			300	291
Total, worst case		273			775			1689			1327			
Sun reduction		0.60			0.60			0.61			0.56			
Oper. time red.		1.00			1.00			1.00			1.00			
Wind dir. red.		0.67			0.67			0.67			0.66			
Total reduction		0.40			0.40			0.41			0.37			
Total, real		109			310			689			489			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 13

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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative**Shadow receptor:** 662 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6407)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		16:03 (32)	07:45		08:23 (108)	07:10			07:20		08:32 (83)	06:36			06:08		06:50 (82)
	17:20	29	16:32 (32)	17:53	28	08:51 (108)	18:26			19:59	3	08:35 (83)	20:28			20:57	91	20:25 (107)
2	07:58		16:04 (32)	07:44		08:24 (108)	07:08			07:19			06:35			06:08		06:51 (82)
	17:21	28	16:32 (32)	17:54	27	08:51 (108)	18:27			20:00			20:29			20:58	92	20:26 (107)
3	07:58		16:05 (32)	07:43		08:25 (108)	07:07			07:17			06:33			06:07		06:51 (82)
	17:21	28	16:33 (32)	17:56	25	08:50 (108)	18:28			20:00			20:30			20:59	94	20:27 (107)
4	07:58		16:05 (32)	07:42		08:26 (108)	07:05			07:15			06:32			06:07		06:50 (82)
	17:22	27	16:32 (32)	17:57	23	08:49 (108)	18:29			20:01			20:31			20:59	93	20:26 (107)
5	07:58		16:06 (32)	07:41		08:26 (108)	07:04			07:14			06:31			06:07		06:50 (82)
	17:23	26	16:32 (32)	17:58	21	08:47 (108)	18:31			20:02			20:32			21:00	95	20:27 (107)
6	07:58		16:07 (32)	07:40		08:28 (108)	07:02			07:12			06:30			06:06		06:51 (82)
	17:24	26	16:33 (32)	17:59	18	08:46 (108)	18:32			20:03			20:33			21:01	94	20:27 (107)
7	07:58		16:08 (32)	07:39		08:30 (108)	07:01		07:38 (83)	07:11			06:29			06:06		06:51 (82)
	17:25	25	16:33 (32)	18:01	14	08:44 (108)	18:33	8	07:46 (83)	20:04			20:34			21:01	95	20:28 (107)
8	07:58		08:26 (108)	07:37		08:35 (108)	07:59		08:32 (83)	07:09			06:27			06:06		06:50 (82)
	17:26	32	16:33 (32)	18:02	5	08:40 (108)	19:34	18	08:50 (83)	20:05			20:35			21:02	95	20:27 (107)
9	07:57		08:24 (108)	07:36			07:57		08:29 (83)	07:08			06:26			06:06		06:51 (82)
	17:27	35	16:33 (32)	18:03			19:35	23	08:52 (83)	20:06			20:36			21:02	96	20:28 (107)
10	07:57		08:24 (108)	07:35			07:56		08:27 (83)	07:06			06:25			06:06		06:51 (82)
	17:28	36	16:33 (32)	18:04			19:36	27	08:54 (83)	20:07			20:37			21:03	96	20:28 (107)
11	07:57		08:22 (108)	07:34			07:54		08:25 (83)	07:04			06:24		07:10 (82)	06:05		06:51 (82)
	17:29	37	16:32 (32)	18:05			19:37	30	08:55 (83)	20:08			20:38	11	07:21 (82)	21:04	96	20:29 (107)
12	07:57		08:22 (108)	07:33			07:53		08:24 (83)	07:03			06:23		07:06 (82)	06:05		06:51 (82)
	17:30	36	16:31 (32)	18:07			19:38	33	08:57 (83)	20:09			20:39	19	07:25 (82)	21:04	97	20:29 (107)
13	07:57		08:22 (108)	07:32			07:51		08:23 (83)	07:01			06:22		07:03 (82)	06:05		06:51 (82)
	17:31	35	16:31 (32)	18:08			19:39	34	08:57 (83)	20:10			20:40	24	07:27 (82)	21:05	97	20:29 (107)
14	07:56		08:21 (108)	07:30			07:49		08:21 (83)	07:00			06:21		07:01 (82)	06:05		06:52 (82)
	17:32	34	16:29 (32)	18:09			19:40	36	08:57 (83)	20:11			20:41	28	07:29 (82)	21:05	96	20:29 (107)
15	07:56		08:21 (108)	07:29			07:48		08:21 (83)	06:58			06:20		07:00 (82)	06:05		06:52 (82)
	17:33	31	16:28 (32)	18:10			19:41	37	08:58 (83)	20:12			20:42	35	20:06 (107)	21:05	96	20:30 (107)
16	07:55		08:20 (108)	07:28			07:46		08:20 (83)	06:57			06:19		06:58 (82)	06:05		06:52 (82)
	17:34	25	08:45 (108)	18:11			19:42	38	08:58 (83)	20:13			20:43	48	20:11 (107)	21:06	97	20:30 (107)
17	07:55		08:20 (108)	07:27			07:45		08:19 (83)	06:55			06:18		06:58 (82)	06:05		06:52 (82)
	17:36	26	08:46 (108)	18:12			19:43	39	08:58 (83)	20:14			20:44	54	20:14 (107)	21:06	97	20:30 (107)
18	07:55		08:19 (108)	07:25			07:43		08:19 (83)	06:54			06:17		06:57 (82)	06:05		06:52 (82)
	17:37	28	08:47 (108)	18:14			19:44	39	08:58 (83)	20:15			20:45	60	20:16 (107)	21:07	97	20:30 (107)
19	07:54		08:20 (108)	07:24			07:41		08:18 (83)	06:52			06:17		06:56 (82)	06:05		06:52 (82)
	17:38	28	08:48 (108)	18:15			19:45	39	08:57 (83)	20:16			20:46	65	20:17 (107)	21:07	97	20:30 (107)
20	07:54		08:19 (108)	07:23			07:40		08:18 (83)	06:51			06:16		06:55 (82)	06:06		06:53 (82)
	17:39	29	08:48 (108)	18:16			19:46	40	08:58 (83)	20:17			20:47	68	20:18 (107)	21:07	97	20:31 (107)
21	07:53		08:20 (108)	07:21			07:38		08:18 (83)	06:49			06:15		06:55 (82)	06:06		06:53 (82)
	17:40	30	08:50 (108)	18:17			19:48	39	08:57 (83)	20:18			20:48	72	20:20 (107)	21:07	97	20:31 (107)
22	07:52		08:20 (108)	07:20			07:37		08:17 (83)	06:48			06:14		06:54 (82)	06:06		06:53 (82)
	17:41	30	08:50 (108)	18:18			19:49	39	08:56 (83)	20:19			20:49	74	20:20 (107)	21:08	97	20:31 (107)
23	07:52		08:19 (108)	07:18			07:35		08:18 (83)	06:47			06:14		06:53 (82)	06:06		06:53 (82)
	17:42	31	08:50 (108)	18:19			19:50	38	08:56 (83)	20:20			20:50	77	20:21 (107)	21:08	97	20:31 (107)
24	07:51		08:19 (108)	07:17			07:33		08:18 (83)	06:45			06:13		06:52 (82)	06:06		06:53 (82)
	17:44	31	08:50 (108)	18:21			19:51	36	08:54 (83)	20:21			20:51	80	20:21 (107)	21:08	97	20:31 (107)
25	07:50		08:20 (108)	07:16			07:32		08:18 (83)	06:44			06:12		06:52 (82)	06:07		06:54 (82)
	17:45	31	08:51 (108)	18:22			19:52	35	08:53 (83)	20:22			20:51	82	20:22 (107)	21:08	97	20:32 (107)
26	07:50		08:20 (108)	07:14			07:30		08:19 (83)	06:42			06:11		06:51 (82)	06:07		06:54 (82)
	17:46	31	08:51 (108)	18:23			19:53	33	08:52 (83)	20:23			20:52	85	20:23 (107)	21:08	97	20:32 (107)
27	07:49		08:20 (108)	07:13			07:28		08:19 (83)	06:41			06:11		06:52 (82)	06:07		06:55 (82)
	17:47	31	08:51 (108)	18:24			19:54	32	08:51 (83)	20:24			20:53	86	20:24 (107)	21:08	97	20:33 (107)
28	07:48		08:20 (108)	07:11			07:27		08:20 (83)	06:40			06:10		06:51 (82)	06:08		06:55 (82)
	17:48	31	08:51 (108)	18:25			19:55	28	08:48 (83)	20:25			20:54	88	20:24 (107)	21:08	96	20:32 (107)
29	07:47		08:20 (108)				07:25		08:22 (83)	06:38			06:10		06:51 (82)	06:08		06:55 (82)
	17:50	31	08:51 (108)				19:56	25	08:47 (83)	20:26			20:55	89	20:25 (107)	21:08	96	20:32 (107)
30	07:46		08:21 (108)				07:23		08:23 (83)	06:37			06:09		06:51 (82)	06:09		06:55 (82)
	17:51	30	08:51 (108)				19:57	21	08:44 (83)	20:27			20:56	90	20:25 (107)	21:08	97	20:33 (107)
31	07:46		08:22 (108)				07:22		08:26 (83)				06:09		06:51 (82)			
	17:52	30	08:52 (108)				19:58	16	08:42 (83)				20:56	91	20:25 (107)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		938			161			783			3			1326			2876	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.63			0.60			0.63			0.63			0.66			0.66	
Total reduction		0.23			0.25			0.28			0.32			0.37			0.39	
Total, real		211			41			218			1			488			1129	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 14

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Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative**Shadow receptor:** 662 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6407)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:55 (82)	06:32		07:18 (82)	07:02			07:31		08:02 (83)	07:04			07:37		08:04 (108)
	21:08	97	20:33 (107)	20:51	16	07:34 (82)	20:09			19:19	34	08:36 (83)	17:33			17:10	37	16:14 (32)
2	06:10		06:56 (82)	06:33		07:23 (82)	07:03			07:32		08:03 (83)	07:05			07:38		08:06 (108)
	21:08	95	20:33 (107)	20:50	6	07:29 (82)	20:08			19:17	31	08:34 (83)	17:32			17:10	35	16:15 (32)
3	06:10		06:56 (82)	06:34			07:04			07:33		08:04 (83)	07:06		08:04 (108)	07:39		08:07 (108)
	21:08	96	20:33 (107)	20:49			20:06			19:15	28	08:32 (83)	17:31	7	08:11 (108)	17:10	35	16:16 (32)
4	06:11		06:56 (82)	06:35			07:05			07:34		08:06 (83)	07:07		08:00 (108)	07:40		08:09 (108)
	21:08	97	20:34 (107)	20:48			20:05			19:14	24	08:30 (83)	17:30	14	08:14 (108)	17:10	33	16:17 (32)
5	06:11		06:56 (82)	06:36			07:06			07:35		08:08 (83)	07:08		07:58 (108)	07:41		08:13 (108)
	21:08	95	20:33 (107)	20:47			20:03			19:12	20	08:28 (83)	17:29	18	08:16 (108)	17:09	27	16:18 (32)
6	06:12		06:57 (82)	06:37			07:07			07:36		08:11 (83)	07:09		07:57 (108)	07:42		15:53 (32)
	21:08	96	20:34 (107)	20:45			20:01			19:10	13	08:24 (83)	17:28	21	08:18 (108)	17:09	26	16:19 (32)
7	06:12		06:57 (82)	06:38			07:08			07:37			07:11		07:56 (108)	07:43		15:53 (32)
	21:07	94	20:33 (107)	20:44			20:00			19:09			17:27	23	08:19 (108)	17:09	26	16:19 (32)
8	06:13		06:57 (82)	06:39			07:09			07:38			07:12		07:55 (108)	07:44		15:53 (32)
	21:07	95	20:34 (107)	20:43			19:57			19:07			17:26	25	08:20 (108)	17:09	27	16:20 (32)
9	06:14		06:58 (82)	06:40			07:10			07:39			07:13		07:54 (108)	07:45		15:53 (32)
	21:07	94	20:34 (107)	20:42			19:55			19:06			17:25	27	08:21 (108)	17:09	28	16:21 (32)
10	06:14		06:58 (82)	06:41			07:11			07:40			07:14		07:54 (108)	07:46		15:54 (32)
	21:06	92	20:33 (107)	20:41			19:53			19:04			17:24	28	08:22 (108)	17:09	28	16:22 (32)
11	06:15		06:58 (82)	06:42			07:11			07:41			07:15		07:53 (108)	07:47		15:54 (32)
	21:06	93	20:34 (107)	20:39			19:52			19:03			17:23	30	08:23 (108)	17:09	29	16:23 (32)
12	06:16		06:59 (82)	06:43			07:12		08:18 (83)	07:42			07:16		07:53 (108)	07:47		15:53 (32)
	21:06	92	20:34 (107)	20:38			19:50	14	08:32 (83)	19:01			17:22	30	08:23 (108)	17:10	30	16:23 (32)
13	06:16		06:59 (82)	06:44			07:13		08:15 (83)	07:43			07:17		07:52 (108)	07:48		15:54 (32)
	21:05	90	20:33 (107)	20:37			19:48	20	08:35 (83)	19:00			17:21	31	08:23 (108)	17:10	29	16:23 (32)
14	06:17		06:59 (82)	06:45			07:14		08:12 (83)	07:44			07:19		07:53 (108)	07:49		15:54 (32)
	21:05	89	20:33 (107)	20:36			19:47	25	08:37 (83)	18:58			17:20	31	08:24 (108)	17:10	30	16:24 (32)
15	06:18		07:00 (82)	06:46			07:15		08:11 (83)	07:45			07:20		07:53 (108)	07:50		15:55 (32)
	21:04	87	20:33 (107)	20:34			19:45	27	08:38 (83)	18:57			17:19	31	08:24 (108)	17:10	30	16:25 (32)
16	06:19		07:01 (82)	06:47			07:16		08:09 (83)	07:46			07:21		07:53 (108)	07:50		15:55 (32)
	21:04	87	20:33 (107)	20:33			19:43	31	08:40 (83)	18:55			17:18	31	08:24 (108)	17:10	30	16:25 (32)
17	06:19		07:01 (82)	06:48			07:17		08:07 (83)	07:47			07:22		07:53 (108)	07:51		15:56 (32)
	21:03	85	20:32 (107)	20:32			19:42	33	08:40 (83)	18:54			17:17	31	08:24 (108)	17:11	30	16:26 (32)
18	06:20		07:01 (82)	06:49			07:18		08:06 (83)	07:48			07:23		07:53 (108)	07:52		15:56 (32)
	21:03	83	20:32 (107)	20:30			19:40	35	08:41 (83)	18:52			17:17	31	08:24 (108)	17:11	31	16:27 (32)
19	06:21		07:02 (82)	06:50			07:19		08:05 (83)	07:49			07:24		07:54 (108)	07:52		15:56 (32)
	21:02	81	20:32 (107)	20:29			19:38	37	08:42 (83)	18:51			17:16	31	08:25 (108)	17:11	31	16:27 (32)
20	06:22		07:03 (82)	06:51			07:20		08:04 (83)	07:50			07:25		07:55 (108)	07:53		15:57 (32)
	21:01	78	20:31 (107)	20:27			19:37	38	08:42 (83)	18:49			17:15	30	08:25 (108)	17:12	31	16:28 (32)
21	06:23		07:03 (82)	06:51			07:21		08:04 (83)	07:51			07:27		07:55 (108)	07:53		15:57 (32)
	21:01	76	20:30 (107)	20:26			19:35	38	08:42 (83)	18:48			17:15	30	08:25 (108)	17:12	31	16:28 (32)
22	06:24		07:04 (82)	06:52			07:22		08:02 (83)	07:52			07:28		07:55 (108)	07:54		15:58 (32)
	21:00	73	20:29 (107)	20:25			19:33	39	08:41 (83)	18:46			17:14	29	08:24 (108)	17:13	31	16:29 (32)
23	06:24		07:05 (82)	06:53			07:23		08:02 (83)	07:54			07:29		07:56 (108)	07:55		15:58 (32)
	20:59	70	20:29 (107)	20:23			19:32	39	08:41 (83)	18:45			17:14	28	08:24 (108)	17:13	31	16:29 (32)
24	06:25		07:06 (82)	06:54			07:24		08:01 (83)	07:55			07:30		07:57 (108)	07:55		15:59 (32)
	20:58	67	20:28 (107)	20:22			19:30	40	08:41 (83)	18:44			17:13	28	08:25 (108)	17:14	31	16:30 (32)
25	06:26		07:07 (82)	06:55			07:25		08:01 (83)	07:56			07:31		07:58 (108)	07:55		15:59 (32)
	20:57	62	20:27 (107)	20:20			19:28	40	08:41 (83)	18:42			17:13	26	08:24 (108)	17:15	31	16:30 (32)
26	06:27		07:08 (82)	06:56			07:26		08:01 (83)	07:57			07:32		07:59 (108)	07:56		15:59 (32)
	20:57	57	20:25 (107)	20:19			19:27	39	08:40 (83)	18:41			17:12	25	08:24 (108)	17:15	31	16:30 (32)
27	06:28		07:08 (82)	06:57			07:27		08:01 (83)	07:58			07:33		08:00 (108)	07:56		16:01 (32)
	20:56	52	20:23 (107)	20:17			19:25	38	08:39 (83)	18:40			17:12	30	16:06 (32)	17:16	30	16:31 (32)
28	06:29		07:09 (82)	06:58			07:28		08:01 (83)	07:59			07:34		08:01 (108)	07:56		16:01 (32)
	20:55	44	20:20 (107)	20:16			19:23	38	08:39 (83)	18:38			17:11	34	16:09 (32)	17:16	30	16:31 (32)
29	06:30		07:11 (82)	06:59			07:29		08:01 (83)	08:00			07:35		08:02 (108)	07:57		16:01 (32)
	20:54	30	07:41 (82)	20:14			19:22	37	08:38 (83)	18:37			17:11	35	16:11 (32)	17:17	30	16:31 (32)
30	06:31		07:13 (82)	07:00			07:30		08:02 (83)	08:01			07:36		08:03 (108)	07:57		16:02 (32)
	20:53	26	07:39 (82)	20:13			19:20	35	08:37 (83)	18:36			17:11	36	16:12 (32)	17:18	29	16:31 (32)
31	06:31		07:15 (82)	07:01						08:02						07:57		16:02 (32)
	20:52	22	07:37 (82)	20:11						18:35						17:19	30	16:32 (32)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		2395			22			643			150			771			938	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.66			0.68			0.63			0.63			0.61			0.67	
Total reduction		0.39			0.41			0.39			0.35			0.22			0.34	
Total, real		943			9			248			53			172			315	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 15

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative**Shadow receptor:** 732 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6422)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:19 (23)	07:44		08:29 (23)	07:10		07:45 (20)	07:20			06:36		19:51 (77)	06:08		
	17:20	41	16:50 (115)	17:53	18	16:50 (115)	18:26	46	08:31 (20)	19:59			20:28	13	20:04 (77)	20:57		
2	07:57		08:19 (23)	07:44		08:32 (23)	07:08		07:45 (20)	07:19			06:34		19:49 (77)	06:08		
	17:20	42	16:51 (115)	17:54	10	08:42 (23)	18:27	45	08:30 (20)	20:00			20:29	17	20:06 (77)	20:58		
3	07:58		08:19 (23)	07:43			07:07		07:45 (20)	07:17			06:33		19:48 (77)	06:07		
	17:21	44	16:52 (115)	17:56			18:28	46	08:31 (20)	20:00			20:30	19	20:07 (77)	20:58		
4	07:58		08:19 (23)	07:42			07:05		07:44 (20)	07:15		19:22 (116)	06:32		19:46 (77)	06:07		
	17:22	46	16:53 (115)	17:57			18:29	46	08:30 (20)	20:01	7	19:29 (116)	20:31	21	20:07 (77)	20:59		
5	07:58		08:19 (23)	07:41			07:04		07:44 (20)	07:14		19:17 (116)	06:31		19:45 (77)	06:07		
	17:23	47	16:53 (115)	17:58			18:30	46	08:30 (20)	20:02	16	19:33 (116)	20:32	23	20:08 (77)	21:00		
6	07:58		08:19 (23)	07:40			07:02		07:44 (20)	07:12		19:15 (116)	06:30		19:45 (77)	06:06		
	17:24	49	16:54 (115)	17:59			18:32	45	08:29 (20)	20:03	21	19:36 (116)	20:33	23	20:08 (77)	21:00		
7	07:58		08:19 (23)	07:38			07:00		07:43 (20)	07:11		19:12 (116)	06:28		19:45 (77)	06:06		
	17:25	50	16:55 (115)	18:00			18:33	45	08:28 (20)	20:04	25	19:37 (116)	20:34	24	20:09 (77)	21:01		
8	07:57		08:19 (23)	07:37			07:59		08:44 (20)	07:09		19:11 (116)	06:27		19:44 (77)	06:06		
	17:26	52	16:56 (115)	18:02			19:34	44	09:28 (20)	20:05	27	19:38 (116)	20:35	25	20:09 (77)	21:02		
9	07:57		08:19 (23)	07:36			07:57		08:44 (20)	07:07		19:09 (116)	06:26		19:44 (77)	06:06		
	17:27	54	16:57 (115)	18:03			19:35	43	09:27 (20)	20:06	30	19:39 (116)	20:36	25	20:09 (77)	21:02		
10	07:57		08:18 (23)	07:35			07:56		08:45 (20)	07:06		19:08 (116)	06:25		19:44 (77)	06:05		
	17:28	55	16:57 (115)	18:04			19:36	42	09:27 (20)	20:07	31	19:39 (116)	20:37	25	20:09 (77)	21:03		
11	07:57		08:18 (23)	07:34			07:54		08:45 (20)	07:04		19:07 (116)	06:24		19:44 (77)	06:05		
	17:29	56	16:57 (115)	18:05			19:37	40	09:25 (20)	20:08	33	19:40 (116)	20:38	25	20:09 (77)	21:03		
12	07:57		08:19 (23)	07:33			07:53		08:45 (20)	07:03		19:06 (116)	06:23		19:44 (77)	06:05		
	17:30	56	16:58 (115)	18:06			19:38	39	09:24 (20)	20:09	33	19:39 (116)	20:39	25	20:09 (77)	21:04		
13	07:56		08:19 (23)	07:32			07:51		08:47 (20)	07:01		19:06 (116)	06:22		19:44 (77)	06:05		
	17:31	59	16:59 (115)	18:08			19:39	36	09:23 (20)	20:10	34	19:40 (116)	20:40	25	20:09 (77)	21:04		
14	07:56		08:18 (23)	07:30			07:49		08:47 (20)	07:00		19:05 (116)	06:21		19:44 (77)	06:05		
	17:32	60	16:59 (115)	18:09			19:40	34	09:21 (20)	20:11	34	19:39 (116)	20:41	24	20:08 (77)	21:05		
15	07:56		08:19 (23)	07:29			07:48		08:49 (20)	06:58		19:05 (116)	06:20		19:45 (77)	06:05		
	17:33	60	17:00 (115)	18:10			19:41	30	09:19 (20)	20:12	35	19:40 (116)	20:42	23	20:08 (77)	21:05		
16	07:55		08:19 (23)	07:28			07:46		08:50 (20)	06:57		19:05 (116)	06:19		19:45 (77)	06:05		
	17:34	61	17:00 (115)	18:11			19:42	27	09:17 (20)	20:13	34	19:39 (116)	20:43	22	20:07 (77)	21:06		
17	07:55		08:19 (23)	07:26		08:04 (20)	07:45		08:52 (20)	06:55		19:05 (116)	06:18		19:46 (77)	06:05		
	17:35	62	17:01 (115)	18:12	11	08:15 (20)	19:43	22	09:14 (20)	20:14	34	19:39 (116)	20:44	21	20:07 (77)	21:06		
18	07:54		08:19 (23)	07:25		08:00 (20)	07:43		08:56 (20)	06:54		19:04 (116)	06:17		19:47 (77)	06:05		
	17:37	62	17:01 (115)	18:13	19	08:19 (20)	19:44	14	09:10 (20)	20:15	34	19:38 (116)	20:45	20	20:07 (77)	21:06		
19	07:54		08:20 (23)	07:24		07:57 (20)	07:41			06:52		19:05 (116)	06:16		19:48 (77)	06:05		
	17:38	61	17:01 (115)	18:15	24	08:21 (20)	19:45			20:16	33	19:38 (116)	20:46	18	20:06 (77)	21:07		
20	07:53		08:20 (23)	07:22		07:55 (20)	07:40			06:51		19:06 (116)	06:16		19:49 (77)	06:05		
	17:39	61	17:01 (115)	18:16	29	08:24 (20)	19:46			20:17	32	19:38 (116)	20:47	16	20:05 (77)	21:07		
21	07:53		08:20 (23)	07:21		07:53 (20)	07:38			06:49		19:06 (116)	06:15		19:50 (77)	06:06		
	17:40	60	17:01 (115)	18:17	32	08:25 (20)	19:47			20:18	30	19:36 (116)	20:48	13	20:03 (77)	21:07		
22	07:52		08:21 (23)	07:20		07:52 (20)	07:36			06:48		19:07 (116)	06:14		19:52 (77)	06:06		
	17:41	59	17:02 (115)	18:18	34	08:26 (20)	19:48			20:19	29	19:36 (116)	20:49	11	20:03 (77)	21:08		
23	07:52		08:21 (23)	07:18		07:51 (20)	07:35			06:46		19:07 (116)	06:13		19:54 (77)	06:06		
	17:42	58	17:01 (115)	18:19	37	08:28 (20)	19:49			20:20	27	19:34 (116)	20:50	6	20:00 (77)	21:08		
24	07:51		08:21 (23)	07:17		07:49 (20)	07:33			06:45		19:08 (116)	06:13			06:06		
	17:43	58	17:01 (115)	18:20	39	08:28 (20)	19:50			20:21	25	19:33 (116)	20:50			21:08		
25	07:50		08:22 (23)	07:15		07:48 (20)	07:31			06:44		19:10 (116)	06:12			06:07		
	17:45	55	17:01 (115)	18:21	41	08:29 (20)	19:52			20:22	21	19:31 (116)	20:51			21:08		
26	07:50		08:23 (23)	07:14		07:47 (20)	07:30			06:42		19:11 (116)	06:11			06:07		
	17:46	53	17:01 (115)	18:23	42	08:29 (20)	19:53			20:23	18	19:29 (116)	20:52			21:08		
27	07:49		08:23 (23)	07:13		07:47 (20)	07:28			06:41		19:14 (116)	06:11			06:07		
	17:47	51	17:00 (115)	18:24	43	08:30 (20)	19:54			20:24	12	19:26 (116)	20:53			21:08		
28	07:48		08:24 (23)	07:11		07:45 (20)	07:27			06:40			06:10			06:08		
	17:48	47	16:59 (115)	18:25	45	08:30 (20)	19:55			20:25			20:54			21:08		
29	07:47		08:25 (23)				07:25			06:38			06:10			06:08		
	17:49	43	16:58 (115)				19:56			20:26			20:55			21:08		
30	07:46		08:26 (23)				07:23			06:37		19:54 (77)	06:09			06:09		
	17:51	37	16:56 (115)				19:57			20:27	7	20:01 (77)	20:55			21:08		
31	07:45		08:28 (23)				07:22						06:09					
	17:52	30	16:54 (115)				19:58						20:56					
Potential sun hours	300			299			370			397			446			449		
Total, worst case		1629			424			690			662			464				
Sun reduction		0.36			0.42			0.44			0.51			0.56				
Oper. time red.		1.00			1.00			1.00			1.00			1.00				
Wind dir. red.		0.64			0.63			0.63			0.65			0.63				
Total reduction		0.23			0.26			0.28			0.33			0.35				
Total, real		375			112			192			218			164				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 16

Licensed user:
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US-SYRACUSE, NY 13202
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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative**Shadow receptor:** 732 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6422)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09			06:32		19:55 (77)	07:02		19:06 (116)	07:31		08:25 (20)	07:03			07:37		08:00 (23)
	21:08			20:51	25	20:20 (77)	20:09	33	19:39 (116)	19:18	38	09:03 (20)	17:33			17:10	58	16:40 (115)
2	06:09			06:33		19:55 (77)	07:03		19:07 (116)	07:32		08:24 (20)	07:05			07:38		08:01 (23)
	21:08			20:50	25	20:20 (77)	20:08	31	19:38 (116)	19:17	39	09:03 (20)	17:32			17:10	55	16:40 (115)
3	06:10			06:34		19:55 (77)	07:04		19:07 (116)	07:33		08:23 (20)	07:06			07:39		08:02 (23)
	21:08			20:49	25	20:20 (77)	20:06	30	19:37 (116)	19:15	41	09:04 (20)	17:31			17:10	54	16:40 (115)
4	06:11			06:35		19:54 (77)	07:05		19:08 (116)	07:34		08:22 (20)	07:07			07:40		08:03 (23)
	21:08			20:48	25	20:19 (77)	20:05	27	19:35 (116)	19:14	42	09:04 (20)	17:30			17:09	52	16:40 (115)
5	06:11			06:36		19:54 (77)	07:06		19:09 (116)	07:35		08:21 (20)	07:08			07:41		08:04 (23)
	21:08			20:47	25	20:19 (77)	20:03	25	19:34 (116)	19:12	44	09:05 (20)	17:29			17:09	50	16:40 (115)
6	06:12			06:37		19:54 (77)	07:07		19:11 (116)	07:36		08:20 (20)	07:09			07:42		08:05 (23)
	21:08			20:45	24	20:18 (77)	20:01	21	19:32 (116)	19:10	45	09:05 (20)	17:28			17:09	49	16:40 (115)
7	06:12			06:38		19:55 (77)	07:08		19:13 (116)	07:37		08:20 (20)	07:10			07:43		08:06 (23)
	21:07			20:44	23	20:18 (77)	20:00	16	19:29 (116)	19:09	45	09:05 (20)	17:26			17:09	47	16:40 (115)
8	06:13			06:39		19:55 (77)	07:08		19:15 (116)	07:38		08:19 (20)	07:12			07:44		08:07 (23)
	21:07			20:43	22	20:17 (77)	19:56	9	19:24 (116)	19:07	46	09:05 (20)	17:25			17:09	46	16:41 (115)
9	06:14			06:40		19:56 (77)	07:09			07:39		08:19 (20)	07:13		08:03 (23)	07:45		08:08 (23)
	21:07			20:42	20	20:16 (77)	19:55			19:06	46	09:05 (20)	17:24	10	08:13 (23)	17:09	44	16:41 (115)
10	06:14			06:41		19:57 (77)	07:10			07:40		08:18 (20)	07:14		08:00 (23)	07:46		08:09 (23)
	21:06			20:41	18	20:15 (77)	19:53			19:04	47	09:05 (20)	17:23	21	16:22 (115)	17:09	42	16:41 (115)
11	06:15			06:42		19:58 (77)	07:11			07:41		08:18 (20)	07:15		07:59 (23)	07:47		08:10 (23)
	21:06			20:39	16	20:14 (77)	19:52			19:02	46	09:04 (20)	17:22	31	16:26 (115)	17:09	41	16:41 (115)
12	06:16			06:43		20:00 (77)	07:12			07:42		08:18 (20)	07:16		07:58 (23)	07:47		08:10 (23)
	21:06			20:38	12	20:12 (77)	19:50			19:01	46	09:04 (20)	17:22	37	16:28 (115)	17:09	41	16:41 (115)
13	06:16			06:44		20:04 (77)	07:13			07:43		08:18 (20)	07:17		07:57 (23)	07:48		08:11 (23)
	21:05			20:37	4	20:08 (77)	19:48			18:59	45	09:03 (20)	17:21	43	16:30 (115)	17:10	39	16:41 (115)
14	06:17			06:45			07:14			07:44		08:19 (20)	07:18		07:56 (23)	07:49		08:12 (23)
	21:05			20:36			19:47			18:58	44	09:03 (20)	17:20	47	16:31 (115)	17:10	38	16:42 (115)
15	06:18			06:46		19:25 (116)	07:15			07:45		08:19 (20)	07:20		07:56 (23)	07:50		08:13 (23)
	21:04			20:34	5	19:30 (116)	19:45			18:56	44	09:03 (20)	17:19	51	16:33 (115)	17:10	36	16:42 (115)
16	06:18			06:47		19:20 (116)	07:16			07:46		08:20 (20)	07:21		07:56 (23)	07:50		08:14 (23)
	21:04			20:33	14	19:34 (116)	19:43			18:55	42	09:02 (20)	17:18	53	16:34 (115)	17:10	35	16:42 (115)
17	06:19			06:47		19:17 (116)	07:17			07:47		08:20 (20)	07:22		07:55 (23)	07:51		08:15 (23)
	21:03			20:31	19	19:36 (116)	19:42			18:53	41	09:01 (20)	17:17	55	16:34 (115)	17:11	33	16:42 (115)
18	06:20			06:48		19:15 (116)	07:18			07:48		08:21 (20)	07:23		07:55 (23)	07:52		08:16 (23)
	21:02			20:30	22	19:37 (116)	19:40			18:52	38	08:59 (20)	17:17	58	16:35 (115)	17:11	32	16:43 (115)
19	06:21			06:49		19:14 (116)	07:19			07:49		08:22 (20)	07:24		07:56 (23)	07:52		08:16 (23)
	21:02			20:29	25	19:39 (116)	19:38			18:50	36	08:58 (20)	17:16	58	16:36 (115)	17:11	32	16:43 (115)
20	06:22			06:50		19:13 (116)	07:20			07:50		08:23 (20)	07:25		07:56 (23)	07:53		08:17 (23)
	21:01			20:27	27	19:40 (116)	19:37			18:49	33	08:56 (20)	17:15	59	16:37 (115)	17:12	32	16:44 (115)
21	06:23		20:02 (77)	06:51		19:11 (116)	07:21			07:51		08:24 (20)	07:27		07:56 (23)	07:53		08:18 (23)
	21:00	9	20:11 (77)	20:26	29	19:40 (116)	19:35			18:48	31	08:55 (20)	17:15	60	16:37 (115)	17:12	30	16:44 (115)
22	06:23		20:01 (77)	06:52		19:10 (116)	07:22			07:52		08:25 (20)	07:28		07:56 (23)	07:54		08:19 (23)
	21:00	12	20:13 (77)	20:24	31	19:41 (116)	19:33			18:46	28	08:53 (20)	17:14	61	16:37 (115)	17:13	30	16:45 (115)
23	06:24		20:00 (77)	06:53		19:10 (116)	07:23			07:53		08:28 (20)	07:29		07:56 (23)	07:54		08:18 (23)
	20:59	14	20:14 (77)	20:23	32	19:42 (116)	19:32			18:45	23	08:51 (20)	17:13	61	16:37 (115)	17:13	32	16:45 (115)
24	06:25		19:59 (77)	06:54		19:09 (116)	07:24			07:55		08:31 (20)	07:30		07:56 (23)	07:55		08:18 (23)
	20:58	17	20:16 (77)	20:22	33	19:42 (116)	19:30			18:43	17	08:48 (20)	17:13	62	16:38 (115)	17:14	32	16:45 (115)
25	06:26		19:58 (77)	06:55		19:08 (116)	07:25		08:40 (20)	07:56		08:35 (20)	07:31		07:57 (23)	07:55		08:19 (23)
	20:57	19	20:17 (77)	20:20	34	19:42 (116)	19:28	11	08:51 (20)	18:42	8	08:43 (20)	17:12	62	16:39 (115)	17:14	32	16:46 (115)
26	06:27		19:56 (77)	06:56		19:08 (116)	07:26		08:36 (20)	07:57			07:32		07:58 (23)	07:56		08:19 (23)
	20:56	21	20:17 (77)	20:19	34	19:42 (116)	19:27	19	08:55 (20)	18:41			17:12	61	16:39 (115)	17:15	33	16:46 (115)
27	06:28		19:56 (77)	06:57		19:07 (116)	07:27		08:33 (20)	07:58			07:33		07:58 (23)	07:56		08:19 (23)
	20:56	22	20:18 (77)	20:17	35	19:42 (116)	19:25	24	08:57 (20)	18:39			17:11	60	16:39 (115)	17:16	34	16:47 (115)
28	06:29		19:56 (77)	06:58		19:06 (116)	07:28		08:30 (20)	07:59			07:34		07:59 (23)	07:56		08:19 (23)
	20:55	22	20:18 (77)	20:16	35	19:41 (116)	19:23	29	08:59 (20)	18:38			17:11	59	16:39 (115)	17:16	36	16:48 (115)
29	06:30		19:55 (77)	06:59		19:06 (116)	07:29		08:28 (20)	08:00			07:35		07:59 (23)	07:57		08:19 (23)
	20:54	24	20:19 (77)	20:14	34	19:40 (116)	19:22	33	09:01 (20)	18:37			17:11	59	16:39 (115)	17:17	38	16:49 (115)
30	06:30		19:55 (77)	07:00		19:06 (116)	07:30		08:27 (20)	08:01			07:36		08:00 (23)	07:57		08:19 (23)
	20:53	24	20:19 (77)	20:12	34	19:40 (116)	19:20	35	09:02 (20)	18:36			17:10	57	16:39 (115)	17:18	38	16:49 (115)
31	06:31		19:55 (77)	07:01		19:06 (116)				08:02						07:57		08:19 (23)
	20:52	25	20:20 (77)	20:11	33	19:39 (116)				18:34						17:19	40	16:50 (115)
Potential sun hours	456			427			374			346			300			291		
Total, worst case	209			740			343			955			1125			1231		
Sun reduction	0.60			0.60			0.61			0.56			0.37			0.50		
Oper. time red.	1.00			1.00			1.00			1.00			1.00			1.00		
Wind dir. red.	0.63			0.64			0.64			0.63			0.64			0.65		
Total reduction	0.38			0.38			0.39			0.35			0.24			0.32		
Total, real	79			285			134			338			266			398		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 17

Licensed user:
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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative**Shadow receptor:** 736 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6425)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January	February			March			April			May			June		
1	07:57	07:44			07:10		07:35 (23)	07:20			06:36		07:19 (20)	06:08		20:01 (116)
	17:20	17:53			18:26	64	17:43 (115)	19:59			20:28	42	08:01 (20)	20:57	24	20:25 (116)
2	07:57	07:44			07:08		07:34 (23)	07:19			06:34		07:19 (20)	06:08		20:00 (116)
	17:20	17:54			18:27	63	17:42 (115)	20:00			20:29	41	08:00 (20)	20:58	26	20:26 (116)
3	07:58	07:43			07:07		07:35 (23)	07:17			06:33		07:20 (20)	06:07		20:00 (116)
	17:21	17:56			18:28	59	17:41 (115)	20:00			20:30	40	08:00 (20)	20:58	27	20:27 (116)
4	07:58	07:42			07:05		07:34 (23)	07:15			06:32		07:19 (20)	06:07		19:59 (116)
	17:22	17:57			18:29	57	17:39 (115)	20:01			20:31	39	07:58 (20)	20:59	28	20:27 (116)
5	07:58	07:41			07:04		07:35 (23)	07:14			06:31		07:20 (20)	06:07		19:59 (116)
	17:23	17:58			18:30	53	17:38 (115)	20:02			20:32	37	07:57 (20)	21:00	29	20:28 (116)
6	07:58	07:40			07:02		07:35 (23)	07:12			06:30		07:21 (20)	06:06		20:00 (116)
	17:24	17:59			18:32	48	17:36 (115)	20:03			20:33	36	07:57 (20)	21:00	29	20:29 (116)
7	07:58	07:38			07:00		07:36 (23)	07:11			06:28		07:22 (20)	06:06		19:59 (116)
	17:25	18:00			18:33	39	17:32 (115)	20:04			20:34	34	07:56 (20)	21:01	30	20:29 (116)
8	07:57	07:37			07:59		08:37 (23)	07:09			06:27		07:23 (20)	06:06		19:59 (116)
	17:26	18:02			19:34	29	18:29 (115)	20:05			20:35	32	07:55 (20)	21:02	30	20:29 (116)
9	07:57	07:36			07:57		08:39 (23)	07:07			06:26		07:24 (20)	06:06		19:59 (116)
	17:27	18:03			19:35	17	08:56 (23)	20:06			20:36	30	07:54 (20)	21:02	31	20:30 (116)
10	07:57	07:35			07:56		08:42 (23)	07:06			06:25		07:25 (20)	06:05		19:59 (116)
	17:28	18:04			19:36	11	08:53 (23)	20:07			20:37	28	07:53 (20)	21:03	31	20:30 (116)
11	07:57	07:34			07:54			07:04		07:40 (20)	06:24		07:26 (20)	06:05		19:59 (116)
	17:29	18:05			19:37			20:08	9	07:49 (20)	20:38	25	07:51 (20)	21:03	32	20:31 (116)
12	07:57	07:33		17:21 (115)	07:53			07:03		07:34 (20)	06:23		07:28 (20)	06:05		19:59 (116)
	17:30	18:06	11	17:32 (115)	19:38			20:09	19	07:53 (20)	20:39	21	07:49 (20)	21:04	32	20:31 (116)
13	07:56	07:32		17:18 (115)	07:51			07:01		07:32 (20)	06:22		07:29 (20)	06:05		19:59 (116)
	17:31	18:08	18	17:36 (115)	19:39			20:10	24	07:56 (20)	20:40	18	07:47 (20)	21:04	33	20:32 (116)
14	07:56	07:30		17:16 (115)	07:49			07:00		07:29 (20)	06:21		07:32 (20)	06:05		19:59 (116)
	17:32	18:09	22	17:38 (115)	19:40			20:11	28	07:57 (20)	20:41	13	07:45 (20)	21:05	33	20:32 (116)
15	07:56	07:29		17:14 (115)	07:48			06:58		07:28 (20)	06:20			06:05		19:59 (116)
	17:33	18:10	25	17:39 (115)	19:41			20:12	31	07:59 (20)	20:42			21:05	33	20:32 (116)
16	07:55	07:28		17:13 (115)	07:46			06:57		07:26 (20)	06:19			06:05		19:59 (116)
	17:34	18:11	28	17:41 (115)	19:42			20:13	34	08:00 (20)	20:43			21:06	34	20:33 (116)
17	07:55	07:26		17:12 (115)	07:45			06:55		07:25 (20)	06:18			06:05		19:59 (116)
	17:35	18:12	30	17:42 (115)	19:43			20:14	36	08:01 (20)	20:44			21:06	34	20:33 (116)
18	07:54	07:25		17:11 (115)	07:43			06:54		07:23 (20)	06:17			06:05		20:00 (116)
	17:37	18:13	32	17:43 (115)	19:44			20:15	38	08:01 (20)	20:45			21:06	33	20:33 (116)
19	07:54	07:24		17:10 (115)	07:41			06:52		07:23 (20)	06:16			06:05		20:00 (116)
	17:38	18:15	33	17:43 (115)	19:45			20:16	39	08:02 (20)	20:46			21:07	33	20:33 (116)
20	07:53	07:22		07:45 (23)	07:40			06:51		07:22 (20)	06:16			06:05		20:00 (116)
	17:39	18:16	47	17:44 (115)	19:46			20:17	41	08:03 (20)	20:47			21:07	33	20:33 (116)
21	07:53	07:21		07:41 (23)	07:38			06:49		07:21 (20)	06:15			06:06		20:01 (116)
	17:40	18:17	53	17:44 (115)	19:47			20:18	41	08:02 (20)	20:48			21:07	33	20:34 (116)
22	07:52	07:20		07:40 (23)	07:36			06:48		07:21 (20)	06:14			06:06		20:01 (116)
	17:41	18:18	58	17:45 (115)	19:48			20:19	42	08:03 (20)	20:49			21:08	33	20:34 (116)
23	07:52	07:18		07:39 (23)	07:35			06:46		07:19 (20)	06:13			06:06		20:01 (116)
	17:42	18:19	60	17:45 (115)	19:49			20:20	43	08:02 (20)	20:50			21:08	33	20:34 (116)
24	07:51	07:17		07:37 (23)	07:33			06:45		07:19 (20)	06:13			06:06		20:01 (116)
	17:44	18:20	63	17:45 (115)	19:50			20:21	44	08:03 (20)	20:50			21:08	33	20:34 (116)
25	07:50	07:15		07:37 (23)	07:31			06:44		07:19 (20)	06:12			06:07		20:02 (116)
	17:45	18:22	64	17:45 (115)	19:52			20:22	44	08:03 (20)	20:51			21:08	33	20:35 (116)
26	07:50	07:14		07:35 (23)	07:30			06:42		07:18 (20)	06:11		20:07 (116)	06:07		20:01 (116)
	17:46	18:23	65	17:44 (115)	19:53			20:23	44	08:02 (20)	20:52	10	20:17 (116)	21:08	34	20:35 (116)
27	07:49	07:13		07:35 (23)	07:28			06:41		07:19 (20)	06:11		20:06 (116)	06:07		20:01 (116)
	17:47	18:24	65	17:44 (115)	19:54			20:24	43	08:02 (20)	20:53	14	20:20 (116)	21:08	34	20:35 (116)
28	07:48	07:11		07:34 (23)	07:27			06:40		07:19 (20)	06:10		20:04 (116)	06:08		20:02 (116)
	17:48	18:25	65	17:43 (115)	19:55			20:25	43	08:02 (20)	20:54	17	20:21 (116)	21:08	33	20:35 (116)
29	07:47				07:25			06:38		07:19 (20)	06:10		20:03 (116)	06:08		20:02 (116)
	17:49				19:56			20:26	43	08:02 (20)	20:55	20	20:23 (116)	21:08	33	20:35 (116)
30	07:46				07:23			06:37		07:18 (20)	06:09		20:02 (116)	06:09		20:03 (116)
	17:51				19:57			20:27	43	08:01 (20)	20:55	21	20:23 (116)	21:08	33	20:36 (116)
31	07:45				07:22						06:09		20:02 (116)			
	17:52				19:58						20:56	23	20:25 (116)			
Potential sun hours	300	299			370			397			446			449		
Total, worst case			739			440			729			541			947	
Sun reduction			0.42			0.44			0.51			0.56			0.60	
Oper. time red.			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.			0.67			0.65			0.67			0.66			0.62	
Total reduction			0.28			0.29			0.34			0.37			0.37	
Total, real			207			127			249			200			352	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 18

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative**Shadow receptor:** 736 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6425)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November	December
1	06:09		20:03 (116)	06:32		07:38 (20)	07:02		07:39 (20)	07:31			07:03	07:37
	21:08	32	20:35 (116)	20:51	23	08:01 (20)	20:09	9	07:48 (20)	19:18			17:33	17:10
2	06:09		20:04 (116)	06:33		07:36 (20)	07:03			07:32			07:05	07:38
	21:08	32	20:36 (116)	20:50	26	08:02 (20)	20:08			19:17			17:32	17:10
3	06:10		20:04 (116)	06:34		07:35 (20)	07:04			07:33		08:21 (23)	07:06	07:39
	21:08	31	20:35 (116)	20:49	29	08:04 (20)	20:06			19:15	8	08:29 (23)	17:31	17:10
4	06:11		20:05 (116)	06:35		07:33 (20)	07:05			07:34		08:17 (23)	07:07	07:40
	21:08	31	20:36 (116)	20:48	31	08:04 (20)	20:05			19:14	15	08:32 (23)	17:30	17:09
5	06:11		20:05 (116)	06:36		07:32 (20)	07:06			07:35		08:15 (23)	07:08	07:41
	21:08	30	20:35 (116)	20:47	33	08:05 (20)	20:03			19:12	19	08:34 (23)	17:29	17:09
6	06:12		20:06 (116)	06:37		07:31 (20)	07:07			07:36		08:13 (23)	07:09	07:42
	21:08	29	20:35 (116)	20:45	35	08:06 (20)	20:01			19:10	35	18:07 (115)	17:28	17:09
7	06:12		20:05 (116)	06:38		07:30 (20)	07:08			07:37		08:11 (23)	07:10	07:43
	21:07	29	20:34 (116)	20:44	37	08:07 (20)	20:00			19:09	44	18:10 (115)	17:26	17:09
8	06:13		20:06 (116)	06:39		07:30 (20)	07:08			07:38		08:10 (23)	07:12	07:44
	21:07	29	20:35 (116)	20:43	37	08:07 (20)	19:56			19:07	51	18:12 (115)	17:25	17:09
9	06:14		20:07 (116)	06:40		07:29 (20)	07:09			07:39		08:09 (23)	07:13	07:45
	21:07	28	20:35 (116)	20:42	39	08:08 (20)	19:55			19:06	54	18:13 (115)	17:24	17:09
10	06:14		20:07 (116)	06:41		07:28 (20)	07:10			07:40		08:08 (23)	07:14	07:46
	21:06	27	20:34 (116)	20:41	41	08:09 (20)	19:53			19:04	58	18:14 (115)	17:23	17:09
11	06:15		20:09 (116)	06:42		07:28 (20)	07:11			07:41		08:08 (23)	07:15	07:47
	21:06	25	20:34 (116)	20:39	41	08:09 (20)	19:52			19:02	61	18:15 (115)	17:22	17:09
12	06:16		20:10 (116)	06:43		07:27 (20)	07:12			07:42		08:07 (23)	07:16	07:47
	21:06	23	20:33 (116)	20:38	42	08:09 (20)	19:50			19:01	63	18:15 (115)	17:22	17:09
13	06:16		20:10 (116)	06:44		07:27 (20)	07:13			07:43		08:07 (23)	07:17	07:48
	21:05	22	20:32 (116)	20:37	43	08:10 (20)	19:48			18:59	65	18:16 (115)	17:21	17:10
14	06:17		20:11 (116)	06:45		07:27 (20)	07:14			07:44		08:08 (23)	07:18	07:49
	21:05	21	20:32 (116)	20:36	43	08:10 (20)	19:47			18:58	65	18:17 (115)	17:20	17:10
15	06:18		20:13 (116)	06:46		07:26 (20)	07:15			07:45		08:08 (23)	07:20	07:50
	21:04	18	20:31 (116)	20:34	44	08:10 (20)	19:45			18:56	65	18:17 (115)	17:19	17:10
16	06:19		20:13 (116)	06:47		07:25 (20)	07:16			07:46		08:08 (23)	07:21	07:50
	21:04	16	20:29 (116)	20:33	44	08:09 (20)	19:43			18:55	65	18:17 (115)	17:18	17:10
17	06:19		20:16 (116)	06:47		07:25 (20)	07:17			07:47		08:08 (23)	07:22	07:51
	21:03	12	20:28 (116)	20:31	44	08:09 (20)	19:42			18:53	63	18:16 (115)	17:17	17:11
18	06:20		20:19 (116)	06:48		07:25 (20)	07:18			07:48		08:09 (23)	07:23	07:52
	21:02	6	20:25 (116)	20:30	44	08:09 (20)	19:40			18:52	62	18:16 (115)	17:17	17:11
19	06:21			06:49		07:25 (20)	07:19			07:49		08:10 (23)	07:24	07:52
	21:02			20:29	44	08:09 (20)	19:38			18:50	59	18:16 (115)	17:16	17:11
20	06:22			06:50		07:25 (20)	07:20			07:50		08:11 (23)	07:25	07:53
	21:01			20:27	43	08:08 (20)	19:37			18:49	56	18:15 (115)	17:15	17:12
21	06:23			06:51		07:25 (20)	07:21			07:51		08:13 (23)	07:27	07:53
	21:00			20:26	43	08:08 (20)	19:35			18:48	50	18:14 (115)	17:15	17:12
22	06:23			06:52		07:26 (20)	07:22			07:52		08:16 (23)	07:28	07:54
	21:00			20:24	41	08:07 (20)	19:33			18:46	44	18:14 (115)	17:14	17:13
23	06:24			06:53		07:26 (20)	07:23			07:53		17:40 (115)	07:29	07:54
	20:59			20:23	40	08:06 (20)	19:32			18:45	34	18:14 (115)	17:13	17:13
24	06:25			06:54		07:27 (20)	07:24			07:55		17:41 (115)	07:30	07:55
	20:58			20:22	39	08:06 (20)	19:30			18:43	32	18:13 (115)	17:13	17:14
25	06:26			06:55		07:27 (20)	07:25			07:56		17:42 (115)	07:31	07:55
	20:57			20:20	38	08:05 (20)	19:28			18:42	29	18:11 (115)	17:12	17:14
26	06:27			06:56		07:28 (20)	07:26			07:57		17:43 (115)	07:32	07:56
	20:56			20:19	36	08:04 (20)	19:27			18:41	27	18:10 (115)	17:12	17:15
27	06:28			06:57		07:29 (20)	07:27			07:58		17:44 (115)	07:33	07:56
	20:56			20:17	33	08:02 (20)	19:25			18:39	24	18:08 (115)	17:11	17:16
28	06:29			06:58		07:29 (20)	07:28			07:59		17:46 (115)	07:34	07:56
	20:55			20:16	31	08:00 (20)	19:23			18:38	21	18:07 (115)	17:11	17:16
29	06:30		07:45 (20)	06:59		07:30 (20)	07:29			08:00		17:48 (115)	07:35	07:57
	20:54	8	07:53 (20)	20:14	28	07:58 (20)	19:22			18:37	17	18:05 (115)	17:11	17:17
30	06:30		07:41 (20)	07:00		07:32 (20)	07:30			08:01		17:52 (115)	07:36	07:57
	20:53	16	07:57 (20)	20:12	24	07:56 (20)	19:20			18:36	9	18:01 (115)	17:10	17:18
31	06:31		07:39 (20)	07:01		07:35 (20)				08:02				07:57
	20:52	20	07:59 (20)	20:11	18	07:53 (20)				18:34				17:19
Potential sun hours	456			427			374			346			300	291
Total, worst case		485			1134			9			1195			
Sun reduction		0.60			0.60			0.61			0.56			
Oper. time red.		1.00			1.00			1.00			1.00			
Wind dir. red.		0.62			0.67			0.67			0.66			
Total reduction		0.37			0.40			0.41			0.37			
Total, real		182			455			4			444			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 19

Licensed user:
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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative**Shadow receptor:** 739 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6426)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January	February			March			April			May			June		
1	07:57	07:44			07:10		17:29 (116)	07:20		19:09 (77)	06:36		07:14 (72)	06:08		06:59 (72)
	17:20	17:53			18:26	29	17:58 (116)	19:59	23	19:32 (77)	20:28	31	07:45 (72)	20:57	61	08:00 (72)
2	07:57	07:44			07:08		17:28 (116)	07:18		19:09 (77)	06:34		07:12 (72)	06:08		06:59 (72)
	17:20	17:54			18:27	29	17:57 (116)	20:00	22	19:31 (77)	20:29	35	07:47 (72)	20:58	61	08:00 (72)
3	07:58	07:43			07:07		17:29 (116)	07:17		19:10 (77)	06:33		07:11 (72)	06:07		07:00 (72)
	17:21	17:56			18:28	28	17:57 (116)	20:00	20	19:30 (77)	20:30	38	07:49 (72)	20:58	60	08:00 (72)
4	07:58	07:42			07:05		17:28 (116)	07:15		19:10 (77)	06:32		07:08 (72)	06:07		06:59 (72)
	17:22	17:57			18:29	28	17:56 (116)	20:01	19	19:29 (77)	20:31	42	07:50 (72)	20:59	61	08:00 (72)
5	07:58	07:41			07:04		17:29 (116)	07:14		19:11 (77)	06:31		07:07 (72)	06:07		07:00 (72)
	17:23	17:58			18:30	27	17:56 (116)	20:02	16	19:27 (77)	20:32	44	07:51 (72)	21:00	60	08:00 (72)
6	07:58	07:40			07:02		17:29 (116)	07:12		19:13 (77)	06:30		07:06 (72)	06:06		07:00 (72)
	17:24	17:59			18:31	26	17:55 (116)	20:03	12	19:25 (77)	20:33	46	07:52 (72)	21:00	60	08:00 (72)
7	07:58	07:38			07:00		17:30 (116)	07:11		19:15 (77)	06:28		07:05 (72)	06:06		07:00 (72)
	17:25	18:00			18:33	23	17:53 (116)	20:04	6	19:21 (77)	20:34	48	07:53 (72)	21:01	60	08:00 (72)
8	07:57	07:37			07:59		18:31 (116)	07:09			06:27		07:04 (72)	06:06		07:00 (72)
	17:26	18:02			19:34	21	18:52 (116)	20:05			20:35	50	07:54 (72)	21:02	60	08:00 (72)
9	07:57	07:36			07:57		18:33 (116)	07:07			06:26		07:03 (72)	06:06		07:01 (72)
	17:27	18:03			19:35	17	18:50 (116)	20:06			20:36	52	07:55 (72)	21:02	59	08:00 (72)
10	07:57	07:35			07:56		18:36 (116)	07:06			06:25		07:02 (72)	06:05		07:01 (72)
	17:28	18:04			19:36	11	18:47 (116)	20:07			20:37	53	07:55 (72)	21:03	59	08:00 (72)
11	07:57	07:34			07:54			07:04			06:24		07:02 (72)	06:05		07:02 (72)
	17:29	18:05			19:37			20:08			20:38	54	07:56 (72)	21:03	59	08:01 (72)
12	07:57	07:33			07:53			07:03			06:23		07:01 (72)	06:05		07:02 (72)
	17:30	18:06			19:38			20:09			20:39	55	07:56 (72)	21:04	59	08:01 (72)
13	07:56	07:32			07:51			07:01			06:22		07:01 (72)	06:05		07:02 (72)
	17:31	18:08			19:39			20:10			20:40	56	07:57 (72)	21:04	59	08:01 (72)
14	07:56	07:30			07:49			07:00			06:21		07:00 (72)	06:05		07:02 (72)
	17:32	18:09			19:40			20:11			20:41	57	07:57 (72)	21:05	59	08:01 (72)
15	07:56	07:29			07:48			06:58			06:20		06:59 (72)	06:05		07:03 (72)
	17:33	18:10			19:41			20:12			20:42	58	07:57 (72)	21:05	58	08:01 (72)
16	07:55	07:28			07:46			06:57			06:19		06:59 (72)	06:05		07:03 (72)
	17:34	18:11			19:42			20:13			20:43	58	07:57 (72)	21:06	58	08:01 (72)
17	07:55	07:26			07:45			06:55			06:18		06:59 (72)	06:05		07:03 (72)
	17:35	18:12			19:43			20:14			20:44	59	07:58 (72)	21:06	58	08:01 (72)
18	07:54	07:25			07:43			06:54			06:17		06:59 (72)	06:05		07:03 (72)
	17:37	18:13			19:44			20:15			20:45	60	07:59 (72)	21:06	58	08:01 (72)
19	07:54	07:24			07:41			06:52			06:16		06:59 (72)	06:05		07:03 (72)
	17:38	18:15			19:45			20:16			20:46	60	07:59 (72)	21:07	58	08:01 (72)
20	07:53	07:22		17:41 (116)	07:40			06:51			06:16		06:58 (72)	06:05		07:03 (72)
	17:39	18:16	6	17:47 (116)	19:46			20:17			20:47	61	07:59 (72)	21:07	59	08:02 (72)
21	07:53	07:21		17:37 (116)	07:38			06:49			06:15		06:58 (72)	06:06		07:04 (72)
	17:40	18:17	13	17:50 (116)	19:47			20:18			20:48	60	07:58 (72)	21:07	59	08:03 (72)
22	07:52	07:20		17:35 (116)	07:36			06:48			06:14		06:59 (72)	06:06		07:04 (72)
	17:41	18:18	18	17:53 (116)	19:48			20:19			20:49	60	07:59 (72)	21:08	59	08:03 (72)
23	07:52	07:18		17:33 (116)	07:35			06:46			06:13		06:58 (72)	06:06		07:04 (72)
	17:42	18:19	22	17:55 (116)	19:49			20:20			20:50	61	07:59 (72)	21:08	59	08:03 (72)
24	07:51	07:17		17:32 (116)	07:33		19:19 (77)	06:45			06:13		06:58 (72)	06:06		07:04 (72)
	17:43	18:20	23	17:55 (116)	19:50	8	19:27 (77)	20:21			20:50	61	07:59 (72)	21:08	58	08:02 (72)
25	07:50	07:15		17:31 (116)	07:31		19:15 (77)	06:44			06:12		06:58 (72)	06:07		07:05 (72)
	17:45	18:21	26	17:57 (116)	19:52	14	19:29 (77)	20:22			20:51	62	08:00 (72)	21:08	58	08:03 (72)
26	07:50	07:14		17:30 (116)	07:30		19:14 (77)	06:42			06:11		06:58 (72)	06:07		07:05 (72)
	17:46	18:23	27	17:57 (116)	19:53	17	19:31 (77)	20:23			20:52	61	07:59 (72)	21:08	58	08:03 (72)
27	07:49	07:13		17:29 (116)	07:28		19:12 (77)	06:41			06:11		06:59 (72)	06:07		07:05 (72)
	17:47	18:24	28	17:57 (116)	19:54	20	19:32 (77)	20:24			20:53	61	08:00 (72)	21:08	58	08:03 (72)
28	07:48	07:11		17:28 (116)	07:27		19:11 (77)	06:40		07:25 (72)	06:10		06:58 (72)	06:08		07:06 (72)
	17:48	18:25	29	17:57 (116)	19:55	21	19:32 (77)	20:25	11	07:36 (72)	20:54	61	07:59 (72)	21:08	58	08:04 (72)
29	07:47				07:25		19:10 (77)	06:38		07:19 (72)	06:10		06:59 (72)	06:08		07:05 (72)
	17:49				19:56	23	19:33 (77)	20:26	21	07:40 (72)	20:55	61	08:00 (72)	21:08	59	08:04 (72)
30	07:46				07:23		19:09 (77)	06:37		07:16 (72)	06:09		06:59 (72)	06:09		07:06 (72)
	17:51				19:57	23	19:32 (77)	20:27	27	07:43 (72)	20:55	61	08:00 (72)	21:08	59	08:05 (72)
31	07:45				07:22		19:09 (77)				06:09		06:59 (72)			
	17:52				19:58	23	19:32 (77)				20:56	61	08:00 (72)			
Potential sun hours	300	299			370			397			446			449		
Total, worst case			192			388			177			1687			1771	
Sun reduction			0.42			0.44			0.51			0.56			0.60	
Oper. time red.			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.			0.67			0.67			0.66			0.67			0.67	
Total reduction			0.28			0.29			0.34			0.38			0.40	
Total, real			54			114			60			638			717	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 20

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative**Shadow receptor:** 739 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6426)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November	December
1	06:09		07:06 (72)	06:32		07:12 (72)	07:02			07:31			07:03	07:37
	21:08	59	08:05 (72)	20:51	55	08:07 (72)	20:09			19:18			17:33	17:10
2	06:09		07:06 (72)	06:33		07:13 (72)	07:03			07:32			07:05	07:38
	21:08	60	08:06 (72)	20:50	53	08:06 (72)	20:08			19:17			17:32	17:10
3	06:10		07:06 (72)	06:34		07:13 (72)	07:04			07:33		18:15 (116)	07:06	07:39
	21:08	59	08:05 (72)	20:49	53	08:06 (72)	20:06			19:15	8	18:23 (116)	17:31	17:10
4	06:11		07:07 (72)	06:35		07:13 (72)	07:05			07:34		18:11 (116)	07:07	07:40
	21:08	59	08:06 (72)	20:48	51	08:04 (72)	20:05			19:14	15	18:26 (116)	17:30	17:09
5	06:11		07:06 (72)	06:36		07:14 (72)	07:06		19:13 (77)	07:35		18:09 (116)	07:08	07:41
	21:08	60	08:06 (72)	20:47	49	08:03 (72)	20:03	5	19:18 (77)	19:12	19	18:28 (116)	17:29	17:09
6	06:12		07:07 (72)	06:37		07:15 (72)	07:07		19:09 (77)	07:36		18:07 (116)	07:09	07:42
	21:08	60	08:07 (72)	20:45	47	08:02 (72)	20:01	12	19:21 (77)	19:10	22	18:29 (116)	17:27	17:09
7	06:12		07:06 (72)	06:38		07:16 (72)	07:08		19:06 (77)	07:37		18:05 (116)	07:10	07:43
	21:07	60	08:06 (72)	20:44	45	08:01 (72)	20:00	16	19:22 (77)	19:09	25	18:30 (116)	17:26	17:09
8	06:13		07:07 (72)	06:39		07:17 (72)	07:08		19:04 (77)	07:38		18:04 (116)	07:12	07:44
	21:07	60	08:07 (72)	20:43	43	08:00 (72)	19:56	19	19:23 (77)	19:07	26	18:30 (116)	17:25	17:09
9	06:13		07:06 (72)	06:40		07:18 (72)	07:09		19:03 (77)	07:39		18:03 (116)	07:13	07:45
	21:07	61	08:07 (72)	20:42	41	07:59 (72)	19:55	20	19:23 (77)	19:06	28	18:31 (116)	17:24	17:09
10	06:14		07:07 (72)	06:41		07:20 (72)	07:10		19:02 (77)	07:40		18:02 (116)	07:14	07:46
	21:06	60	08:07 (72)	20:41	37	07:57 (72)	19:53	22	19:24 (77)	19:04	29	18:31 (116)	17:23	17:09
11	06:15		07:07 (72)	06:42		07:21 (72)	07:11		19:01 (77)	07:41		18:02 (116)	07:15	07:47
	21:06	61	08:08 (72)	20:39	35	07:56 (72)	19:52	23	19:24 (77)	19:02	29	18:31 (116)	17:22	17:09
12	06:16		07:06 (72)	06:43		07:23 (72)	07:12		19:01 (77)	07:42		18:01 (116)	07:16	07:47
	21:06	61	08:07 (72)	20:38	30	07:53 (72)	19:50	23	19:24 (77)	19:01	29	18:30 (116)	17:22	17:09
13	06:16		07:07 (72)	06:44		07:26 (72)	07:13		19:01 (77)	07:43		18:01 (116)	07:17	07:48
	21:05	61	08:08 (72)	20:37	25	07:51 (72)	19:48	22	19:23 (77)	18:59	29	18:30 (116)	17:21	17:10
14	06:17		07:07 (72)	06:45		07:29 (72)	07:14		19:00 (77)	07:44		18:02 (116)	07:18	07:49
	21:05	61	08:08 (72)	20:36	18	07:47 (72)	19:47	23	19:23 (77)	18:58	28	18:30 (116)	17:20	17:10
15	06:18		07:08 (72)	06:46		07:34 (72)	07:15		19:01 (77)	07:45		18:02 (116)	07:20	07:50
	21:04	61	08:09 (72)	20:34	6	07:40 (72)	19:45	21	19:22 (77)	18:56	28	18:30 (116)	17:19	17:10
16	06:18		07:07 (72)	06:47			07:16		19:01 (77)	07:46		18:02 (116)	07:21	07:50
	21:04	61	08:08 (72)	20:33			19:43	20	19:21 (77)	18:55	27	18:29 (116)	17:18	17:10
17	06:19		07:07 (72)	06:47			07:17		19:02 (77)	07:47		18:03 (116)	07:22	07:51
	21:03	62	08:09 (72)	20:31			19:42	18	19:20 (77)	18:53	25	18:28 (116)	17:17	17:11
18	06:20		07:08 (72)	06:48			07:18		19:03 (77)	07:48		18:03 (116)	07:23	07:52
	21:02	61	08:09 (72)	20:30			19:40	15	19:18 (77)	18:52	23	18:26 (116)	17:17	17:11
19	06:21		07:08 (72)	06:49			07:19		19:05 (77)	07:49		18:04 (116)	07:24	07:52
	21:02	61	08:09 (72)	20:29			19:38	10	19:15 (77)	18:50	21	18:25 (116)	17:16	17:11
20	06:22		07:07 (72)	06:50			07:20			07:50		18:06 (116)	07:25	07:53
	21:01	62	08:09 (72)	20:27			19:37			18:49	17	18:23 (116)	17:15	17:12
21	06:22		07:08 (72)	06:51			07:21			07:51		18:08 (116)	07:27	07:53
	21:00	61	08:09 (72)	20:26			19:35			18:48	12	18:20 (116)	17:15	17:12
22	06:23		07:08 (72)	06:52			07:22			07:52			07:28	07:54
	21:00	61	08:09 (72)	20:24			19:33			18:46			17:14	17:13
23	06:24		07:09 (72)	06:53			07:23			07:53			07:29	07:54
	20:59	60	08:09 (72)	20:23			19:32			18:45			17:13	17:13
24	06:25		07:09 (72)	06:54			07:24			07:55			07:30	07:55
	20:58	60	08:09 (72)	20:22			19:30			18:43			17:13	17:14
25	06:26		07:09 (72)	06:55			07:25			07:56			07:31	07:55
	20:57	60	08:09 (72)	20:20			19:28			18:42			17:12	17:14
26	06:27		07:09 (72)	06:56			07:26			07:57			07:32	07:56
	20:56	59	08:08 (72)	20:19			19:27			18:41			17:12	17:15
27	06:28		07:09 (72)	06:57			07:27			07:58			07:33	07:56
	20:56	59	08:08 (72)	20:17			19:25			18:39			17:11	17:16
28	06:29		07:10 (72)	06:58			07:28			07:59			07:34	07:56
	20:55	58	08:08 (72)	20:16			19:23			18:38			17:11	17:16
29	06:30		07:10 (72)	06:59			07:29			08:00			07:35	07:57
	20:54	58	08:08 (72)	20:14			19:22			18:37			17:11	17:17
30	06:30		07:11 (72)	07:00			07:30			08:01			07:36	07:57
	20:53	56	08:07 (72)	20:12			19:20			18:36			17:10	17:18
31	06:31		07:11 (72)	07:01						08:02				07:57
	20:52	56	08:07 (72)	20:11						18:34				17:19
Potential sun hours	456			427			374			346			300	291
Total, worst case		1858			588			269			440			
Sun reduction		0.60			0.60			0.61			0.56			
Oper. time red.		1.00			1.00			1.00			1.00			
Wind dir. red.		0.67			0.67			0.66			0.67			
Total reduction		0.40			0.40			0.40			0.38			
Total, real		752			238			108			166			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 21

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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative**Shadow receptor:** 741 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6427)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March	April			May			June		
1	07:57		09:07 (21)	07:44		16:25 (20)	07:10	07:20			06:36		07:08 (18)	06:08		07:04 (18)
	17:20	50	16:44 (20)	17:53	30	16:55 (20)	18:26	19:59			20:28	32	07:40 (18)	20:57	83	20:21 (72)
2	07:57		09:08 (21)	07:44		16:26 (20)	07:08	07:18			06:34		07:07 (18)	06:08		07:05 (18)
	17:20	49	16:45 (20)	17:54	28	16:54 (20)	18:27	20:00			20:29	34	07:41 (18)	20:58	83	20:22 (72)
3	07:57		09:09 (21)	07:43		16:27 (20)	07:07	07:17			06:33		07:06 (18)	06:07		07:05 (18)
	17:21	49	16:46 (20)	17:55	26	16:53 (20)	18:28	20:00			20:30	36	07:42 (18)	20:58	84	20:22 (72)
4	07:58		09:11 (21)	07:42		16:29 (20)	07:05	07:15			06:32		07:04 (18)	06:07		07:06 (18)
	17:22	47	16:47 (20)	17:57	22	16:51 (20)	18:29	20:01			20:31	38	07:42 (18)	20:59	83	20:22 (72)
5	07:58		09:12 (21)	07:41		16:32 (20)	07:03	07:14			06:31		07:03 (18)	06:07		07:06 (18)
	17:23	45	16:47 (20)	17:58	17	16:49 (20)	18:30	20:02			20:32	40	07:43 (18)	21:00	83	20:23 (72)
6	07:58		09:15 (21)	07:39		16:35 (20)	07:02	07:12			06:30		07:03 (18)	06:06		07:07 (18)
	17:24	41	16:48 (20)	17:59	12	16:47 (20)	18:31	20:03			20:33	41	07:44 (18)	21:00	83	20:24 (72)
7	07:57		16:15 (20)	07:38			07:00	07:10			06:28		07:02 (18)	06:06		07:07 (18)
	17:25	34	16:49 (20)	18:00			18:33	20:04			20:34	43	07:45 (18)	21:01	82	20:23 (72)
8	07:57		16:15 (20)	07:37			07:59	07:09			06:27		07:02 (18)	06:06		07:08 (18)
	17:26	35	16:50 (20)	18:02			19:34	20:05			20:35	43	07:45 (18)	21:02	82	20:24 (72)
9	07:57		16:15 (20)	07:36			07:57	07:07			06:26		07:01 (18)	06:06		07:08 (18)
	17:27	36	16:51 (20)	18:03			19:35	20:06			20:36	44	07:45 (18)	21:02	81	20:24 (72)
10	07:57		16:15 (20)	07:35			07:56	07:06			06:25		07:01 (18)	06:05		07:09 (18)
	17:28	36	16:51 (20)	18:04			19:36	20:07			20:37	45	07:46 (18)	21:03	80	20:24 (72)
11	07:57		16:15 (20)	07:34			07:54	07:04			06:24		07:00 (18)	06:05		07:10 (18)
	17:29	37	16:52 (20)	18:05			19:37	20:08			20:38	46	07:46 (18)	21:03	80	20:25 (72)
12	07:57		16:16 (20)	07:33			07:53	07:03			06:23		07:00 (18)	06:05		07:10 (18)
	17:30	37	16:53 (20)	18:06			19:38	20:09			20:39	46	07:46 (18)	21:04	80	20:25 (72)
13	07:56		16:15 (20)	07:31			07:51	07:01			06:22		07:00 (18)	06:05		07:11 (18)
	17:31	38	16:53 (20)	18:08			19:39	20:10			20:40	46	07:46 (18)	21:04	79	20:26 (72)
14	07:56		16:16 (20)	07:30			07:49	07:00			06:21		07:00 (18)	06:05		07:11 (18)
	17:32	38	16:54 (20)	18:09			19:40	20:11			20:41	46	07:46 (18)	21:05	79	20:26 (72)
15	07:56		16:16 (20)	07:29			07:48	06:58			06:20		06:59 (18)	06:05		07:12 (18)
	17:33	39	16:55 (20)	18:10			19:41	20:12			20:42	50	19:59 (72)	21:05	78	20:26 (72)
16	07:55		16:16 (20)	07:28			07:46	06:57			06:19		06:59 (18)	06:05		07:12 (18)
	17:34	39	16:55 (20)	18:11			19:42	20:13			20:43	61	20:04 (72)	21:06	78	20:26 (72)
17	07:55		16:17 (20)	07:26			07:44	06:55			06:18		06:59 (18)	06:05		07:12 (18)
	17:35	39	16:56 (20)	18:12			19:43	20:14			20:44	66	20:07 (72)	21:06	77	20:26 (72)
18	07:54		16:16 (20)	07:25			07:43	06:54			06:17		07:00 (18)	06:05		07:12 (18)
	17:36	40	16:56 (20)	18:13			19:44	20:15			20:45	71	20:10 (72)	21:06	78	20:27 (72)
19	07:54		16:17 (20)	07:24			07:41	06:52			06:16		07:00 (18)	06:05		07:13 (18)
	17:38	40	16:57 (20)	18:15			19:45	20:16			20:46	72	20:11 (72)	21:07	77	20:27 (72)
20	07:53		16:17 (20)	07:22			07:40	06:51			06:16		07:00 (18)	06:05		07:13 (18)
	17:39	40	16:57 (20)	18:16			19:46	20:17			20:47	75	20:12 (72)	21:07	77	20:27 (72)
21	07:53		16:17 (20)	07:21			07:38	06:49			06:15		07:00 (18)	06:06		07:14 (18)
	17:40	40	16:57 (20)	18:17			19:47	20:18			20:48	76	20:13 (72)	21:07	77	20:28 (72)
22	07:52		16:18 (20)	07:20			07:36	06:48			06:14		07:01 (18)	06:06		07:14 (18)
	17:41	40	16:58 (20)	18:18			19:48	20:19			20:49	78	20:15 (72)	21:08	77	20:28 (72)
23	07:52		16:18 (20)	07:18			07:35	06:46			06:13		07:01 (18)	06:06		07:14 (18)
	17:42	39	16:57 (20)	18:19			19:49	20:20			20:50	81	20:16 (72)	21:08	77	20:28 (72)
24	07:51		16:18 (20)	07:17			07:33	06:45			06:13		07:01 (18)	06:06		07:14 (18)
	17:43	39	16:57 (20)	18:20			19:50	20:21			20:50	81	20:16 (72)	21:08	77	20:28 (72)
25	07:50		16:20 (20)	07:15			07:31	06:44			06:12		07:01 (18)	06:07		07:14 (18)
	17:45	38	16:58 (20)	18:21			19:51	20:22			20:51	82	20:17 (72)	21:08	77	20:28 (72)
26	07:49		16:20 (20)	07:14			07:30	06:42			06:11		07:01 (18)	06:07		07:14 (18)
	17:46	38	16:58 (20)	18:23			19:52	20:23			20:52	84	20:18 (72)	21:08	78	20:28 (72)
27	07:49		16:21 (20)	07:12			07:28	06:41		07:17 (18)	06:11		07:02 (18)	06:07		07:14 (18)
	17:47	36	16:57 (20)	18:24			19:54	20:24	15	07:32 (18)	20:53	83	20:19 (72)	21:08	78	20:28 (72)
28	07:48		16:21 (20)	07:11			07:27	06:40		07:14 (18)	06:10		07:02 (18)	06:08		07:14 (18)
	17:48	36	16:57 (20)	18:25			19:55	20:25	21	07:35 (18)	20:54	83	20:19 (72)	21:08	79	20:29 (72)
29	07:47		16:22 (20)				07:25	06:38		07:11 (18)	06:10		07:03 (18)	06:08		07:14 (18)
	17:49	35	16:57 (20)				19:56	20:26	26	07:37 (18)	20:55	84	20:20 (72)	21:08	79	20:29 (72)
30	07:46		16:23 (20)				07:23	06:37		07:10 (18)	06:09		07:03 (18)	06:08		07:14 (18)
	17:51	33	16:56 (20)				19:57	20:27	28	07:38 (18)	20:55	84	20:20 (72)	21:08	80	20:29 (72)
31	07:45		16:24 (20)				07:22				06:08		07:04 (18)			
	17:52	31	16:55 (20)				19:58				20:56	84	20:21 (72)			
Potential sun hours	300			299			370	397			446			449		
Total, worst case		1214			135				90			1875			2386	
Sun reduction		0.36			0.42				0.51			0.56			0.60	
Oper. time red.		1.00			1.00				1.00			1.00			1.00	
Wind dir. red.		0.67			0.67				0.67			0.66			0.64	
Total reduction		0.24			0.28				0.34			0.37			0.39	
Total, real		293			38				31			694			924	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 22

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative**Shadow receptor:** 741 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6427)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September	October	November			December		
1	06:09		07:14 (18)	06:32		07:11 (18)	07:02	07:31	07:03			07:37		15:57 (20)
	21:08	80	20:29 (72)	20:51	46	07:57 (18)	20:09	19:18	17:33			17:10	37	16:34 (20)
2	06:09		07:13 (18)	06:33		07:11 (18)	07:03	07:31	07:05			07:38		15:58 (20)
	21:08	81	20:29 (72)	20:50	45	07:56 (18)	20:08	19:17	17:32			17:10	36	16:34 (20)
3	06:10		07:14 (18)	06:34		07:11 (18)	07:04	07:32	07:06			07:39		15:59 (20)
	21:08	80	20:29 (72)	20:49	44	07:55 (18)	20:06	19:15	17:31			17:10	35	16:34 (20)
4	06:10		07:14 (18)	06:35		07:11 (18)	07:05	07:33	07:07			07:40		15:59 (20)
	21:08	81	20:30 (72)	20:48	44	07:55 (18)	20:05	19:14	17:30			17:09	35	16:34 (20)
5	06:11		07:13 (18)	06:36		07:11 (18)	07:06	07:34	07:08		16:04 (20)	07:41		16:00 (20)
	21:08	82	20:29 (72)	20:46	44	07:55 (18)	20:03	19:12	17:29	13	16:17 (20)	17:09	34	16:34 (20)
6	06:12		07:14 (18)	06:37		07:12 (18)	07:07	07:35	07:09		16:01 (20)	07:42		09:01 (21)
	21:08	82	20:30 (72)	20:45	42	07:54 (18)	20:01	19:10	17:27	19	16:20 (20)	17:09	41	16:34 (20)
7	06:12		07:13 (18)	06:38		07:13 (18)	07:07	07:37	07:10		16:00 (20)	07:43		09:00 (21)
	21:07	82	20:29 (72)	20:44	40	07:53 (18)	20:00	19:09	17:26	22	16:22 (20)	17:09	45	16:35 (20)
8	06:13		07:13 (18)	06:39		07:13 (18)	07:08	07:38	07:12		15:58 (20)	07:44		08:59 (21)
	21:07	83	20:30 (72)	20:43	40	07:53 (18)	19:56	19:07	17:25	26	16:24 (20)	17:09	47	16:35 (20)
9	06:13		07:12 (18)	06:40		07:14 (18)	07:09	07:39	07:13		15:57 (20)	07:45		08:58 (21)
	21:07	84	20:29 (72)	20:42	38	07:52 (18)	19:55	19:06	17:24	28	16:25 (20)	17:09	49	16:35 (20)
10	06:14		07:12 (18)	06:41		07:15 (18)	07:10	07:40	07:14		15:55 (20)	07:46		08:58 (21)
	21:06	83	20:29 (72)	20:41	36	07:51 (18)	19:53	19:04	17:23	31	16:26 (20)	17:09	49	16:35 (20)
11	06:15		07:12 (18)	06:42		07:16 (18)	07:11	07:41	07:15		15:55 (20)	07:47		08:58 (21)
	21:06	83	20:29 (72)	20:39	34	07:50 (18)	19:52	19:02	17:22	32	16:27 (20)	17:09	50	16:35 (20)
12	06:15		07:12 (18)	06:43		07:17 (18)	07:12	07:42	07:16		15:54 (20)	07:47		08:57 (21)
	21:06	83	20:29 (72)	20:38	31	07:48 (18)	19:50	19:01	17:21	34	16:28 (20)	17:09	51	16:35 (20)
13	06:16		07:12 (18)	06:44		07:19 (18)	07:13	07:43	07:17		15:54 (20)	07:48		08:57 (21)
	21:05	84	20:29 (72)	20:37	28	07:47 (18)	19:48	18:59	17:21	35	16:29 (20)	17:10	51	16:35 (20)
14	06:17		07:12 (18)	06:45		07:20 (18)	07:14	07:44	07:18		15:53 (20)	07:49		08:58 (21)
	21:05	84	20:29 (72)	20:35	25	07:45 (18)	19:47	18:58	17:20	36	16:29 (20)	17:10	51	16:36 (20)
15	06:18		07:12 (18)	06:46		07:22 (18)	07:15	07:45	07:20		15:54 (20)	07:50		08:58 (21)
	21:04	84	20:29 (72)	20:34	19	07:41 (18)	19:45	18:56	17:19	36	16:30 (20)	17:10	51	16:36 (20)
16	06:18		07:11 (18)	06:46		07:25 (18)	07:16	07:46	07:21		15:53 (20)	07:50		08:58 (21)
	21:04	83	20:28 (72)	20:33	13	07:38 (18)	19:43	18:55	17:18	38	16:31 (20)	17:10	51	16:36 (20)
17	06:19		07:11 (18)	06:47			07:17	07:47	07:22		15:53 (20)	07:51		08:58 (21)
	21:03	82	20:27 (72)	20:31			19:42	18:53	17:17	38	16:31 (20)	17:11	51	16:36 (20)
18	06:20		07:11 (18)	06:48			07:18	07:48	07:23		15:52 (20)	07:52		08:58 (21)
	21:02	83	20:27 (72)	20:30			19:40	18:52	17:17	39	16:31 (20)	17:11	51	16:36 (20)
19	06:21		07:11 (18)	06:49			07:19	07:49	07:24		15:52 (20)	07:52		08:59 (21)
	21:02	82	20:27 (72)	20:29			19:38	18:50	17:16	39	16:31 (20)	17:11	51	16:37 (20)
20	06:22		07:10 (18)	06:50			07:20	07:50	07:25		15:53 (20)	07:53		08:59 (21)
	21:01	81	20:25 (72)	20:27			19:37	18:49	17:15	40	16:33 (20)	17:12	52	16:38 (20)
21	06:22		07:10 (18)	06:51			07:21	07:51	07:26		15:53 (20)	07:53		08:59 (21)
	21:00	80	20:25 (72)	20:26			19:35	18:48	17:15	40	16:33 (20)	17:12	52	16:38 (20)
22	06:23		07:10 (18)	06:52			07:22	07:52	07:28		15:53 (20)	07:54		09:00 (21)
	21:00	78	20:24 (72)	20:24			19:33	18:46	17:14	40	16:33 (20)	17:13	52	16:39 (20)
23	06:24		07:10 (18)	06:53			07:23	07:53	07:29		15:53 (20)	07:54		09:00 (21)
	20:59	76	20:23 (72)	20:23			19:32	18:45	17:13	40	16:33 (20)	17:13	52	16:39 (20)
24	06:25		07:10 (18)	06:54			07:24	07:54	07:30		15:53 (20)	07:55		09:01 (21)
	20:58	75	20:22 (72)	20:21			19:30	18:43	17:13	40	16:33 (20)	17:14	51	16:39 (20)
25	06:26		07:10 (18)	06:55			07:25	07:56	07:31		15:55 (20)	07:55		09:02 (21)
	20:57	72	20:21 (72)	20:20			19:28	18:42	17:12	39	16:34 (20)	17:14	51	16:40 (20)
26	06:27		07:10 (18)	06:56			07:26	07:57	07:32		15:55 (20)	07:56		09:02 (21)
	20:56	68	20:19 (72)	20:18			19:27	18:41	17:12	39	16:34 (20)	17:15	51	16:40 (20)
27	06:28		07:10 (18)	06:57			07:27	07:58	07:33		15:55 (20)	07:56		09:02 (21)
	20:56	64	20:17 (72)	20:17			19:25	18:39	17:11	39	16:34 (20)	17:16	52	16:41 (20)
28	06:29		07:10 (18)	06:58			07:28	07:59	07:34		15:56 (20)	07:56		09:04 (21)
	20:55	57	20:13 (72)	20:15			19:23	18:38	17:11	38	16:34 (20)	17:16	51	16:42 (20)
29	06:29		07:10 (18)	06:59			07:29	08:00	07:35		15:56 (20)	07:57		09:04 (21)
	20:54	47	07:57 (18)	20:14			19:22	18:37	17:11	38	16:34 (20)	17:17	51	16:42 (20)
30	06:30		07:10 (18)	07:00			07:30	08:01	07:36		15:57 (20)	07:57		09:05 (21)
	20:53	47	07:57 (18)	20:12			19:20	18:36	17:10	37	16:34 (20)	17:18	51	16:43 (20)
31	06:31		07:11 (18)	07:01				08:02				07:57		09:06 (21)
	20:52	46	07:57 (18)	20:11				18:34				17:19	51	16:44 (20)
Potential sun hours	456			427			374	346	300			291		
Total, worst case		2357			569					896			1483	
Sun reduction		0.60			0.60					0.37			0.50	
Oper. time red.		1.00			1.00					1.00			1.00	
Wind dir. red.		0.65			0.67					0.67			0.65	
Total reduction		0.39			0.40					0.25			0.33	
Total, real		923			230					224			482	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 23

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
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Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative**Shadow receptor:** 742 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6428)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May	June
1	07:57		15:58 (23)	07:44		16:07 (23)	07:10		07:55 (21)	07:20		09:05 (21)	06:36	06:08
	17:20	41	16:39 (23)	17:53	66	17:28 (25)	18:26	52	08:47 (21)	19:59	46	19:27 (20)	20:28	20:57
2	07:57		15:59 (23)	07:44		16:08 (23)	07:08		07:53 (21)	07:18		18:50 (20)	06:34	06:08
	17:20	41	16:40 (23)	17:54	64	17:28 (25)	18:27	55	08:48 (21)	20:00	37	19:27 (20)	20:29	20:58
3	07:57		15:59 (23)	07:43		16:09 (23)	07:07		07:53 (21)	07:17		18:50 (20)	06:33	06:07
	17:21	41	16:40 (23)	17:55	63	17:28 (25)	18:28	56	08:49 (21)	20:00	38	19:28 (20)	20:30	20:58
4	07:58		15:59 (23)	07:42		16:10 (23)	07:05		07:51 (21)	07:15		18:49 (20)	06:32	06:07
	17:22	42	16:41 (23)	17:57	60	17:28 (25)	18:29	58	08:49 (21)	20:01	38	19:27 (20)	20:31	20:59
5	07:58		15:59 (23)	07:41		16:12 (23)	07:03		07:51 (21)	07:14		18:49 (20)	06:31	06:07
	17:23	43	16:42 (23)	17:58	56	17:28 (25)	18:30	59	08:50 (21)	20:02	37	19:26 (20)	20:32	21:00
6	07:58		15:59 (23)	07:39		16:13 (23)	07:02		07:50 (21)	07:12		18:49 (20)	06:30	06:06
	17:24	44	16:43 (23)	17:59	52	17:27 (25)	18:31	60	08:50 (21)	20:03	37	19:26 (20)	20:33	21:00
7	07:57		16:00 (23)	07:38		16:15 (23)	07:00		07:49 (21)	07:10		18:49 (20)	06:28	06:06
	17:25	43	16:43 (23)	18:00	47	17:26 (25)	18:33	60	08:49 (21)	20:04	36	19:25 (20)	20:34	21:01
8	07:57		16:00 (23)	07:37		16:17 (23)	07:59		08:49 (21)	07:09		18:50 (20)	06:27	06:06
	17:26	44	16:44 (23)	18:02	41	17:25 (25)	19:34	61	09:50 (21)	20:05	35	19:25 (20)	20:35	21:02
9	07:57		16:00 (23)	07:36		16:19 (23)	07:57		08:48 (21)	07:07		18:50 (20)	06:26	06:06
	17:27	45	16:45 (23)	18:03	33	17:23 (25)	19:35	62	09:50 (21)	20:06	34	19:24 (20)	20:36	21:02
10	07:57		16:00 (23)	07:35		16:22 (23)	07:56		08:48 (21)	07:06		18:50 (20)	06:25	06:05
	17:28	45	16:45 (23)	18:04	19	16:41 (23)	19:36	62	09:50 (21)	20:07	32	19:22 (20)	20:37	21:03
11	07:57		16:00 (23)	07:34		16:26 (23)	07:54		08:47 (21)	07:04		18:51 (20)	06:24	06:05
	17:29	46	16:46 (23)	18:05	10	16:36 (23)	19:37	62	09:49 (21)	20:08	31	19:22 (20)	20:38	21:03
12	07:57		16:00 (23)	07:33			07:53		08:46 (21)	07:03		18:51 (20)	06:23	06:05
	17:30	47	16:47 (23)	18:06			19:38	63	09:49 (21)	20:09	29	19:20 (20)	20:39	21:04
13	07:56		16:00 (23)	07:31			07:51		08:46 (21)	07:01		18:53 (20)	06:22	06:05
	17:31	47	16:47 (23)	18:08			19:39	63	09:49 (21)	20:10	26	19:19 (20)	20:40	21:04
14	07:56		16:01 (23)	07:30			07:49		08:46 (21)	07:00		18:54 (20)	06:21	06:05
	17:32	47	16:48 (23)	18:09			19:40	62	09:48 (21)	20:11	22	19:16 (20)	20:41	21:05
15	07:56		16:01 (23)	07:29			07:48		08:46 (21)	06:58		18:56 (20)	06:20	06:05
	17:33	48	16:49 (23)	18:10			19:41	62	09:48 (21)	20:12	18	19:14 (20)	20:42	21:05
16	07:55		16:01 (23)	07:28			07:46		08:46 (21)	06:57		18:58 (20)	06:19	06:05
	17:34	48	16:49 (23)	18:11			19:42	61	09:47 (21)	20:13	13	19:11 (20)	20:43	21:06
17	07:55		16:01 (23)	07:26			07:44		08:46 (21)	06:55			06:18	06:05
	17:35	49	16:50 (23)	18:12			19:43	60	09:46 (21)	20:14			20:44	21:06
18	07:54		16:01 (23)	07:25			07:43		08:46 (21)	06:54			06:17	06:05
	17:36	49	16:50 (23)	18:13			19:44	60	09:46 (21)	20:15			20:45	21:06
19	07:54		16:02 (23)	07:24			07:41		08:46 (21)	06:52			06:16	06:05
	17:38	49	16:51 (23)	18:15			19:45	58	09:44 (21)	20:16			20:46	21:07
20	07:53		16:02 (23)	07:22		08:17 (21)	07:40		08:46 (21)	06:51			06:16	06:05
	17:39	49	16:51 (23)	18:16	10	08:27 (21)	19:46	57	09:43 (21)	20:17			20:47	21:07
21	07:53		16:02 (23)	07:21		08:11 (21)	07:38		08:47 (21)	06:49			06:15	06:06
	17:40	49	16:51 (23)	18:17	21	08:32 (21)	19:47	55	09:42 (21)	20:18			20:48	21:07
22	07:52		16:03 (23)	07:20		08:08 (21)	07:36		08:47 (21)	06:48			06:14	06:06
	17:41	54	17:17 (25)	18:18	28	08:36 (21)	19:48	54	09:41 (21)	20:19			20:49	21:08
23	07:52		16:03 (23)	07:18		08:04 (21)	07:35		08:47 (21)	06:46			06:13	06:06
	17:42	57	17:18 (25)	18:19	34	08:38 (21)	19:49	57	19:14 (20)	20:20			20:50	21:08
24	07:51		16:03 (23)	07:17		08:03 (21)	07:33		08:49 (21)	06:45			06:13	06:06
	17:43	60	17:19 (25)	18:20	37	08:40 (21)	19:50	64	19:19 (20)	20:21			20:50	21:08
25	07:50		16:04 (23)	07:15		08:01 (21)	07:31		08:49 (21)	06:44			06:12	06:07
	17:45	62	17:21 (25)	18:21	42	08:43 (21)	19:51	69	19:22 (20)	20:22			20:51	21:08
26	07:49		16:04 (23)	07:14		07:59 (21)	07:30		08:51 (21)	06:42			06:11	06:07
	17:46	64	17:22 (25)	18:23	45	08:44 (21)	19:52	69	19:24 (20)	20:23			20:52	21:08
27	07:49		16:05 (23)	07:12		07:58 (21)	07:28		08:52 (21)	06:41			06:11	06:07
	17:47	63	17:23 (25)	18:24	47	08:45 (21)	19:54	69	19:25 (20)	20:24			20:53	21:08
28	07:48		16:05 (23)	07:11		07:56 (21)	07:27		08:53 (21)	06:40			06:10	06:08
	17:48	65	17:24 (25)	18:25	50	08:46 (21)	19:55	68	19:25 (20)	20:25			20:54	21:08
29	07:47		16:05 (23)				07:25		08:55 (21)	06:38			06:10	06:08
	17:49	66	17:25 (25)				19:56	66	19:27 (20)	20:26			20:55	21:08
30	07:46		16:06 (23)				07:23		08:57 (21)	06:37			06:09	06:08
	17:51	66	17:26 (25)				19:57	62	19:27 (20)	20:27			20:55	21:08
31	07:45		16:07 (23)				07:22		08:59 (21)				06:08	
	17:52	66	17:28 (25)				19:58	57	19:27 (20)				20:56	
Potential sun hours	300			299			370			397			446	449
Total, worst case		1580			825			1883			509			
Sun reduction		0.36			0.42			0.44			0.51			
Oper. time red.		1.00			1.00			1.00			1.00			
Wind dir. red.		0.68			0.66			0.64			0.66			
Total reduction		0.24			0.28			0.28			0.34			
Total, real		386			230			529			172			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 24

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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative**Shadow receptor:** 742 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6428)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July	August			September			October			November			December		
1	06:09	06:32			07:02		18:50 (20)	07:31		08:26 (21)	07:03		15:50 (23)	07:37		15:42 (23)
	21:08	20:51			20:09	31	19:21 (20)	19:18	62	09:28 (21)	17:33	20	16:10 (23)	17:10	46	16:28 (23)
2	06:09	06:33			07:03		18:49 (20)	07:31		08:25 (21)	07:05		15:49 (23)	07:38		15:43 (23)
	21:08	20:50			20:08	32	19:21 (20)	19:17	63	09:28 (21)	17:32	34	16:53 (25)	17:10	45	16:28 (23)
3	06:10	06:34			07:04		18:48 (20)	07:32		08:25 (21)	07:06		15:46 (23)	07:39		15:43 (23)
	21:08	20:49			20:06	34	19:22 (20)	19:15	63	09:28 (21)	17:31	43	16:55 (25)	17:10	45	16:28 (23)
4	06:10	06:35			07:05		18:47 (20)	07:33		08:25 (21)	07:07		15:45 (23)	07:40		15:44 (23)
	21:08	20:48			20:05	35	19:22 (20)	19:14	62	09:27 (21)	17:30	48	16:56 (25)	17:09	44	16:28 (23)
5	06:11	06:36			07:06		18:46 (20)	07:34		08:25 (21)	07:08		15:43 (23)	07:41		15:45 (23)
	21:08	20:46			20:03	36	19:22 (20)	19:12	62	09:27 (21)	17:29	53	16:57 (25)	17:09	43	16:28 (23)
6	06:12	06:37			07:07		18:45 (20)	07:35		08:25 (21)	07:09		15:41 (23)	07:42		15:45 (23)
	21:08	20:45			20:01	37	19:22 (20)	19:10	61	09:26 (21)	17:27	57	16:57 (25)	17:09	44	16:29 (23)
7	06:12	06:38			07:07		18:44 (20)	07:37		08:25 (21)	07:10		15:41 (23)	07:43		15:46 (23)
	21:07	20:44			20:00	37	19:21 (20)	19:09	60	09:25 (21)	17:26	60	16:59 (25)	17:09	43	16:29 (23)
8	06:13	06:39			07:08		18:43 (20)	07:38		08:25 (21)	07:12		15:40 (23)	07:44		15:47 (23)
	21:07	20:43			19:56	38	19:21 (20)	19:07	60	09:25 (21)	17:25	63	16:59 (25)	17:09	42	16:29 (23)
9	06:13	06:40			07:09		18:43 (20)	07:39		08:26 (21)	07:13		15:39 (23)	07:45		15:48 (23)
	21:07	20:42			19:55	38	19:21 (20)	19:06	58	09:24 (21)	17:24	64	16:59 (25)	17:09	41	16:29 (23)
10	06:14	06:41			07:10		18:43 (20)	07:40		08:26 (21)	07:14		15:38 (23)	07:46		15:49 (23)
	21:06	20:41			19:53	37	19:20 (20)	19:04	57	09:23 (21)	17:23	66	16:59 (25)	17:09	41	16:30 (23)
11	06:15	06:42			07:11		08:58 (21)	07:41		08:27 (21)	07:15		15:39 (23)	07:47		15:49 (23)
	21:06	20:39			19:52	45	19:20 (20)	19:02	55	09:22 (21)	17:22	65	16:59 (25)	17:09	41	16:30 (23)
12	06:15	06:43			07:12		08:52 (21)	07:42		08:27 (21)	07:16		15:38 (23)	07:47		15:49 (23)
	21:06	20:38			19:50	56	19:19 (20)	19:01	54	09:21 (21)	17:21	66	16:58 (25)	17:09	40	16:29 (23)
13	06:16	06:44			07:13		08:48 (21)	07:43		08:28 (21)	07:17		15:37 (23)	07:48		15:50 (23)
	21:05	20:37			19:48	62	19:18 (20)	18:59	51	09:19 (21)	17:21	66	16:57 (25)	17:10	40	16:30 (23)
14	06:17	06:45			07:14		08:46 (21)	07:44		08:29 (21)	07:18		15:37 (23)	07:49		15:51 (23)
	21:05	20:35			19:47	65	19:17 (20)	18:58	49	09:18 (21)	17:20	65	16:56 (25)	17:10	39	16:30 (23)
15	06:18	06:46			07:15		08:43 (21)	07:45		08:31 (21)	07:20		15:38 (23)	07:50		15:52 (23)
	21:04	20:34			19:45	69	19:16 (20)	18:56	46	09:17 (21)	17:19	63	16:56 (25)	17:10	39	16:31 (23)
16	06:18	06:46			07:16		08:41 (21)	07:46		08:32 (21)	07:21		15:37 (23)	07:50		15:52 (23)
	21:04	20:33			19:43	69	19:14 (20)	18:55	43	09:15 (21)	17:18	64	16:55 (25)	17:10	38	16:30 (23)
17	06:19	06:47			07:17		08:39 (21)	07:47		08:33 (21)	07:22		15:37 (23)	07:51		15:53 (23)
	21:03	20:31			19:42	69	19:12 (20)	18:53	40	09:13 (21)	17:17	62	16:54 (25)	17:11	38	16:31 (23)
18	06:20	06:48			07:18		08:38 (21)	07:48		08:35 (21)	07:23		15:37 (23)	07:52		15:53 (23)
	21:02	20:30			19:40	68	19:10 (20)	18:52	36	09:11 (21)	17:17	60	16:53 (25)	17:11	38	16:31 (23)
19	06:21	06:49			07:19		08:35 (21)	07:49		08:37 (21)	07:24		15:37 (23)	07:52		15:54 (23)
	21:02	20:29			19:38	66	19:06 (20)	18:50	32	09:09 (21)	17:16	57	16:52 (25)	17:11	38	16:32 (23)
20	06:22	06:50			07:20		08:34 (21)	07:50		08:39 (21)	07:25		15:38 (23)	07:53		15:55 (23)
	21:01	20:27			19:37	60	19:02 (20)	18:49	27	09:06 (21)	17:15	54	16:52 (25)	17:12	37	16:32 (23)
21	06:22	06:51			07:21		08:33 (21)	07:51		08:43 (21)	07:26		15:38 (23)	07:53		15:55 (23)
	21:00	20:26			19:35	53	09:26 (21)	18:48	18	09:01 (21)	17:15	49	16:27 (23)	17:12	37	16:32 (23)
22	06:23	06:52			07:22		08:32 (21)	07:52			07:28		15:38 (23)	07:54		15:56 (23)
	21:00	20:24			19:33	54	09:26 (21)	18:46			17:14	49	16:27 (23)	17:13	37	16:33 (23)
23	06:24	06:53			07:23		08:31 (21)	07:53			07:29		15:38 (23)	07:54		15:56 (23)
	20:59	20:23			19:32	56	09:27 (21)	18:45			17:13	49	16:27 (23)	17:13	37	16:33 (23)
24	06:25	06:54			07:24		08:30 (21)	07:54			07:30		15:38 (23)	07:55		15:56 (23)
	20:58	20:21			19:30	57	09:27 (21)	18:43			17:13	49	16:27 (23)	17:14	38	16:34 (23)
25	06:26	06:55			07:25		08:29 (21)	07:56			07:31		15:39 (23)	07:55		15:57 (23)
	20:57	20:20			19:28	59	09:28 (21)	18:42			17:12	49	16:28 (23)	17:14	38	16:35 (23)
26	06:27	06:56			07:26		08:28 (21)	07:57			07:32		15:40 (23)	07:56		15:57 (23)
	20:56	20:18			19:27	60	09:28 (21)	18:41			17:12	48	16:28 (23)	17:15	38	16:35 (23)
27	06:28	06:57		19:00 (20)	07:27		08:27 (21)	07:58			07:33		15:40 (23)	07:56		15:57 (23)
	20:56	20:17	13	19:13 (20)	19:25	61	09:28 (21)	18:39			17:11	48	16:28 (23)	17:16	38	16:35 (23)
28	06:29	06:58		18:57 (20)	07:28		08:27 (21)	07:59			07:34		15:41 (23)	07:56		15:58 (23)
	20:55	20:15	19	19:16 (20)	19:23	61	09:28 (21)	18:38			17:11	47	16:28 (23)	17:16	39	16:37 (23)
29	06:29	06:59		18:55 (20)	07:29		08:26 (21)	08:00			07:35		15:41 (23)	07:57		15:58 (23)
	20:54	20:14	22	19:17 (20)	19:22	62	09:28 (21)	18:37			17:11	47	16:28 (23)	17:17	39	16:37 (23)
30	06:30	07:00		18:53 (20)	07:30		08:26 (21)	08:01			07:36		15:42 (23)	07:57		15:58 (23)
	20:53	20:12	26	19:19 (20)	19:20	62	09:28 (21)	18:36			17:10	46	16:28 (23)	17:18	40	16:38 (23)
31	06:31	07:01		18:51 (20)				08:02		16:54 (23)				07:57		15:58 (23)
	20:52	20:11	29	19:20 (20)				18:34	13	17:07 (23)				17:19	40	16:38 (23)
Potential sun hours	456	427			374			346			300			291		
Total, worst case			109			1569			1072			1611			1243	
Sun reduction			0.60			0.61			0.56			0.37			0.50	
Oper. time red.			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.			0.66			0.64			0.63			0.68			0.68	
Total reduction			0.40			0.39			0.36			0.25			0.34	
Total, real			43			618			381			405			422	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 25

Licensed user:
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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative**Shadow receptor:** 743 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6429)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May		June
1	07:57		16:20 (23)	07:44		16:13 (23)	07:10		08:05 (21)	07:20		08:34 (21)	06:36		06:08
	17:20	16	16:36 (23)	17:53	68	17:29 (25)	18:26	14	08:19 (21)	19:59	82	19:30 (20)	20:28		20:57
2	07:57		16:19 (23)	07:44		16:14 (23)	07:08		07:59 (21)	07:18		08:35 (21)	06:34		06:08
	17:20	18	16:37 (23)	17:54	68	17:30 (25)	18:27	24	08:23 (21)	20:00	81	19:30 (20)	20:29		20:58
3	07:57		16:18 (23)	07:43		16:14 (23)	07:07		07:56 (21)	07:17		08:36 (21)	06:33		06:07
	17:21	20	16:38 (23)	17:55	70	17:31 (25)	18:28	31	08:27 (21)	20:00	81	19:32 (20)	20:30		20:58
4	07:58		16:18 (23)	07:42		16:14 (23)	07:05		07:53 (21)	07:15		08:36 (21)	06:32		06:07
	17:22	22	16:40 (23)	17:57	72	17:33 (25)	18:29	36	08:29 (21)	20:01	81	19:32 (20)	20:31		20:59
5	07:58		16:18 (23)	07:41		16:15 (23)	07:03		07:51 (21)	07:14		08:37 (21)	06:31		06:07
	17:23	23	16:41 (23)	17:58	70	17:33 (25)	18:30	40	08:31 (21)	20:02	79	19:32 (20)	20:32		21:00
6	07:58		16:17 (23)	07:39		16:16 (23)	07:02		07:48 (21)	07:12		08:39 (21)	06:30		06:06
	17:24	26	16:43 (23)	17:59	69	17:33 (25)	18:31	44	08:32 (21)	20:03	77	19:33 (20)	20:33		21:00
7	07:57		16:17 (23)	07:38		16:16 (23)	07:00		07:46 (21)	07:10		08:40 (21)	06:28		06:06
	17:25	27	16:44 (23)	18:00	68	17:33 (25)	18:33	47	08:33 (21)	20:04	73	19:32 (20)	20:34		21:01
8	07:57		16:17 (23)	07:37		16:17 (23)	07:59		08:45 (21)	07:09		08:42 (21)	06:27		06:06
	17:26	28	16:45 (23)	18:02	66	17:33 (25)	19:34	50	09:35 (21)	20:05	70	19:33 (20)	20:35		21:02
9	07:57		16:16 (23)	07:36		16:18 (23)	07:57		08:43 (21)	07:07		08:44 (21)	06:26		06:06
	17:27	31	16:47 (23)	18:03	63	17:32 (25)	19:35	53	09:36 (21)	20:06	65	19:32 (20)	20:36		21:02
10	07:57		16:15 (23)	07:35		16:19 (23)	07:56		08:42 (21)	07:06		08:46 (21)	06:25		06:05
	17:28	32	16:47 (23)	18:04	60	17:32 (25)	19:36	55	09:37 (21)	20:07	59	19:32 (20)	20:37		21:03
11	07:57		16:15 (23)	07:34		16:19 (23)	07:54		08:41 (21)	07:04		08:51 (21)	06:24		06:05
	17:29	34	16:49 (23)	18:05	55	17:30 (25)	19:37	56	09:37 (21)	20:08	49	19:32 (20)	20:38		21:03
12	07:57		16:15 (23)	07:33		16:21 (23)	07:53		08:39 (21)	07:03		18:54 (20)	06:23		06:05
	17:30	35	16:50 (23)	18:06	49	17:28 (25)	19:38	58	09:37 (21)	20:09	37	19:31 (20)	20:39		21:04
13	07:56		16:14 (23)	07:31		16:22 (23)	07:51		08:39 (21)	07:01		18:55 (20)	06:22		06:05
	17:31	37	16:51 (23)	18:08	40	17:25 (25)	19:39	59	09:38 (21)	20:10	36	19:31 (20)	20:40		21:04
14	07:56		16:14 (23)	07:30		16:24 (23)	07:49		08:37 (21)	07:00		18:55 (20)	06:21		06:05
	17:32	38	16:52 (23)	18:09	33	16:57 (23)	19:40	61	09:38 (21)	20:11	34	19:29 (20)	20:41		21:05
15	07:56		16:15 (23)	07:29		16:25 (23)	07:48		08:37 (21)	06:58		18:56 (20)	06:20		06:05
	17:33	38	16:53 (23)	18:10	29	16:54 (23)	19:41	62	09:39 (21)	20:12	33	19:29 (20)	20:42		21:05
16	07:55		16:14 (23)	07:28		16:28 (23)	07:46		08:36 (21)	06:57		18:56 (20)	06:19		06:05
	17:34	40	16:54 (23)	18:11	25	16:53 (23)	19:42	63	09:39 (21)	20:13	31	19:27 (20)	20:43		21:06
17	07:55		16:14 (23)	07:26		16:31 (23)	07:44		08:35 (21)	06:55		18:57 (20)	06:18		06:05
	17:35	41	16:55 (23)	18:12	19	16:50 (23)	19:43	63	09:38 (21)	20:14	30	19:27 (20)	20:44		21:06
18	07:54		16:13 (23)	07:25		16:34 (23)	07:43		08:35 (21)	06:54		18:57 (20)	06:17		06:05
	17:36	43	16:56 (23)	18:13	11	16:45 (23)	19:44	64	09:39 (21)	20:15	28	19:25 (20)	20:45		21:06
19	07:54		16:14 (23)	07:24			07:41		08:34 (21)	06:52		18:59 (20)	06:16		06:05
	17:38	43	16:57 (23)	18:15			19:45	64	09:38 (21)	20:16	24	19:23 (20)	20:46		21:07
20	07:53		16:13 (23)	07:22			07:40		08:33 (21)	06:51		19:01 (20)	06:16		06:05
	17:39	45	16:58 (23)	18:16			19:46	65	09:38 (21)	20:17	21	19:22 (20)	20:47		21:07
21	07:53		16:13 (23)	07:21			07:38		08:34 (21)	06:49		19:02 (20)	06:15		06:06
	17:40	45	16:58 (23)	18:17			19:47	64	09:38 (21)	20:18	17	19:19 (20)	20:48		21:07
22	07:52		16:13 (23)	07:20			07:36		08:33 (21)	06:48		19:06 (20)	06:14		06:06
	17:41	46	16:59 (23)	18:18			19:48	64	09:37 (21)	20:19	10	19:16 (20)	20:49		21:08
23	07:52		16:13 (23)	07:18			07:35		08:32 (21)	06:46			06:13		06:06
	17:42	47	17:00 (23)	18:19			19:49	64	09:36 (21)	20:20			20:50		21:08
24	07:51		16:12 (23)	07:17			07:33		08:33 (21)	06:45			06:13		06:06
	17:43	48	17:00 (23)	18:20			19:50	63	09:36 (21)	20:21			20:50		21:08
25	07:50		16:13 (23)	07:15			07:31		08:32 (21)	06:44			06:12		06:07
	17:45	48	17:01 (23)	18:21			19:51	63	09:35 (21)	20:22			20:51		21:08
26	07:49		16:13 (23)	07:14			07:30		08:33 (21)	06:42			06:11		06:07
	17:46	49	17:02 (23)	18:23			19:52	62	09:35 (21)	20:23			20:52		21:08
27	07:49		16:13 (23)	07:12			07:28		08:33 (21)	06:41			06:11		06:07
	17:47	56	17:23 (25)	18:24			19:54	61	09:34 (21)	20:24			20:53		21:08
28	07:48		16:13 (23)	07:11			07:27		08:32 (21)	06:40			06:10		06:08
	17:48	59	17:24 (25)	18:25			19:55	60	09:32 (21)	20:25			20:54		21:08
29	07:47		16:13 (23)				07:25		08:33 (21)	06:38			06:10		06:08
	17:49	61	17:25 (25)				19:56	73	19:24 (20)	20:26			20:55		21:08
30	07:46		16:13 (23)				07:23		08:33 (21)	06:37			06:09		06:08
	17:51	64	17:26 (25)				19:57	76	19:26 (20)	20:27			20:55		21:08
31	07:45		16:13 (23)				07:22		08:33 (21)				06:08		
	17:52	67	17:28 (25)				19:58	80	19:28 (20)				20:56		
Potential sun hours	300			299			370			397			446		449
Total, worst case		1227			935			1739			1098				
Sun reduction		0.36			0.42			0.44			0.51				
Oper. time red.		1.00			1.00			1.00			1.00				
Wind dir. red.		0.68			0.68			0.64			0.65				
Total reduction		0.24			0.29			0.28			0.33				
Total, real		300			267			488			364				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 26

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative**Shadow receptor:** 743 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6429)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July	August			September			October			November			December		
1	06:09	06:32			07:02		08:50 (21)	07:31		08:18 (21)	07:03		15:48 (23)	07:37		15:57 (23)
	21:08	20:51			20:09	49	19:31 (20)	19:18	59	09:17 (21)	17:33	60	17:01 (25)	17:10	34	16:31 (23)
2	06:09	06:33			07:03		08:45 (21)	07:31		08:19 (21)	07:05		15:48 (23)	07:38		15:58 (23)
	21:08	20:50			20:08	60	19:31 (20)	19:17	57	09:16 (21)	17:32	62	17:02 (25)	17:10	32	16:30 (23)
3	06:10	06:34			07:04		08:42 (21)	07:32		08:19 (21)	07:06		15:47 (23)	07:39		15:59 (23)
	21:08	20:49			20:06	65	19:30 (20)	19:15	56	09:15 (21)	17:31	66	17:03 (25)	17:10	31	16:30 (23)
4	06:10	06:35			07:05		08:39 (21)	07:33		08:20 (21)	07:07		15:46 (23)	07:40		16:01 (23)
	21:08	20:48			20:05	70	19:30 (20)	19:14	54	09:14 (21)	17:30	68	17:03 (25)	17:09	29	16:30 (23)
5	06:11	06:36			07:06		08:37 (21)	07:34		08:21 (21)	07:08		15:45 (23)	07:41		16:02 (23)
	21:08	20:46			20:03	73	19:29 (20)	19:12	51	09:12 (21)	17:29	69	17:03 (25)	17:09	27	16:29 (23)
6	06:12	06:37			07:07		08:35 (21)	07:35		08:22 (21)	07:09		15:45 (23)	07:42		16:03 (23)
	21:08	20:45			20:01	77	19:29 (20)	19:10	49	09:11 (21)	17:27	71	17:03 (25)	17:09	26	16:29 (23)
7	06:12	06:38			07:07		08:32 (21)	07:37		08:23 (21)	07:10		15:45 (23)	07:43		16:05 (23)
	21:07	20:44			20:00	79	19:27 (20)	19:09	46	09:09 (21)	17:26	71	17:03 (25)	17:09	23	16:28 (23)
8	06:13	06:39			07:08		08:31 (21)	07:38		08:25 (21)	07:12		15:45 (23)	07:44		16:06 (23)
	21:07	20:43			19:56	80	19:26 (20)	19:07	42	09:07 (21)	17:25	70	17:02 (25)	17:09	22	16:28 (23)
9	06:13	06:40			07:09		08:29 (21)	07:39		08:26 (21)	07:13		15:44 (23)	07:45		16:07 (23)
	21:07	20:42			19:55	81	19:25 (20)	19:06	39	09:05 (21)	17:24	70	17:01 (25)	17:09	21	16:28 (23)
10	06:14	06:41			07:10		08:28 (21)	07:40		08:28 (21)	07:14		15:44 (23)	07:46		16:09 (23)
	21:06	20:41			19:53	82	19:24 (20)	19:04	34	09:02 (21)	17:23	68	17:00 (25)	17:09	18	16:27 (23)
11	06:15	06:42			07:11		08:27 (21)	07:41		08:31 (21)	07:15		15:45 (23)	07:47		16:11 (23)
	21:06	20:39			19:52	81	19:22 (20)	19:02	28	08:59 (21)	17:22	66	16:59 (25)	17:09	16	16:27 (23)
12	06:15	06:43			07:12		08:25 (21)	07:42		08:34 (21)	07:16		15:45 (23)	07:47		16:11 (23)
	21:06	20:38			19:50	80	19:20 (20)	19:01	21	08:55 (21)	17:21	63	16:58 (25)	17:09	14	16:25 (23)
13	06:16	06:44			07:13		08:24 (21)	07:43		08:41 (21)	07:17		15:45 (23)	07:48		16:13 (23)
	21:05	20:37			19:48	79	19:18 (20)	18:59	6	08:47 (21)	17:21	61	16:57 (25)	17:10	12	16:25 (23)
14	06:17	06:45			07:14		08:24 (21)	07:44			07:18		15:45 (23)	07:49		16:15 (23)
	21:05	20:35			19:47	73	19:15 (20)	18:58			17:20	59	16:56 (25)	17:10	9	16:24 (23)
15	06:18	06:46			07:15		08:23 (21)	07:45			07:20		15:46 (23)	07:50		16:18 (23)
	21:04	20:34			19:45	62	19:08 (20)	18:56			17:19	56	16:56 (25)	17:10	5	16:23 (23)
16	06:18	06:46			07:16		08:22 (21)	07:46			07:21		15:46 (23)	07:50		
	21:04	20:33			19:43	61	09:23 (21)	18:55			17:18	49	16:35 (23)	17:10		
17	06:19	06:47			07:17		08:21 (21)	07:47			07:22		15:46 (23)	07:51		
	21:03	20:31			19:42	62	09:23 (21)	18:53			17:17	48	16:34 (23)	17:11		
18	06:20	06:48			07:18		08:21 (21)	07:48			07:23		15:46 (23)	07:52		
	21:02	20:30			19:40	62	09:23 (21)	18:52			17:17	48	16:34 (23)	17:11		
19	06:21	06:49			07:19		08:19 (21)	07:49			07:24		15:47 (23)	07:52		
	21:02	20:29			19:38	64	09:23 (21)	18:50			17:16	47	16:34 (23)	17:11		
20	06:22	06:50			07:20		08:19 (21)	07:50			07:25		15:48 (23)	07:53		
	21:01	20:27			19:37	64	09:23 (21)	18:49			17:15	46	16:34 (23)	17:12		
21	06:22	06:51		19:10 (20)	07:21		08:18 (21)	07:51			07:26		15:49 (23)	07:53		
	21:00	20:26	11	19:21 (20)	19:35	64	09:22 (21)	18:48			17:15	45	16:34 (23)	17:12		
22	06:23	06:52		19:07 (20)	07:22		08:18 (21)	07:52			07:28		15:49 (23)	07:54		
	21:00	20:24	17	19:24 (20)	19:33	64	09:22 (21)	18:46			17:14	45	16:34 (23)	17:13		
23	06:24	06:53		19:04 (20)	07:23		08:18 (21)	07:53			07:29		15:50 (23)	07:54		
	20:59	20:23	22	19:26 (20)	19:32	64	09:22 (21)	18:45			17:13	43	16:33 (23)	17:13		
24	06:25	06:54		19:02 (20)	07:24		08:17 (21)	07:54		17:04 (23)	07:30		15:50 (23)	07:55		
	20:58	20:21	26	19:28 (20)	19:30	65	09:22 (21)	18:43	14	17:18 (23)	17:13	43	16:33 (23)	17:14		
25	06:26	06:55		19:01 (20)	07:25		08:17 (21)	07:56		17:00 (23)	07:31		15:52 (23)	07:55		
	20:57	20:20	28	19:29 (20)	19:28	64	09:21 (21)	18:42	21	17:21 (23)	17:12	41	16:33 (23)	17:14		
26	06:27	06:56		19:00 (20)	07:26		08:17 (21)	07:57		16:57 (23)	07:32		15:53 (23)	07:56		
	20:56	20:18	30	19:30 (20)	19:27	64	09:21 (21)	18:41	26	17:23 (23)	17:12	40	16:33 (23)	17:15		
27	06:28	06:57		18:57 (20)	07:27		08:17 (21)	07:58		16:55 (23)	07:33		15:54 (23)	07:56		
	20:56	20:17	32	19:29 (20)	19:25	63	09:20 (21)	18:39	29	17:24 (23)	17:11	39	16:33 (23)	17:16		
28	06:29	06:58		18:56 (20)	07:28		08:17 (21)	07:59		16:53 (23)	07:34		15:54 (23)	07:56		16:24 (23)
	20:55	20:15	34	19:30 (20)	19:23	63	09:20 (21)	18:38	33	17:26 (23)	17:11	38	16:32 (23)	17:16	4	16:28 (23)
29	06:29	06:59		18:55 (20)	07:29		08:18 (21)	08:00		16:52 (23)	07:35		15:55 (23)	07:57		16:23 (23)
	20:54	20:14	35	19:30 (20)	19:22	61	09:19 (21)	18:37	43	17:56 (25)	17:11	37	16:32 (23)	17:17	8	16:31 (23)
30	06:30	07:00		18:55 (20)	07:30		08:18 (21)	08:01		16:50 (23)	07:36		15:56 (23)	07:57		16:22 (23)
	20:53	20:12	36	19:31 (20)	19:20	60	09:18 (21)	18:36	51	17:58 (25)	17:10	35	16:31 (23)	17:18	10	16:32 (23)
31	06:31	07:01		18:54 (20)				08:02		16:49 (23)				07:57		16:21 (23)
	20:52	20:11	37	19:31 (20)				18:34	56	18:00 (25)				17:19	13	16:34 (23)
Potential sun hours	456	427			374			346			300			291		
Total, worst case			308			2036			815			1624			354	
Sun reduction			0.60			0.61			0.56			0.37			0.50	
Oper. time red.			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.			0.66			0.64			0.65			0.68			0.68	
Total reduction			0.39			0.39			0.36			0.25			0.34	
Total, real			121			797			297			408			120	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 27

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative**Shadow receptor:** 747 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6431)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57			07:44		08:10 (22)	07:09		17:31 (21)	07:20			06:36		06:57 (129)	06:08		19:53 (18)
	17:19			17:53	34	08:44 (22)	18:26	22	17:53 (21)	19:59			20:28	34	07:31 (129)	20:57	22	20:15 (18)
2	07:57			07:43		08:09 (22)	07:08		17:31 (21)	07:18			06:34		06:57 (129)	06:08		19:54 (18)
	17:20			17:54	36	08:45 (22)	18:27	21	17:52 (21)	20:00			20:29	35	07:32 (129)	20:58	21	20:15 (18)
3	07:57			07:42		08:09 (22)	07:06		17:32 (21)	07:17			06:33		06:57 (129)	06:07		19:54 (18)
	17:21			17:55	37	08:46 (22)	18:28	19	17:51 (21)	20:00			20:30	35	07:32 (129)	20:58	20	20:14 (18)
4	07:57			07:41		08:09 (22)	07:05		17:33 (21)	07:15			06:32		06:56 (129)	06:07		19:55 (18)
	17:22			17:57	37	08:46 (22)	18:29	16	17:49 (21)	20:01			20:31	35	07:31 (129)	20:59	19	20:14 (18)
5	07:57			07:40		08:09 (22)	07:03		17:34 (21)	07:14			06:31		06:56 (129)	06:06		19:56 (18)
	17:23			17:58	38	08:47 (22)	18:30	12	17:46 (21)	20:02			20:32	35	07:31 (129)	21:00	18	20:14 (18)
6	07:57			07:39		08:09 (22)	07:02		17:39 (21)	07:12			06:29		06:56 (129)	06:06		19:57 (18)
	17:24			17:59	38	08:47 (22)	18:31	3	17:42 (21)	20:03			20:33	35	07:31 (129)	21:00	17	20:14 (18)
7	07:57			07:38		08:09 (22)	07:00			07:10			06:28		06:56 (129)	06:06		19:57 (18)
	17:25			18:00	38	08:47 (22)	18:32			20:04			20:34	35	07:31 (129)	21:01	16	20:13 (18)
8	07:57			07:37		08:09 (22)	07:59			07:09			06:27		06:56 (129)	06:06		19:58 (18)
	17:26			18:01	39	08:48 (22)	19:34			20:05			20:35	35	07:31 (129)	21:02	15	20:13 (18)
9	07:57			07:36		08:09 (22)	07:57			07:07			06:26		06:57 (129)	06:05		19:59 (18)
	17:27			18:03	39	08:48 (22)	19:35			20:06			20:36	42	20:08 (18)	21:02	14	20:13 (18)
10	07:57			07:35		08:09 (22)	07:56			07:06			06:25		06:57 (129)	06:05		20:00 (18)
	17:28			18:04	39	08:48 (22)	19:36			20:07			20:37	47	20:10 (18)	21:03	13	20:13 (18)
11	07:57			07:34		08:09 (22)	07:54			07:04			06:24		06:57 (129)	06:05		20:01 (18)
	17:29			18:05	38	08:47 (22)	19:37			20:08			20:38	49	20:12 (18)	21:03	11	20:12 (18)
12	07:57			07:33		08:09 (22)	07:52			07:03			06:23		06:58 (129)	06:05		20:02 (18)
	17:30			18:06	38	08:47 (22)	19:38			20:09			20:39	50	20:13 (18)	21:04	10	20:12 (18)
13	07:56			07:31		08:10 (22)	07:51			07:01			06:22		06:58 (129)	06:05		20:03 (18)
	17:31			18:07	36	08:46 (22)	19:39			20:10			20:40	51	20:14 (18)	21:04	9	20:12 (18)
14	07:56			07:30		08:11 (22)	07:49			07:00			06:21		06:59 (129)	06:05		20:03 (18)
	17:32			18:09	35	08:46 (22)	19:40			20:11			20:41	50	20:14 (18)	21:05	8	20:11 (18)
15	07:56			07:29		08:11 (22)	07:48			06:58			06:20		07:00 (129)	06:05		20:04 (18)
	17:33			18:10	34	08:45 (22)	19:41			20:12			20:42	50	20:15 (18)	21:05	7	20:11 (18)
16	07:55			07:28		08:12 (22)	07:46			06:56			06:19		07:01 (129)	06:05		20:05 (18)
	17:34			18:11	32	08:44 (22)	19:42			20:13			20:43	48	20:15 (18)	21:06	5	20:10 (18)
17	07:55			07:26		08:13 (22)	07:44			06:55			06:18		07:01 (129)	06:05		20:07 (18)
	17:35			18:12	30	08:43 (22)	19:43			20:14			20:44	48	20:15 (18)	21:06	2	20:09 (18)
18	07:54			07:25		08:14 (22)	07:43			06:54			06:17		07:03 (129)	06:05		
	17:36			18:13	32	17:45 (21)	19:44			20:15			20:45	47	20:17 (18)	21:06		
19	07:54			07:24		08:16 (22)	07:41			06:52			06:16		07:05 (129)	06:05		
	17:38			18:15	37	17:49 (21)	19:45			20:16			20:46	44	20:17 (18)	21:07		
20	07:53			07:22		08:18 (22)	07:40			06:51			06:16		07:06 (129)	06:05		
	17:39			18:16	36	17:51 (21)	19:46			20:17			20:47	40	20:16 (18)	21:07		
21	07:53			07:21		08:20 (22)	07:38			06:49			06:15		07:08 (129)	06:06		
	17:40			18:17	33	17:52 (21)	19:47			20:18			20:48	36	20:16 (18)	21:07		
22	07:52			07:20		17:32 (21)	07:36			06:48		07:10 (129)	06:14		19:50 (18)	06:06		
	17:41			18:18	21	17:53 (21)	19:48			20:19	13	07:23 (129)	20:49	27	20:17 (18)	21:07		
23	07:52		08:20 (22)	07:18		17:31 (21)	07:35			06:46		07:06 (129)	06:13		19:50 (18)	06:06		
	17:42	10	08:30 (22)	18:19	22	17:53 (21)	19:49			20:20	19	07:25 (129)	20:49	27	20:17 (18)	21:08		
24	07:51		08:17 (22)	07:17		17:30 (21)	07:33			06:45		07:04 (129)	06:13		19:50 (18)	06:06		
	17:43	16	08:33 (22)	18:20	24	17:54 (21)	19:50			20:21	23	07:27 (129)	20:50	26	20:16 (18)	21:08		
25	07:50		08:16 (22)	07:15		17:30 (21)	07:31			06:44		07:03 (129)	06:12		19:51 (18)	06:07		20:09 (18)
	17:45	19	08:35 (22)	18:21	25	17:55 (21)	19:51			20:22	25	07:28 (129)	20:51	26	20:17 (18)	21:08	2	20:10 (18)
26	07:49		08:15 (22)	07:14		17:30 (21)	07:30			06:42		07:01 (129)	06:11		19:51 (18)	06:07		20:08 (18)
	17:46	23	08:38 (22)	18:23	24	17:54 (21)	19:52			20:23	28	07:29 (129)	20:52	26	20:17 (18)	21:08	4	20:12 (18)
27	07:49		08:14 (22)	07:12		17:30 (21)	07:28			06:41		07:00 (129)	06:11		19:51 (18)	06:07		20:07 (18)
	17:47	25	08:39 (22)	18:24	24	17:54 (21)	19:53			20:24	30	07:30 (129)	20:53	25	20:16 (18)	21:08	5	20:12 (18)
28	07:48		08:13 (22)	07:11		17:30 (21)	07:26			06:39		07:00 (129)	06:10		19:52 (18)	06:08		20:07 (18)
	17:48	27	08:40 (22)	18:25	24	17:54 (21)	19:54			20:25	31	07:31 (129)	20:54	24	20:16 (18)	21:08	7	20:14 (18)
29	07:47		08:12 (22)				07:25			06:38		06:58 (129)	06:09		19:52 (18)	06:08		20:06 (18)
	17:49	30	08:42 (22)				19:55			20:26	32	07:30 (129)	20:55	24	20:16 (18)	21:08	8	20:14 (18)
30	07:46		08:11 (22)				07:23			06:37		06:58 (129)	06:09		19:53 (18)	06:08		20:05 (18)
	17:51	32	08:43 (22)				19:57			20:27	33	07:31 (129)	20:55	23	20:16 (18)	21:08	10	20:15 (18)
31	07:45		08:10 (22)				07:22						06:08		19:54 (18)			
	17:52	33	08:43 (22)				19:58						20:56	22	20:16 (18)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		215			920			93			234			1131			263	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.61			0.63			0.68			0.67			0.65			0.63	
Total reduction		0.22			0.26			0.30			0.34			0.36			0.38	
Total, real		47			242			28			80			411			99	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 28

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative **Shadow receptor:** 747 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6431)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September		October			November			December
1	06:09		20:05 (18)	06:32		07:08 (129)	07:02		07:30			07:03		07:38 (22)	07:37
	21:08	11	20:16 (18)	20:51	50	20:23 (18)	20:09		19:18			17:33	39	08:17 (22)	17:10
2	06:09		20:04 (18)	06:33		07:08 (129)	07:03		07:31			07:05		07:38 (22)	07:38
	21:08	12	20:16 (18)	20:50	48	20:22 (18)	20:08		19:17			17:32	39	08:17 (22)	17:10
3	06:10		20:04 (18)	06:34		07:07 (129)	07:04		07:32			07:06		07:39 (22)	07:39
	21:08	14	20:18 (18)	20:49	45	20:19 (18)	20:06		19:15			17:31	38	08:17 (22)	17:10
4	06:10		20:03 (18)	06:35		07:06 (129)	07:05		07:33			07:07		07:38 (22)	07:40
	21:08	15	20:18 (18)	20:48	42	20:17 (18)	20:04		19:13			17:30	39	08:17 (22)	17:09
5	06:11		20:04 (18)	06:36		07:06 (129)	07:06		07:34			07:08		07:38 (22)	07:41
	21:08	15	20:19 (18)	20:46	34	07:40 (129)	20:03		19:12			17:28	39	08:17 (22)	17:09
6	06:12		20:04 (18)	06:37		07:06 (129)	07:06		07:35			07:09		07:38 (22)	07:42
	21:07	16	20:20 (18)	20:45	35	07:41 (129)	20:01		19:10			17:27	38	08:16 (22)	17:09
7	06:12		20:03 (18)	06:38		07:06 (129)	07:07		07:36			07:10		07:40 (22)	07:43
	21:07	17	20:20 (18)	20:44	35	07:41 (129)	20:00		19:09			17:26	37	08:17 (22)	17:09
8	06:13		20:03 (18)	06:39		07:06 (129)	07:08		07:37		18:12 (21)	07:11		07:40 (22)	07:44
	21:07	18	20:21 (18)	20:43	35	07:41 (129)	19:56		19:07	9	18:21 (21)	17:25	36	08:16 (22)	17:09
9	06:13		20:02 (18)	06:40		07:06 (129)	07:09		07:38		18:09 (21)	07:13		07:40 (22)	07:45
	21:07	20	20:22 (18)	20:42	35	07:41 (129)	19:55		19:05	14	18:23 (21)	17:24	36	08:16 (22)	17:09
10	06:14		20:02 (18)	06:41		07:06 (129)	07:10		07:40		18:07 (21)	07:14		07:41 (22)	07:46
	21:06	20	20:22 (18)	20:41	35	07:41 (129)	19:53		19:04	17	18:24 (21)	17:23	34	08:15 (22)	17:09
11	06:15		20:02 (18)	06:42		07:06 (129)	07:11		07:41		18:05 (21)	07:15		07:42 (22)	07:46
	21:06	21	20:23 (18)	20:39	34	07:40 (129)	19:51		19:02	20	18:25 (21)	17:22	33	08:15 (22)	17:09
12	06:15		20:01 (18)	06:43		07:06 (129)	07:12		07:42		18:04 (21)	07:16		07:43 (22)	07:47
	21:05	22	20:23 (18)	20:38	34	07:40 (129)	19:50		19:01	22	18:26 (21)	17:21	31	08:14 (22)	17:09
13	06:16		20:01 (18)	06:44		07:07 (129)	07:13		07:43		18:03 (21)	07:17		07:44 (22)	07:48
	21:05	23	20:24 (18)	20:37	32	07:39 (129)	19:48		18:59	23	18:26 (21)	17:21	29	08:13 (22)	17:09
14	06:17		20:01 (18)	06:44		07:06 (129)	07:14		07:44		18:02 (21)	07:18		07:45 (22)	07:49
	21:05	24	20:25 (18)	20:35	32	07:38 (129)	19:46		18:58	24	18:26 (21)	17:20	27	08:12 (22)	17:10
15	06:18		20:01 (18)	06:45		07:07 (129)	07:15		07:45		18:03 (21)	07:20		07:47 (22)	07:50
	21:04	25	20:26 (18)	20:34	30	07:37 (129)	19:45		18:56	24	18:27 (21)	17:19	25	08:12 (22)	17:10
16	06:18		20:00 (18)	06:46		07:07 (129)	07:16		07:46		18:02 (21)	07:21		07:48 (22)	07:50
	21:03	25	20:25 (18)	20:33	29	07:36 (129)	19:43		18:55	25	18:27 (21)	17:18	23	08:11 (22)	17:10
17	06:19		20:00 (18)	06:47		07:08 (129)	07:17		07:47		18:02 (21)	07:22		07:50 (22)	07:51
	21:03	26	20:26 (18)	20:31	27	07:35 (129)	19:42		18:53	24	18:26 (21)	17:17	19	08:09 (22)	17:10
18	06:20		20:00 (18)	06:48		07:09 (129)	07:18		07:48		18:02 (21)	07:23		07:51 (22)	07:52
	21:02	26	20:26 (18)	20:30	25	07:34 (129)	19:40		18:52	23	18:25 (21)	17:16	16	08:07 (22)	17:11
19	06:21		20:01 (18)	06:49		07:11 (129)	07:19		07:49		18:02 (21)	07:24		07:54 (22)	07:52
	21:02	26	20:27 (18)	20:29	21	07:32 (129)	19:38		18:50	23	18:25 (21)	17:16	10	08:04 (22)	17:11
20	06:22		20:00 (18)	06:50		07:12 (129)	07:20		07:50		08:55 (22)	07:25			07:53
	21:01	26	20:26 (18)	20:27	18	07:30 (129)	19:37		18:49	27	18:23 (21)	17:15			17:12
21	06:22		20:00 (18)	06:51		07:15 (129)	07:21		07:51		08:50 (22)	07:26			07:53
	21:00	26	20:26 (18)	20:26	12	07:27 (129)	19:35		18:48	34	18:22 (21)	17:14			17:12
22	06:23		07:21 (129)	06:52			07:22		07:52		08:47 (22)	07:28			07:54
	21:00	32	20:27 (18)	20:24			19:33		18:46	36	18:20 (21)	17:14			17:13
23	06:24		07:18 (129)	06:53			07:23		07:53		08:46 (22)	07:29			07:54
	20:59	39	20:27 (18)	20:23			19:32		18:45	36	18:19 (21)	17:13			17:13
24	06:25		07:16 (129)	06:54			07:24		07:54		08:44 (22)	07:30			07:55
	20:58	42	20:27 (18)	20:21			19:30		18:43	28	09:12 (22)	17:13			17:14
25	06:26		07:15 (129)	06:55			07:25		07:56		08:43 (22)	07:31			07:55
	20:57	45	20:27 (18)	20:20			19:28		18:42	30	09:13 (22)	17:12			17:14
26	06:27		07:13 (129)	06:56			07:26		07:57		08:42 (22)	07:32			07:56
	20:56	47	20:26 (18)	20:18			19:27		18:41	32	09:14 (22)	17:12			17:15
27	06:28		07:12 (129)	06:57			07:27		07:58		08:40 (22)	07:33			07:56
	20:55	48	20:26 (18)	20:17			19:25		18:39	34	09:14 (22)	17:11			17:16
28	06:29		07:11 (129)	06:58			07:27		07:59		08:40 (22)	07:34			07:56
	20:55	50	20:26 (18)	20:15			19:23		18:38	35	09:15 (22)	17:11			17:16
29	06:29		07:10 (129)	06:59			07:28		08:00		08:40 (22)	07:35			07:57
	20:54	50	20:25 (18)	20:14			19:22		18:37	36	09:16 (22)	17:11			17:17
30	06:30		07:09 (129)	07:00			07:29		08:01		08:39 (22)	07:36			07:57
	20:53	51	20:25 (18)	20:12			19:20		18:36	37	09:16 (22)	17:10			17:18
31	06:31		07:09 (129)	07:01					08:02		08:39 (22)				07:57
	20:52	50	20:24 (18)	20:11					18:34	38	09:17 (22)				17:18
Potential sun hours	456			427			374		346			300			291
Total, worst case		882			688					651			588		
Sun reduction		0.60			0.60					0.56			0.37		
Oper. time red.		1.00			1.00					1.00			1.00		
Wind dir. red.		0.64			0.67					0.64			0.61		
Total reduction		0.38			0.40					0.36			0.23		
Total, real		337			275					234			133		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 29

Licensed user:
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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative**Shadow receptor:** 750 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6434)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January	February			March			April	May			June		
1	07:57	07:44			07:09		07:52 (22)	07:20	06:36			06:08		06:41 (129)
	17:19	17:53			18:26	50	18:02 (21)	19:59	20:28			20:57	57	20:29 (18)
2	07:57	07:43			07:08		07:52 (22)	07:18	06:34			06:08		06:41 (129)
	17:20	17:54			18:27	52	18:03 (21)	20:00	20:29			20:58	57	20:30 (18)
3	07:57	07:42			07:06		07:53 (22)	07:17	06:33			06:07		06:41 (129)
	17:21	17:55			18:28	52	18:04 (21)	20:00	20:30			20:58	56	20:29 (18)
4	07:57	07:41			07:05		07:54 (22)	07:15	06:32			06:07		06:42 (129)
	17:22	17:57			18:29	51	18:04 (21)	20:01	20:31			20:59	57	20:30 (18)
5	07:57	07:40			07:03		07:55 (22)	07:14	06:31			06:06		06:42 (129)
	17:23	17:58			18:30	49	18:04 (21)	20:02	20:32			21:00	57	20:31 (18)
6	07:57	07:39			07:02		07:57 (22)	07:12	06:29			06:06		06:43 (129)
	17:24	17:59			18:31	46	18:05 (21)	20:03	20:33			21:00	56	20:31 (18)
7	07:57	07:38			07:00		07:59 (22)	07:10	06:28		06:51 (129)	06:06		06:43 (129)
	17:25	18:00			18:32	42	18:05 (21)	20:04	20:34	11	07:02 (129)	21:01	56	20:31 (18)
8	07:57	07:37			07:59		09:04 (22)	07:09	06:27		06:48 (129)	06:06		06:43 (129)
	17:26	18:01			19:34	33	19:05 (21)	20:05	20:35	17	07:05 (129)	21:02	56	20:31 (18)
9	07:57	07:36		08:07 (22)	07:57		18:40 (21)	07:07	06:26		06:46 (129)	06:05		06:44 (129)
	17:27	18:03	7	08:14 (22)	19:35	24	19:04 (21)	20:06	20:36	20	07:06 (129)	21:02	55	20:32 (18)
10	07:57	07:35		08:03 (22)	07:56		18:41 (21)	07:06	06:25		06:45 (129)	06:05		06:44 (129)
	17:28	18:04	16	08:19 (22)	19:36	23	19:04 (21)	20:07	20:37	23	07:08 (129)	21:03	55	20:32 (18)
11	07:57	07:34		08:00 (22)	07:54		18:41 (21)	07:04	06:24		06:44 (129)	06:05		06:45 (129)
	17:29	18:05	21	08:21 (22)	19:37	22	19:03 (21)	20:08	20:38	25	07:09 (129)	21:03	54	20:32 (18)
12	07:57	07:33		07:58 (22)	07:52		18:41 (21)	07:03	06:23		06:43 (129)	06:05		06:45 (129)
	17:30	18:06	25	08:23 (22)	19:38	20	19:01 (21)	20:09	20:39	27	07:10 (129)	21:04	54	20:33 (18)
13	07:56	07:31		07:57 (22)	07:51		18:43 (21)	07:01	06:22		06:42 (129)	06:05		06:46 (129)
	17:31	18:07	28	08:25 (22)	19:39	17	19:00 (21)	20:10	20:40	29	07:11 (129)	21:04	54	20:33 (18)
14	07:56	07:30		07:56 (22)	07:49		18:44 (21)	07:00	06:21		06:41 (129)	06:05		06:46 (129)
	17:32	18:09	30	08:26 (22)	19:40	14	18:58 (21)	20:11	20:41	30	07:11 (129)	21:05	54	20:33 (18)
15	07:56	07:29		07:54 (22)	07:48		18:47 (21)	06:58	06:20		06:40 (129)	06:05		06:47 (129)
	17:33	18:10	33	08:27 (22)	19:41	7	18:54 (21)	20:12	20:42	32	07:12 (129)	21:05	53	20:33 (18)
16	07:55	07:28		07:53 (22)	07:46			06:56	06:19		06:40 (129)	06:05		06:47 (129)
	17:34	18:11	35	08:28 (22)	19:42			20:13	20:43	32	07:12 (129)	21:06	54	20:34 (18)
17	07:55	07:26		07:53 (22)	07:44			06:55	06:18		06:39 (129)	06:05		06:47 (129)
	17:35	18:12	36	08:29 (22)	19:43			20:14	20:44	33	07:12 (129)	21:06	54	20:34 (18)
18	07:54	07:25		07:51 (22)	07:43			06:54	06:17		06:40 (129)	06:05		06:47 (129)
	17:36	18:13	38	08:29 (22)	19:44			20:15	20:45	33	07:13 (129)	21:06	53	20:34 (18)
19	07:54	07:24		07:51 (22)	07:41			06:52	06:16		06:39 (129)	06:05		06:47 (129)
	17:38	18:15	39	08:30 (22)	19:45			20:16	20:46	34	07:13 (129)	21:07	53	20:34 (18)
20	07:53	07:22		07:51 (22)	07:40			06:51	06:16		06:39 (129)	06:05		06:48 (129)
	17:39	18:16	40	08:31 (22)	19:46			20:17	20:47	34	07:13 (129)	21:07	52	20:34 (18)
21	07:53	07:21		07:50 (22)	07:38			06:49	06:15		06:39 (129)	06:06		06:48 (129)
	17:40	18:17	40	08:30 (22)	19:47			20:18	20:48	34	07:13 (129)	21:07	52	20:34 (18)
22	07:52	07:20		07:50 (22)	07:36			06:48	06:14		06:39 (129)	06:06		06:49 (129)
	17:41	18:18	41	08:31 (22)	19:48			20:19	20:49	39	20:19 (18)	21:07	52	20:35 (18)
23	07:52	07:18		07:49 (22)	07:35			06:46	06:13		06:39 (129)	06:06		06:48 (129)
	17:42	18:19	41	08:30 (22)	19:49			20:20	20:49	44	20:21 (18)	21:08	53	20:35 (18)
24	07:51	07:17		07:50 (22)	07:33			06:45	06:13		06:39 (129)	06:06		06:48 (129)
	17:43	18:20	40	08:30 (22)	19:50			20:21	20:50	48	20:23 (18)	21:08	53	20:35 (18)
25	07:50	07:15		07:50 (22)	07:31			06:44	06:12		06:39 (129)	06:07		06:49 (129)
	17:45	18:21	40	08:30 (22)	19:51			20:22	20:51	51	20:25 (18)	21:08	54	20:36 (18)
26	07:49	07:14		07:50 (22)	07:30			06:42	06:11		06:39 (129)	06:07		06:49 (129)
	17:46	18:23	39	08:29 (22)	19:52			20:23	20:52	52	20:25 (18)	21:08	54	20:36 (18)
27	07:49	07:12		07:51 (22)	07:28			06:41	06:11		06:39 (129)	06:07		06:49 (129)
	17:47	18:24	38	08:29 (22)	19:53			20:24	20:53	54	20:26 (18)	21:08	53	20:35 (18)
28	07:48	07:11		07:51 (22)	07:26			06:39	06:10		06:40 (129)	06:08		06:49 (129)
	17:48	18:25	46	17:58 (21)	19:54			20:25	20:54	54	20:27 (18)	21:08	54	20:36 (18)
29	07:47				07:25			06:38	06:09		06:39 (129)	06:08		06:49 (129)
	17:49				19:55			20:26	20:54	56	20:27 (18)	21:08	54	20:36 (18)
30	07:46				07:23			06:37	06:09		06:40 (129)	06:08		06:49 (129)
	17:51				19:57			20:27	20:55	56	20:28 (18)	21:08	53	20:36 (18)
31	07:45				07:22				06:08		06:41 (129)			
	17:52				19:58				20:56	56	20:29 (18)			
Potential sun hours	300	299			370			397	446			449		
Total, worst case			673			502				924			1629	
Sun reduction			0.42			0.44				0.56			0.60	
Oper. time red.			1.00			1.00				1.00			1.00	
Wind dir. red.			0.63			0.65				0.67			0.65	
Total reduction			0.26			0.29				0.38			0.39	
Total, real			178			144				347			637	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 30

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative**Shadow receptor:** 750 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6434)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December
1	06:09		06:49 (129)	06:32		06:54 (129)	07:02			07:30		18:21 (21)	07:03		07:32 (22)	07:37
	21:08	55	20:37 (18)	20:51	26	07:20 (129)	20:09			19:18	19	18:40 (21)	17:33	15	07:47 (22)	17:10
2	06:09		06:49 (129)	06:33		06:55 (129)	07:03			07:31		18:20 (21)	07:05		07:38 (22)	07:38
	21:08	54	20:36 (18)	20:50	24	07:19 (129)	20:08			19:17	21	18:41 (21)	17:32	3	07:41 (22)	17:10
3	06:10		06:49 (129)	06:34		06:55 (129)	07:04			07:32		18:19 (21)	07:06			07:39
	21:08	55	20:37 (18)	20:49	22	07:17 (129)	20:06			19:15	22	18:41 (21)	17:31			17:10
4	06:10		06:49 (129)	06:35		06:57 (129)	07:05			07:33		18:18 (21)	07:07			07:40
	21:08	54	20:36 (18)	20:48	19	07:16 (129)	20:04			19:13	24	18:42 (21)	17:30			17:09
5	06:11		06:49 (129)	06:36		06:59 (129)	07:06			07:34		18:17 (21)	07:08			07:41
	21:08	56	20:37 (18)	20:46	15	07:14 (129)	20:03			19:12	25	18:42 (21)	17:28			17:09
6	06:12		06:49 (129)	06:37		07:02 (129)	07:06			07:35		08:37 (22)	07:09			07:42
	21:07	57	20:38 (18)	20:45	8	07:10 (129)	20:01			19:10	38	18:41 (21)	17:27			17:09
7	06:12		06:49 (129)	06:38			07:07			07:36		08:34 (22)	07:10			07:43
	21:07	56	20:37 (18)	20:44			20:00			19:09	45	18:41 (21)	17:26			17:09
8	06:13		06:49 (129)	06:39			07:08			07:37		08:31 (22)	07:11			07:44
	21:07	57	20:37 (18)	20:43			19:56			19:07	49	18:40 (21)	17:25			17:09
9	06:13		06:48 (129)	06:40			07:09			07:38		08:29 (22)	07:13			07:45
	21:07	57	20:37 (18)	20:42			19:55			19:05	52	18:40 (21)	17:24			17:09
10	06:14		06:49 (129)	06:41			07:10			07:40		08:27 (22)	07:14			07:46
	21:06	56	20:37 (18)	20:41			19:53			19:04	52	18:38 (21)	17:23			17:09
11	06:15		06:49 (129)	06:42			07:11			07:41		08:26 (22)	07:15			07:46
	21:06	56	20:37 (18)	20:39			19:51			19:02	52	18:37 (21)	17:22			17:09
12	06:15		06:48 (129)	06:43			07:12			07:42		08:25 (22)	07:16			07:47
	21:05	58	20:37 (18)	20:38			19:50			19:01	51	18:35 (21)	17:21			17:09
13	06:16		06:48 (129)	06:44			07:13			07:43		08:24 (22)	07:17			07:48
	21:05	57	20:37 (18)	20:37			19:48			18:59	49	18:33 (21)	17:21			17:09
14	06:17		06:49 (129)	06:44			07:14			07:44		08:23 (22)	07:18			07:49
	21:05	56	20:37 (18)	20:35			19:46			18:58	43	18:29 (21)	17:20			17:10
15	06:18		06:49 (129)	06:45			07:15			07:45		08:23 (22)	07:20			07:50
	21:04	54	20:36 (18)	20:34			19:45			18:56	39	09:02 (22)	17:19			17:10
16	06:18		06:48 (129)	06:46			07:16			07:46		08:22 (22)	07:21			07:50
	21:03	54	20:35 (18)	20:33			19:43			18:55	40	09:02 (22)	17:18			17:10
17	06:19		06:48 (129)	06:47			07:17			07:47		08:22 (22)	07:22			07:51
	21:03	53	20:35 (18)	20:31			19:42			18:53	40	09:02 (22)	17:17			17:11
18	06:20		06:49 (129)	06:48			07:18			07:48		08:21 (22)	07:23			07:52
	21:02	51	20:34 (18)	20:30			19:40			18:52	41	09:02 (22)	17:17			17:11
19	06:21		06:49 (129)	06:49			07:19			07:49		08:21 (22)	07:24			07:52
	21:02	50	20:34 (18)	20:29			19:38			18:50	40	09:01 (22)	17:16			17:11
20	06:22		06:48 (129)	06:50			07:20			07:50		08:21 (22)	07:25			07:53
	21:01	47	20:32 (18)	20:27			19:37			18:49	40	09:01 (22)	17:15			17:12
21	06:22		06:49 (129)	06:51			07:21			07:51		08:21 (22)	07:26			07:53
	21:00	43	20:30 (18)	20:26			19:35			18:48	40	09:01 (22)	17:14			17:12
22	06:23		06:49 (129)	06:52			07:22			07:52		08:21 (22)	07:28			07:54
	21:00	35	07:24 (129)	20:24			19:33			18:46	39	09:00 (22)	17:14			17:13
23	06:24		06:49 (129)	06:53			07:23			07:53		08:22 (22)	07:29			07:54
	20:59	35	07:24 (129)	20:23			19:32			18:45	38	09:00 (22)	17:13			17:13
24	06:25		06:50 (129)	06:54			07:24			07:54		08:22 (22)	07:30			07:55
	20:58	34	07:24 (129)	20:21			19:30			18:43	38	09:00 (22)	17:13			17:14
25	06:26		06:50 (129)	06:55			07:25			07:56		08:23 (22)	07:31			07:55
	20:57	34	07:24 (129)	20:20			19:28			18:42	36	08:59 (22)	17:12			17:14
26	06:27		06:49 (129)	06:56			07:26			07:57		08:23 (22)	07:32			07:56
	20:56	34	07:23 (129)	20:18			19:27			18:41	35	08:58 (22)	17:12			17:15
27	06:28		06:50 (129)	06:57			07:27			07:58		08:24 (22)	07:33			07:56
	20:55	33	07:23 (129)	20:17			19:25			18:39	32	08:56 (22)	17:11			17:16
28	06:29		06:51 (129)	06:58			07:27			07:59		08:25 (22)	07:34			07:56
	20:55	31	07:22 (129)	20:15			19:23			18:38	30	08:55 (22)	17:11			17:16
29	06:29		06:51 (129)	06:59			07:28		18:26 (21)	08:00		08:27 (22)	07:35			07:56
	20:54	31	07:22 (129)	20:14			19:22	11	18:37 (21)	18:37	27	08:54 (22)	17:11			17:17
30	06:30		06:52 (129)	07:00			07:29		18:23 (21)	08:01		08:28 (22)	07:36			07:57
	20:53	30	07:22 (129)	20:12			19:20	16	18:39 (21)	18:36	24	08:52 (22)	17:10			17:18
31	06:31		06:53 (129)	07:01						08:02		08:30 (22)				07:57
	20:52	28	07:21 (129)	20:11						18:34	20	08:50 (22)				17:18
Potential sun hours	456			427			374			346			300			291
Total, worst case		1461			114			27			1141			18		
Sun reduction		0.60			0.60			0.61			0.56			0.37		
Oper. time red.		1.00			1.00			1.00			1.00			1.00		
Wind dir. red.		0.66			0.68			0.67			0.64			0.63		
Total reduction		0.40			0.41			0.41			0.36			0.23		
Total, real		580			47			11			407			4		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 31

Licensed user:
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Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative**Shadow receptor:** 799 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6441)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:35 (72)	07:45		08:45 (72)	07:10			07:20		18:53 (117)	06:36			06:08		19:49 (74)
	17:20	79	16:54 (116)	17:53	53	09:38 (72)	18:26			19:59	36	19:29 (117)	20:28			20:57	25	20:14 (74)
2	07:57		08:35 (72)	07:44		08:46 (72)	07:08			07:18		18:52 (117)	06:34			06:08		19:50 (74)
	17:20	80	16:54 (116)	17:54	51	09:37 (72)	18:27			20:00	37	19:29 (117)	20:29			20:58	24	20:14 (74)
3	07:58		08:35 (72)	07:43		08:47 (72)	07:07			07:17		18:51 (117)	06:33			06:07		19:50 (74)
	17:21	79	16:54 (116)	17:55	49	09:36 (72)	18:28			20:00	39	19:30 (117)	20:30			20:58	24	20:14 (74)
4	07:58		08:35 (72)	07:42		08:48 (72)	07:05			07:15		18:50 (117)	06:32			06:07		19:50 (74)
	17:22	81	16:55 (116)	17:57	47	09:35 (72)	18:29			20:01	40	19:30 (117)	20:31			20:59	23	20:13 (74)
5	07:58		08:36 (72)	07:41		08:49 (72)	07:04			07:14		18:49 (117)	06:31			06:07		19:51 (74)
	17:23	80	16:55 (116)	17:58	46	09:35 (72)	18:30			20:02	41	19:30 (117)	20:32			21:00	22	20:13 (74)
6	07:58		08:36 (72)	07:40		08:50 (72)	07:02			07:12		18:49 (117)	06:30		19:54 (74)	06:06		19:52 (74)
	17:24	81	16:56 (116)	17:59	44	09:34 (72)	18:31			20:03	42	19:31 (117)	20:33	12	20:06 (74)	21:00	21	20:13 (74)
7	07:58		08:37 (72)	07:38		08:52 (72)	07:00			07:11		18:48 (117)	06:28		19:52 (74)	06:06		19:52 (74)
	17:25	80	16:56 (116)	18:00	40	09:32 (72)	18:33			20:04	42	19:30 (117)	20:34	16	20:08 (74)	21:01	20	20:12 (74)
8	07:57		08:37 (72)	07:37		08:53 (72)	07:59			07:09		18:48 (117)	06:27		19:50 (74)	06:06		19:53 (74)
	17:26	81	16:57 (116)	18:02	38	09:31 (72)	19:34			20:05	43	19:31 (117)	20:35	20	20:10 (74)	21:02	19	20:12 (74)
9	07:57		08:37 (72)	07:36		08:55 (72)	07:57			07:07		18:47 (117)	06:26		19:49 (74)	06:06		19:54 (74)
	17:27	83	16:58 (116)	18:03	35	09:30 (72)	19:35			20:06	43	19:30 (117)	20:36	22	20:11 (74)	21:02	18	20:12 (74)
10	07:57		08:37 (72)	07:35		08:57 (72)	07:56			07:06		18:47 (117)	06:25		19:48 (74)	06:05		19:55 (74)
	17:28	81	16:57 (116)	18:04	31	09:28 (72)	19:36			20:07	42	19:29 (117)	20:37	24	20:12 (74)	21:03	16	20:11 (74)
11	07:57		08:37 (72)	07:34		09:00 (72)	07:54			07:04		18:47 (117)	06:24		19:47 (74)	06:05		19:56 (74)
	17:29	82	16:58 (116)	18:05	26	09:26 (72)	19:37			20:08	42	19:29 (117)	20:38	26	20:13 (74)	21:03	15	20:11 (74)
12	07:57		08:38 (72)	07:33		09:02 (72)	07:53			07:03		18:47 (117)	06:23		19:46 (74)	06:05		19:56 (74)
	17:30	81	16:58 (116)	18:06	20	09:22 (72)	19:38			20:09	41	19:28 (117)	20:39	28	20:14 (74)	21:04	15	20:11 (74)
13	07:56		08:39 (72)	07:32		09:07 (72)	07:51			07:01		18:48 (117)	06:22		19:46 (74)	06:05		19:57 (74)
	17:31	80	16:58 (116)	18:08	10	09:17 (72)	19:39			20:10	40	19:28 (117)	20:40	28	20:14 (74)	21:04	14	20:11 (74)
14	07:56		08:38 (72)	07:30			07:49			07:00		18:47 (117)	06:21		19:45 (74)	06:05		19:58 (74)
	17:32	81	16:58 (116)	18:09			19:40			20:11	40	19:27 (117)	20:41	29	20:14 (74)	21:05	12	20:10 (74)
15	07:56		08:39 (72)	07:29			07:48			06:58		18:48 (117)	06:20		19:45 (74)	06:05		19:58 (74)
	17:33	80	16:58 (116)	18:10			19:41			20:12	39	19:27 (117)	20:42	30	20:15 (74)	21:05	12	20:10 (74)
16	07:55		08:39 (72)	07:28			07:46			06:57		18:48 (117)	06:19		19:44 (74)	06:05		19:59 (74)
	17:34	79	16:58 (116)	18:11			19:42			20:13	37	19:25 (117)	20:43	31	20:15 (74)	21:06	11	20:10 (74)
17	07:55		08:39 (72)	07:26			07:45			06:55		18:49 (117)	06:18		19:44 (74)	06:05		20:00 (74)
	17:35	78	16:58 (116)	18:12			19:43			20:14	36	19:25 (117)	20:44	31	20:15 (74)	21:06	10	20:10 (74)
18	07:54		08:39 (72)	07:25			07:43			06:54		18:50 (117)	06:17		19:45 (74)	06:05		20:00 (74)
	17:37	76	16:57 (116)	18:13			19:44			20:15	33	19:23 (117)	20:45	31	20:16 (74)	21:06	9	20:09 (74)
19	07:54		08:40 (72)	07:24			07:41			06:52		18:51 (117)	06:16		19:45 (74)	06:05		20:00 (74)
	17:38	74	16:57 (116)	18:15			19:45			20:16	31	19:22 (117)	20:46	31	20:16 (74)	21:07	9	20:09 (74)
20	07:53		08:40 (72)	07:22			07:40			06:51		18:53 (117)	06:16		19:44 (74)	06:05		20:01 (74)
	17:39	71	16:55 (116)	18:16			19:46			20:17	27	19:20 (117)	20:47	32	20:16 (74)	21:07	8	20:09 (74)
21	07:53		08:40 (72)	07:21			07:38			06:49		18:54 (117)	06:15		19:44 (74)	06:06		20:02 (74)
	17:40	67	16:53 (116)	18:17			19:47			20:18	24	19:18 (117)	20:48	31	20:15 (74)	21:07	8	20:10 (74)
22	07:52		08:41 (72)	07:20			07:36			06:48		18:56 (117)	06:14		19:45 (74)	06:06		20:02 (74)
	17:41	59	09:40 (72)	18:18			19:48			20:19	20	19:16 (117)	20:49	31	20:16 (74)	21:08	8	20:10 (74)
23	07:52		08:41 (72)	07:18			07:35			06:46		18:59 (117)	06:13		19:45 (74)	06:06		20:01 (74)
	17:42	59	09:40 (72)	18:19			19:49			20:20	13	19:12 (117)	20:50	31	20:16 (74)	21:08	9	20:10 (74)
24	07:51		08:41 (72)	07:17			07:33			06:45			06:13		19:45 (74)	06:06		20:01 (74)
	17:43	58	09:39 (72)	18:20			19:50			20:21			20:50	30	20:15 (74)	21:08	9	20:10 (74)
25	07:50		08:42 (72)	07:15			07:31			06:44			06:12		19:46 (74)	06:07		20:02 (74)
	17:45	58	09:40 (72)	18:21			19:52			20:22			20:51	30	20:16 (74)	21:08	10	20:12 (74)
26	07:50		08:42 (72)	07:14			07:30		19:11 (117)	06:42			06:11		19:46 (74)	06:07		20:01 (74)
	17:46	58	09:40 (72)	18:23			19:53	5	19:16 (117)	20:23			20:52	29	20:15 (74)	21:08	11	20:12 (74)
27	07:49		08:43 (72)	07:13			07:28		19:04 (117)	06:41			06:11		19:47 (74)	06:07		20:01 (74)
	17:47	57	09:40 (72)	18:24			19:54	17	19:21 (117)	20:24			20:53	29	20:16 (74)	21:08	11	20:12 (74)
28	07:48		08:43 (72)	07:11			07:27		19:01 (117)	06:40			06:10		19:47 (74)	06:08		20:01 (74)
	17:48	56	09:39 (72)	18:25			19:55	22	19:23 (117)	20:25			20:54	28	20:15 (74)	21:08	12	20:13 (74)
29	07:47		08:44 (72)				07:25		18:59 (117)	06:38			06:10		19:48 (74)	06:08		20:00 (74)
	17:49	55	09:39 (72)				19:56	27	19:26 (117)	20:26			20:55	27	20:15 (74)	21:08	14	20:14 (74)
30	07:46		08:44 (72)				07:23		18:56 (117)	06:37			06:09		19:48 (74)	06:09		20:01 (74)
	17:51	55	09:39 (72)				19:57	31	19:27 (117)	20:27			20:55	26	20:14 (74)	21:08	14	20:15 (74)
31	07:45		08:45 (72)				07:22		18:54 (117)				06:09		19:49 (74)			
	17:52	53	09:38 (72)				19:58	34	19:28 (117)				20:56	26	20:15 (74)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		2222			490			136			828			709			433	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.62			0.61			0.66			0.66			0.63			0.63	
Total reduction		0.22			0.25			0.29			0.33			0.35			0.38	
Total, real		496			125			39			277			250			163	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 32

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative**Shadow receptor:** 799 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6441)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		20:00 (74)	06:32		19:57 (74)	07:02		18:46 (117)	07:31			07:04		08:26 (72)	07:37		08:19 (72)
	21:08	15	20:15 (74)	20:51	27	20:24 (74)	20:09	42	19:28 (117)	19:18			17:33	31	08:57 (72)	17:10	82	16:40 (116)
2	06:09		20:00 (74)	06:33		19:58 (74)	07:03		18:46 (117)	07:32			07:05		08:25 (72)	07:38		08:20 (72)
	21:08	16	20:16 (74)	20:50	25	20:23 (74)	20:08	42	19:28 (117)	19:17			17:32	35	09:00 (72)	17:10	81	16:40 (116)
3	06:10		19:59 (74)	06:34		19:59 (74)	07:04		18:45 (117)	07:33			07:06		08:23 (72)	07:39		08:20 (72)
	21:08	17	20:16 (74)	20:49	23	20:22 (74)	20:06	43	19:28 (117)	19:15			17:31	38	09:01 (72)	17:10	83	16:41 (116)
4	06:10		19:59 (74)	06:35		19:59 (74)	07:05		18:45 (117)	07:34			07:07		08:21 (72)	07:40		08:21 (72)
	21:08	19	20:18 (74)	20:48	21	20:20 (74)	20:05	43	19:28 (117)	19:14			17:30	41	09:02 (72)	17:09	81	16:41 (116)
5	06:11		19:59 (74)	06:36		20:01 (74)	07:06		18:45 (117)	07:35			07:08		08:20 (72)	07:41		08:22 (72)
	21:08	19	20:18 (74)	20:47	18	20:19 (74)	20:03	42	19:27 (117)	19:12			17:29	44	09:04 (72)	17:09	81	16:42 (116)
6	06:12		19:59 (74)	06:37		20:02 (74)	07:07		18:45 (117)	07:36			07:09		08:20 (72)	07:42		08:22 (72)
	21:08	20	20:19 (74)	20:45	15	20:17 (74)	20:01	42	19:27 (117)	19:10			17:27	46	09:06 (72)	17:09	81	16:42 (116)
7	06:12		19:58 (74)	06:38		20:05 (74)	07:08		18:44 (117)	07:37			07:10		08:19 (72)	07:43		08:23 (72)
	21:07	21	20:19 (74)	20:44	10	20:15 (74)	20:00	41	19:25 (117)	19:09			17:26	47	09:06 (72)	17:09	80	16:42 (116)
8	06:13		19:58 (74)	06:39			07:08		18:44 (117)	07:38			07:12		08:18 (72)	07:44		08:24 (72)
	21:07	22	20:20 (74)	20:43			19:56	40	19:24 (117)	19:07			17:25	49	09:07 (72)	17:09	80	16:43 (116)
9	06:13		19:57 (74)	06:40			07:09		18:44 (117)	07:39			07:13		08:17 (72)	07:45		08:24 (72)
	21:07	23	20:20 (74)	20:42			19:55	40	19:24 (117)	19:06			17:24	51	09:08 (72)	17:09	79	16:43 (116)
10	06:14		19:57 (74)	06:41			07:10		18:45 (117)	07:40			07:14		08:16 (72)	07:46		08:25 (72)
	21:06	24	20:21 (74)	20:41			19:53	38	19:23 (117)	19:04			17:23	52	09:08 (72)	17:09	79	16:44 (116)
11	06:15		19:57 (74)	06:42			07:11		18:46 (117)	07:41			07:15		08:17 (72)	07:47		08:26 (72)
	21:06	25	20:22 (74)	20:39			19:52	35	19:21 (117)	19:02			17:22	53	09:10 (72)	17:09	79	16:45 (116)
12	06:16		19:56 (74)	06:43			07:12		18:46 (117)	07:42			07:16		08:16 (72)	07:47		08:26 (72)
	21:06	26	20:22 (74)	20:38			19:50	34	19:20 (117)	19:01			17:22	54	09:10 (72)	17:09	78	16:44 (116)
13	06:16		19:56 (74)	06:44			07:13		18:47 (117)	07:43			07:17		08:16 (72)	07:48		08:26 (72)
	21:05	27	20:23 (74)	20:37			19:48	31	19:18 (117)	18:59			17:21	55	09:11 (72)	17:10	77	16:44 (116)
14	06:17		19:56 (74)	06:45			07:14		18:49 (117)	07:44			07:19		08:15 (72)	07:49		08:27 (72)
	21:05	27	20:23 (74)	20:36			19:47	27	19:16 (117)	18:58			17:20	56	09:11 (72)	17:10	78	16:45 (116)
15	06:18		19:56 (74)	06:46			07:15		18:51 (117)	07:45			07:20		08:16 (72)	07:50		08:28 (72)
	21:04	28	20:24 (74)	20:34			19:45	23	19:14 (117)	18:56			17:19	57	09:13 (72)	17:10	77	16:45 (116)
16	06:18		19:55 (74)	06:47			07:16		18:53 (117)	07:46			07:21		08:15 (72)	07:50		08:28 (72)
	21:04	29	20:24 (74)	20:33			19:43	18	19:11 (117)	18:55			17:18	58	09:13 (72)	17:10	76	16:45 (116)
17	06:19		19:55 (74)	06:47			07:17		18:57 (117)	07:47			07:22		08:15 (72)	07:51		08:29 (72)
	21:03	29	20:24 (74)	20:31			19:42	9	19:06 (117)	18:53			17:17	58	09:13 (72)	17:11	75	16:45 (116)
18	06:20		19:55 (74)	06:48			07:18			07:48			07:23		08:15 (72)	07:52		08:30 (72)
	21:02	30	20:25 (74)	20:30			19:40			18:52			17:17	58	09:13 (72)	17:11	75	16:46 (116)
19	06:21		19:55 (74)	06:49		19:10 (117)	07:19			07:49			07:24		08:16 (72)	07:52		08:30 (72)
	21:02	30	20:25 (74)	20:29	3	19:13 (117)	19:38			18:50			17:16	59	09:15 (72)	17:11	75	16:46 (116)
20	06:22		19:54 (74)	06:50		19:04 (117)	07:20			07:50			07:25		08:16 (72)	07:53		08:31 (72)
	21:01	31	20:25 (74)	20:27	14	19:18 (117)	19:37			18:49			17:15	59	09:15 (72)	17:12	74	16:47 (116)
21	06:22		19:55 (74)	06:51		19:01 (117)	07:21			07:51			07:27		08:16 (72)	07:53		08:31 (72)
	21:00	30	20:25 (74)	20:26	20	19:21 (117)	19:35			18:48			17:15	67	16:29 (116)	17:12	74	16:47 (116)
22	06:23		19:55 (74)	06:52		18:58 (117)	07:22			07:52			07:28		08:16 (72)	07:54		08:32 (72)
	21:00	31	20:26 (74)	20:24	25	19:23 (117)	19:33			18:46			17:14	71	16:31 (116)	17:13	74	16:48 (116)
23	06:24		19:55 (74)	06:53		18:56 (117)	07:23			07:53			07:29		08:16 (72)	07:54		08:32 (72)
	20:59	31	20:26 (74)	20:23	28	19:24 (117)	19:32			18:45			17:13	74	16:33 (116)	17:13	74	16:48 (116)
24	06:25		19:55 (74)	06:54		18:55 (117)	07:24			07:55			07:30		08:16 (72)	07:55		08:32 (72)
	20:58	31	20:26 (74)	20:22	31	19:26 (117)	19:30			18:43			17:13	76	16:34 (116)	17:14	74	16:48 (116)
25	06:26		19:55 (74)	06:55		18:53 (117)	07:25			07:56			07:31		08:17 (72)	07:55		08:33 (72)
	20:57	31	20:26 (74)	20:20	34	19:27 (117)	19:28			18:42			17:12	78	16:36 (116)	17:14	75	16:49 (116)
26	06:27		19:55 (74)	06:56		18:52 (117)	07:26			07:57			07:32		08:18 (72)	07:56		08:33 (72)
	20:56	30	20:25 (74)	20:19	35	19:27 (117)	19:27			18:41			17:12	79	16:37 (116)	17:15	75	16:49 (116)
27	06:28		19:55 (74)	06:57		18:50 (117)	07:27			07:58			07:33		08:18 (72)	07:56		08:33 (72)
	20:56	30	20:25 (74)	20:17	37	19:27 (117)	19:25			18:39			17:11	80	16:37 (116)	17:16	76	16:50 (116)
28	06:29		19:55 (74)	06:58		18:49 (117)	07:28			07:59			07:34		08:18 (72)	07:56		08:34 (72)
	20:55	30	20:25 (74)	20:16	39	19:28 (117)	19:23			18:38			17:11	81	16:38 (116)	17:16	76	16:51 (116)
29	06:29		19:56 (74)	06:59		18:48 (117)	07:29			08:00		09:35 (72)	07:35		08:19 (72)	07:57		08:34 (72)
	20:54	29	20:25 (74)	20:14	40	19:28 (117)	19:22			18:37	13	09:48 (72)	17:11	81	16:39 (116)	17:17	77	16:51 (116)
30	06:30		19:56 (74)	07:00		18:47 (117)	07:30			08:01		09:31 (72)	07:36		08:19 (72)	07:57		08:34 (72)
	20:53	29	20:25 (74)	20:12	41	19:28 (117)	19:20			18:36	21	09:52 (72)	17:10	81	16:39 (116)	17:18	77	16:52 (116)
31	06:31		19:57 (74)	07:01		18:47 (117)				08:02		09:28 (72)				07:57		08:34 (72)
	20:52	27	20:24 (74)	20:11	41	19:28 (117)				18:34	27	09:55 (72)				17:19	79	16:53 (116)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		807			527			590			61			1769			2402	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.63			0.65			0.66			0.61			0.61			0.63	
Total reduction		0.38			0.39			0.40			0.34			0.23			0.31	
Total, real		304			205			236			21			401			752	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 33

Licensed user:
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Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative**Shadow receptor:** 812 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6448)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57			07:44		17:08 (18)	07:09		07:44 (100)	07:20		07:39 (126)	06:36			06:08		19:56 (16)
	17:19			17:53	17	17:25 (18)	18:26	46	08:30 (100)	19:59	15	07:54 (126)	20:28			20:57	23	20:19 (16)
2	07:57			07:43		17:07 (18)	07:08		07:42 (100)	07:18		07:37 (126)	06:34			06:08		19:57 (16)
	17:20			17:54	19	17:26 (18)	18:27	48	08:30 (100)	20:00	17	07:54 (126)	20:29			20:58	22	20:19 (16)
3	07:57			07:42		17:06 (18)	07:06		07:42 (100)	07:17		07:35 (126)	06:33			06:07		19:57 (16)
	17:21			17:55	21	17:27 (18)	18:28	49	08:31 (100)	20:00	19	07:54 (126)	20:30			20:58	21	20:18 (16)
4	07:58			07:41		17:06 (18)	07:05		07:41 (100)	07:15		07:34 (126)	06:32			06:07		19:58 (16)
	17:22			17:57	22	17:28 (18)	18:29	50	08:31 (100)	20:01	21	07:55 (126)	20:31			20:59	20	20:18 (16)
5	07:58			07:40		17:06 (18)	07:03		07:40 (100)	07:14		07:32 (126)	06:31			06:06		19:59 (16)
	17:23			17:58	22	17:28 (18)	18:30	50	08:30 (100)	20:02	22	07:54 (126)	20:32			21:00	20	20:19 (16)
6	07:57			07:39		17:06 (18)	07:02		07:40 (100)	07:12		07:31 (126)	06:29			06:06		19:59 (16)
	17:24			17:59	23	17:29 (18)	18:31	51	08:31 (100)	20:03	24	07:55 (126)	20:33			21:00	20	20:19 (16)
7	07:57			07:38		17:06 (18)	07:00		07:39 (100)	07:10		07:29 (126)	06:28			06:06		19:59 (16)
	17:25			18:00	23	17:29 (18)	18:32	51	08:30 (100)	20:04	25	07:54 (126)	20:34			21:01	19	20:18 (16)
8	07:57			07:37		17:06 (18)	07:59		08:39 (100)	07:09		07:29 (126)	06:27			06:06		20:00 (16)
	17:26			18:01	23	17:29 (18)	19:34	52	09:31 (100)	20:05	24	07:53 (126)	20:35			21:02	18	20:18 (16)
9	07:57			07:36		17:07 (18)	07:57		08:38 (100)	07:07		07:29 (126)	06:26			06:05		20:01 (16)
	17:27			18:03	22	17:29 (18)	19:35	52	09:30 (100)	20:06	23	07:52 (126)	20:36			21:02	17	20:18 (16)
10	07:57			07:35		17:07 (18)	07:56		08:39 (100)	07:06		07:29 (126)	06:25			06:05		20:01 (16)
	17:28			18:04	22	17:29 (18)	19:36	51	09:30 (100)	20:07	22	07:51 (126)	20:37			21:03	17	20:18 (16)
11	07:57			07:34		17:07 (18)	07:54		08:38 (100)	07:04		07:31 (126)	06:24			06:05		20:02 (16)
	17:29			18:05	21	17:28 (18)	19:37	52	09:30 (100)	20:08	19	07:50 (126)	20:38			21:03	16	20:18 (16)
12	07:57			07:33		17:09 (18)	07:52		08:38 (100)	07:03		07:31 (126)	06:23		20:03 (16)	06:05		20:03 (16)
	17:30			18:06	18	17:27 (18)	19:38	51	09:29 (100)	20:09	17	07:48 (126)	20:39	7	20:10 (16)	21:04	14	20:17 (16)
13	07:56			07:31		17:10 (18)	07:51		08:38 (100)	07:01		07:33 (126)	06:22		20:00 (16)	06:05		20:03 (16)
	17:31			18:07	16	17:26 (18)	19:39	50	09:28 (100)	20:10	13	07:46 (126)	20:40	12	20:12 (16)	21:04	14	20:17 (16)
14	07:56			07:30		17:12 (18)	07:49		08:38 (100)	07:00		07:36 (126)	06:21		19:59 (16)	06:05		20:04 (16)
	17:32			18:09	13	17:25 (18)	19:40	49	09:27 (100)	20:11	6	07:42 (126)	20:41	15	20:14 (16)	21:05	13	20:17 (16)
15	07:56			07:29		17:14 (18)	07:48		08:38 (100)	06:58			06:20		19:57 (16)	06:05		20:04 (16)
	17:33			18:10	7	17:21 (18)	19:41	48	09:26 (100)	20:12			20:42	18	20:15 (16)	21:05	13	20:17 (16)
16	07:55			07:28			07:46		08:39 (100)	06:56			06:19		19:56 (16)	06:05		20:05 (16)
	17:34			18:11			19:42	47	09:26 (100)	20:13			20:43	20	20:16 (16)	21:06	12	20:17 (16)
17	07:55			07:26			07:44		08:39 (100)	06:55			06:18		19:56 (16)	06:05		20:05 (16)
	17:35			18:12			19:43	45	09:24 (100)	20:14			20:44	20	20:16 (16)	21:06	12	20:17 (16)
18	07:54			07:25			07:43		08:40 (100)	06:54			06:17		19:56 (16)	06:05		20:05 (16)
	17:36			18:13			19:44	43	09:23 (100)	20:15			20:45	22	20:18 (16)	21:06	12	20:17 (16)
19	07:54			07:24			07:41		08:41 (100)	06:52			06:16		19:55 (16)	06:05		20:05 (16)
	17:38			18:14			19:45	40	09:21 (100)	20:16			20:46	23	20:18 (16)	21:07	12	20:17 (16)
20	07:53			07:22		08:05 (100)	07:40		08:41 (100)	06:51			06:16		19:55 (16)	06:05		20:06 (16)
	17:39			18:16	6	08:11 (100)	19:46	38	09:19 (100)	20:17			20:47	23	20:18 (16)	21:07	11	20:17 (16)
21	07:53			07:21		07:58 (100)	07:38		08:43 (100)	06:49			06:15		19:54 (16)	06:05		20:06 (16)
	17:40			18:17	18	08:16 (100)	19:47	35	09:18 (100)	20:18			20:48	24	20:18 (16)	21:07	11	20:17 (16)
22	07:52			07:20		07:55 (100)	07:36		08:44 (100)	06:48			06:14		19:55 (16)	06:06		20:07 (16)
	17:41			18:18	25	08:20 (100)	19:48	31	09:15 (100)	20:19			20:49	24	20:19 (16)	21:07	11	20:18 (16)
23	07:52			07:18		07:52 (100)	07:35		08:46 (100)	06:46			06:13		19:55 (16)	06:06		20:07 (16)
	17:42			18:19	30	08:22 (100)	19:49	27	09:13 (100)	20:20			20:49	24	20:19 (16)	21:08	11	20:18 (16)
24	07:51			07:17		07:50 (100)	07:33		08:49 (100)	06:45			06:13		19:54 (16)	06:06		20:06 (16)
	17:43			18:20	34	08:24 (100)	19:50	21	09:10 (100)	20:21			20:50	25	20:19 (16)	21:08	12	20:18 (16)
25	07:50			07:15		07:49 (100)	07:31		08:52 (100)	06:44			06:12		19:55 (16)	06:06		20:07 (16)
	17:45			18:21	37	08:26 (100)	19:51	13	09:05 (100)	20:22			20:51	24	20:19 (16)	21:08	12	20:19 (16)
26	07:49			07:14		07:47 (100)	07:30			06:42			06:11		19:55 (16)	06:07		20:07 (16)
	17:46			18:23	40	08:27 (100)	19:52			20:23			20:52	24	20:19 (16)	21:08	12	20:19 (16)
27	07:49			07:12		07:46 (100)	07:28			06:41			06:11		19:54 (16)	06:07		20:06 (16)
	17:47			18:24	42	08:28 (100)	19:53			20:24			20:53	25	20:19 (16)	21:08	13	20:19 (16)
28	07:48			07:11		07:44 (100)	07:26			06:39			06:10		19:55 (16)	06:08		20:07 (16)
	17:48			18:25	44	08:28 (100)	19:54			20:25			20:54	24	20:19 (16)	21:08	13	20:20 (16)
29	07:47		17:12 (18)				07:25		07:44 (126)	06:38			06:09		19:55 (16)	06:08		20:06 (16)
	17:49	8	17:20 (18)				19:55	3	07:47 (126)	20:26			20:55	24	20:19 (16)	21:08	14	20:20 (16)
30	07:46		17:10 (18)				07:23		07:42 (126)	06:37			06:09		19:56 (16)	06:08		20:06 (16)
	17:51	12	17:22 (18)				19:57	8	07:50 (126)	20:27			20:55	23	20:19 (16)	21:08	14	20:20 (16)
31	07:45		17:09 (18)				07:22		07:40 (126)				06:08		19:57 (16)			
	17:52	15	17:24 (18)				19:58	12	07:52 (126)				20:56	22	20:19 (16)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		35			565			1113			267			423			449	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.68			0.66			0.63			0.67			0.63			0.63	
Total reduction		0.25			0.28			0.28			0.34			0.35			0.38	
Total, real		9			157			311			91			149			169	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 34

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative**Shadow receptor:** 812 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6448)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December
1	06:09		20:06 (16)	06:32		20:15 (16)	07:02		07:30 (126)	07:30		08:17 (100)	07:03		16:36 (18)	07:37
	21:08	16	20:22 (16)	20:51	4	20:19 (16)	20:09	19	07:49 (126)	19:18	51	09:08 (100)	17:33	22	16:58 (18)	17:10
2	06:09		20:06 (16)	06:33			07:03		07:28 (126)	07:31		08:17 (100)	07:05		16:37 (18)	07:38
	21:08	16	20:22 (16)	20:50			20:08	22	07:50 (126)	19:17	51	09:08 (100)	17:32	22	16:59 (18)	17:10
3	06:10		20:06 (16)	06:34			07:04		07:27 (126)	07:32		08:16 (100)	07:06		16:36 (18)	07:39
	21:08	17	20:23 (16)	20:49			20:06	23	07:50 (126)	19:15	52	09:08 (100)	17:31	23	16:59 (18)	17:10
4	06:10		20:05 (16)	06:35			07:05		07:27 (126)	07:33		08:16 (100)	07:07		16:36 (18)	07:40
	21:08	18	20:23 (16)	20:48			20:04	24	07:51 (126)	19:13	52	09:08 (100)	17:30	23	16:59 (18)	17:09
5	06:11		20:05 (16)	06:36			07:06		07:26 (126)	07:34		08:16 (100)	07:08		16:36 (18)	07:41
	21:08	19	20:24 (16)	20:46			20:03	25	07:51 (126)	19:12	52	09:08 (100)	17:28	23	16:59 (18)	17:09
6	06:12		20:06 (16)	06:37			07:06		07:26 (126)	07:35		08:15 (100)	07:09		16:36 (18)	07:42
	21:07	19	20:25 (16)	20:45			20:01	24	07:50 (126)	19:10	52	09:07 (100)	17:27	22	16:58 (18)	17:09
7	06:12		20:05 (16)	06:38			07:07		07:27 (126)	07:36		08:15 (100)	07:10		16:37 (18)	07:43
	21:07	20	20:25 (16)	20:44			20:00	22	07:49 (126)	19:09	52	09:07 (100)	17:26	22	16:59 (18)	17:09
8	06:13		20:05 (16)	06:39			07:08		07:28 (126)	07:37		08:15 (100)	07:11		16:37 (18)	07:44
	21:07	20	20:25 (16)	20:43			19:56	21	07:49 (126)	19:07	51	09:06 (100)	17:25	21	16:58 (18)	17:09
9	06:13		20:04 (16)	06:40			07:09		07:29 (126)	07:38		08:15 (100)	07:13		16:38 (18)	07:45
	21:07	21	20:25 (16)	20:42			19:55	19	07:48 (126)	19:05	51	09:06 (100)	17:24	19	16:57 (18)	17:09
10	06:14		20:05 (16)	06:41			07:10		07:30 (126)	07:40		08:15 (100)	07:14		16:39 (18)	07:46
	21:06	21	20:26 (16)	20:41			19:53	17	07:47 (126)	19:04	50	09:05 (100)	17:23	17	16:56 (18)	17:09
11	06:15		20:05 (16)	06:42			07:11		07:31 (126)	07:41		08:16 (100)	07:15		16:41 (18)	07:46
	21:06	22	20:27 (16)	20:39			19:51	15	07:46 (126)	19:02	48	09:04 (100)	17:22	15	16:56 (18)	17:09
12	06:15		20:04 (16)	06:43			07:12		07:32 (126)	07:42		08:16 (100)	07:16		16:42 (18)	07:47
	21:05	23	20:27 (16)	20:38			19:50	12	07:44 (126)	19:01	47	09:03 (100)	17:21	12	16:54 (18)	17:09
13	06:16		20:04 (16)	06:44			07:13		07:33 (126)	07:43		08:17 (100)	07:17		16:44 (18)	07:48
	21:05	23	20:27 (16)	20:37			19:48	9	07:42 (126)	18:59	45	09:02 (100)	17:21	8	16:52 (18)	17:09
14	06:17		20:04 (16)	06:44			07:14		07:34 (126)	07:44		08:17 (100)	07:18			07:49
	21:05	24	20:28 (16)	20:35			19:46	4	07:38 (126)	18:58	44	09:01 (100)	17:20			17:10
15	06:18		20:05 (16)	06:45			07:15			07:45		08:19 (100)	07:20			07:50
	21:04	23	20:28 (16)	20:34			19:45			18:56	41	09:00 (100)	17:19			17:10
16	06:18		20:04 (16)	06:46			07:16			07:46		08:20 (100)	07:21			07:50
	21:03	24	20:28 (16)	20:33			19:43			18:55	39	08:59 (100)	17:18			17:10
17	06:19		20:04 (16)	06:47			07:17			07:47		08:21 (100)	07:22			07:51
	21:03	24	20:28 (16)	20:31			19:42			18:53	36	08:57 (100)	17:17			17:10
18	06:20		20:04 (16)	06:48			07:18		08:41 (100)	07:48		08:23 (100)	07:23			07:52
	21:02	25	20:29 (16)	20:30			19:40	10	08:51 (100)	18:52	32	08:55 (100)	17:16			17:11
19	06:21		20:05 (16)	06:49			07:19		08:36 (100)	07:49		08:24 (100)	07:24			07:52
	21:02	24	20:29 (16)	20:29			19:38	19	08:55 (100)	18:50	28	08:52 (100)	17:16			17:11
20	06:22		20:04 (16)	06:50			07:20		08:33 (100)	07:50		08:27 (100)	07:25			07:53
	21:01	24	20:28 (16)	20:27			19:37	25	08:58 (100)	18:49	23	08:50 (100)	17:15			17:12
21	06:22		20:04 (16)	06:51			07:21		08:30 (100)	07:51		08:30 (100)	07:26			07:53
	21:00	25	20:29 (16)	20:26			19:35	30	09:00 (100)	18:47	16	08:46 (100)	17:14			17:12
22	06:23		20:05 (16)	06:52			07:22		08:28 (100)	07:52			07:28			07:54
	21:00	24	20:29 (16)	20:24			19:33	34	09:02 (100)	18:46			17:14			17:13
23	06:24		20:05 (16)	06:53			07:23		08:26 (100)	07:53			07:29			07:54
	20:59	24	20:29 (16)	20:23			19:32	37	09:03 (100)	18:45			17:13			17:13
24	06:25		20:06 (16)	06:54			07:24		08:25 (100)	07:54			07:30			07:55
	20:58	23	20:29 (16)	20:21			19:30	39	09:04 (100)	18:43			17:13			17:14
25	06:26		20:06 (16)	06:55			07:25		08:23 (100)	07:56			07:31			07:55
	20:57	22	20:28 (16)	20:20			19:28	42	09:05 (100)	18:42			17:12			17:14
26	06:27		20:06 (16)	06:56			07:26		08:22 (100)	07:57			07:32			07:56
	20:56	21	20:27 (16)	20:18			19:27	44	09:06 (100)	18:41			17:12			17:15
27	06:28		20:07 (16)	06:57			07:27		08:21 (100)	07:58		17:43 (18)	07:33			07:56
	20:55	20	20:27 (16)	20:17			19:25	46	09:07 (100)	18:39	9	17:52 (18)	17:11			17:16
28	06:28		20:07 (16)	06:58			07:27		08:20 (100)	07:59		17:40 (18)	07:34			07:56
	20:55	19	20:26 (16)	20:15			19:23	47	09:07 (100)	18:38	14	17:54 (18)	17:11			17:16
29	06:29		20:09 (16)	06:59		07:37 (126)	07:28		08:19 (100)	08:00		17:39 (18)	07:35			07:57
	20:54	16	20:25 (16)	20:14	6	07:43 (126)	19:22	49	09:08 (100)	18:37	17	17:56 (18)	17:11			17:17
30	06:30		20:10 (16)	07:00		07:33 (126)	07:29		08:18 (100)	08:01		17:38 (18)	07:36			07:57
	20:53	14	20:24 (16)	20:12	13	07:46 (126)	19:20	50	09:08 (100)	18:36	19	17:57 (18)	17:10			17:18
31	06:31		20:12 (16)	07:01		07:31 (126)				08:02		17:37 (18)				07:57
	20:52	10	20:22 (16)	20:11	17	07:48 (126)				18:34	20	17:57 (18)				17:18
Potential sun hours	456			427			374			346			300			291
Total, worst case		641			40			728			992			249		
Sun reduction		0.60			0.60			0.61			0.56			0.37		
Oper. time red.		1.00			1.00			1.00			1.00			1.00		
Wind dir. red.		0.63			0.66			0.64			0.64			0.68		
Total reduction		0.38			0.40			0.39			0.36			0.25		
Total, real		242			16			287			355			63		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

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EDR
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US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative **Shadow receptor:** 3380 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6523)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		15:48 (108)	07:45		08:08 (33)	07:10			07:20		07:46 (28)	06:36		18:59 (83)	06:08		18:54 (83)
	17:20	40	16:28 (108)	17:53	77	16:51 (108)	18:26			19:59	36	08:22 (28)	20:28	45	19:44 (83)	20:57	57	19:51 (83)
2	07:58		15:48 (108)	07:44		08:06 (33)	07:08			07:19		07:45 (28)	06:35		18:58 (83)	06:08		18:55 (83)
	17:21	41	16:29 (108)	17:54	81	16:52 (108)	18:27			20:00	37	08:22 (28)	20:29	47	19:45 (83)	20:58	56	19:51 (83)
3	07:58		15:48 (108)	07:43		08:04 (33)	07:07			07:17		07:45 (28)	06:33		18:57 (83)	06:07		18:56 (83)
	17:21	42	16:30 (108)	17:56	85	16:52 (108)	18:28			20:00	37	08:22 (28)	20:30	49	19:46 (83)	20:58	56	19:52 (83)
4	07:58		15:48 (108)	07:42		08:03 (33)	07:05			07:15		07:44 (28)	06:32		18:56 (83)	06:07		18:55 (83)
	17:22	43	16:31 (108)	17:57	88	16:52 (108)	18:29			20:01	37	08:21 (28)	20:31	51	19:47 (83)	20:59	56	19:51 (83)
5	07:58		15:48 (108)	07:41		08:01 (33)	07:04			07:14		07:43 (28)	06:31		18:55 (83)	06:07		18:56 (83)
	17:23	44	16:32 (108)	17:58	89	16:51 (108)	18:31			20:02	38	08:21 (28)	20:32	52	19:47 (83)	21:00	55	19:51 (83)
6	07:58		15:48 (108)	07:40		08:00 (33)	07:02			07:12		07:44 (28)	06:30		18:54 (83)	06:06		18:57 (83)
	17:24	45	16:33 (108)	17:59	91	16:51 (108)	18:32			20:03	37	08:21 (28)	20:33	54	19:48 (83)	21:00	55	19:52 (83)
7	07:58		15:48 (108)	07:39		08:00 (33)	07:01			07:11		07:44 (28)	06:29		18:53 (83)	06:06		18:57 (83)
	17:25	46	16:34 (108)	18:00	91	16:51 (108)	18:33			20:04	35	08:19 (28)	20:34	55	19:48 (83)	21:01	55	19:52 (83)
8	07:57		15:48 (108)	07:37		07:59 (33)	07:59			07:09		07:44 (28)	06:27		18:53 (83)	06:06		18:57 (83)
	17:26	47	16:35 (108)	18:02	93	16:51 (108)	19:34			20:05	35	08:19 (28)	20:35	56	19:49 (83)	21:02	54	19:51 (83)
9	07:57		15:48 (108)	07:36		07:59 (33)	07:57			07:07		07:44 (28)	06:26		18:53 (83)	06:06		18:57 (83)
	17:27	48	16:36 (108)	18:03	93	16:51 (108)	19:35			20:06	34	08:18 (28)	20:36	56	19:49 (83)	21:02	54	19:51 (83)
10	07:57		15:48 (108)	07:35		07:59 (33)	07:56			07:06		07:45 (28)	06:25		18:52 (83)	06:06		18:58 (83)
	17:28	49	16:37 (108)	18:04	92	16:50 (108)	19:36			20:07	32	08:17 (28)	20:37	58	19:50 (83)	21:03	53	19:51 (83)
11	07:57		15:47 (108)	07:34		07:59 (33)	07:54			07:04		07:45 (28)	06:24		18:52 (83)	06:05		18:58 (83)
	17:29	51	16:38 (108)	18:05	91	16:50 (108)	19:37			20:08	30	08:15 (28)	20:38	58	19:50 (83)	21:03	54	19:52 (83)
12	07:57		15:47 (108)	07:33		07:58 (33)	07:53			07:03		07:47 (28)	06:23		18:52 (83)	06:05		18:59 (83)
	17:30	52	16:39 (108)	18:06	91	16:49 (108)	19:38			20:09	27	08:14 (28)	20:39	58	19:50 (83)	21:04	53	19:52 (83)
13	07:56		15:47 (108)	07:32		07:58 (33)	07:51			07:01		07:48 (28)	06:22		18:51 (83)	06:05		18:59 (83)
	17:31	53	16:40 (108)	18:08	89	16:48 (108)	19:39			20:10	24	08:12 (28)	20:40	59	19:50 (83)	21:04	53	19:52 (83)
14	07:56		15:47 (108)	07:30		07:58 (33)	07:49			07:00		07:49 (28)	06:21		18:51 (83)	06:05		18:59 (83)
	17:32	53	16:40 (108)	18:09	88	16:48 (108)	19:40			20:11	21	08:10 (28)	20:41	59	19:50 (83)	21:05	53	19:52 (83)
15	07:56		15:47 (108)	07:29		07:59 (33)	07:48			06:58		07:51 (28)	06:20		18:51 (83)	06:05		19:00 (83)
	17:33	55	16:42 (108)	18:10	84	16:47 (108)	19:41			20:12	16	08:07 (28)	20:42	60	19:51 (83)	21:05	52	19:52 (83)
16	07:55		15:46 (108)	07:28		07:58 (33)	07:46			06:57		07:54 (28)	06:19		18:51 (83)	06:05		19:00 (83)
	17:34	56	16:42 (108)	18:11	82	16:45 (108)	19:42			20:13	9	08:03 (28)	20:43	60	19:51 (83)	21:06	52	19:52 (83)
17	07:55		15:47 (108)	07:27		07:59 (33)	07:45			06:55			06:18		18:51 (83)	06:05		19:00 (83)
	17:36	56	16:43 (108)	18:12	79	16:45 (108)	19:43			20:14			20:44	61	19:52 (83)	21:06	52	19:52 (83)
18	07:55		15:46 (108)	07:25		08:00 (33)	07:43			06:54			06:17		18:51 (83)	06:05		19:00 (83)
	17:37	58	16:44 (108)	18:14	75	16:44 (108)	19:44			20:15			20:45	60	19:51 (83)	21:07	52	19:52 (83)
19	07:54		15:47 (108)	07:24		08:00 (33)	07:41			06:52			06:17		18:51 (83)	06:05		19:01 (83)
	17:38	58	16:45 (108)	18:15	70	16:42 (108)	19:45			20:16			20:46	60	19:51 (83)	21:07	51	19:52 (83)
20	07:53		15:46 (108)	07:23		08:01 (33)	07:40			06:51			06:16		18:51 (83)	06:06		19:01 (83)
	17:39	59	16:45 (108)	18:16	64	16:40 (108)	19:46			20:17			20:47	60	19:51 (83)	21:07	51	19:52 (83)
21	07:53		15:46 (108)	07:21		08:02 (33)	07:38			06:49			06:15		18:51 (83)	06:06		19:02 (83)
	17:40	60	16:46 (108)	18:17	57	16:38 (108)	19:47			20:18			20:48	60	19:51 (83)	21:07	51	19:53 (83)
22	07:52		15:46 (108)	07:20		08:04 (33)	07:36			06:48			06:14		18:52 (83)	06:06		19:02 (83)
	17:41	61	16:47 (108)	18:18	48	16:35 (108)	19:49			20:19			20:49	60	19:52 (83)	21:08	51	19:53 (83)
23	07:52		15:46 (108)	07:18		08:06 (33)	07:35		08:03 (28)	06:47			06:13		18:52 (83)	06:06		19:02 (83)
	17:42	61	16:47 (108)	18:19	38	16:32 (108)	19:50	8	08:11 (28)	20:20			20:50	59	19:51 (83)	21:08	51	19:53 (83)
24	07:51		15:46 (108)	07:17		08:08 (33)	07:33		07:58 (28)	06:45		19:15 (83)	06:13		18:51 (83)	06:06		19:01 (83)
	17:44	62	16:48 (108)	18:20	21	16:26 (108)	19:51	17	08:15 (28)	20:21	15	19:30 (83)	20:50	60	19:51 (83)	21:08	52	19:53 (83)
25	07:50		15:46 (108)	07:16			07:32		07:55 (28)	06:44		19:11 (83)	06:12		18:52 (83)	06:07		19:02 (83)
	17:45	63	16:49 (108)	18:22			19:52	22	08:17 (28)	20:22	23	19:34 (83)	20:51	60	19:52 (83)	21:08	52	19:54 (83)
26	07:50		15:46 (108)	07:14			07:30		07:53 (28)	06:42		19:08 (83)	06:11		18:52 (83)	06:07		19:02 (83)
	17:46	63	16:49 (108)	18:23			19:53	26	08:19 (28)	20:23	28	19:36 (83)	20:52	59	19:51 (83)	21:08	52	19:54 (83)
27	07:49		15:46 (108)	07:13			07:28		07:51 (28)	06:41		19:05 (83)	06:11		18:53 (83)	06:07		19:02 (83)
	17:47	63	16:49 (108)	18:24			19:54	29	08:20 (28)	20:24	33	19:38 (83)	20:53	59	19:52 (83)	21:08	52	19:54 (83)
28	07:48		15:46 (108)	07:11			07:27		07:49 (28)	06:40		19:04 (83)	06:10		18:53 (83)	06:08		19:03 (83)
	17:48	64	16:50 (108)	18:25			19:55	31	08:20 (28)	20:25	36	19:40 (83)	20:54	58	19:51 (83)	21:08	52	19:55 (83)
29	07:47		15:46 (108)				07:25		07:49 (28)	06:38		19:02 (83)	06:10		18:54 (83)	06:08		19:02 (83)
	17:50	64	16:50 (108)				19:56	33	08:22 (28)	20:26	40	19:42 (83)	20:55	58	19:52 (83)	21:08	53	19:55 (83)
30	07:46		15:46 (108)				07:23		07:47 (28)	06:37		19:00 (83)	06:09		18:54 (83)	06:09		19:03 (83)
	17:51	64	16:50 (108)				19:57	35	08:22 (28)	20:27	43	19:43 (83)	20:55	57	19:51 (83)	21:08	53	19:56 (83)
31	07:45		08:12 (33)				07:22		07:46 (28)				06:09		18:54 (83)			
	17:52	66	16:50 (108)				19:58	35	08:21 (28)				20:56	58	19:52 (83)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		1687			1857			236			703			1766			1593	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.68			0.66			0.66			0.65			0.63			0.63	
Total reduction		0.24			0.28			0.29			0.33			0.36			0.38	
Total, real		412			515			69			235			630			609	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 36

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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative **Shadow receptor:** 3380 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6523)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		19:02 (83)	06:32		19:02 (83)	07:02		07:44 (28)	07:31			07:04		07:28 (33)	07:37		15:29 (108)
	21:08	54	19:56 (83)	20:51	59	20:01 (83)	20:09	30	08:14 (28)	19:19			17:33	91	16:19 (108)	17:10	51	16:20 (108)
2	06:10		19:03 (83)	06:33		19:03 (83)	07:03		07:43 (28)	07:32			07:05		07:29 (33)	07:38		15:30 (108)
	21:08	53	19:56 (83)	20:50	57	20:00 (83)	20:08	32	08:15 (28)	19:17			17:32	92	16:20 (108)	17:10	49	16:19 (108)
3	06:10		19:03 (83)	06:34		19:03 (83)	07:04		07:42 (28)	07:33			07:06		07:29 (33)	07:39		15:31 (108)
	21:08	53	19:56 (83)	20:49	57	20:00 (83)	20:06	34	08:16 (28)	19:15			17:31	93	16:21 (108)	17:10	48	16:19 (108)
4	06:11		19:03 (83)	06:35		19:03 (83)	07:05		07:41 (28)	07:34			07:07		07:30 (33)	07:40		15:32 (108)
	21:08	54	19:57 (83)	20:48	57	20:00 (83)	20:05	35	08:16 (28)	19:14			17:30	91	16:21 (108)	17:10	47	16:19 (108)
5	06:11		19:02 (83)	06:36		19:03 (83)	07:06		07:41 (28)	07:35			07:08		07:30 (33)	07:41		15:33 (108)
	21:08	55	19:57 (83)	20:47	55	19:58 (83)	20:03	36	08:17 (28)	19:12			17:29	91	16:21 (108)	17:09	46	16:19 (108)
6	06:12		19:03 (83)	06:37		19:03 (83)	07:07		07:40 (28)	07:36			07:09		07:32 (33)	07:42		15:34 (108)
	21:08	55	19:58 (83)	20:45	55	19:58 (83)	20:01	37	08:17 (28)	19:10			17:28	90	16:22 (108)	17:09	45	16:19 (108)
7	06:12		19:02 (83)	06:38		19:04 (83)	07:08		07:40 (28)	07:37			07:10		07:33 (33)	07:43		15:35 (108)
	21:07	55	19:57 (83)	20:44	53	19:57 (83)	20:00	37	08:17 (28)	19:09			17:27	88	16:22 (108)	17:09	44	16:19 (108)
8	06:13		19:03 (83)	06:39		19:04 (83)	07:09		07:39 (28)	07:38			07:12		07:34 (33)	07:44		15:36 (108)
	21:07	55	19:58 (83)	20:43	52	19:56 (83)	19:57	38	08:17 (28)	19:07			17:26	85	16:22 (108)	17:09	43	16:19 (108)
9	06:14		19:03 (83)	06:40		19:05 (83)	07:10		07:38 (28)	07:39			07:13		07:36 (33)	07:45		15:37 (108)
	21:07	56	19:59 (83)	20:42	50	19:55 (83)	19:55	37	08:15 (28)	19:06			17:24	82	16:22 (108)	17:09	42	16:19 (108)
10	06:14		19:02 (83)	06:41		19:06 (83)	07:10		07:38 (28)	07:40			07:14		07:39 (33)	07:46		15:38 (108)
	21:06	57	19:59 (83)	20:41	48	19:54 (83)	19:53	37	08:15 (28)	19:04			17:24	76	16:22 (108)	17:09	41	16:19 (108)
11	06:15		19:02 (83)	06:42		19:07 (83)	07:11		07:38 (28)	07:41			07:15		15:18 (108)	07:47		15:39 (108)
	21:06	57	19:59 (83)	20:39	46	19:53 (83)	19:52	36	08:14 (28)	19:03			17:23	64	16:22 (108)	17:09	40	16:19 (108)
12	06:16		19:03 (83)	06:43		19:08 (83)	07:12		07:38 (28)	07:42			07:16		15:18 (108)	07:47		15:39 (108)
	21:06	57	20:00 (83)	20:38	44	19:52 (83)	19:50	36	08:14 (28)	19:01			17:22	64	16:22 (108)	17:10	39	16:18 (108)
13	06:16		19:02 (83)	06:44		19:09 (83)	07:13		07:38 (28)	07:43			07:17		15:18 (108)	07:48		15:40 (108)
	21:05	57	19:59 (83)	20:37	42	19:51 (83)	19:48	35	08:13 (28)	18:59			17:21	64	16:22 (108)	17:10	38	16:18 (108)
14	06:17		19:02 (83)	06:45		19:10 (83)	07:14		07:39 (28)	07:44			07:19		15:18 (108)	07:49		15:41 (108)
	21:05	58	20:00 (83)	20:36	39	19:49 (83)	19:47	33	08:12 (28)	18:58			17:20	64	16:22 (108)	17:10	38	16:19 (108)
15	06:18		19:02 (83)	06:46		19:12 (83)	07:15		07:39 (28)	07:45			07:20		15:19 (108)	07:50		15:42 (108)
	21:04	59	20:01 (83)	20:34	36	19:48 (83)	19:45	32	08:11 (28)	18:56			17:19	63	16:22 (108)	17:10	37	16:19 (108)
16	06:19		19:02 (83)	06:47		19:14 (83)	07:16		07:40 (28)	07:46			07:21		15:19 (108)	07:50		15:42 (108)
	21:04	59	20:01 (83)	20:33	32	19:46 (83)	19:43	29	08:09 (28)	18:55			17:18	63	16:22 (108)	17:10	37	16:19 (108)
17	06:19		19:02 (83)	06:48		19:15 (83)	07:17		07:41 (28)	07:47		08:44 (33)	07:22		15:19 (108)	07:51		15:43 (108)
	21:03	59	20:01 (83)	20:32	27	19:42 (83)	19:42	27	08:08 (28)	18:53	4	08:48 (33)	17:17	63	16:22 (108)	17:11	36	16:19 (108)
18	06:20		19:02 (83)	06:49		19:18 (83)	07:18		07:43 (28)	07:48		08:39 (33)	07:23		15:20 (108)	07:52		15:44 (108)
	21:02	59	20:01 (83)	20:30	21	19:39 (83)	19:40	23	08:06 (28)	18:52	28	17:00 (108)	17:17	62	16:22 (108)	17:11	36	16:20 (108)
19	06:21		19:02 (83)	06:50		19:22 (83)	07:19		07:45 (28)	07:49		08:36 (33)	07:24		15:21 (108)	07:52		15:44 (108)
	21:02	59	20:01 (83)	20:29	12	19:34 (83)	19:38	18	08:03 (28)	18:51	42	17:04 (108)	17:16	61	16:22 (108)	17:11	36	16:20 (108)
20	06:22		19:02 (83)	06:50			07:20		07:48 (28)	07:50		08:34 (33)	07:25		15:21 (108)	07:53		15:45 (108)
	21:01	60	20:02 (83)	20:27			19:37	11	07:59 (28)	18:49	52	17:07 (108)	17:15	61	16:22 (108)	17:12	35	16:20 (108)
21	06:23		19:01 (83)	06:51			07:21			07:51		08:32 (33)	07:27		15:22 (108)	07:53		15:45 (108)
	21:00	60	20:01 (83)	20:26			19:35			18:48	59	17:09 (108)	17:15	60	16:22 (108)	17:12	35	16:20 (108)
22	06:23		19:01 (83)	06:52			07:22			07:52		08:32 (33)	07:28		15:22 (108)	07:54		15:46 (108)
	21:00	60	20:01 (83)	20:25			19:33			18:46	65	17:11 (108)	17:14	59	16:21 (108)	17:13	35	16:21 (108)
23	06:24		19:01 (83)	06:53			07:23			07:53		08:30 (33)	07:29		15:23 (108)	07:54		15:46 (108)
	20:59	61	20:02 (83)	20:23			19:32			18:45	72	17:13 (108)	17:14	58	16:21 (108)	17:13	35	16:21 (108)
24	06:25		19:02 (83)	06:54			07:24			07:55		08:30 (33)	07:30		15:24 (108)	07:55		15:46 (108)
	20:58	60	20:02 (83)	20:22			19:30			18:44	75	17:14 (108)	17:13	58	16:22 (108)	17:14	35	16:21 (108)
25	06:26		19:02 (83)	06:55			07:25			07:56		08:29 (33)	07:31		15:25 (108)	07:55		15:47 (108)
	20:57	60	20:02 (83)	20:20			19:28			18:42	80	17:15 (108)	17:12	56	16:21 (108)	17:14	36	16:23 (108)
26	06:27		19:02 (83)	06:56			07:26			07:57		08:28 (33)	07:32		15:25 (108)	07:56		15:47 (108)
	20:57	60	20:02 (83)	20:19			19:27			18:41	82	17:15 (108)	17:12	56	16:21 (108)	17:15	36	16:23 (108)
27	06:28		19:01 (83)	06:57		07:57 (28)	07:27			07:58		08:28 (33)	07:33		15:26 (108)	07:56		15:47 (108)
	20:56	60	20:01 (83)	20:17	9	08:06 (28)	19:25			18:40	85	17:16 (108)	17:12	55	16:21 (108)	17:16	36	16:23 (108)
28	06:29		19:01 (83)	06:58		07:53 (28)	07:28			07:59		08:28 (33)	07:34		15:27 (108)	07:56		15:48 (108)
	20:55	60	20:01 (83)	20:16	17	08:10 (28)	19:23			18:38	88	17:18 (108)	17:11	53	16:20 (108)	17:16	37	16:25 (108)
29	06:30		19:02 (83)	06:59		07:49 (28)	07:29			08:00		08:28 (33)	07:35		15:27 (108)	07:57		15:48 (108)
	20:54	59	20:01 (83)	20:14	22	08:11 (28)	19:22			18:37	89	17:18 (108)	17:11	53	16:20 (108)	17:17	38	16:26 (108)
30	06:31		19:02 (83)	07:00		07:47 (28)	07:30			08:01		08:28 (33)	07:36		15:28 (108)	07:57		15:48 (108)
	20:53	59	20:01 (83)	20:13	25	08:12 (28)	19:20			18:36	90	17:19 (108)	17:10	52	16:20 (108)	17:18	38	16:26 (108)
31	06:31		19:02 (83)	07:01		07:46 (28)				08:02		08:28 (33)				07:57		15:48 (108)
	20:52	59	20:01 (83)	20:11	27	08:13 (28)				18:35	91	17:19 (108)				17:19	39	16:27 (108)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		1789			942			633			1002			2068			1228	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.63			0.64			0.66			0.65			0.67			0.68	
Total reduction		0.38			0.38			0.40			0.37			0.25			0.34	
Total, real		684			362			256			369			515			417	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 37

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative **Shadow receptor:** 3417 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6536)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March	April	May	June		
1	07:58		15:53 (133)	07:45		15:56 (133)	07:10	07:20	06:36	06:08		
	17:20	51	16:44 (133)	17:53	66	17:02 (133)	18:26	19:59	20:28	20:57		
2	07:58		15:53 (133)	07:44		15:56 (133)	07:08	07:19	06:35	06:08		
	17:21	51	16:44 (133)	17:55	66	17:02 (133)	18:27	20:00	20:29	20:58		
3	07:58		15:53 (133)	07:43		15:57 (133)	07:07	07:17	06:33	06:07		
	17:22	52	16:45 (133)	17:56	65	17:02 (133)	18:28	20:00	20:30	20:59		
4	07:58		15:53 (133)	07:42		15:57 (133)	07:05	07:16	06:32	06:07		
	17:22	53	16:46 (133)	17:57	65	17:02 (133)	18:30	20:01	20:31	20:59		
5	07:58		15:53 (133)	07:41		15:58 (133)	07:04	07:14	06:31	06:07		
	17:23	54	16:47 (133)	17:58	64	17:02 (133)	18:31	20:02	20:33	21:00		
6	07:58		15:52 (133)	07:40		15:58 (133)	07:02	07:12	06:30	06:06		07:20 (87)
	17:24	55	16:47 (133)	17:59	63	17:01 (133)	18:32	20:03	20:34	21:01	4	07:24 (87)
7	07:58		15:53 (133)	07:39		15:58 (133)	07:01	07:11	06:29	06:06		07:15 (87)
	17:25	55	16:48 (133)	18:01	62	17:00 (133)	18:33	20:04	20:35	21:01	14	07:29 (87)
8	07:58		15:53 (133)	07:38		15:59 (133)	07:59	07:09	06:28	06:06		07:12 (87)
	17:26	56	16:49 (133)	18:02	61	17:00 (133)	19:34	20:05	20:36	21:02	19	07:31 (87)
9	07:58		15:53 (133)	07:36		16:00 (133)	07:58	07:08	06:26	06:06		07:11 (87)
	17:27	57	16:50 (133)	18:03	60	17:00 (133)	19:35	20:06	20:37	21:02	22	07:33 (87)
10	07:57		15:53 (133)	07:35		16:01 (133)	07:56	07:06	06:25	06:06		07:10 (87)
	17:28	58	16:51 (133)	18:04	58	16:59 (133)	19:36	20:07	20:38	21:03	25	07:35 (87)
11	07:57		15:53 (133)	07:34		16:02 (133)	07:54	07:04	06:24	06:05		07:09 (87)
	17:29	58	16:51 (133)	18:05	57	16:59 (133)	19:37	20:08	20:38	21:04	27	07:36 (87)
12	07:57		15:53 (133)	07:33		16:02 (133)	07:53	07:03	06:23	06:05		07:08 (87)
	17:30	59	16:52 (133)	18:07	55	16:57 (133)	19:38	20:09	20:39	21:04	29	07:37 (87)
13	07:57		15:53 (133)	07:32		16:04 (133)	07:51	07:01	06:22	06:05		07:08 (87)
	17:31	60	16:53 (133)	18:08	53	16:57 (133)	19:39	20:10	20:40	21:05	30	07:38 (87)
14	07:56		15:53 (133)	07:30		16:05 (133)	07:50	07:00	06:21	06:05		07:07 (87)
	17:32	60	16:53 (133)	18:09	51	16:56 (133)	19:40	20:11	20:41	21:05	32	07:39 (87)
15	07:56		15:53 (133)	07:29		16:07 (133)	07:48	06:58	06:20	06:05		07:07 (87)
	17:33	61	16:54 (133)	18:10	48	16:55 (133)	19:41	20:12	20:42	21:06	33	07:40 (87)
16	07:56		15:53 (133)	07:28		16:07 (133)	07:46	06:57	06:19	06:05		07:07 (87)
	17:35	61	16:54 (133)	18:11	46	16:53 (133)	19:42	20:13	20:43	21:06	33	07:40 (87)
17	07:55		15:53 (133)	07:27		16:09 (133)	07:45	06:55	06:18	06:05		07:07 (87)
	17:36	63	16:56 (133)	18:13	43	16:52 (133)	19:43	20:14	20:44	21:06	34	07:41 (87)
18	07:55		15:53 (133)	07:25		16:12 (133)	07:43	06:54	06:18	06:05		07:06 (87)
	17:37	63	16:56 (133)	18:14	39	16:51 (133)	19:44	20:15	20:45	21:07	35	07:41 (87)
19	07:54		15:53 (133)	07:24		16:13 (133)	07:41	06:52	06:17	06:06		07:06 (87)
	17:38	64	16:57 (133)	18:15	35	16:48 (133)	19:46	20:16	20:46	21:07	36	07:42 (87)
20	07:54		15:53 (133)	07:23		16:16 (133)	07:40	06:51	06:16	06:06		07:07 (87)
	17:39	64	16:57 (133)	18:16	30	16:46 (133)	19:47	20:17	20:47	21:07	36	07:43 (87)
21	07:53		15:54 (133)	07:21		16:20 (133)	07:38	06:49	06:15	06:06		07:07 (87)
	17:40	64	16:58 (133)	18:17	23	16:43 (133)	19:48	20:18	20:48	21:08	36	07:43 (87)
22	07:52		15:53 (133)	07:20		16:24 (133)	07:37	06:48	06:14	06:06		07:07 (87)
	17:41	66	16:59 (133)	18:18	14	16:38 (133)	19:49	20:19	20:49	21:08	36	07:43 (87)
23	07:52		15:53 (133)	07:19			07:35	06:47	06:14	06:06		07:07 (87)
	17:43	66	16:59 (133)	18:19			19:50	20:20	20:50	21:08	36	07:43 (87)
24	07:51		15:54 (133)	07:17			07:33	06:45	06:13	06:07		07:08 (87)
	17:44	66	17:00 (133)	18:21			19:51	20:21	20:51	21:08	35	07:43 (87)
25	07:50		15:54 (133)	07:16			07:32	06:44	06:12	06:07		07:08 (87)
	17:45	66	17:00 (133)	18:22			19:52	20:22	20:52	21:08	35	07:43 (87)
26	07:50		15:54 (133)	07:14			07:30	06:42	06:12	06:07		07:09 (87)
	17:46	66	17:00 (133)	18:23			19:53	20:23	20:52	21:08	34	07:43 (87)
27	07:49		15:54 (133)	07:13			07:28	06:41	06:11	06:08		07:10 (87)
	17:47	66	17:00 (133)	18:24			19:54	20:24	20:53	21:09	33	07:43 (87)
28	07:48		15:54 (133)	07:11			07:27	06:40	06:10	06:08		07:10 (87)
	17:48	66	17:00 (133)	18:25			19:55	20:25	20:54	21:09	32	07:42 (87)
29	07:47		15:54 (133)				07:25	06:38	06:10	06:08		07:11 (87)
	17:50	67	17:01 (133)				19:56	20:26	20:55	21:09	31	07:42 (87)
30	07:46		15:55 (133)				07:24	06:37	06:09	06:09		07:12 (87)
	17:51	67	17:02 (133)				19:57	20:27	20:56	21:09	30	07:42 (87)
31	07:46		15:56 (133)				07:22		06:09			
	17:52	66	17:02 (133)				19:58		20:56			
Potential sun hours	300			299			370	397	446	449		
Total, worst case		1881			1124						747	
Sun reduction		0.36			0.42						0.60	
Oper. time red.		1.00			1.00						1.00	
Wind dir. red.		0.68			0.68						0.68	
Total reduction		0.24			0.28						0.41	
Total, real		457			319						306	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 38

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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative **Shadow receptor:** 3417 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6536)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August	September	October			November			December		
1	06:09		07:13 (87)	06:32	07:02	07:31			07:04		15:31 (133)	07:38		15:35 (133)
	21:09	28	07:41 (87)	20:51	20:10	19:19			17:33	58	16:29 (133)	17:10	58	16:33 (133)
2	06:10		07:15 (87)	06:33	07:03	07:32			07:05		15:30 (133)	07:39		15:35 (133)
	21:08	25	07:40 (87)	20:50	20:08	19:17			17:32	60	16:30 (133)	17:10	58	16:33 (133)
3	06:10		07:16 (87)	06:34	07:04	07:33			07:06		15:29 (133)	07:40		15:36 (133)
	21:08	23	07:39 (87)	20:49	20:06	19:15			17:31	61	16:30 (133)	17:10	57	16:33 (133)
4	06:11		07:18 (87)	06:35	07:05	07:34			07:07		15:28 (133)	07:41		15:37 (133)
	21:08	20	07:38 (87)	20:48	20:05	19:14			17:30	62	16:30 (133)	17:10	56	16:33 (133)
5	06:11		07:19 (87)	06:36	07:06	07:35			07:08		15:27 (133)	07:41		15:38 (133)
	21:08	16	07:35 (87)	20:47	20:03	19:12			17:29	63	16:30 (133)	17:10	55	16:33 (133)
6	06:12		07:23 (87)	06:37	07:07	07:36			07:09		15:28 (133)	07:42		15:38 (133)
	21:08	10	07:33 (87)	20:46	20:02	19:11			17:28	63	16:31 (133)	17:09	55	16:33 (133)
7	06:12			06:38	07:08	07:37			07:11		15:27 (133)	07:43		15:39 (133)
	21:08			20:44	20:00	19:09			17:27	65	16:32 (133)	17:09	54	16:33 (133)
8	06:13			06:39	07:09	07:38			07:12		15:27 (133)	07:44		15:40 (133)
	21:07			20:43	19:57	19:07			17:26	65	16:32 (133)	17:09	53	16:33 (133)
9	06:14			06:40	07:10	07:39			07:13		15:26 (133)	07:45		15:41 (133)
	21:07			20:42	19:55	19:06			17:25	66	16:32 (133)	17:09	52	16:33 (133)
10	06:14			06:41	07:11	07:40			07:14		15:27 (133)	07:46		15:42 (133)
	21:07			20:41	19:53	19:04			17:24	66	16:33 (133)	17:09	52	16:34 (133)
11	06:15			06:42	07:12	07:41			07:15		15:26 (133)	07:47		15:43 (133)
	21:06			20:40	19:52	19:03			17:23	67	16:33 (133)	17:10	51	16:34 (133)
12	06:16			06:43	07:12	07:42			07:16		15:26 (133)	07:48		15:44 (133)
	21:06			20:38	19:50	19:01			17:22	67	16:33 (133)	17:10	50	16:34 (133)
13	06:16			06:44	07:13	07:43			07:18		15:26 (133)	07:48		15:44 (133)
	21:05			20:37	19:48	19:00			17:21	67	16:33 (133)	17:10	50	16:34 (133)
14	06:17			06:45	07:14	07:44			07:19		15:27 (133)	07:49		15:45 (133)
	21:05			20:36	19:47	18:58			17:20	66	16:33 (133)	17:10	49	16:34 (133)
15	06:18			06:46	07:15	07:45			07:20		15:27 (133)	07:50		15:46 (133)
	21:04			20:34	19:45	18:57			17:19	66	16:33 (133)	17:10	49	16:35 (133)
16	06:19			06:47	07:16	07:46			07:21		15:27 (133)	07:51		15:46 (133)
	21:04			20:33	19:43	18:55			17:18	66	16:33 (133)	17:11	48	16:34 (133)
17	06:19			06:48	07:17	07:47			07:22		15:27 (133)	07:51		15:47 (133)
	21:03			20:32	19:42	18:54			17:18	66	16:33 (133)	17:11	48	16:35 (133)
18	06:20			06:49	07:18	07:48			07:23		15:28 (133)	07:52		15:48 (133)
	21:03			20:30	19:40	18:52			17:17	66	16:34 (133)	17:11	47	16:35 (133)
19	06:21			06:50	07:19	07:49			07:24		15:28 (133)	07:52		15:48 (133)
	21:02			20:29	19:39	18:51			17:16	66	16:34 (133)	17:12	47	16:35 (133)
20	06:22			06:51	07:20	07:50		16:52 (133)	07:26		15:28 (133)	07:53		15:49 (133)
	21:01			20:28	19:37	18:49	18	17:10 (133)	17:15	66	16:34 (133)	17:12	47	16:36 (133)
21	06:23			06:52	07:21	07:51		16:49 (133)	07:27		15:29 (133)	07:54		15:49 (133)
	21:01			20:26	19:35	18:48	26	17:15 (133)	17:15	64	16:33 (133)	17:12	47	16:36 (133)
22	06:24			06:52	07:22	07:53		16:46 (133)	07:28		15:29 (133)	07:54		15:50 (133)
	21:00			20:25	19:34	18:46	31	17:17 (133)	17:14	64	16:33 (133)	17:13	47	16:37 (133)
23	06:24			06:53	07:23	07:54		16:43 (133)	07:29		15:29 (133)	07:55		15:50 (133)
	20:59			20:23	19:32	18:45	36	17:19 (133)	17:14	64	16:33 (133)	17:13	47	16:37 (133)
24	06:25			06:54	07:24	07:55		16:41 (133)	07:30		15:31 (133)	07:55		15:51 (133)
	20:58			20:22	19:30	18:44	40	17:21 (133)	17:13	63	16:34 (133)	17:14	47	16:38 (133)
25	06:26			06:55	07:25	07:56		16:39 (133)	07:31		15:31 (133)	07:55		15:51 (133)
	20:58			20:20	19:29	18:42	43	17:22 (133)	17:13	63	16:34 (133)	17:15	47	16:38 (133)
26	06:27			06:56	07:26	07:57		16:37 (133)	07:32		15:32 (133)	07:56		15:51 (133)
	20:57			20:19	19:27	18:41	46	17:23 (133)	17:12	61	16:33 (133)	17:15	48	16:39 (133)
27	06:28			06:57	07:27	07:58		16:36 (133)	07:33		15:32 (133)	07:56		15:52 (133)
	20:56			20:17	19:25	18:40	49	17:25 (133)	17:12	61	16:33 (133)	17:16	48	16:40 (133)
28	06:29			06:58	07:28	07:59		16:35 (133)	07:34		15:33 (133)	07:57		15:52 (133)
	20:55			20:16	19:24	18:38	51	17:26 (133)	17:11	60	16:33 (133)	17:17	48	16:40 (133)
29	06:30			06:59	07:29	08:00		16:33 (133)	07:35		15:33 (133)	07:57		15:52 (133)
	20:54			20:14	19:22	18:37	54	17:27 (133)	17:11	60	16:33 (133)	17:17	49	16:41 (133)
30	06:31			07:00	07:30	08:01		16:32 (133)	07:36		15:34 (133)	07:57		15:52 (133)
	20:53			20:13	19:20	18:36	55	17:27 (133)	17:11	59	16:33 (133)	17:18	49	16:41 (133)
31	06:32			07:01		08:03		16:31 (133)				07:57		15:52 (133)
	20:52			20:11		18:35	57	17:28 (133)				17:19	50	16:42 (133)
Potential sun hours	456			427	374	346			300			291		
Total, worst case		122					506			1911			1563	
Sun reduction		0.60					0.56			0.37			0.50	
Oper. time red.		1.00					1.00			1.00			1.00	
Wind dir. red.		0.68					0.68			0.68			0.68	
Total reduction		0.41					0.38			0.25			0.34	
Total, real		50					191			477			528	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 39

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative **Shadow receptor:** 3426 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6538)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January	February			March			April			May			June		
1	07:57	07:44			07:09		08:07 (22)	07:20			06:36		06:55 (129)	06:08		06:57 (129)
	17:19	17:53			18:26	40	18:00 (21)	19:59			20:28	20	07:15 (129)	20:57	43	20:26 (18)
2	07:57	07:43			07:08		08:11 (22)	07:18			06:34		06:54 (129)	06:08		06:59 (129)
	17:20	17:54			18:27	32	18:00 (21)	20:00			20:29	22	07:16 (129)	20:58	39	20:26 (18)
3	07:57	07:42		08:11 (22)	07:06		17:35 (21)	07:17			06:33		06:53 (129)	06:07		07:00 (129)
	17:21	17:55	9	08:20 (22)	18:28	25	18:00 (21)	20:00			20:30	25	07:18 (129)	20:58	37	20:26 (18)
4	07:57	07:41		08:07 (22)	07:05		17:35 (21)	07:15			06:32		06:51 (129)	06:07		07:02 (129)
	17:22	17:57	17	08:24 (22)	18:29	25	18:00 (21)	20:01			20:31	27	07:18 (129)	20:59	33	20:26 (18)
5	07:57	07:40		08:05 (22)	07:03		17:35 (21)	07:14			06:31		06:50 (129)	06:06		20:00 (18)
	17:23	17:58	21	08:26 (22)	18:30	24	17:59 (21)	20:02			20:32	29	07:19 (129)	21:00	27	20:27 (18)
6	07:57	07:39		08:04 (22)	07:02		17:35 (21)	07:12			06:29		06:49 (129)	06:06		20:00 (18)
	17:24	17:59	24	08:28 (22)	18:31	24	17:59 (21)	20:03			20:33	30	07:19 (129)	21:00	27	20:27 (18)
7	07:57	07:38		08:03 (22)	07:00		17:36 (21)	07:10			06:28		06:48 (129)	06:06		20:00 (18)
	17:25	18:00	27	08:30 (22)	18:32	21	17:57 (21)	20:04			20:34	32	07:20 (129)	21:01	26	20:26 (18)
8	07:57	07:37		08:02 (22)	07:59		18:37 (21)	07:09			06:27		06:48 (129)	06:06		20:00 (18)
	17:26	18:01	29	08:31 (22)	19:34	20	18:57 (21)	20:05			20:35	32	07:20 (129)	21:02	27	20:27 (18)
9	07:57	07:36		08:01 (22)	07:57		18:38 (21)	07:07			06:26		06:48 (129)	06:05		20:01 (18)
	17:27	18:03	31	08:32 (22)	19:35	16	18:54 (21)	20:06			20:36	33	07:21 (129)	21:02	26	20:27 (18)
10	07:57	07:35		08:00 (22)	07:56		18:40 (21)	07:06			06:25		06:47 (129)	06:05		20:01 (18)
	17:28	18:04	34	08:34 (22)	19:36	13	18:53 (21)	20:07			20:37	34	07:21 (129)	21:03	26	20:27 (18)
11	07:57	07:34		07:59 (22)	07:54		18:44 (21)	07:04			06:24		06:47 (129)	06:05		20:02 (18)
	17:29	18:05	35	08:34 (22)	19:37	4	18:48 (21)	20:08			20:38	34	07:21 (129)	21:03	26	20:28 (18)
12	07:57	07:33		07:58 (22)	07:52			07:03			06:23		06:47 (129)	06:05		20:02 (18)
	17:30	18:06	36	08:34 (22)	19:38			20:09			20:39	34	07:21 (129)	21:04	26	20:28 (18)
13	07:56	07:31		07:58 (22)	07:51			07:01			06:22		06:47 (129)	06:05		20:02 (18)
	17:31	18:07	37	08:35 (22)	19:39			20:10			20:40	34	07:21 (129)	21:04	26	20:28 (18)
14	07:56	07:30		07:58 (22)	07:49			07:00			06:21		06:47 (129)	06:05		20:02 (18)
	17:32	18:09	38	08:36 (22)	19:40			20:11			20:41	34	07:21 (129)	21:05	26	20:28 (18)
15	07:56	07:29		07:57 (22)	07:48			06:58			06:20		06:47 (129)	06:05		20:03 (18)
	17:33	18:10	38	08:35 (22)	19:41			20:12			20:42	34	07:21 (129)	21:05	25	20:28 (18)
16	07:55	07:28		07:57 (22)	07:46			06:56			06:19		06:47 (129)	06:05		20:03 (18)
	17:34	18:11	39	08:36 (22)	19:42			20:13			20:43	34	07:21 (129)	21:06	25	20:28 (18)
17	07:55	07:26		07:57 (22)	07:44			06:55			06:18		06:47 (129)	06:05		20:03 (18)
	17:35	18:12	39	08:36 (22)	19:43			20:14			20:44	40	20:14 (18)	21:06	25	20:28 (18)
18	07:54	07:25		07:56 (22)	07:43			06:54			06:17		06:48 (129)	06:05		20:03 (18)
	17:36	18:13	39	08:35 (22)	19:44			20:15			20:45	45	20:18 (18)	21:06	25	20:28 (18)
19	07:54	07:24		07:57 (22)	07:41			06:52			06:16		06:48 (129)	06:05		20:03 (18)
	17:38	18:15	38	08:35 (22)	19:45			20:16			20:46	47	20:19 (18)	21:07	26	20:29 (18)
20	07:53	07:22		07:57 (22)	07:40			06:51			06:16		06:48 (129)	06:05		20:03 (18)
	17:39	18:16	38	08:35 (22)	19:46			20:17			20:47	49	20:20 (18)	21:07	26	20:29 (18)
21	07:53	07:21		07:57 (22)	07:38			06:49			06:15		06:48 (129)	06:06		20:04 (18)
	17:40	18:17	37	08:34 (22)	19:47			20:18			20:48	51	20:21 (18)	21:07	25	20:29 (18)
22	07:52	07:20		07:58 (22)	07:36			06:48			06:14		06:49 (129)	06:06		20:04 (18)
	17:41	18:18	36	08:34 (22)	19:48			20:19			20:49	52	20:22 (18)	21:07	26	20:30 (18)
23	07:52	07:18		07:58 (22)	07:35			06:46			06:13		06:49 (129)	06:06		20:04 (18)
	17:42	18:19	39	17:50 (21)	19:49			20:20			20:49	52	20:23 (18)	21:08	26	20:30 (18)
24	07:51	07:17		07:59 (22)	07:33			06:45			06:13		06:50 (129)	06:06		20:04 (18)
	17:43	18:20	46	17:55 (21)	19:50			20:21			20:50	51	20:23 (18)	21:08	25	20:29 (18)
25	07:50	07:15		08:00 (22)	07:31			06:44			06:12		06:51 (129)	06:07		20:05 (18)
	17:45	18:21	47	17:57 (21)	19:51			20:22			20:51	51	20:24 (18)	21:08	25	20:30 (18)
26	07:49	07:14		08:01 (22)	07:30			06:42			06:11		06:51 (129)	06:07		20:05 (18)
	17:46	18:23	48	17:58 (21)	19:52			20:23			20:52	51	20:24 (18)	21:08	25	20:30 (18)
27	07:49	07:12		08:03 (22)	07:28			06:41			06:11		06:52 (129)	06:07		20:05 (18)
	17:47	18:24	46	17:59 (21)	19:53			20:24			20:53	49	20:24 (18)	21:08	25	20:30 (18)
28	07:48	07:11		08:04 (22)	07:26			06:39			06:10		06:53 (129)	06:08		20:06 (18)
	17:48	18:25	45	17:59 (21)	19:54			20:25			20:54	49	20:25 (18)	21:08	25	20:31 (18)
29	07:47				07:25			06:38		07:00 (129)	06:09		06:53 (129)	06:08		20:05 (18)
	17:49				19:55			20:26	9	07:09 (129)	20:54	48	20:25 (18)	21:08	26	20:31 (18)
30	07:46				07:23			06:37		06:57 (129)	06:09		06:55 (129)	06:08		20:05 (18)
	17:51				19:57			20:27	16	07:13 (129)	20:55	46	20:25 (18)	21:08	26	20:31 (18)
31	07:45				07:22						06:08		06:56 (129)			
	17:52				19:58						20:56	44	20:26 (18)			
Potential sun hours	300	299			370			397			446			449		
Total, worst case			913			244			25			1213			821	
Sun reduction			0.42			0.44			0.51			0.56			0.60	
Oper. time red.			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.			0.63			0.67			0.68			0.66			0.63	
Total reduction			0.26			0.29			0.35			0.37			0.38	
Total, real			241			71			9			450			309	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 40

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative **Shadow receptor:** 3426 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6538)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September	October			November			December
1	06:09		20:06 (18)	06:32		06:57 (129)	07:02	07:30			07:03		07:29 (22)	07:37
	21:08	26	20:32 (18)	20:51	35	07:32 (129)	20:09	19:18			17:33	33	08:02 (22)	17:10
2	06:09		20:05 (18)	06:33		06:58 (129)	07:03	07:31			07:05		07:30 (22)	07:38
	21:08	26	20:31 (18)	20:50	34	07:32 (129)	20:08	19:17			17:32	31	08:01 (22)	17:10
3	06:10		20:06 (18)	06:34		06:57 (129)	07:04	07:32		18:19 (21)	07:06		07:32 (22)	07:39
	21:08	26	20:32 (18)	20:49	34	07:31 (129)	20:06	19:15	10	18:29 (21)	17:31	29	08:01 (22)	17:10
4	06:10		20:06 (18)	06:35		06:57 (129)	07:05	07:33		18:16 (21)	07:07		07:33 (22)	07:40
	21:08	26	20:32 (18)	20:48	33	07:30 (129)	20:04	19:13	15	18:31 (21)	17:30	26	07:59 (22)	17:09
5	06:11		20:06 (18)	06:36		06:58 (129)	07:06	07:34		18:14 (21)	07:08		07:34 (22)	07:41
	21:08	27	20:33 (18)	20:46	32	07:30 (129)	20:03	19:12	19	18:33 (21)	17:28	24	07:58 (22)	17:09
6	06:12		20:07 (18)	06:37		06:58 (129)	07:06	07:35		18:13 (21)	07:09		07:35 (22)	07:42
	21:07	26	20:33 (18)	20:45	31	07:29 (129)	20:01	19:10	20	18:33 (21)	17:27	21	07:56 (22)	17:09
7	06:12		20:06 (18)	06:38		06:59 (129)	07:07	07:36		18:11 (21)	07:10		07:39 (22)	07:43
	21:07	27	20:33 (18)	20:44	30	07:29 (129)	20:00	19:09	23	18:34 (21)	17:26	15	07:54 (22)	17:09
8	06:13		07:11 (129)	06:39		07:00 (129)	07:08	07:37		18:10 (21)	07:11		07:42 (22)	07:44
	21:07	30	20:34 (18)	20:43	28	07:28 (129)	19:56	19:07	24	18:34 (21)	17:25	8	07:50 (22)	17:09
9	06:13		07:08 (129)	06:40		07:01 (129)	07:09	07:38		18:10 (21)	07:13			07:45
	21:07	36	20:33 (18)	20:42	26	07:27 (129)	19:55	19:05	24	18:34 (21)	17:24			17:09
10	06:14		07:07 (129)	06:41		07:02 (129)	07:10	07:40		18:09 (21)	07:14			07:46
	21:06	39	20:34 (18)	20:41	24	07:26 (129)	19:53	19:04	25	18:34 (21)	17:23			17:09
11	06:15		07:06 (129)	06:42		07:03 (129)	07:11	07:41		18:09 (21)	07:15			07:46
	21:06	41	20:34 (18)	20:39	22	07:25 (129)	19:51	19:02	25	18:34 (21)	17:22			17:09
12	06:15		07:04 (129)	06:43		07:04 (129)	07:12	07:42		08:42 (22)	07:16			07:47
	21:05	43	20:33 (18)	20:38	19	07:23 (129)	19:50	19:01	36	18:33 (21)	17:21			17:09
13	06:16		07:04 (129)	06:44		07:06 (129)	07:13	07:43		08:38 (22)	07:17			07:48
	21:05	45	20:34 (18)	20:37	15	07:21 (129)	19:48	18:59	43	18:33 (21)	17:21			17:09
14	06:17		07:03 (129)	06:44		07:09 (129)	07:14	07:44		08:36 (22)	07:18			07:49
	21:05	47	20:34 (18)	20:35	6	07:15 (129)	19:46	18:58	46	18:32 (21)	17:20			17:10
15	06:18		07:03 (129)	06:45			07:15	07:45		08:35 (22)	07:20			07:50
	21:04	48	20:34 (18)	20:34			19:45	18:56	46	18:31 (21)	17:19			17:10
16	06:18		07:01 (129)	06:46			07:16	07:46		08:33 (22)	07:21			07:50
	21:03	49	20:33 (18)	20:33			19:43	18:55	48	18:30 (21)	17:18			17:10
17	06:19		07:01 (129)	06:47			07:17	07:47		08:32 (22)	07:22			07:51
	21:03	50	20:34 (18)	20:31			19:42	18:53	46	18:28 (21)	17:17			17:11
18	06:20		07:01 (129)	06:48			07:18	07:48		08:30 (22)	07:23			07:52
	21:02	51	20:34 (18)	20:30			19:40	18:52	44	18:25 (21)	17:17			17:11
19	06:21		07:00 (129)	06:49			07:19	07:49		08:29 (22)	07:24			07:52
	21:02	51	20:33 (18)	20:29			19:38	18:50	36	09:05 (22)	17:16			17:11
20	06:22		06:59 (129)	06:50			07:20	07:50		08:28 (22)	07:25			07:53
	21:01	51	20:32 (18)	20:27			19:37	18:49	37	09:05 (22)	17:15			17:12
21	06:22		06:59 (129)	06:51			07:21	07:51		08:28 (22)	07:26			07:53
	21:00	51	20:32 (18)	20:26			19:35	18:48	37	09:05 (22)	17:14			17:12
22	06:23		06:59 (129)	06:52			07:22	07:52		08:27 (22)	07:28			07:54
	21:00	50	20:31 (18)	20:24			19:33	18:46	38	09:05 (22)	17:14			17:13
23	06:24		06:59 (129)	06:53			07:23	07:53		08:28 (22)	07:29			07:54
	20:59	49	20:31 (18)	20:23			19:32	18:45	38	09:06 (22)	17:13			17:13
24	06:25		06:58 (129)	06:54			07:24	07:54		08:27 (22)	07:30			07:55
	20:58	49	20:30 (18)	20:21			19:30	18:43	39	09:06 (22)	17:13			17:14
25	06:26		06:58 (129)	06:55			07:25	07:56		08:27 (22)	07:31			07:55
	20:57	47	20:29 (18)	20:20			19:28	18:42	39	09:06 (22)	17:12			17:14
26	06:27		06:57 (129)	06:56			07:26	07:57		08:27 (22)	07:32			07:56
	20:56	44	20:26 (18)	20:18			19:27	18:41	38	09:05 (22)	17:12			17:15
27	06:28		06:57 (129)	06:57			07:27	07:58		08:27 (22)	07:33			07:56
	20:55	36	20:22 (18)	20:17			19:25	18:39	38	09:05 (22)	17:11			17:16
28	06:29		06:57 (129)	06:58			07:27	07:59		08:27 (22)	07:34			07:56
	20:55	34	07:31 (129)	20:15			19:23	18:38	37	09:04 (22)	17:11			17:16
29	06:29		06:57 (129)	06:59			07:28	08:00		08:28 (22)	07:35			07:56
	20:54	35	07:32 (129)	20:14			19:22	18:37	37	09:05 (22)	17:11			17:17
30	06:30		06:57 (129)	07:00			07:29	08:01		08:28 (22)	07:36			07:57
	20:53	35	07:32 (129)	20:12			19:20	18:36	36	09:04 (22)	17:10			17:18
31	06:31		06:57 (129)	07:01				08:02		08:28 (22)				07:57
	20:52	35	07:32 (129)	20:11				18:34	35	09:03 (22)				17:18
Potential sun hours	456			427			374	346			300			291
Total, worst case		1230			369				979			187		
Sun reduction		0.60			0.60				0.56			0.37		
Oper. time red.		1.00			1.00				1.00			1.00		
Wind dir. red.		0.65			0.68				0.64			0.62		
Total reduction		0.39			0.41				0.36			0.23		
Total, real		480			150				350			43		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

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3/2/2012 10:01 AM / 41

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative **Shadow receptor:** 3429 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6541)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April	May	June
1	07:57		09:36 (129)	07:44		09:35 (129)	07:09		09:40 (129)	07:20	06:36	06:08
	17:19	92	11:08 (129)	17:53	114	11:29 (129)	18:26	93	11:13 (129)	19:59	20:28	20:57
2	07:57		09:36 (129)	07:43		09:35 (129)	07:08		09:40 (129)	07:18	06:34	06:08
	17:20	92	11:08 (129)	17:54	114	11:29 (129)	18:27	91	11:11 (129)	20:00	20:29	20:58
3	07:57		09:36 (129)	07:42		09:34 (129)	07:06		09:41 (129)	07:17	06:33	06:07
	17:21	93	11:09 (129)	17:55	116	11:30 (129)	18:28	88	11:09 (129)	20:00	20:30	20:58
4	07:57		09:36 (129)	07:41		09:34 (129)	07:05		09:42 (129)	07:15	06:32	06:07
	17:22	94	11:10 (129)	17:57	116	11:30 (129)	18:29	85	11:07 (129)	20:01	20:31	20:59
5	07:57		09:37 (129)	07:40		09:34 (129)	07:03		09:42 (129)	07:14	06:31	06:06
	17:23	94	11:11 (129)	17:58	116	11:30 (129)	18:30	82	11:04 (129)	20:02	20:32	21:00
6	07:57		09:37 (129)	07:39		09:35 (129)	07:02		09:43 (129)	07:12	06:29	06:06
	17:24	95	11:12 (129)	17:59	115	11:30 (129)	18:31	79	11:02 (129)	20:03	20:33	21:00
7	07:57		09:37 (129)	07:38		09:35 (129)	07:00		09:44 (129)	07:10	06:28	06:06
	17:25	96	11:13 (129)	18:00	116	11:31 (129)	18:32	75	10:59 (129)	20:04	20:34	21:01
8	07:57		09:37 (129)	07:37		09:35 (129)	07:59		10:46 (129)	07:09	06:27	06:06
	17:26	97	11:14 (129)	18:01	116	11:31 (129)	19:34	71	11:57 (129)	20:05	20:35	21:02
9	07:57		09:37 (129)	07:36		09:35 (129)	07:57		10:46 (129)	07:07	06:26	06:05
	17:27	98	11:15 (129)	18:03	116	11:31 (129)	19:35	67	11:53 (129)	20:06	20:36	21:02
10	07:57		09:37 (129)	07:35		09:35 (129)	07:56		10:48 (129)	07:06	06:25	06:05
	17:28	98	11:15 (129)	18:04	116	11:31 (129)	19:36	63	11:51 (129)	20:07	20:37	21:03
11	07:57		09:37 (129)	07:34		09:34 (129)	07:54		10:49 (129)	07:04	06:24	06:05
	17:29	99	11:16 (129)	18:05	116	11:30 (129)	19:37	58	11:47 (129)	20:08	20:38	21:03
12	07:57		09:37 (129)	07:33		09:35 (129)	07:52		10:51 (129)	07:03	06:23	06:05
	17:30	100	11:17 (129)	18:06	115	11:30 (129)	19:38	52	11:43 (129)	20:09	20:39	21:04
13	07:56		09:36 (129)	07:31		09:35 (129)	07:51		10:53 (129)	07:01	06:22	06:05
	17:31	101	11:17 (129)	18:07	115	11:30 (129)	19:39	46	11:39 (129)	20:10	20:40	21:04
14	07:56		09:37 (129)	07:30		09:35 (129)	07:49		10:56 (129)	06:59	06:21	06:05
	17:32	101	11:18 (129)	18:09	115	11:30 (129)	19:40	39	11:35 (129)	20:11	20:41	21:05
15	07:56		09:37 (129)	07:29		09:35 (129)	07:48		10:58 (129)	06:58	06:20	06:05
	17:33	102	11:19 (129)	18:10	114	11:29 (129)	19:41	31	11:29 (129)	20:12	20:42	21:05
16	07:55		09:36 (129)	07:28		09:35 (129)	07:46		11:04 (129)	06:56	06:19	06:05
	17:34	104	11:20 (129)	18:11	113	11:28 (129)	19:42	19	11:23 (129)	20:13	20:43	21:06
17	07:55		09:37 (129)	07:26		09:36 (129)	07:44			06:55	06:18	06:05
	17:35	104	11:21 (129)	18:12	112	11:28 (129)	19:43			20:14	20:44	21:06
18	07:54		09:36 (129)	07:25		09:35 (129)	07:43			06:53	06:17	06:05
	17:36	105	11:21 (129)	18:13	112	11:27 (129)	19:44			20:15	20:45	21:06
19	07:54		09:37 (129)	07:24		09:36 (129)	07:41			06:52	06:16	06:05
	17:38	106	11:23 (129)	18:14	110	11:26 (129)	19:45			20:16	20:46	21:07
20	07:53		09:36 (129)	07:22		09:36 (129)	07:40			06:51	06:16	06:05
	17:39	107	11:23 (129)	18:16	110	11:26 (129)	19:46			20:17	20:47	21:07
21	07:53		09:36 (129)	07:21		09:36 (129)	07:38			06:49	06:15	06:05
	17:40	107	11:23 (129)	18:17	108	11:24 (129)	19:47			20:18	20:48	21:07
22	07:52		09:36 (129)	07:20		09:37 (129)	07:36			06:48	06:14	06:06
	17:41	109	11:25 (129)	18:18	107	11:24 (129)	19:48			20:19	20:49	21:07
23	07:51		09:36 (129)	07:18		09:36 (129)	07:35			06:46	06:13	06:06
	17:42	109	11:25 (129)	18:19	106	11:22 (129)	19:49			20:20	20:49	21:08
24	07:51		09:36 (129)	07:17		09:37 (129)	07:33			06:45	06:12	06:06
	17:43	109	11:25 (129)	18:20	104	11:21 (129)	19:50			20:21	20:50	21:08
25	07:50		09:35 (129)	07:15		09:38 (129)	07:31			06:43	06:12	06:06
	17:45	111	11:26 (129)	18:21	102	11:20 (129)	19:51			20:22	20:51	21:08
26	07:49		09:36 (129)	07:14		09:38 (129)	07:30			06:42	06:11	06:07
	17:46	111	11:27 (129)	18:22	100	11:18 (129)	19:52			20:23	20:52	21:08
27	07:49		09:36 (129)	07:12		09:39 (129)	07:28			06:41	06:11	06:07
	17:47	111	11:27 (129)	18:24	98	11:17 (129)	19:53			20:24	20:53	21:08
28	07:48		09:35 (129)	07:11		09:39 (129)	07:26			06:39	06:10	06:08
	17:48	113	11:28 (129)	18:25	96	11:15 (129)	19:54			20:25	20:54	21:08
29	07:47		09:35 (129)				07:25			06:38	06:09	06:08
	17:49	113	11:28 (129)				19:55			20:26	20:54	21:08
30	07:46		09:35 (129)				07:23			06:37	06:09	06:08
	17:51	113	11:28 (129)				19:56			20:27	20:55	21:08
31	07:45		09:35 (129)				07:22				06:08	
	17:52	114	11:29 (129)				19:58				20:56	
Potential sun hours	300			299			370			397	446	449
Total, worst case		3198			3108			1039				
Sun reduction		0.36			0.42			0.44				
Oper. time red.		1.00			1.00			1.00				
Wind dir. red.		0.60			0.60			0.60				
Total reduction		0.21			0.25			0.26				
Total, real		686			778			272				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

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3/2/2012 10:01 AM / 42

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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative **Shadow receptor:** 3429 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6541)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July		August		September			October			November			December		
1	06:09		06:32		07:02			07:30		10:31 (129)	07:03		09:04 (129)	07:37		09:19 (129)
	21:08		20:51		20:09			19:18	50	11:21 (129)	17:33	116	11:00 (129)	17:10	99	10:58 (129)
2	06:09		06:33		07:03			07:31		10:29 (129)	07:05		09:04 (129)	07:38		09:20 (129)
	21:08		20:50		20:08			19:17	55	11:24 (129)	17:32	116	11:00 (129)	17:10	98	10:58 (129)
3	06:10		06:34		07:04			07:32		10:27 (129)	07:06		09:05 (129)	07:39		09:20 (129)
	21:08		20:49		20:06			19:15	60	11:27 (129)	17:31	116	11:01 (129)	17:09	98	10:58 (129)
4	06:10		06:35		07:05			07:33		10:25 (129)	07:07		09:04 (129)	07:40		09:21 (129)
	21:08		20:47		20:04			19:13	64	11:29 (129)	17:30	116	11:00 (129)	17:09	97	10:58 (129)
5	06:11		06:36		07:06			07:34		10:23 (129)	07:08		09:04 (129)	07:41		09:22 (129)
	21:08		20:46		20:03			19:12	69	11:32 (129)	17:28	116	11:00 (129)	17:09	96	10:58 (129)
6	06:12		06:37		07:06			07:35		10:21 (129)	07:09		09:04 (129)	07:42		09:23 (129)
	21:07		20:45		20:01			19:10	73	11:34 (129)	17:27	116	11:00 (129)	17:09	95	10:58 (129)
7	06:12		06:38		07:07			07:36		10:20 (129)	07:10		09:05 (129)	07:43		09:24 (129)
	21:07		20:44		20:00			19:09	76	11:36 (129)	17:26	116	11:01 (129)	17:09	94	10:58 (129)
8	06:13		06:39		07:08			07:37		10:18 (129)	07:11		09:05 (129)	07:44		09:24 (129)
	21:07		20:43		19:56			19:07	80	11:38 (129)	17:25	116	11:01 (129)	17:09	94	10:58 (129)
9	06:13		06:40		07:09			07:38		10:17 (129)	07:13		09:05 (129)	07:45		09:25 (129)
	21:07		20:42		19:55			19:05	83	11:40 (129)	17:24	115	11:00 (129)	17:09	93	10:58 (129)
10	06:14		06:41		07:10			07:39		10:15 (129)	07:14		09:06 (129)	07:46		09:26 (129)
	21:06		20:40		19:53			19:04	87	11:42 (129)	17:23	114	11:00 (129)	17:09	92	10:58 (129)
11	06:15		06:42		07:11			07:41		10:14 (129)	07:15		09:07 (129)	07:46		09:26 (129)
	21:06		20:39		19:51			19:02	90	11:44 (129)	17:22	114	11:01 (129)	17:09	92	10:58 (129)
12	06:15		06:43		07:12			07:42		10:13 (129)	07:16		09:07 (129)	07:47		09:27 (129)
	21:05		20:38		19:50			19:01	92	11:45 (129)	17:21	113	11:00 (129)	17:09	91	10:58 (129)
13	06:16		06:44		07:13			07:43		10:12 (129)	07:17		09:07 (129)	07:48		09:28 (129)
	21:05		20:37		19:48			18:59	95	11:47 (129)	17:20	113	11:00 (129)	17:09	90	10:58 (129)
14	06:17		06:44		07:14			07:44		10:11 (129)	07:18		09:07 (129)	07:49		09:29 (129)
	21:05		20:35		19:46			18:58	97	11:48 (129)	17:20	113	11:00 (129)	17:10	90	10:59 (129)
15	06:18		06:45		07:15			07:45		10:10 (129)	07:20		09:09 (129)	07:50		09:29 (129)
	21:04		20:34		19:45			18:56	99	11:49 (129)	17:19	111	11:00 (129)	17:10	89	10:58 (129)
16	06:18		06:46		07:16			07:46		10:10 (129)	07:21		09:09 (129)	07:50		09:30 (129)
	21:03		20:33		19:43			18:55	101	11:51 (129)	17:18	111	11:00 (129)	17:10	89	10:59 (129)
17	06:19		06:47		07:17			07:47		10:09 (129)	07:22		09:09 (129)	07:51		09:31 (129)
	21:03		20:31		19:41			18:53	103	11:52 (129)	17:17	111	11:00 (129)	17:10	89	11:00 (129)
18	06:20		06:48		07:18			07:48		10:09 (129)	07:23		09:10 (129)	07:52		09:31 (129)
	21:02		20:30		19:40			18:52	104	11:53 (129)	17:16	109	10:59 (129)	17:11	88	10:59 (129)
19	06:21		06:49		07:19			07:49		10:08 (129)	07:24		09:10 (129)	07:52		09:32 (129)
	21:02		20:29		19:38			18:50	106	11:54 (129)	17:16	109	10:59 (129)	17:11	88	11:00 (129)
20	06:22		06:50		07:20			07:50		10:07 (129)	07:25		09:11 (129)	07:53		09:32 (129)
	21:01		20:27		19:36			18:49	107	11:54 (129)	17:15	109	11:00 (129)	17:12	88	11:00 (129)
21	06:22		06:51		07:21			07:51		10:06 (129)	07:26		09:12 (129)	07:53		09:33 (129)
	21:00		20:26		19:35			18:47	109	11:55 (129)	17:14	107	10:59 (129)	17:12	88	11:01 (129)
22	06:23		06:52		07:22			07:52		10:06 (129)	07:27		09:12 (129)	07:54		09:33 (129)
	21:00		20:24		19:33			18:46	110	11:56 (129)	17:14	107	10:59 (129)	17:13	88	11:01 (129)
23	06:24		06:53		07:23			07:53		10:06 (129)	07:29		09:13 (129)	07:54		09:34 (129)
	20:59		20:23		19:31			18:45	111	11:57 (129)	17:13	106	10:59 (129)	17:13	88	11:02 (129)
24	06:25		06:54		07:24			07:54		10:06 (129)	07:30		09:13 (129)	07:55		09:34 (129)
	20:58		20:21		19:30			18:43	112	11:58 (129)	17:13	105	10:58 (129)	17:14	88	11:02 (129)
25	06:26		06:55		07:25			07:55		10:05 (129)	07:31		09:14 (129)	07:55		09:35 (129)
	20:57		20:20		19:28			18:42	113	11:58 (129)	17:12	104	10:58 (129)	17:14	88	11:03 (129)
26	06:27		06:56		07:26			07:57		10:05 (129)	07:32		09:15 (129)	07:56		09:35 (129)
	20:56		20:18		19:27			18:41	113	11:58 (129)	17:12	104	10:59 (129)	17:15	89	11:04 (129)
27	06:28		06:57		07:26		10:49 (129)	07:58		10:04 (129)	07:33		09:16 (129)	07:56		09:35 (129)
	20:55		20:17		19:25	11	11:00 (129)	18:39	114	11:58 (129)	17:11	103	10:59 (129)	17:16	89	11:04 (129)
28	06:28		06:58		07:27		10:42 (129)	07:59		10:04 (129)	07:34		09:17 (129)	07:56		09:36 (129)
	20:55		20:15		19:23	26	11:08 (129)	18:38	115	11:59 (129)	17:11	101	10:58 (129)	17:16	89	11:05 (129)
29	06:29		06:59		07:28		10:37 (129)	08:00		10:05 (129)	07:35		09:17 (129)	07:56		09:36 (129)
	20:54		20:14		19:22	36	11:13 (129)	18:37	115	12:00 (129)	17:11	101	10:58 (129)	17:17	90	11:06 (129)
30	06:30		07:00		07:29		10:34 (129)	08:01		10:04 (129)	07:36		09:18 (129)	07:57		09:36 (129)
	20:53		20:12		19:20	43	11:17 (129)	18:35	116	12:00 (129)	17:10	100	10:58 (129)	17:18	90	11:06 (129)
31	06:31		07:01					08:02		10:04 (129)				07:57		09:36 (129)
	20:52		20:11					18:34	116	12:00 (129)				17:18	91	11:07 (129)
Potential sun hours	456		427		374			346			300			291		
Total, worst case						116			2935			3308			2828	
Sun reduction						0.61			0.56			0.37			0.50	
Oper. time red.						1.00			1.00			1.00			1.00	
Wind dir. red.						0.60			0.60			0.60			0.60	
Total reduction						0.36			0.33			0.22			0.30	
Total, real						42			980			730			843	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 43

Licensed user:
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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative **Shadow receptor:** 3431 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6543)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57			07:44		08:06 (129)	07:09			07:20			06:36		07:04 (100)	06:08		07:00 (100)
	17:19			17:53	19	08:25 (129)	18:26			19:59			20:28	31	07:35 (100)	20:57	38	07:38 (100)
2	07:57			07:43		08:04 (129)	07:08		17:47 (18)	07:18			06:34		07:03 (100)	06:08		07:01 (100)
	17:20			17:54	23	08:27 (129)	18:27	9	17:56 (18)	20:00			20:29	33	07:36 (100)	20:58	37	07:38 (100)
3	07:57			07:42		08:03 (129)	07:06		17:45 (18)	07:17			06:33		07:02 (100)	06:07		07:01 (100)
	17:21			17:55	25	08:28 (129)	18:28	15	18:00 (18)	20:00			20:30	36	07:38 (100)	20:58	37	07:38 (100)
4	07:57			07:41		08:03 (129)	07:05		17:42 (18)	07:15			06:32		07:00 (100)	06:07		07:02 (100)
	17:22			17:57	26	08:29 (129)	18:29	19	18:01 (18)	20:01			20:31	38	07:38 (100)	20:59	36	07:38 (100)
5	07:58			07:40		08:02 (129)	07:03		17:40 (18)	07:14			06:31		06:59 (100)	06:06		07:02 (100)
	17:23			17:58	28	08:30 (129)	18:30	22	18:02 (18)	20:02			20:32	39	07:38 (100)	21:00	36	07:38 (100)
6	07:57			07:39		08:01 (129)	07:02		17:39 (18)	07:12			06:29		06:58 (100)	06:06		07:03 (100)
	17:24			17:59	30	08:31 (129)	18:31	24	18:03 (18)	20:03			20:33	41	07:39 (100)	21:00	35	07:38 (100)
7	07:57			07:38		08:01 (129)	07:00		17:38 (18)	07:10			06:28		06:58 (100)	06:06		07:03 (100)
	17:25			18:00	30	08:31 (129)	18:32	25	18:03 (18)	20:04			20:34	42	07:40 (100)	21:01	34	07:37 (100)
8	07:57			07:37		08:01 (129)	07:59		18:38 (18)	07:09			06:27		06:57 (100)	06:06		07:04 (100)
	17:26			18:01	31	08:32 (129)	19:34	26	19:04 (18)	20:05			20:35	43	07:40 (100)	21:02	33	07:37 (100)
9	07:57			07:36		08:01 (129)	07:57		18:37 (18)	07:07			06:26		06:57 (100)	06:05		07:04 (100)
	17:27			18:03	32	08:33 (129)	19:35	27	19:04 (18)	20:06			20:36	44	07:41 (100)	21:02	33	07:37 (100)
10	07:57			07:35		08:01 (129)	07:56		18:37 (18)	07:06			06:25		06:56 (100)	06:05		07:05 (100)
	17:28			18:04	32	08:33 (129)	19:36	27	19:04 (18)	20:07			20:37	45	07:41 (100)	21:03	32	07:37 (100)
11	07:57			07:34		08:00 (129)	07:54		18:37 (18)	07:04			06:24		06:56 (100)	06:05		07:06 (100)
	17:29			18:05	32	08:32 (129)	19:37	26	19:03 (18)	20:08			20:38	45	07:41 (100)	21:03	31	07:37 (100)
12	07:57			07:33		08:01 (129)	07:52		18:37 (18)	07:03			06:23		06:56 (100)	06:05		07:06 (100)
	17:30			18:06	31	08:32 (129)	19:38	25	19:02 (18)	20:09			20:39	45	07:41 (100)	21:04	31	07:37 (100)
13	07:56			07:31		08:01 (129)	07:51		18:37 (18)	07:01			06:22		06:56 (100)	06:05		07:07 (100)
	17:31			18:07	31	08:32 (129)	19:39	25	19:02 (18)	20:10			20:40	45	07:41 (100)	21:04	29	07:36 (100)
14	07:56			07:30		08:02 (129)	07:49		18:37 (18)	07:00			06:21		06:55 (100)	06:05		07:07 (100)
	17:32			18:09	30	08:32 (129)	19:40	24	19:01 (18)	20:11			20:41	46	07:41 (100)	21:05	29	07:36 (100)
15	07:56			07:29		08:01 (129)	07:48		18:38 (18)	06:58			06:20		06:55 (100)	06:05		07:08 (100)
	17:33			18:10	30	08:31 (129)	19:41	21	18:59 (18)	20:12			20:42	46	07:41 (100)	21:05	28	07:36 (100)
16	07:55			07:28		08:02 (129)	07:46		18:40 (18)	06:56			06:19		06:55 (100)	06:05		07:08 (100)
	17:34			18:11	29	08:31 (129)	19:42	18	18:58 (18)	20:13			20:43	46	07:41 (100)	21:06	28	07:36 (100)
17	07:55			07:26		08:03 (129)	07:44		18:41 (18)	06:55			06:18		06:55 (100)	06:05		07:08 (100)
	17:35			18:12	27	08:30 (129)	19:43	15	18:56 (18)	20:14			20:44	46	07:41 (100)	21:06	28	07:36 (100)
18	07:54			07:25		08:04 (129)	07:43		18:44 (18)	06:54			06:17		06:56 (100)	06:05		07:09 (100)
	17:36			18:13	24	08:28 (129)	19:44	9	18:53 (18)	20:15			20:45	46	07:42 (100)	21:06	27	07:36 (100)
19	07:54			07:24		08:05 (129)	07:41			06:52			06:16		06:56 (100)	06:05		07:09 (100)
	17:38			18:15	22	08:27 (129)	19:45			20:16			20:46	45	07:41 (100)	21:07	27	07:36 (100)
20	07:53			07:22		08:07 (129)	07:40			06:51			06:16		06:56 (100)	06:05		07:09 (100)
	17:39			18:16	19	08:26 (129)	19:46			20:17			20:47	45	07:41 (100)	21:07	27	07:36 (100)
21	07:53			07:21		08:09 (129)	07:38			06:49			06:15		06:55 (100)	06:06		07:09 (100)
	17:40			18:17	14	08:23 (129)	19:47			20:18			20:48	46	07:41 (100)	21:07	27	07:36 (100)
22	07:52			07:20		08:13 (129)	07:36			06:48			06:14		06:56 (100)	06:06		07:10 (100)
	17:41			18:18	6	08:19 (129)	19:48			20:19			20:49	45	07:41 (100)	21:07	27	07:37 (100)
23	07:52			07:18			07:35			06:46			06:13		06:56 (100)	06:06		07:10 (100)
	17:42			18:19			19:49			20:20			20:49	45	07:41 (100)	21:08	27	07:37 (100)
24	07:51			07:17			07:33			06:45			06:13		06:56 (100)	06:06		07:10 (100)
	17:43			18:20			19:50			20:21			20:50	44	07:40 (100)	21:08	27	07:37 (100)
25	07:50			07:15			07:31			06:44			06:12		06:57 (100)	06:07		07:10 (100)
	17:45			18:21			19:51			20:22			20:51	43	07:40 (100)	21:08	28	07:38 (100)
26	07:49			07:14			07:30			06:42			06:11		06:57 (100)	06:07		07:10 (100)
	17:46			18:23			19:52			20:23			20:52	43	07:40 (100)	21:08	28	07:38 (100)
27	07:49			07:12			07:28			06:41		07:13 (100)	06:11		06:57 (100)	06:07		07:10 (100)
	17:47			18:24			19:53			20:24	14	07:27 (100)	20:53	42	07:39 (100)	21:08	28	07:38 (100)
28	07:48			07:11			07:26			06:39		07:10 (100)	06:10		06:58 (100)	06:08		07:10 (100)
	17:48			18:25			19:54			20:25	20	07:30 (100)	20:54	41	07:39 (100)	21:08	29	07:39 (100)
29	07:47						07:25			06:38		07:07 (100)	06:09		06:58 (100)	06:08		07:10 (100)
	17:49						19:55			20:26	25	07:32 (100)	20:55	41	07:39 (100)	21:08	29	07:39 (100)
30	07:46		08:09 (129)				07:23			06:37		07:05 (100)	06:09		06:59 (100)	06:08		07:09 (100)
	17:51	12	08:21 (129)				19:57			20:27	28	07:33 (100)	20:55	40	07:39 (100)	21:08	31	07:40 (100)
31	07:45		08:07 (129)				07:22						06:08		07:00 (100)			
	17:52	16	08:23 (129)				19:58						20:56	39	07:39 (100)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		28			571			357			87			1316			917	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.62			0.62			0.67			0.67			0.67			0.67	
Total reduction		0.22			0.26			0.29			0.34			0.38			0.40	
Total, real		6			148			104			30			496			370	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 44

Licensed user:
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(315) 471 0688
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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative **Shadow receptor:** 3431 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6543)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December
1	06:09		07:10 (100)	06:32		07:06 (100)	07:02			07:30		18:16 (18)	07:03		07:30 (129)	07:37
	21:08	31	07:41 (100)	20:51	46	07:52 (100)	20:09			19:18	26	18:42 (18)	17:33	32	08:02 (129)	17:10
2	06:09		07:09 (100)	06:33		07:07 (100)	07:03			07:31		18:16 (18)	07:05		07:31 (129)	07:38
	21:08	32	07:41 (100)	20:50	45	07:52 (100)	20:08			19:17	26	18:42 (18)	17:32	31	08:02 (129)	17:10
3	06:10		07:10 (100)	06:34		07:06 (100)	07:04			07:32		18:15 (18)	07:06		07:31 (129)	07:39
	21:08	32	07:42 (100)	20:49	44	07:50 (100)	20:06			19:15	27	18:42 (18)	17:31	31	08:02 (129)	17:10
4	06:10		07:09 (100)	06:35		07:07 (100)	07:05			07:33		18:15 (18)	07:07		07:31 (129)	07:40
	21:08	33	07:42 (100)	20:48	43	07:50 (100)	20:04			19:13	26	18:41 (18)	17:30	30	08:01 (129)	17:09
5	06:11		07:09 (100)	06:36		07:07 (100)	07:06			07:34		18:14 (18)	07:08		07:31 (129)	07:41
	21:08	34	07:43 (100)	20:46	43	07:50 (100)	20:03			19:12	27	18:41 (18)	17:28	30	08:01 (129)	17:09
6	06:12		07:09 (100)	06:37		07:08 (100)	07:06			07:35		18:15 (18)	07:09		07:32 (129)	07:42
	21:07	35	07:44 (100)	20:45	41	07:49 (100)	20:01			19:10	25	18:40 (18)	17:27	28	08:00 (129)	17:09
7	06:12		07:09 (100)	06:38		07:08 (100)	07:07			07:36		18:15 (18)	07:10		07:33 (129)	07:43
	21:07	35	07:44 (100)	20:44	41	07:49 (100)	20:00			19:09	24	18:39 (18)	17:26	27	08:00 (129)	17:09
8	06:13		07:09 (100)	06:39		07:09 (100)	07:08			07:37		18:15 (18)	07:11		07:34 (129)	07:44
	21:07	36	07:45 (100)	20:43	39	07:48 (100)	19:56			19:07	23	18:38 (18)	17:25	25	07:59 (129)	17:09
9	06:13		07:08 (100)	06:40		07:10 (100)	07:09			07:38		18:16 (18)	07:13		07:35 (129)	07:45
	21:07	37	07:45 (100)	20:42	37	07:47 (100)	19:55			19:05	20	18:36 (18)	17:24	22	07:57 (129)	17:09
10	06:14		07:08 (100)	06:41		07:11 (100)	07:10			07:40		18:17 (18)	07:14		07:37 (129)	07:46
	21:06	37	07:45 (100)	20:41	35	07:46 (100)	19:53			19:04	18	18:35 (18)	17:23	19	07:56 (129)	17:09
11	06:15		07:08 (100)	06:42		07:12 (100)	07:11			07:41		18:19 (18)	07:15		07:39 (129)	07:46
	21:06	38	07:46 (100)	20:39	33	07:45 (100)	19:51			19:02	13	18:32 (18)	17:22	16	07:55 (129)	17:09
12	06:15		07:07 (100)	06:43		07:13 (100)	07:12			07:42		18:23 (18)	07:16		07:42 (129)	07:47
	21:05	39	07:46 (100)	20:38	30	07:43 (100)	19:50			19:01	4	18:27 (18)	17:21	10	07:52 (129)	17:09
13	06:16		07:07 (100)	06:44		07:14 (100)	07:13			07:43			07:17			07:48
	21:05	40	07:47 (100)	20:37	28	07:42 (100)	19:48			18:59			17:21			17:09
14	06:17		07:08 (100)	06:44		07:15 (100)	07:14			07:44			07:18			07:49
	21:05	40	07:48 (100)	20:35	24	07:39 (100)	19:46			18:58			17:20			17:10
15	06:18		07:08 (100)	06:45		07:18 (100)	07:15			07:45			07:20			07:50
	21:04	41	07:49 (100)	20:34	18	07:36 (100)	19:45			18:56			17:19			17:10
16	06:18		07:07 (100)	06:46		07:21 (100)	07:16			07:46			07:21			07:50
	21:03	41	07:48 (100)	20:33	11	07:32 (100)	19:43			18:55			17:18			17:10
17	06:19		07:07 (100)	06:47			07:17			07:47			07:22			07:51
	21:03	42	07:49 (100)	20:31			19:42			18:53			17:17			17:10
18	06:20		07:07 (100)	06:48			07:18			07:48			07:23			07:52
	21:02	43	07:50 (100)	20:30			19:40			18:52			17:16			17:11
19	06:21		07:07 (100)	06:49			07:19			07:49			07:24			07:52
	21:02	43	07:50 (100)	20:29			19:38			18:50			17:16			17:11
20	06:22		07:06 (100)	06:50			07:20			07:50		08:42 (129)	07:25			07:53
	21:01	44	07:50 (100)	20:27			19:37			18:49	9	08:51 (129)	17:15			17:12
21	06:22		07:06 (100)	06:51			07:21			07:51		08:39 (129)	07:26			07:53
	21:00	44	07:50 (100)	20:26			19:35			18:47	15	08:54 (129)	17:14			17:12
22	06:23		07:06 (100)	06:52			07:22			07:52		08:36 (129)	07:28			07:54
	21:00	45	07:51 (100)	20:24			19:33			18:46	20	08:56 (129)	17:14			17:13
23	06:24		07:06 (100)	06:53			07:23			07:53		08:35 (129)	07:29			07:54
	20:59	45	07:51 (100)	20:23			19:32			18:45	23	08:58 (129)	17:13			17:13
24	06:25		07:06 (100)	06:54			07:24			07:54		08:34 (129)	07:30			07:55
	20:58	46	07:52 (100)	20:21			19:30			18:43	25	08:59 (129)	17:13			17:14
25	06:26		07:06 (100)	06:55			07:25		18:29 (18)	07:56		08:33 (129)	07:31			07:55
	20:57	46	07:52 (100)	20:20			19:28	4	18:33 (18)	18:42	27	09:00 (129)	17:12			17:14
26	06:27		07:05 (100)	06:56			07:26		18:24 (18)	07:57		08:32 (129)	07:32			07:56
	20:56	46	07:51 (100)	20:18			19:27	13	18:37 (18)	18:41	29	09:01 (129)	17:12			17:15
27	06:28		07:05 (100)	06:57			07:27		18:22 (18)	07:58		08:31 (129)	07:33			07:56
	20:55	47	07:52 (100)	20:17			19:25	17	18:39 (18)	18:39	30	09:01 (129)	17:11			17:16
28	06:28		07:06 (100)	06:58			07:27		18:20 (18)	07:59		08:30 (129)	07:34			07:56
	20:55	46	07:52 (100)	20:15			19:23	20	18:40 (18)	18:38	31	09:01 (129)	17:11			17:16
29	06:29		07:06 (100)	06:59			07:28		18:18 (18)	08:00		08:31 (129)	07:35			07:57
	20:54	46	07:52 (100)	20:14			19:22	23	18:41 (18)	18:37	31	09:02 (129)	17:11			17:17
30	06:30		07:06 (100)	07:00			07:29		18:17 (18)	08:01		08:30 (129)	07:36			07:57
	20:53	46	07:52 (100)	20:12			19:20	24	18:41 (18)	18:36	32	09:02 (129)	17:10			17:18
31	06:31		07:06 (100)	07:01						08:02		08:30 (129)				07:57
	20:52	46	07:52 (100)	20:11						18:34	32	09:02 (129)				17:18
Potential sun hours	456			427			374			346			300			291
Total, worst case		1256			558			101			563			301		
Sun reduction		0.60			0.60			0.61			0.56			0.37		
Oper. time red.		1.00			1.00			1.00			1.00			1.00		
Wind dir. red.		0.67			0.67			0.67			0.64			0.62		
Total reduction		0.40			0.40			0.41			0.36			0.23		
Total, real		507			225			41			202			69		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 45

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative **Shadow receptor:** 7825 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6596)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June
1	07:57		08:19 (28)	07:45		08:28 (28)	07:10		17:27 (82)	07:20			06:36		19:28 (81)	06:08
	17:20	56	15:54 (83)	17:53	13	08:41 (28)	18:26	25	17:52 (82)	19:59			20:28	37	20:05 (81)	20:57
2	07:58		08:19 (28)	07:44		08:32 (28)	07:08		17:24 (82)	07:19			06:35		19:28 (81)	06:08
	17:21	57	15:54 (83)	17:54	5	08:37 (28)	18:27	30	17:54 (82)	20:00			20:29	37	20:05 (81)	20:58
3	07:58		08:19 (28)	07:43			07:07		17:23 (82)	07:17			06:33		19:27 (81)	06:07
	17:21	57	15:54 (83)	17:56			18:28	33	17:56 (82)	20:00			20:30	38	20:05 (81)	20:58
4	07:58		08:19 (28)	07:42			07:05		17:21 (82)	07:15			06:32		19:27 (81)	06:07
	17:22	57	15:54 (83)	17:57			18:29	36	17:57 (82)	20:01			20:31	39	20:06 (81)	20:59
5	07:58		08:19 (28)	07:41			07:04		17:19 (82)	07:14			06:31		19:26 (81)	06:07
	17:23	57	15:54 (83)	17:58			18:31	40	17:59 (82)	20:02			20:32	39	20:05 (81)	21:00
6	07:58		08:19 (28)	07:40			07:02		17:18 (82)	07:12			06:30		19:26 (81)	06:06
	17:24	57	15:54 (83)	17:59			18:32	42	18:00 (82)	20:03			20:33	39	20:05 (81)	21:01
7	07:58		08:19 (28)	07:39			07:01		17:17 (82)	07:11			06:29		19:26 (81)	06:06
	17:25	58	15:55 (83)	18:00			18:33	44	18:01 (82)	20:04			20:34	39	20:05 (81)	21:01
8	07:58		08:19 (28)	07:37			07:59		18:16 (82)	07:09			06:27		19:26 (81)	06:06
	17:26	58	15:55 (83)	18:02			19:34	45	19:01 (82)	20:05			20:35	39	20:05 (81)	21:02
9	07:57		08:19 (28)	07:36			07:57		18:14 (82)	07:07			06:26		19:26 (81)	06:06
	17:27	57	15:55 (83)	18:03			19:35	47	19:01 (82)	20:06			20:36	39	20:05 (81)	21:02
10	07:57		08:19 (28)	07:35			07:56		18:14 (82)	07:06			06:25		19:27 (81)	06:05
	17:28	57	15:55 (83)	18:04			19:36	48	19:02 (82)	20:07			20:37	38	20:05 (81)	21:03
11	07:57		08:18 (28)	07:34			07:54		18:13 (82)	07:04			06:24		19:27 (81)	06:05
	17:29	56	15:53 (83)	18:05			19:37	49	19:02 (82)	20:08			20:38	38	20:05 (81)	21:03
12	07:57		08:18 (28)	07:33			07:53		18:13 (82)	07:03			06:23		19:27 (81)	06:05
	17:30	55	15:53 (83)	18:06			19:38	50	19:03 (82)	20:09			20:39	37	20:04 (81)	21:04
13	07:56		08:18 (28)	07:32			07:51		18:12 (82)	07:01			06:22		19:27 (81)	06:05
	17:31	55	15:53 (83)	18:08			19:39	51	19:03 (82)	20:10			20:40	37	20:04 (81)	21:04
14	07:56		08:17 (28)	07:30			07:49		18:11 (82)	07:00			06:21		19:28 (81)	06:05
	17:32	52	15:51 (83)	18:09			19:40	51	19:02 (82)	20:11			20:41	35	20:03 (81)	21:05
15	07:56		08:17 (28)	07:29			07:48		18:12 (82)	06:58			06:20		19:28 (81)	06:05
	17:33	51	15:51 (83)	18:10			19:41	51	19:03 (82)	20:12			20:42	35	20:03 (81)	21:05
16	07:55		08:16 (28)	07:28			07:46		18:11 (82)	06:57			06:19		19:29 (81)	06:05
	17:34	48	15:49 (83)	18:11			19:42	51	19:02 (82)	20:13			20:43	33	20:02 (81)	21:06
17	07:55		08:16 (28)	07:27			07:45		18:11 (82)	06:55			06:18		19:30 (81)	06:05
	17:36	44	15:47 (83)	18:12			19:43	50	19:01 (82)	20:14			20:44	32	20:02 (81)	21:06
18	07:55		08:16 (28)	07:25			07:43		18:11 (82)	06:54			06:17		19:31 (81)	06:05
	17:37	36	15:43 (83)	18:14			19:44	50	19:01 (82)	20:15			20:45	31	20:02 (81)	21:07
19	07:54		08:16 (28)	07:24			07:41		18:11 (82)	06:52			06:17		19:31 (81)	06:05
	17:38	30	08:46 (28)	18:15			19:45	49	19:00 (82)	20:16			20:46	30	20:01 (81)	21:07
20	07:53		08:16 (28)	07:23			07:40		18:12 (82)	06:51			06:16		19:32 (81)	06:06
	17:39	29	08:45 (28)	18:16			19:46	48	19:00 (82)	20:17			20:47	28	20:00 (81)	21:07
21	07:53		08:17 (28)	07:21			07:38		18:12 (82)	06:49			06:15		19:32 (81)	06:06
	17:40	29	08:46 (28)	18:17			19:47	47	18:59 (82)	20:18			20:48	27	19:59 (81)	21:07
22	07:52		08:17 (28)	07:20			07:36		18:12 (82)	06:48		19:43 (81)	06:14		19:34 (81)	06:06
	17:41	29	08:46 (28)	18:18			19:49	46	18:58 (82)	20:19	10	19:53 (81)	20:49	24	19:58 (81)	21:08
23	07:52		08:18 (28)	07:18			07:35		18:13 (82)	06:47		19:40 (81)	06:13		19:35 (81)	06:06
	17:42	28	08:46 (28)	18:19			19:50	44	18:57 (82)	20:20	17	19:57 (81)	20:50	22	19:57 (81)	21:08
24	07:51		08:18 (28)	07:17			07:33		18:13 (82)	06:45		19:37 (81)	06:13		19:36 (81)	06:06
	17:44	28	08:46 (28)	18:20			19:51	43	18:56 (82)	20:21	21	19:58 (81)	20:51	20	19:56 (81)	21:08
25	07:50		08:19 (28)	07:16			07:32		18:14 (82)	06:44		19:35 (81)	06:12		19:38 (81)	06:07
	17:45	27	08:46 (28)	18:22			19:52	40	18:54 (82)	20:22	25	20:00 (81)	20:51	17	19:55 (81)	21:08
26	07:50		08:20 (28)	07:14			07:30		18:16 (82)	06:42		19:33 (81)	06:11		19:40 (81)	06:07
	17:46	26	08:46 (28)	18:23			19:53	37	18:53 (82)	20:23	28	20:01 (81)	20:52	13	19:53 (81)	21:08
27	07:49		08:20 (28)	07:13		17:37 (82)	07:28		18:16 (82)	06:41		19:32 (81)	06:11		19:43 (81)	06:07
	17:47	25	08:45 (28)	18:24	6	17:43 (82)	19:54	35	18:51 (82)	20:24	30	20:02 (81)	20:53	8	19:51 (81)	21:08
28	07:48		08:21 (28)	07:11		17:30 (82)	07:27		18:18 (82)	06:40		19:31 (81)	06:10			06:08
	17:48	24	08:45 (28)	18:25	19	17:49 (82)	19:55	31	18:49 (82)	20:25	32	20:03 (81)	20:54			21:08
29	07:47		08:22 (28)				07:25		18:20 (82)	06:38		19:30 (81)	06:10			06:08
	17:50	22	08:44 (28)				19:56	27	18:47 (82)	20:26	34	20:04 (81)	20:55			21:08
30	07:46		08:23 (28)				07:23		18:22 (82)	06:37		19:29 (81)	06:09			06:09
	17:51	20	08:43 (28)				19:57	21	18:43 (82)	20:27	35	20:04 (81)	20:55			21:08
31	07:45		08:26 (28)				07:22		18:25 (82)				06:09			
	17:52	16	08:42 (28)				19:58	14	18:39 (82)				20:56			
Potential sun hours	300			299			370			397			446			449
Total, worst case		1301			43			1275			232			851		
Sun reduction		0.36			0.42			0.44			0.51			0.56		
Oper. time red.		1.00			1.00			1.00			1.00			1.00		
Wind dir. red.		0.63			0.64			0.67			0.63			0.63		
Total reduction		0.23			0.27			0.29			0.32			0.35		
Total, real		296			12			373			75			302		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 46

Licensed user:
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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative **Shadow receptor:** 7825 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6596)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09			06:32		19:38 (81)	07:02			07:31		17:51 (82)	07:04			07:37		08:00 (28)
	21:08			20:51	37	20:15 (81)	20:09			19:19	51	18:42 (82)	17:33			17:10	56	15:35 (83)
2	06:10			06:33		19:37 (81)	07:03			07:32		17:51 (82)	07:05			07:38		08:01 (28)
	21:08			20:50	38	20:15 (81)	20:08			19:17	50	18:41 (82)	17:32			17:10	58	15:37 (83)
3	06:10			06:34		19:37 (81)	07:04			07:33		17:51 (82)	07:06			07:39		08:02 (28)
	21:08			20:49	39	20:16 (81)	20:06			19:15	49	18:40 (82)	17:31			17:10	57	15:38 (83)
4	06:11			06:35		19:37 (81)	07:05			07:34		17:52 (82)	07:07			07:40		08:03 (28)
	21:08			20:48	39	20:16 (81)	20:05			19:14	47	18:39 (82)	17:30			17:10	58	15:39 (83)
5	06:11			06:36		19:36 (81)	07:06			07:35		17:52 (82)	07:08			07:41		08:04 (28)
	21:08			20:47	39	20:15 (81)	20:03			19:12	46	18:38 (82)	17:29			17:09	58	15:40 (83)
6	06:12			06:37		19:36 (81)	07:07			07:36		17:52 (82)	07:09			07:42		08:05 (28)
	21:08			20:45	39	20:15 (81)	20:01			19:10	45	18:37 (82)	17:28			17:09	58	15:41 (83)
7	06:12			06:38		19:36 (81)	07:08			07:37		17:53 (82)	07:10			07:43		08:06 (28)
	21:07			20:44	39	20:15 (81)	20:00			19:09	43	18:36 (82)	17:27			17:09	57	15:41 (83)
8	06:13			06:39		19:36 (81)	07:09			07:38		17:54 (82)	07:12			07:44		08:07 (28)
	21:07			20:43	39	20:15 (81)	19:57			19:07	40	18:34 (82)	17:26			17:09	57	15:42 (83)
9	06:14			06:40		19:36 (81)	07:10			07:39		17:54 (82)	07:13		08:01 (28)	07:45		08:08 (28)
	21:07			20:42	38	20:14 (81)	19:55			19:06	39	18:33 (82)	17:24	7	08:08 (28)	17:09	57	15:43 (83)
10	06:14			06:41		19:36 (81)	07:10			07:40		17:56 (82)	07:14		07:59 (28)	07:46		08:09 (28)
	21:06			20:41	38	20:14 (81)	19:53			19:04	35	18:31 (82)	17:24	13	08:12 (28)	17:09	58	15:44 (83)
11	06:15			06:42		19:37 (81)	07:11			07:41		17:57 (82)	07:15		07:57 (28)	07:47		08:10 (28)
	21:06			20:39	37	20:14 (81)	19:52			19:03	32	18:29 (82)	17:23	16	08:13 (28)	17:09	57	15:45 (83)
12	06:16			06:43		19:37 (81)	07:12		18:18 (82)	07:42		17:59 (82)	07:16		07:55 (28)	07:47		08:10 (28)
	21:06			20:38	36	20:13 (81)	19:50	12	18:30 (82)	19:01	28	18:27 (82)	17:22	20	08:15 (28)	17:10	57	15:45 (83)
13	06:16			06:44		19:37 (81)	07:13		18:14 (82)	07:43		18:02 (82)	07:17		07:54 (28)	07:48		08:11 (28)
	21:05			20:37	35	20:12 (81)	19:48	20	18:34 (82)	18:59	23	18:25 (82)	17:21	22	08:16 (28)	17:10	57	15:46 (83)
14	06:17			06:45		19:38 (81)	07:14		18:11 (82)	07:44		18:06 (82)	07:19		07:54 (28)	07:49		08:12 (28)
	21:05			20:36	34	20:12 (81)	19:47	26	18:37 (82)	18:58	14	18:20 (82)	17:20	24	08:18 (28)	17:10	56	15:47 (83)
15	06:18			06:46		19:39 (81)	07:15		18:08 (82)	07:45			07:20		07:53 (28)	07:50		08:13 (28)
	21:04			20:34	32	20:11 (81)	19:45	30	18:38 (82)	18:56			17:19	25	08:18 (28)	17:10	55	15:48 (83)
16	06:19		19:53 (81)	06:47		19:40 (81)	07:16		18:06 (82)	07:46			07:21		07:53 (28)	07:50		08:13 (28)
	21:04	4	19:57 (81)	20:33	30	20:10 (81)	19:43	34	18:40 (82)	18:55			17:18	26	08:19 (28)	17:10	56	15:48 (83)
17	06:19		19:50 (81)	06:48		19:40 (81)	07:17		18:04 (82)	07:47			07:22		07:52 (28)	07:51		08:14 (28)
	21:03	11	20:01 (81)	20:32	27	20:07 (81)	19:42	37	18:41 (82)	18:53			17:17	27	08:19 (28)	17:11	54	15:48 (83)
18	06:20		19:48 (81)	06:49		19:41 (81)	07:18		18:02 (82)	07:48			07:23		07:52 (28)	07:52		08:15 (28)
	21:02	15	20:03 (81)	20:30	25	20:06 (81)	19:40	40	18:42 (82)	18:52			17:17	28	08:20 (28)	17:11	54	15:49 (83)
19	06:21		19:47 (81)	06:49		19:43 (81)	07:19		18:01 (82)	07:49			07:24		07:53 (28)	07:52		08:15 (28)
	21:02	18	20:05 (81)	20:29	21	20:04 (81)	19:38	42	18:43 (82)	18:51			17:16	28	08:21 (28)	17:11	54	15:49 (83)
20	06:22		19:46 (81)	06:50		19:45 (81)	07:20		18:00 (82)	07:50			07:25		07:52 (28)	07:53		08:16 (28)
	21:01	21	20:07 (81)	20:27	16	20:01 (81)	19:37	43	18:43 (82)	18:49			17:15	29	08:21 (28)	17:12	54	15:50 (83)
21	06:23		19:44 (81)	06:51		19:49 (81)	07:21		17:57 (82)	07:51			07:27		07:52 (28)	07:53		08:16 (28)
	21:00	23	20:07 (81)	20:26	8	19:57 (81)	19:35	46	18:43 (82)	18:48			17:15	29	08:21 (28)	17:12	54	15:50 (83)
22	06:23		19:43 (81)	06:52			07:22		17:56 (82)	07:52			07:28		07:52 (28)	07:54		08:17 (28)
	21:00	25	20:08 (81)	20:25			19:33	47	18:43 (82)	18:46			17:14	30	08:22 (28)	17:13	54	15:51 (83)
23	06:24		19:43 (81)	06:53			07:23		17:55 (82)	07:53			07:29		07:53 (28)	07:54		08:17 (28)
	20:59	27	20:10 (81)	20:23			19:32	48	18:43 (82)	18:45			17:14	29	08:22 (28)	17:13	54	15:51 (83)
24	06:25		19:42 (81)	06:54			07:24		17:54 (82)	07:55			07:30		07:54 (28)	07:55		08:18 (28)
	20:58	29	20:11 (81)	20:22			19:30	50	18:44 (82)	18:44			17:13	36	15:21 (83)	17:14	54	15:52 (83)
25	06:26		19:41 (81)	06:55			07:25		17:54 (82)	07:56			07:31		07:54 (28)	07:55		08:18 (28)
	20:57	31	20:12 (81)	20:20			19:28	50	18:44 (82)	18:42			17:12	44	15:25 (83)	17:14	54	15:52 (83)
26	06:27		19:41 (81)	06:56			07:26		17:53 (82)	07:57			07:32		07:55 (28)	07:56		08:18 (28)
	20:57	31	20:12 (81)	20:19			19:27	51	18:44 (82)	18:41			17:12	48	15:28 (83)	17:15	54	15:52 (83)
27	06:28		19:39 (81)	06:57			07:27		17:53 (82)	07:58			07:33		07:56 (28)	07:56		08:18 (28)
	20:56	33	20:12 (81)	20:17			19:25	50	18:43 (82)	18:40			17:12	51	15:30 (83)	17:16	54	15:52 (83)
28	06:29		19:39 (81)	06:58			07:28		17:52 (82)	07:59			07:34		07:57 (28)	07:56		08:19 (28)
	20:55	34	20:13 (81)	20:16			19:23	51	18:43 (82)	18:38			17:11	52	15:31 (83)	17:16	56	15:54 (83)
29	06:30		19:39 (81)	06:59			07:29		17:52 (82)	08:00			07:35		07:58 (28)	07:57		08:19 (28)
	20:54	35	20:14 (81)	20:14			19:22	51	18:43 (82)	18:37			17:11	54	15:33 (83)	17:17	56	15:54 (83)
30	06:31		19:38 (81)	07:00			07:30		17:51 (82)	08:01			07:36		07:59 (28)	07:57		08:19 (28)
	20:53	36	20:14 (81)	20:13			19:20	51	18:42 (82)	18:36			17:10	55	15:34 (83)	17:18	57	15:54 (83)
31	06:31		19:38 (81)	07:01						08:02						07:57		08:19 (28)
	20:52	37	20:15 (81)	20:11						18:35						17:19	56	15:54 (83)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		410			686			779			542			693			1731	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.63			0.63			0.67			0.67			0.62			0.65	
Total reduction		0.38			0.38			0.41			0.37			0.23			0.33	
Total, real		156			261			316			202			158			566	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 47

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative **Shadow receptor:** 8224 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6613)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February	March			April			May			June		
1	07:57		16:08 (49)	07:45	07:10			07:20		08:10 (118)	06:36			06:08		06:50 (119)
	17:20	35	16:43 (49)	17:53	18:26			19:59	16	08:26 (118)	20:28			20:57	29	07:19 (119)
2	07:57		16:08 (49)	07:44	07:08			07:19		08:12 (118)	06:35			06:08		06:51 (119)
	17:21	35	16:43 (49)	17:55	18:27			20:00	10	08:22 (118)	20:29			20:58	28	07:19 (119)
3	07:58		16:09 (49)	07:43	07:07			07:17			06:33			06:08		06:52 (119)
	17:22	35	16:44 (49)	17:56	18:28			20:00			20:30			20:58	27	07:19 (119)
4	07:58		16:09 (49)	07:42	07:05			07:15			06:32			06:07		06:52 (119)
	17:22	35	16:44 (49)	17:57	18:29			20:01			20:31			20:59	26	07:18 (119)
5	07:58		16:09 (49)	07:41	07:04			07:14			06:31		07:00 (119)	06:07		06:52 (119)
	17:23	36	16:45 (49)	17:58	18:31			20:02			20:32	10	07:10 (119)	21:00	26	07:18 (119)
6	07:58		16:10 (49)	07:40	07:02			07:12			06:30		06:56 (119)	06:07		06:53 (119)
	17:24	35	16:45 (49)	17:59	18:32			20:03			20:33	16	07:12 (119)	21:00	26	07:19 (119)
7	07:58		16:10 (49)	07:39	07:01			07:11			06:29		06:54 (119)	06:06		06:54 (119)
	17:25	36	16:46 (49)	18:01	18:33			20:04			20:34	20	07:14 (119)	21:01	25	07:19 (119)
8	07:57		16:11 (49)	07:37	07:59			07:09			06:28		06:53 (119)	06:06		06:55 (119)
	17:26	35	16:46 (49)	18:02	19:34			20:05			20:35	22	07:15 (119)	21:02	24	07:19 (119)
9	07:57		16:12 (49)	07:36	07:57			07:08			06:26		06:52 (119)	06:06		06:54 (119)
	17:27	35	16:47 (49)	18:03	19:35			20:06			20:36	24	07:16 (119)	21:02	23	07:17 (119)
10	07:57		16:11 (49)	07:35	07:56			07:06			06:25		06:51 (119)	06:06		06:55 (119)
	17:28	36	16:47 (49)	18:04	19:36			20:07			20:37	26	07:17 (119)	21:03	22	07:17 (119)
11	07:57		16:12 (49)	07:34	07:54			07:04			06:24		06:50 (119)	06:06		06:56 (119)
	17:29	35	16:47 (49)	18:05	19:37			20:08			20:38	28	07:18 (119)	21:03	21	07:17 (119)
12	07:57		16:13 (49)	07:33	07:53			07:03			06:23		06:49 (119)	06:05		06:56 (119)
	17:30	35	16:48 (49)	18:07	19:38			20:09			20:39	30	07:19 (119)	21:04	21	07:17 (119)
13	07:56		16:14 (49)	07:32	07:51		08:19 (118)	07:01			06:22		06:48 (119)	06:05		06:57 (119)
	17:31	34	16:48 (49)	18:08	19:39	10	08:29 (118)	20:10			20:40	31	07:19 (119)	21:04	20	07:17 (119)
14	07:56		16:14 (49)	07:30	07:49		08:15 (118)	07:00			06:21		06:48 (119)	06:05		06:58 (119)
	17:32	34	16:48 (49)	18:09	19:40	17	08:32 (118)	20:11			20:41	31	07:19 (119)	21:05	19	07:17 (119)
15	07:56		16:15 (49)	07:29	07:48		08:13 (118)	06:58			06:20		06:47 (119)	06:05		06:58 (119)
	17:33	34	16:49 (49)	18:10	19:41	21	08:34 (118)	20:12			20:42	33	07:20 (119)	21:05	19	07:17 (119)
16	07:55		16:15 (49)	07:28	07:46		08:11 (118)	06:57			06:19		06:48 (119)	06:05		06:58 (119)
	17:35	33	16:48 (49)	18:11	19:42	24	08:35 (118)	20:13			20:43	33	07:21 (119)	21:06	19	07:17 (119)
17	07:55		16:16 (49)	07:27	07:45		08:09 (118)	06:55			06:18		06:48 (119)	06:05		06:59 (119)
	17:36	33	16:49 (49)	18:12	19:43	27	08:36 (118)	20:14			20:44	33	07:21 (119)	21:06	18	07:17 (119)
18	07:54		16:16 (49)	07:25	07:43		08:08 (118)	06:54			06:18		06:47 (119)	06:05		06:59 (119)
	17:37	32	16:48 (49)	18:14	19:44	29	08:37 (118)	20:15			20:45	34	07:21 (119)	21:06	18	07:17 (119)
19	07:54		16:18 (49)	07:24	07:41		08:07 (118)	06:52			06:17		06:47 (119)	06:06		06:59 (119)
	17:38	31	16:49 (49)	18:15	19:45	30	08:37 (118)	20:16			20:46	34	07:21 (119)	21:07	18	07:17 (119)
20	07:53		16:18 (49)	07:23	07:40		08:06 (118)	06:51			06:16		06:47 (119)	06:06		07:00 (119)
	17:39	30	16:48 (49)	18:16	19:46	32	08:38 (118)	20:17			20:47	34	07:21 (119)	21:07	18	07:18 (119)
21	07:53		16:19 (49)	07:21	07:38		08:05 (118)	06:49			06:15		06:48 (119)	06:06		07:00 (119)
	17:40	28	16:47 (49)	18:17	19:48	33	08:38 (118)	20:18			20:48	33	07:21 (119)	21:07	18	07:18 (119)
22	07:52		16:21 (49)	07:20	07:37		08:04 (118)	06:48			06:14		06:47 (119)	06:06		07:00 (119)
	17:41	26	16:47 (49)	18:18	19:49	33	08:37 (118)	20:19			20:49	34	07:21 (119)	21:08	18	07:18 (119)
23	07:52		16:21 (49)	07:18	07:35		08:05 (118)	06:47			06:14		06:47 (119)	06:06		07:00 (119)
	17:43	26	16:47 (49)	18:19	19:50	33	08:38 (118)	20:20			20:50	34	07:21 (119)	21:08	18	07:18 (119)
24	07:51		16:23 (49)	07:17	07:33		08:04 (118)	06:45			06:13		06:48 (119)	06:07		07:01 (119)
	17:44	23	16:46 (49)	18:21	19:51	33	08:37 (118)	20:21			20:50	33	07:21 (119)	21:08	18	07:19 (119)
25	07:50		16:25 (49)	07:16	07:32		08:04 (118)	06:44			06:12		06:48 (119)	06:07		07:01 (119)
	17:45	20	16:45 (49)	18:22	19:52	32	08:36 (118)	20:22			20:51	33	07:21 (119)	21:08	18	07:19 (119)
26	07:50		16:27 (49)	07:14	07:30		08:04 (118)	06:42			06:12		06:48 (119)	06:07		07:01 (119)
	17:46	17	16:44 (49)	18:23	19:53	32	08:36 (118)	20:23			20:52	32	07:20 (119)	21:08	18	07:19 (119)
27	07:49		16:29 (49)	07:13	07:28		08:04 (118)	06:41			06:11		06:49 (119)	06:08		07:01 (119)
	17:47	13	16:42 (49)	18:24	19:54	30	08:34 (118)	20:24			20:53	32	07:21 (119)	21:08	19	07:20 (119)
28	07:48		16:33 (49)	07:11	07:27		08:04 (118)	06:40			06:10		06:48 (119)	06:08		07:01 (119)
	17:48	4	16:37 (49)	18:25	19:55	29	08:33 (118)	20:25			20:54	32	07:20 (119)	21:08	19	07:20 (119)
29	07:47				07:25		08:06 (118)	06:38			06:10		06:49 (119)	06:08		07:00 (119)
	17:50				19:56	26	08:32 (118)	20:26			20:55	31	07:20 (119)	21:08	20	07:20 (119)
30	07:46				07:24		08:06 (118)	06:37			06:09		06:49 (119)	06:09		07:01 (119)
	17:51				19:57	24	08:30 (118)	20:27			20:55	31	07:20 (119)	21:08	20	07:21 (119)
31	07:45				07:22		08:08 (118)				06:09		06:50 (119)			
	17:52				19:58	21	08:29 (118)				20:56	30	07:20 (119)			
Potential sun hours	300			299	370			397			446			449		
Total, worst case		841				516			26			794			633	
Sun reduction		0.36				0.44			0.51			0.56			0.60	
Oper. time red.		1.00				1.00			1.00			1.00			1.00	
Wind dir. red.		0.68				0.65			0.65			0.68			0.68	
Total reduction		0.24				0.28			0.33			0.38			0.41	
Total, real		205				147			9			302			258	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 48

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative **Shadow receptor:** 8224 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6613)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October	November			December		
1	06:09		07:00 (119)	06:33		07:00 (119)	07:02			07:31	07:04			07:37		15:54 (49)
	21:08	21	07:21 (119)	20:51	29	07:29 (119)	20:09			19:19	17:33			17:10	35	16:29 (49)
2	06:10		07:00 (119)	06:33		07:01 (119)	07:03			07:32	07:05			07:38		15:54 (49)
	21:08	22	07:22 (119)	20:50	27	07:28 (119)	20:08			19:17	17:32			17:10	36	16:30 (49)
3	06:10		07:00 (119)	06:34		07:02 (119)	07:04			07:33	07:06			07:39		15:55 (49)
	21:08	22	07:22 (119)	20:49	26	07:28 (119)	20:06			19:15	17:31			17:10	35	16:30 (49)
4	06:11		07:00 (119)	06:35		07:03 (119)	07:05			07:34	07:07			07:40		15:55 (49)
	21:08	24	07:24 (119)	20:48	24	07:27 (119)	20:05			19:14	17:30			17:10	36	16:31 (49)
5	06:11		06:59 (119)	06:36		07:04 (119)	07:06			07:35	07:08			07:41		15:56 (49)
	21:08	25	07:24 (119)	20:47	21	07:25 (119)	20:03			19:12	17:29			17:10	35	16:31 (49)
6	06:12		07:00 (119)	06:37		07:04 (119)	07:07			07:36	07:09			07:42		15:56 (49)
	21:08	25	07:25 (119)	20:45	19	07:23 (119)	20:01			19:11	17:28			17:09	35	16:31 (49)
7	06:13		07:00 (119)	06:38		07:06 (119)	07:08			07:37	07:10			07:43		15:56 (49)
	21:07	26	07:26 (119)	20:44	15	07:21 (119)	20:00			19:09	17:27			17:09	36	16:32 (49)
8	06:13		06:59 (119)	06:39		07:10 (119)	07:09			07:38	07:12			07:44		15:57 (49)
	21:07	26	07:25 (119)	20:43	7	07:17 (119)	19:57			19:07	17:26			17:09	35	16:32 (49)
9	06:14		06:59 (119)	06:40			07:10			07:39	07:13			07:45		15:58 (49)
	21:07	27	07:26 (119)	20:42			19:55			19:06	17:25			17:09	35	16:33 (49)
10	06:14		06:58 (119)	06:41			07:11		08:06 (118)	07:40	07:14			07:46		15:58 (49)
	21:06	28	07:26 (119)	20:41			19:53	8	08:14 (118)	19:04	17:24			17:09	35	16:33 (49)
11	06:15		06:58 (119)	06:42			07:11		08:02 (118)	07:41	07:15			07:47		15:59 (49)
	21:06	29	07:27 (119)	20:39			19:52	16	08:18 (118)	19:03	17:23			17:10	35	16:34 (49)
12	06:16		06:59 (119)	06:43			07:12		07:59 (118)	07:42	07:16			07:47		15:59 (49)
	21:06	29	07:28 (119)	20:38			19:50	21	08:20 (118)	19:01	17:22			17:10	34	16:33 (49)
13	06:17		06:58 (119)	06:44			07:13		07:58 (118)	07:43	07:17			07:48		15:59 (49)
	21:05	30	07:28 (119)	20:37			19:48	23	08:21 (118)	19:00	17:21			17:10	35	16:34 (49)
14	06:17		06:58 (119)	06:45			07:14		07:56 (118)	07:44	07:19		16:05 (49)	07:49		16:00 (49)
	21:05	30	07:28 (119)	20:36			19:47	26	08:22 (118)	18:58	17:20	5	16:10 (49)	17:10	35	16:35 (49)
15	06:18		06:58 (119)	06:46			07:15		07:55 (118)	07:45	07:20		16:02 (49)	07:50		16:01 (49)
	21:04	31	07:29 (119)	20:34			19:45	28	08:23 (118)	18:57	17:19	13	16:15 (49)	17:10	34	16:35 (49)
16	06:19		06:58 (119)	06:47			07:16		07:54 (118)	07:46	07:21		16:00 (49)	07:50		16:01 (49)
	21:04	32	07:30 (119)	20:33			19:43	29	08:23 (118)	18:55	17:18	17	16:17 (49)	17:11	34	16:35 (49)
17	06:20		06:57 (119)	06:48			07:17		07:53 (118)	07:47	07:22		15:58 (49)	07:51		16:02 (49)
	21:03	32	07:29 (119)	20:32			19:42	31	08:24 (118)	18:54	17:18	20	16:18 (49)	17:11	34	16:36 (49)
18	06:20		06:57 (119)	06:49			07:18		07:52 (118)	07:48	07:23		15:57 (49)	07:52		16:01 (49)
	21:02	33	07:30 (119)	20:30			19:40	32	08:24 (118)	18:52	17:17	23	16:20 (49)	17:11	35	16:36 (49)
19	06:21		06:57 (119)	06:50			07:19		07:51 (118)	07:49	07:24		15:56 (49)	07:52		16:02 (49)
	21:02	33	07:30 (119)	20:29			19:38	33	08:24 (118)	18:51	17:16	26	16:22 (49)	17:12	34	16:36 (49)
20	06:22		06:58 (119)	06:51			07:20		07:51 (118)	07:50	07:25		15:56 (49)	07:53		16:03 (49)
	21:01	33	07:31 (119)	20:27			19:37	33	08:24 (118)	18:49	17:15	27	16:23 (49)	17:12	34	16:37 (49)
21	06:23		06:58 (119)	06:52			07:21		07:51 (118)	07:51	07:27		15:55 (49)	07:53		16:03 (49)
	21:00	33	07:31 (119)	20:26			19:35	33	08:24 (118)	18:48	17:15	28	16:23 (49)	17:12	34	16:37 (49)
22	06:24		06:57 (119)	06:52			07:22		07:50 (118)	07:52	07:28		15:54 (49)	07:54		16:04 (49)
	21:00	34	07:31 (119)	20:25			19:33	32	08:22 (118)	18:46	17:14	30	16:24 (49)	17:13	34	16:38 (49)
23	06:24		06:57 (119)	06:53			07:23		07:50 (118)	07:53	07:29		15:54 (49)	07:54		16:04 (49)
	20:59	34	07:31 (119)	20:23			19:32	31	08:21 (118)	18:45	17:14	31	16:25 (49)	17:13	34	16:38 (49)
24	06:25		06:57 (119)	06:54			07:24		07:50 (118)	07:55	07:30		15:53 (49)	07:55		16:04 (49)
	20:58	34	07:31 (119)	20:22			19:30	31	08:21 (118)	18:44	17:13	32	16:25 (49)	17:14	34	16:38 (49)
25	06:26		06:58 (119)	06:55			07:25		07:50 (118)	07:56	07:31		15:54 (49)	07:55		16:05 (49)
	20:57	33	07:31 (119)	20:20			19:28	30	08:20 (118)	18:42	17:13	33	16:27 (49)	17:15	35	16:40 (49)
26	06:27		06:58 (119)	06:56			07:26		07:51 (118)	07:57	07:32		15:54 (49)	07:56		16:06 (49)
	20:56	33	07:31 (119)	20:19			19:27	28	08:19 (118)	18:41	17:12	33	16:27 (49)	17:15	34	16:40 (49)
27	06:28		06:58 (119)	06:57			07:27		07:52 (118)	07:58	07:33		15:54 (49)	07:56		16:06 (49)
	20:56	33	07:31 (119)	20:17			19:25	25	08:17 (118)	18:40	17:12	34	16:28 (49)	17:16	34	16:40 (49)
28	06:29		06:58 (119)	06:58			07:28		07:53 (118)	07:59	07:34		15:54 (49)	07:56		16:07 (49)
	20:55	32	07:30 (119)	20:16			19:23	22	08:15 (118)	18:38	17:11	34	16:28 (49)	17:17	34	16:41 (49)
29	06:30		06:58 (119)	06:59			07:29		07:54 (118)	08:00	07:35		15:54 (49)	07:57		16:07 (49)
	20:54	32	07:30 (119)	20:14			19:22	19	08:13 (118)	18:37	17:11	35	16:29 (49)	17:17	35	16:42 (49)
30	06:31		06:59 (119)	07:00			07:30		07:57 (118)	08:01	07:36		15:54 (49)	07:57		16:07 (49)
	20:53	31	07:30 (119)	20:13			19:20	13	08:10 (118)	18:36	17:11	35	16:29 (49)	17:18	35	16:42 (49)
31	06:32		06:59 (119)	07:01						08:02				07:57		16:07 (49)
	20:52	30	07:29 (119)	20:11						18:35				17:19	35	16:42 (49)
Potential sun hours	456			426			374			346	300			291		
Total, worst case		917			168			544				456			1075	
Sun reduction		0.60			0.60			0.61				0.37			0.50	
Oper. time red.		1.00			1.00			1.00				1.00			1.00	
Wind dir. red.		0.68			0.68			0.65				0.68			0.68	
Total reduction		0.41			0.41			0.39				0.25			0.34	
Total, real		374			68			215				114			364	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 49

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative **Shadow receptor:** 8226 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6615)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February		March			April			May			June		
1	07:57		16:02 (49)	07:45		07:10			07:20		07:54 (118)	06:36			06:08		06:45 (119)
	17:20	38	16:40 (49)	17:53		18:26			19:59	28	08:22 (118)	20:28			20:57	28	07:13 (119)
2	07:57		16:03 (49)	07:44		07:08			07:19		07:54 (118)	06:35			06:08		06:46 (119)
	17:21	38	16:41 (49)	17:55		18:27			20:00	27	08:21 (118)	20:29			20:58	28	07:14 (119)
3	07:58		16:03 (49)	07:43		07:07			07:17		07:55 (118)	06:33			06:08		06:47 (119)
	17:22	38	16:41 (49)	17:56		18:28			20:00	25	08:20 (118)	20:30			20:58	27	07:14 (119)
4	07:58		16:03 (49)	07:42		07:05			07:15		07:56 (118)	06:32			06:07		06:46 (119)
	17:22	39	16:42 (49)	17:57		18:29			20:01	22	08:18 (118)	20:31			20:59	27	07:13 (119)
5	07:58		16:04 (49)	07:41		07:04			07:14		07:58 (118)	06:31			06:07		06:47 (119)
	17:23	38	16:42 (49)	17:58		18:31			20:02	18	08:16 (118)	20:32			21:00	26	07:13 (119)
6	07:58		16:04 (49)	07:40		07:02			07:12		07:59 (118)	06:30			06:07		06:48 (119)
	17:24	39	16:43 (49)	17:59		18:32			20:03	14	08:13 (118)	20:33			21:00	25	07:13 (119)
7	07:58		16:05 (49)	07:39		07:01			07:11		08:03 (118)	06:29			06:06		06:49 (119)
	17:25	39	16:44 (49)	18:01		18:33			20:04	5	08:08 (118)	20:34			21:01	24	07:13 (119)
8	07:57		16:05 (49)	07:37		07:59			07:09			06:28		06:53 (119)	06:06		06:49 (119)
	17:26	39	16:44 (49)	18:02		19:34			20:05			20:35	11	07:04 (119)	21:02	24	07:13 (119)
9	07:57		16:06 (49)	07:36		07:57			07:08			06:26		06:51 (119)	06:06		06:49 (119)
	17:27	39	16:45 (49)	18:03		19:35			20:06			20:36	15	07:06 (119)	21:02	23	07:12 (119)
10	07:57		16:06 (49)	07:35		07:56			07:06			06:25		06:49 (119)	06:06		06:50 (119)
	17:28	39	16:45 (49)	18:04		19:36			20:07			20:37	19	07:08 (119)	21:03	22	07:12 (119)
11	07:57		16:06 (49)	07:34		07:54			07:04			06:24		06:48 (119)	06:06		06:50 (119)
	17:29	39	16:45 (49)	18:05		19:37			20:08			20:38	21	07:09 (119)	21:03	22	07:12 (119)
12	07:57		16:07 (49)	07:33		07:53			07:03			06:23		06:47 (119)	06:05		06:51 (119)
	17:30	39	16:46 (49)	18:07		19:38			20:09			20:39	23	07:10 (119)	21:04	21	07:12 (119)
13	07:56		16:08 (49)	07:32		07:51			07:01			06:22		06:46 (119)	06:05		06:51 (119)
	17:31	39	16:47 (49)	18:08		19:39			20:10			20:40	25	07:11 (119)	21:04	21	07:12 (119)
14	07:56		16:08 (49)	07:30		07:49			07:00			06:21		06:45 (119)	06:05		06:52 (119)
	17:32	38	16:46 (49)	18:09		19:40			20:11			20:41	27	07:12 (119)	21:05	20	07:12 (119)
15	07:56		16:09 (49)	07:29		07:48			06:58			06:20		06:44 (119)	06:05		06:52 (119)
	17:33	38	16:47 (49)	18:10		19:41			20:12			20:42	28	07:12 (119)	21:05	20	07:12 (119)
16	07:55		16:09 (49)	07:28		07:46			06:57			06:19		06:45 (119)	06:05		06:53 (119)
	17:35	38	16:47 (49)	18:11		19:42			20:13			20:43	28	07:13 (119)	21:06	19	07:12 (119)
17	07:55		16:10 (49)	07:27		07:45			06:55			06:18		06:44 (119)	06:05		06:53 (119)
	17:36	37	16:47 (49)	18:12		19:43			20:14			20:44	30	07:14 (119)	21:06	19	07:12 (119)
18	07:54		16:10 (49)	07:25		07:43			06:54			06:18		06:44 (119)	06:05		06:53 (119)
	17:37	37	16:47 (49)	18:14		19:44			20:15			20:45	30	07:14 (119)	21:06	19	07:12 (119)
19	07:54		16:11 (49)	07:24		07:41		08:07 (118)	06:52			06:17		06:43 (119)	06:06		06:53 (119)
	17:38	36	16:47 (49)	18:15		19:45	10	08:17 (118)	20:16			20:46	31	07:14 (119)	21:07	19	07:12 (119)
20	07:53		16:12 (49)	07:23		07:40		08:04 (118)	06:51			06:16		06:43 (119)	06:06		06:54 (119)
	17:39	35	16:47 (49)	18:16		19:46	17	08:21 (118)	20:17			20:47	31	07:14 (119)	21:07	19	07:13 (119)
21	07:53		16:12 (49)	07:21		07:38		08:01 (118)	06:49			06:15		06:44 (119)	06:06		06:54 (119)
	17:40	34	16:46 (49)	18:17		19:48	21	08:22 (118)	20:18			20:48	31	07:15 (119)	21:07	19	07:13 (119)
22	07:52		16:14 (49)	07:20		07:37		07:59 (118)	06:48			06:14		06:43 (119)	06:06		06:54 (119)
	17:41	33	16:47 (49)	18:18		19:49	24	08:23 (118)	20:19			20:49	31	07:14 (119)	21:08	19	07:13 (119)
23	07:52		16:14 (49)	07:18		07:35		07:58 (118)	06:47			06:14		06:43 (119)	06:06		06:54 (119)
	17:43	32	16:46 (49)	18:19		19:50	26	08:24 (118)	20:20			20:50	31	07:14 (119)	21:08	19	07:13 (119)
24	07:51		16:15 (49)	07:17		07:33		07:57 (118)	06:45			06:13		06:44 (119)	06:07		06:55 (119)
	17:44	30	16:45 (49)	18:21		19:51	27	08:24 (118)	20:21			20:50	31	07:15 (119)	21:08	19	07:14 (119)
25	07:50		16:17 (49)	07:16		07:32		07:55 (118)	06:44			06:12		06:44 (119)	06:07		06:55 (119)
	17:45	29	16:46 (49)	18:22		19:52	29	08:24 (118)	20:22			20:51	31	07:15 (119)	21:08	19	07:14 (119)
26	07:50		16:18 (49)	07:14		07:30		07:55 (118)	06:42			06:12		06:43 (119)	06:07		06:55 (119)
	17:46	27	16:45 (49)	18:23		19:53	30	08:25 (118)	20:23			20:52	31	07:14 (119)	21:08	19	07:14 (119)
27	07:49		16:19 (49)	07:13		07:28		07:54 (118)	06:41			06:11		06:44 (119)	06:08		06:55 (119)
	17:47	25	16:44 (49)	18:24		19:54	31	08:25 (118)	20:24			20:53	31	07:15 (119)	21:08	20	07:15 (119)
28	07:48		16:21 (49)	07:11		07:27		07:53 (118)	06:40			06:10		06:44 (119)	06:08		06:55 (119)
	17:48	21	16:42 (49)	18:25		19:55	31	08:24 (118)	20:25			20:54	30	07:14 (119)	21:08	20	07:15 (119)
29	07:47		16:23 (49)			07:25		07:54 (118)	06:38			06:10		06:45 (119)	06:08		06:55 (119)
	17:50	17	16:40 (49)			19:56	30	08:24 (118)	20:26			20:55	29	07:14 (119)	21:08	20	07:15 (119)
30	07:46		16:26 (49)			07:24		07:53 (118)	06:37			06:09		06:45 (119)	06:09		06:55 (119)
	17:51	12	16:38 (49)			19:57	30	08:23 (118)	20:27			20:55	29	07:14 (119)	21:08	21	07:16 (119)
31	07:45					07:22		07:54 (118)				06:09		06:45 (119)			
	17:52					19:58	29	08:23 (118)				20:56	29	07:14 (119)			
Potential sun hours	300			299		370			397			446			449		
Total, worst case		1022					335			139			653			648	
Sun reduction		0.36					0.44			0.51			0.56			0.60	
Oper. time red.		1.00					1.00			1.00			1.00			1.00	
Wind dir. red.		0.68					0.65			0.65			0.68			0.68	
Total reduction		0.24					0.29			0.33			0.38			0.41	
Total, real		249					97			46			249			265	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 50

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative **Shadow receptor:** 8226 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6615)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October	November			December		
1	06:09		06:54 (119)	06:33		06:58 (119)	07:02			07:31	07:04			07:37		15:48 (49)
	21:08	22	07:16 (119)	20:51	22	07:20 (119)	20:09			19:19	17:33			17:10	39	16:27 (49)
2	06:10		06:55 (119)	06:33		06:59 (119)	07:03			07:32	07:05			07:38		15:49 (49)
	21:08	22	07:17 (119)	20:50	20	07:19 (119)	20:08			19:17	17:32			17:10	39	16:28 (49)
3	06:10		06:54 (119)	06:34		07:00 (119)	07:04			07:33	07:06			07:39		15:49 (49)
	21:08	23	07:17 (119)	20:49	18	07:18 (119)	20:06			19:15	17:31			17:10	39	16:28 (49)
4	06:11		06:55 (119)	06:35		07:02 (119)	07:05			07:34	07:07			07:40		15:49 (49)
	21:08	23	07:18 (119)	20:48	14	07:16 (119)	20:05			19:14	17:30			17:10	39	16:28 (49)
5	06:11		06:54 (119)	06:36		07:05 (119)	07:06		08:00 (118)	07:35	07:08			07:41		15:50 (49)
	21:08	24	07:18 (119)	20:47	8	07:13 (119)	20:03	5	08:05 (118)	19:12	17:29			17:10	39	16:29 (49)
6	06:12		06:54 (119)	06:37			07:07		07:55 (118)	07:36	07:09			07:42		15:50 (49)
	21:08	25	07:19 (119)	20:45			20:01	14	08:09 (118)	19:11	17:28			17:09	39	16:29 (49)
7	06:13		06:55 (119)	06:38			07:08		07:53 (118)	07:37	07:10			07:43		15:51 (49)
	21:07	25	07:20 (119)	20:44			20:00	18	08:11 (118)	19:09	17:27			17:09	39	16:30 (49)
8	06:13		06:54 (119)	06:39			07:09		07:51 (118)	07:38	07:12			07:44		15:52 (49)
	21:07	26	07:20 (119)	20:43			19:57	22	08:13 (118)	19:07	17:26			17:09	38	16:30 (49)
9	06:14		06:54 (119)	06:40			07:10		07:48 (118)	07:39	07:13			07:45		15:52 (49)
	21:07	27	07:21 (119)	20:42			19:55	25	08:13 (118)	19:06	17:25			17:09	38	16:30 (49)
10	06:14		06:53 (119)	06:41			07:11		07:47 (118)	07:40	07:14			07:46		15:53 (49)
	21:06	28	07:21 (119)	20:41			19:53	27	08:14 (118)	19:04	17:24			17:09	38	16:31 (49)
11	06:15		06:53 (119)	06:42			07:11		07:46 (118)	07:41	07:15			07:47		15:53 (49)
	21:06	29	07:22 (119)	20:39			19:52	28	08:14 (118)	19:03	17:23			17:10	38	16:31 (49)
12	06:16		06:54 (119)	06:43			07:12		07:45 (118)	07:42	07:16		15:57 (49)	07:47		15:53 (49)
	21:06	28	07:22 (119)	20:38			19:50	29	08:14 (118)	19:01	17:22	13	16:10 (49)	17:10	38	16:31 (49)
13	06:17		06:53 (119)	06:44			07:13		07:45 (118)	07:43	07:17		15:55 (49)	07:48		15:54 (49)
	21:05	29	07:22 (119)	20:37			19:48	30	08:15 (118)	19:00	17:21	18	16:13 (49)	17:10	38	16:32 (49)
14	06:17		06:53 (119)	06:45			07:14		07:44 (118)	07:44	07:19		15:53 (49)	07:49		15:55 (49)
	21:05	30	07:23 (119)	20:36			19:47	31	08:15 (118)	18:58	17:20	21	16:14 (49)	17:10	37	16:32 (49)
15	06:18		06:53 (119)	06:46			07:15		07:44 (118)	07:45	07:20		15:52 (49)	07:50		15:56 (49)
	21:04	30	07:23 (119)	20:34			19:45	30	08:14 (118)	18:57	17:19	25	16:17 (49)	17:10	37	16:33 (49)
16	06:19		06:53 (119)	06:47			07:16		07:43 (118)	07:46	07:21		15:51 (49)	07:50		15:55 (49)
	21:04	31	07:24 (119)	20:33			19:43	31	08:14 (118)	18:55	17:18	27	16:18 (49)	17:11	38	16:33 (49)
17	06:20		06:53 (119)	06:48			07:17		07:43 (118)	07:47	07:22		15:50 (49)	07:51		15:56 (49)
	21:03	30	07:23 (119)	20:32			19:42	31	08:14 (118)	18:54	17:18	29	16:19 (49)	17:11	37	16:33 (49)
18	06:20		06:53 (119)	06:49			07:18		07:44 (118)	07:48	07:23		15:49 (49)	07:52		15:56 (49)
	21:02	31	07:24 (119)	20:30			19:40	29	08:13 (118)	18:52	17:17	30	16:19 (49)	17:11	37	16:33 (49)
19	06:21		06:53 (119)	06:50			07:19		07:44 (118)	07:49	07:24		15:49 (49)	07:52		15:57 (49)
	21:02	31	07:24 (119)	20:29			19:38	28	08:12 (118)	18:51	17:16	32	16:21 (49)	17:12	37	16:34 (49)
20	06:22		06:53 (119)	06:51			07:20		07:44 (118)	07:50	07:25		15:49 (49)	07:53		15:58 (49)
	21:01	32	07:25 (119)	20:27			19:37	27	08:11 (118)	18:49	17:15	33	16:22 (49)	17:12	37	16:35 (49)
21	06:23		06:54 (119)	06:52			07:21		07:45 (118)	07:51	07:27		15:48 (49)	07:53		15:58 (49)
	21:00	31	07:25 (119)	20:26			19:35	24	08:09 (118)	18:48	17:15	34	16:22 (49)	17:12	37	16:35 (49)
22	06:24		06:53 (119)	06:52			07:22		07:45 (118)	07:52	07:28		15:48 (49)	07:54		15:59 (49)
	21:00	31	07:24 (119)	20:25			19:33	22	08:07 (118)	18:46	17:14	35	16:23 (49)	17:13	37	16:36 (49)
23	06:24		06:53 (119)	06:53			07:23		07:47 (118)	07:53	07:29		15:47 (49)	07:54		15:59 (49)
	20:59	31	07:24 (119)	20:23			19:32	18	08:05 (118)	18:45	17:14	36	16:23 (49)	17:13	37	16:36 (49)
24	06:25		06:54 (119)	06:54			07:24		07:49 (118)	07:55	07:30		15:47 (49)	07:55		15:59 (49)
	20:58	30	07:24 (119)	20:22			19:30	13	08:02 (118)	18:44	17:13	37	16:24 (49)	17:14	37	16:36 (49)
25	06:26		06:54 (119)	06:55			07:25			07:56	07:31		15:48 (49)	07:55		16:00 (49)
	20:57	30	07:24 (119)	20:20			19:28			18:42	17:13	37	16:25 (49)	17:15	37	16:37 (49)
26	06:27		06:54 (119)	06:56			07:26			07:57	07:32		15:48 (49)	07:56		16:00 (49)
	20:56	30	07:24 (119)	20:19			19:27			18:41	17:12	38	16:26 (49)	17:15	37	16:37 (49)
27	06:28		06:55 (119)	06:57			07:27			07:58	07:33		15:48 (49)	07:56		16:00 (49)
	20:56	29	07:24 (119)	20:17			19:25			18:40	17:12	38	16:26 (49)	17:16	38	16:38 (49)
28	06:29		06:55 (119)	06:58			07:28			07:59	07:34		15:48 (49)	07:56		16:01 (49)
	20:55	28	07:23 (119)	20:16			19:23			18:38	17:11	38	16:26 (49)	17:17	38	16:39 (49)
29	06:30		06:55 (119)	06:59			07:29			08:00	07:35		15:48 (49)	07:57		16:02 (49)
	20:54	27	07:22 (119)	20:14			19:22			18:37	17:11	39	16:27 (49)	17:17	37	16:39 (49)
30	06:31		06:56 (119)	07:00			07:30			08:01	07:36		15:48 (49)	07:57		16:02 (49)
	20:53	26	07:22 (119)	20:13			19:20			18:36	17:11	39	16:27 (49)	17:18	37	16:39 (49)
31	06:32		06:57 (119)	07:01						08:02				07:57		16:02 (49)
	20:52	24	07:21 (119)	20:11						18:35				17:19	38	16:40 (49)
Potential sun hours	456			426			374			346	300			291		
Total, worst case		863			82			482				599			1171	
Sun reduction		0.60			0.60			0.61				0.37			0.50	
Oper. time red.		1.00			1.00			1.00				1.00			1.00	
Wind dir. red.		0.68			0.68			0.65				0.68			0.68	
Total reduction		0.41			0.41			0.40				0.25			0.34	
Total, real		353			33			193				150			396	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 51

Licensed user:
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US-SYRACUSE, NY 13202
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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative **Shadow receptor:** 8343 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6630)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:25 (100)	07:44		08:45 (100)	07:09		07:29 (126)	07:20			06:36			06:08		06:33 (15)
	17:19	36	09:01 (100)	17:53	15	09:00 (100)	18:26	3	07:32 (126)	19:59			20:28			20:57	34	07:07 (15)
2	07:57		08:25 (100)	07:43		08:49 (100)	07:08		07:27 (126)	07:18			06:34			06:08		06:33 (15)
	17:20	36	09:01 (100)	17:54	7	08:56 (100)	18:27	6	07:33 (126)	20:00			20:29			20:58	35	07:08 (15)
3	07:57		08:25 (100)	07:43			07:06		07:26 (126)	07:17			06:33			06:07		06:33 (15)
	17:21	37	09:02 (100)	17:55			18:28	9	07:35 (126)	20:00			20:30			20:58	35	07:08 (15)
4	07:58		08:25 (100)	07:42			07:05		07:24 (126)	07:15			06:32			06:07		06:33 (15)
	17:22	38	09:03 (100)	17:57			18:29	12	07:36 (126)	20:01			20:31			20:59	35	07:08 (15)
5	07:58		08:26 (100)	07:40			07:03		07:22 (126)	07:14			06:31			06:06		06:33 (15)
	17:23	37	09:03 (100)	17:58			18:30	14	07:36 (126)	20:02			20:32			21:00	36	07:09 (15)
6	07:58		08:26 (100)	07:39			07:02		07:21 (126)	07:12			06:29			06:06		06:33 (15)
	17:24	38	09:04 (100)	17:59			18:31	16	07:37 (126)	20:03			20:33			21:00	37	07:10 (15)
7	07:57		08:26 (100)	07:38			07:00		07:19 (126)	07:10			06:28			06:06		06:33 (15)
	17:25	39	09:05 (100)	18:00			18:32	17	07:36 (126)	20:04			20:34			21:01	36	07:09 (15)
8	07:57		08:27 (100)	07:37			07:59		08:18 (126)	07:09		19:29 (16)	06:27			06:06		06:33 (15)
	17:26	38	09:05 (100)	18:01			19:34	19	08:37 (126)	20:05	4	19:33 (16)	20:35			21:02	37	07:10 (15)
9	07:57		08:27 (100)	07:36			07:57		08:16 (126)	07:07		19:25 (16)	06:26			06:05		06:33 (15)
	17:27	39	09:06 (100)	18:03			19:35	20	08:36 (126)	20:06	13	19:38 (16)	20:36			21:02	37	07:10 (15)
10	07:57		08:27 (100)	07:35			07:56		08:15 (126)	07:06		19:22 (16)	06:25			06:05		06:33 (15)
	17:28	39	09:06 (100)	18:04			19:36	21	08:36 (126)	20:07	17	19:39 (16)	20:37			21:03	38	07:11 (15)
11	07:57		08:28 (100)	07:34			07:54		08:15 (126)	07:04		19:21 (16)	06:24			06:05		06:33 (15)
	17:29	38	09:06 (100)	18:05			19:37	19	08:34 (126)	20:08	20	19:41 (16)	20:38			21:03	38	07:11 (15)
12	07:57		08:28 (100)	07:33			07:52		08:15 (126)	07:03		19:19 (16)	06:23			06:05		06:34 (15)
	17:30	39	09:07 (100)	18:06			19:38	18	08:33 (126)	20:09	23	19:42 (16)	20:39			21:04	37	07:11 (15)
13	07:56		08:28 (100)	07:31			07:51		08:17 (126)	07:01		19:18 (16)	06:22			06:05		06:34 (15)
	17:31	39	09:07 (100)	18:07			19:39	15	08:32 (126)	20:10	25	19:43 (16)	20:40			21:04	38	07:12 (15)
14	07:56		08:29 (100)	07:30			07:49		08:19 (126)	07:00		19:17 (16)	06:21			06:05		06:34 (15)
	17:32	39	09:08 (100)	18:09			19:40	10	08:29 (126)	20:11	26	19:43 (16)	20:41			21:05	38	07:12 (15)
15	07:56		08:29 (100)	07:29			07:48			06:58		19:16 (16)	06:20			06:05		06:34 (15)
	17:33	40	09:09 (100)	18:10			19:41			20:12	27	19:43 (16)	20:42			21:05	38	07:12 (15)
16	07:55		08:29 (100)	07:28			07:46			06:56		19:15 (16)	06:19			06:05		06:34 (15)
	17:34	39	09:08 (100)	18:11			19:42			20:13	28	19:43 (16)	20:43			21:06	38	07:12 (15)
17	07:55		08:30 (100)	07:26			07:44			06:55		19:16 (16)	06:18			06:05		06:34 (15)
	17:35	39	09:09 (100)	18:12			19:43			20:14	27	19:43 (16)	20:44			21:06	38	07:12 (15)
18	07:54		08:30 (100)	07:25			07:43			06:54		19:15 (16)	06:17			06:05		06:34 (15)
	17:36	39	09:09 (100)	18:13			19:44			20:15	27	19:42 (16)	20:45			21:06	39	07:13 (15)
19	07:54		08:31 (100)	07:24			07:41			06:52		19:15 (16)	06:16		06:46 (15)	06:05		06:34 (15)
	17:38	38	09:09 (100)	18:14			19:45			20:16	27	19:42 (16)	20:46	7	06:53 (15)	21:07	39	07:13 (15)
20	07:53		08:31 (100)	07:22			07:40			06:51		19:15 (16)	06:16		06:42 (15)	06:05		06:35 (15)
	17:39	38	09:09 (100)	18:16			19:46			20:17	26	19:41 (16)	20:47	14	06:56 (15)	21:07	38	07:13 (15)
21	07:53		08:32 (100)	07:21			07:38			06:49		19:15 (16)	06:15		06:40 (15)	06:05		06:35 (15)
	17:40	37	09:09 (100)	18:17			19:47			20:18	26	19:41 (16)	20:48	18	06:58 (15)	21:07	38	07:13 (15)
22	07:52		08:33 (100)	07:20			07:36			06:48		19:16 (16)	06:14		06:39 (15)	06:06		06:36 (15)
	17:41	36	09:09 (100)	18:18			19:48			20:19	25	19:41 (16)	20:49	21	07:00 (15)	21:07	38	07:14 (15)
23	07:52		08:33 (100)	07:18			07:35			06:46		19:16 (16)	06:13		06:38 (15)	06:06		06:35 (15)
	17:42	36	09:09 (100)	18:19			19:49			20:20	23	19:39 (16)	20:49	23	07:01 (15)	21:08	39	07:14 (15)
24	07:51		08:34 (100)	07:17			07:33			06:45		19:18 (16)	06:13		06:37 (15)	06:06		06:35 (15)
	17:43	34	09:08 (100)	18:20			19:50			20:21	20	19:38 (16)	20:50	24	07:01 (15)	21:08	39	07:14 (15)
25	07:50		08:35 (100)	07:15			07:31			06:44		19:19 (16)	06:12		06:36 (15)	06:06		06:36 (15)
	17:45	34	09:09 (100)	18:21			19:51			20:22	18	19:37 (16)	20:51	27	07:03 (15)	21:08	38	07:14 (15)
26	07:49		08:36 (100)	07:14			07:30			06:42		19:20 (16)	06:11		06:35 (15)	06:07		06:36 (15)
	17:46	32	09:08 (100)	18:23			19:52			20:23	14	19:34 (16)	20:52	29	07:04 (15)	21:08	38	07:14 (15)
27	07:49		08:37 (100)	07:12			07:28			06:41		19:24 (16)	06:11		06:34 (15)	06:07		06:36 (15)
	17:47	30	09:07 (100)	18:24			19:53			20:24	7	19:31 (16)	20:53	30	07:04 (15)	21:08	38	07:14 (15)
28	07:48		08:38 (100)	07:11			07:26			06:39			06:10		06:34 (15)	06:08		06:37 (15)
	17:48	28	09:06 (100)	18:25			19:54			20:25			20:54	31	07:05 (15)	21:08	38	07:15 (15)
29	07:47		08:39 (100)				07:25			06:38			06:09		06:34 (15)	06:08		06:37 (15)
	17:49	26	09:05 (100)				19:56			20:26			20:55	31	07:05 (15)	21:08	38	07:15 (15)
30	07:46		08:41 (100)				07:23			06:37			06:09		06:34 (15)	06:08		06:37 (15)
	17:51	23	09:04 (100)				19:57			20:27			20:55	32	07:06 (15)	21:08	37	07:14 (15)
31	07:45		08:43 (100)				07:22						06:08		06:34 (15)			
	17:52	19	09:02 (100)				19:58						20:56	33	07:07 (15)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		1100			22			199			423			320			1122	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.61			0.61			0.63			0.64			0.68			0.68	
Total reduction		0.22			0.25			0.28			0.32			0.38			0.41	
Total, real		238			6			55			137			121			456	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 52

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative **Shadow receptor:** 8343 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6630)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:38 (15)	06:32			07:02		19:20 (16)	07:30		07:55 (126)	07:03			07:37		08:10 (100)
	21:08	37	07:15 (15)	20:51			20:09	20	19:40 (16)	19:18	17	08:12 (126)	17:33			17:10	39	08:49 (100)
2	06:09		06:37 (15)	06:33			07:03		19:21 (16)	07:31		07:54 (126)	07:05			07:38		08:10 (100)
	21:08	38	07:15 (15)	20:50			20:08	17	19:38 (16)	19:17	19	08:13 (126)	17:32			17:10	39	08:49 (100)
3	06:10		06:38 (15)	06:34			07:04		19:23 (16)	07:32		07:53 (126)	07:06			07:39		08:11 (100)
	21:08	37	07:15 (15)	20:49			20:06	13	19:36 (16)	19:15	20	08:13 (126)	17:31			17:09	38	08:49 (100)
4	06:10		06:38 (15)	06:35			07:05		19:27 (16)	07:33		07:53 (126)	07:07			07:40		08:11 (100)
	21:08	37	07:15 (15)	20:48			20:04	5	19:32 (16)	19:13	20	08:13 (126)	17:30			17:09	38	08:49 (100)
5	06:11		06:39 (15)	06:36			07:06			07:34		07:54 (126)	07:08			07:41		08:12 (100)
	21:08	36	07:15 (15)	20:46			20:03			19:12	19	08:13 (126)	17:28			17:09	38	08:50 (100)
6	06:12		06:39 (15)	06:37			07:06			07:35		07:55 (126)	07:09			07:42		08:12 (100)
	21:07	37	07:16 (15)	20:45			20:01			19:10	18	08:13 (126)	17:27			17:09	38	08:50 (100)
7	06:12		06:39 (15)	06:38			07:07			07:36		07:56 (126)	07:10			07:43		08:13 (100)
	21:07	36	07:15 (15)	20:44			20:00			19:09	17	08:13 (126)	17:26			17:09	37	08:50 (100)
8	06:13		06:40 (15)	06:39			07:08			07:37		07:57 (126)	07:11			07:44		08:13 (100)
	21:07	36	07:16 (15)	20:43			19:56			19:07	15	08:12 (126)	17:25			17:09	38	08:51 (100)
9	06:13		06:40 (15)	06:40			07:09			07:38		07:58 (126)	07:13		08:19 (100)	07:45		08:14 (100)
	21:07	35	07:15 (15)	20:42			19:55			19:05	13	08:11 (126)	17:24	8	08:27 (100)	17:09	37	08:51 (100)
10	06:14		06:40 (15)	06:41			07:10			07:40		07:59 (126)	07:14		08:16 (100)	07:46		08:15 (100)
	21:06	35	07:15 (15)	20:41			19:53			19:04	11	08:10 (126)	17:23	15	08:31 (100)	17:09	36	08:51 (100)
11	06:15		06:41 (15)	06:42			07:11			07:41		08:00 (126)	07:15		08:14 (100)	07:46		08:15 (100)
	21:06	34	07:15 (15)	20:39			19:51			19:02	8	08:08 (126)	17:22	20	08:34 (100)	17:09	36	08:51 (100)
12	06:15		06:41 (15)	06:43			07:12			07:42		08:01 (126)	07:16		08:13 (100)	07:47		08:15 (100)
	21:05	34	07:15 (15)	20:38			19:50			19:01	5	08:06 (126)	17:21	23	08:36 (100)	17:09	36	08:51 (100)
13	06:16		06:42 (15)	06:44			07:13			07:43			07:17		08:11 (100)	07:48		08:16 (100)
	21:05	33	07:15 (15)	20:37			19:48			18:59			17:21	26	08:37 (100)	17:09	36	08:52 (100)
14	06:17		06:43 (15)	06:44			07:14			07:44			07:18		08:10 (100)	07:49		08:17 (100)
	21:05	32	07:15 (15)	20:35			19:46			18:58			17:20	28	08:38 (100)	17:10	36	08:53 (100)
15	06:18		06:44 (15)	06:45			07:15			07:45			07:20		08:10 (100)	07:50		08:18 (100)
	21:04	31	07:15 (15)	20:34			19:45			18:56			17:19	30	08:40 (100)	17:10	35	08:53 (100)
16	06:18		06:43 (15)	06:46		19:29 (16)	07:16			07:46			07:21		08:09 (100)	07:50		08:18 (100)
	21:04	30	07:13 (15)	20:33	10	19:39 (16)	19:43			18:55			17:18	32	08:41 (100)	17:10	35	08:53 (100)
17	06:19		06:44 (15)	06:47		19:27 (16)	07:17			07:47			07:22		08:08 (100)	07:51		08:19 (100)
	21:03	29	07:13 (15)	20:31	14	19:41 (16)	19:42			18:53			17:17	34	08:42 (100)	17:10	35	08:54 (100)
18	06:20		06:45 (15)	06:48		19:25 (16)	07:18			07:48			07:23		08:08 (100)	07:52		08:19 (100)
	21:02	28	07:13 (15)	20:30	18	19:43 (16)	19:40			18:52			17:16	34	08:42 (100)	17:11	34	08:53 (100)
19	06:21		06:47 (15)	06:49		19:23 (16)	07:19			07:49			07:24		08:07 (100)	07:52		08:19 (100)
	21:02	25	07:12 (15)	20:29	21	19:44 (16)	19:38			18:50			17:16	36	08:43 (100)	17:11	35	08:54 (100)
20	06:22		06:47 (15)	06:50		19:22 (16)	07:20			07:50			07:25		08:08 (100)	07:53		08:20 (100)
	21:01	24	07:11 (15)	20:27	23	19:45 (16)	19:37			18:49			17:15	36	08:44 (100)	17:12	35	08:55 (100)
21	06:22		06:48 (15)	06:51		19:21 (16)	07:21			07:51			07:26		08:08 (100)	07:53		08:20 (100)
	21:00	22	07:10 (15)	20:26	24	19:45 (16)	19:35			18:47			17:14	37	08:45 (100)	17:12	35	08:55 (100)
22	06:23		06:50 (15)	06:52		19:20 (16)	07:22			07:52			07:28		08:08 (100)	07:54		08:21 (100)
	21:00	19	07:09 (15)	20:24	26	19:46 (16)	19:33			18:46			17:14	37	08:45 (100)	17:13	35	08:56 (100)
23	06:24		06:52 (15)	06:53		19:20 (16)	07:23			07:53			07:29		08:07 (100)	07:54		08:21 (100)
	20:59	15	07:07 (15)	20:23	26	19:46 (16)	19:32			18:45			17:13	38	08:45 (100)	17:13	35	08:56 (100)
24	06:25		06:54 (15)	06:54		19:19 (16)	07:24			07:54			07:30		08:07 (100)	07:55		08:21 (100)
	20:58	11	07:05 (15)	20:21	27	19:46 (16)	19:30			18:43			17:13	39	08:46 (100)	17:14	35	08:56 (100)
25	06:26			06:55		19:19 (16)	07:25			07:56			07:31		08:08 (100)	07:55		08:22 (100)
	20:57			20:20	27	19:46 (16)	19:28			18:42			17:12	39	08:47 (100)	17:14	35	08:57 (100)
26	06:27			06:56		19:17 (16)	07:26			07:57			07:32		08:08 (100)	07:56		08:23 (100)
	20:56			20:18	28	19:45 (16)	19:27			18:41			17:12	39	08:47 (100)	17:15	35	08:58 (100)
27	06:28			06:57		19:17 (16)	07:27			07:58			07:33		08:09 (100)	07:56		08:23 (100)
	20:55			20:17	28	19:45 (16)	19:25			18:39			17:11	39	08:48 (100)	17:16	35	08:58 (100)
28	06:28			06:58		19:17 (16)	07:27			07:59			07:34		08:09 (100)	07:56		08:24 (100)
	20:55			20:15	27	19:44 (16)	19:23			18:38			17:11	39	08:48 (100)	17:16	35	08:59 (100)
29	06:29			06:59		19:18 (16)	07:28		08:01 (126)	08:00			07:35		08:09 (100)	07:57		08:24 (100)
	20:54			20:14	26	19:44 (16)	19:22	7	08:08 (126)	18:37			17:11	39	08:48 (100)	17:17	35	08:59 (100)
30	06:30			07:00		19:18 (16)	07:29		07:57 (126)	08:01			07:36		08:09 (100)	07:57		08:24 (100)
	20:53			20:12	25	19:43 (16)	19:20	13	08:10 (126)	18:36			17:10	39	08:48 (100)	17:18	36	09:00 (100)
31	06:31			07:01		19:19 (16)				08:02						07:57		08:24 (100)
	20:52			20:11	23	19:42 (16)				18:34						17:18	36	09:00 (100)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		731			373			75			182			707			1118	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.68			0.64			0.64			0.63			0.61			0.61	
Total reduction		0.41			0.38			0.39			0.35			0.22			0.30	
Total, real		297			142			29			64			157			336	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 53

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative **Shadow receptor:** 8351 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6633)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:25 (108)	07:45			07:10		07:44 (83)	07:20			06:36		07:24 (82)	06:08		06:29 (106)
	17:20	29	08:54 (108)	17:53			18:26	38	08:22 (83)	19:59			20:28	89	19:58 (107)	20:57	45	19:53 (107)
2	07:58		08:25 (108)	07:44			07:08		07:44 (83)	07:19			06:35		07:24 (82)	06:08		06:29 (106)
	17:21	29	08:54 (108)	17:54			18:27	37	08:21 (83)	20:00			20:29	91	19:59 (107)	20:58	43	19:52 (107)
3	07:58		08:26 (108)	07:43			07:07		07:44 (83)	07:17			06:33		07:24 (82)	06:07		06:29 (106)
	17:21	30	08:56 (108)	17:56			18:28	37	08:21 (83)	20:00			20:30	92	20:00 (107)	20:59	43	19:52 (107)
4	07:58		08:26 (108)	07:42			07:05		07:44 (83)	07:15			06:32		07:25 (82)	06:07		06:28 (106)
	17:22	29	08:55 (108)	17:57			18:29	36	08:20 (83)	20:01			20:31	91	20:00 (107)	20:59	43	19:51 (107)
5	07:58		08:26 (108)	07:41			07:04		07:44 (83)	07:14			06:31		07:24 (82)	06:07		06:29 (106)
	17:23	30	08:56 (108)	17:58			18:31	36	08:20 (83)	20:02			20:32	92	20:00 (107)	21:00	40	19:50 (107)
6	07:58		08:27 (108)	07:40			07:02		07:44 (83)	07:12			06:30		07:24 (82)	06:06		06:29 (106)
	17:24	29	08:56 (108)	17:59			18:32	35	08:19 (83)	20:03			20:33	91	20:00 (107)	21:01	39	19:50 (107)
7	07:58		08:27 (108)	07:39			07:01		07:45 (83)	07:11			06:29		07:25 (82)	06:06		06:29 (106)
	17:25	30	08:57 (108)	18:01			18:33	34	08:19 (83)	20:04			20:34	91	20:01 (107)	21:01	37	19:49 (107)
8	07:58		08:28 (108)	07:37			07:59		08:45 (83)	07:09			06:27		07:25 (82)	06:06		06:28 (106)
	17:26	29	08:57 (108)	18:02			19:34	32	09:17 (83)	20:05			20:35	91	20:01 (107)	21:02	36	19:47 (107)
9	07:57		08:29 (108)	07:36			07:57		08:46 (83)	07:08			06:26		07:26 (82)	06:06		06:28 (106)
	17:27	29	08:58 (108)	18:03			19:35	29	09:15 (83)	20:06			20:36	90	20:01 (107)	21:02	33	19:46 (107)
10	07:57		08:29 (108)	07:35			07:56		08:47 (83)	07:06		07:50 (82)	06:25		07:27 (82)	06:06		06:29 (106)
	17:28	29	08:58 (108)	18:04			19:36	27	09:14 (83)	20:07	11	08:01 (82)	20:37	88	20:01 (107)	21:03	27	19:44 (107)
11	07:57		08:29 (108)	07:34			07:54		08:48 (83)	07:04		07:44 (82)	06:24		07:27 (82)	06:05		06:29 (106)
	17:29	29	08:58 (108)	18:05			19:37	24	09:12 (83)	20:08	21	08:05 (82)	20:38	87	20:01 (107)	21:04	24	06:53 (106)
12	07:57		08:30 (108)	07:33			07:53		08:51 (83)	07:03		07:41 (82)	06:23		07:28 (82)	06:05		06:29 (106)
	17:30	29	08:59 (108)	18:07			19:38	19	09:10 (83)	20:09	27	08:08 (82)	20:39	85	20:01 (107)	21:04	24	06:53 (106)
13	07:57		08:31 (108)	07:32			07:51		08:53 (83)	07:01		07:38 (82)	06:22		07:29 (82)	06:05		06:29 (106)
	17:31	28	08:59 (108)	18:08			19:39	13	09:06 (83)	20:10	31	08:09 (82)	20:40	83	20:01 (107)	21:05	25	06:54 (106)
14	07:56		08:31 (108)	07:30			07:49			07:00		07:37 (82)	06:21		07:30 (82)	06:05		06:29 (106)
	17:32	28	08:59 (108)	18:09			19:40			20:11	34	08:11 (82)	20:41	80	20:00 (107)	21:05	25	06:54 (106)
15	07:56		08:32 (108)	07:29			07:48			06:58		07:35 (82)	06:20		07:31 (82)	06:05		06:30 (106)
	17:33	27	08:59 (108)	18:10			19:41			20:12	37	08:12 (82)	20:42	77	20:00 (107)	21:05	24	06:54 (106)
16	07:55		08:32 (108)	07:28			07:46			06:57		07:33 (82)	06:19		07:32 (82)	06:05		06:30 (106)
	17:34	27	08:59 (108)	18:11			19:42			20:13	41	08:14 (82)	20:43	75	20:00 (107)	21:06	24	06:54 (106)
17	07:55		08:33 (108)	07:27			07:45			06:55		07:32 (82)	06:18		07:34 (82)	06:05		06:30 (106)
	17:36	26	08:59 (108)	18:12			19:43			20:14	42	08:14 (82)	20:44	71	20:00 (107)	21:06	24	06:54 (106)
18	07:55		08:34 (108)	07:25		07:59 (83)	07:43			06:54		07:31 (82)	06:17		07:35 (82)	06:05		06:30 (106)
	17:37	24	08:58 (108)	18:14	11	08:10 (83)	19:44			20:15	44	08:15 (82)	20:45	69	20:00 (107)	21:07	24	06:54 (106)
19	07:54		08:35 (108)	07:24		07:55 (83)	07:41			06:52		07:29 (82)	06:17		07:36 (82)	06:05		06:30 (106)
	17:38	24	08:59 (108)	18:15	18	08:13 (83)	19:45			20:16	46	08:15 (82)	20:46	65	19:59 (107)	21:07	25	06:55 (106)
20	07:54		08:36 (108)	07:23		07:53 (83)	07:40			06:51		07:29 (82)	06:16		07:38 (82)	06:06		06:31 (106)
	17:39	22	08:58 (108)	18:16	22	08:15 (83)	19:46			20:17	47	08:16 (82)	20:47	60	19:59 (107)	21:07	25	06:56 (106)
21	07:53		08:37 (108)	07:21		07:52 (83)	07:38			06:49		07:27 (82)	06:15		07:41 (82)	06:06		06:31 (106)
	17:40	21	08:58 (108)	18:17	25	08:17 (83)	19:48			20:18	49	08:16 (82)	20:48	55	19:59 (107)	21:07	25	06:56 (106)
22	07:52		08:38 (108)	07:20		07:50 (83)	07:37			06:48		07:27 (82)	06:14		07:43 (82)	06:06		06:31 (106)
	17:41	19	08:57 (108)	18:18	28	08:18 (83)	19:49			20:19	49	08:16 (82)	20:49	48	19:58 (107)	21:08	25	06:56 (106)
23	07:52		08:40 (108)	07:18		07:49 (83)	07:35			06:47		07:27 (82)	06:14		19:20 (107)	06:06		06:31 (106)
	17:42	15	08:55 (108)	18:19	31	08:20 (83)	19:50			20:20	60	19:46 (107)	20:50	38	19:58 (107)	21:08	25	06:56 (106)
24	07:51		08:42 (108)	07:17		07:47 (83)	07:33			06:45		07:25 (82)	06:13		19:21 (107)	06:06		06:31 (106)
	17:44	11	08:53 (108)	18:21	33	08:20 (83)	19:51			20:21	69	19:49 (107)	20:51	36	19:57 (107)	21:08	25	06:56 (106)
25	07:50		08:46 (108)	07:16		07:47 (83)	07:32			06:44		07:25 (82)	06:12		19:22 (107)	06:07		06:32 (106)
	17:45	5	08:51 (108)	18:22	34	08:21 (83)	19:52			20:22	75	19:52 (107)	20:51	35	19:57 (107)	21:08	24	06:56 (106)
26	07:50			07:14		07:45 (83)	07:30			06:42		07:25 (82)	06:11		06:34 (106)	06:07		06:32 (106)
	17:46			18:23	36	08:21 (83)	19:53			20:23	79	19:54 (107)	20:52	42	19:56 (107)	21:08	24	06:56 (106)
27	07:49			07:13		07:45 (83)	07:28			06:41		07:24 (82)	06:11		06:33 (106)	06:07		06:32 (106)
	17:47			18:24	36	08:21 (83)	19:54			20:24	82	19:55 (107)	20:53	43	19:56 (107)	21:08	24	06:56 (106)
28	07:48			07:11		07:44 (83)	07:27			06:40		07:24 (82)	06:10		06:32 (106)	06:08		06:32 (106)
	17:48			18:25	37	08:21 (83)	19:55			20:25	85	19:56 (107)	20:54	44	19:55 (107)	21:08	25	06:57 (106)
29	07:47						07:25			06:38		07:24 (82)	06:10		06:31 (106)	06:08		06:32 (106)
	17:50						19:56			20:26	87	19:57 (107)	20:55	46	19:55 (107)	21:08	25	06:57 (106)
30	07:46						07:23			06:37		07:24 (82)	06:09		06:30 (106)	06:09		06:33 (106)
	17:51						19:57			20:27	88	19:58 (107)	20:56	46	19:54 (107)	21:08	24	06:57 (106)
31	07:46						07:22						06:09		06:30 (106)			
	17:52						19:58						20:56	45	19:54 (107)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		628			311			397			1104			2136			876	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.61			0.63			0.63			0.66			0.65			0.67	
Total reduction		0.22			0.26			0.28			0.34			0.36			0.40	
Total, real		137			82			110			371			774			353	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 54

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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative **Shadow receptor:** 8351 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6633)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:33 (106)	06:32		07:38 (82)	07:02		07:43 (82)	07:31		08:30 (83)	07:04			07:37		08:11 (108)
	21:08	24	06:57 (106)	20:51	85	20:11 (107)	20:09	21	08:04 (82)	19:19	17	08:47 (83)	17:33			17:10	29	08:40 (108)
2	06:10		06:34 (106)	06:33		07:38 (82)	07:03		07:48 (82)	07:32		08:28 (83)	07:05			07:38		08:11 (108)
	21:08	24	06:58 (106)	20:50	86	20:11 (107)	20:08	11	07:59 (82)	19:17	22	08:50 (83)	17:32			17:10	29	08:40 (108)
3	06:10		06:34 (106)	06:34		07:37 (82)	07:04			07:33		08:26 (83)	07:06			07:39		08:12 (108)
	21:08	30	19:50 (107)	20:49	88	20:11 (107)	20:06			19:15	25	08:51 (83)	17:31			17:10	29	08:41 (108)
4	06:11		06:34 (106)	06:35		07:36 (82)	07:05			07:34		08:24 (83)	07:07			07:40		08:12 (108)
	21:08	34	19:52 (107)	20:48	89	20:11 (107)	20:05			19:14	28	08:52 (83)	17:30			17:10	29	08:41 (108)
5	06:11		06:34 (106)	06:36		07:35 (82)	07:06			07:35		08:22 (83)	07:08			07:41		08:12 (108)
	21:08	36	19:53 (107)	20:47	90	20:10 (107)	20:03			19:12	31	08:53 (83)	17:29			17:09	30	08:42 (108)
6	06:12		06:35 (106)	06:37		07:34 (82)	07:07			07:36		08:21 (83)	07:09			07:42		08:13 (108)
	21:08	38	19:55 (107)	20:45	92	20:10 (107)	20:01			19:10	33	08:54 (83)	17:28			17:09	29	08:42 (108)
7	06:12		06:35 (106)	06:38		07:34 (82)	07:08			07:37		08:20 (83)	07:11			07:43		08:13 (108)
	21:07	40	19:56 (107)	20:44	91	20:10 (107)	20:00			19:09	34	08:54 (83)	17:27			17:09	30	08:43 (108)
8	06:13		06:36 (106)	06:39		07:34 (82)	07:09			07:38		08:19 (83)	07:12			07:44		08:14 (108)
	21:07	40	19:57 (107)	20:43	91	20:09 (107)	19:57			19:07	36	08:55 (83)	17:26			17:09	29	08:43 (108)
9	06:14		06:36 (106)	06:40		07:33 (82)	07:10			07:39		08:19 (83)	07:13			07:45		08:14 (108)
	21:07	43	19:59 (107)	20:42	92	20:09 (107)	19:55			19:06	36	08:55 (83)	17:25			17:09	30	08:44 (108)
10	06:14		06:36 (106)	06:41		07:33 (82)	07:11			07:40		08:18 (83)	07:14			07:46		08:15 (108)
	21:06	44	19:59 (107)	20:41	90	20:08 (107)	19:53			19:04	37	08:55 (83)	17:24			17:09	29	08:44 (108)
11	06:15		06:37 (106)	06:42		07:33 (82)	07:11			07:41		08:18 (83)	07:15			07:47		08:16 (108)
	21:06	45	20:01 (107)	20:39	91	20:08 (107)	19:52			19:03	37	08:55 (83)	17:23			17:09	29	08:45 (108)
12	06:16		06:38 (106)	06:43		07:32 (82)	07:12			07:42		08:17 (83)	07:16			07:47		08:16 (108)
	21:06	46	20:02 (107)	20:38	90	20:07 (107)	19:50			19:01	37	08:54 (83)	17:22			17:10	28	08:44 (108)
13	06:16		06:38 (106)	06:44		07:32 (82)	07:13			07:43		08:18 (83)	07:17			07:48		08:16 (108)
	21:05	46	20:02 (107)	20:37	89	20:06 (107)	19:48			19:00	37	08:55 (83)	17:21			17:10	29	08:45 (108)
14	06:17		06:39 (106)	06:45		07:32 (82)	07:14			07:44		08:18 (83)	07:19			07:49		08:17 (108)
	21:05	45	20:03 (107)	20:36	87	20:05 (107)	19:47			18:58	36	08:54 (83)	17:20			17:10	28	08:45 (108)
15	06:18		06:40 (106)	06:46		07:32 (82)	07:15			07:45		08:18 (83)	07:20			07:50		08:18 (108)
	21:04	46	20:04 (107)	20:34	85	20:04 (107)	19:45			18:57	36	08:54 (83)	17:19			17:10	28	08:46 (108)
16	06:19		06:42 (106)	06:47		07:32 (82)	07:16			07:46		08:18 (83)	07:21			07:50		08:18 (108)
	21:04	44	20:05 (107)	20:33	81	20:02 (107)	19:43			18:55	35	08:53 (83)	17:18			17:10	28	08:46 (108)
17	06:19		06:43 (106)	06:48		07:31 (82)	07:17			07:47		08:18 (83)	07:22		08:19 (108)	07:51		08:19 (108)
	21:03	42	20:05 (107)	20:32	79	20:00 (107)	19:42			18:54	34	08:52 (83)	17:17	5	08:24 (108)	17:11	28	08:47 (108)
18	06:20		06:45 (106)	06:49		07:31 (82)	07:18			07:48		08:19 (83)	07:23		08:16 (108)	07:52		08:19 (108)
	21:03	39	20:06 (107)	20:30	73	19:57 (107)	19:40			18:52	32	08:51 (83)	17:17	11	08:27 (108)	17:11	28	08:47 (108)
19	06:21		19:31 (107)	06:50		07:31 (82)	07:19			07:49		08:20 (83)	07:24		08:15 (108)	07:52		08:19 (108)
	21:02	36	20:07 (107)	20:29	68	19:55 (107)	19:38			18:51	30	08:50 (83)	17:16	15	08:30 (108)	17:11	28	08:47 (108)
20	06:22		19:31 (107)	06:51		07:31 (82)	07:20			07:50		08:21 (83)	07:25		08:13 (108)	07:53		08:20 (108)
	21:01	37	20:08 (107)	20:27	59	19:50 (107)	19:37			18:49	27	08:48 (83)	17:15	19	08:32 (108)	17:12	28	08:48 (108)
21	06:23		07:56 (82)	06:51		07:32 (82)	07:21			07:51		08:22 (83)	07:27		08:12 (108)	07:54		08:20 (108)
	21:01	41	20:08 (107)	20:26	49	08:21 (82)	19:35			18:48	24	08:46 (83)	17:15	21	08:33 (108)	17:12	28	08:48 (108)
22	06:24		07:51 (82)	06:52		07:32 (82)	07:22			07:52		08:24 (83)	07:28		08:12 (108)	07:54		08:21 (108)
	21:00	52	20:08 (107)	20:25	48	08:20 (82)	19:33			18:46	21	08:45 (83)	17:14	22	08:34 (108)	17:13	28	08:49 (108)
23	06:24		07:49 (82)	06:53		07:33 (82)	07:23			07:54		08:26 (83)	07:29		08:11 (108)	07:55		08:21 (108)
	20:59	58	20:09 (107)	20:23	47	08:20 (82)	19:32			18:45	17	08:43 (83)	17:14	24	08:35 (108)	17:13	28	08:49 (108)
24	06:25		07:47 (82)	06:54		07:33 (82)	07:24			07:55		08:30 (83)	07:30		08:12 (108)	07:55		08:22 (108)
	20:58	63	20:10 (107)	20:22	46	08:19 (82)	19:30			18:44	8	08:38 (83)	17:13	24	08:36 (108)	17:14	28	08:50 (108)
25	06:26		07:46 (82)	06:55		07:34 (82)	07:25			07:56			07:31		08:11 (108)	07:55		08:22 (108)
	20:57	66	20:10 (107)	20:20	44	08:18 (82)	19:28			18:42			17:13	26	08:37 (108)	17:15	28	08:50 (108)
26	06:27		07:45 (82)	06:56		07:35 (82)	07:26			07:57			07:32		08:11 (108)	07:56		08:23 (108)
	20:57	70	20:11 (107)	20:19	42	08:17 (82)	19:27			18:41			17:12	27	08:38 (108)	17:15	27	08:50 (108)
27	06:28		07:43 (82)	06:57		07:35 (82)	07:27			07:58			07:33		08:11 (108)	07:56		08:24 (108)
	20:56	73	20:10 (107)	20:17	40	08:15 (82)	19:25			18:40			17:12	27	08:38 (108)	17:16	28	08:52 (108)
28	06:29		07:42 (82)	06:58		07:37 (82)	07:28			07:59			07:34		08:11 (108)	07:56		08:24 (108)
	20:55	76	20:10 (107)	20:16	37	08:14 (82)	19:23			18:38			17:11	28	08:39 (108)	17:16	28	08:52 (108)
29	06:30		07:41 (82)	06:59		07:37 (82)	07:29			08:00			07:35		08:11 (108)	07:57		08:24 (108)
	20:54	79	20:11 (107)	20:14	34	08:11 (82)	19:22			18:37			17:11	28	08:39 (108)	17:17	28	08:52 (108)
30	06:31		07:40 (82)	07:00		07:38 (82)	07:30		08:35 (83)	08:01			07:36		08:11 (108)	07:57		08:24 (108)
	20:53	81	20:11 (107)	20:13	31	08:09 (82)	19:20	9	08:44 (83)	18:36			17:11	29	08:40 (108)	17:18	29	08:53 (108)
31	06:31		07:39 (82)	07:01		07:41 (82)				08:02						07:57		08:24 (108)
	20:52	83	20:11 (107)	20:11	26	08:07 (82)				18:35						17:19	29	08:53 (108)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		1521			2140			41			710			306			884	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.65			0.66			0.66			0.63			0.61			0.61	
Total reduction		0.39			0.39			0.40			0.35			0.22			0.30	
Total, real		593			840			16			251			68			267	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 55

Licensed user:
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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative **Shadow receptor:** 8352 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6634)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:26 (108)	07:45			07:10		07:45 (83)	07:20			06:36		07:23 (82)	06:08		06:29 (106)
	17:20	29	08:55 (108)	17:53			18:26	37	08:22 (83)	19:59			20:28	92	19:59 (107)	20:57	41	19:52 (107)
2	07:58		08:26 (108)	07:44			07:08		07:44 (83)	07:19			06:35		07:23 (82)	06:08		06:29 (106)
	17:21	29	08:55 (108)	17:54			18:27	38	08:22 (83)	20:00			20:29	93	20:00 (107)	20:58	39	19:51 (107)
3	07:58		08:27 (108)	07:43			07:07		07:45 (83)	07:17			06:33		07:23 (82)	06:07		06:29 (106)
	17:21	30	08:57 (108)	17:56			18:28	37	08:22 (83)	20:00			20:30	93	20:00 (107)	20:59	39	19:51 (107)
4	07:58		08:27 (108)	07:42			07:05		07:44 (83)	07:15			06:32		07:23 (82)	06:07		06:28 (106)
	17:22	29	08:56 (108)	17:57			18:29	37	08:21 (83)	20:01			20:31	94	20:01 (107)	20:59	37	19:49 (107)
5	07:58		08:27 (108)	07:41			07:04		07:45 (83)	07:14			06:31		07:23 (82)	06:07		06:28 (106)
	17:23	30	08:57 (108)	17:58			18:31	36	08:21 (83)	20:02			20:32	93	20:00 (107)	21:00	34	19:48 (107)
6	07:58		08:28 (108)	07:40			07:02		07:45 (83)	07:12			06:30		07:23 (82)	06:06		06:29 (106)
	17:24	29	08:57 (108)	17:59			18:32	35	08:20 (83)	20:03			20:33	93	20:00 (107)	21:01	32	19:47 (107)
7	07:58		08:28 (108)	07:39			07:01		07:45 (83)	07:11			06:29		07:23 (82)	06:06		06:29 (106)
	17:25	30	08:58 (108)	18:01			18:33	35	08:20 (83)	20:04			20:34	94	20:01 (107)	21:01	28	19:45 (107)
8	07:58		08:29 (108)	07:37			07:59		08:46 (83)	07:09			06:27		07:24 (82)	06:06		06:28 (106)
	17:26	29	08:58 (108)	18:02			19:34	32	09:18 (83)	20:05			20:35	93	20:01 (107)	21:02	22	06:50 (106)
9	07:57		08:29 (108)	07:36			07:57		08:46 (83)	07:08			06:26		07:24 (82)	06:06		06:28 (106)
	17:27	30	08:59 (108)	18:03			19:35	30	09:16 (83)	20:06			20:36	92	20:01 (107)	21:02	23	06:51 (106)
10	07:57		08:30 (108)	07:35			07:56		08:48 (83)	07:06			06:25		07:25 (82)	06:06		06:28 (106)
	17:28	29	08:59 (108)	18:04			19:36	27	09:15 (83)	20:07			20:37	90	20:01 (107)	21:03	23	06:51 (106)
11	07:57		08:30 (108)	07:34			07:54		08:48 (83)	07:04		07:48 (82)	06:24		07:25 (82)	06:05		06:28 (106)
	17:29	29	08:59 (108)	18:05			19:37	25	09:13 (83)	20:08	12	08:00 (82)	20:38	90	20:01 (107)	21:04	24	06:52 (106)
12	07:57		08:31 (108)	07:33			07:53		08:51 (83)	07:03		07:44 (82)	06:23		07:26 (82)	06:05		06:28 (106)
	17:30	29	09:00 (108)	18:07			19:38	20	09:11 (83)	20:09	21	08:05 (82)	20:39	88	20:01 (107)	21:04	24	06:52 (106)
13	07:57		08:32 (108)	07:32			07:51		08:53 (83)	07:01		07:40 (82)	06:22		07:26 (82)	06:05		06:29 (106)
	17:31	28	09:00 (108)	18:08			19:39	15	09:08 (83)	20:10	27	08:07 (82)	20:40	87	20:01 (107)	21:05	23	06:52 (106)
14	07:56		08:32 (108)	07:30			07:49		08:58 (83)	07:00		07:38 (82)	06:21		07:27 (82)	06:05		06:29 (106)
	17:32	28	09:00 (108)	18:09			19:40	3	09:01 (83)	20:11	31	08:09 (82)	20:41	84	20:00 (107)	21:05	24	06:53 (106)
15	07:56		08:33 (108)	07:29			07:48			06:58		07:36 (82)	06:20		07:28 (82)	06:05		06:29 (106)
	17:33	27	09:00 (108)	18:10			19:41			20:12	35	08:11 (82)	20:42	81	20:00 (107)	21:05	24	06:53 (106)
16	07:55		08:33 (108)	07:28			07:46			06:57		07:34 (82)	06:19		07:28 (82)	06:05		06:29 (106)
	17:34	26	08:59 (108)	18:11			19:42			20:13	38	08:12 (82)	20:43	80	20:00 (107)	21:06	24	06:53 (106)
17	07:55		08:34 (108)	07:27			07:45			06:55		07:32 (82)	06:18		07:30 (82)	06:05		06:29 (106)
	17:36	26	09:00 (108)	18:12			19:43			20:14	41	08:13 (82)	20:44	77	20:00 (107)	21:06	24	06:53 (106)
18	07:55		08:35 (108)	07:25		07:59 (83)	07:43			06:54		07:31 (82)	06:17		07:31 (82)	06:05		06:29 (106)
	17:37	24	08:59 (108)	18:14	12	08:11 (83)	19:44			20:15	43	08:14 (82)	20:45	75	20:00 (107)	21:07	25	06:54 (106)
19	07:54		08:36 (108)	07:24		07:55 (83)	07:41			06:52		07:29 (82)	06:17		07:32 (82)	06:05		06:29 (106)
	17:38	23	08:59 (108)	18:15	19	08:14 (83)	19:45			20:16	45	08:14 (82)	20:46	72	19:59 (107)	21:07	25	06:54 (106)
20	07:54		08:37 (108)	07:23		07:53 (83)	07:40			06:51		07:29 (82)	06:16		07:33 (82)	06:06		06:30 (106)
	17:39	21	08:58 (108)	18:16	23	08:16 (83)	19:46			20:17	46	08:15 (82)	20:47	68	19:59 (107)	21:07	25	06:55 (106)
21	07:53		08:39 (108)	07:21		07:52 (83)	07:38			06:49		07:27 (82)	06:15		07:35 (82)	06:06		06:30 (106)
	17:40	19	08:58 (108)	18:17	26	08:18 (83)	19:48			20:18	48	08:15 (82)	20:48	65	19:59 (107)	21:07	25	06:55 (106)
22	07:52		08:40 (108)	07:20		07:50 (83)	07:37			06:48		07:27 (82)	06:14		07:36 (82)	06:06		06:30 (106)
	17:41	17	08:57 (108)	18:18	29	08:19 (83)	19:49			20:19	49	08:16 (82)	20:49	61	19:58 (107)	21:08	25	06:55 (106)
23	07:52		08:41 (108)	07:18		07:49 (83)	07:35			06:47		07:26 (82)	06:14		07:38 (82)	06:06		06:30 (106)
	17:42	15	08:56 (108)	18:19	31	08:20 (83)	19:50			20:20	62	19:47 (107)	20:50	55	19:57 (107)	21:08	25	06:55 (106)
24	07:51		08:44 (108)	07:17		07:48 (83)	07:33			06:45		07:25 (82)	06:13		07:39 (82)	06:06		06:30 (106)
	17:44	9	08:53 (108)	18:21	33	08:21 (83)	19:51			20:21	70	19:50 (107)	20:51	51	19:56 (107)	21:08	25	06:55 (106)
25	07:50			07:16		07:47 (83)	07:32			06:44		07:25 (82)	06:12		07:43 (82)	06:07		06:31 (106)
	17:45			18:22	35	08:22 (83)	19:52			20:22	76	19:53 (107)	20:51	45	19:57 (107)	21:08	24	06:55 (106)
26	07:50			07:14		07:46 (83)	07:30			06:42		07:25 (82)	06:11		19:24 (107)	06:07		06:31 (106)
	17:46			18:23	36	08:22 (83)	19:53			20:23	80	19:55 (107)	20:52	32	19:56 (107)	21:08	24	06:55 (106)
27	07:49			07:13		07:46 (83)	07:28			06:41		07:24 (82)	06:11		06:35 (106)	06:07		06:31 (106)
	17:47			18:24	36	08:22 (83)	19:54			20:24	82	19:55 (107)	20:53	36	19:56 (107)	21:08	24	06:55 (106)
28	07:48			07:11		07:45 (83)	07:27			06:40		07:24 (82)	06:10		06:33 (106)	06:08		06:32 (106)
	17:48			18:25	37	08:22 (83)	19:55			20:25	85	19:57 (107)	20:54	39	19:55 (107)	21:08	24	06:56 (106)
29	07:47						07:25			06:38		07:24 (82)	06:10		06:32 (106)	06:08		06:32 (106)
	17:50						19:56			20:26	88	19:58 (107)	20:55	39	19:54 (107)	21:08	24	06:56 (106)
30	07:46						07:23			06:37		07:23 (82)	06:09		06:31 (106)	06:09		06:33 (106)
	17:51						19:57			20:27	90	19:58 (107)	20:56	40	19:53 (107)	21:08	23	06:56 (106)
31	07:46						07:22						06:09		06:30 (106)			
	17:52						19:58						20:56	40	19:53 (107)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		615			317			407			1069			2232			803	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.61			0.63			0.63			0.66			0.65			0.68	
Total reduction		0.22			0.26			0.28			0.34			0.36			0.40	
Total, real		134			84			113			359			810			325	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 56

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative **Shadow receptor:** 8352 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6634)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:32 (106)	06:32		07:36 (82)	07:02		07:47 (82)	07:31		08:30 (83)	07:04			07:37		08:12 (108)
	21:08	24	06:56 (106)	20:51	88	20:11 (107)	20:09	12	07:59 (82)	19:19	19	08:49 (83)	17:33			17:10	29	08:41 (108)
2	06:10		06:33 (106)	06:33		07:36 (82)	07:03			07:32		08:28 (83)	07:05			07:38		08:12 (108)
	21:08	24	06:57 (106)	20:50	90	20:12 (107)	20:08			19:17	23	08:51 (83)	17:32			17:10	30	08:42 (108)
3	06:10		06:33 (106)	06:34		07:35 (82)	07:04			07:33		08:26 (83)	07:06			07:39		08:13 (108)
	21:08	23	06:56 (106)	20:49	91	20:12 (107)	20:06			19:15	26	08:52 (83)	17:31			17:10	29	08:42 (108)
4	06:11		06:34 (106)	06:35		07:35 (82)	07:05			07:34		08:24 (83)	07:07			07:40		08:13 (108)
	21:08	23	06:57 (106)	20:48	92	20:12 (107)	20:05			19:14	29	08:53 (83)	17:30			17:10	29	08:42 (108)
5	06:11		06:34 (106)	06:36		07:33 (82)	07:06			07:35		08:23 (83)	07:08			07:41		08:13 (108)
	21:08	25	19:49 (107)	20:47	92	20:10 (107)	20:03			19:12	31	08:54 (83)	17:29			17:09	30	08:43 (108)
6	06:12		06:35 (106)	06:37		07:33 (82)	07:07			07:36		08:21 (83)	07:09			07:42		08:14 (108)
	21:08	30	19:52 (107)	20:45	93	20:10 (107)	20:01			19:10	34	08:55 (83)	17:28			17:09	29	08:43 (108)
7	06:12		06:34 (106)	06:38		07:33 (82)	07:08			07:37		08:20 (83)	07:11			07:43		08:14 (108)
	21:07	35	19:54 (107)	20:44	93	20:10 (107)	20:00			19:09	35	08:55 (83)	17:27			17:09	30	08:44 (108)
8	06:13		06:35 (106)	06:39		07:32 (82)	07:09			07:38		08:20 (83)	07:12			07:44		08:15 (108)
	21:07	36	19:56 (107)	20:43	95	20:10 (107)	19:57			19:07	35	08:55 (83)	17:26			17:09	29	08:44 (108)
9	06:14		06:36 (106)	06:40		07:32 (82)	07:10			07:39		08:19 (83)	07:13			07:45		08:15 (108)
	21:07	37	19:57 (107)	20:42	93	20:09 (107)	19:55			19:06	37	08:56 (83)	17:25			17:09	30	08:45 (108)
10	06:14		06:36 (106)	06:41		07:32 (82)	07:11			07:40		08:18 (83)	07:14			07:46		08:16 (108)
	21:06	39	19:58 (107)	20:41	93	20:09 (107)	19:53			19:04	38	08:56 (83)	17:24			17:09	29	08:45 (108)
11	06:15		06:37 (106)	06:42		07:32 (82)	07:11			07:41		08:18 (83)	07:15			07:47		08:17 (108)
	21:06	39	19:59 (107)	20:39	91	20:08 (107)	19:52			19:03	37	08:55 (83)	17:23			17:09	29	08:46 (108)
12	06:16		06:38 (106)	06:43		07:31 (82)	07:12			07:42		08:18 (83)	07:16			07:47		08:16 (108)
	21:06	41	20:01 (107)	20:38	91	20:07 (107)	19:50			19:01	37	08:55 (83)	17:22			17:10	29	08:45 (108)
13	06:16		06:38 (106)	06:44		07:31 (82)	07:13			07:43		08:18 (83)	07:17			07:48		08:17 (108)
	21:05	41	20:01 (107)	20:37	89	20:06 (107)	19:48			19:00	38	08:56 (83)	17:21			17:10	29	08:46 (108)
14	06:17		06:40 (106)	06:45		07:31 (82)	07:14			07:44		08:18 (83)	07:19			07:49		08:18 (108)
	21:05	40	20:02 (107)	20:36	87	20:05 (107)	19:47			18:58	37	08:55 (83)	17:20			17:10	29	08:47 (108)
15	06:18		06:41 (106)	06:46		07:31 (82)	07:15			07:45		08:18 (83)	07:20			07:50		08:19 (108)
	21:04	39	20:03 (107)	20:34	85	20:04 (107)	19:45			18:57	37	08:55 (83)	17:19			17:10	28	08:47 (108)
16	06:19		06:43 (106)	06:47		07:31 (82)	07:16			07:46		08:19 (83)	07:21			07:50		08:18 (108)
	21:04	38	20:05 (107)	20:33	83	20:03 (107)	19:43			18:55	35	08:54 (83)	17:18			17:10	29	08:47 (108)
17	06:19		19:33 (107)	06:48		07:30 (82)	07:17			07:47		08:19 (83)	07:22			07:51		08:19 (108)
	21:03	32	20:05 (107)	20:32	80	20:00 (107)	19:42			18:54	34	08:53 (83)	17:17			17:11	29	08:48 (108)
18	06:20		07:54 (82)	06:49		07:31 (82)	07:18			07:48		08:19 (83)	07:23		08:18 (108)	07:52		08:20 (108)
	21:03	40	20:06 (107)	20:30	74	19:58 (107)	19:40			18:52	33	08:52 (83)	17:17	9	08:27 (108)	17:11	29	08:49 (108)
19	06:21		07:51 (82)	06:50		07:31 (82)	07:19			07:49		08:20 (83)	07:24		08:16 (108)	07:52		08:20 (108)
	21:02	48	20:07 (107)	20:29	68	19:55 (107)	19:38			18:51	31	08:51 (83)	17:16	15	08:31 (108)	17:11	29	08:49 (108)
20	06:22		07:49 (82)	06:51		07:31 (82)	07:20			07:50		08:21 (83)	07:25		08:15 (108)	07:53		08:21 (108)
	21:01	53	20:07 (107)	20:27	60	19:51 (107)	19:37			18:49	28	08:49 (83)	17:15	17	08:32 (108)	17:12	28	08:49 (108)
21	06:23		07:46 (82)	06:51		07:32 (82)	07:21			07:51		08:22 (83)	07:27		08:14 (108)	07:54		08:21 (108)
	21:01	58	20:07 (107)	20:26	49	08:21 (82)	19:35			18:48	25	08:47 (83)	17:15	19	08:33 (108)	17:12	28	08:49 (108)
22	06:24		07:45 (82)	06:52		07:32 (82)	07:22			07:52		08:25 (83)	07:28		08:13 (108)	07:54		08:22 (108)
	21:00	62	20:08 (107)	20:25	48	08:20 (82)	19:33			18:46	21	08:46 (83)	17:14	21	08:34 (108)	17:13	28	08:50 (108)
23	06:24		07:44 (82)	06:53		07:33 (82)	07:23			07:54		08:27 (83)	07:29		08:12 (108)	07:55		08:22 (108)
	20:59	67	20:09 (107)	20:23	46	08:19 (82)	19:32			18:45	17	08:44 (83)	17:14	23	08:35 (108)	17:13	28	08:50 (108)
24	06:25		07:43 (82)	06:54		07:33 (82)	07:24			07:55		08:30 (83)	07:30		08:13 (108)	07:55		08:23 (108)
	20:58	69	20:09 (107)	20:22	45	08:18 (82)	19:30			18:44	10	08:40 (83)	17:13	24	08:37 (108)	17:14	29	08:52 (108)
25	06:26		07:42 (82)	06:55		07:34 (82)	07:25			07:56			07:31		08:12 (108)	07:55		08:23 (108)
	20:57	73	20:10 (107)	20:20	43	08:17 (82)	19:28			18:42			17:13	26	08:38 (108)	17:15	29	08:52 (108)
26	06:27		07:41 (82)	06:56		07:35 (82)	07:26			07:57			07:32		08:12 (108)	07:56		08:23 (108)
	20:57	75	20:10 (107)	20:19	41	08:16 (82)	19:27			18:41			17:12	27	08:39 (108)	17:15	29	08:52 (108)
27	06:28		07:39 (82)	06:57		07:36 (82)	07:27			07:58			07:33		08:12 (108)	07:56		08:24 (108)
	20:56	79	20:10 (107)	20:17	38	08:14 (82)	19:25			18:40			17:12	27	08:39 (108)	17:16	29	08:53 (108)
28	06:29		07:39 (82)	06:58		07:38 (82)	07:28			07:59			07:34		08:12 (108)	07:56		08:25 (108)
	20:55	80	20:10 (107)	20:16	34	08:12 (82)	19:23			18:38			17:11	28	08:40 (108)	17:16	28	08:53 (108)
29	06:30		07:38 (82)	06:59		07:38 (82)	07:29			08:00			07:35		08:12 (108)	07:57		08:25 (108)
	20:54	83	20:11 (107)	20:14	31	08:09 (82)	19:22			18:37			17:11	28	08:40 (108)	17:17	29	08:54 (108)
30	06:31		07:37 (82)	07:00		07:40 (82)	07:30		08:34 (83)	08:01			07:36		08:12 (108)	07:57		08:25 (108)
	20:53	85	20:11 (107)	20:13	27	08:07 (82)	19:20	12	08:46 (83)	18:36			17:11	29	08:41 (108)	17:18	29	08:54 (108)
31	06:31		07:37 (82)	07:01		07:43 (82)				08:02						07:57		08:25 (108)
	20:52	86	20:11 (107)	20:11	21	08:04 (82)				18:35						17:19	29	08:54 (108)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		1524			2151			24			727			293			897	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.65			0.66			0.65			0.63			0.61			0.61	
Total reduction		0.39			0.39			0.40			0.35			0.22			0.30	
Total, real		595			845			9			257			66			271	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 57

Licensed user:
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US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative **Shadow receptor:** 8353 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6635)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:30 (108)	07:45			07:10		07:49 (83)	07:20			06:36		07:26 (82)	06:08		06:30 (106)
	17:20	30	09:00 (108)	17:53			18:26	38	08:27 (83)	19:59			20:28	96	19:57 (107)	20:57	17	06:47 (106)
2	07:58		08:30 (108)	07:44			07:08		07:49 (83)	07:19			06:35		07:26 (82)	06:08		06:30 (106)
	17:21	30	09:00 (108)	17:54			18:27	37	08:26 (83)	20:00			20:29	97	19:58 (107)	20:58	19	06:49 (106)
3	07:58		08:31 (108)	07:43			07:07		07:49 (83)	07:17			06:33		07:27 (82)	06:07		06:30 (106)
	17:21	30	09:01 (108)	17:56			18:28	37	08:26 (83)	20:00			20:30	95	19:58 (107)	20:59	20	06:50 (106)
4	07:58		08:31 (108)	07:42			07:05		07:49 (83)	07:15			06:32		07:27 (82)	06:07		06:29 (106)
	17:22	30	09:01 (108)	17:57			18:29	36	08:25 (83)	20:01			20:31	95	19:58 (107)	20:59	20	06:49 (106)
5	07:58		08:32 (108)	07:41			07:04		07:50 (83)	07:14			06:31		07:26 (82)	06:07		06:29 (106)
	17:23	29	09:01 (108)	17:58			18:31	35	08:25 (83)	20:02			20:32	95	19:57 (107)	21:00	21	06:50 (106)
6	07:58		08:32 (108)	07:40			07:02		07:50 (83)	07:12			06:30		07:27 (82)	06:06		06:29 (106)
	17:24	29	09:01 (108)	17:59			18:32	33	08:23 (83)	20:03			20:33	93	19:57 (107)	21:01	22	06:51 (106)
7	07:58		08:33 (108)	07:39			07:01		07:52 (83)	07:11			06:29		07:27 (82)	06:06		06:29 (106)
	17:25	29	09:02 (108)	18:01			18:33	30	08:22 (83)	20:04			20:34	93	19:57 (107)	21:01	23	06:52 (106)
8	07:58		08:34 (108)	07:37			07:59		08:52 (83)	07:09			06:27		07:28 (82)	06:06		06:28 (106)
	17:26	28	09:02 (108)	18:02			19:34	28	09:20 (83)	20:05			20:35	91	19:57 (107)	21:02	23	06:51 (106)
9	07:57		08:34 (108)	07:36			07:57		08:53 (83)	07:08		07:54 (82)	06:26		07:28 (82)	06:06		06:28 (106)
	17:27	29	09:03 (108)	18:03			19:35	25	09:18 (83)	20:06	10	08:04 (82)	20:36	91	19:57 (107)	21:02	24	06:52 (106)
10	07:57		08:35 (108)	07:35			07:56		08:56 (83)	07:06		07:49 (82)	06:25		07:29 (82)	06:06		06:29 (106)
	17:28	28	09:03 (108)	18:04			19:36	20	09:16 (83)	20:07	21	08:10 (82)	20:37	87	19:56 (107)	21:03	23	06:52 (106)
11	07:57		08:35 (108)	07:34			07:54		08:58 (83)	07:04		07:45 (82)	06:24		07:29 (82)	06:05		06:29 (106)
	17:29	27	09:02 (108)	18:05			19:37	15	09:13 (83)	20:08	27	08:12 (82)	20:38	86	19:56 (107)	21:04	24	06:53 (106)
12	07:57		08:36 (108)	07:33			07:53			07:03		07:43 (82)	06:23		07:30 (82)	06:05		06:29 (106)
	17:30	27	09:03 (108)	18:07			19:38			20:09	32	08:15 (82)	20:39	84	19:56 (107)	21:04	24	06:53 (106)
13	07:57		08:37 (108)	07:32			07:51			07:01		07:40 (82)	06:22		07:31 (82)	06:05		06:29 (106)
	17:31	26	09:03 (108)	18:08			19:39			20:10	36	08:16 (82)	20:40	80	19:55 (107)	21:05	24	06:53 (106)
14	07:56		08:38 (108)	07:30			07:49			07:00		07:39 (82)	06:21		07:31 (82)	06:05		06:29 (106)
	17:32	24	09:02 (108)	18:09			19:40			20:11	39	08:18 (82)	20:41	79	19:55 (107)	21:05	25	06:54 (106)
15	07:56		08:39 (108)	07:29		08:04 (83)	07:48			06:58		07:37 (82)	06:20		07:32 (82)	06:05		06:29 (106)
	17:33	24	09:03 (108)	18:10	12	08:16 (83)	19:41			20:12	41	08:18 (82)	20:42	75	19:54 (107)	21:05	25	06:54 (106)
16	07:55		08:40 (108)	07:28		08:00 (83)	07:46			06:57		07:36 (82)	06:19		07:33 (82)	06:05		06:29 (106)
	17:34	22	09:02 (108)	18:11	18	08:18 (83)	19:42			20:13	44	08:20 (82)	20:43	72	19:53 (107)	21:06	25	06:54 (106)
17	07:55		08:41 (108)	07:27		07:58 (83)	07:45			06:55		07:34 (82)	06:18		07:35 (82)	06:05		06:29 (106)
	17:36	21	09:02 (108)	18:12	23	08:21 (83)	19:43			20:14	46	08:20 (82)	20:44	69	19:54 (107)	21:06	25	06:54 (106)
18	07:55		08:42 (108)	07:25		07:57 (83)	07:43			06:54		07:33 (82)	06:17		07:36 (82)	06:05		06:30 (106)
	17:37	19	09:01 (108)	18:14	26	08:23 (83)	19:44			20:15	48	08:21 (82)	20:45	66	19:53 (107)	21:07	24	06:54 (106)
19	07:54		08:44 (108)	07:24		07:55 (83)	07:41			06:52		07:32 (82)	06:17		07:37 (82)	06:05		06:30 (106)
	17:38	16	09:00 (108)	18:15	29	08:24 (83)	19:45			20:16	49	08:21 (82)	20:46	61	19:52 (107)	21:07	24	06:54 (106)
20	07:54		08:46 (108)	07:23		07:54 (83)	07:40			06:51		07:31 (82)	06:16		07:38 (82)	06:06		06:31 (106)
	17:39	12	08:58 (108)	18:16	31	08:25 (83)	19:46			20:17	66	19:46 (107)	20:47	57	19:51 (107)	21:07	24	06:55 (106)
21	07:53		08:49 (108)	07:21		07:53 (83)	07:38			06:49		07:30 (82)	06:15		07:40 (82)	06:06		06:31 (106)
	17:40	8	08:57 (108)	18:17	33	08:26 (83)	19:48			20:18	73	19:49 (107)	20:48	52	19:50 (107)	21:07	25	06:56 (106)
22	07:52			07:20		07:52 (83)	07:37			06:48		07:29 (82)	06:14		07:42 (82)	06:06		06:31 (106)
	17:41			18:18	34	08:26 (83)	19:49			20:19	78	19:51 (107)	20:49	46	19:49 (107)	21:08	25	06:56 (106)
23	07:52			07:18		07:51 (83)	07:35			06:47		07:29 (82)	06:14		07:43 (82)	06:06		06:31 (106)
	17:42			18:19	36	08:27 (83)	19:50			20:20	83	19:53 (107)	20:50	41	19:48 (107)	21:08	24	06:55 (106)
24	07:51			07:17		07:50 (83)	07:33			06:45		07:28 (82)	06:13		07:46 (82)	06:06		06:31 (106)
	17:44			18:21	37	08:27 (83)	19:51			20:21	85	19:53 (107)	20:51	32	19:46 (107)	21:08	24	06:55 (106)
25	07:50			07:16		07:50 (83)	07:32			06:44		07:28 (82)	06:12		19:28 (107)	06:07		06:31 (106)
	17:45			18:22	38	08:28 (83)	19:52			20:22	88	19:55 (107)	20:51	17	19:45 (107)	21:08	25	06:56 (106)
26	07:50			07:14		07:49 (83)	07:30			06:42		07:28 (82)	06:11		19:30 (107)	06:07		06:31 (106)
	17:46			18:23	38	08:27 (83)	19:53			20:23	91	19:56 (107)	20:52	13	19:43 (107)	21:08	25	06:56 (106)
27	07:49			07:13		07:49 (83)	07:28			06:41		07:27 (82)	06:11		06:35 (106)	06:07		06:31 (106)
	17:47			18:24	39	08:28 (83)	19:54			20:24	92	19:56 (107)	20:53	15	19:41 (107)	21:08	25	06:56 (106)
28	07:48			07:11		07:49 (83)	07:27			06:40		07:27 (82)	06:10		06:33 (106)	06:08		06:32 (106)
	17:48			18:25	38	08:27 (83)	19:55			20:25	93	19:56 (107)	20:54	10	06:43 (106)	21:08	25	06:57 (106)
29	07:47						07:25			06:38		07:27 (82)	06:10		06:32 (106)	06:08		06:32 (106)
	17:50						19:56			20:26	94	19:57 (107)	20:55	13	06:45 (106)	21:08	24	06:56 (106)
30	07:46						07:23			06:37		07:26 (82)	06:09		06:31 (106)	06:09		06:33 (106)
	17:51						19:57			20:27	96	19:57 (107)	20:56	15	06:46 (106)	21:08	24	06:57 (106)
31	07:46						07:22						06:09		06:31 (106)			
	17:52						19:58						20:56	16	06:47 (106)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		518			432			334			1332			1932			702	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.61			0.63			0.63			0.66			0.65			0.68	
Total reduction		0.22			0.26			0.28			0.34			0.36			0.41	
Total, real		113			114			92			446			704			287	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 58

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative **Shadow receptor:** 8353 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6635)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:33 (106)	06:32		07:40 (82)	07:02		07:44 (82)	07:31			07:04			07:37		08:17 (108)
	21:08	24	06:57 (106)	20:51	85	20:07 (107)	20:09	27	08:11 (82)	19:19			17:33			17:10	28	08:45 (108)
2	06:10		06:34 (106)	06:33		07:40 (82)	07:03		07:47 (82)	07:32		08:38 (83)	07:05			07:38		08:17 (108)
	21:08	23	06:57 (106)	20:50	87	20:07 (107)	20:08	21	08:08 (82)	19:17	11	08:49 (83)	17:32			17:10	28	08:45 (108)
3	06:10		06:33 (106)	06:34		07:39 (82)	07:04		07:52 (82)	07:33		08:34 (83)	07:06			07:39		08:18 (108)
	21:08	24	06:57 (106)	20:49	89	20:07 (107)	20:06	11	08:03 (82)	19:15	19	08:53 (83)	17:31			17:10	28	08:46 (108)
4	06:11		06:34 (106)	06:35		07:39 (82)	07:05			07:34		08:32 (83)	07:07			07:40		08:18 (108)
	21:08	23	06:57 (106)	20:48	89	20:07 (107)	20:05			19:14	23	08:55 (83)	17:30			17:10	28	08:46 (108)
5	06:11		06:34 (106)	06:36		07:37 (82)	07:06			07:35		08:30 (83)	07:08			07:41		08:18 (108)
	21:08	23	06:57 (106)	20:47	92	20:07 (107)	20:03			19:12	26	08:56 (83)	17:29			17:09	29	08:47 (108)
6	06:12		06:35 (106)	06:37		07:37 (82)	07:07			07:36		08:28 (83)	07:09			07:42		08:18 (108)
	21:08	22	06:57 (106)	20:45	93	20:07 (107)	20:01			19:10	29	08:57 (83)	17:28			17:09	30	08:48 (108)
7	06:12		06:35 (106)	06:38		07:36 (82)	07:08			07:37		08:26 (83)	07:11			07:43		08:19 (108)
	21:07	22	06:57 (106)	20:44	95	20:07 (107)	20:00			19:09	32	08:58 (83)	17:27			17:09	29	08:48 (108)
8	06:13		06:36 (106)	06:39		07:36 (82)	07:09			07:38		08:25 (83)	07:12			07:44		08:19 (108)
	21:07	21	06:57 (106)	20:43	95	20:07 (107)	19:57			19:07	34	08:59 (83)	17:26			17:09	30	08:49 (108)
9	06:14		06:37 (106)	06:40		07:36 (82)	07:10			07:39		08:24 (83)	07:13			07:45		08:20 (108)
	21:07	20	06:57 (106)	20:42	96	20:07 (107)	19:55			19:06	35	08:59 (83)	17:25			17:09	29	08:49 (108)
10	06:14		06:37 (106)	06:41		07:35 (82)	07:11			07:40		08:23 (83)	07:14			07:46		08:20 (108)
	21:06	19	06:56 (106)	20:41	96	20:06 (107)	19:53			19:04	37	09:00 (83)	17:24			17:09	30	08:50 (108)
11	06:15		06:38 (106)	06:42		07:35 (82)	07:11			07:41		08:23 (83)	07:15			07:47		08:21 (108)
	21:06	18	06:56 (106)	20:39	95	20:06 (107)	19:52			19:03	37	09:00 (83)	17:23			17:09	30	08:51 (108)
12	06:16		06:39 (106)	06:43		07:35 (82)	07:12			07:42		08:22 (83)	07:16			07:47		08:20 (108)
	21:06	17	06:56 (106)	20:38	96	20:06 (107)	19:50			19:01	38	09:00 (83)	17:22			17:10	30	08:50 (108)
13	06:16		06:39 (106)	06:44		07:35 (82)	07:13			07:43		08:22 (83)	07:17			07:48		08:21 (108)
	21:05	16	06:55 (106)	20:37	95	20:05 (107)	19:48			19:00	39	09:01 (83)	17:21			17:10	30	08:51 (108)
14	06:17		06:40 (106)	06:45		07:35 (82)	07:14			07:44		08:22 (83)	07:19			07:49		08:22 (108)
	21:05	14	06:54 (106)	20:36	95	20:05 (107)	19:47			18:58	39	09:01 (83)	17:20			17:10	30	08:52 (108)
15	06:18		06:42 (106)	06:46		07:34 (82)	07:15			07:45		08:22 (83)	07:20			07:50		08:22 (108)
	21:04	11	06:53 (106)	20:34	94	20:04 (107)	19:45			18:57	38	09:00 (83)	17:19			17:10	30	08:52 (108)
16	06:19		06:44 (106)	06:47		07:34 (82)	07:16			07:46		08:22 (83)	07:21			07:50		08:22 (108)
	21:04	10	19:48 (107)	20:33	93	20:03 (107)	19:43			18:55	38	09:00 (83)	17:18			17:10	30	08:52 (108)
17	06:19		19:41 (107)	06:48		07:33 (82)	07:17			07:47		08:22 (83)	07:22			07:51		08:23 (108)
	21:03	10	19:51 (107)	20:32	90	20:01 (107)	19:42			18:54	37	08:59 (83)	17:17			17:11	30	08:53 (108)
18	06:20		19:39 (107)	06:49		07:34 (82)	07:18			07:48		08:22 (83)	07:23			07:52		08:24 (108)
	21:03	15	19:54 (107)	20:30	87	20:00 (107)	19:40			18:52	37	08:59 (83)	17:17			17:11	30	08:54 (108)
19	06:21		07:58 (82)	06:50		07:34 (82)	07:19			07:49		08:22 (83)	07:24			07:52		08:24 (108)
	21:02	27	19:56 (107)	20:29	85	19:59 (107)	19:38			18:51	36	08:58 (83)	17:16			17:11	30	08:54 (108)
20	06:22		07:55 (82)	06:51		07:34 (82)	07:20			07:50		08:22 (83)	07:25			07:53		08:25 (108)
	21:01	37	19:58 (107)	20:27	81	19:57 (107)	19:37			18:49	35	08:57 (83)	17:15			17:12	30	08:55 (108)
21	06:23		07:52 (82)	06:51		07:34 (82)	07:21			07:51		08:23 (83)	07:27		08:24 (108)	07:53		08:25 (108)
	21:01	43	19:58 (107)	20:26	77	19:55 (107)	19:35			18:48	33	08:56 (83)	17:15	8	08:32 (108)	17:12	30	08:55 (108)
22	06:24		07:50 (82)	06:52		07:35 (82)	07:22			07:52		08:25 (83)	07:28		08:22 (108)	07:54		08:26 (108)
	21:00	50	19:59 (107)	20:25	71	19:53 (107)	19:33			18:46	30	08:55 (83)	17:14	12	08:34 (108)	17:13	30	08:56 (108)
23	06:24		07:49 (82)	06:53		07:35 (82)	07:23			07:54		08:26 (83)	07:29		08:20 (108)	07:55		08:26 (108)
	20:59	54	20:01 (107)	20:23	65	19:50 (107)	19:32			18:45	28	08:54 (83)	17:14	16	08:36 (108)	17:13	30	08:56 (108)
24	06:25		07:48 (82)	06:54		07:35 (82)	07:24			07:55		08:27 (83)	07:30		08:20 (108)	07:55		08:27 (108)
	20:58	59	20:02 (107)	20:22	50	08:25 (82)	19:30			18:44	25	08:52 (83)	17:13	19	08:39 (108)	17:14	30	08:57 (108)
25	06:26		07:47 (82)	06:55		07:36 (82)	07:25			07:56		08:28 (83)	07:31		08:19 (108)	07:55		08:27 (108)
	20:57	64	20:03 (107)	20:20	48	08:24 (82)	19:28			18:42	22	08:50 (83)	17:13	21	08:40 (108)	17:15	30	08:57 (108)
26	06:27		07:46 (82)	06:56		07:37 (82)	07:26			07:57		08:31 (83)	07:32		08:19 (108)	07:56		08:27 (108)
	20:57	67	20:04 (107)	20:19	46	08:23 (82)	19:27			18:41	16	08:47 (83)	17:12	22	08:41 (108)	17:15	30	08:57 (108)
27	06:28		07:44 (82)	06:57		07:38 (82)	07:27			07:58		08:34 (83)	07:33		08:18 (108)	07:56		08:28 (108)
	20:56	70	20:03 (107)	20:17	44	08:22 (82)	19:25			18:40	9	08:43 (83)	17:12	24	08:42 (108)	17:16	30	08:58 (108)
28	06:29		07:43 (82)	06:58		07:39 (82)	07:28			07:59			07:34		08:18 (108)	07:56		08:28 (108)
	20:55	74	20:04 (107)	20:16	41	08:20 (82)	19:23			18:38			17:11	24	08:42 (108)	17:16	30	08:58 (108)
29	06:30		07:42 (82)	06:59		07:39 (82)	07:29			08:00			07:35		08:18 (108)	07:57		08:28 (108)
	20:54	77	20:05 (107)	20:14	39	08:18 (82)	19:22			18:37			17:11	25	08:43 (108)	17:17	31	08:59 (108)
30	06:31		07:42 (82)	07:00		07:40 (82)	07:30			08:01			07:36		08:17 (108)	07:57		08:29 (108)
	20:53	79	20:06 (107)	20:13	36	08:16 (82)	19:20			18:36			17:11	27	08:44 (108)	17:18	30	08:59 (108)
31	06:31		07:41 (82)	07:01		07:42 (82)				08:02						07:57		08:29 (108)
	20:52	82	20:06 (107)	20:11	32	08:14 (82)				18:35						17:19	30	08:59 (108)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		1115			2377			59			783			198			920	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.66			0.66			0.67			0.63			0.61			0.61	
Total reduction		0.39			0.39			0.41			0.35			0.22			0.30	
Total, real		440			933			24			276			44			279	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 59

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative **Shadow receptor:** 8354 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6636)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:28 (108)	07:45			07:10		07:47 (83)	07:20			06:36		07:24 (82)	06:08		06:30 (106)
	17:20	30	08:58 (108)	17:53			18:26	38	08:25 (83)	19:59			20:28	93	19:58 (107)	20:57	23	19:43 (107)
2	07:58		08:28 (108)	07:44			07:08		07:46 (83)	07:19			06:35		07:24 (82)	06:08		06:29 (106)
	17:21	30	08:58 (108)	17:54			18:27	38	08:24 (83)	20:00			20:29	95	19:59 (107)	20:58	18	06:47 (106)
3	07:58		08:29 (108)	07:43			07:07		07:47 (83)	07:17			06:33		07:24 (82)	06:07		06:29 (106)
	17:21	30	08:59 (108)	17:56			18:28	37	08:24 (83)	20:00			20:30	95	19:59 (107)	20:59	19	06:48 (106)
4	07:58		08:29 (108)	07:42			07:05		07:46 (83)	07:15			06:32		07:24 (82)	06:07		06:28 (106)
	17:22	30	08:59 (108)	17:57			18:29	37	08:23 (83)	20:01			20:31	96	20:00 (107)	20:59	20	06:48 (106)
5	07:58		08:29 (108)	07:41			07:04		07:47 (83)	07:14			06:31		07:23 (82)	06:07		06:28 (106)
	17:23	30	08:59 (108)	17:58			18:31	36	08:23 (83)	20:02			20:32	95	19:59 (107)	21:00	21	06:49 (106)
6	07:58		08:30 (108)	07:40			07:02		07:47 (83)	07:12			06:30		07:24 (82)	06:06		06:29 (106)
	17:24	30	09:00 (108)	17:59			18:32	35	08:22 (83)	20:03			20:33	94	19:59 (107)	21:01	21	06:50 (106)
7	07:58		08:30 (108)	07:39			07:01		07:48 (83)	07:11			06:29		07:24 (82)	06:06		06:29 (106)
	17:25	30	09:00 (108)	18:01			18:33	33	08:21 (83)	20:04			20:34	94	19:59 (107)	21:01	21	06:50 (106)
8	07:58		08:31 (108)	07:37			07:59		08:48 (83)	07:09			06:27		07:24 (82)	06:06		06:28 (106)
	17:26	30	09:01 (108)	18:02			19:34	32	09:20 (83)	20:05			20:35	93	19:59 (107)	21:02	22	06:50 (106)
9	07:57		08:32 (108)	07:36			07:57		08:49 (83)	07:08			06:26		07:25 (82)	06:06		06:28 (106)
	17:27	29	09:01 (108)	18:03			19:35	29	09:18 (83)	20:06			20:36	92	19:59 (107)	21:02	22	06:50 (106)
10	07:57		08:33 (108)	07:35			07:56		08:51 (83)	07:06			06:25		07:25 (82)	06:06		06:28 (106)
	17:28	29	09:02 (108)	18:04			19:36	26	09:17 (83)	20:07			20:37	91	19:59 (107)	21:03	23	06:51 (106)
11	07:57		08:33 (108)	07:34			07:54		08:52 (83)	07:04		07:48 (82)	06:24		07:26 (82)	06:05		06:28 (106)
	17:29	28	09:01 (108)	18:05			19:37	22	09:14 (83)	20:08	15	08:03 (82)	20:38	89	19:59 (107)	21:04	23	06:51 (106)
12	07:57		08:34 (108)	07:33			07:53		08:55 (83)	07:03		07:45 (82)	06:23		07:26 (82)	06:05		06:28 (106)
	17:30	28	09:02 (108)	18:07			19:38	17	09:12 (83)	20:09	22	08:07 (82)	20:39	89	19:59 (107)	21:04	24	06:52 (106)
13	07:57		08:35 (108)	07:32			07:51		08:58 (83)	07:01		07:41 (82)	06:22		07:27 (82)	06:05		06:29 (106)
	17:31	27	09:02 (108)	18:08			19:39	9	09:07 (83)	20:10	28	08:09 (82)	20:40	87	19:59 (107)	21:05	23	06:52 (106)
14	07:56		08:35 (108)	07:30			07:49			07:00		07:39 (82)	06:21		07:27 (82)	06:05		06:29 (106)
	17:32	26	09:01 (108)	18:09			19:40			20:11	33	08:12 (82)	20:41	84	19:58 (107)	21:05	23	06:52 (106)
15	07:56		08:36 (108)	07:29			07:48			06:58		07:37 (82)	06:20		07:28 (82)	06:05		06:29 (106)
	17:33	26	09:02 (108)	18:10			19:41			20:12	36	08:13 (82)	20:42	82	19:58 (107)	21:05	24	06:53 (106)
16	07:55		08:36 (108)	07:28			07:46			06:57		07:35 (82)	06:19		07:29 (82)	06:05		06:29 (106)
	17:34	25	09:01 (108)	18:11			19:42			20:13	40	08:15 (82)	20:43	79	19:57 (107)	21:06	24	06:53 (106)
17	07:55		08:38 (108)	07:27		08:00 (83)	07:45			06:55		07:33 (82)	06:18		07:30 (82)	06:05		06:29 (106)
	17:36	23	09:01 (108)	18:12	14	08:14 (83)	19:43			20:14	42	08:15 (82)	20:44	77	19:58 (107)	21:06	24	06:53 (106)
18	07:55		08:38 (108)	07:25		07:58 (83)	07:43			06:54		07:32 (82)	06:17		07:31 (82)	06:05		06:29 (106)
	17:37	22	09:00 (108)	18:14	19	08:17 (83)	19:44			20:15	44	08:16 (82)	20:45	74	19:57 (107)	21:07	24	06:53 (106)
19	07:54		08:40 (108)	07:24		07:55 (83)	07:41			06:52		07:30 (82)	06:17		07:32 (82)	06:05		06:29 (106)
	17:38	20	09:00 (108)	18:15	24	08:19 (83)	19:45			20:16	47	08:17 (82)	20:46	71	19:56 (107)	21:07	24	06:53 (106)
20	07:54		08:41 (108)	07:23		07:53 (83)	07:40			06:51		07:30 (82)	06:16		07:33 (82)	06:06		06:30 (106)
	17:39	18	08:59 (108)	18:16	28	08:21 (83)	19:46			20:17	48	08:18 (82)	20:47	66	19:55 (107)	21:07	24	06:54 (106)
21	07:53		08:43 (108)	07:21		07:52 (83)	07:38			06:49		07:28 (82)	06:15		07:35 (82)	06:06		06:30 (106)
	17:40	16	08:59 (108)	18:17	30	08:22 (83)	19:48			20:18	53	19:42 (107)	20:48	64	19:56 (107)	21:07	24	06:54 (106)
22	07:52		08:45 (108)	07:20		07:51 (83)	07:37			06:48		07:28 (82)	06:14		07:36 (82)	06:06		06:30 (106)
	17:41	12	08:57 (108)	18:18	32	08:23 (83)	19:49			20:19	65	19:48 (107)	20:49	60	19:55 (107)	21:08	24	06:54 (106)
23	07:52		08:48 (108)	07:18		07:50 (83)	07:35			06:47		07:27 (82)	06:14		07:37 (82)	06:06		06:30 (106)
	17:42	6	08:54 (108)	18:19	34	08:24 (83)	19:50			20:20	73	19:51 (107)	20:50	56	19:54 (107)	21:08	24	06:54 (106)
24	07:51			07:17		07:49 (83)	07:33			06:45		07:26 (82)	06:13		07:38 (82)	06:06		06:30 (106)
	17:44			18:21	35	08:24 (83)	19:51			20:21	77	19:52 (107)	20:51	51	19:53 (107)	21:08	24	06:54 (106)
25	07:50			07:16		07:48 (83)	07:32			06:44		07:26 (82)	06:12		07:40 (82)	06:07		06:31 (106)
	17:45			18:22	37	08:25 (83)	19:52			20:22	82	19:54 (107)	20:51	46	19:52 (107)	21:08	24	06:55 (106)
26	07:50			07:14		07:47 (83)	07:30			06:42		07:26 (82)	06:11		07:42 (82)	06:07		06:31 (106)
	17:46			18:23	38	08:25 (83)	19:53			20:23	85	19:56 (107)	20:52	39	19:51 (107)	21:08	24	06:55 (106)
27	07:49			07:13		07:47 (83)	07:28			06:41		07:24 (82)	06:11		07:46 (82)	06:07		06:31 (106)
	17:47			18:24	38	08:25 (83)	19:54			20:24	89	19:56 (107)	20:53	31	19:51 (107)	21:08	24	06:55 (106)
28	07:48			07:11		07:46 (83)	07:27			06:40		07:24 (82)	06:10		06:34 (106)	06:08		06:32 (106)
	17:48			18:25	39	08:25 (83)	19:55			20:25	91	19:57 (107)	20:54	27	19:49 (107)	21:08	24	06:56 (106)
29	07:47						07:25			06:38		07:24 (82)	06:10		06:33 (106)	06:08		06:32 (106)
	17:50						19:56			20:26	92	19:58 (107)	20:55	29	19:49 (107)	21:08	23	06:55 (106)
30	07:46						07:23			06:37		07:23 (82)	06:09		06:31 (106)	06:09		06:32 (106)
	17:51						19:57			20:27	94	19:58 (107)	20:56	29	19:47 (107)	21:08	24	06:56 (106)
31	07:46						07:22						06:09		06:31 (106)			
	17:52						19:58						20:56	27	19:46 (107)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		575			368			389			1156			2195			686	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.61			0.63			0.63			0.66			0.65			0.68	
Total reduction		0.22			0.26			0.28			0.34			0.36			0.41	
Total, real		125			97			108			388			799			280	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 60

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative **Shadow receptor:** 8354 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6636)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:32 (106)	06:32		07:37 (82)	07:02		07:48 (82)	07:31		08:35 (83)	07:04			07:37		08:15 (108)
	21:08	24	06:56 (106)	20:51	88	20:10 (107)	20:09	14	08:02 (82)	19:19	14	08:49 (83)	17:33			17:10	28	08:43 (108)
2	06:10		06:33 (106)	06:33		07:36 (82)	07:03			07:32		08:31 (83)	07:05			07:38		08:15 (108)
	21:08	23	06:56 (106)	20:50	91	20:10 (107)	20:08			19:17	21	08:52 (83)	17:32			17:10	29	08:44 (108)
3	06:10		06:33 (106)	06:34		07:36 (82)	07:04			07:33		08:29 (83)	07:06			07:39		08:15 (108)
	21:08	23	06:56 (106)	20:49	92	20:10 (107)	20:06			19:15	24	08:53 (83)	17:31			17:10	29	08:44 (108)
4	06:11		06:34 (106)	06:35		07:35 (82)	07:05			07:34		08:27 (83)	07:07			07:40		08:15 (108)
	21:08	22	06:56 (106)	20:48	93	20:10 (107)	20:05			19:14	28	08:55 (83)	17:30			17:10	30	08:45 (108)
5	06:11		06:34 (106)	06:36		07:34 (82)	07:06			07:35		08:25 (83)	07:08			07:41		08:16 (108)
	21:08	22	06:56 (106)	20:47	94	20:09 (107)	20:03			19:12	31	08:56 (83)	17:29			17:09	29	08:45 (108)
6	06:12		06:35 (106)	06:37		07:34 (82)	07:07			07:36		08:24 (83)	07:09			07:42		08:16 (108)
	21:08	21	06:56 (106)	20:45	94	20:09 (107)	20:01			19:10	33	08:57 (83)	17:28			17:09	30	08:46 (108)
7	06:12		06:35 (106)	06:38		07:33 (82)	07:08			07:37		08:23 (83)	07:11			07:43		08:16 (108)
	21:07	20	06:55 (106)	20:44	96	20:09 (107)	20:00			19:09	34	08:57 (83)	17:27			17:09	30	08:46 (108)
8	06:13		06:35 (106)	06:39		07:33 (82)	07:09			07:38		08:22 (83)	07:12			07:44		08:17 (108)
	21:07	20	06:55 (106)	20:43	96	20:09 (107)	19:57			19:07	36	08:58 (83)	17:26			17:09	30	08:47 (108)
9	06:14		06:36 (106)	06:40		07:33 (82)	07:10			07:39		08:21 (83)	07:13			07:45		08:17 (108)
	21:07	20	06:56 (106)	20:42	94	20:08 (107)	19:55			19:06	37	08:58 (83)	17:25			17:09	30	08:47 (108)
10	06:14		06:36 (106)	06:41		07:33 (82)	07:11			07:40		08:20 (83)	07:14			07:46		08:18 (108)
	21:06	19	06:55 (106)	20:41	94	20:08 (107)	19:53			19:04	38	08:58 (83)	17:24			17:09	30	08:48 (108)
11	06:15		06:38 (106)	06:42		07:32 (82)	07:11			07:41		08:20 (83)	07:15			07:47		08:19 (108)
	21:06	16	06:54 (106)	20:39	96	20:08 (107)	19:52			19:03	38	08:58 (83)	17:23			17:09	30	08:49 (108)
12	06:16		06:39 (106)	06:43		07:32 (82)	07:12			07:42		08:19 (83)	07:16			07:47		08:18 (108)
	21:06	25	19:53 (107)	20:38	94	20:07 (107)	19:50			19:01	39	08:58 (83)	17:22			17:10	30	08:48 (108)
13	06:16		06:39 (106)	06:44		07:32 (82)	07:13			07:43		08:20 (83)	07:17			07:48		08:19 (108)
	21:05	27	19:54 (107)	20:37	93	20:06 (107)	19:48			19:00	38	08:58 (83)	17:21			17:10	30	08:49 (108)
14	06:17		06:40 (106)	06:45		07:32 (82)	07:14			07:44		08:20 (83)	07:19			07:49		08:20 (108)
	21:05	29	19:56 (107)	20:36	91	20:05 (107)	19:47			18:58	38	08:58 (83)	17:20			17:10	30	08:50 (108)
15	06:18		06:42 (106)	06:46		07:32 (82)	07:15			07:45		08:20 (83)	07:20			07:50		08:20 (108)
	21:04	29	19:58 (107)	20:34	90	20:05 (107)	19:45			18:57	38	08:58 (83)	17:19			17:10	30	08:50 (108)
16	06:19		06:46 (106)	06:47		07:32 (82)	07:16			07:46		08:20 (83)	07:21			07:50		08:20 (108)
	21:04	24	20:00 (107)	20:33	87	20:03 (107)	19:43			18:55	37	08:57 (83)	17:18			17:10	30	08:50 (108)
17	06:19		07:53 (82)	06:48		07:31 (82)	07:17			07:47		08:20 (83)	07:22			07:51		08:21 (108)
	21:03	35	20:00 (107)	20:32	85	20:01 (107)	19:42			18:54	36	08:56 (83)	17:17			17:11	30	08:51 (108)
18	06:20		07:51 (82)	06:49		07:32 (82)	07:18			07:48		08:20 (83)	07:23			07:52		08:22 (108)
	21:03	42	20:01 (107)	20:30	81	20:00 (107)	19:40			18:52	35	08:55 (83)	17:17			17:11	30	08:52 (108)
19	06:21		07:49 (82)	06:50		07:32 (82)	07:19			07:49		08:21 (83)	07:24		08:23 (108)	07:52		08:22 (108)
	21:02	48	20:02 (107)	20:29	77	19:58 (107)	19:38			18:51	33	08:54 (83)	17:16	6	08:29 (108)	17:11	29	08:51 (108)
20	06:22		07:48 (82)	06:51		07:32 (82)	07:20			07:50		08:22 (83)	07:25		08:20 (108)	07:53		08:23 (108)
	21:01	54	20:04 (107)	20:27	72	19:55 (107)	19:37			18:49	31	08:53 (83)	17:15	12	08:32 (108)	17:12	29	08:52 (108)
21	06:23		07:46 (82)	06:51		07:33 (82)	07:21			07:51		08:22 (83)	07:27		08:18 (108)	07:53		08:23 (108)
	21:01	57	20:04 (107)	20:26	64	19:52 (107)	19:35			18:48	29	08:51 (83)	17:15	16	08:34 (108)	17:12	29	08:52 (108)
22	06:24		07:45 (82)	06:52		07:33 (82)	07:22			07:52		08:25 (83)	07:28		08:17 (108)	07:54		08:24 (108)
	21:00	62	20:05 (107)	20:25	49	08:22 (82)	19:33			18:46	26	08:51 (83)	17:14	18	08:35 (108)	17:13	29	08:53 (108)
23	06:24		07:44 (82)	06:53		07:34 (82)	07:23			07:54		08:26 (83)	07:29		08:16 (108)	07:55		08:24 (108)
	20:59	64	20:05 (107)	20:23	47	08:21 (82)	19:32			18:45	23	08:49 (83)	17:14	20	08:36 (108)	17:13	29	08:53 (108)
24	06:25		07:43 (82)	06:54		07:34 (82)	07:24			07:55		08:28 (83)	07:30		08:16 (108)	07:55		08:25 (108)
	20:58	69	20:06 (107)	20:22	46	08:20 (82)	19:30			18:44	18	08:46 (83)	17:13	22	08:38 (108)	17:14	29	08:54 (108)
25	06:26		07:42 (82)	06:55		07:35 (82)	07:25			07:56		08:31 (83)	07:31		08:16 (108)	07:55		08:25 (108)
	20:57	72	20:07 (107)	20:20	44	08:19 (82)	19:28			18:42	12	08:43 (83)	17:13	23	08:39 (108)	17:15	30	08:55 (108)
26	06:27		07:41 (82)	06:56		07:36 (82)	07:26			07:57			07:32		08:15 (108)	07:56		08:25 (108)
	20:57	76	20:08 (107)	20:19	42	08:18 (82)	19:27			18:41			17:12	25	08:40 (108)	17:15	30	08:55 (108)
27	06:28		07:40 (82)	06:57		07:37 (82)	07:27			07:58			07:33		08:15 (108)	07:56		08:26 (108)
	20:56	77	20:07 (107)	20:17	39	08:16 (82)	19:25			18:40			17:12	26	08:41 (108)	17:16	30	08:56 (108)
28	06:29		07:39 (82)	06:58		07:39 (82)	07:28			07:59			07:34		08:15 (108)	07:56		08:26 (108)
	20:55	80	20:08 (107)	20:16	36	08:15 (82)	19:23			18:38			17:11	26	08:41 (108)	17:16	30	08:56 (108)
29	06:30		07:38 (82)	06:59		07:39 (82)	07:29			08:00			07:35		08:15 (108)	07:57		08:27 (108)
	20:54	83	20:08 (107)	20:14	33	08:12 (82)	19:22			18:37			17:11	27	08:42 (108)	17:17	29	08:56 (108)
30	06:31		07:38 (82)	07:00		07:41 (82)	07:30			08:01			07:36		08:15 (108)	07:57		08:27 (108)
	20:53	85	20:09 (107)	20:13	28	08:09 (82)	19:20			18:36			17:11	28	08:43 (108)	17:18	30	08:57 (108)
31	06:31		07:37 (82)	07:01		07:44 (82)				08:02						07:57		08:27 (108)
	20:52	87	20:09 (107)	20:11	22	08:06 (82)				18:35						17:19	30	08:57 (108)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		1355			2248			14			767			249			918	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.66			0.66			0.67			0.63			0.61			0.61	
Total reduction		0.39			0.39			0.41			0.35			0.22			0.30	
Total, real		532			883			6			271			56			278	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 61

Licensed user:
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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative **Shadow receptor:** 8355 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6637)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:24 (108)	07:45			07:10		07:45 (83)	07:20			06:36		07:29 (82)	06:08		06:30 (106)
	17:20	29	08:53 (108)	17:53			18:26	37	08:22 (83)	19:59			20:28	88	19:57 (107)	20:57	47	19:49 (107)
2	07:58		08:25 (108)	07:44			07:08		07:45 (83)	07:19			06:35		07:30 (82)	06:08		06:30 (106)
	17:21	28	08:53 (108)	17:54			18:27	36	08:21 (83)	20:00			20:29	88	19:58 (107)	20:58	45	19:49 (107)
3	07:58		08:26 (108)	07:43			07:07		07:46 (83)	07:17			06:33		07:30 (82)	06:07		06:31 (106)
	17:21	29	08:55 (108)	17:56			18:28	35	08:21 (83)	20:00			20:30	87	19:58 (107)	20:59	43	19:48 (107)
4	07:58		08:26 (108)	07:42			07:05		07:45 (83)	07:15			06:32		07:31 (82)	06:07		06:30 (106)
	17:22	28	08:54 (108)	17:57			18:29	35	08:20 (83)	20:01			20:31	87	19:59 (107)	20:59	42	19:47 (107)
5	07:58		08:26 (108)	07:41			07:04		07:46 (83)	07:14			06:31		07:31 (82)	06:07		06:30 (106)
	17:23	29	08:55 (108)	17:58			18:31	33	08:19 (83)	20:02			20:32	85	19:58 (107)	21:00	40	19:46 (107)
6	07:58		08:26 (108)	07:40			07:02		07:46 (83)	07:12			06:30		07:32 (82)	06:06		06:31 (106)
	17:24	29	08:55 (108)	17:59			18:32	32	08:18 (83)	20:03			20:33	83	19:58 (107)	21:01	37	19:45 (107)
7	07:58		08:27 (108)	07:39			07:01		07:48 (83)	07:11		07:50 (82)	06:29		07:33 (82)	06:06		06:31 (106)
	17:25	29	08:56 (108)	18:01			18:33	29	08:17 (83)	20:04	16	08:06 (82)	20:34	82	19:59 (107)	21:01	34	19:44 (107)
8	07:58		08:28 (108)	07:37			07:59		08:48 (83)	07:09		07:47 (82)	06:27		07:34 (82)	06:06		06:30 (106)
	17:26	28	08:56 (108)	18:02			19:34	27	09:15 (83)	20:05	23	08:10 (82)	20:35	80	19:59 (107)	21:02	30	19:41 (107)
9	07:57		08:28 (108)	07:36			07:57		08:49 (83)	07:08		07:44 (82)	06:26		07:35 (82)	06:06		06:31 (106)
	17:27	29	08:57 (108)	18:03			19:35	24	09:13 (83)	20:06	28	08:12 (82)	20:36	78	19:59 (107)	21:02	24	06:55 (106)
10	07:57		08:29 (108)	07:35			07:56		08:51 (83)	07:06		07:42 (82)	06:25		07:36 (82)	06:06		06:31 (106)
	17:28	28	08:57 (108)	18:04			19:36	20	09:11 (83)	20:07	32	08:14 (82)	20:37	76	19:59 (107)	21:03	24	06:55 (106)
11	07:57		08:29 (108)	07:34			07:54		08:53 (83)	07:04		07:40 (82)	06:24		07:38 (82)	06:05		06:31 (106)
	17:29	28	08:57 (108)	18:05			19:37	15	09:08 (83)	20:08	35	08:15 (82)	20:38	72	19:59 (107)	21:04	25	06:56 (106)
12	07:57		08:30 (108)	07:33			07:53		08:59 (83)	07:03		07:38 (82)	06:23		07:39 (82)	06:05		06:31 (106)
	17:30	28	08:58 (108)	18:07			19:38	4	09:03 (83)	20:09	39	08:17 (82)	20:39	68	19:58 (107)	21:04	25	06:56 (106)
13	07:57		08:31 (108)	07:32			07:51			07:01		07:36 (82)	06:22		07:42 (82)	06:05		06:32 (106)
	17:31	27	08:58 (108)	18:08			19:39			20:10	41	08:17 (82)	20:40	63	19:58 (107)	21:05	24	06:56 (106)
14	07:56		08:31 (108)	07:30			07:49			07:00		07:36 (82)	06:21		07:44 (82)	06:05		06:32 (106)
	17:32	27	08:58 (108)	18:09			19:40			20:11	42	08:18 (82)	20:41	58	19:58 (107)	21:05	24	06:56 (106)
15	07:56		08:32 (108)	07:29			07:48			06:58		07:34 (82)	06:20		19:13 (107)	06:05		06:32 (106)
	17:33	26	08:58 (108)	18:10			19:41			20:12	44	08:18 (82)	20:42	45	19:58 (107)	21:05	25	06:57 (106)
16	07:55		08:32 (108)	07:28			07:46			06:57		07:33 (82)	06:19		19:14 (107)	06:05		06:32 (106)
	17:34	25	08:57 (108)	18:11			19:42			20:13	46	08:19 (82)	20:43	43	19:57 (107)	21:06	25	06:57 (106)
17	07:55		08:33 (108)	07:27		07:59 (83)	07:45			06:55		07:32 (82)	06:18		19:15 (107)	06:05		06:32 (106)
	17:36	25	08:58 (108)	18:12	12	08:11 (83)	19:43			20:14	47	08:19 (82)	20:44	43	19:58 (107)	21:06	25	06:57 (106)
18	07:55		08:34 (108)	07:25		07:56 (83)	07:43			06:54		07:32 (82)	06:17		19:15 (107)	06:05		06:32 (106)
	17:37	23	08:57 (108)	18:14	18	08:14 (83)	19:44			20:15	48	08:20 (82)	20:45	42	19:57 (107)	21:07	25	06:57 (106)
19	07:54		08:35 (108)	07:24		07:53 (83)	07:41			06:52		07:30 (82)	06:17		19:15 (107)	06:05		06:33 (106)
	17:38	22	08:57 (108)	18:15	23	08:16 (83)	19:45			20:16	49	08:19 (82)	20:46	42	19:57 (107)	21:07	24	06:57 (106)
20	07:54		08:36 (108)	07:23		07:52 (83)	07:40			06:51		07:30 (82)	06:16		19:16 (107)	06:06		06:34 (106)
	17:39	20	08:56 (108)	18:16	26	08:18 (83)	19:46			20:17	50	08:20 (82)	20:47	40	19:56 (107)	21:07	24	06:58 (106)
21	07:53		08:38 (108)	07:21		07:51 (83)	07:38			06:49		07:29 (82)	06:15		19:17 (107)	06:06		06:34 (106)
	17:40	18	08:56 (108)	18:17	28	08:19 (83)	19:48			20:18	50	08:19 (82)	20:48	39	19:56 (107)	21:07	24	06:58 (106)
22	07:52		08:39 (108)	07:20		07:49 (83)	07:37			06:48		07:29 (82)	06:14		06:37 (106)	06:06		06:34 (106)
	17:41	16	08:55 (108)	18:18	31	08:20 (83)	19:49			20:19	66	19:46 (107)	20:49	46	19:56 (107)	21:08	24	06:58 (106)
23	07:52		08:40 (108)	07:18		07:48 (83)	07:35			06:47		07:29 (82)	06:14		06:35 (106)	06:06		06:34 (106)
	17:42	13	08:53 (108)	18:19	33	08:21 (83)	19:50			20:20	73	19:49 (107)	20:50	48	19:55 (107)	21:08	24	06:58 (106)
24	07:51		08:43 (108)	07:17		07:47 (83)	07:33			06:45		07:28 (82)	06:13		06:33 (106)	06:06		06:33 (106)
	17:44	8	08:51 (108)	18:21	34	08:21 (83)	19:51			20:21	77	19:50 (107)	20:51	50	19:54 (107)	21:08	25	06:58 (106)
25	07:50			07:16		07:47 (83)	07:32			06:44		07:29 (82)	06:12		06:33 (106)	06:07		06:34 (106)
	17:45			18:22	35	08:22 (83)	19:52			20:22	79	19:52 (107)	20:51	51	19:54 (107)	21:08	25	06:59 (106)
26	07:50			07:14		07:46 (83)	07:30			06:42		07:29 (82)	06:11		06:32 (106)	06:07		06:34 (106)
	17:46			18:23	35	08:21 (83)	19:53			20:23	83	19:54 (107)	20:52	50	19:53 (107)	21:08	25	06:59 (106)
27	07:49			07:13		07:46 (83)	07:28			06:41		07:28 (82)	06:11		06:32 (106)	06:07		06:34 (106)
	17:47			18:24	36	08:22 (83)	19:54			20:24	84	19:54 (107)	20:53	51	19:53 (107)	21:08	25	06:59 (106)
28	07:48			07:11		07:45 (83)	07:27			06:40		07:29 (82)	06:10		06:31 (106)	06:08		06:35 (106)
	17:48			18:25	36	08:21 (83)	19:55			20:25	85	19:55 (107)	20:54	51	19:52 (107)	21:08	24	06:59 (106)
29	07:47						07:25			06:38		07:29 (82)	06:10		06:31 (106)	06:08		06:35 (106)
	17:50						19:56			20:26	86	19:56 (107)	20:55	50	19:52 (107)	21:08	24	06:59 (106)
30	07:46						07:23			06:37		07:29 (82)	06:09		06:30 (106)	06:09		06:35 (106)
	17:51						19:57			20:27	87	19:56 (107)	20:56	50	19:51 (107)	21:08	25	07:00 (106)
31	07:46						07:22						06:09		06:31 (106)			
	17:52						19:58						20:56	47	19:50 (107)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		592			347			327			1310			1883			857	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.61			0.63			0.63			0.66			0.65			0.68	
Total reduction		0.22			0.26			0.28			0.34			0.36			0.40	
Total, real		129			92			91			440			680			347	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 62

Licensed user:
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217 Montgomery St.
US-SYRACUSE, NY 13202
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Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative **Shadow receptor:** 8355 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6637)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:35 (106)	06:32		07:49 (82)	07:02		07:39 (82)	07:31			07:04			07:37		08:11 (108)
	21:08	25	07:00 (106)	20:51	71	20:09 (107)	20:09	35	08:14 (82)	19:19			17:33			17:10	28	08:39 (108)
2	06:10		06:36 (106)	06:33		07:48 (82)	07:03		07:40 (82)	07:32		08:33 (83)	07:05			07:38		08:11 (108)
	21:08	24	07:00 (106)	20:50	73	20:09 (107)	20:08	32	08:12 (82)	19:17	12	08:45 (83)	17:32			17:10	28	08:39 (108)
3	06:10		06:36 (106)	06:34		07:46 (82)	07:04		07:42 (82)	07:33		08:30 (83)	07:06			07:39		08:11 (108)
	21:08	24	07:00 (106)	20:49	77	20:09 (107)	20:06	28	08:10 (82)	19:15	18	08:48 (83)	17:31			17:10	29	08:40 (108)
4	06:11		06:36 (106)	06:35		07:45 (82)	07:05		07:44 (82)	07:34		08:27 (83)	07:07			07:40		08:12 (108)
	21:08	25	07:01 (106)	20:48	79	20:09 (107)	20:05	23	08:07 (82)	19:14	23	08:50 (83)	17:30			17:10	28	08:40 (108)
5	06:11		06:36 (106)	06:36		07:43 (82)	07:06		07:47 (82)	07:35		08:25 (83)	07:08			07:41		08:12 (108)
	21:08	32	19:48 (107)	20:47	81	20:08 (107)	20:03	16	08:03 (82)	19:12	26	08:51 (83)	17:29			17:09	29	08:41 (108)
6	06:12		06:37 (106)	06:37		07:42 (82)	07:07			07:36		08:24 (83)	07:09			07:42		08:13 (108)
	21:08	35	19:50 (107)	20:45	83	20:08 (107)	20:01			19:10	28	08:52 (83)	17:28			17:09	28	08:41 (108)
7	06:12		06:36 (106)	06:38		07:41 (82)	07:08			07:37		08:22 (83)	07:11			07:43		08:13 (108)
	21:07	38	19:51 (107)	20:44	84	20:08 (107)	20:00			19:09	31	08:53 (83)	17:27			17:09	29	08:42 (108)
8	06:13		06:37 (106)	06:39		07:40 (82)	07:09			07:38		08:21 (83)	07:12			07:44		08:14 (108)
	21:07	41	19:53 (107)	20:43	86	20:08 (107)	19:57			19:07	33	08:54 (83)	17:26			17:09	28	08:42 (108)
9	06:14		06:38 (106)	06:40		07:40 (82)	07:10			07:39		08:20 (83)	07:13			07:45		08:14 (108)
	21:07	42	19:55 (107)	20:42	86	20:07 (107)	19:55			19:06	34	08:54 (83)	17:25			17:09	29	08:43 (108)
10	06:14		06:37 (106)	06:41		07:39 (82)	07:11			07:40		08:19 (83)	07:14			07:46		08:15 (108)
	21:06	45	19:55 (107)	20:41	88	20:07 (107)	19:53			19:04	35	08:54 (83)	17:24			17:09	28	08:43 (108)
11	06:15		06:38 (106)	06:42		07:38 (82)	07:11			07:41		08:19 (83)	07:15			07:47		08:15 (108)
	21:06	46	19:57 (107)	20:39	87	20:06 (107)	19:52			19:03	35	08:54 (83)	17:23			17:09	29	08:44 (108)
12	06:16		06:39 (106)	06:43		07:38 (82)	07:12			07:42		08:18 (83)	07:16			07:47		08:15 (108)
	21:06	47	19:58 (107)	20:38	88	20:06 (107)	19:50			19:01	36	08:54 (83)	17:22			17:10	28	08:43 (108)
13	06:16		06:38 (106)	06:44		07:37 (82)	07:13			07:43		08:19 (83)	07:17			07:48		08:16 (108)
	21:05	48	19:58 (107)	20:37	87	20:05 (107)	19:48			19:00	36	08:55 (83)	17:21			17:10	28	08:44 (108)
14	06:17		06:39 (106)	06:45		07:37 (82)	07:14			07:44		08:19 (83)	07:19			07:49		08:17 (108)
	21:05	50	20:00 (107)	20:36	87	20:04 (107)	19:47			18:58	36	08:55 (83)	17:20			17:10	28	08:45 (108)
15	06:18		06:40 (106)	06:46		07:36 (82)	07:15			07:45		08:18 (83)	07:20			07:50		08:17 (108)
	21:04	50	20:01 (107)	20:34	86	20:03 (107)	19:45			18:57	36	08:54 (83)	17:19			17:10	28	08:45 (108)
16	06:19		06:41 (106)	06:47		07:36 (82)	07:16			07:46		08:18 (83)	07:21			07:50		08:17 (108)
	21:04	50	20:02 (107)	20:33	84	20:02 (107)	19:43			18:55	36	08:54 (83)	17:18			17:10	28	08:45 (108)
17	06:19		06:41 (106)	06:48		07:35 (82)	07:17			07:47		08:19 (83)	07:22			07:51		08:18 (108)
	21:03	51	20:02 (107)	20:32	81	19:59 (107)	19:42			18:54	34	08:53 (83)	17:17			17:11	28	08:46 (108)
18	06:20		06:42 (106)	06:49		07:34 (82)	07:18			07:48		08:19 (83)	07:23		08:17 (108)	07:52		08:19 (108)
	21:03	51	20:03 (107)	20:30	79	19:58 (107)	19:40			18:52	33	08:52 (83)	17:17	8	08:25 (108)	17:11	28	08:47 (108)
19	06:21		06:43 (106)	06:50		07:34 (82)	07:19			07:49		08:19 (83)	07:24		08:15 (108)	07:52		08:19 (108)
	21:02	50	20:04 (107)	20:29	76	19:56 (107)	19:38			18:51	32	08:51 (83)	17:16	13	08:28 (108)	17:11	27	08:46 (108)
20	06:22		06:45 (106)	06:51		07:34 (82)	07:20			07:50		08:20 (83)	07:25		08:14 (108)	07:53		08:20 (108)
	21:01	49	20:05 (107)	20:27	70	19:53 (107)	19:37			18:49	30	08:50 (83)	17:15	16	08:30 (108)	17:12	27	08:47 (108)
21	06:23		06:45 (106)	06:51		07:34 (82)	07:21			07:51		08:21 (83)	07:27		08:13 (108)	07:54		08:20 (108)
	21:01	48	20:05 (107)	20:26	64	19:50 (107)	19:35			18:48	27	08:48 (83)	17:15	18	08:31 (108)	17:12	27	08:47 (108)
22	06:24		06:49 (106)	06:52		07:34 (82)	07:22			07:52		08:23 (83)	07:28		08:12 (108)	07:54		08:21 (108)
	21:00	41	20:05 (107)	20:25	50	08:24 (82)	19:33			18:46	25	08:48 (83)	17:14	20	08:32 (108)	17:13	27	08:48 (108)
23	06:24		19:26 (107)	06:53		07:34 (82)	07:23			07:54		08:24 (83)	07:29		08:11 (108)	07:55		08:21 (108)
	20:59	40	20:06 (107)	20:23	49	08:23 (82)	19:32			18:45	22	08:46 (83)	17:14	22	08:33 (108)	17:13	27	08:48 (108)
24	06:25		19:26 (107)	06:54		07:34 (82)	07:24			07:55		08:26 (83)	07:30		08:12 (108)	07:55		08:22 (108)
	20:58	41	20:07 (107)	20:22	49	08:23 (82)	19:30			18:44	17	08:43 (83)	17:13	23	08:35 (108)	17:14	27	08:49 (108)
25	06:26		19:26 (107)	06:55		07:35 (82)	07:25			07:56		08:29 (83)	07:31		08:11 (108)	07:55		08:22 (108)
	20:57	41	20:07 (107)	20:20	47	08:22 (82)	19:28			18:42	11	08:40 (83)	17:13	25	08:36 (108)	17:15	27	08:49 (108)
26	06:27		19:25 (107)	06:56		07:35 (82)	07:26			07:57			07:32		08:11 (108)	07:56		08:22 (108)
	20:57	43	20:08 (107)	20:19	47	08:22 (82)	19:27			18:41			17:12	25	08:36 (108)	17:15	28	08:50 (108)
27	06:28		19:24 (107)	06:57		07:35 (82)	07:27			07:58			07:33		08:11 (108)	07:56		08:23 (108)
	20:56	43	20:07 (107)	20:17	46	08:21 (82)	19:25			18:40			17:12	26	08:37 (108)	17:16	28	08:51 (108)
28	06:29		19:24 (107)	06:58		07:36 (82)	07:28			07:59			07:34		08:11 (108)	07:56		08:23 (108)
	20:55	44	20:08 (107)	20:16	44	08:20 (82)	19:23			18:38			17:11	27	08:38 (108)	17:16	28	08:51 (108)
29	06:30		07:58 (82)	06:59		07:36 (82)	07:29			08:00			07:35		08:11 (108)	07:57		08:24 (108)
	20:54	51	20:08 (107)	20:14	42	08:18 (82)	19:22			18:37			17:11	27	08:38 (108)	17:17	27	08:51 (108)
30	06:31		07:54 (82)	07:00		07:36 (82)	07:30			08:01			07:36		08:11 (108)	07:57		08:24 (108)
	20:53	60	20:09 (107)	20:13	41	08:17 (82)	19:20			18:36			17:11	28	08:39 (108)	17:18	28	08:52 (108)
31	06:31		07:51 (82)	07:01		07:37 (82)				08:02						07:57		08:24 (108)
	20:52	66	20:09 (107)	20:11	39	08:16 (82)				18:35						17:19	28	08:52 (108)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		1341			2151			134			686			278			865	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.65			0.65			0.67			0.63			0.61			0.61	
Total reduction		0.39			0.39			0.41			0.35			0.22			0.30	
Total, real		523			843			54			242			62			261	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 63

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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative **Shadow receptor:** 8356 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6638)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:24 (108)	07:45			07:10		07:44 (83)	07:20			06:36		07:25 (82)	06:08		06:29 (106)
	17:20	28	08:52 (108)	17:53			18:26	36	08:20 (83)	19:59			20:28	88	19:58 (107)	20:57	50	19:54 (107)
2	07:58		08:24 (108)	07:44			07:08		07:43 (83)	07:19			06:35		07:25 (82)	06:08		06:29 (106)
	17:21	29	08:53 (108)	17:54			18:27	37	08:20 (83)	20:00			20:29	89	19:59 (107)	20:58	50	19:54 (107)
3	07:58		08:26 (108)	07:43			07:07		07:44 (83)	07:17			06:33		07:26 (82)	06:07		06:30 (106)
	17:21	28	08:54 (108)	17:56			18:28	36	08:20 (83)	20:00			20:30	90	20:00 (107)	20:59	48	19:53 (107)
4	07:58		08:25 (108)	07:42			07:05		07:43 (83)	07:15			06:32		07:26 (82)	06:07		06:29 (106)
	17:22	29	08:54 (108)	17:57			18:29	36	08:19 (83)	20:01			20:31	89	20:00 (107)	20:59	47	19:52 (107)
5	07:58		08:25 (108)	07:41			07:04		07:44 (83)	07:14			06:31		07:26 (82)	06:07		06:29 (106)
	17:23	29	08:54 (108)	17:58			18:31	35	08:19 (83)	20:02			20:32	90	20:00 (107)	21:00	46	19:52 (107)
6	07:58		08:26 (108)	07:40			07:02		07:44 (83)	07:12			06:30		07:26 (82)	06:06		06:29 (106)
	17:24	29	08:55 (108)	17:59			18:32	34	08:18 (83)	20:03			20:33	89	20:00 (107)	21:01	46	19:52 (107)
7	07:58		08:26 (108)	07:39			07:01		07:45 (83)	07:11			06:29		07:27 (82)	06:06		06:30 (106)
	17:25	29	08:55 (108)	18:01			18:33	32	08:17 (83)	20:04			20:34	87	20:00 (107)	21:01	43	19:51 (107)
8	07:58		08:27 (108)	07:37			07:59		08:45 (83)	07:09			06:27		07:28 (82)	06:06		06:29 (106)
	17:26	29	08:56 (108)	18:02			19:34	31	09:16 (83)	20:05			20:35	87	20:01 (107)	21:02	42	19:50 (107)
9	07:57		08:28 (108)	07:36			07:57		08:45 (83)	07:08		07:49 (82)	06:26		07:28 (82)	06:06		06:29 (106)
	17:27	28	08:56 (108)	18:03			19:35	29	09:14 (83)	20:06	12	08:01 (82)	20:36	87	20:01 (107)	21:02	40	19:49 (107)
10	07:57		08:28 (108)	07:35			07:56		08:47 (83)	07:06		07:45 (82)	06:25		07:29 (82)	06:06		06:29 (106)
	17:28	29	08:57 (108)	18:04			19:36	26	09:13 (83)	20:07	21	08:06 (82)	20:37	85	20:01 (107)	21:03	40	19:49 (107)
11	07:57		08:28 (108)	07:34			07:54		08:48 (83)	07:04		07:41 (82)	06:24		07:30 (82)	06:05		06:30 (106)
	17:29	29	08:57 (108)	18:05			19:37	22	09:10 (83)	20:08	27	08:08 (82)	20:38	83	20:01 (107)	21:04	37	19:48 (107)
12	07:57		08:29 (108)	07:33			07:53		08:51 (83)	07:03		07:40 (82)	06:23		07:31 (82)	06:05		06:30 (106)
	17:30	28	08:57 (108)	18:07			19:38	17	09:08 (83)	20:09	30	08:10 (82)	20:39	81	20:01 (107)	21:04	34	19:47 (107)
13	07:57		08:30 (108)	07:32			07:51		08:54 (83)	07:01		07:37 (82)	06:22		07:32 (82)	06:05		06:30 (106)
	17:31	28	08:58 (108)	18:08			19:39	10	09:04 (83)	20:10	34	08:11 (82)	20:40	78	20:01 (107)	21:05	33	19:46 (107)
14	07:56		08:30 (108)	07:30			07:49			07:00		07:36 (82)	06:21		07:33 (82)	06:05		06:30 (106)
	17:32	27	08:57 (108)	18:09			19:40			20:11	37	08:13 (82)	20:41	75	20:00 (107)	21:05	30	19:45 (107)
15	07:56		08:31 (108)	07:29			07:48			06:58		07:34 (82)	06:20		07:35 (82)	06:05		06:30 (106)
	17:33	27	08:58 (108)	18:10			19:41			20:12	40	08:14 (82)	20:42	70	20:00 (107)	21:05	25	06:55 (106)
16	07:55		08:31 (108)	07:28			07:46			06:57		07:33 (82)	06:19		07:36 (82)	06:05		06:31 (106)
	17:34	26	08:57 (108)	18:11			19:42			20:13	42	08:15 (82)	20:43	68	20:00 (107)	21:06	24	06:55 (106)
17	07:55		08:32 (108)	07:27			07:45			06:55		07:31 (82)	06:18		07:39 (82)	06:05		06:31 (106)
	17:36	26	08:58 (108)	18:12			19:43			20:14	44	08:15 (82)	20:44	64	20:01 (107)	21:06	24	06:55 (106)
18	07:55		08:32 (108)	07:25		07:59 (83)	07:43			06:54		07:30 (82)	06:17		07:41 (82)	06:05		06:31 (106)
	17:37	25	08:57 (108)	18:14	10	08:09 (83)	19:44			20:15	46	08:16 (82)	20:45	58	20:00 (107)	21:07	24	06:55 (106)
19	07:54		08:34 (108)	07:24		07:55 (83)	07:41			06:52		07:29 (82)	06:17		07:45 (82)	06:05		06:31 (106)
	17:38	24	08:58 (108)	18:15	17	08:12 (83)	19:45			20:16	47	08:16 (82)	20:46	50	20:00 (107)	21:07	24	06:55 (106)
20	07:54		08:34 (108)	07:23		07:53 (83)	07:40			06:51		07:29 (82)	06:16		19:17 (107)	06:06		06:32 (106)
	17:39	23	08:57 (108)	18:16	21	08:14 (83)	19:46			20:17	47	08:16 (82)	20:47	42	19:59 (107)	21:07	25	06:57 (106)
21	07:53		08:36 (108)	07:21		07:51 (83)	07:38			06:49		07:27 (82)	06:15		19:18 (107)	06:06		06:32 (106)
	17:40	21	08:57 (108)	18:17	25	08:16 (83)	19:48			20:18	49	08:16 (82)	20:48	42	20:00 (107)	21:07	25	06:57 (106)
22	07:52		08:37 (108)	07:20		07:49 (83)	07:37			06:48		07:27 (82)	06:14		19:19 (107)	06:06		06:32 (106)
	17:41	19	08:56 (108)	18:18	28	08:17 (83)	19:49			20:19	50	08:17 (82)	20:49	40	19:59 (107)	21:08	25	06:57 (106)
23	07:52		08:38 (108)	07:18		07:48 (83)	07:35			06:47		07:27 (82)	06:14		19:19 (107)	06:06		06:32 (106)
	17:42	17	08:55 (108)	18:19	30	08:18 (83)	19:50			20:20	58	19:45 (107)	20:50	39	19:58 (107)	21:08	25	06:57 (106)
24	07:51		08:40 (108)	07:17		07:47 (83)	07:33			06:45		07:26 (82)	06:13		06:36 (106)	06:06		06:32 (106)
	17:44	13	08:53 (108)	18:21	32	08:19 (83)	19:51			20:21	67	19:48 (107)	20:51	44	19:58 (107)	21:08	24	06:56 (106)
25	07:50		08:43 (108)	07:16		07:46 (83)	07:32			06:44		07:26 (82)	06:12		06:34 (106)	06:07		06:33 (106)
	17:45	9	08:52 (108)	18:22	34	08:20 (83)	19:52			20:22	73	19:51 (107)	20:51	48	19:58 (107)	21:08	24	06:57 (106)
26	07:50			07:14		07:45 (83)	07:30			06:42		07:26 (82)	06:11		06:33 (106)	06:07		06:33 (106)
	17:46			18:23	35	08:20 (83)	19:53			20:23	77	19:53 (107)	20:52	49	19:57 (107)	21:08	24	06:57 (106)
27	07:49			07:13		07:45 (83)	07:28			06:41		07:25 (82)	06:11		06:32 (106)	06:07		06:32 (106)
	17:47			18:24	35	08:20 (83)	19:54			20:24	81	19:54 (107)	20:53	50	19:57 (107)	21:08	25	06:57 (106)
28	07:48			07:11		07:44 (83)	07:27			06:40		07:25 (82)	06:10		06:31 (106)	06:08		06:33 (106)
	17:48			18:25	36	08:20 (83)	19:55			20:25	84	19:56 (107)	20:54	51	19:56 (107)	21:08	30	19:48 (107)
29	07:47						07:25			06:38		07:25 (82)	06:10		06:31 (106)	06:08		06:33 (106)
	17:50						19:56			20:26	86	19:57 (107)	20:55	51	19:56 (107)	21:08	32	19:49 (107)
30	07:46						07:23			06:37		07:25 (82)	06:09		06:30 (106)	06:09		06:34 (106)
	17:51						19:57			20:27	87	19:57 (107)	20:56	50	19:55 (107)	21:08	34	19:51 (107)
31	07:46						07:22						06:09		06:30 (106)			
	17:52						19:58						20:56	50	19:55 (107)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		629			303			381			1139			2064			1000	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.61			0.63			0.63			0.66			0.65			0.67	
Total reduction		0.22			0.26			0.28			0.34			0.36			0.40	
Total, real		137			80			106			383			747			401	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 64

Licensed user:
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Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative **Shadow receptor:** 8356 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6638)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:34 (106)	06:32		07:41 (82)	07:02		07:41 (82)	07:31		08:31 (83)	07:04			07:37		08:10 (108)
	21:08	36	19:52 (107)	20:51	81	20:11 (107)	20:09	26	08:07 (82)	19:19	15	08:46 (83)	17:33			17:10	29	08:39 (108)
2	06:10		06:34 (106)	06:33		07:40 (82)	07:03		07:43 (82)	07:32		08:28 (83)	07:05			07:38		08:10 (108)
	21:08	38	19:53 (107)	20:50	83	20:11 (107)	20:08	21	08:04 (82)	19:17	20	08:48 (83)	17:32			17:10	29	08:39 (108)
3	06:10		06:34 (106)	06:34		07:40 (82)	07:04		07:47 (82)	07:33		08:25 (83)	07:06			07:39		08:11 (108)
	21:08	40	19:54 (107)	20:49	84	20:11 (107)	20:06	12	07:59 (82)	19:15	25	08:50 (83)	17:31			17:10	29	08:40 (108)
4	06:11		06:35 (106)	06:35		07:39 (82)	07:05			07:34		08:24 (83)	07:07			07:40		08:11 (108)
	21:08	42	19:56 (107)	20:48	86	20:11 (107)	20:05			19:14	27	08:51 (83)	17:30			17:10	29	08:40 (108)
5	06:11		06:35 (106)	06:36		07:37 (82)	07:06			07:35		08:22 (83)	07:08			07:41		08:11 (108)
	21:08	43	19:56 (107)	20:47	87	20:10 (107)	20:03			19:12	30	08:52 (83)	17:29			17:09	29	08:40 (108)
6	06:12		06:35 (106)	06:37		07:36 (82)	07:07			07:36		08:21 (83)	07:09			07:42		08:12 (108)
	21:08	44	19:57 (107)	20:45	88	20:10 (107)	20:01			19:10	32	08:53 (83)	17:28			17:09	29	08:41 (108)
7	06:12		06:35 (106)	06:38		07:36 (82)	07:08			07:37		08:20 (83)	07:11			07:43		08:12 (108)
	21:07	46	19:58 (107)	20:44	89	20:10 (107)	20:00			19:09	33	08:53 (83)	17:27			17:09	29	08:41 (108)
8	06:13		06:36 (106)	06:39		07:35 (82)	07:09			07:38		08:19 (83)	07:12			07:44		08:13 (108)
	21:07	47	19:59 (107)	20:43	89	20:09 (107)	19:57			19:07	34	08:53 (83)	17:26			17:09	29	08:42 (108)
9	06:14		06:37 (106)	06:40		07:35 (82)	07:10			07:39		08:18 (83)	07:13			07:45		08:14 (108)
	21:07	47	20:00 (107)	20:42	90	20:09 (107)	19:55			19:06	36	08:54 (83)	17:25			17:09	28	08:42 (108)
10	06:14		06:36 (106)	06:41		07:34 (82)	07:11			07:40		08:18 (83)	07:14			07:46		08:14 (108)
	21:06	49	20:01 (107)	20:41	89	20:08 (107)	19:53			19:04	36	08:54 (83)	17:24			17:09	29	08:43 (108)
11	06:15		06:37 (106)	06:42		07:34 (82)	07:11			07:41		08:17 (83)	07:15			07:47		08:15 (108)
	21:06	50	20:02 (107)	20:39	88	20:07 (107)	19:52			19:03	36	08:53 (83)	17:23			17:09	28	08:43 (108)
12	06:16		06:38 (106)	06:43		07:34 (82)	07:12			07:42		08:17 (83)	07:16			07:47		08:15 (108)
	21:06	51	20:03 (107)	20:38	88	20:07 (107)	19:50			19:01	36	08:53 (83)	17:22			17:10	28	08:43 (108)
13	06:16		06:38 (106)	06:44		07:33 (82)	07:13			07:43		08:18 (83)	07:17			07:48		08:15 (108)
	21:05	51	20:03 (107)	20:37	87	20:06 (107)	19:48			19:00	36	08:54 (83)	17:21			17:10	28	08:43 (108)
14	06:17		06:39 (106)	06:45		07:33 (82)	07:14			07:44		08:17 (83)	07:19			07:49		08:16 (108)
	21:05	51	20:04 (107)	20:36	84	20:04 (107)	19:47			18:58	36	08:53 (83)	17:20			17:10	28	08:44 (108)
15	06:18		06:40 (106)	06:46		07:33 (82)	07:15			07:45		08:17 (83)	07:20			07:50		08:17 (108)
	21:04	50	20:05 (107)	20:34	83	20:03 (107)	19:45			18:57	36	08:53 (83)	17:19			17:10	28	08:45 (108)
16	06:19		06:41 (106)	06:47		07:33 (82)	07:16			07:46		08:18 (83)	07:21			07:50		08:17 (108)
	21:04	51	20:06 (107)	20:33	81	20:02 (107)	19:43			18:55	34	08:52 (83)	17:18			17:10	27	08:44 (108)
17	06:19		06:41 (106)	06:48		07:32 (82)	07:17			07:47		08:18 (83)	07:22		08:16 (108)	07:51		08:18 (108)
	21:03	50	20:06 (107)	20:32	76	19:59 (107)	19:42			18:54	33	08:51 (83)	17:17	9	08:25 (108)	17:11	27	08:45 (108)
18	06:20		06:43 (106)	06:49		07:32 (82)	07:18			07:48		08:18 (83)	07:23		08:14 (108)	07:52		08:19 (108)
	21:03	49	20:07 (107)	20:30	72	19:57 (107)	19:40			18:52	32	08:50 (83)	17:17	13	08:27 (108)	17:11	27	08:46 (108)
19	06:21		06:45 (106)	06:50		07:32 (82)	07:19			07:49		08:19 (83)	07:24		08:13 (108)	07:52		08:19 (108)
	21:02	46	20:08 (107)	20:29	66	19:54 (107)	19:38			18:51	30	08:49 (83)	17:16	17	08:30 (108)	17:11	27	08:46 (108)
20	06:22		19:30 (107)	06:51		07:32 (82)	07:20			07:50		08:20 (83)	07:25		08:12 (108)	07:53		08:20 (108)
	21:01	38	20:08 (107)	20:27	54	19:47 (107)	19:37			18:49	27	08:47 (83)	17:15	19	08:31 (108)	17:12	26	08:46 (108)
21	06:23		19:28 (107)	06:51		07:32 (82)	07:21			07:51		08:21 (83)	07:27		08:11 (108)	07:54		08:20 (108)
	21:01	40	20:08 (107)	20:26	49	08:21 (82)	19:35			18:48	24	08:45 (83)	17:15	21	08:32 (108)	17:12	26	08:46 (108)
22	06:24		19:28 (107)	06:52		07:32 (82)	07:22			07:52		08:24 (83)	07:28		08:10 (108)	07:54		08:21 (108)
	21:00	41	20:09 (107)	20:25	49	08:21 (82)	19:33			18:46	20	08:44 (83)	17:14	23	08:33 (108)	17:13	26	08:47 (108)
23	06:24		19:28 (107)	06:53		07:33 (82)	07:23			07:54		08:26 (83)	07:29		08:10 (108)	07:55		08:21 (108)
	20:59	41	20:09 (107)	20:23	47	08:20 (82)	19:32			18:45	15	08:41 (83)	17:14	24	08:34 (108)	17:13	26	08:47 (108)
24	06:25		19:28 (107)	06:54		07:33 (82)	07:24			07:55		08:30 (83)	07:30		08:10 (108)	07:55		08:22 (108)
	20:58	42	20:10 (107)	20:22	47	08:20 (82)	19:30			18:44	7	08:37 (83)	17:13	25	08:35 (108)	17:14	27	08:49 (108)
25	06:26		07:53 (82)	06:55		07:33 (82)	07:25			07:56			07:31		08:10 (108)	07:55		08:22 (108)
	20:57	54	20:10 (107)	20:20	46	08:19 (82)	19:28			18:42			17:13	26	08:36 (108)	17:15	27	08:49 (108)
26	06:27		07:51 (82)	06:56		07:34 (82)	07:26			07:57			07:32		08:10 (108)	07:56		08:22 (108)
	20:57	61	20:11 (107)	20:19	44	08:18 (82)	19:27			18:41			17:12	26	08:36 (108)	17:15	27	08:49 (108)
27	06:28		07:48 (82)	06:57		07:35 (82)	07:27			07:58			07:33		08:10 (108)	07:56		08:23 (108)
	20:56	65	20:10 (107)	20:17	42	08:17 (82)	19:25			18:40			17:12	27	08:37 (108)	17:16	27	08:50 (108)
28	06:29		07:46 (82)	06:58		07:36 (82)	07:28			07:59			07:34		08:10 (108)	07:56		08:23 (108)
	20:55	70	20:11 (107)	20:16	39	08:15 (82)	19:23			18:38			17:11	27	08:37 (108)	17:16	27	08:50 (108)
29	06:30		07:45 (82)	06:59		07:36 (82)	07:29			08:00			07:35		08:10 (108)	07:57		08:23 (108)
	20:54	73	20:11 (107)	20:14	37	08:13 (82)	19:22			18:37			17:11	28	08:38 (108)	17:17	28	08:51 (108)
30	06:31		07:43 (82)	07:00		07:37 (82)	07:30		08:36 (83)	08:01			07:36		08:10 (108)	07:57		08:23 (108)
	20:53	76	20:11 (107)	20:13	34	08:11 (82)	19:20	5	08:41 (83)	18:36			17:11	28	08:38 (108)	17:18	28	08:51 (108)
31	06:31		07:42 (82)	07:01		07:39 (82)				08:02						07:57		08:24 (108)
	20:52	78	20:11 (107)	20:11	30	08:09 (82)				18:35						17:19	27	08:51 (108)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		1560			2109			64			690			313			859	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.65			0.66			0.66			0.63			0.61			0.61	
Total reduction		0.39			0.39			0.40			0.35			0.22			0.30	
Total, real		607			828			26			244			70			260	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 65

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative**Shadow receptor:** 10055 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6741)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April		May			June		
1	07:57		16:24 (39)	07:45			07:10		08:07 (108)	07:20		06:36			06:08		07:01 (83)
	17:20	23	16:47 (39)	17:53			18:26	36	08:43 (108)	19:59		20:28			20:57	64	08:05 (83)
2	07:58		16:25 (39)	07:44			07:08		08:07 (108)	07:19		06:35		07:28 (83)	06:08		07:02 (83)
	17:21	22	16:47 (39)	17:54			18:27	34	08:41 (108)	20:00		20:29	11	07:39 (83)	20:58	63	08:05 (83)
3	07:58		16:25 (39)	07:43		08:19 (108)	07:07		08:09 (108)	07:17		06:33		07:23 (83)	06:07		07:02 (83)
	17:21	23	16:48 (39)	17:56	15	08:34 (108)	18:28	31	08:40 (108)	20:00		20:30	21	07:44 (83)	20:58	64	08:06 (83)
4	07:58		16:26 (39)	07:42		08:16 (108)	07:05		08:10 (108)	07:15		06:32		07:20 (83)	06:07		07:02 (83)
	17:22	22	16:48 (39)	17:57	21	08:37 (108)	18:29	27	08:37 (108)	20:01		20:31	27	07:47 (83)	20:59	63	08:05 (83)
5	07:58		16:27 (39)	07:41		08:13 (108)	07:04		08:13 (108)	07:14		06:31		07:17 (83)	06:07		07:02 (83)
	17:23	21	16:48 (39)	17:58	25	08:38 (108)	18:31	22	08:35 (108)	20:02		20:32	32	07:49 (83)	21:00	64	08:06 (83)
6	07:58		16:28 (39)	07:40		08:11 (108)	07:02		08:15 (108)	07:12		06:30		07:15 (83)	06:06		07:02 (83)
	17:24	20	16:48 (39)	17:59	29	08:40 (108)	18:32	16	08:31 (108)	20:03		20:33	36	07:51 (83)	21:01	64	08:06 (83)
7	07:58		16:28 (39)	07:39		08:10 (108)	07:01			07:11		06:29		07:13 (83)	06:06		07:03 (83)
	17:25	20	16:48 (39)	18:01	32	08:42 (108)	18:33			20:04		20:34	39	07:52 (83)	21:01	64	08:07 (83)
8	07:58		16:30 (39)	07:37		08:09 (108)	07:59			07:09		06:27		07:12 (83)	06:06		07:02 (83)
	17:26	19	16:49 (39)	18:02	34	08:43 (108)	19:34			20:05		20:35	42	07:54 (83)	21:02	64	08:06 (83)
9	07:57		16:31 (39)	07:36		08:08 (108)	07:57			07:07		06:26		07:11 (83)	06:06		07:03 (83)
	17:27	18	16:49 (39)	18:03	37	08:45 (108)	19:35			20:06		20:36	44	07:55 (83)	21:02	63	08:06 (83)
10	07:57		16:32 (39)	07:35		08:07 (108)	07:56			07:06		06:25		07:10 (83)	06:06		07:03 (83)
	17:28	17	16:49 (39)	18:04	50	17:41 (32)	19:36			20:07		20:37	46	07:56 (83)	21:03	64	08:07 (83)
11	07:57		16:32 (39)	07:34		08:07 (108)	07:54			07:04		06:24		07:09 (83)	06:05		07:03 (83)
	17:29	16	16:48 (39)	18:05	55	17:43 (32)	19:37			20:08		20:38	48	07:57 (83)	21:03	64	08:07 (83)
12	07:57		16:34 (39)	07:33		08:05 (108)	07:53			07:03		06:23		07:08 (83)	06:05		07:03 (83)
	17:30	14	16:48 (39)	18:07	60	17:43 (32)	19:38			20:09		20:39	50	07:58 (83)	21:04	64	08:07 (83)
13	07:56		16:36 (39)	07:32		08:05 (108)	07:51			07:01		06:22		07:07 (83)	06:05		07:04 (83)
	17:31	11	16:47 (39)	18:08	64	17:45 (32)	19:39			20:10		20:40	52	07:59 (83)	21:04	63	08:07 (83)
14	07:56		16:37 (39)	07:30		08:05 (108)	07:49			07:00		06:21		07:06 (83)	06:05		07:04 (83)
	17:32	8	16:45 (39)	18:09	66	17:46 (32)	19:40			20:11		20:41	53	07:59 (83)	21:05	64	08:08 (83)
15	07:56			07:29		08:04 (108)	07:48			06:58		06:20		07:05 (83)	06:05		07:04 (83)
	17:33			18:10	71	17:48 (32)	19:41			20:12		20:42	55	08:00 (83)	21:05	64	08:08 (83)
16	07:55			07:28		08:03 (108)	07:46			06:57		06:19		07:04 (83)	06:05		07:04 (83)
	17:34			18:11	72	17:48 (32)	19:42			20:13		20:43	56	08:00 (83)	21:06	64	08:08 (83)
17	07:55			07:27		08:03 (108)	07:45			06:55		06:18		07:05 (83)	06:05		07:04 (83)
	17:36			18:12	74	17:49 (32)	19:43			20:14		20:44	56	08:01 (83)	21:06	64	08:08 (83)
18	07:55			07:25		08:03 (108)	07:43			06:54		06:17		07:04 (83)	06:05		07:05 (83)
	17:37			18:14	74	17:49 (32)	19:44			20:15		20:45	58	08:02 (83)	21:07	63	08:08 (83)
19	07:54			07:24		08:03 (108)	07:41			06:52		06:17		07:03 (83)	06:05		07:05 (83)
	17:38			18:15	74	17:49 (32)	19:45			20:16		20:46	59	08:02 (83)	21:07	63	08:08 (83)
20	07:54			07:23		08:03 (108)	07:40			06:51		06:16		07:03 (83)	06:06		07:06 (83)
	17:39			18:16	75	17:49 (32)	19:46			20:17		20:47	59	08:02 (83)	21:07	63	08:09 (83)
21	07:53			07:21		08:02 (108)	07:38			06:49		06:15		07:03 (83)	06:06		07:06 (83)
	17:40			18:17	74	17:48 (32)	19:48			20:18		20:48	60	08:03 (83)	21:07	63	08:09 (83)
22	07:52			07:20		08:03 (108)	07:37			06:48		06:14		07:03 (83)	06:06		07:06 (83)
	17:41			18:18	72	17:48 (32)	19:49			20:19		20:49	60	08:03 (83)	21:08	63	08:09 (83)
23	07:52			07:18		08:03 (108)	07:35			06:47		06:13		07:02 (83)	06:06		07:06 (83)
	17:42			18:19	71	17:48 (32)	19:50			20:20		20:50	61	08:03 (83)	21:08	63	08:09 (83)
24	07:51			07:17		08:03 (108)	07:33			06:45		06:13		07:01 (83)	06:06		07:06 (83)
	17:44			18:20	68	17:46 (32)	19:51			20:21		20:51	62	08:03 (83)	21:08	63	08:09 (83)
25	07:50			07:16		08:04 (108)	07:32			06:44		06:12		07:02 (83)	06:07		07:06 (83)
	17:45			18:22	65	17:46 (32)	19:52			20:22		20:51	62	08:04 (83)	21:08	64	08:10 (83)
26	07:50			07:14		08:04 (108)	07:30			06:42		06:11		07:01 (83)	06:07		07:06 (83)
	17:46			18:23	61	17:44 (32)	19:53			20:23		20:52	63	08:04 (83)	21:08	64	08:10 (83)
27	07:49			07:13		08:05 (108)	07:28			06:41		06:11		07:02 (83)	06:07		07:06 (83)
	17:47			18:24	56	17:42 (32)	19:54			20:24		20:53	63	08:05 (83)	21:08	64	08:10 (83)
28	07:48			07:11		08:05 (108)	07:27			06:40		06:10		07:01 (83)	06:08		07:07 (83)
	17:48			18:25	47	17:38 (32)	19:55			20:25		20:54	63	08:04 (83)	21:08	64	08:11 (83)
29	07:47						07:25			06:38		06:10		07:02 (83)	06:08		07:07 (83)
	17:50						19:56			20:26		20:55	63	08:05 (83)	21:08	63	08:10 (83)
30	07:46						07:23			06:37		06:09		07:01 (83)	06:09		07:08 (83)
	17:51						19:57			20:27		20:55	64	08:05 (83)	21:08	63	08:11 (83)
31	07:46						07:22					06:09		07:02 (83)			
	17:52						19:58					20:56	63	08:05 (83)			
Potential sun hours	300			299			370			397		446			449		
Total, worst case		254			1442			166					1528			1907	
Sun reduction		0.36			0.42			0.44					0.56			0.60	
Oper. time red.		1.00			1.00			1.00					1.00			1.00	
Wind dir. red.		0.68			0.64			0.62					0.68			0.68	
Total reduction		0.24			0.27			0.27					0.38			0.40	
Total, real		62			386			45					577			772	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

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3/2/2012 10:01 AM / 66

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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative **Shadow receptor:** 10055 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6741)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September	October			November			December		
1	06:09		07:07 (83)	06:32		07:19 (83)	07:02	07:31			07:04		07:36 (108)	07:37		16:14 (39)
	21:08	64	08:11 (83)	20:51	49	08:08 (83)	20:09	19:19			17:33	49	17:09 (32)	17:10	16	16:30 (39)
2	06:10		07:08 (83)	06:33		07:20 (83)	07:03	07:32			07:05		07:38 (108)	07:38		16:14 (39)
	21:08	64	08:12 (83)	20:50	47	08:07 (83)	20:08	19:17			17:32	36	08:14 (108)	17:10	17	16:31 (39)
3	06:10		07:08 (83)	06:34		07:21 (83)	07:04	07:33			07:06		07:39 (108)	07:39		16:14 (39)
	21:08	63	08:11 (83)	20:49	45	08:06 (83)	20:06	19:15			17:31	34	08:13 (108)	17:10	18	16:32 (39)
4	06:11		07:08 (83)	06:35		07:22 (83)	07:05	07:34			07:07		07:40 (108)	07:40		16:14 (39)
	21:08	64	08:12 (83)	20:48	43	08:05 (83)	20:05	19:14			17:30	31	08:11 (108)	17:10	19	16:33 (39)
5	06:11		07:08 (83)	06:36		07:22 (83)	07:06	07:35			07:08		07:42 (108)	07:41		16:14 (39)
	21:08	64	08:12 (83)	20:47	41	08:03 (83)	20:03	19:12			17:29	28	08:10 (108)	17:09	20	16:34 (39)
6	06:12		07:09 (83)	06:37		07:24 (83)	07:07	07:36			07:09		07:44 (108)	07:42		16:14 (39)
	21:08	63	08:12 (83)	20:45	37	08:01 (83)	20:01	19:10			17:28	25	08:09 (108)	17:09	20	16:34 (39)
7	06:12		07:08 (83)	06:38		07:25 (83)	07:08	07:37		08:53 (108)	07:11		07:46 (108)	07:43		16:14 (39)
	21:07	64	08:12 (83)	20:44	35	08:00 (83)	20:00	19:09	11	09:04 (108)	17:27	20	08:06 (108)	17:09	21	16:35 (39)
8	06:13		07:09 (83)	06:39		07:27 (83)	07:09	07:38		08:49 (108)	07:12		07:49 (108)	07:44		16:14 (39)
	21:07	64	08:13 (83)	20:43	31	07:58 (83)	19:57	19:07	19	09:08 (108)	17:26	14	08:03 (108)	17:09	22	16:36 (39)
9	06:14		07:09 (83)	06:40		07:30 (83)	07:10	07:39		08:46 (108)	07:13			07:45		16:14 (39)
	21:07	64	08:13 (83)	20:42	25	07:55 (83)	19:55	19:06	25	09:11 (108)	17:25			17:09	23	16:37 (39)
10	06:14		07:09 (83)	06:41		07:33 (83)	07:11	07:40		08:44 (108)	07:14			07:46		16:15 (39)
	21:06	64	08:13 (83)	20:41	19	07:52 (83)	19:53	19:04	29	09:13 (108)	17:24			17:09	22	16:37 (39)
11	06:15		07:10 (83)	06:42		07:40 (83)	07:11	07:41		08:42 (108)	07:15			07:47		16:15 (39)
	21:06	63	08:13 (83)	20:39	5	07:45 (83)	19:52	19:03	32	09:14 (108)	17:23			17:09	23	16:38 (39)
12	06:16		07:10 (83)	06:43			07:12	07:42		08:40 (108)	07:16			07:47		16:15 (39)
	21:06	64	08:14 (83)	20:38			19:50	19:01	35	09:15 (108)	17:22			17:10	23	16:38 (39)
13	06:16		07:10 (83)	06:44			07:13	07:43		08:39 (108)	07:17			07:48		16:15 (39)
	21:05	63	08:13 (83)	20:37			19:48	19:00	38	09:17 (108)	17:21			17:10	24	16:39 (39)
14	06:17		07:10 (83)	06:45			07:14	07:44		08:38 (108)	07:19			07:49		16:16 (39)
	21:05	63	08:13 (83)	20:36			19:47	18:58	51	18:13 (32)	17:20			17:10	23	16:39 (39)
15	06:18		07:11 (83)	06:46			07:15	07:45		08:37 (108)	07:20			07:50		16:17 (39)
	21:04	63	08:14 (83)	20:34			19:45	18:57	57	18:15 (32)	17:19			17:10	23	16:40 (39)
16	06:19		07:11 (83)	06:47			07:16	07:46		08:36 (108)	07:21			07:50		16:16 (39)
	21:04	63	08:14 (83)	20:33			19:43	18:55	63	18:17 (32)	17:18			17:10	24	16:40 (39)
17	06:19		07:11 (83)	06:48			07:17	07:47		08:35 (108)	07:22			07:51		16:17 (39)
	21:03	62	08:13 (83)	20:32			19:42	18:54	67	18:18 (32)	17:17			17:11	24	16:41 (39)
18	06:20		07:11 (83)	06:49			07:18	07:48		08:34 (108)	07:23			07:52		16:18 (39)
	21:02	62	08:13 (83)	20:30			19:40	18:52	69	18:18 (32)	17:17			17:11	24	16:42 (39)
19	06:21		07:12 (83)	06:50			07:19	07:49		08:34 (108)	07:24			07:52		16:18 (39)
	21:02	62	08:14 (83)	20:29			19:38	18:51	72	18:19 (32)	17:16			17:11	24	16:42 (39)
20	06:22		07:12 (83)	06:50			07:20	07:50		08:33 (108)	07:25			07:53		16:19 (39)
	21:01	62	08:14 (83)	20:27			19:37	18:49	74	18:19 (32)	17:15			17:12	24	16:43 (39)
21	06:23		07:12 (83)	06:51			07:21	07:51		08:33 (108)	07:27			07:53		16:19 (39)
	21:00	61	08:13 (83)	20:26			19:35	18:48	74	18:19 (32)	17:15			17:12	24	16:43 (39)
22	06:24		07:12 (83)	06:52			07:22	07:52		08:34 (108)	07:28			07:54		16:20 (39)
	21:00	61	08:13 (83)	20:25			19:33	18:46	74	18:20 (32)	17:14			17:13	24	16:44 (39)
23	06:24		07:13 (83)	06:53			07:23	07:54		08:33 (108)	07:29			07:54		16:20 (39)
	20:59	60	08:13 (83)	20:23			19:32	18:45	74	18:19 (32)	17:14			17:13	24	16:44 (39)
24	06:25		07:14 (83)	06:54			07:24	07:55		08:33 (108)	07:30			07:55		16:21 (39)
	20:58	59	08:13 (83)	20:22			19:30	18:44	75	18:19 (32)	17:13			17:14	24	16:45 (39)
25	06:26		07:14 (83)	06:55			07:25	07:56		08:33 (108)	07:31			07:55		16:21 (39)
	20:57	58	08:12 (83)	20:20			19:28	18:42	73	18:18 (32)	17:13			17:15	24	16:45 (39)
26	06:27		07:15 (83)	06:56			07:26	07:57		08:33 (108)	07:32			07:56		16:21 (39)
	20:57	57	08:12 (83)	20:19			19:27	18:41	72	18:18 (32)	17:12			17:15	24	16:45 (39)
27	06:28		07:14 (83)	06:57			07:27	07:58		08:33 (108)	07:33			07:56		16:22 (39)
	20:56	57	08:11 (83)	20:17			19:25	18:40	69	18:16 (32)	17:12			17:16	24	16:46 (39)
28	06:29		07:15 (83)	06:58			07:28	07:59		08:34 (108)	07:34		16:17 (39)	07:56		16:23 (39)
	20:55	56	08:11 (83)	20:16			19:23	18:38	67	18:16 (32)	17:11	8	16:25 (39)	17:16	23	16:46 (39)
29	06:30		07:16 (83)	06:59			07:29	08:00		08:35 (108)	07:35		16:16 (39)	07:57		16:23 (39)
	20:54	54	08:10 (83)	20:14			19:22	18:37	63	18:14 (32)	17:11	11	16:27 (39)	17:17	23	16:46 (39)
30	06:31		07:17 (83)	07:00			07:30	08:01		08:35 (108)	07:36		16:15 (39)	07:57		16:23 (39)
	20:53	52	08:09 (83)	20:13			19:20	18:36	60	18:13 (32)	17:11	14	16:29 (39)	17:18	24	16:47 (39)
31	06:31		07:18 (83)	07:01				08:02		08:36 (108)				07:57		16:24 (39)
	20:52	51	08:09 (83)	20:11				18:35	54	18:11 (32)				17:19	23	16:47 (39)
Potential sun hours	456			427			374	346			300			291		
Total, worst case		1891			377				1397			270			695	
Sun reduction		0.60			0.60				0.56			0.37			0.50	
Oper. time red.		1.00			1.00				1.00			1.00			1.00	
Wind dir. red.		0.68			0.68				0.64			0.63			0.68	
Total reduction		0.40			0.40				0.36			0.23			0.34	
Total, real		765			153				499			63			234	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 67

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative**Shadow receptor:** 10056 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6742)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		16:28 (39)	07:45			07:10		07:41 (108)	07:20			06:36			06:08		06:52 (83)
	17:20	25	16:53 (39)	17:53			18:26	65	17:59 (32)	19:59			20:28			20:57	29	07:21 (83)
2	07:58		16:28 (39)	07:44			07:08		07:39 (108)	07:19			06:35			06:08		06:51 (83)
	17:21	26	16:54 (39)	17:54			18:27	67	17:58 (32)	20:00			20:29			20:58	32	07:23 (83)
3	07:58		16:29 (39)	07:43			07:07		07:39 (108)	07:17			06:33			06:07		06:51 (83)
	17:21	25	16:54 (39)	17:56			18:28	67	17:58 (32)	20:00			20:30			20:58	33	07:24 (83)
4	07:58		16:29 (39)	07:42			07:05		07:37 (108)	07:15			06:32			06:07		06:50 (83)
	17:22	26	16:55 (39)	17:57			18:29	69	17:57 (32)	20:01			20:31			20:59	34	07:24 (83)
5	07:58		16:29 (39)	07:41			07:04		07:37 (108)	07:14			06:31			06:07		06:50 (83)
	17:23	26	16:55 (39)	17:58			18:31	69	17:57 (32)	20:02			20:32			21:00	35	07:25 (83)
6	07:58		16:30 (39)	07:40			07:02		07:36 (108)	07:12			06:30			06:06		06:49 (83)
	17:24	26	16:56 (39)	17:59			18:32	67	17:55 (32)	20:03			20:33			21:01	37	07:26 (83)
7	07:58		16:30 (39)	07:39			07:01		07:35 (108)	07:11			06:29			06:06		06:49 (83)
	17:25	27	16:57 (39)	18:01			18:33	67	17:54 (32)	20:04			20:34			21:01	38	07:27 (83)
8	07:58		16:31 (39)	07:37			07:59		08:34 (108)	07:09			06:27			06:06		06:48 (83)
	17:26	26	16:57 (39)	18:02			19:34	65	18:52 (32)	20:05			20:35			21:02	39	07:27 (83)
9	07:57		16:32 (39)	07:36			07:57		08:34 (108)	07:07			06:26			06:06		06:48 (83)
	17:27	26	16:58 (39)	18:03			19:35	61	18:50 (32)	20:06			20:36			21:02	40	07:28 (83)
10	07:57		16:32 (39)	07:35			07:56		08:34 (108)	07:06			06:25			06:06		06:48 (83)
	17:28	26	16:58 (39)	18:04			19:36	55	18:47 (32)	20:07			20:37			21:03	40	07:28 (83)
11	07:57		16:32 (39)	07:34			07:54		08:33 (108)	07:04			06:24			06:05		06:48 (83)
	17:29	26	16:58 (39)	18:05			19:37	45	09:18 (108)	20:08			20:38			21:03	41	07:29 (83)
12	07:57		16:33 (39)	07:33			07:53		08:34 (108)	07:03			06:23			06:05		06:48 (83)
	17:30	26	16:59 (39)	18:07			19:38	44	09:18 (108)	20:09			20:39			21:04	42	07:30 (83)
13	07:56		16:34 (39)	07:32			07:51		08:33 (108)	07:01			06:22			06:05		06:48 (83)
	17:31	25	16:59 (39)	18:08			19:39	44	09:17 (108)	20:10			20:40			21:04	42	07:30 (83)
14	07:56		16:34 (39)	07:30			07:49		08:33 (108)	07:00			06:21			06:05		06:48 (83)
	17:32	25	16:59 (39)	18:09			19:40	43	09:16 (108)	20:11			20:41			21:05	42	07:30 (83)
15	07:56		16:35 (39)	07:29			07:48		08:34 (108)	06:58			06:20			06:05		06:48 (83)
	17:33	24	16:59 (39)	18:10			19:41	42	09:16 (108)	20:12			20:42			21:05	43	07:31 (83)
16	07:55		16:35 (39)	07:28			07:46		08:34 (108)	06:57			06:19			06:05		06:48 (83)
	17:34	24	16:59 (39)	18:11			19:42	40	09:14 (108)	20:13			20:43			21:06	43	07:31 (83)
17	07:55		16:36 (39)	07:27			07:45		08:34 (108)	06:55			06:18			06:05		06:48 (83)
	17:36	23	16:59 (39)	18:12			19:43	39	09:13 (108)	20:14			20:44			21:06	43	07:31 (83)
18	07:55		16:36 (39)	07:25			07:43		08:35 (108)	06:54			06:17			06:05		06:48 (83)
	17:37	23	16:59 (39)	18:14			19:44	37	09:12 (108)	20:15			20:45			21:07	44	07:32 (83)
19	07:54		16:38 (39)	07:24		17:43 (32)	07:41		08:36 (108)	06:52			06:17			06:05		06:48 (83)
	17:38	21	16:59 (39)	18:15	3	17:46 (32)	19:45	34	09:10 (108)	20:16			20:46			21:07	44	07:32 (83)
20	07:54		16:39 (39)	07:23		17:38 (32)	07:40		08:37 (108)	06:51			06:16			06:06		06:49 (83)
	17:39	19	16:58 (39)	18:16	13	17:51 (32)	19:46	32	09:09 (108)	20:17			20:47			21:07	44	07:33 (83)
21	07:53		16:40 (39)	07:21		17:35 (32)	07:38		08:38 (108)	06:49			06:15			06:06		06:49 (83)
	17:40	18	16:58 (39)	18:17	18	17:53 (32)	19:48	29	09:07 (108)	20:18			20:48			21:07	44	07:33 (83)
22	07:52		16:42 (39)	07:20		17:34 (32)	07:37		08:40 (108)	06:48			06:14			06:06		06:49 (83)
	17:41	15	16:57 (39)	18:18	21	17:55 (32)	19:49	24	09:04 (108)	20:19			20:49			21:08	44	07:33 (83)
23	07:52		16:43 (39)	07:18		17:33 (32)	07:35		08:43 (108)	06:47			06:14			06:06		06:49 (83)
	17:42	12	16:55 (39)	18:19	24	17:57 (32)	19:50	18	09:01 (108)	20:20			20:50			21:08	44	07:33 (83)
24	07:51		16:45 (39)	07:17		07:54 (108)	07:33		08:47 (108)	06:45			06:13			06:06		06:49 (83)
	17:44	8	16:53 (39)	18:20	36	17:57 (32)	19:51	9	08:56 (108)	20:21			20:51			21:08	44	07:33 (83)
25	07:50			07:16		07:50 (108)	07:32			06:44			06:12			06:07		06:50 (83)
	17:45			18:22	45	17:58 (32)	19:52			20:22			20:51			21:08	43	07:33 (83)
26	07:50			07:14		07:46 (108)	07:30			06:42			06:11		07:03 (83)	06:07		06:50 (83)
	17:46			18:23	53	17:58 (32)	19:53			20:23			20:52	5	07:08 (83)	21:08	43	07:33 (83)
27	07:49			07:13		07:44 (108)	07:28			06:41			06:11		07:00 (83)	06:07		06:50 (83)
	17:47			18:24	59	17:59 (32)	19:54			20:24			20:53	13	07:13 (83)	21:08	43	07:33 (83)
28	07:48			07:11		07:42 (108)	07:27			06:40			06:10		06:57 (83)	06:08		06:51 (83)
	17:48			18:25	62	17:58 (32)	19:55			20:25			20:54	18	07:15 (83)	21:08	43	07:34 (83)
29	07:47						07:25			06:38			06:10		06:56 (83)	06:08		06:51 (83)
	17:50						19:56			20:26			20:55	22	07:18 (83)	21:08	42	07:33 (83)
30	07:46						07:23			06:37			06:09		06:54 (83)	06:09		06:52 (83)
	17:51						19:57			20:27			20:55	25	07:19 (83)	21:08	42	07:34 (83)
31	07:46						07:22						06:09		06:53 (83)			
	17:52						19:58						20:56	28	07:21 (83)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		548			334			1132						111			1217	
Sun reduction		0.36			0.42			0.44						0.56			0.60	
Oper. time red.		1.00			1.00			1.00						1.00			1.00	
Wind dir. red.		0.67			0.66			0.64						0.68			0.68	
Total reduction		0.24			0.28			0.28						0.38			0.41	
Total, real		133			93			320						42			499	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 68

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative**Shadow receptor:** 10056 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6742)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August		September			October			November			December		
1	06:09		06:52 (83)	06:32		07:02			07:31		08:12 (108)	07:04			07:37		16:14 (39)
	21:08	41	07:33 (83)	20:51		20:09			19:19	44	08:56 (108)	17:33			17:10	26	16:40 (39)
2	06:10		06:53 (83)	06:33		07:03			07:32		08:12 (108)	07:05			07:38		16:14 (39)
	21:08	41	07:34 (83)	20:50		20:08			19:17	44	08:56 (108)	17:32			17:10	26	16:40 (39)
3	06:10		06:53 (83)	06:34		07:04			07:33		08:11 (108)	07:06			07:39		16:15 (39)
	21:08	40	07:33 (83)	20:49		20:06			19:15	50	18:22 (32)	17:31			17:10	26	16:41 (39)
4	06:11		06:54 (83)	06:35		07:05			07:34		08:11 (108)	07:07			07:40		16:15 (39)
	21:08	39	07:33 (83)	20:48		20:05			19:14	59	18:26 (32)	17:30			17:10	26	16:41 (39)
5	06:11		06:54 (83)	06:36		07:06			07:35		08:11 (108)	07:08			07:41		16:15 (39)
	21:08	38	07:32 (83)	20:47		20:03			19:12	62	18:28 (32)	17:29			17:09	27	16:42 (39)
6	06:12		06:55 (83)	06:37		07:07			07:36		08:11 (108)	07:09			07:42		16:16 (39)
	21:08	38	07:33 (83)	20:45		20:01			19:10	65	18:29 (32)	17:28			17:09	26	16:42 (39)
7	06:12		06:56 (83)	06:38		07:08			07:37		08:11 (108)	07:11			07:43		16:17 (39)
	21:07	36	07:32 (83)	20:44		20:00			19:09	67	18:30 (32)	17:27			17:09	25	16:42 (39)
8	06:13		06:57 (83)	06:39		07:09			07:38		08:11 (108)	07:12			07:44		16:17 (39)
	21:07	35	07:32 (83)	20:43		19:57			19:07	68	18:31 (32)	17:26			17:09	26	16:43 (39)
9	06:14		06:58 (83)	06:40		07:10			07:39		08:11 (108)	07:13			07:45		16:18 (39)
	21:07	33	07:31 (83)	20:42		19:55			19:06	69	18:31 (32)	17:25			17:09	25	16:43 (39)
10	06:14		06:58 (83)	06:41		07:11			07:40		08:12 (108)	07:14			07:46		16:18 (39)
	21:06	32	07:30 (83)	20:41		19:53			19:04	69	18:32 (32)	17:24			17:09	26	16:44 (39)
11	06:15		06:59 (83)	06:42		07:11			07:41		08:12 (108)	07:15			07:47		16:19 (39)
	21:06	31	07:30 (83)	20:39		19:52			19:03	68	18:32 (32)	17:23			17:09	25	16:44 (39)
12	06:16		07:01 (83)	06:43		07:12			07:42		08:13 (108)	07:16			07:47		16:19 (39)
	21:06	28	07:29 (83)	20:38		19:50			19:01	65	18:31 (32)	17:22			17:10	25	16:44 (39)
13	06:16		07:02 (83)	06:44		07:13			07:43		08:15 (108)	07:17			07:48		16:20 (39)
	21:05	26	07:28 (83)	20:37		19:48			19:00	63	18:32 (32)	17:21			17:10	24	16:44 (39)
14	06:17		07:03 (83)	06:45		07:14			07:44		08:16 (108)	07:19			07:49		16:20 (39)
	21:05	24	07:27 (83)	20:36		19:47			18:58	61	18:32 (32)	17:20			17:10	25	16:45 (39)
15	06:18		07:05 (83)	06:46		07:15			07:45		08:18 (108)	07:20			07:50		16:21 (39)
	21:04	21	07:26 (83)	20:34		19:45			18:57	56	18:31 (32)	17:19			17:10	24	16:45 (39)
16	06:19		07:08 (83)	06:47		07:16			07:46		08:20 (108)	07:21			07:50		16:21 (39)
	21:04	16	07:24 (83)	20:33		19:43			18:55	50	18:30 (32)	17:18			17:10	24	16:45 (39)
17	06:19		07:10 (83)	06:48		07:17			07:47		08:22 (108)	07:22			07:51		16:22 (39)
	21:03	10	07:20 (83)	20:32		19:42			18:54	44	18:29 (32)	17:17			17:11	23	16:45 (39)
18	06:20			06:49		07:18			07:48		08:29 (108)	07:23		16:19 (39)	07:52		16:23 (39)
	21:02			20:30		19:40			18:52	28	18:28 (32)	17:17	8	16:27 (39)	17:11	23	16:46 (39)
19	06:21			06:50		07:19		08:36 (108)	07:49		18:04 (32)	07:24		16:18 (39)	07:52		16:23 (39)
	21:02			20:29		19:38	5	08:41 (108)	18:51	23	18:27 (32)	17:16	12	16:30 (39)	17:11	23	16:46 (39)
20	06:22			06:50		07:20		08:30 (108)	07:50		18:05 (32)	07:25		16:17 (39)	07:53		16:24 (39)
	21:01			20:27		19:37	17	08:47 (108)	18:49	20	18:25 (32)	17:15	15	16:32 (39)	17:12	23	16:47 (39)
21	06:23			06:51		07:21		08:27 (108)	07:51		18:06 (32)	07:27		16:15 (39)	07:53		16:24 (39)
	21:00			20:26		19:35	22	08:49 (108)	18:48	17	18:23 (32)	17:15	18	16:33 (39)	17:12	23	16:47 (39)
22	06:24			06:52		07:22		08:23 (108)	07:52		18:10 (32)	07:28		16:15 (39)	07:54		16:25 (39)
	21:00			20:25		19:33	27	08:50 (108)	18:46	11	18:21 (32)	17:14	19	16:34 (39)	17:13	23	16:48 (39)
23	06:24			06:53		07:23		08:21 (108)	07:54			07:29		16:14 (39)	07:54		16:25 (39)
	20:59			20:23		19:32	31	08:52 (108)	18:45			17:14	21	16:35 (39)	17:13	23	16:48 (39)
24	06:25			06:54		07:24		08:20 (108)	07:55			07:30		16:14 (39)	07:55		16:26 (39)
	20:58			20:22		19:30	33	08:53 (108)	18:44			17:13	23	16:37 (39)	17:14	23	16:49 (39)
25	06:26			06:55		07:25		08:18 (108)	07:56			07:31		16:14 (39)	07:55		16:26 (39)
	20:57			20:20		19:28	36	08:54 (108)	18:42			17:13	23	16:37 (39)	17:15	23	16:49 (39)
26	06:27			06:56		07:26		08:17 (108)	07:57			07:32		16:14 (39)	07:56		16:26 (39)
	20:57			20:19		19:27	38	08:55 (108)	18:41			17:12	24	16:38 (39)	17:15	23	16:49 (39)
27	06:28			06:57		07:27		08:16 (108)	07:58			07:33		16:14 (39)	07:56		16:27 (39)
	20:56			20:17		19:25	39	08:55 (108)	18:40			17:12	24	16:38 (39)	17:16	24	16:51 (39)
28	06:29			06:58		07:28		08:15 (108)	07:59			07:34		16:14 (39)	07:56		16:27 (39)
	20:55			20:16		19:23	41	08:56 (108)	18:38			17:11	25	16:39 (39)	17:16	24	16:51 (39)
29	06:30			06:59		07:29		08:14 (108)	08:00			07:35		16:14 (39)	07:57		16:27 (39)
	20:54			20:14		19:22	42	08:56 (108)	18:37			17:11	25	16:39 (39)	17:17	25	16:52 (39)
30	06:31			07:00		07:30		08:13 (108)	08:01			07:36		16:14 (39)	07:57		16:28 (39)
	20:53			20:13		19:20	43	08:56 (108)	18:36			17:11	26	16:40 (39)	17:18	24	16:52 (39)
31	06:31			07:01					08:02						07:57		16:28 (39)
	20:52			20:11					18:35						17:19	25	16:53 (39)
Potential sun hours	456			427		374			346			300			291		
Total, worst case		529					374			1103			263			758	
Sun reduction		0.60					0.61			0.56			0.37			0.50	
Oper. time red.		1.00					1.00			1.00			1.00			1.00	
Wind dir. red.		0.68					0.63			0.65			0.67			0.67	
Total reduction		0.41					0.39			0.36			0.25			0.34	
Total, real		217					145			402			66			255	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

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3/2/2012 10:01 AM / 69

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative**Shadow receptor:** 10168 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6756)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March	April	May			June		
1	07:57		14:36 (127)	07:44		15:04 (127)	07:09	07:20	06:36			06:08		19:58 (22)
	17:19	75	15:51 (127)	17:53	43	15:47 (127)	18:26	19:58	20:28			20:57	28	20:26 (22)
2	07:57		14:37 (127)	07:43		15:07 (127)	07:08	07:18	06:34			06:07		19:58 (22)
	17:20	74	15:51 (127)	17:54	39	15:46 (127)	18:27	20:00	20:29			20:57	28	20:26 (22)
3	07:57		14:37 (127)	07:42		15:09 (127)	07:06	07:17	06:33			06:07		19:58 (22)
	17:21	74	15:51 (127)	17:55	35	15:44 (127)	18:28	20:00	20:30			20:58	28	20:26 (22)
4	07:57		14:38 (127)	07:41		15:12 (127)	07:05	07:15	06:32			06:07		19:58 (22)
	17:22	74	15:52 (127)	17:57	30	15:42 (127)	18:29	20:01	20:31			20:59	29	20:27 (22)
5	07:57		14:38 (127)	07:40		15:16 (127)	07:03	07:14	06:31			06:06		19:58 (22)
	17:23	74	15:52 (127)	17:58	23	15:39 (127)	18:30	20:02	20:32			21:00	29	20:27 (22)
6	07:57		14:39 (127)	07:39		15:21 (127)	07:02	07:12	06:29			06:06		19:59 (22)
	17:24	74	15:53 (127)	17:59	14	15:35 (127)	18:31	20:03	20:33			21:00	29	20:28 (22)
7	07:57		14:40 (127)	07:38			07:00	07:10	06:28			06:06		19:58 (22)
	17:25	73	15:53 (127)	18:00			18:32	20:04	20:34			21:01	29	20:27 (22)
8	07:57		14:40 (127)	07:37			07:59	07:09	06:27			06:06		19:58 (22)
	17:26	74	15:54 (127)	18:01			19:34	20:05	20:35			21:02	30	20:28 (22)
9	07:57		14:41 (127)	07:36			07:57	07:07	06:26			06:05		19:58 (22)
	17:27	73	15:54 (127)	18:03			19:35	20:06	20:36			21:02	30	20:28 (22)
10	07:57		14:41 (127)	07:35			07:56	07:06	06:25			06:05		19:59 (22)
	17:28	73	15:54 (127)	18:04			19:36	20:07	20:37			21:03	30	20:29 (22)
11	07:57		14:42 (127)	07:34			07:54	07:04	06:24			06:05		19:59 (22)
	17:29	72	15:54 (127)	18:05			19:37	20:08	20:38			21:03	30	20:29 (22)
12	07:56		14:43 (127)	07:33			07:52	07:03	06:23			06:05		19:59 (22)
	17:30	72	15:55 (127)	18:06			19:38	20:09	20:39			21:04	30	20:29 (22)
13	07:56		14:43 (127)	07:31			07:51	07:01	06:22			06:05		19:59 (22)
	17:31	71	15:54 (127)	18:07			19:39	20:10	20:40			21:04	31	20:30 (22)
14	07:56		14:44 (127)	07:30			07:49	06:59	06:21			06:05		20:00 (22)
	17:32	71	15:55 (127)	18:09			19:40	20:11	20:41			21:05	30	20:30 (22)
15	07:56		14:45 (127)	07:29			07:48	06:58	06:20			06:05		20:00 (22)
	17:33	70	15:55 (127)	18:10			19:41	20:12	20:42			21:05	30	20:30 (22)
16	07:55		14:45 (127)	07:28			07:46	06:56	06:19			06:05		20:00 (22)
	17:34	70	15:55 (127)	18:11			19:42	20:13	20:43			21:06	30	20:30 (22)
17	07:55		14:47 (127)	07:26			07:44	06:55	06:18			06:05		20:00 (22)
	17:35	68	15:55 (127)	18:12			19:43	20:14	20:44			21:06	30	20:30 (22)
18	07:54		14:47 (127)	07:25			07:43	06:53	06:17			06:05		20:00 (22)
	17:36	68	15:55 (127)	18:13			19:44	20:15	20:45			21:06	30	20:30 (22)
19	07:54		14:47 (127)	07:24			07:41	06:52	06:16			06:05		20:00 (22)
	17:38	67	15:54 (127)	18:14			19:45	20:16	20:46			21:07	30	20:30 (22)
20	07:53		14:49 (127)	07:22			07:39	06:51	06:16		20:10 (22)	06:05		20:00 (22)
	17:39	66	15:55 (127)	18:16			19:46	20:17	20:47	2	20:12 (22)	21:07	31	20:31 (22)
21	07:53		14:49 (127)	07:21			07:38	06:49	06:15		20:05 (22)	06:05		20:00 (22)
	17:40	65	15:54 (127)	18:17			19:47	20:18	20:48	11	20:16 (22)	21:07	31	20:31 (22)
22	07:52		14:51 (127)	07:20			07:36	06:48	06:14		20:04 (22)	06:06		20:01 (22)
	17:41	64	15:55 (127)	18:18			19:48	20:19	20:48	14	20:18 (22)	21:07	31	20:32 (22)
23	07:51		14:52 (127)	07:18			07:35	06:46	06:13		20:03 (22)	06:06		20:01 (22)
	17:42	62	15:54 (127)	18:19			19:49	20:20	20:49	16	20:19 (22)	21:08	31	20:32 (22)
24	07:51		14:52 (127)	07:17			07:33	06:45	06:12		20:01 (22)	06:06		20:01 (22)
	17:43	62	15:54 (127)	18:20			19:50	20:21	20:50	19	20:20 (22)	21:08	30	20:31 (22)
25	07:50		14:53 (127)	07:15			07:31	06:43	06:12		20:01 (22)	06:06		20:01 (22)
	17:45	60	15:53 (127)	18:21			19:51	20:22	20:51	21	20:22 (22)	21:08	30	20:31 (22)
26	07:49		14:55 (127)	07:14			07:30	06:42	06:11		20:00 (22)	06:07		20:02 (22)
	17:46	58	15:53 (127)	18:22			19:52	20:23	20:52	22	20:22 (22)	21:08	30	20:32 (22)
27	07:49		14:57 (127)	07:12			07:28	06:41	06:11		19:59 (22)	06:07		20:02 (22)
	17:47	55	15:52 (127)	18:24			19:53	20:24	20:53	24	20:23 (22)	21:08	30	20:32 (22)
28	07:48		14:58 (127)	07:11			07:26	06:39	06:10		19:59 (22)	06:08		20:03 (22)
	17:48	54	15:52 (127)	18:25			19:54	20:25	20:54	25	20:24 (22)	21:08	30	20:33 (22)
29	07:47		14:59 (127)				07:25	06:38	06:09		19:58 (22)	06:08		20:03 (22)
	17:49	52	15:51 (127)				19:55	20:26	20:54	26	20:24 (22)	21:08	30	20:33 (22)
30	07:46		15:01 (127)				07:23	06:37	06:09		19:59 (22)	06:08		20:02 (22)
	17:51	49	15:50 (127)				19:56	20:27	20:55	26	20:25 (22)	21:08	30	20:32 (22)
31	07:45		15:03 (127)				07:22		06:08		19:59 (22)			
	17:52	46	15:49 (127)				19:57		20:56	27	20:26 (22)			
Potential sun hours	300			299			370	397	446			449		
Total, worst case		2060			184					233			895	
Sun reduction		0.36			0.42					0.56			0.60	
Oper. time red.		1.00			1.00					1.00			1.00	
Wind dir. red.		0.66			0.66					0.62			0.62	
Total reduction		0.24			0.28					0.35			0.38	
Total, real		495			52					82			336	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

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3/2/2012 10:01 AM / 70

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Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative **Shadow receptor:** 10168 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6756)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August	September	October	November			December		
1	06:09		20:03 (22)	06:32	07:02	07:30	07:03			07:37		14:24 (127)
	21:08	30	20:33 (22)	20:51	20:09	19:18	17:33			17:10	72	15:36 (127)
2	06:09		20:03 (22)	06:33	07:03	07:31	07:04			07:38		14:24 (127)
	21:08	30	20:33 (22)	20:50	20:08	19:17	17:32			17:10	73	15:37 (127)
3	06:10		20:04 (22)	06:34	07:04	07:32	07:06			07:39		14:24 (127)
	21:08	29	20:33 (22)	20:49	20:06	19:15	17:31			17:09	73	15:37 (127)
4	06:10		20:03 (22)	06:35	07:05	07:33	07:07			07:40		14:24 (127)
	21:08	30	20:33 (22)	20:47	20:04	19:13	17:30			17:09	74	15:38 (127)
5	06:11		20:04 (22)	06:36	07:05	07:34	07:08		14:50 (127)	07:41		14:25 (127)
	21:08	30	20:34 (22)	20:46	20:03	19:12	17:28	15	15:05 (127)	17:09	73	15:38 (127)
6	06:11		20:05 (22)	06:37	07:06	07:35	07:09		14:45 (127)	07:42		14:25 (127)
	21:07	29	20:34 (22)	20:45	20:01	19:10	17:27	24	15:09 (127)	17:09	74	15:39 (127)
7	06:12		20:04 (22)	06:38	07:07	07:36	07:10		14:43 (127)	07:43		14:25 (127)
	21:07	30	20:34 (22)	20:44	20:00	19:09	17:26	30	15:13 (127)	17:09	74	15:39 (127)
8	06:13		20:05 (22)	06:39	07:08	07:37	07:11		14:40 (127)	07:44		14:26 (127)
	21:07	29	20:34 (22)	20:43	19:56	19:07	17:25	35	15:15 (127)	17:09	74	15:40 (127)
9	06:13		20:05 (22)	06:40	07:09	07:38	07:13		14:37 (127)	07:45		14:26 (127)
	21:07	28	20:33 (22)	20:42	19:55	19:05	17:24	40	15:17 (127)	17:09	74	15:40 (127)
10	06:14		20:05 (22)	06:41	07:10	07:39	07:14		14:35 (127)	07:46		14:27 (127)
	21:06	29	20:34 (22)	20:40	19:53	19:04	17:23	43	15:18 (127)	17:09	74	15:41 (127)
11	06:15		20:06 (22)	06:42	07:11	07:40	07:15		14:34 (127)	07:46		14:26 (127)
	21:06	28	20:34 (22)	20:39	19:51	19:02	17:22	47	15:21 (127)	17:09	75	15:41 (127)
12	06:15		20:06 (22)	06:43	07:12	07:42	07:16		14:33 (127)	07:47		14:27 (127)
	21:05	27	20:33 (22)	20:38	19:50	19:01	17:21	49	15:22 (127)	17:09	74	15:41 (127)
13	06:16		20:07 (22)	06:43	07:13	07:43	07:17		14:31 (127)	07:48		14:27 (127)
	21:05	26	20:33 (22)	20:37	19:48	18:59	17:20	52	15:23 (127)	17:09	75	15:42 (127)
14	06:17		20:07 (22)	06:44	07:14	07:44	07:18		14:30 (127)	07:49		14:28 (127)
	21:04	26	20:33 (22)	20:35	19:46	18:58	17:20	54	15:24 (127)	17:10	75	15:43 (127)
15	06:18		20:07 (22)	06:45	07:15	07:45	07:19		14:28 (127)	07:49		14:28 (127)
	21:04	25	20:32 (22)	20:34	19:45	18:56	17:19	56	15:24 (127)	17:10	74	15:42 (127)
16	06:18		20:08 (22)	06:46	07:16	07:46	07:21		14:28 (127)	07:50		14:28 (127)
	21:03	24	20:32 (22)	20:33	19:43	18:55	17:18	58	15:26 (127)	17:10	75	15:43 (127)
17	06:19		20:09 (22)	06:47	07:17	07:47	07:22		14:27 (127)	07:51		14:29 (127)
	21:03	23	20:32 (22)	20:31	19:41	18:53	17:17	60	15:27 (127)	17:10	75	15:44 (127)
18	06:20		20:10 (22)	06:48	07:18	07:48	07:23		14:26 (127)	07:51		14:29 (127)
	21:02	22	20:32 (22)	20:30	19:40	18:52	17:16	61	15:27 (127)	17:11	75	15:44 (127)
19	06:21		20:11 (22)	06:49	07:19	07:49	07:24		14:26 (127)	07:52		14:30 (127)
	21:02	20	20:31 (22)	20:29	19:38	18:50	17:16	62	15:28 (127)	17:11	75	15:45 (127)
20	06:22		20:11 (22)	06:50	07:20	07:50	07:25		14:26 (127)	07:53		14:30 (127)
	21:01	18	20:29 (22)	20:27	19:36	18:49	17:15	64	15:30 (127)	17:12	75	15:45 (127)
21	06:22		20:13 (22)	06:51	07:21	07:51	07:26		14:25 (127)	07:53		14:31 (127)
	21:00	16	20:29 (22)	20:26	19:35	18:47	17:14	65	15:30 (127)	17:12	75	15:46 (127)
22	06:23		20:15 (22)	06:52	07:22	07:52	07:27		14:25 (127)	07:54		14:31 (127)
	20:59	12	20:27 (22)	20:24	19:33	18:46	17:14	66	15:31 (127)	17:13	75	15:46 (127)
23	06:24		20:17 (22)	06:53	07:23	07:53	07:29		14:24 (127)	07:54		14:32 (127)
	20:59	8	20:25 (22)	20:23	19:31	18:45	17:13	67	15:31 (127)	17:13	75	15:47 (127)
24	06:25			06:54	07:24	07:54	07:30		14:24 (127)	07:55		14:32 (127)
	20:58			20:21	19:30	18:43	17:13	68	15:32 (127)	17:14	75	15:47 (127)
25	06:26			06:55	07:25	07:55	07:31		14:24 (127)	07:55		14:33 (127)
	20:57			20:20	19:28	18:42	17:12	68	15:32 (127)	17:14	75	15:48 (127)
26	06:27			06:56	07:25	07:57	07:32		14:24 (127)	07:55		14:33 (127)
	20:56			20:18	19:26	18:41	17:12	70	15:34 (127)	17:15	75	15:48 (127)
27	06:28			06:57	07:26	07:58	07:33		14:24 (127)	07:56		14:33 (127)
	20:55			20:17	19:25	18:39	17:11	70	15:34 (127)	17:15	75	15:48 (127)
28	06:28			06:58	07:27	07:59	07:34		14:24 (127)	07:56		14:34 (127)
	20:54			20:15	19:23	18:38	17:11	71	15:35 (127)	17:16	74	15:48 (127)
29	06:29			06:59	07:28	08:00	07:35		14:24 (127)	07:56		14:35 (127)
	20:54			20:14	19:22	18:37	17:11	71	15:35 (127)	17:17	75	15:50 (127)
30	06:30			07:00	07:29	08:01	07:36		14:24 (127)	07:57		14:35 (127)
	20:53			20:12	19:20	18:35	17:10	72	15:36 (127)	17:18	75	15:50 (127)
31	06:31			07:01		08:02				07:57		14:36 (127)
	20:52			20:11		18:34				17:18	74	15:50 (127)
Potential sun hours	456			427	374	346	300			291		
Total, worst case		569						1438			2306	
Sun reduction		0.60						0.37			0.50	
Oper. time red.		1.00						1.00			1.00	
Wind dir. red.		0.62						0.66			0.66	
Total reduction		0.38						0.25			0.33	
Total, real		214						355			770	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 71

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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative**Shadow receptor:** 10206 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6761)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:34 (72)	07:44		08:38 (72)	07:10			07:20		19:07 (117)	06:36			06:08		19:50 (74)
	17:20	68	16:54 (116)	17:53	59	09:37 (72)	18:26			19:59	20	19:27 (117)	20:28			20:57	29	20:19 (74)
2	07:57		08:34 (72)	07:44		08:38 (72)	07:08			07:18		19:04 (117)	06:34			06:08		19:51 (74)
	17:20	68	16:54 (116)	17:54	59	09:37 (72)	18:27			20:00	24	19:28 (117)	20:29			20:58	29	20:20 (74)
3	07:58		08:34 (72)	07:43		08:39 (72)	07:07			07:17		19:02 (117)	06:33			06:07		19:52 (74)
	17:21	70	16:55 (116)	17:55	58	09:37 (72)	18:28			20:00	29	19:31 (117)	20:30			20:58	28	20:20 (74)
4	07:58		08:34 (72)	07:42		08:39 (72)	07:05			07:15		19:00 (117)	06:32			06:07		19:51 (74)
	17:22	72	16:56 (116)	17:57	57	09:36 (72)	18:29			20:01	31	19:31 (117)	20:31			20:59	28	20:19 (74)
5	07:58		08:34 (72)	07:41		08:40 (72)	07:04			07:14		18:58 (117)	06:31			06:07		19:52 (74)
	17:23	73	16:57 (116)	17:58	56	09:36 (72)	18:30			20:02	34	19:32 (117)	20:32			21:00	27	20:19 (74)
6	07:58		08:35 (72)	07:40		08:41 (72)	07:02			07:12		18:57 (117)	06:30			06:06		19:53 (74)
	17:24	74	16:58 (116)	17:59	55	09:36 (72)	18:31			20:03	36	19:33 (117)	20:33			21:00	27	20:20 (74)
7	07:58		08:35 (72)	07:38		08:41 (72)	07:00			07:11		18:56 (117)	06:28			06:06		19:52 (74)
	17:25	76	16:59 (116)	18:00	54	09:35 (72)	18:33			20:04	38	19:34 (117)	20:34			21:01	27	20:19 (74)
8	07:57		08:35 (72)	07:37		08:42 (72)	07:59			07:09		18:55 (117)	06:27			06:06		19:53 (74)
	17:26	77	17:00 (116)	18:02	53	09:35 (72)	19:34			20:05	40	19:35 (117)	20:35			21:02	26	20:19 (74)
9	07:57		08:35 (72)	07:36		08:43 (72)	07:57			07:07		18:54 (117)	06:26		20:00 (74)	06:06		19:54 (74)
	17:27	78	17:01 (116)	18:03	51	09:34 (72)	19:35			20:06	40	19:34 (117)	20:36	7	20:07 (74)	21:02	25	20:19 (74)
10	07:57		08:35 (72)	07:35		08:44 (72)	07:56			07:06		18:53 (117)	06:25		19:57 (74)	06:05		19:54 (74)
	17:28	78	17:01 (116)	18:04	49	09:33 (72)	19:36			20:07	41	19:34 (117)	20:37	13	20:10 (74)	21:03	25	20:19 (74)
11	07:57		08:35 (72)	07:34		08:46 (72)	07:54			07:04		18:53 (117)	06:24		19:55 (74)	06:05		19:55 (74)
	17:29	78	17:01 (116)	18:05	46	09:32 (72)	19:37			20:08	42	19:35 (117)	20:38	17	20:12 (74)	21:03	24	20:19 (74)
12	07:57		08:35 (72)	07:33		08:46 (72)	07:53			07:03		18:52 (117)	06:23		19:54 (74)	06:05		19:55 (74)
	17:30	81	17:02 (116)	18:06	44	09:30 (72)	19:38			20:09	42	19:34 (117)	20:39	19	20:13 (74)	21:04	24	20:19 (74)
13	07:56		08:36 (72)	07:32		08:48 (72)	07:51			07:01		18:52 (117)	06:22		19:52 (74)	06:05		19:56 (74)
	17:31	81	17:03 (116)	18:08	41	09:29 (72)	19:39			20:10	42	19:34 (117)	20:40	23	20:15 (74)	21:04	23	20:19 (74)
14	07:56		08:35 (72)	07:30		08:49 (72)	07:49			07:00		18:51 (117)	06:21		19:51 (74)	06:05		19:56 (74)
	17:32	81	17:02 (116)	18:09	38	09:27 (72)	19:40			20:11	43	19:34 (117)	20:41	24	20:15 (74)	21:05	23	20:19 (74)
15	07:56		08:36 (72)	07:29		08:50 (72)	07:48			06:58		18:52 (117)	06:20		19:51 (74)	06:05		19:56 (74)
	17:33	81	17:03 (116)	18:10	35	09:25 (72)	19:41			20:12	42	19:34 (117)	20:42	25	20:16 (74)	21:05	23	20:19 (74)
16	07:55		08:35 (72)	07:28		08:53 (72)	07:46			06:57		18:51 (117)	06:19		19:50 (74)	06:05		19:57 (74)
	17:34	82	17:03 (116)	18:11	30	09:23 (72)	19:42			20:13	42	19:33 (117)	20:43	27	20:17 (74)	21:06	22	20:19 (74)
17	07:55		08:36 (72)	07:26		08:55 (72)	07:45			06:55		18:52 (117)	06:18		19:49 (74)	06:05		19:57 (74)
	17:35	81	17:03 (116)	18:12	25	09:20 (72)	19:43			20:14	41	19:33 (117)	20:44	28	20:17 (74)	21:06	22	20:19 (74)
18	07:54		08:35 (72)	07:25		08:59 (72)	07:43			06:54		18:51 (117)	06:17		19:50 (74)	06:05		19:57 (74)
	17:37	82	17:03 (116)	18:13	18	09:17 (72)	19:44			20:15	41	19:32 (117)	20:45	28	20:18 (74)	21:06	22	20:19 (74)
19	07:54		08:36 (72)	07:24			07:41			06:52		18:52 (117)	06:16		19:49 (74)	06:05		19:57 (74)
	17:38	80	17:03 (116)	18:15			19:45			20:16	39	19:31 (117)	20:46	29	20:18 (74)	21:07	22	20:19 (74)
20	07:53		08:36 (72)	07:22			07:40			06:51		18:53 (117)	06:16		19:49 (74)	06:05		19:58 (74)
	17:39	80	17:03 (116)	18:16			19:46			20:17	38	19:31 (117)	20:47	29	20:18 (74)	21:07	21	20:19 (74)
21	07:53		08:35 (72)	07:21			07:38			06:49		18:53 (117)	06:15		19:48 (74)	06:06		19:59 (74)
	17:40	79	17:02 (116)	18:17			19:47			20:18	36	19:29 (117)	20:48	30	20:18 (74)	21:07	21	20:20 (74)
22	07:52		08:36 (72)	07:20			07:36			06:48		18:54 (117)	06:14		19:49 (74)	06:06		19:59 (74)
	17:41	77	17:02 (116)	18:18			19:48			20:19	35	19:29 (117)	20:49	30	20:19 (74)	21:08	21	20:20 (74)
23	07:52		08:36 (72)	07:18			07:35			06:46		18:55 (117)	06:13		19:49 (74)	06:06		19:58 (74)
	17:42	76	17:01 (116)	18:19			19:49			20:20	32	19:27 (117)	20:50	30	20:19 (74)	21:08	22	20:20 (74)
24	07:51		08:36 (72)	07:17			07:33			06:45		18:56 (117)	06:13		19:48 (74)	06:06		19:58 (74)
	17:43	73	16:59 (116)	18:20			19:50			20:21	30	19:26 (117)	20:50	31	20:19 (74)	21:08	22	20:20 (74)
25	07:50		08:37 (72)	07:15			07:31			06:44		18:57 (117)	06:12		19:49 (74)	06:07		19:59 (74)
	17:45	68	16:58 (116)	18:21			19:52			20:22	28	19:25 (117)	20:51	31	20:20 (74)	21:08	22	20:21 (74)
26	07:50		08:37 (72)	07:14			07:30			06:42		18:58 (117)	06:11		19:49 (74)	06:07		19:59 (74)
	17:46	61	09:38 (72)	18:23			19:53			20:23	24	19:22 (117)	20:52	30	20:19 (74)	21:08	22	20:21 (74)
27	07:49		08:37 (72)	07:13			07:28			06:41		19:01 (117)	06:11		19:49 (74)	06:07		19:59 (74)
	17:47	61	09:38 (72)	18:24			19:54			20:24	19	19:20 (117)	20:53	31	20:20 (74)	21:08	22	20:21 (74)
28	07:48		08:37 (72)	07:11			07:27			06:40		19:04 (117)	06:10		19:49 (74)	06:08		19:59 (74)
	17:48	61	09:38 (72)	18:25			19:55			20:25	13	19:17 (117)	20:54	31	20:20 (74)	21:08	23	20:22 (74)
29	07:47		08:37 (72)				07:25			06:38			06:10		19:50 (74)	06:08		19:59 (74)
	17:49	61	09:38 (72)				19:56			20:26			20:55	30	20:20 (74)	21:08	23	20:22 (74)
30	07:46		08:37 (72)				07:23			06:37			06:09		19:50 (74)	06:09		19:59 (74)
	17:51	60	09:37 (72)				19:57			20:27			20:55	30	20:20 (74)	21:08	24	20:23 (74)
31	07:45		08:37 (72)				07:22		19:10 (117)				06:09		19:50 (74)			
	17:52	60	09:37 (72)				19:58	13	19:23 (117)				20:56	30	20:20 (74)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		2278			828			13			962			603			719	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.62			0.61			0.65			0.65			0.63			0.63	
Total reduction		0.22			0.25			0.29			0.33			0.35			0.38	
Total, real		510			211			4			319			212			270	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 72

Licensed user:
EDR
217 Montgomery St.
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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative**Shadow receptor:** 10206 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6761)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		19:59 (74)	06:32		20:05 (74)	07:02		18:52 (117)	07:31			07:04		08:13 (72)	07:37		08:17 (72)
	21:08	24	20:23 (74)	20:51	19	20:24 (74)	20:09	42	19:34 (117)	19:18			17:33	49	09:02 (72)	17:10	79	16:43 (116)
2	06:09		19:59 (74)	06:33		20:06 (74)	07:03		18:52 (117)	07:32			07:05		08:13 (72)	07:38		08:18 (72)
	21:08	25	20:24 (74)	20:50	16	20:22 (74)	20:08	41	19:33 (117)	19:17			17:32	51	09:04 (72)	17:10	79	16:44 (116)
3	06:10		19:59 (74)	06:34		20:09 (74)	07:04		18:52 (117)	07:33			07:06		08:12 (72)	07:39		08:18 (72)
	21:08	25	20:24 (74)	20:49	11	20:20 (74)	20:06	40	19:32 (117)	19:15			17:31	52	09:04 (72)	17:10	78	16:44 (116)
4	06:10		19:59 (74)	06:35			07:05		18:52 (117)	07:34			07:07		08:11 (72)	07:40		08:19 (72)
	21:08	26	20:25 (74)	20:48			20:05	40	19:32 (117)	19:14			17:30	54	09:05 (72)	17:09	77	16:44 (116)
5	06:11		19:59 (74)	06:36			07:06		18:53 (117)	07:35			07:08		08:10 (72)	07:41		08:20 (72)
	21:08	26	20:25 (74)	20:47			20:03	38	19:31 (117)	19:12			17:29	56	09:06 (72)	17:09	75	16:44 (116)
6	06:12		19:59 (74)	06:37			07:07		18:53 (117)	07:36			07:09		08:11 (72)	07:42		08:21 (72)
	21:08	27	20:26 (74)	20:45			20:01	36	19:29 (117)	19:10			17:27	56	09:07 (72)	17:09	74	16:44 (116)
7	06:12		19:58 (74)	06:38			07:08		18:53 (117)	07:37			07:10		08:10 (72)	07:43		08:21 (72)
	21:07	27	20:25 (74)	20:44			20:00	34	19:27 (117)	19:09			17:26	57	09:07 (72)	17:09	73	16:44 (116)
8	06:13		19:59 (74)	06:39			07:08		18:54 (117)	07:38			07:12		08:10 (72)	07:44		08:22 (72)
	21:07	27	20:26 (74)	20:43			19:56	32	19:26 (117)	19:07			17:25	58	09:08 (72)	17:09	72	16:44 (116)
9	06:13		19:58 (74)	06:40			07:09		18:55 (117)	07:39			07:13		08:09 (72)	07:45		08:23 (72)
	21:07	28	20:26 (74)	20:42			19:55	29	19:24 (117)	19:06			17:24	59	09:08 (72)	17:09	70	16:44 (116)
10	06:14		19:58 (74)	06:41			07:10		18:57 (117)	07:40			07:14		08:09 (72)	07:46		08:24 (72)
	21:06	29	20:27 (74)	20:41			19:53	25	19:22 (117)	19:04			17:23	59	09:08 (72)	17:09	69	16:44 (116)
11	06:15		19:58 (74)	06:42			07:11		18:59 (117)	07:41			07:15		08:09 (72)	07:47		08:25 (72)
	21:06	29	20:27 (74)	20:39			19:52	20	19:19 (117)	19:02			17:22	60	09:09 (72)	17:09	68	16:45 (116)
12	06:16		19:58 (74)	06:43			07:12		19:02 (117)	07:42			07:16		08:09 (72)	07:47		08:25 (72)
	21:06	29	20:27 (74)	20:38			19:50	13	19:15 (117)	19:01			17:22	60	09:09 (72)	17:09	67	16:44 (116)
13	06:16		19:58 (74)	06:44			07:13			07:43			07:17		08:09 (72)	07:48		08:26 (72)
	21:05	30	20:28 (74)	20:37			19:48			18:59			17:21	61	09:10 (72)	17:10	66	16:44 (116)
14	06:17		19:58 (74)	06:45		19:15 (117)	07:14			07:44			07:19		08:09 (72)	07:49		08:27 (72)
	21:05	30	20:28 (74)	20:36	6	19:21 (117)	19:47			18:58			17:20	61	09:10 (72)	17:10	65	16:45 (116)
15	06:18		19:58 (74)	06:46		19:10 (117)	07:15			07:45			07:20		08:10 (72)	07:50		08:28 (72)
	21:04	31	20:29 (74)	20:34	15	19:25 (117)	19:45			18:56			17:19	61	09:11 (72)	17:10	64	16:45 (116)
16	06:18		19:58 (74)	06:47		19:07 (117)	07:16			07:46			07:21		08:10 (72)	07:50		08:28 (72)
	21:04	30	20:28 (74)	20:33	20	19:27 (117)	19:43			18:55			17:18	61	09:11 (72)	17:10	63	16:45 (116)
17	06:19		19:58 (74)	06:47		19:05 (117)	07:17			07:47			07:22		08:10 (72)	07:51		08:29 (72)
	21:03	31	20:29 (74)	20:31	24	19:29 (117)	19:42			18:53			17:17	68	16:31 (116)	17:11	62	16:45 (116)
18	06:20		19:58 (74)	06:48		19:03 (117)	07:18			07:48			07:23		08:10 (72)	07:52		08:30 (72)
	21:02	31	20:29 (74)	20:30	28	19:31 (117)	19:40			18:52			17:17	73	16:33 (116)	17:11	62	16:46 (116)
19	06:21		19:59 (74)	06:49		19:01 (117)	07:19			07:49			07:24		08:11 (72)	07:52		08:30 (72)
	21:02	30	20:29 (74)	20:29	31	19:32 (117)	19:38			18:50			17:16	76	16:36 (116)	17:11	61	16:46 (116)
20	06:22		19:58 (74)	06:50		19:00 (117)	07:20			07:50			07:25		08:11 (72)	07:53		08:31 (72)
	21:01	31	20:29 (74)	20:27	33	19:33 (117)	19:37			18:49			17:15	77	16:37 (116)	17:12	61	16:47 (116)
21	06:22		19:58 (74)	06:51		18:59 (117)	07:21			07:51			07:27		08:11 (72)	07:53		08:31 (72)
	21:00	31	20:29 (74)	20:26	35	19:34 (117)	19:35			18:48			17:15	79	16:38 (116)	17:12	61	16:47 (116)
22	06:23		19:59 (74)	06:52		18:58 (117)	07:22			07:52			07:28		08:12 (72)	07:54		08:32 (72)
	21:00	30	20:29 (74)	20:24	36	19:34 (117)	19:33			18:46			17:14	80	16:39 (116)	17:13	61	16:48 (116)
23	06:24		19:59 (74)	06:53		18:57 (117)	07:23			07:53		09:33 (72)	07:29		08:12 (72)	07:54		08:32 (72)
	20:59	30	20:29 (74)	20:23	38	19:35 (117)	19:32			18:45	10	09:43 (72)	17:13	80	16:39 (116)	17:13	61	16:48 (116)
24	06:25		19:59 (74)	06:54		18:56 (117)	07:24			07:55		09:28 (72)	07:30		08:12 (72)	07:55		08:32 (72)
	20:58	30	20:29 (74)	20:22	39	19:35 (117)	19:30			18:43	20	09:48 (72)	17:13	82	16:40 (116)	17:14	61	16:48 (116)
25	06:26		20:00 (74)	06:55		18:55 (117)	07:25			07:56		09:24 (72)	07:31		08:14 (72)	07:55		08:33 (72)
	20:57	29	20:29 (74)	20:20	41	19:36 (117)	19:28			18:42	27	09:51 (72)	17:12	81	16:41 (116)	17:14	62	16:49 (116)
26	06:27		19:59 (74)	06:56		18:55 (117)	07:26			07:57		09:22 (72)	07:32		08:14 (72)	07:56		08:33 (72)
	20:56	29	20:28 (74)	20:19	41	19:36 (117)	19:27			18:41	31	09:53 (72)	17:12	82	16:42 (116)	17:15	62	16:49 (116)
27	06:28		20:00 (74)	06:57		18:53 (117)	07:27			07:58		09:20 (72)	07:33		08:15 (72)	07:56		08:33 (72)
	20:56	27	20:27 (74)	20:17	42	19:35 (117)	19:25			18:39	35	09:55 (72)	17:11	81	16:42 (116)	17:16	63	16:50 (116)
28	06:29		20:01 (74)	06:58		18:53 (117)	07:28			07:59		09:19 (72)	07:34		08:15 (72)	07:56		08:34 (72)
	20:55	26	20:27 (74)	20:16	42	19:35 (117)	19:23			18:38	39	09:58 (72)	17:11	81	16:42 (116)	17:16	64	16:51 (116)
29	06:29		20:01 (74)	06:59		18:52 (117)	07:29			08:00		09:17 (72)	07:35		08:16 (72)	07:57		08:34 (72)
	20:54	25	20:26 (74)	20:14	43	19:35 (117)	19:22			18:37	42	09:59 (72)	17:11	81	16:43 (116)	17:17	64	16:51 (116)
30	06:30		20:02 (74)	07:00		18:52 (117)	07:30			08:01		09:16 (72)	07:36		08:16 (72)	07:57		08:34 (72)
	20:53	24	20:26 (74)	20:12	42	19:34 (117)	19:20			18:36	44	10:00 (72)	17:10	81	16:43 (116)	17:18	65	16:52 (116)
31	06:31		20:04 (74)	07:01		18:52 (117)				08:02		09:14 (72)				07:57		08:34 (72)
	20:52	21	20:25 (74)	20:11	42	19:34 (117)				18:34	47	10:01 (72)				17:19	67	16:53 (116)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		868			644			390			295			2017			2076	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.63			0.65			0.65			0.61			0.62			0.63	
Total reduction		0.38			0.39			0.40			0.34			0.23			0.31	
Total, real		327			251			155			100			459			649	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 73

Licensed user:
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US-SYRACUSE, NY 13202
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Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative**Shadow receptor:** 10280 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6762)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:25 (108)	07:45			07:10		07:43 (83)	07:20			06:36		07:20 (82)	06:08		06:30 (106)
	17:20	29	08:54 (108)	17:53			18:26	38	08:21 (83)	19:59			20:28	88	19:59 (107)	20:57	47	19:57 (107)
2	07:58		08:25 (108)	07:44			07:08		07:43 (83)	07:19			06:35		07:20 (82)	06:08		06:30 (106)
	17:21	29	08:54 (108)	17:54			18:27	37	08:20 (83)	20:00			20:29	89	20:00 (107)	20:58	40	19:56 (107)
3	07:58		08:26 (108)	07:43			07:07		07:43 (83)	07:17			06:33		07:20 (82)	06:07		06:29 (106)
	17:21	30	08:56 (108)	17:56			18:28	38	08:21 (83)	20:00			20:30	91	20:01 (107)	20:59	41	19:56 (107)
4	07:58		08:26 (108)	07:42			07:05		07:42 (83)	07:15			06:32		07:20 (82)	06:07		06:28 (106)
	17:22	29	08:55 (108)	17:57			18:29	38	08:20 (83)	20:01			20:31	93	20:02 (107)	20:59	41	19:55 (107)
5	07:58		08:26 (108)	07:41			07:04		07:43 (83)	07:14			06:31		07:19 (82)	06:07		06:28 (106)
	17:23	30	08:56 (108)	17:58			18:31	37	08:20 (83)	20:02			20:32	93	20:01 (107)	21:00	40	19:55 (107)
6	07:58		08:27 (108)	07:40			07:02		07:42 (83)	07:12			06:30		07:19 (82)	06:06		06:28 (106)
	17:24	29	08:56 (108)	17:59			18:32	37	08:19 (83)	20:03			20:33	94	20:02 (107)	21:01	39	19:54 (107)
7	07:58		08:27 (108)	07:39			07:01		07:43 (83)	07:11			06:29		07:19 (82)	06:06		06:28 (106)
	17:25	30	08:57 (108)	18:01			18:33	36	08:19 (83)	20:04			20:34	95	20:02 (107)	21:01	39	19:54 (107)
8	07:58		08:28 (108)	07:37			07:59		08:43 (83)	07:09			06:27		07:19 (82)	06:06		06:27 (106)
	17:26	30	08:58 (108)	18:02			19:34	35	09:18 (83)	20:05			20:35	95	20:03 (107)	21:02	39	19:53 (107)
9	07:57		08:28 (108)	07:36			07:57		08:43 (83)	07:08			06:26		07:20 (82)	06:06		06:27 (106)
	17:27	30	08:58 (108)	18:03			19:35	33	09:16 (83)	20:06			20:36	94	20:03 (107)	21:02	37	19:52 (107)
10	07:57		08:29 (108)	07:35			07:56		08:44 (83)	07:06			06:25		07:20 (82)	06:06		06:27 (106)
	17:28	30	08:59 (108)	18:04			19:36	32	09:16 (83)	20:07			20:37	94	20:03 (107)	21:03	35	19:51 (107)
11	07:57		08:29 (108)	07:34			07:54		08:45 (83)	07:04			06:24		07:20 (82)	06:05		06:28 (106)
	17:29	29	08:58 (108)	18:05			19:37	29	09:14 (83)	20:08			20:38	93	20:03 (107)	21:04	33	19:51 (107)
12	07:57		08:30 (108)	07:33			07:53		08:46 (83)	07:03			06:23		07:21 (82)	06:05		06:28 (106)
	17:30	29	08:59 (108)	18:07			19:38	27	09:13 (83)	20:09			20:39	92	20:03 (107)	21:04	32	19:50 (107)
13	07:57		08:30 (108)	07:32			07:51		08:47 (83)	07:01			06:22		07:21 (82)	06:05		06:28 (106)
	17:31	30	09:00 (108)	18:08			19:39	23	09:10 (83)	20:10			20:40	91	20:03 (107)	21:05	29	19:49 (107)
14	07:56		08:30 (108)	07:30			07:49		08:49 (83)	07:00		07:43 (82)	06:21		07:21 (82)	06:05		06:28 (106)
	17:32	29	08:59 (108)	18:09			19:40	18	09:07 (83)	20:11	16	07:59 (82)	20:41	90	20:03 (107)	21:05	27	19:48 (107)
15	07:56		08:31 (108)	07:29			07:48		08:53 (83)	06:58		07:38 (82)	06:20		07:22 (82)	06:05		06:28 (106)
	17:33	29	09:00 (108)	18:10			19:41	11	09:04 (83)	20:12	24	08:02 (82)	20:42	89	20:03 (107)	21:05	23	06:51 (106)
16	07:55		08:32 (108)	07:28			07:46			06:57		07:36 (82)	06:19		07:22 (82)	06:05		06:28 (106)
	17:34	27	08:59 (108)	18:11			19:42			20:13	29	08:05 (82)	20:43	87	20:02 (107)	21:06	23	06:51 (106)
17	07:55		08:33 (108)	07:27			07:45			06:55		07:33 (82)	06:18		07:24 (82)	06:05		06:28 (106)
	17:36	27	09:00 (108)	18:12			19:43			20:14	33	08:06 (82)	20:44	85	20:03 (107)	21:06	23	06:51 (106)
18	07:55		08:33 (108)	07:25			07:43			06:54		07:32 (82)	06:17		07:24 (82)	06:05		06:28 (106)
	17:37	26	08:59 (108)	18:14			19:44			20:15	36	08:08 (82)	20:45	84	20:03 (107)	21:07	23	06:51 (106)
19	07:54		08:34 (108)	07:24		07:59 (83)	07:41			06:52		07:29 (82)	06:17		07:25 (82)	06:05		06:28 (106)
	17:38	25	08:59 (108)	18:15	8	08:07 (83)	19:45			20:16	40	08:09 (82)	20:46	81	20:02 (107)	21:07	23	06:51 (106)
20	07:54		08:35 (108)	07:23		07:55 (83)	07:40			06:51		07:28 (82)	06:16		07:25 (82)	06:06		06:29 (106)
	17:39	24	08:59 (108)	18:16	16	08:11 (83)	19:46			20:17	42	08:10 (82)	20:47	80	20:02 (107)	21:07	24	06:53 (106)
21	07:53		08:37 (108)	07:21		07:53 (83)	07:38			06:49		07:27 (82)	06:15		07:27 (82)	06:06		06:29 (106)
	17:40	22	08:59 (108)	18:17	21	08:14 (83)	19:48			20:18	43	08:10 (82)	20:48	77	20:02 (107)	21:07	24	06:53 (106)
22	07:52		08:38 (108)	07:20		07:50 (83)	07:37			06:48		07:26 (82)	06:14		07:27 (82)	06:06		06:29 (106)
	17:41	20	08:58 (108)	18:18	25	08:15 (83)	19:49			20:19	45	08:11 (82)	20:49	74	20:01 (107)	21:08	24	06:53 (106)
23	07:52		08:39 (108)	07:18		07:49 (83)	07:35			06:47		07:25 (82)	06:14		07:28 (82)	06:06		06:29 (106)
	17:42	18	08:57 (108)	18:19	28	08:17 (83)	19:50			20:20	47	08:12 (82)	20:50	72	20:01 (107)	21:08	24	06:53 (106)
24	07:51		08:40 (108)	07:17		07:47 (83)	07:33			06:45		07:24 (82)	06:13		07:29 (82)	06:06		06:29 (106)
	17:44	15	08:55 (108)	18:21	31	08:18 (83)	19:51			20:21	48	08:12 (82)	20:51	69	20:00 (107)	21:08	23	06:52 (106)
25	07:50		08:43 (108)	07:16		07:47 (83)	07:32			06:44		07:23 (82)	06:12		07:30 (82)	06:07		06:30 (106)
	17:45	11	08:54 (108)	18:22	32	08:19 (83)	19:52			20:22	64	19:50 (107)	20:51	66	20:00 (107)	21:08	23	06:53 (106)
26	07:50		08:48 (108)	07:14		07:45 (83)	07:30			06:42		07:23 (82)	06:11		07:31 (82)	06:07		06:30 (106)
	17:46	2	08:50 (108)	18:23	34	08:19 (83)	19:53			20:23	70	19:53 (107)	20:52	64	20:00 (107)	21:08	23	06:53 (106)
27	07:49			07:13		07:45 (83)	07:28			06:41		07:21 (82)	06:11		07:33 (82)	06:07		06:30 (106)
	17:47			18:24	35	08:20 (83)	19:54			20:24	77	19:55 (107)	20:53	59	20:00 (107)	21:08	23	06:53 (106)
28	07:48			07:11		07:44 (83)	07:27			06:40		07:21 (82)	06:10		07:34 (82)	06:08		06:31 (106)
	17:48			18:25	36	08:20 (83)	19:55			20:25	80	19:57 (107)	20:54	56	19:59 (107)	21:08	25	19:49 (107)
29	07:47						07:25			06:38		07:21 (82)	06:10		07:36 (82)	06:08		06:31 (106)
	17:50						19:56			20:26	84	19:58 (107)	20:55	52	19:59 (107)	21:08	29	19:52 (107)
30	07:46						07:23			06:37		07:20 (82)	06:09		06:32 (106)	06:09		06:32 (106)
	17:51						19:57			20:27	86	19:58 (107)	20:56	56	19:58 (107)	21:08	31	19:54 (107)
31	07:46						07:22						06:09		06:31 (106)			
	17:52						19:58						20:56	53	19:58 (107)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		659			266			469			864			2496			907	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.61			0.63			0.63			0.66			0.65			0.67	
Total reduction		0.22			0.27			0.28			0.34			0.36			0.40	
Total, real		143			71			130			291			908			363	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II SFA_4_1100m_cumulative

Printed/Page
3/2/2012 10:01 AM / 74

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / scurtis@edrpc.com

Calculated:
3/1/2012 4:26 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II SFA_4_1100m_cumulative**Shadow receptor:** 10280 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6762)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:32 (106)	06:32		07:31 (82)	07:02			07:31		08:26 (83)	07:04			07:37		08:11 (108)
	21:08	33	19:54 (107)	20:51	93	20:14 (107)	20:09			19:19	25	08:51 (83)	17:33			17:10	30	08:41 (108)
2	06:10		06:33 (106)	06:33		07:31 (82)	07:03			07:32		08:24 (83)	07:05			07:38		08:11 (108)
	21:08	34	19:56 (107)	20:50	94	20:14 (107)	20:08			19:17	28	08:52 (83)	17:32			17:10	30	08:41 (108)
3	06:10		06:32 (106)	06:34		07:30 (82)	07:04			07:33		08:22 (83)	07:06			07:39		08:11 (108)
	21:08	37	19:57 (107)	20:49	95	20:14 (107)	20:06			19:15	31	08:53 (83)	17:31			17:10	30	08:41 (108)
4	06:11		06:33 (106)	06:35		07:30 (82)	07:05			07:34		08:21 (83)	07:07			07:40		08:12 (108)
	21:08	37	19:58 (107)	20:48	94	20:13 (107)	20:05			19:14	33	08:54 (83)	17:30			17:10	30	08:42 (108)
5	06:11		06:33 (106)	06:36		07:29 (82)	07:06			07:35		08:20 (83)	07:08			07:41		08:12 (108)
	21:08	39	19:59 (107)	20:47	94	20:12 (107)	20:03			19:12	34	08:54 (83)	17:29			17:09	30	08:42 (108)
6	06:12		06:34 (106)	06:37		07:29 (82)	07:07			07:36		08:19 (83)	07:09			07:42		08:13 (108)
	21:08	40	20:00 (107)	20:45	94	20:12 (107)	20:01			19:10	35	08:54 (83)	17:28			17:09	30	08:43 (108)
7	06:12		06:34 (106)	06:38		07:29 (82)	07:08			07:37		08:18 (83)	07:11			07:43		08:13 (108)
	21:07	41	20:01 (107)	20:44	94	20:11 (107)	20:00			19:09	37	08:55 (83)	17:27			17:09	30	08:43 (108)
8	06:13		06:35 (106)	06:39		07:29 (82)	07:09			07:38		08:17 (83)	07:12			07:44		08:14 (108)
	21:07	41	20:02 (107)	20:43	93	20:11 (107)	19:57			19:07	38	08:55 (83)	17:26			17:09	29	08:43 (108)
9	06:14		06:36 (106)	06:40		07:28 (82)	07:10			07:39		08:17 (83)	07:13			07:45		08:14 (108)
	21:07	41	20:03 (107)	20:42	93	20:10 (107)	19:55			19:06	38	08:55 (83)	17:25			17:09	30	08:44 (108)
10	06:14		06:36 (106)	06:41		07:28 (82)	07:11			07:40		08:16 (83)	07:14			07:46		08:15 (108)
	21:06	42	20:03 (107)	20:41	92	20:10 (107)	19:53			19:04	38	08:54 (83)	17:24			17:09	29	08:44 (108)
11	06:15		06:38 (106)	06:42		07:28 (82)	07:11			07:41		08:16 (83)	07:15			07:47		08:16 (108)
	21:06	41	20:05 (107)	20:39	90	20:09 (107)	19:52			19:03	38	08:54 (83)	17:23			17:09	29	08:45 (108)
12	06:16		06:39 (106)	06:43		07:28 (82)	07:12			07:42		08:16 (83)	07:16			07:47		08:16 (108)
	21:06	51	20:06 (107)	20:38	89	20:08 (107)	19:50			19:01	38	08:54 (83)	17:22			17:10	28	08:44 (108)
13	06:16		06:40 (106)	06:44		07:29 (82)	07:13			07:43		08:17 (83)	07:17			07:48		08:16 (108)
	21:05	54	20:06 (107)	20:37	86	20:07 (107)	19:48			19:00	37	08:54 (83)	17:21			17:10	29	08:45 (108)
14	06:17		06:43 (106)	06:45		07:29 (82)	07:14			07:44		08:17 (83)	07:19			07:49		08:17 (108)
	21:05	53	20:07 (107)	20:36	82	20:05 (107)	19:47			18:58	36	08:53 (83)	17:20			17:10	29	08:46 (108)
15	06:18		07:44 (82)	06:46		07:29 (82)	07:15			07:45		08:17 (83)	07:20			07:50		08:18 (108)
	21:04	54	20:08 (107)	20:34	79	20:04 (107)	19:45			18:57	36	08:53 (83)	17:19			17:10	28	08:46 (108)
16	06:19		07:43 (82)	06:47		07:29 (82)	07:16			07:46		08:18 (83)	07:21		08:20 (108)	07:50		08:18 (108)
	21:04	58	20:09 (107)	20:33	75	20:02 (107)	19:43			18:55	34	08:52 (83)	17:18	3	08:23 (108)	17:10	28	08:46 (108)
17	06:19		07:41 (82)	06:48		07:29 (82)	07:17			07:47		08:18 (83)	07:22		08:16 (108)	07:51		08:19 (108)
	21:03	62	20:09 (107)	20:32	69	19:59 (107)	19:42			18:54	32	08:50 (83)	17:17	11	08:27 (108)	17:11	28	08:47 (108)
18	06:20		07:40 (82)	06:49		07:29 (82)	07:18			07:48		08:19 (83)	07:23		08:14 (108)	07:52		08:20 (108)
	21:03	64	20:09 (107)	20:30	62	19:55 (107)	19:40			18:52	30	08:49 (83)	17:17	15	08:29 (108)	17:11	28	08:48 (108)
19	06:21		07:40 (82)	06:50		07:29 (82)	07:19			07:49		08:20 (83)	07:24		08:14 (108)	07:52		08:19 (108)
	21:02	67	20:10 (107)	20:29	49	08:18 (82)	19:38			18:51	27	08:47 (83)	17:16	18	08:32 (108)	17:11	28	08:47 (108)
20	06:22		07:39 (82)	06:51		07:30 (82)	07:20			07:50		08:21 (83)	07:25		08:13 (108)	07:53		08:20 (108)
	21:01	71	20:11 (107)	20:27	47	08:17 (82)	19:37			18:49	24	08:45 (83)	17:15	20	08:33 (108)	17:12	28	08:48 (108)
21	06:23		07:37 (82)	06:51		07:31 (82)	07:21			07:51		08:23 (83)	07:27		08:12 (108)	07:53		08:20 (108)
	21:01	74	20:11 (107)	20:26	45	08:16 (82)	19:35			18:48	20	08:43 (83)	17:15	22	08:34 (108)	17:12	28	08:48 (108)
22	06:24		07:37 (82)	06:52		07:31 (82)	07:22			07:52		08:27 (83)	07:28		08:11 (108)	07:54		08:21 (108)
	21:00	75	20:11 (107)	20:25	44	08:15 (82)	19:33			18:46	14	08:41 (83)	17:14	24	08:35 (108)	17:13	28	08:49 (108)
23	06:24		07:36 (82)	06:53		07:32 (82)	07:23			07:54			07:29		08:10 (108)	07:55		08:21 (108)
	20:59	78	20:12 (107)	20:23	42	08:14 (82)	19:32			18:45			17:14	26	08:36 (108)	17:13	28	08:49 (108)
24	06:25		07:36 (82)	06:54		07:33 (82)	07:24			07:55			07:30		08:11 (108)	07:55		08:22 (108)
	20:58	79	20:12 (107)	20:22	39	08:12 (82)	19:30			18:44			17:13	26	08:37 (108)	17:14	28	08:50 (108)
25	06:26		07:35 (82)	06:55		07:35 (82)	07:25			07:56			07:31		08:11 (108)	07:55		08:23 (108)
	20:57	83	20:13 (107)	20:20	36	08:11 (82)	19:28			18:42			17:13	27	08:38 (108)	17:15	28	08:51 (108)
26	06:27		07:35 (82)	06:56		07:36 (82)	07:26			07:57			07:32		08:11 (108)	07:56		08:23 (108)
	20:57	84	20:13 (107)	20:19	33	08:09 (82)	19:27			18:41			17:12	27	08:38 (108)	17:15	28	08:51 (108)
27	06:28		07:33 (82)	06:57		07:38 (82)	07:27			07:58			07:33		08:10 (108)	07:56		08:24 (108)
	20:56	87	20:13 (107)	20:17	29	08:07 (82)	19:25			18:40			17:12	29	08:39 (108)	17:16	28	08:52 (108)
28	06:29		07:33 (82)	06:58		07:41 (82)	07:28		08:36 (83)	07:59			07:34		08:10 (108)	07:56		08:24 (108)
	20:55	88	20:13 (107)	20:16	23	08:04 (82)	19:23	6	08:42 (83)	18:38			17:11	29	08:39 (108)	17:16	28	08:52 (108)
29	06:30		07:32 (82)	06:59		07:43 (82)	07:29		08:31 (83)	08:00			07:35		08:11 (108)	07:57		08:24 (108)
	20:54	90	20:13 (107)	20:14	16	07:59 (82)	19:22	16	08:47 (83)	18:37			17:11	29	08:40 (108)	17:17	29	08:53 (108)
30	06:31		07:32 (82)	07:00			07:30		08:28 (83)	08:01			07:36		08:11 (108)	07:57		08:24 (108)
	20:53	90	20:13 (107)	20:13			19:20	21	08:49 (83)	18:36			17:11	29	08:40 (108)	17:18	29	08:53 (108)
31	06:31		07:31 (82)	07:01						08:02						07:57		08:24 (108)
	20:52	93	20:14 (107)	20:11						18:35						17:19	29	08:53 (108)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		1881			1971			43			703			335			892	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.65			0.66			0.63			0.63			0.61			0.61	
Total reduction		0.39			0.39			0.38			0.35			0.22			0.30	
Total, real		734			775			17			248			75			270	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Attachment G

Cumulative Analysis WindPRO Overview Reports and Calendars (Obstacle Analysis)

Project:
11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:31 PM / 1

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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Main Result

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
280	307	482	420	473	385	412	385	596	797	832	727

W	WNW	NW	NNW	Sum
858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: 11052 contours.wpo (2)
Obstacles used in calculation
Eye height: 1.5 m
Grid resolution: 10 m

WTGs

	UTM NAD83 Zone: 17				WTG type						
	East	North	Z	Row data/Description	Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	RPM
	UTM NAD83 Zone: 17		[m]					[kW]	[m]	[m]	[RPM]
1	272,137	4,451,125	353.4	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
2	271,815	4,450,540	350.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
3	271,790	4,449,793	350.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
4	272,475	4,449,775	357.1	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
5	271,998	4,449,433	353.5	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
6	272,189	4,449,097	356.6	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
7	276,356	4,448,726	405.6	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
8	274,759	4,448,413	400.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
9	272,467	4,448,109	358.2	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
10	280,861	4,448,148	350.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
11	278,853	4,448,045	380.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
12	281,025	4,447,874	348.2	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
13	272,409	4,447,677	356.7	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
14	281,211	4,447,602	343.2	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
15	280,402	4,447,595	358.3	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
16	278,976	4,447,472	380.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
17	272,450	4,446,720	354.2	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
18	278,950	4,446,644	380.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
20	277,948	4,446,172	380.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
21	278,885	4,446,040	378.9	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
22	280,328	4,445,995	360.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
23	278,159	4,445,871	376.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
25	277,581	4,445,687	377.9	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
27	270,872	4,445,505	350.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
28	276,213	4,445,379	386.3	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9

To be continued on next page...

Project:
11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

...continued from previous page

	UTM NAD83 Zone: 17				WTG type						
	East	North	Z	Row data/Description	Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	RPM
	UTM NAD83 Zone: 17		[m]					[kW]	[m]	[m]	[RPM]
31	271,144	4,445,247	350.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
32	274,049	4,445,130	388.9	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
33	276,230	4,445,089	385.1	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
35	270,571	4,445,044	350.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
36	271,391	4,444,931	350.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
37	273,288	4,444,967	377.8	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
39	274,008	4,444,795	390.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
40	270,750	4,444,754	350.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
41	273,398	4,444,672	380.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
42	270,156	4,444,618	350.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
43	271,010	4,444,452	350.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
44	273,956	4,444,420	382.3	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
45	270,336	4,444,343	350.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
47	276,514	4,443,784	370.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
49	273,998	4,441,382	360.5	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
51	279,750	4,440,899	350.5	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
52	274,190	4,440,661	360.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
53	279,803	4,440,602	350.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
54	278,006	4,440,399	390.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
55	274,318	4,440,370	357.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
56	280,319	4,440,297	350.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
59	273,971	4,439,914	352.5	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
64	278,921	4,438,883	350.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
65	279,038	4,438,635	350.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
67	277,778	4,437,551	341.5	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
69	276,370	4,437,086	340.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
70	275,472	4,436,907	330.0	NORDEX N100 2500...	Yes	NORDEX	N100-2,500	2,500	99.8	100.0	14.9
71	279,368	4,445,092	360.8	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
72	277,985	4,446,737	380.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
73	276,767	4,447,605	399.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
74	276,919	4,447,310	395.2	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
75	276,272	4,447,236	402.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
76	276,392	4,446,951	400.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
77	276,558	4,446,666	396.2	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
78	279,498	4,440,175	352.5	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
79	278,190	4,442,124	383.9	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
80	278,158	4,441,799	390.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
81	274,913	4,446,038	390.1	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
82	275,069	4,445,768	395.5	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
83	275,215	4,445,504	400.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
84	276,290	4,442,736	379.6	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
85	275,852	4,442,363	375.3	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
86	276,329	4,441,802	384.9	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
87	273,127	4,446,337	368.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
88	276,592	4,438,677	390.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
89	275,778	4,438,425	380.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
90	278,236	4,441,453	390.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
91	281,835	4,443,472	341.3	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
92	281,137	4,443,883	347.8	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
93	280,804	4,444,251	350.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
94	281,156	4,441,420	350.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
95	282,198	4,441,581	340.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0

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11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

...continued from previous page

	UTM NAD83 Zone: 17 East	North	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	RPM
	UTM NAD83 Zone: 17		[m]					[kW]	[m]	[m]	[RPM]
96	282,065	4,442,739	347.1	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
97	276,789	4,442,289	381.2	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
98	276,034	4,442,154	380.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
99	276,489	4,442,477	379.4	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
100	280,316	4,446,937	360.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
101	280,472	4,445,042	351.6	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
105	275,340	4,446,427	400.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
106	275,561	4,446,153	400.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
107	274,088	4,445,876	388.2	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
108	275,300	4,445,175	395.3	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
109	275,088	4,444,675	390.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
110	272,661	4,447,412	358.7	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
112	275,073	4,442,766	370.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
113	275,193	4,442,396	367.4	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
114	279,563	4,439,098	342.9	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
115	276,812	4,445,897	387.5	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
116	276,801	4,446,428	390.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
117	277,119	4,447,042	390.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
118	275,271	4,441,707	366.2	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
119	275,266	4,442,026	367.1	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
122	268,302	4,438,216	348.7	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
123	268,534	4,437,137	342.9	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
125	267,824	4,438,274	350.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
126	280,855	4,447,117	350.4	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
127	280,863	4,445,374	350.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
128	282,108	4,440,994	335.2	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
129	280,479	4,446,456	360.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
130	282,325	4,442,257	340.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
131	277,665	4,441,538	390.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
132	278,636	4,438,180	350.0	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0
133	272,570	4,446,003	355.5	GE WIND ENERGY ...	Yes	GE WIND ENERGY	GE 2.5-103-2,500	2,500	103.0	98.3	5.0

Shadow receptor-Input

No.	UTM NAD83 Zone: 17 East	North	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
			[m]	[m]	[m]	[m]	[°]	[°]	
410	274,603	4,442,172	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
411	274,606	4,442,229	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
573	274,681	4,444,963	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
575	274,731	4,444,518	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
581	275,654	4,445,023	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
658	275,621	4,445,255	391.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
662	274,637	4,445,617	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
732	277,485	4,446,339	382.6	1.0	1.0	1.0	0.0	90.0	"Green house mode"
736	277,422	4,446,104	381.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
739	277,597	4,446,632	382.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
741	278,455	4,446,519	380.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
742	278,554	4,446,158	379.3	1.0	1.0	1.0	0.0	90.0	"Green house mode"
743	278,559	4,446,129	379.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
747	279,797	4,446,294	367.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

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UTM NAD83 Zone: 17

No.	East	North	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode
750	279,800	4,446,215	367.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
799	277,669	4,447,012	389.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
812	279,892	4,447,076	361.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3380	275,601	4,445,395	394.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3417	272,870	4,446,213	370.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3426	279,786	4,446,250	368.4	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3429	280,369	4,446,608	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
3431	279,798	4,446,799	361.9	1.0	1.0	1.0	0.0	90.0	"Green house mode"
7825	275,516	4,445,853	400.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8224	274,559	4,441,798	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8226	274,502	4,441,762	360.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8343	279,807	4,447,339	365.8	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8351	274,616	4,445,718	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8352	274,625	4,445,716	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8353	274,644	4,445,726	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8354	274,638	4,445,718	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8355	274,600	4,445,730	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
8356	274,605	4,445,721	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10055	274,845	4,445,400	394.7	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10056	274,798	4,445,323	392.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10168	281,070	4,445,633	348.2	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10206	277,674	4,446,991	388.1	1.0	1.0	1.0	0.0	90.0	"Green house mode"
10280	274,629	4,445,707	390.0	1.0	1.0	1.0	0.0	90.0	"Green house mode"

Calculation Results

Shadow receptor

	Shadow, worst case			**Shadow, expected values**
No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
410	65:39	122	0:41	24:55
411	108:57	223	0:41	36:53
573	175:50	292	0:55	56:41
575	80:40	136	0:58	30:47
581	138:16	226	1:02	47:21
658	134:33	157	1:40	47:36
662	183:26	233	1:37	63:47
732	141:12	244	1:02	42:42
736	103:39	178	1:05	36:59
739	122:50	178	1:02	47:27
741	183:25	206	1:24	63:59
742	173:21	216	1:09	53:06
743	168:56	213	1:22	52:42
747	58:41	122	0:39	18:36
750	84:55	162	0:52	30:36
799	160:24	261	0:59	47:47
812	0:00	0	0:00	0:00
3380	258:24	299	1:33	84:32
3417	130:54	157	1:07	38:48
3426	60:35	131	0:39	20:55

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

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	Shadow, worst case			Shadow, expected values
No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
3429	275:32	171	1:56	72:10
3431	100:55	195	0:47	36:37
7825	142:23	225	0:58	45:15
8224	59:58	138	0:34	22:50
8226	99:54	210	0:39	33:50
8343	106:12	221	0:40	33:59
8351	184:14	265	1:32	64:24
8352	184:19	262	1:35	64:28
8353	178:22	261	1:37	62:32
8354	182:00	260	1:36	63:42
8355	179:31	268	1:28	62:43
8356	185:11	267	1:30	64:47
10055	165:27	215	1:15	59:16
10056	106:09	189	1:09	36:10
10168	128:05	159	1:15	38:22
10206	157:37	178	1:22	43:58
10280	191:26	260	1:35	67:03

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
1	NORDEX N100 2500 99.8 !O! hub: 100.0 m (170)	0:00	0:00
2	NORDEX N100 2500 99.8 !O! hub: 100.0 m (171)	0:00	0:00
3	NORDEX N100 2500 99.8 !O! hub: 100.0 m (172)	0:00	0:00
4	NORDEX N100 2500 99.8 !O! hub: 100.0 m (173)	0:00	0:00
5	NORDEX N100 2500 99.8 !O! hub: 100.0 m (174)	0:00	0:00
6	NORDEX N100 2500 99.8 !O! hub: 100.0 m (175)	0:00	0:00
7	NORDEX N100 2500 99.8 !O! hub: 100.0 m (176)	0:00	0:00
8	NORDEX N100 2500 99.8 !O! hub: 100.0 m (177)	0:00	0:00
9	NORDEX N100 2500 99.8 !O! hub: 100.0 m (178)	0:00	0:00
10	NORDEX N100 2500 99.8 !O! hub: 100.0 m (179)	0:00	0:00
11	NORDEX N100 2500 99.8 !O! hub: 100.0 m (180)	0:00	0:00
12	NORDEX N100 2500 99.8 !O! hub: 100.0 m (181)	0:00	0:00
13	NORDEX N100 2500 99.8 !O! hub: 100.0 m (182)	0:00	0:00
14	NORDEX N100 2500 99.8 !O! hub: 100.0 m (183)	0:00	0:00
15	NORDEX N100 2500 99.8 !O! hub: 100.0 m (184)	36:13	14:42
16	NORDEX N100 2500 99.8 !O! hub: 100.0 m (185)	14:11	5:03
17	NORDEX N100 2500 99.8 !O! hub: 100.0 m (186)	0:00	0:00
18	NORDEX N100 2500 99.8 !O! hub: 100.0 m (187)	82:27	31:09
20	NORDEX N100 2500 99.8 !O! hub: 100.0 m (188)	160:43	52:20
21	NORDEX N100 2500 99.8 !O! hub: 100.0 m (189)	112:25	36:55
22	NORDEX N100 2500 99.8 !O! hub: 100.0 m (190)	83:48	26:10
23	NORDEX N100 2500 99.8 !O! hub: 100.0 m (191)	136:09	38:00
25	NORDEX N100 2500 99.8 !O! hub: 100.0 m (192)	13:37	3:37
27	NORDEX N100 2500 99.8 !O! hub: 100.0 m (193)	0:00	0:00
28	NORDEX N100 2500 99.8 !O! hub: 100.0 m (194)	86:11	28:47
31	NORDEX N100 2500 99.8 !O! hub: 100.0 m (195)	0:00	0:00
32	NORDEX N100 2500 99.8 !O! hub: 100.0 m (196)	75:00	25:02
33	NORDEX N100 2500 99.8 !O! hub: 100.0 m (197)	75:14	25:33
35	NORDEX N100 2500 99.8 !O! hub: 100.0 m (198)	0:00	0:00

To be continued on next page...

Project:
11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

...continued from previous page

No.	Name	Worst case [h/year]	Expected [h/year]
36	NORDEX N100 2500 99.8 !O! hub: 100.0 m (199)	0:00	0:00
37	NORDEX N100 2500 99.8 !O! hub: 100.0 m (200)	0:00	0:00
39	NORDEX N100 2500 99.8 !O! hub: 100.0 m (201)	77:21	25:53
40	NORDEX N100 2500 99.8 !O! hub: 100.0 m (202)	0:00	0:00
41	NORDEX N100 2500 99.8 !O! hub: 100.0 m (203)	0:00	0:00
42	NORDEX N100 2500 99.8 !O! hub: 100.0 m (204)	0:00	0:00
43	NORDEX N100 2500 99.8 !O! hub: 100.0 m (205)	0:00	0:00
44	NORDEX N100 2500 99.8 !O! hub: 100.0 m (206)	33:18	10:41
45	NORDEX N100 2500 99.8 !O! hub: 100.0 m (207)	0:00	0:00
47	NORDEX N100 2500 99.8 !O! hub: 100.0 m (208)	0:00	0:00
49	NORDEX N100 2500 99.8 !O! hub: 100.0 m (209)	46:32	13:15
51	NORDEX N100 2500 99.8 !O! hub: 100.0 m (210)	0:00	0:00
52	NORDEX N100 2500 99.8 !O! hub: 100.0 m (211)	0:00	0:00
53	NORDEX N100 2500 99.8 !O! hub: 100.0 m (212)	0:00	0:00
54	NORDEX N100 2500 99.8 !O! hub: 100.0 m (213)	0:00	0:00
55	NORDEX N100 2500 99.8 !O! hub: 100.0 m (214)	0:00	0:00
56	NORDEX N100 2500 99.8 !O! hub: 100.0 m (215)	0:00	0:00
59	NORDEX N100 2500 99.8 !O! hub: 100.0 m (216)	0:00	0:00
64	NORDEX N100 2500 99.8 !O! hub: 100.0 m (217)	0:00	0:00
65	NORDEX N100 2500 99.8 !O! hub: 100.0 m (218)	0:00	0:00
67	NORDEX N100 2500 99.8 !O! hub: 100.0 m (219)	0:00	0:00
69	NORDEX N100 2500 99.8 !O! hub: 100.0 m (220)	0:00	0:00
70	NORDEX N100 2500 99.8 !O! hub: 100.0 m (221)	0:00	0:00
71	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (114)	0:00	0:00
72	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (115)	258:40	86:36
73	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (116)	0:00	0:00
74	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (117)	34:48	12:51
75	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (118)	0:00	0:00
76	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (119)	0:00	0:00
77	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (120)	24:40	8:57
78	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (121)	0:00	0:00
79	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (122)	0:00	0:00
80	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (123)	0:00	0:00
81	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (124)	36:19	13:14
82	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (125)	187:35	69:45
83	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (126)	301:23	109:26
84	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (127)	0:00	0:00
85	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (128)	0:00	0:00
86	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (129)	0:00	0:00
87	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (130)	14:29	5:56
88	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (131)	0:00	0:00
89	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (132)	0:00	0:00
90	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (133)	0:00	0:00
91	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (134)	0:00	0:00
92	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (135)	0:00	0:00
93	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (136)	0:00	0:00
94	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (137)	0:00	0:00
95	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (138)	0:00	0:00
96	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (139)	0:00	0:00
97	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (140)	0:00	0:00
98	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (141)	0:00	0:00
99	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (142)	0:00	0:00
100	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (143)	118:01	39:35

To be continued on next page...

Project:
11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

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SHADOW - Main Result

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

...continued from previous page

No.	Name	Worst case [h/year]	Expected [h/year]
101	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (144)	0:00	0:00
105	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (145)	0:00	0:00
106	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (146)	24:42	9:51
107	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (147)	104:53	39:59
108	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (148)	429:23	138:29
109	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (149)	134:26	39:10
110	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (150)	0:00	0:00
112	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (151)	0:00	0:00
113	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (152)	76:07	30:26
114	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (153)	0:00	0:00
115	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (154)	60:21	17:31
116	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (155)	85:02	28:13
117	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (156)	41:09	14:55
118	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (157)	58:05	17:14
119	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (158)	81:30	30:00
122	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (159)	0:00	0:00
123	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (160)	0:00	0:00
125	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (161)	0:00	0:00
126	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (165)	6:41	2:07
127	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (162)	99:48	27:44
128	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (163)	0:00	0:00
129	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (164)	366:09	105:34
130	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (166)	0:00	0:00
131	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (167)	0:00	0:00
132	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (168)	0:00	0:00
133	GE WIND ENERGY GE 2.5-103 2500 103.0 !O! hub: 98.3 m (169)	116:25	32:53

Project:
11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

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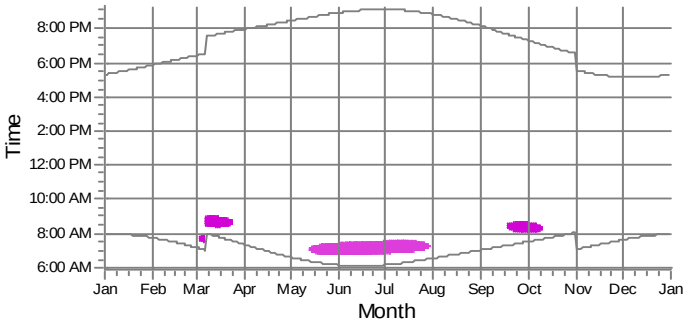
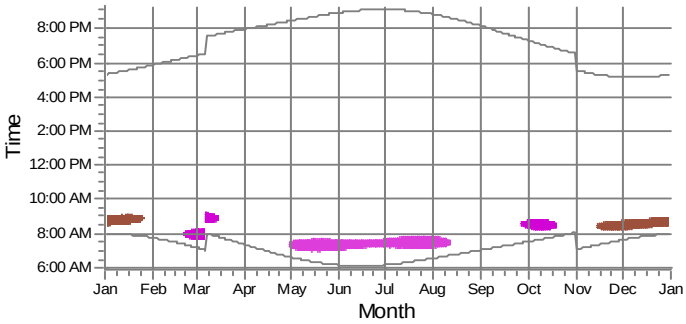
SHADOW - Calendar, graphical

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

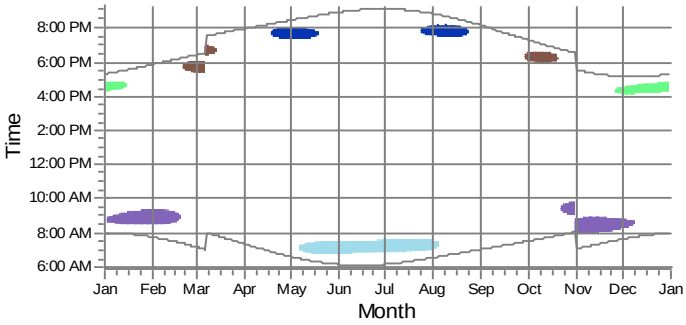
410: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6306)



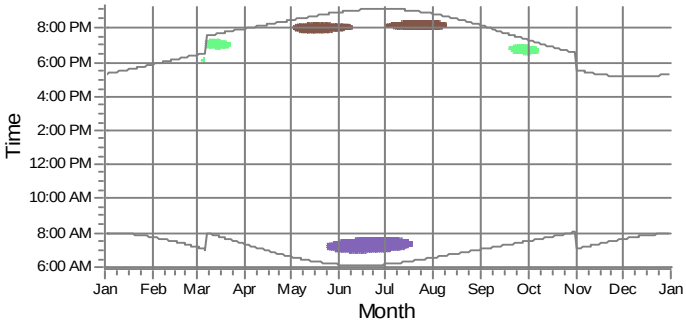
411: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6307)



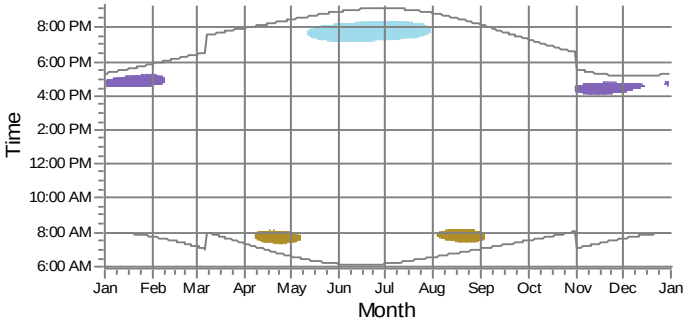
573: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6308)



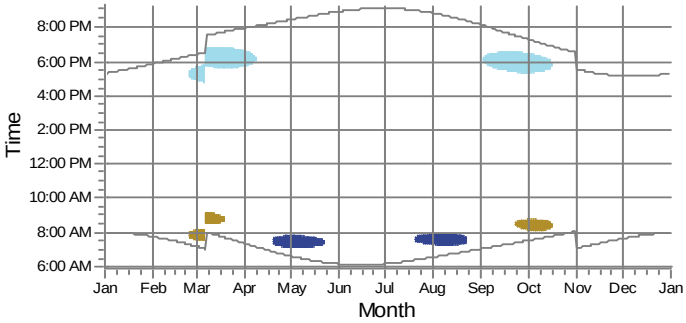
575: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6309)



581: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6310)



658: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6311)



WTGs

108: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (148)
109: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (149)
113: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (152)
118: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (157)
119: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (158)
28: NORDEX N100 2500 99.8 IOI hub: 100.0 m (194)
32: NORDEX N100 2500 99.8 IOI hub: 100.0 m (196)
33: NORDEX N100 2500 99.8 IOI hub: 100.0 m (197)
39: NORDEX N100 2500 99.8 IOI hub: 100.0 m (201)
44: NORDEX N100 2500 99.8 IOI hub: 100.0 m (206)

Project:
11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

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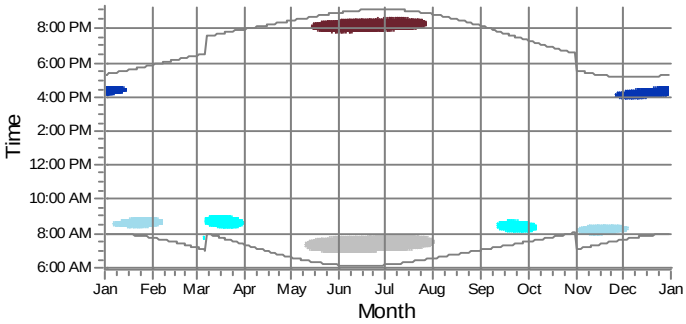
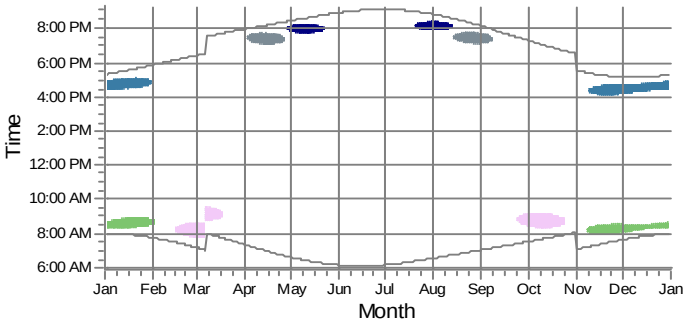
SHADOW - Calendar, graphical

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

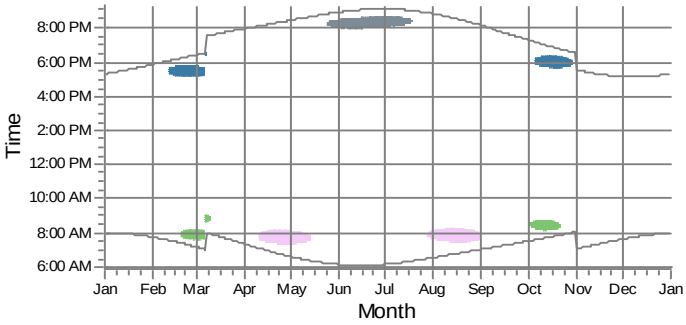
662: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6312)



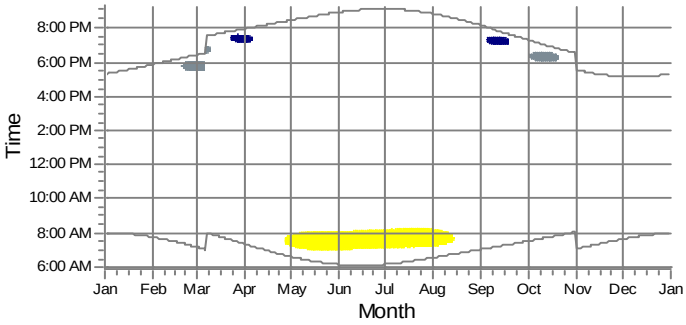
732: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6313)



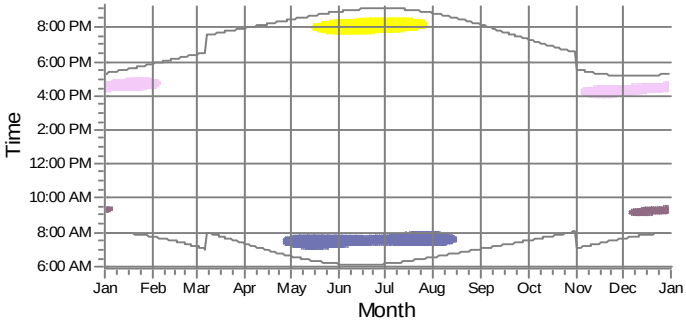
736: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6314)



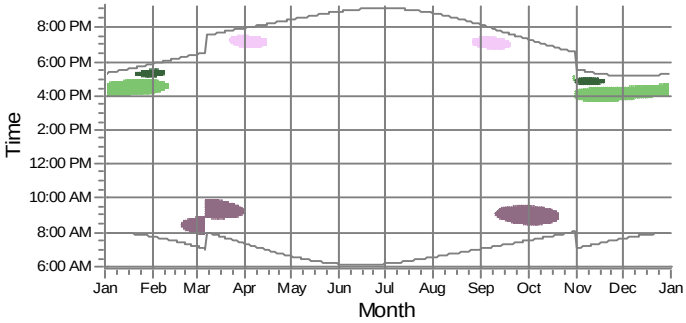
739: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6315)



741: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6316)



742: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6317)



WTGs

72: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (115)
77: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (120)
82: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (125)
83: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (126)
107: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (147)
108: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (148)
115: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (154)
116: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (155)
18: NORDEX N100 2500 99.8 IOI hub: 100.0 m (187)
20: NORDEX N100 2500 99.8 IOI hub: 100.0 m (188)
21: NORDEX N100 2500 99.8 IOI hub: 100.0 m (189)
23: NORDEX N100 2500 99.8 IOI hub: 100.0 m (191)
25: NORDEX N100 2500 99.8 IOI hub: 100.0 m (192)
32: NORDEX N100 2500 99.8 IOI hub: 100.0 m (196)

Project:
11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

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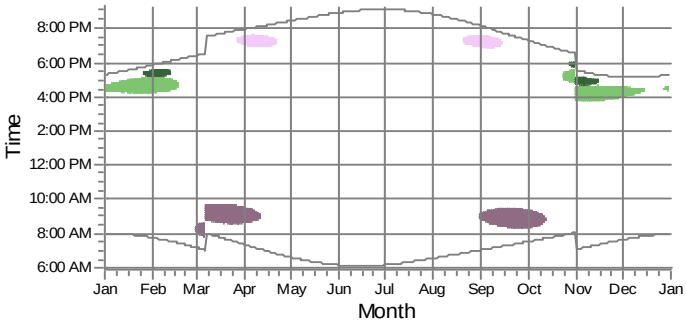
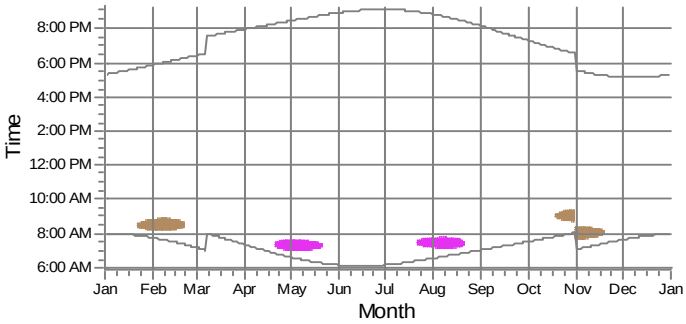
SHADOW - Calendar, graphical

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

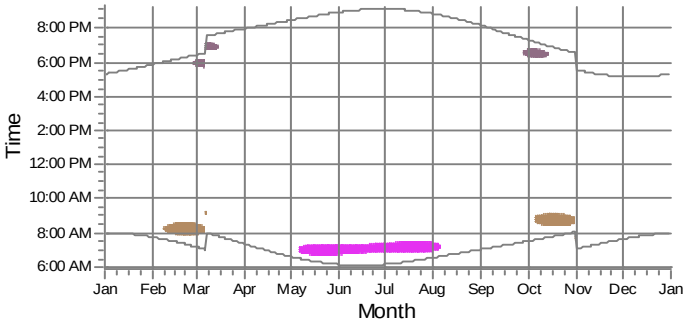
743: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6318)



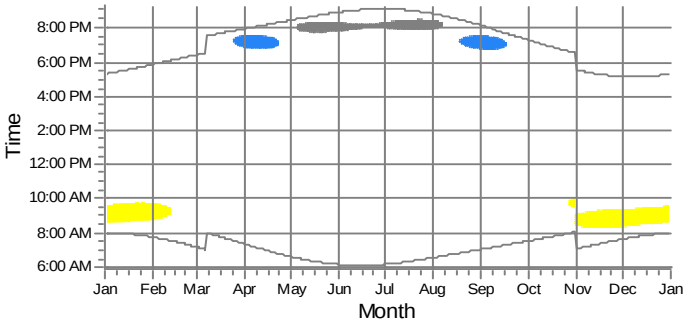
747: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6319)



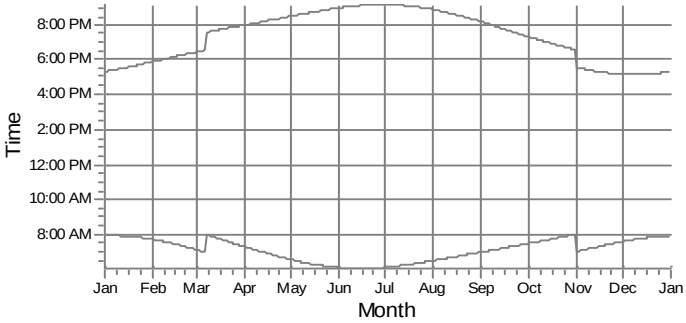
750: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6320)



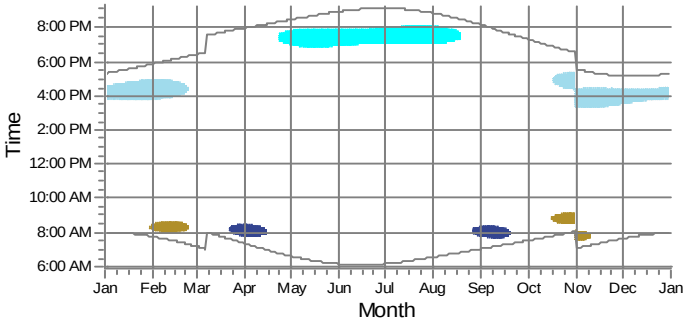
799: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6321)



812: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6322)



3380: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6323)



WTGs

72: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (115)
74: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (117)
83: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (126)
108: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (148)
117: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (156)
129: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (164)
20: NORDEX N100 2500 99.8 IOI hub: 100.0 m (188)
21: NORDEX N100 2500 99.8 IOI hub: 100.0 m (189)
22: NORDEX N100 2500 99.8 IOI hub: 100.0 m (190)
23: NORDEX N100 2500 99.8 IOI hub: 100.0 m (191)
25: NORDEX N100 2500 99.8 IOI hub: 100.0 m (192)
28: NORDEX N100 2500 99.8 IOI hub: 100.0 m (194)
33: NORDEX N100 2500 99.8 IOI hub: 100.0 m (197)

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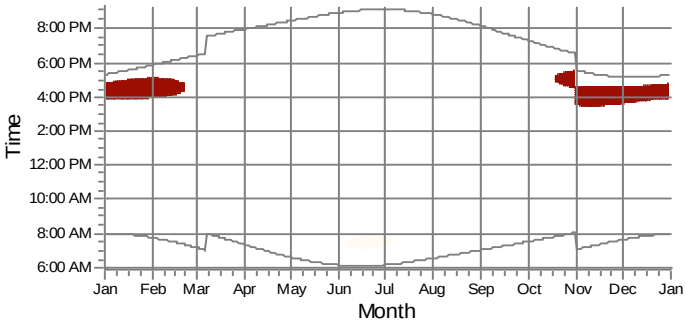
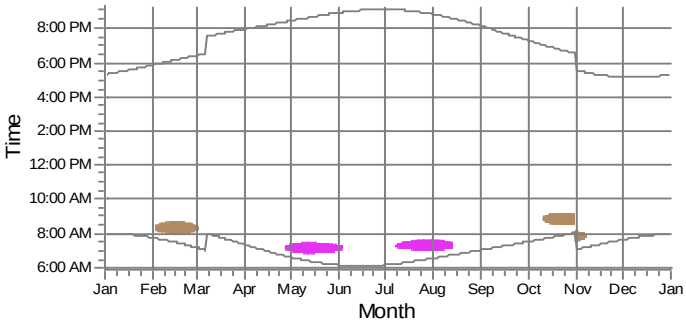
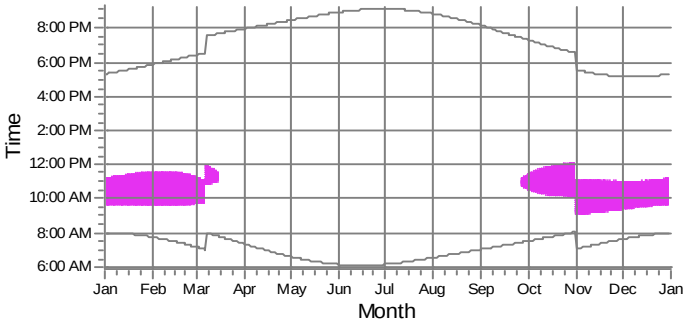
3417: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6324)



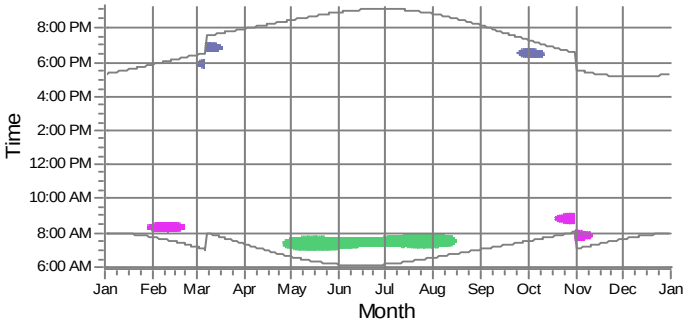
3426: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6325)



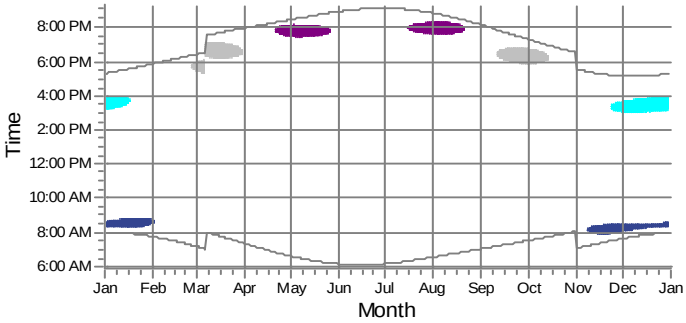
3429: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6326)



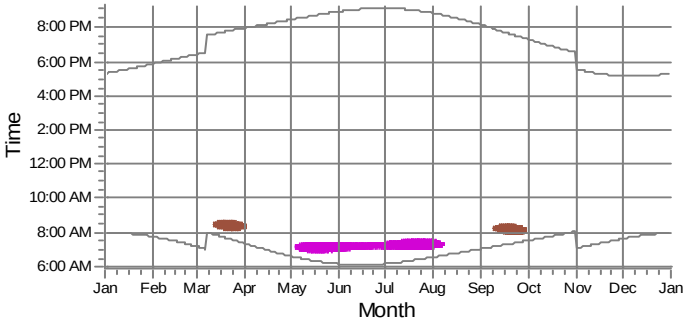
3431: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6327)



7825: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6328)



8224: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6329)



WTGs

81: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (124)
82: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (125)
83: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (126)
87: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (130)
100: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (143)
118: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (157)
119: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (158)
129: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (164)
133: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (169)
18: NORDEX N100 2500 99.8 IOI hub: 100.0 m (187)
22: NORDEX N100 2500 99.8 IOI hub: 100.0 m (190)
28: NORDEX N100 2500 99.8 IOI hub: 100.0 m (194)

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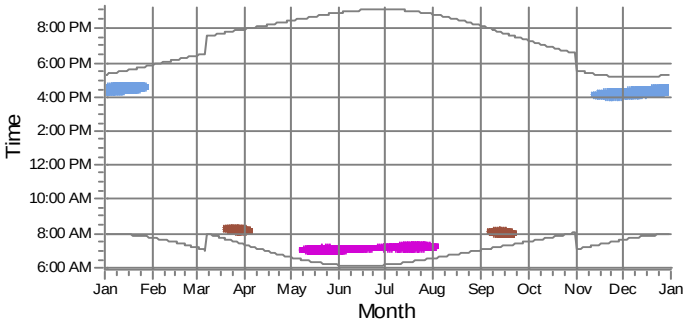
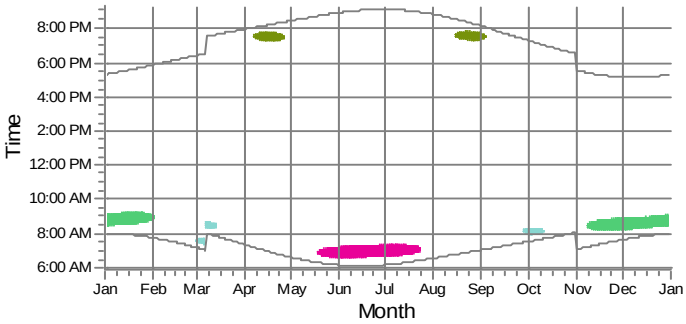
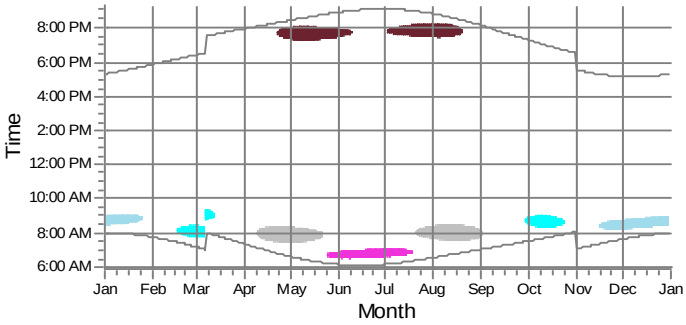
8226: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6330)



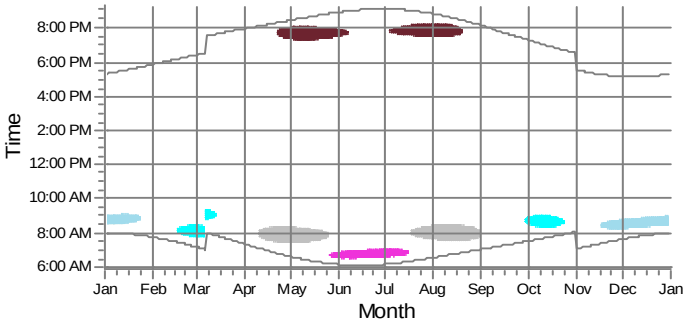
8343: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6331)



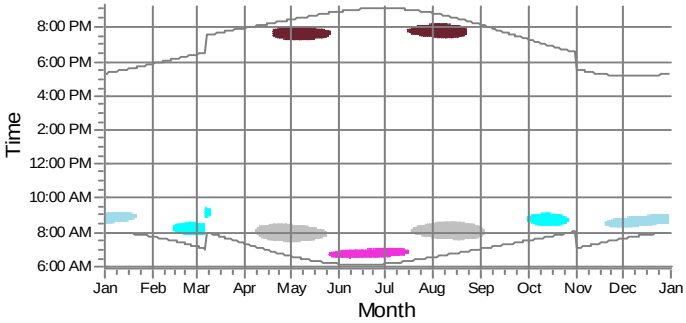
8351: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6332)



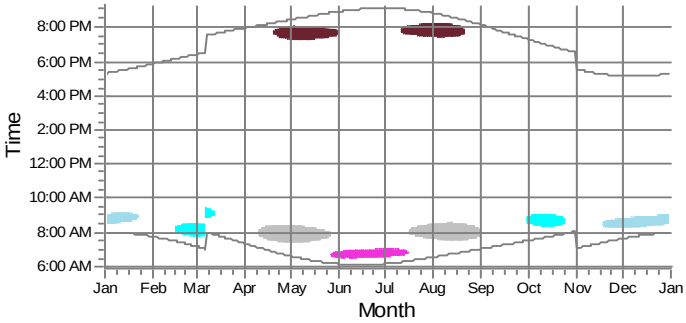
8352: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6333)



8353: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6334)



8354: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6335)



WTGs

82: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (125)
83: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (126)
100: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (143)
106: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (146)
107: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (147)
108: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (148)
118: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (157)
119: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (158)
126: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (165)
15: NORDEX N100 2500 99.8 IOI hub: 100.0 m (184)
16: NORDEX N100 2500 99.8 IOI hub: 100.0 m (185)
49: NORDEX N100 2500 99.8 IOI hub: 100.0 m (209)

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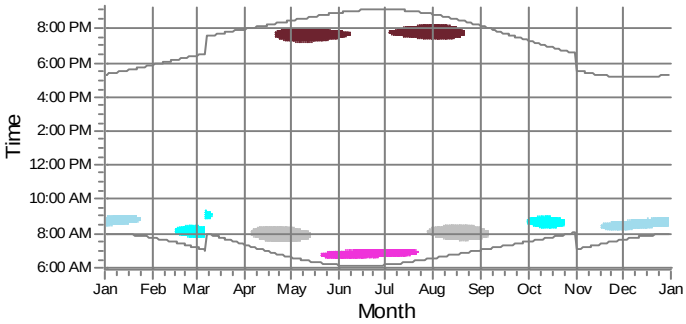
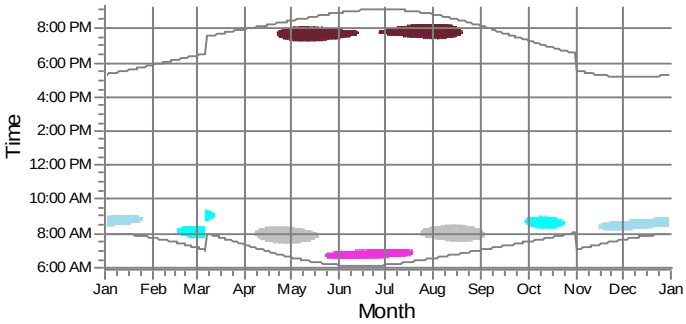
Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

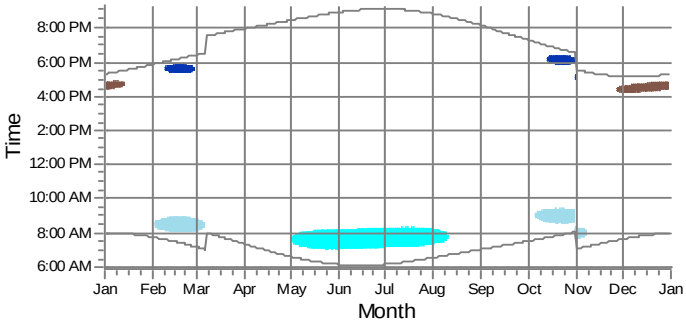
8355: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6336)



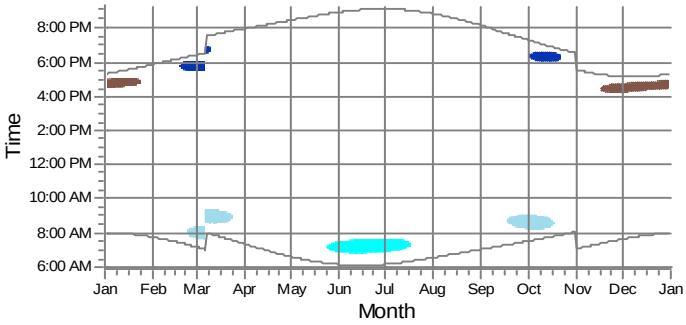
8356: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6337)



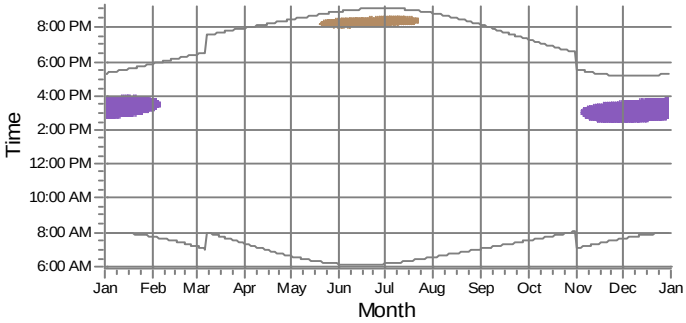
10055: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6338)



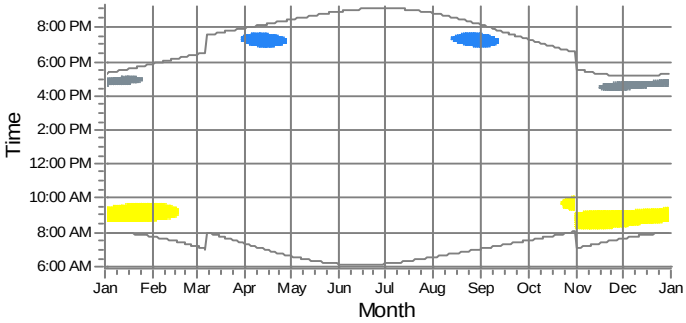
10056: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6339)



10168: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6340)



10206: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6341)



WTGs

72: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (115)
82: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (125)
83: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (126)
106: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (146)
107: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (147)
108: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (148)
116: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (155)
117: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (156)
127: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (162)
22: NORDEX N100 2500 99.8 IOI hub: 100.0 m (190)
32: NORDEX N100 2500 99.8 IOI hub: 100.0 m (196)
39: NORDEX N100 2500 99.8 IOI hub: 100.0 m (201)

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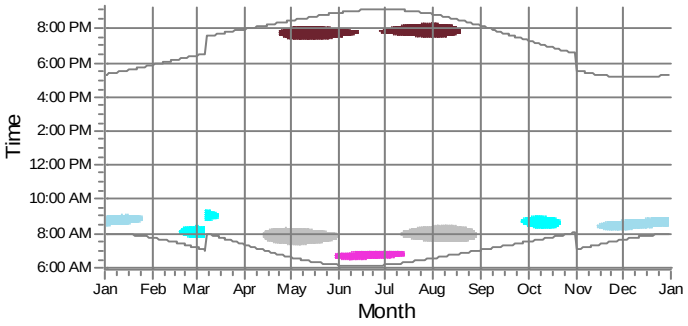
10280: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6342)



WTGs

82: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (125)
83: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (126)
106: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (146)
107: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (147)
108: GE WIND ENERGY GE 2.5-103 2500 103.0 IOI hub: 98.3 m (148)

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SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative**Shadow receptor:** 410 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6306)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January	February	March			April	May			June		
1	07:57	07:45	07:10			07:20	06:36			06:08		06:42 (113)
	17:20	17:53	18:26			19:59	20:28			20:57	39	07:21 (113)
2	07:57	07:44	07:08			07:19	06:35			06:08		06:42 (113)
	17:21	17:55	18:27			20:00	20:29			20:58	40	07:22 (113)
3	07:58	07:43	07:07			07:17	06:33			06:08		06:43 (113)
	17:22	17:56	18:28			20:00	20:30			20:58	39	07:22 (113)
4	07:58	07:42	07:05		07:33 (119)	07:15	06:32			06:07		06:42 (113)
	17:22	17:57	18:29	14	07:47 (119)	20:01	20:31			20:59	40	07:22 (113)
5	07:58	07:41	07:04		07:31 (119)	07:14	06:31			06:07		06:42 (113)
	17:23	17:58	18:31	20	07:51 (119)	20:02	20:32			21:00	40	07:22 (113)
6	07:58	07:40	07:02		07:28 (119)	07:12	06:30			06:07		06:43 (113)
	17:24	17:59	18:32	24	07:52 (119)	20:03	20:33			21:00	40	07:23 (113)
7	07:58	07:39	07:01		07:27 (119)	07:11	06:29			06:06		06:43 (113)
	17:25	18:01	18:33	27	07:54 (119)	20:04	20:34			21:01	40	07:23 (113)
8	07:57	07:37	07:59		08:25 (119)	07:09	06:28			06:06		06:43 (113)
	17:26	18:02	19:34	29	08:54 (119)	20:05	20:35			21:02	41	07:24 (113)
9	07:57	07:36	07:57		08:24 (119)	07:08	06:26			06:06		06:43 (113)
	17:27	18:03	19:35	31	08:55 (119)	20:06	20:36			21:02	40	07:23 (113)
10	07:57	07:35	07:56		08:23 (119)	07:06	06:25			06:06		06:43 (113)
	17:28	18:04	19:36	33	08:56 (119)	20:07	20:37			21:03	40	07:23 (113)
11	07:57	07:34	07:54		08:22 (119)	07:04	06:24			06:06		06:43 (113)
	17:29	18:05	19:37	33	08:55 (119)	20:08	20:38			21:03	41	07:24 (113)
12	07:57	07:33	07:53		08:22 (119)	07:03	06:23			06:05		06:43 (113)
	17:30	18:07	19:38	34	08:56 (119)	20:09	20:39			21:04	41	07:24 (113)
13	07:56	07:32	07:51		08:21 (119)	07:01	06:22			06:05		06:44 (113)
	17:31	18:08	19:39	35	08:56 (119)	20:10	20:40			21:04	40	07:24 (113)
14	07:56	07:30	07:49		08:20 (119)	07:00	06:21		06:56 (113)	06:05		06:44 (113)
	17:32	18:09	19:40	35	08:55 (119)	20:11	20:41	8	07:04 (113)	21:05	40	07:24 (113)
15	07:56	07:29	07:48		08:21 (119)	06:58	06:20		06:53 (113)	06:05		06:44 (113)
	17:33	18:10	19:41	34	08:55 (119)	20:12	20:42	15	07:08 (113)	21:05	40	07:24 (113)
16	07:55	07:28	07:46		08:20 (119)	06:57	06:19		06:51 (113)	06:05		06:44 (113)
	17:35	18:11	19:42	34	08:54 (119)	20:13	20:43	20	07:11 (113)	21:06	41	07:25 (113)
17	07:55	07:27	07:45		08:20 (119)	06:55	06:18		06:50 (113)	06:05		06:44 (113)
	17:36	18:12	19:43	33	08:53 (119)	20:14	20:44	22	07:12 (113)	21:06	41	07:25 (113)
18	07:54	07:25	07:43		08:21 (119)	06:54	06:18		06:48 (113)	06:05		06:44 (113)
	17:37	18:14	19:44	32	08:53 (119)	20:15	20:45	25	07:13 (113)	21:06	41	07:25 (113)
19	07:54	07:24	07:41		08:21 (119)	06:52	06:17		06:47 (113)	06:06		06:45 (113)
	17:38	18:15	19:45	31	08:52 (119)	20:16	20:46	27	07:14 (113)	21:07	40	07:25 (113)
20	07:53	07:23	07:40		08:22 (119)	06:51	06:16		06:46 (113)	06:06		06:46 (113)
	17:39	18:16	19:46	29	08:51 (119)	20:17	20:47	29	07:15 (113)	21:07	40	07:26 (113)
21	07:53	07:21	07:38		08:23 (119)	06:49	06:15		06:46 (113)	06:06		06:46 (113)
	17:40	18:17	19:48	26	08:49 (119)	20:18	20:48	30	07:16 (113)	21:07	40	07:26 (113)
22	07:52	07:20	07:37		08:23 (119)	06:48	06:14		06:45 (113)	06:06		06:46 (113)
	17:41	18:18	19:49	24	08:47 (119)	20:19	20:49	32	07:17 (113)	21:08	40	07:26 (113)
23	07:52	07:18	07:35		08:26 (119)	06:47	06:14		06:44 (113)	06:06		06:46 (113)
	17:43	18:19	19:50	20	08:46 (119)	20:20	20:50	33	07:17 (113)	21:08	40	07:26 (113)
24	07:51	07:17	07:33		08:27 (119)	06:45	06:13		06:44 (113)	06:07		06:47 (113)
	17:44	18:21	19:51	15	08:42 (119)	20:21	20:50	35	07:19 (113)	21:08	40	07:27 (113)
25	07:50	07:16	07:32		08:32 (119)	06:44	06:12		06:43 (113)	06:07		06:46 (113)
	17:45	18:22	19:52	5	08:37 (119)	20:22	20:51	36	07:19 (113)	21:08	41	07:27 (113)
26	07:50	07:14	07:30			06:42	06:12		06:43 (113)	06:07		06:46 (113)
	17:46	18:23	19:53			20:23	20:52	36	07:19 (113)	21:08	41	07:27 (113)
27	07:49	07:13	07:28			06:41	06:11		06:43 (113)	06:08		06:47 (113)
	17:47	18:24	19:54			20:24	20:53	37	07:20 (113)	21:08	40	07:27 (113)
28	07:48	07:11	07:27			06:40	06:10		06:42 (113)	06:08		06:47 (113)
	17:48	18:25	19:55			20:25	20:54	38	07:20 (113)	21:08	40	07:27 (113)
29	07:47		07:25			06:38	06:10		06:43 (113)	06:08		06:47 (113)
	17:50		19:56			20:26	20:55	38	07:21 (113)	21:08	40	07:27 (113)
30	07:46		07:24			06:37	06:09		06:42 (113)	06:09		06:48 (113)
	17:51		19:57			20:27	20:55	38	07:20 (113)	21:08	40	07:28 (113)
31	07:45		07:22				06:09		06:42 (113)			
	17:52		19:58				20:56	39	07:21 (113)			
Potential sun hours	300	299	370			397	446			449		
Total, worst case				598				538			1206	
Sun reduction				0.44				0.56			0.60	
Oper. time red.				1.00				1.00			1.00	
Wind dir. red.				0.63				0.68			0.68	
Total reduction				0.28				0.38			0.41	
Total, real				166				205			493	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 2

Licensed user:
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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 410 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6306)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August	September			October			November	December
1	06:09		06:47 (113)	06:32	07:02			07:31		08:01 (119)	07:04	07:37
	21:08	41	07:28 (113)	20:51	20:09			19:19	34	08:35 (119)	17:33	17:10
2	06:10		06:48 (113)	06:33	07:03			07:32		08:01 (119)	07:05	07:38
	21:08	40	07:28 (113)	20:50	20:08			19:17	33	08:34 (119)	17:32	17:10
3	06:10		06:48 (113)	06:34	07:04			07:33		08:01 (119)	07:06	07:39
	21:08	40	07:28 (113)	20:49	20:06			19:15	32	08:33 (119)	17:31	17:10
4	06:11		06:48 (113)	06:35	07:05			07:34		08:01 (119)	07:07	07:40
	21:08	41	07:29 (113)	20:48	20:05			19:14	31	08:32 (119)	17:30	17:10
5	06:11		06:48 (113)	06:36	07:06			07:35		08:02 (119)	07:08	07:41
	21:08	40	07:28 (113)	20:47	20:03			19:12	29	08:31 (119)	17:29	17:10
6	06:12		06:49 (113)	06:37	07:07			07:36		08:02 (119)	07:09	07:42
	21:08	40	07:29 (113)	20:45	20:01			19:11	28	08:30 (119)	17:28	17:09
7	06:13		06:49 (113)	06:38	07:08			07:37		08:03 (119)	07:10	07:43
	21:07	40	07:29 (113)	20:44	20:00			19:09	25	08:28 (119)	17:27	17:09
8	06:13		06:49 (113)	06:39	07:09			07:38		08:05 (119)	07:12	07:44
	21:07	40	07:29 (113)	20:43	19:57			19:07	21	08:26 (119)	17:26	17:09
9	06:14		06:50 (113)	06:40	07:10			07:39		08:07 (119)	07:13	07:45
	21:07	39	07:29 (113)	20:42	19:55			19:06	17	08:24 (119)	17:25	17:09
10	06:14		06:49 (113)	06:41	07:11			07:40		08:10 (119)	07:14	07:46
	21:06	40	07:29 (113)	20:41	19:53			19:04	10	08:20 (119)	17:24	17:09
11	06:15		06:50 (113)	06:42	07:11			07:41			07:15	07:47
	21:06	39	07:29 (113)	20:39	19:52			19:03			17:23	17:10
12	06:16		06:51 (113)	06:43	07:12			07:42			07:16	07:47
	21:06	39	07:30 (113)	20:38	19:50			19:01			17:22	17:10
13	06:17		06:50 (113)	06:44	07:13			07:43			07:17	07:48
	21:05	39	07:29 (113)	20:37	19:48			19:00			17:21	17:10
14	06:17		06:51 (113)	06:45	07:14			07:44			07:19	07:49
	21:05	38	07:29 (113)	20:36	19:47			18:58			17:20	17:10
15	06:18		06:52 (113)	06:46	07:15			07:45			07:20	07:50
	21:04	37	07:29 (113)	20:34	19:45			18:57			17:19	17:10
16	06:19		06:52 (113)	06:47	07:16			07:46			07:21	07:50
	21:04	37	07:29 (113)	20:33	19:43			18:55			17:18	17:11
17	06:20		06:52 (113)	06:48	07:17			07:47			07:22	07:51
	21:03	36	07:28 (113)	20:32	19:42			18:54			17:18	17:11
18	06:20		06:53 (113)	06:49	07:18			07:48			07:23	07:52
	21:02	35	07:28 (113)	20:30	19:40			18:52			17:17	17:11
19	06:21		06:53 (113)	06:50	07:19		08:15 (119)	07:49			07:24	07:52
	21:02	35	07:28 (113)	20:29	19:38	14	08:29 (119)	18:51			17:16	17:12
20	06:22		06:54 (113)	06:51	07:20		08:12 (119)	07:50			07:25	07:53
	21:01	34	07:28 (113)	20:27	19:37	19	08:31 (119)	18:49			17:15	17:12
21	06:23		06:55 (113)	06:52	07:21		08:10 (119)	07:51			07:27	07:53
	21:00	33	07:28 (113)	20:26	19:35	23	08:33 (119)	18:48			17:15	17:12
22	06:24		06:55 (113)	06:52	07:22		08:07 (119)	07:52			07:28	07:54
	21:00	31	07:26 (113)	20:25	19:33	26	08:33 (119)	18:46			17:14	17:13
23	06:24		06:56 (113)	06:53	07:23		08:06 (119)	07:53			07:29	07:54
	20:59	30	07:26 (113)	20:23	19:32	28	08:34 (119)	18:45			17:14	17:13
24	06:25		06:57 (113)	06:54	07:24		08:05 (119)	07:55			07:30	07:55
	20:58	28	07:25 (113)	20:22	19:30	30	08:35 (119)	18:44			17:13	17:14
25	06:26		06:58 (113)	06:55	07:25		08:04 (119)	07:56			07:31	07:55
	20:57	26	07:24 (113)	20:20	19:28	31	08:35 (119)	18:42			17:13	17:15
26	06:27		06:59 (113)	06:56	07:26		08:03 (119)	07:57			07:32	07:56
	20:56	24	07:23 (113)	20:19	19:27	33	08:36 (119)	18:41			17:12	17:15
27	06:28		07:01 (113)	06:57	07:27		08:02 (119)	07:58			07:33	07:56
	20:56	21	07:22 (113)	20:17	19:25	34	08:36 (119)	18:40			17:12	17:16
28	06:29		07:02 (113)	06:58	07:28		08:01 (119)	07:59			07:34	07:56
	20:55	17	07:19 (113)	20:16	19:23	35	08:36 (119)	18:38			17:11	17:17
29	06:30		07:04 (113)	06:59	07:29		08:01 (119)	08:00			07:35	07:57
	20:54	13	07:17 (113)	20:14	19:22	35	08:36 (119)	18:37			17:11	17:17
30	06:31		07:10 (113)	07:00	07:30		08:01 (119)	08:01			07:36	07:57
	20:53	2	07:12 (113)	20:13	19:20	34	08:35 (119)	18:36			17:11	17:18
31	06:32			07:01				08:02				07:57
	20:52			20:11				18:35				17:19
Potential sun hours	456			426	374			346			300	291
Total, worst case		995				342			260			
Sun reduction		0.60				0.61			0.56			
Oper. time red.		1.00				1.00			1.00			
Wind dir. red.		0.68				0.63			0.63			
Total reduction		0.41				0.39			0.35			
Total, real		407				132			92			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 3

Licensed user:
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Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 411 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6307)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April	May			June		
1	07:57		08:25 (118)	07:45			07:10		07:37 (119)	07:20	06:36		07:09 (113)	06:08		06:58 (113)
	17:20	29	08:54 (118)	17:53			18:26	32	08:09 (119)	19:59	20:28	14	07:23 (113)	20:57	35	07:33 (113)
2	07:57		08:25 (118)	07:44			07:08		07:36 (119)	07:19	06:35		07:06 (113)	06:08		06:59 (113)
	17:21	29	08:54 (118)	17:55			18:27	33	08:09 (119)	20:00	20:29	19	07:25 (113)	20:58	34	07:33 (113)
3	07:58		08:25 (118)	07:43			07:07		07:36 (119)	07:17	06:33		07:04 (113)	06:07		07:00 (113)
	17:22	30	08:55 (118)	17:56			18:28	34	08:10 (119)	20:00	20:30	24	07:28 (113)	20:58	33	07:33 (113)
4	07:58		08:26 (118)	07:42			07:05		07:35 (119)	07:15	06:32		07:03 (113)	06:07		07:00 (113)
	17:22	29	08:55 (118)	17:57			18:29	34	08:09 (119)	20:01	20:31	26	07:29 (113)	20:59	32	07:32 (113)
5	07:58		08:26 (118)	07:41			07:04		07:36 (119)	07:14	06:31		07:01 (113)	06:07		07:00 (113)
	17:23	30	08:56 (118)	17:58			18:31	34	08:10 (119)	20:02	20:32	29	07:30 (113)	21:00	32	07:32 (113)
6	07:58		08:27 (118)	07:40			07:02		07:35 (119)	07:12	06:30		06:59 (113)	06:07		07:01 (113)
	17:24	29	08:56 (118)	17:59			18:32	34	08:09 (119)	20:03	20:33	32	07:31 (113)	21:00	31	07:32 (113)
7	07:58		08:27 (118)	07:39			07:01		07:36 (119)	07:11	06:29		06:58 (113)	06:06		07:02 (113)
	17:25	30	08:57 (118)	18:01			18:33	33	08:09 (119)	20:04	20:34	34	07:32 (113)	21:01	30	07:32 (113)
8	07:57		08:28 (118)	07:37			07:59		08:35 (119)	07:09	06:28		06:58 (113)	06:06		07:03 (113)
	17:26	30	08:58 (118)	18:02			19:34	33	09:08 (119)	20:05	20:35	34	07:32 (113)	21:02	29	07:32 (113)
9	07:57		08:28 (118)	07:36			07:57		08:35 (119)	07:08	06:26		06:57 (113)	06:06		07:02 (113)
	17:27	30	08:58 (118)	18:03			19:35	32	09:07 (119)	20:06	20:36	36	07:33 (113)	21:02	29	07:31 (113)
10	07:57		08:28 (118)	07:35			07:56		08:36 (119)	07:06	06:25		06:56 (113)	06:06		07:03 (113)
	17:28	30	08:58 (118)	18:04			19:36	30	09:06 (119)	20:07	20:37	37	07:33 (113)	21:03	28	07:31 (113)
11	07:57		08:28 (118)	07:34			07:54		08:36 (119)	07:04	06:24		06:56 (113)	06:06		07:04 (113)
	17:29	31	08:59 (118)	18:05			19:37	29	09:05 (119)	20:08	20:38	38	07:34 (113)	21:03	27	07:31 (113)
12	07:57		08:29 (118)	07:33			07:53		08:38 (119)	07:03	06:23		06:55 (113)	06:05		07:04 (113)
	17:30	30	08:59 (118)	18:07			19:38	26	09:04 (119)	20:09	20:39	39	07:34 (113)	21:04	27	07:31 (113)
13	07:56		08:30 (118)	07:32			07:51		08:39 (119)	07:01	06:22		06:55 (113)	06:05		07:05 (113)
	17:31	30	09:00 (118)	18:08			19:39	23	09:02 (119)	20:10	20:40	39	07:34 (113)	21:04	26	07:31 (113)
14	07:56		08:30 (118)	07:30			07:49		08:40 (119)	07:00	06:21		06:55 (113)	06:05		07:05 (113)
	17:32	29	08:59 (118)	18:09			19:40	19	08:59 (119)	20:11	20:41	39	07:34 (113)	21:05	26	07:31 (113)
15	07:56		08:31 (118)	07:29			07:48		08:43 (119)	06:58	06:20		06:54 (113)	06:05		07:06 (113)
	17:33	29	09:00 (118)	18:10			19:41	13	08:56 (119)	20:12	20:42	41	07:35 (113)	21:05	25	07:31 (113)
16	07:55		08:31 (118)	07:28			07:46			06:57	06:19		06:55 (113)	06:05		07:06 (113)
	17:35	29	09:00 (118)	18:11			19:42			20:13	20:43	41	07:36 (113)	21:06	25	07:31 (113)
17	07:55		08:32 (118)	07:27			07:45			06:55	06:18		06:55 (113)	06:05		07:06 (113)
	17:36	28	09:00 (118)	18:12			19:43			20:14	20:44	40	07:35 (113)	21:06	25	07:31 (113)
18	07:54		08:32 (118)	07:25			07:43			06:54	06:18		06:55 (113)	06:05		07:07 (113)
	17:37	28	09:00 (118)	18:14			19:44			20:15	20:45	40	07:35 (113)	21:06	24	07:31 (113)
19	07:54		08:34 (118)	07:24			07:41			06:52	06:17		06:54 (113)	06:06		07:07 (113)
	17:38	26	09:00 (118)	18:15			19:45			20:16	20:46	41	07:35 (113)	21:07	24	07:31 (113)
20	07:53		08:34 (118)	07:23			07:40			06:51	06:16		06:54 (113)	06:06		07:08 (113)
	17:39	25	08:59 (118)	18:16			19:46			20:17	20:47	41	07:35 (113)	21:07	24	07:32 (113)
21	07:53		08:35 (118)	07:21			07:38			06:49	06:15		06:55 (113)	06:06		07:08 (113)
	17:40	24	08:59 (118)	18:17			19:48			20:18	20:48	41	07:36 (113)	21:07	24	07:32 (113)
22	07:52		08:36 (118)	07:20		07:50 (119)	07:37			06:48	06:14		06:55 (113)	06:06		07:08 (113)
	17:41	23	08:59 (118)	18:18	8	07:58 (119)	19:49			20:19	20:49	40	07:35 (113)	21:08	24	07:32 (113)
23	07:52		08:37 (118)	07:18		07:46 (119)	07:35			06:47	06:14		06:55 (113)	06:06		07:08 (113)
	17:43	21	08:58 (118)	18:19	16	08:02 (119)	19:50			20:20	20:50	40	07:35 (113)	21:08	24	07:32 (113)
24	07:51		08:38 (118)	07:17		07:43 (119)	07:33			06:45	06:13		06:56 (113)	06:07		07:09 (113)
	17:44	19	08:57 (118)	18:21	21	08:04 (119)	19:51			20:21	20:50	39	07:35 (113)	21:08	24	07:33 (113)
25	07:50		08:41 (118)	07:16		07:42 (119)	07:32			06:44	06:12		06:56 (113)	06:07		07:08 (113)
	17:45	15	08:56 (118)	18:22	24	08:06 (119)	19:52			20:22	20:51	39	07:35 (113)	21:08	25	07:33 (113)
26	07:50		08:43 (118)	07:14		07:40 (119)	07:30			06:42	06:12		06:56 (113)	06:07		07:08 (113)
	17:46	11	08:54 (118)	18:23	27	08:07 (119)	19:53			20:23	20:52	38	07:34 (113)	21:08	25	07:33 (113)
27	07:49		08:47 (118)	07:13		07:39 (119)	07:28			06:41	06:11		06:57 (113)	06:08		07:09 (113)
	17:47	3	08:50 (118)	18:24	29	08:08 (119)	19:54			20:24	20:53	38	07:35 (113)	21:08	25	07:34 (113)
28	07:48			07:11		07:38 (119)	07:27			06:40	06:10		06:56 (113)	06:08		07:08 (113)
	17:48			18:25	30	08:08 (119)	19:55			20:25	20:54	38	07:34 (113)	21:08	26	07:34 (113)
29	07:47						07:25			06:38	06:10		06:57 (113)	06:08		07:08 (113)
	17:50						19:56			20:26	20:55	37	07:34 (113)	21:08	26	07:34 (113)
30	07:46						07:24			06:37	06:09		06:57 (113)	06:09		07:08 (113)
	17:51						19:57			20:27	20:55	36	07:33 (113)	21:08	27	07:35 (113)
31	07:45						07:22				06:09		06:58 (113)			
	17:52						19:58				20:56	36	07:34 (113)			
Potential sun hours	300			299			370			397	446			449		
Total, worst case		697			155			439				1106			816	
Sun reduction		0.36			0.42			0.44				0.56			0.60	
Oper. time red.		1.00			1.00			1.00				1.00			1.00	
Wind dir. red.		0.61			0.63			0.63				0.68			0.68	
Total reduction		0.22			0.26			0.28				0.38			0.40	
Total, real		151			41			122				416			329	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 4

Licensed user:
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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 411 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6307)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		07:08 (113)	06:32		07:06 (113)	07:02			07:31		08:17 (119)	07:04			07:37		08:10 (118)
	21:08	27	07:35 (113)	20:51	39	07:45 (113)	20:09			19:19	25	08:42 (119)	17:33			17:10	31	08:41 (118)
2	06:10		07:08 (113)	06:33		07:07 (113)	07:03			07:32		08:16 (119)	07:05			07:38		08:11 (118)
	21:08	28	07:36 (113)	20:50	37	07:44 (113)	20:08			19:17	27	08:43 (119)	17:32			17:10	30	08:41 (118)
3	06:10		07:08 (113)	06:34		07:07 (113)	07:04			07:33		08:14 (119)	07:06			07:39		08:11 (118)
	21:08	28	07:36 (113)	20:49	37	07:44 (113)	20:06			19:15	30	08:44 (119)	17:31			17:10	30	08:41 (118)
4	06:11		07:08 (113)	06:35		07:08 (113)	07:05			07:34		08:13 (119)	07:07			07:40		08:12 (118)
	21:08	29	07:37 (113)	20:48	35	07:43 (113)	20:05			19:14	31	08:44 (119)	17:30			17:10	30	08:42 (118)
5	06:11		07:07 (113)	06:36		07:09 (113)	07:06			07:35		08:12 (119)	07:08			07:41		08:12 (118)
	21:08	30	07:37 (113)	20:47	34	07:43 (113)	20:03			19:12	32	08:44 (119)	17:29			17:10	30	08:42 (118)
6	06:12		07:08 (113)	06:37		07:08 (113)	07:07			07:36		08:11 (119)	07:09			07:42		08:13 (118)
	21:08	30	07:38 (113)	20:45	33	07:41 (113)	20:01			19:11	34	08:45 (119)	17:28			17:09	29	08:42 (118)
7	06:12		07:08 (113)	06:38		07:09 (113)	07:08			07:37		08:11 (119)	07:10			07:43		08:13 (118)
	21:07	31	07:39 (113)	20:44	31	07:40 (113)	20:00			19:09	34	08:45 (119)	17:27			17:09	30	08:43 (118)
8	06:13		07:07 (113)	06:39		07:11 (113)	07:09			07:38		08:10 (119)	07:12			07:44		08:14 (118)
	21:07	32	07:39 (113)	20:43	28	07:39 (113)	19:57			19:07	34	08:44 (119)	17:26			17:09	29	08:43 (118)
9	06:14		07:07 (113)	06:40		07:12 (113)	07:10			07:39		08:10 (119)	07:13			07:45		08:14 (118)
	21:07	33	07:40 (113)	20:42	25	07:37 (113)	19:55			19:06	34	08:44 (119)	17:25			17:09	30	08:44 (118)
10	06:14		07:06 (113)	06:41		07:13 (113)	07:11			07:40		08:10 (119)	07:14			07:46		08:15 (118)
	21:06	34	07:40 (113)	20:41	23	07:36 (113)	19:53			19:04	34	08:44 (119)	17:24			17:09	29	08:44 (118)
11	06:15		07:06 (113)	06:42		07:15 (113)	07:11			07:41		08:10 (119)	07:15			07:47		08:16 (118)
	21:06	35	07:41 (113)	20:39	19	07:34 (113)	19:52			19:03	33	08:43 (119)	17:23			17:10	29	08:45 (118)
12	06:16		07:07 (113)	06:43		07:19 (113)	07:12			07:42		08:10 (119)	07:16			07:47		08:16 (118)
	21:06	35	07:42 (113)	20:38	11	07:30 (113)	19:50			19:01	32	08:42 (119)	17:22			17:10	28	08:44 (118)
13	06:17		07:06 (113)	06:44			07:13			07:43		08:11 (119)	07:17			07:48		08:16 (118)
	21:05	36	07:42 (113)	20:37			19:48			19:00	32	08:43 (119)	17:21			17:10	29	08:45 (118)
14	06:17		07:06 (113)	06:45			07:14			07:44		08:12 (119)	07:19			07:49		08:17 (118)
	21:05	36	07:42 (113)	20:36			19:47			18:58	30	08:42 (119)	17:20			17:10	28	08:45 (118)
15	06:18		07:06 (113)	06:46			07:15			07:45		08:12 (119)	07:20		08:20 (118)	07:50		08:18 (118)
	21:04	37	07:43 (113)	20:34			19:45			18:57	28	08:40 (119)	17:19	3	08:23 (118)	17:10	28	08:46 (118)
16	06:19		07:06 (113)	06:47			07:16			07:46		08:13 (119)	07:21		08:16 (118)	07:50		08:18 (118)
	21:04	38	07:44 (113)	20:33			19:43			18:55	26	08:39 (119)	17:18	11	08:27 (118)	17:11	28	08:46 (118)
17	06:20		07:05 (113)	06:48			07:17			07:47		08:14 (119)	07:22		08:14 (118)	07:51		08:19 (118)
	21:03	38	07:43 (113)	20:32			19:42			18:54	23	08:37 (119)	17:18	15	08:29 (118)	17:11	27	08:46 (118)
18	06:20		07:05 (113)	06:49			07:18			07:48		08:16 (119)	07:23		08:12 (118)	07:52		08:19 (118)
	21:02	39	07:44 (113)	20:30			19:40			18:52	19	08:35 (119)	17:17	19	08:31 (118)	17:11	27	08:46 (118)
19	06:21		07:05 (113)	06:50			07:19			07:49		08:18 (119)	07:24		08:12 (118)	07:52		08:20 (118)
	21:02	39	07:44 (113)	20:29			19:38			18:51	14	08:32 (119)	17:16	21	08:33 (118)	17:12	27	08:47 (118)
20	06:22		07:05 (113)	06:51			07:20			07:50		08:24 (119)	07:25		08:11 (118)	07:53		08:21 (118)
	21:01	40	07:45 (113)	20:27			19:37			18:49	2	08:26 (119)	17:15	23	08:34 (118)	17:12	27	08:48 (118)
21	06:23		07:06 (113)	06:52			07:21			07:51			07:27		08:11 (118)	07:53		08:20 (118)
	21:00	39	07:45 (113)	20:26			19:35			18:48			17:15	24	08:35 (118)	17:12	28	08:48 (118)
22	06:24		07:05 (113)	06:52			07:22			07:52			07:28		08:10 (118)	07:54		08:21 (118)
	21:00	40	07:45 (113)	20:25			19:33			18:46			17:14	25	08:35 (118)	17:13	28	08:49 (118)
23	06:24		07:05 (113)	06:53			07:23			07:53			07:29		08:10 (118)	07:54		08:21 (118)
	20:59	40	07:45 (113)	20:23			19:32			18:45			17:14	26	08:36 (118)	17:13	28	08:49 (118)
24	06:25		07:05 (113)	06:54			07:24			07:55			07:30		08:09 (118)	07:55		08:22 (118)
	20:58	41	07:46 (113)	20:22			19:30			18:44			17:13	28	08:37 (118)	17:14	27	08:49 (118)
25	06:26		07:05 (113)	06:55			07:25			07:56			07:31		08:10 (118)	07:55		08:23 (118)
	20:57	41	07:46 (113)	20:20			19:28			18:42			17:13	28	08:38 (118)	17:15	27	08:50 (118)
26	06:27		07:05 (113)	06:56			07:26			07:57			07:32		08:10 (118)	07:56		08:23 (118)
	20:56	41	07:46 (113)	20:19			19:27			18:41			17:12	29	08:39 (118)	17:15	27	08:50 (118)
27	06:28		07:06 (113)	06:57			07:27			07:58			07:33		08:10 (118)	07:56		08:23 (118)
	20:56	40	07:46 (113)	20:17			19:25			18:40			17:12	29	08:39 (118)	17:16	28	08:51 (118)
28	06:29		07:05 (113)	06:58			07:28		08:25 (119)	07:59			07:34		08:10 (118)	07:56		08:24 (118)
	20:55	40	07:45 (113)	20:16			19:23	10	08:35 (119)	18:38			17:11	30	08:40 (118)	17:17	28	08:52 (118)
29	06:30		07:05 (113)	06:59			07:29		08:22 (119)	08:00			07:35		08:10 (118)	07:57		08:24 (118)
	20:54	40	07:45 (113)	20:14			19:22	17	08:39 (119)	18:37			17:11	30	08:40 (118)	17:17	28	08:52 (118)
30	06:31		07:05 (113)	07:00			07:30		08:19 (119)	08:01			07:36		08:10 (118)	07:57		08:24 (118)
	20:53	40	07:45 (113)	20:13			19:20	21	08:40 (119)	18:36			17:11	30	08:40 (118)	17:18	29	08:53 (118)
31	06:32		07:06 (113)	07:01						08:02						07:57		08:24 (118)
	20:52	39	07:45 (113)	20:11						18:35						17:19	29	08:53 (118)
Potential sun hours	456			426			374			346			300			291		
Total, worst case		1116			352			48			554			371			883	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.68			0.68			0.63			0.63			0.61			0.61	
Total reduction		0.40			0.40			0.38			0.35			0.22			0.30	
Total, real		450			142			18			195			83			266	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 5

Licensed user:
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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative**Shadow receptor:** 573 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6308)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		16:18 (44)	07:45		08:28 (109)	07:10		17:26 (39)	07:20			06:36		19:21 (32)	06:08		06:46 (108)
	17:20	26	16:44 (44)	17:53	49	09:17 (109)	18:26	32	17:58 (39)	19:59			20:28	36	19:57 (32)	20:57	38	07:24 (108)
2	07:58		16:19 (44)	07:44		08:28 (109)	07:08		17:25 (39)	07:19			06:35		19:21 (32)	06:08		06:46 (108)
	17:21	25	16:44 (44)	17:54	49	09:17 (109)	18:27	32	17:57 (39)	20:00			20:29	36	19:57 (32)	20:58	38	07:24 (108)
3	07:58		08:39 (109)	07:43		08:28 (109)	07:07		17:25 (39)	07:17			06:33		19:21 (32)	06:07		06:47 (108)
	17:21	31	16:44 (44)	17:56	49	09:17 (109)	18:28	33	17:58 (39)	20:00			20:30	36	19:57 (32)	20:58	38	07:25 (108)
4	07:58		08:37 (109)	07:42		08:29 (109)	07:05		17:24 (39)	07:15			06:32		19:21 (32)	06:07		06:46 (108)
	17:22	36	16:45 (44)	17:57	48	09:17 (109)	18:29	33	17:57 (39)	20:01			20:31	36	19:57 (32)	20:59	38	07:24 (108)
5	07:58		08:36 (109)	07:41		08:28 (109)	07:04		17:25 (39)	07:14			06:31		19:20 (32)	06:07		06:47 (108)
	17:23	39	16:45 (44)	17:58	48	09:16 (109)	18:31	33	17:58 (39)	20:02			20:32	36	19:56 (32)	21:00	37	07:24 (108)
6	07:58		08:35 (109)	07:40		08:29 (109)	07:02		17:24 (39)	07:12			06:30		19:20 (32)	06:06		06:47 (108)
	17:24	40	16:45 (44)	17:59	47	09:16 (109)	18:32	33	17:57 (39)	20:03			20:33	35	19:55 (32)	21:01	38	07:25 (108)
7	07:58		08:34 (109)	07:39		08:29 (109)	07:01		17:25 (39)	07:11			06:29		19:21 (32)	06:06		06:48 (108)
	17:25	43	16:45 (44)	18:01	46	09:15 (109)	18:33	32	17:57 (39)	20:04			20:34	34	19:55 (32)	21:01	37	07:25 (108)
8	07:58		08:34 (109)	07:37		08:30 (109)	07:59		18:25 (39)	07:09			06:27		06:59 (108)	06:06		06:47 (108)
	17:26	43	16:45 (44)	18:02	45	09:15 (109)	19:34	30	18:55 (39)	20:05			20:35	44	19:55 (32)	21:02	37	07:24 (108)
9	07:57		08:33 (109)	07:36		08:31 (109)	07:57		18:25 (39)	07:08			06:26		06:56 (108)	06:06		06:48 (108)
	17:27	45	16:45 (44)	18:03	44	09:15 (109)	19:35	29	18:54 (39)	20:06			20:36	48	19:54 (32)	21:02	36	07:24 (108)
10	07:57		08:33 (109)	07:35		08:31 (109)	07:56		18:27 (39)	07:06			06:25		06:54 (108)	06:06		06:48 (108)
	17:28	46	16:46 (44)	18:04	43	09:14 (109)	19:36	26	18:53 (39)	20:07			20:37	52	19:54 (32)	21:03	36	07:24 (108)
11	07:57		08:32 (109)	07:34		08:32 (109)	07:54		18:28 (39)	07:04			06:24		06:52 (108)	06:05		06:49 (108)
	17:29	47	16:45 (44)	18:05	42	09:14 (109)	19:37	23	18:51 (39)	20:08			20:38	54	19:53 (32)	21:03	36	07:25 (108)
12	07:57		08:31 (109)	07:33		08:33 (109)	07:53		18:30 (39)	07:03			06:23		06:51 (108)	06:05		06:49 (108)
	17:30	47	16:44 (44)	18:07	39	09:12 (109)	19:38	20	18:50 (39)	20:09			20:39	54	19:52 (32)	21:04	36	07:25 (108)
13	07:56		08:31 (109)	07:32		08:34 (109)	07:51		18:31 (39)	07:01			06:22		06:50 (108)	06:05		06:50 (108)
	17:31	46	16:44 (44)	18:08	37	09:11 (109)	19:39	16	18:47 (39)	20:10			20:40	54	19:51 (32)	21:04	35	07:25 (108)
14	07:56		08:30 (109)	07:30		08:35 (109)	07:49		18:35 (39)	07:00			06:21		06:49 (108)	06:05		06:50 (108)
	17:32	46	16:43 (44)	18:09	35	09:10 (109)	19:40	7	18:42 (39)	20:11			20:41	55	19:50 (32)	21:05	35	07:25 (108)
15	07:56		08:30 (109)	07:29		08:37 (109)	07:48			06:58			06:20		06:48 (108)	06:05		06:50 (108)
	17:33	42	16:41 (44)	18:10	32	09:09 (109)	19:41			20:12			20:42	53	19:49 (32)	21:05	35	07:25 (108)
16	07:55		08:29 (109)	07:28		08:38 (109)	07:46			06:57			06:19		06:47 (108)	06:05		06:50 (108)
	17:34	37	09:06 (109)	18:11	28	09:06 (109)	19:42			20:13			20:43	53	19:48 (32)	21:06	35	07:25 (108)
17	07:55		08:29 (109)	07:27		08:40 (109)	07:45			06:55			06:18		06:47 (108)	06:05		06:51 (108)
	17:36	39	09:08 (109)	18:12	24	09:04 (109)	19:43			20:14			20:44	51	19:47 (32)	21:06	34	07:25 (108)
18	07:55		08:29 (109)	07:25		08:43 (109)	07:43			06:54			06:17		06:47 (108)	06:05		06:51 (108)
	17:37	39	09:08 (109)	18:14	19	09:02 (109)	19:44			20:15			20:45	48	19:45 (32)	21:07	34	07:25 (108)
19	07:54		08:29 (109)	07:24		08:48 (109)	07:41			06:52		19:37 (32)	06:17		06:46 (108)	06:05		06:51 (108)
	17:38	41	09:10 (109)	18:15	8	08:56 (109)	19:45			20:16	7	19:44 (32)	20:46	42	19:41 (32)	21:07	34	07:25 (108)
20	07:54		08:28 (109)	07:23			07:40			06:51		19:33 (32)	06:16		06:46 (108)	06:06		06:52 (108)
	17:39	42	09:10 (109)	18:16			19:46			20:17	16	19:49 (32)	20:47	36	07:22 (108)	21:07	34	07:26 (108)
21	07:53		08:29 (109)	07:21		17:38 (39)	07:38			06:49		19:30 (32)	06:15		06:46 (108)	06:06		06:52 (108)
	17:40	43	09:12 (109)	18:17	8	17:46 (39)	19:48			20:18	20	19:50 (32)	20:48	37	07:23 (108)	21:07	34	07:26 (108)
22	07:52		08:28 (109)	07:20		17:35 (39)	07:37			06:48		19:28 (32)	06:14		06:46 (108)	06:06		06:52 (108)
	17:41	44	09:12 (109)	18:18	15	17:50 (39)	19:49			20:19	24	19:52 (32)	20:49	37	07:23 (108)	21:08	34	07:26 (108)
23	07:52		08:27 (109)	07:18		17:33 (39)	07:35			06:47		19:27 (32)	06:14		06:45 (108)	06:06		06:52 (108)
	17:42	45	09:12 (109)	18:19	20	17:53 (39)	19:50			20:20	27	19:54 (32)	20:50	38	07:23 (108)	21:08	34	07:26 (108)
24	07:51		08:27 (109)	07:17		17:30 (39)	07:33			06:45		19:25 (32)	06:13		06:46 (108)	06:07		06:53 (108)
	17:44	46	09:13 (109)	18:21	24	17:54 (39)	19:51			20:21	29	19:54 (32)	20:51	38	07:24 (108)	21:08	34	07:27 (108)
25	07:50		08:28 (109)	07:16		17:29 (39)	07:32			06:44		19:24 (32)	06:12		06:45 (108)	06:07		06:53 (108)
	17:45	46	09:14 (109)	18:22	26	17:55 (39)	19:52			20:22	31	19:55 (32)	20:51	39	07:24 (108)	21:08	34	07:27 (108)
26	07:50		08:27 (109)	07:14		17:28 (39)	07:30			06:42		19:24 (32)	06:11		06:45 (108)	06:07		06:52 (108)
	17:46	48	09:15 (109)	18:23	28	17:56 (39)	19:53			20:23	32	19:56 (32)	20:52	38	07:23 (108)	21:08	35	07:27 (108)
27	07:49		08:27 (109)	07:13		17:27 (39)	07:28			06:41		19:22 (32)	06:11		06:45 (108)	06:07		06:53 (108)
	17:47	48	09:15 (109)	18:24	30	17:57 (39)	19:54			20:24	34	19:56 (32)	20:53	39	07:24 (108)	21:08	35	07:28 (108)
28	07:48		08:27 (109)	07:11		17:26 (39)	07:27			06:40		19:22 (32)	06:10		06:45 (108)	06:08		06:53 (108)
	17:48	48	09:15 (109)	18:25	31	17:57 (39)	19:55			20:25	34	19:56 (32)	20:54	39	07:24 (108)	21:08	35	07:28 (108)
29	07:47		08:27 (109)				07:25			06:38		19:22 (32)	06:10		06:46 (108)	06:08		06:53 (108)
	17:50	48	09:15 (109)				19:56			20:26	35	19:57 (32)	20:55	38	07:24 (108)	21:08	35	07:28 (108)
30	07:46		08:27 (109)				07:23			06:37		19:21 (32)	06:09		06:45 (108)	06:09		06:53 (108)
	17:51	49	09:16 (109)				19:57			20:27	35	19:56 (32)	20:55	39	07:24 (108)	21:08	36	07:29 (108)
31	07:46		08:28 (109)				07:22						06:09		06:46 (108)			
	17:52	49	09:17 (109)				19:58						20:56	38	07:24 (108)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		1314			914			379			324			1313			1067	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.62			0.62			0.67			0.63			0.66			0.68	
Total reduction		0.22			0.26			0.29			0.32			0.37			0.41	
Total, real		291			235			111			104			484			433	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 6

Licensed user:
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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative**Shadow receptor:** 573 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6308)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:53 (108)	06:32		07:02 (108)	07:02			07:31		18:09 (39)	07:04		08:00 (109)	07:37		08:14 (109)
	21:08	36	07:29 (108)	20:51	54	20:03 (32)	20:09			19:19	19	18:28 (39)	17:33	43	08:43 (109)	17:10	47	16:27 (44)
2	06:10		06:54 (108)	06:33		07:03 (108)	07:03			07:32		18:07 (39)	07:05		08:00 (109)	07:38		08:15 (109)
	21:08	36	07:30 (108)	20:50	54	20:04 (32)	20:08			19:17	22	18:29 (39)	17:32	45	08:45 (109)	17:10	47	16:28 (44)
3	06:10		06:53 (108)	06:34		07:05 (108)	07:04			07:33		18:05 (39)	07:06		07:59 (109)	07:39		08:16 (109)
	21:08	36	07:29 (108)	20:49	51	20:05 (32)	20:06			19:15	25	18:30 (39)	17:31	46	08:45 (109)	17:10	45	16:28 (44)
4	06:11		06:54 (108)	06:35		07:08 (108)	07:05			07:34		18:04 (39)	07:07		07:59 (109)	07:40		08:18 (109)
	21:08	36	07:30 (108)	20:48	47	20:05 (32)	20:05			19:14	27	18:31 (39)	17:30	46	08:45 (109)	17:10	43	16:29 (44)
5	06:11		06:53 (108)	06:36		07:12 (108)	07:06			07:35		18:02 (39)	07:08		07:58 (109)	07:41		08:19 (109)
	21:08	37	07:30 (108)	20:47	40	20:06 (32)	20:03			19:12	30	18:32 (39)	17:29	48	08:46 (109)	17:09	43	16:30 (44)
6	06:12		06:54 (108)	06:37		19:30 (32)	07:07			07:36		18:01 (39)	07:09		07:59 (109)	07:42		08:21 (109)
	21:08	37	07:31 (108)	20:45	35	20:05 (32)	20:01			19:10	31	18:32 (39)	17:28	48	08:47 (109)	17:09	41	16:31 (44)
7	06:12		06:53 (108)	06:38		19:30 (32)	07:08			07:37		18:00 (39)	07:11		07:58 (109)	07:43		08:23 (109)
	21:07	37	07:30 (108)	20:44	35	20:05 (32)	20:00			19:09	32	18:32 (39)	17:27	49	08:47 (109)	17:09	39	16:32 (44)
8	06:13		06:54 (108)	06:39		19:30 (32)	07:09			07:38		18:00 (39)	07:12		07:58 (109)	07:44		08:25 (109)
	21:07	37	07:31 (108)	20:43	35	20:05 (32)	19:57			19:07	32	18:32 (39)	17:26	49	08:47 (109)	17:09	37	16:33 (44)
9	06:14		06:54 (108)	06:40		19:30 (32)	07:10			07:39		17:59 (39)	07:13		07:58 (109)	07:45		08:28 (109)
	21:07	38	07:32 (108)	20:42	36	20:06 (32)	19:55			19:06	33	18:32 (39)	17:25	49	08:47 (109)	17:09	32	16:33 (44)
10	06:14		06:53 (108)	06:41		19:29 (32)	07:11			07:40		17:59 (39)	07:14		07:59 (109)	07:46		16:09 (44)
	21:06	38	07:31 (108)	20:41	37	20:06 (32)	19:53			19:04	33	18:32 (39)	17:24	49	08:48 (109)	17:09	25	16:34 (44)
11	06:15		06:54 (108)	06:42		19:29 (32)	07:11			07:41		17:58 (39)	07:15		07:59 (109)	07:47		16:09 (44)
	21:06	38	07:32 (108)	20:39	36	20:05 (32)	19:52			19:03	33	18:31 (39)	17:23	49	08:48 (109)	17:09	26	16:35 (44)
12	06:16		06:54 (108)	06:43		19:29 (32)	07:12			07:42		17:58 (39)	07:16		07:59 (109)	07:47		16:09 (44)
	21:06	39	07:33 (108)	20:38	36	20:05 (32)	19:50			19:01	33	18:31 (39)	17:22	49	08:48 (109)	17:10	26	16:35 (44)
13	06:16		06:54 (108)	06:44		19:29 (32)	07:13			07:43		17:59 (39)	07:17		07:59 (109)	07:48		16:09 (44)
	21:05	38	07:32 (108)	20:37	36	20:05 (32)	19:48			19:00	32	18:31 (39)	17:21	48	08:47 (109)	17:10	26	16:35 (44)
14	06:17		06:54 (108)	06:45		19:30 (32)	07:14			07:44		17:59 (39)	07:19		08:00 (109)	07:49		16:10 (44)
	21:05	39	07:33 (108)	20:36	35	20:05 (32)	19:47			18:58	31	18:30 (39)	17:20	48	08:48 (109)	17:10	26	16:36 (44)
15	06:18		06:54 (108)	06:46		19:30 (32)	07:15			07:45		18:00 (39)	07:20		08:00 (109)	07:50		16:10 (44)
	21:04	39	07:33 (108)	20:34	34	20:04 (32)	19:45			18:57	29	18:29 (39)	17:19	48	08:48 (109)	17:10	27	16:37 (44)
16	06:19		06:55 (108)	06:47		19:30 (32)	07:16			07:46		18:00 (39)	07:21		08:00 (109)	07:50		16:10 (44)
	21:04	38	07:33 (108)	20:33	33	20:03 (32)	19:43			18:55	28	18:28 (39)	17:18	48	08:48 (109)	17:10	27	16:37 (44)
17	06:19		06:54 (108)	06:48		19:30 (32)	07:17			07:47		18:01 (39)	07:22		08:01 (109)	07:51		16:11 (44)
	21:03	39	07:33 (108)	20:32	32	20:02 (32)	19:42			18:54	25	18:26 (39)	17:18	46	08:47 (109)	17:11	27	16:38 (44)
18	06:20		06:55 (108)	06:49		19:30 (32)	07:18			07:48		18:02 (39)	07:23		08:01 (109)	07:52		16:12 (44)
	21:02	38	07:33 (108)	20:30	31	20:01 (32)	19:40			18:52	23	18:25 (39)	17:17	46	08:47 (109)	17:11	27	16:39 (44)
19	06:21		06:55 (108)	06:50		19:31 (32)	07:19			07:49		18:04 (39)	07:24		08:02 (109)	07:52		16:12 (44)
	21:02	38	07:33 (108)	20:29	29	20:00 (32)	19:38			18:51	19	18:23 (39)	17:16	45	08:47 (109)	17:12	27	16:39 (44)
20	06:22		06:55 (108)	06:51		19:32 (32)	07:20			07:50		18:06 (39)	07:25		08:03 (109)	07:53		16:13 (44)
	21:01	38	07:33 (108)	20:27	26	19:58 (32)	19:37			18:49	14	18:20 (39)	17:15	44	08:47 (109)	17:12	27	16:40 (44)
21	06:23		06:55 (108)	06:51		19:34 (32)	07:21			07:51		18:12 (39)	07:27		08:04 (109)	07:53		16:12 (44)
	21:00	37	07:32 (108)	20:26	23	19:57 (32)	19:35			18:48	2	18:13 (39)	17:15	43	08:47 (109)	17:12	27	16:39 (44)
22	06:24		06:55 (108)	06:52		19:35 (32)	07:22			07:52			07:28		08:04 (109)	07:54		16:13 (44)
	21:00	38	07:33 (108)	20:25	20	19:55 (32)	19:33			18:46			17:14	42	08:46 (109)	17:13	27	16:40 (44)
23	06:24		06:56 (108)	06:53		19:38 (32)	07:23			07:54		09:16 (109)	07:29		08:05 (109)	07:54		16:13 (44)
	20:59	37	07:33 (108)	20:23	14	19:52 (32)	19:32			18:45	12	09:28 (109)	17:14	41	08:46 (109)	17:13	27	16:40 (44)
24	06:25		06:56 (108)	06:54		19:42 (32)	07:24			07:55		09:12 (109)	07:30		08:07 (109)	07:55		16:15 (44)
	20:58	36	07:32 (108)	20:22	5	19:47 (32)	19:30			18:44	20	09:32 (109)	17:13	39	08:46 (109)	17:14	27	16:42 (44)
25	06:26		06:57 (108)	06:55			07:25			07:56		09:09 (109)	07:31		08:07 (109)	07:55		16:15 (44)
	20:57	45	19:54 (32)	20:20			19:28			18:42	25	09:34 (109)	17:13	39	08:46 (109)	17:15	27	16:42 (44)
26	06:27		06:58 (108)	06:56			07:26			07:57		09:07 (109)	07:32		08:08 (109)	07:56		16:15 (44)
	20:57	48	19:56 (32)	20:19			19:27			18:41	29	09:36 (109)	17:12	37	08:45 (109)	17:15	27	16:42 (44)
27	06:28		06:58 (108)	06:57			07:27			07:58		09:05 (109)	07:33		08:09 (109)	07:56		16:16 (44)
	20:56	52	19:58 (32)	20:17			19:25			18:40	33	09:38 (109)	17:12	43	16:20 (44)	17:16	27	16:43 (44)
28	06:29		06:58 (108)	06:58			07:28			07:59		09:05 (109)	07:34		08:10 (109)	07:56		16:16 (44)
	20:55	53	19:59 (32)	20:16			19:23			18:38	35	09:40 (109)	17:11	45	16:22 (44)	17:17	27	16:43 (44)
29	06:30		06:59 (108)	06:59			07:29			08:00		09:03 (109)	07:35		08:11 (109)	07:57		16:17 (44)
	20:54	54	20:00 (32)	20:14			19:22			18:37	38	09:41 (109)	17:11	46	16:24 (44)	17:17	26	16:43 (44)
30	06:31		07:00 (108)	07:00			07:30		18:12 (39)	08:01		09:02 (109)	07:36		08:12 (109)	07:57		16:17 (44)
	20:53	54	20:01 (32)	20:13			19:20	13	18:25 (39)	18:36	40	09:42 (109)	17:11	47	16:25 (44)	17:18	26	16:43 (44)
31	06:32		07:01 (108)	07:01						08:02		09:01 (109)				07:57		16:17 (44)
	20:52	54	20:02 (32)	20:11						18:35	42	09:43 (109)				17:19	27	16:44 (44)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		1260			814			13			827			1365			960	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.68			0.64			0.67			0.65			0.61			0.66	
Total reduction		0.40			0.38			0.41			0.36			0.22			0.33	
Total, real		508			310			5			299			304			316	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 7

Licensed user:
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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative**Shadow receptor:** 575 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6309)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January	February	March			April	May			June		
1	07:57	07:45	07:10			07:20	06:36			06:08		06:52 (109)
	17:20	17:53	18:26			19:59	20:28			20:57	56	20:10 (39)
2	07:58	07:44	07:08			07:19	06:35			06:08		06:51 (109)
	17:21	17:54	18:27			20:00	20:29			20:58	57	20:10 (39)
3	07:58	07:43	07:07			07:17	06:33			06:07		06:51 (109)
	17:21	17:56	18:28			20:00	20:30			20:58	57	20:10 (39)
4	07:58	07:42	07:05			07:15	06:32		19:53 (39)	06:07		06:50 (109)
	17:22	17:57	18:29			20:01	20:31	12	20:05 (39)	20:59	56	20:08 (39)
5	07:58	07:41	07:04		18:01 (44)	07:14	06:31		19:50 (39)	06:07		06:49 (109)
	17:23	17:58	18:31	5	18:06 (44)	20:02	20:32	16	20:06 (39)	21:00	57	20:08 (39)
6	07:58	07:40	07:02		17:56 (44)	07:12	06:30		19:48 (39)	06:06		06:49 (109)
	17:24	17:59	18:32	14	18:10 (44)	20:03	20:33	20	20:08 (39)	21:01	57	20:08 (39)
7	07:58	07:39	07:01		17:54 (44)	07:11	06:29		19:47 (39)	06:06		06:49 (109)
	17:25	18:01	18:33	18	18:12 (44)	20:04	20:34	22	20:09 (39)	21:01	55	20:07 (39)
8	07:58	07:37	07:59		18:51 (44)	07:09	06:27		19:46 (39)	06:06		06:48 (109)
	17:26	18:02	19:34	22	19:13 (44)	20:05	20:35	24	20:10 (39)	21:02	55	20:06 (39)
9	07:57	07:36	07:57		18:50 (44)	07:08	06:26		19:45 (39)	06:06		06:48 (109)
	17:27	18:03	19:35	23	19:13 (44)	20:06	20:36	26	20:11 (39)	21:02	54	20:05 (39)
10	07:57	07:35	07:56		18:49 (44)	07:06	06:25		19:44 (39)	06:06		06:48 (109)
	17:28	18:04	19:36	26	19:15 (44)	20:07	20:37	28	20:12 (39)	21:03	52	20:04 (39)
11	07:57	07:34	07:54		18:48 (44)	07:04	06:24		19:44 (39)	06:05		06:48 (109)
	17:29	18:05	19:37	27	19:15 (44)	20:08	20:38	28	20:12 (39)	21:03	46	07:34 (109)
12	07:57	07:33	07:53		18:48 (44)	07:03	06:23		19:43 (39)	06:05		06:48 (109)
	17:30	18:07	19:38	28	19:16 (44)	20:09	20:39	30	20:13 (39)	21:04	47	07:35 (109)
13	07:56	07:32	07:51		18:47 (44)	07:01	06:22		19:43 (39)	06:05		06:48 (109)
	17:31	18:08	19:39	29	19:16 (44)	20:10	20:40	30	20:13 (39)	21:04	47	07:35 (109)
14	07:56	07:30	07:49		18:46 (44)	07:00	06:21		19:43 (39)	06:05		06:48 (109)
	17:32	18:09	19:40	29	19:15 (44)	20:11	20:41	30	20:13 (39)	21:05	48	07:36 (109)
15	07:56	07:29	07:48		18:46 (44)	06:58	06:20		19:42 (39)	06:05		06:48 (109)
	17:33	18:10	19:41	30	19:16 (44)	20:12	20:42	31	20:13 (39)	21:05	48	07:36 (109)
16	07:55	07:28	07:46		18:46 (44)	06:57	06:19		19:42 (39)	06:05		06:48 (109)
	17:34	18:11	19:42	29	19:15 (44)	20:13	20:43	31	20:13 (39)	21:06	49	07:37 (109)
17	07:55	07:27	07:45		18:46 (44)	06:55	06:18		19:43 (39)	06:05		06:48 (109)
	17:36	18:12	19:43	28	19:14 (44)	20:14	20:44	31	20:14 (39)	21:06	49	07:37 (109)
18	07:55	07:25	07:43		18:47 (44)	06:54	06:18		19:43 (39)	06:05		06:48 (109)
	17:37	18:14	19:44	26	19:13 (44)	20:15	20:45	31	20:14 (39)	21:07	49	07:37 (109)
19	07:54	07:24	07:41		18:47 (44)	06:52	06:17		19:43 (39)	06:05		06:48 (109)
	17:38	18:15	19:45	25	19:12 (44)	20:16	20:46	31	20:14 (39)	21:07	49	07:37 (109)
20	07:53	07:23	07:40		18:48 (44)	06:51	06:16		19:43 (39)	06:06		06:49 (109)
	17:39	18:16	19:46	23	19:11 (44)	20:17	20:47	30	20:13 (39)	21:07	49	07:38 (109)
21	07:53	07:21	07:38		18:49 (44)	06:49	06:15		19:44 (39)	06:06		06:49 (109)
	17:40	18:17	19:48	20	19:09 (44)	20:18	20:48	30	20:14 (39)	21:07	49	07:38 (109)
22	07:52	07:20	07:37		18:50 (44)	06:48	06:14		19:44 (39)	06:06		06:49 (109)
	17:41	18:18	19:49	16	19:06 (44)	20:19	20:49	30	20:14 (39)	21:08	49	07:38 (109)
23	07:52	07:18	07:35		18:54 (44)	06:47	06:14		19:44 (39)	06:06		06:49 (109)
	17:42	18:19	19:50	10	19:04 (44)	20:20	20:50	29	20:13 (39)	21:08	49	07:38 (109)
24	07:51	07:17	07:33			06:45	06:13		19:45 (39)	06:07		06:50 (109)
	17:44	18:21	19:51			20:21	20:51	29	20:14 (39)	21:08	49	07:39 (109)
25	07:50	07:16	07:32			06:44	06:12		07:06 (109)	06:07		06:50 (109)
	17:45	18:22	19:52			20:22	20:51	33	20:13 (39)	21:08	49	07:39 (109)
26	07:50	07:14	07:30			06:42	06:11		07:01 (109)	06:07		06:50 (109)
	17:46	18:23	19:53			20:23	20:52	42	20:12 (39)	21:08	49	07:39 (109)
27	07:49	07:13	07:28			06:41	06:11		06:59 (109)	06:07		06:51 (109)
	17:47	18:24	19:54			20:24	20:53	47	20:13 (39)	21:08	48	07:39 (109)
28	07:48	07:11	07:27			06:40	06:10		06:57 (109)	06:08		06:51 (109)
	17:48	18:25	19:55			20:25	20:54	50	20:12 (39)	21:08	48	07:39 (109)
29	07:47		07:25			06:38	06:10		06:56 (109)	06:08		06:51 (109)
	17:50		19:56			20:26	20:55	52	20:12 (39)	21:08	48	07:39 (109)
30	07:46		07:23			06:37	06:09		06:54 (109)	06:09		06:52 (109)
	17:51		19:57			20:27	20:55	54	20:11 (39)	21:08	47	07:39 (109)
31	07:45		07:22				06:09		06:53 (109)			
	17:52		19:58				20:56	56	20:11 (39)			
Potential sun hours	300	299	370			397	446			449		
Total, worst case				428				903			1522	
Sun reduction				0.44				0.56			0.60	
Oper. time red.				1.00				1.00			1.00	
Wind dir. red.				0.67				0.64			0.68	
Total reduction				0.29				0.36			0.41	
Total, real				126				324			619	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 8

Licensed user:
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217 Montgomery St.
US-SYRACUSE, NY 13202
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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 575 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6309)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November	December
1	06:09		06:52 (109)	06:32		19:54 (39)	07:02			07:31		18:26 (44)	07:04	07:37
	21:08	47	07:39 (109)	20:51	29	20:23 (39)	20:09			19:19	29	18:55 (44)	17:33	17:10
2	06:10		06:53 (109)	06:33		19:55 (39)	07:03			07:32		18:26 (44)	07:05	07:38
	21:08	50	20:08 (39)	20:50	28	20:23 (39)	20:08			19:17	28	18:54 (44)	17:32	17:10
3	06:10		06:53 (109)	06:34		19:55 (39)	07:04			07:33		18:26 (44)	07:06	07:39
	21:08	53	20:10 (39)	20:49	27	20:22 (39)	20:06			19:15	27	18:53 (44)	17:31	17:10
4	06:11		06:54 (109)	06:35		19:56 (39)	07:05			07:34		18:27 (44)	07:07	07:40
	21:08	54	20:11 (39)	20:48	25	20:21 (39)	20:05			19:14	25	18:52 (44)	17:30	17:10
5	06:11		06:54 (109)	06:36		19:57 (39)	07:06			07:35		18:27 (44)	07:08	07:41
	21:08	56	20:12 (39)	20:47	24	20:21 (39)	20:03			19:12	23	18:50 (44)	17:29	17:09
6	06:12		06:55 (109)	06:37		19:57 (39)	07:07			07:36		18:29 (44)	07:09	07:42
	21:08	57	20:14 (39)	20:45	22	20:19 (39)	20:01			19:10	19	18:48 (44)	17:28	17:09
7	06:12		06:55 (109)	06:38		19:58 (39)	07:08			07:37		18:30 (44)	07:10	07:43
	21:07	57	20:14 (39)	20:44	19	20:17 (39)	20:00			19:09	17	18:47 (44)	17:27	17:09
8	06:13		06:57 (109)	06:39		20:00 (39)	07:09			07:38		18:33 (44)	07:12	07:44
	21:07	57	20:15 (39)	20:43	15	20:15 (39)	19:57			19:07	11	18:44 (44)	17:26	17:09
9	06:14		06:58 (109)	06:40		20:03 (39)	07:10			07:39			07:13	07:45
	21:07	58	20:17 (39)	20:42	10	20:13 (39)	19:55			19:06			17:25	17:09
10	06:14		06:58 (109)	06:41			07:11			07:40			07:14	07:46
	21:06	57	20:17 (39)	20:41			19:53			19:04			17:24	17:09
11	06:15		06:59 (109)	06:42			07:11			07:41			07:15	07:47
	21:06	57	20:18 (39)	20:39			19:52			19:03			17:23	17:09
12	06:16		07:01 (109)	06:43			07:12			07:42			07:16	07:47
	21:06	56	20:19 (39)	20:38			19:50			19:01			17:22	17:10
13	06:16		07:01 (109)	06:44			07:13			07:43			07:17	07:48
	21:05	55	20:19 (39)	20:37			19:48			19:00			17:21	17:10
14	06:17		07:03 (109)	06:45			07:14			07:44			07:19	07:49
	21:05	53	20:20 (39)	20:36			19:47			18:58			17:20	17:10
15	06:18		07:05 (109)	06:46			07:15			07:45			07:20	07:50
	21:04	52	20:21 (39)	20:34			19:45			18:57			17:19	17:10
16	06:19		07:07 (109)	06:47			07:16			07:46			07:21	07:50
	21:04	50	20:22 (39)	20:33			19:43			18:55			17:18	17:10
17	06:19		07:09 (109)	06:48			07:17			07:47			07:22	07:51
	21:03	45	20:21 (39)	20:32			19:42			18:54			17:18	17:11
18	06:20		07:12 (109)	06:49			07:18			07:48			07:23	07:52
	21:02	40	20:22 (39)	20:30			19:40			18:52			17:17	17:11
19	06:21		19:54 (39)	06:50			07:19			07:49			07:24	07:52
	21:02	29	20:23 (39)	20:29			19:38			18:51			17:16	17:12
20	06:22		19:54 (39)	06:51			07:20		18:42 (44)	07:50			07:25	07:53
	21:01	29	20:23 (39)	20:27			19:37	7	18:49 (44)	18:49			17:15	17:12
21	06:23		19:53 (39)	06:51			07:21		18:38 (44)	07:51			07:27	07:53
	21:00	30	20:23 (39)	20:26			19:35	14	18:52 (44)	18:48			17:15	17:12
22	06:24		19:53 (39)	06:52			07:22		18:34 (44)	07:52			07:28	07:54
	21:00	30	20:23 (39)	20:25			19:33	19	18:53 (44)	18:46			17:14	17:13
23	06:24		19:53 (39)	06:53			07:23		18:32 (44)	07:54			07:29	07:54
	20:59	31	20:24 (39)	20:23			19:32	22	18:54 (44)	18:45			17:14	17:13
24	06:25		19:53 (39)	06:54			07:24		18:31 (44)	07:55			07:30	07:55
	20:58	31	20:24 (39)	20:22			19:30	24	18:55 (44)	18:44			17:13	17:14
25	06:26		19:53 (39)	06:55			07:25		18:29 (44)	07:56			07:31	07:55
	20:57	31	20:24 (39)	20:20			19:28	27	18:56 (44)	18:42			17:13	17:15
26	06:27		19:53 (39)	06:56			07:26		18:28 (44)	07:57			07:32	07:56
	20:57	32	20:25 (39)	20:19			19:27	28	18:56 (44)	18:41			17:12	17:15
27	06:28		19:53 (39)	06:57			07:27		18:27 (44)	07:58			07:33	07:56
	20:56	32	20:25 (39)	20:17			19:25	29	18:56 (44)	18:40			17:12	17:16
28	06:29		19:53 (39)	06:58			07:28		18:27 (44)	07:59			07:34	07:56
	20:55	31	20:24 (39)	20:16			19:23	29	18:56 (44)	18:38			17:11	17:17
29	06:30		19:53 (39)	06:59			07:29		18:26 (44)	08:00			07:35	07:57
	20:54	31	20:24 (39)	20:14			19:22	30	18:56 (44)	18:37			17:11	17:17
30	06:31		19:53 (39)	07:00			07:30		18:26 (44)	08:01			07:36	07:57
	20:53	31	20:24 (39)	20:13			19:20	29	18:55 (44)	18:36			17:11	17:18
31	06:32		19:54 (39)	07:01						08:02				07:57
	20:52	29	20:23 (39)	20:11						18:35				17:19
Potential sun hours	456			427			374			346			300	291
Total, worst case		1351			199			258			179			
Sun reduction		0.60			0.60			0.61			0.56			
Oper. time red.		1.00			1.00			1.00			1.00			
Wind dir. red.		0.66			0.63			0.67			0.67			
Total reduction		0.39			0.38			0.41			0.37			
Total, real		532			75			105			67			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 9

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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 581 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6310)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March	April			May			June		
1	07:57		16:34 (109)	07:45		16:34 (109)	07:10	07:20			06:36		07:22 (33)	06:08		19:11 (108)
	17:20	13	16:47 (109)	17:53	35	17:09 (109)	18:26	19:59			20:28	32	07:54 (33)	20:57	56	20:07 (108)
2	07:57		16:33 (109)	07:44		16:35 (109)	07:08	07:19			06:35		07:23 (33)	06:08		19:11 (108)
	17:21	15	16:48 (109)	17:54	33	17:08 (109)	18:27	20:00			20:29	30	07:53 (33)	20:58	57	20:08 (108)
3	07:58		16:33 (109)	07:43		16:36 (109)	07:07	07:17			06:33		07:24 (33)	06:07		19:11 (108)
	17:21	16	16:49 (109)	17:56	32	17:08 (109)	18:28	20:00			20:30	28	07:52 (33)	20:58	58	20:09 (108)
4	07:58		16:32 (109)	07:42		16:36 (109)	07:05	07:15			06:32		07:26 (33)	06:07		19:11 (108)
	17:22	18	16:50 (109)	17:57	30	17:06 (109)	18:29	20:01			20:31	24	07:50 (33)	20:59	58	20:09 (108)
5	07:58		16:32 (109)	07:41		16:37 (109)	07:04	07:14			06:31		07:26 (33)	06:07		19:11 (108)
	17:23	20	16:52 (109)	17:58	28	17:05 (109)	18:31	20:02			20:32	22	07:48 (33)	21:00	59	20:10 (108)
6	07:58		16:32 (109)	07:40		16:39 (109)	07:02	07:12			06:30		07:28 (33)	06:06		19:11 (108)
	17:24	21	16:53 (109)	17:59	25	17:04 (109)	18:32	20:03			20:33	18	07:46 (33)	21:00	59	20:10 (108)
7	07:58		16:32 (109)	07:39		16:41 (109)	07:01	07:11			06:29		07:31 (33)	06:06		19:11 (108)
	17:25	22	16:54 (109)	18:00	22	17:03 (109)	18:33	20:04			20:34	12	07:43 (33)	21:01	60	20:11 (108)
8	07:57		16:31 (109)	07:37		16:43 (109)	07:59	07:09			06:27			06:06		19:10 (108)
	17:26	25	16:56 (109)	18:02	18	17:01 (109)	19:34	20:05			20:35			21:02	60	20:10 (108)
9	07:57		16:31 (109)	07:36		16:46 (109)	07:57	07:07		07:36 (33)	06:26			06:06		19:11 (108)
	17:27	26	16:57 (109)	18:03	12	16:58 (109)	19:35	20:06	15	07:51 (33)	20:36			21:02	60	20:11 (108)
10	07:57		16:31 (109)	07:35			07:56	07:06		07:33 (33)	06:25			06:06		19:11 (108)
	17:28	27	16:58 (109)	18:04			19:36	20:07	21	07:54 (33)	20:37			21:03	60	20:11 (108)
11	07:57		16:30 (109)	07:34			07:54	07:04		07:30 (33)	06:24			06:05		19:11 (108)
	17:29	28	16:58 (109)	18:05			19:37	20:08	25	07:55 (33)	20:38			21:03	61	20:12 (108)
12	07:57		16:31 (109)	07:33			07:53	07:03		07:29 (33)	06:23			06:05		19:11 (108)
	17:30	29	17:00 (109)	18:06			19:38	20:09	28	07:57 (33)	20:39			21:04	61	20:12 (108)
13	07:56		16:31 (109)	07:32			07:51	07:01		07:27 (33)	06:22		19:35 (108)	06:05		19:11 (108)
	17:31	30	17:01 (109)	18:08			19:39	20:10	31	07:58 (33)	20:40	6	19:41 (108)	21:04	62	20:13 (108)
14	07:56		16:30 (109)	07:30			07:49	07:00		07:25 (33)	06:21		19:29 (108)	06:05		19:11 (108)
	17:32	31	17:01 (109)	18:09			19:40	20:11	33	07:58 (33)	20:41	18	19:47 (108)	21:05	62	20:13 (108)
15	07:56		16:30 (109)	07:29			07:48	06:58		07:24 (33)	06:20		19:26 (108)	06:05		19:12 (108)
	17:33	33	17:03 (109)	18:10			19:41	20:12	35	07:59 (33)	20:42	24	19:50 (108)	21:05	61	20:13 (108)
16	07:55		16:30 (109)	07:28			07:46	06:57		07:23 (33)	06:19		19:24 (108)	06:05		19:12 (108)
	17:34	33	17:03 (109)	18:11			19:42	20:13	36	07:59 (33)	20:43	28	19:52 (108)	21:06	61	20:13 (108)
17	07:55		16:30 (109)	07:27			07:45	06:55		07:22 (33)	06:18		19:22 (108)	06:05		19:12 (108)
	17:36	34	17:04 (109)	18:12			19:43	20:14	38	08:00 (33)	20:44	32	19:54 (108)	21:06	62	20:14 (108)
18	07:54		16:30 (109)	07:25			07:43	06:54		07:22 (33)	06:17		19:21 (108)	06:05		19:12 (108)
	17:37	34	17:04 (109)	18:14			19:44	20:15	39	08:01 (33)	20:45	35	19:56 (108)	21:06	62	20:14 (108)
19	07:54		16:30 (109)	07:24			07:41	06:52		07:21 (33)	06:17		19:19 (108)	06:05		19:12 (108)
	17:38	36	17:06 (109)	18:15			19:45	20:16	39	08:00 (33)	20:46	38	19:57 (108)	21:07	62	20:14 (108)
20	07:53		16:30 (109)	07:23			07:40	06:51		07:21 (33)	06:16		19:18 (108)	06:06		19:12 (108)
	17:39	36	17:06 (109)	18:16			19:46	20:17	40	08:01 (33)	20:47	40	19:58 (108)	21:07	62	20:14 (108)
21	07:53		16:29 (109)	07:21			07:38	06:49		07:20 (33)	06:15		19:16 (108)	06:06		19:13 (108)
	17:40	37	17:06 (109)	18:17			19:47	20:18	40	08:00 (33)	20:48	43	19:59 (108)	21:07	62	20:15 (108)
22	07:52		16:30 (109)	07:20			07:36	06:48		07:20 (33)	06:14		19:16 (108)	06:06		19:13 (108)
	17:41	37	17:07 (109)	18:18			19:49	20:19	40	08:00 (33)	20:49	45	20:01 (108)	21:08	62	20:15 (108)
23	07:52		16:30 (109)	07:18			07:35	06:47		07:20 (33)	06:13		19:15 (108)	06:06		19:13 (108)
	17:42	37	17:07 (109)	18:19			19:50	20:20	40	08:00 (33)	20:50	46	20:01 (108)	21:08	62	20:15 (108)
24	07:51		16:30 (109)	07:17			07:33	06:45		07:19 (33)	06:13		19:14 (108)	06:06		19:13 (108)
	17:44	37	17:07 (109)	18:20			19:51	20:21	40	07:59 (33)	20:50	48	20:02 (108)	21:08	62	20:15 (108)
25	07:50		16:31 (109)	07:16			07:32	06:44		07:20 (33)	06:12		19:14 (108)	06:07		19:14 (108)
	17:45	37	17:08 (109)	18:22			19:52	20:22	39	07:59 (33)	20:51	49	20:03 (108)	21:08	62	20:16 (108)
26	07:50		16:31 (109)	07:14			07:30	06:42		07:19 (33)	06:11		19:13 (108)	06:07		19:14 (108)
	17:46	37	17:08 (109)	18:23			19:53	20:23	39	07:58 (33)	20:52	51	20:04 (108)	21:08	61	20:15 (108)
27	07:49		16:31 (109)	07:13			07:28	06:41		07:20 (33)	06:11		19:13 (108)	06:07		19:14 (108)
	17:47	37	17:08 (109)	18:24			19:54	20:24	37	07:57 (33)	20:53	52	20:05 (108)	21:08	61	20:15 (108)
28	07:48		16:31 (109)	07:11			07:27	06:40		07:20 (33)	06:10		19:12 (108)	06:08		19:15 (108)
	17:48	37	17:08 (109)	18:25			19:55	20:25	37	07:57 (33)	20:54	53	20:05 (108)	21:08	61	20:16 (108)
29	07:47		16:32 (109)				07:25	06:38		07:21 (33)	06:10		19:12 (108)	06:08		19:14 (108)
	17:50	36	17:08 (109)				19:56	20:26	35	07:56 (33)	20:55	54	20:06 (108)	21:08	62	20:16 (108)
30	07:46		16:32 (109)				07:23	06:37		07:21 (33)	06:09		19:12 (108)	06:09		19:15 (108)
	17:51	36	17:08 (109)				19:57	20:27	34	07:55 (33)	20:55	54	20:06 (108)	21:08	61	20:16 (108)
31	07:45		16:33 (109)				07:22				06:09		19:12 (108)			
	17:52	35	17:08 (109)				19:58				20:56	55	20:07 (108)			
Potential sun hours	300			299			370	397			446			449		
Total, worst case		930			235				761			937			1819	
Sun reduction		0.36			0.42				0.51			0.56			0.60	
Oper. time red.		1.00			1.00				1.00			1.00			1.00	
Wind dir. red.		0.68			0.68				0.67			0.64			0.63	
Total reduction		0.25			0.29				0.34			0.36			0.38	
Total, real		228			67				260			335			689	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 10

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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 581 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6310)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October	November			December		
1	06:09		19:15 (108)	06:32			07:02		07:29 (33)	07:31	07:04		16:21 (109)	07:37		16:12 (109)
	21:08	61	20:16 (108)	20:51			20:09	25	07:54 (33)	19:19	17:33	2	16:22 (109)	17:10	29	16:41 (109)
2	06:10		19:16 (108)	06:33			07:03		07:31 (33)	07:32	07:05		16:15 (109)	07:38		16:13 (109)
	21:08	61	20:17 (108)	20:50			20:08	21	07:52 (33)	19:17	17:32	14	16:29 (109)	17:10	27	16:40 (109)
3	06:10		19:16 (108)	06:34			07:04		07:34 (33)	07:33	07:06		16:12 (109)	07:39		16:14 (109)
	21:08	60	20:16 (108)	20:49			20:06	15	07:49 (33)	19:15	17:31	19	16:31 (109)	17:10	26	16:40 (109)
4	06:11		19:17 (108)	06:35			07:05			07:34	07:07		16:10 (109)	07:40		16:15 (109)
	21:08	60	20:17 (108)	20:48			20:05			19:14	17:30	23	16:33 (109)	17:10	25	16:40 (109)
5	06:11		19:16 (108)	06:36		07:44 (33)	07:06			07:35	07:08		16:09 (109)	07:41		16:17 (109)
	21:08	60	20:16 (108)	20:47	6	07:50 (33)	20:03			19:12	17:29	25	16:34 (109)	17:09	22	16:39 (109)
6	06:12		19:17 (108)	06:37		07:40 (33)	07:07			07:36	07:09		16:08 (109)	07:42		16:18 (109)
	21:08	59	20:16 (108)	20:45	14	07:54 (33)	20:01			19:10	17:28	28	16:36 (109)	17:09	21	16:39 (109)
7	06:12		19:17 (108)	06:38		07:37 (33)	07:08			07:37	07:10		16:07 (109)	07:43		16:19 (109)
	21:07	59	20:16 (108)	20:44	19	07:56 (33)	20:00			19:09	17:27	30	16:37 (109)	17:09	20	16:39 (109)
8	06:13		19:18 (108)	06:39		07:35 (33)	07:09			07:38	07:12		16:06 (109)	07:44		16:20 (109)
	21:07	58	20:16 (108)	20:43	23	07:58 (33)	19:57			19:07	17:26	31	16:37 (109)	17:09	19	16:39 (109)
9	06:14		19:19 (108)	06:40		07:34 (33)	07:10			07:39	07:13		16:05 (109)	07:45		16:22 (109)
	21:07	57	20:16 (108)	20:42	26	08:00 (33)	19:55			19:06	17:25	33	16:38 (109)	17:09	16	16:38 (109)
10	06:14		19:18 (108)	06:41		07:33 (33)	07:10			07:40	07:14		16:05 (109)	07:46		16:23 (109)
	21:06	58	20:16 (108)	20:41	28	08:01 (33)	19:53			19:04	17:24	34	16:39 (109)	17:09	15	16:38 (109)
11	06:15		19:19 (108)	06:42		07:31 (33)	07:11			07:41	07:15		16:05 (109)	07:47		16:25 (109)
	21:06	57	20:16 (108)	20:39	31	08:02 (33)	19:52			19:03	17:23	35	16:40 (109)	17:09	13	16:38 (109)
12	06:16		19:20 (108)	06:43		07:30 (33)	07:12			07:42	07:16		16:04 (109)	07:47		16:25 (109)
	21:06	56	20:16 (108)	20:38	33	08:03 (33)	19:50			19:01	17:22	36	16:40 (109)	17:10	11	16:36 (109)
13	06:16		19:20 (108)	06:44		07:29 (33)	07:13			07:43	07:17		16:04 (109)	07:48		16:27 (109)
	21:05	55	20:15 (108)	20:37	35	08:04 (33)	19:48			18:59	17:21	36	16:40 (109)	17:10	9	16:36 (109)
14	06:17		19:21 (108)	06:45		07:29 (33)	07:14			07:44	07:19		16:03 (109)	07:49		16:29 (109)
	21:05	54	20:15 (108)	20:36	35	08:04 (33)	19:47			18:58	17:20	37	16:40 (109)	17:10	6	16:35 (109)
15	06:18		19:21 (108)	06:46		07:28 (33)	07:15			07:45	07:20		16:04 (109)	07:50		16:32 (109)
	21:04	54	20:15 (108)	20:34	37	08:05 (33)	19:45			18:56	17:19	37	16:41 (109)	17:10	2	16:34 (109)
16	06:19		19:22 (108)	06:47		07:27 (33)	07:16			07:46	07:21		16:04 (109)	07:50		
	21:04	53	20:15 (108)	20:33	38	08:05 (33)	19:43			18:55	17:18	37	16:41 (109)	17:10		
17	06:19		19:22 (108)	06:48		07:26 (33)	07:17			07:47	07:22		16:04 (109)	07:51		
	21:03	51	20:13 (108)	20:32	38	08:04 (33)	19:42			18:53	17:17	37	16:41 (109)	17:11		
18	06:20		19:23 (108)	06:49		07:25 (33)	07:18			07:48	07:23		16:04 (109)	07:52		
	21:02	50	20:13 (108)	20:30	40	08:05 (33)	19:40			18:52	17:17	37	16:41 (109)	17:11		
19	06:21		19:24 (108)	06:50		07:25 (33)	07:19			07:49	07:24		16:05 (109)	07:52		
	21:02	49	20:13 (108)	20:29	40	08:05 (33)	19:38			18:51	17:16	37	16:42 (109)	17:11		
20	06:22		19:25 (108)	06:50		07:25 (33)	07:20			07:50	07:25		16:05 (109)	07:53		
	21:01	47	20:12 (108)	20:27	40	08:05 (33)	19:37			18:49	17:15	37	16:42 (109)	17:12		
21	06:23		19:25 (108)	06:51		07:25 (33)	07:21			07:51	07:27		16:05 (109)	07:53		
	21:00	46	20:11 (108)	20:26	40	08:05 (33)	19:35			18:48	17:15	37	16:42 (109)	17:12		
22	06:23		19:26 (108)	06:52		07:25 (33)	07:22			07:52	07:28		16:06 (109)	07:54		
	21:00	44	20:10 (108)	20:25	40	08:05 (33)	19:33			18:46	17:14	36	16:42 (109)	17:13		
23	06:24		19:28 (108)	06:53		07:25 (33)	07:23			07:53	07:29		16:06 (109)	07:54		
	20:59	41	20:09 (108)	20:23	39	08:04 (33)	19:32			18:45	17:14	36	16:42 (109)	17:13		
24	06:25		19:29 (108)	06:54		07:25 (33)	07:24			07:55	07:30		16:07 (109)	07:55		
	20:58	39	20:08 (108)	20:22	39	08:04 (33)	19:30			18:44	17:13	34	16:41 (109)	17:14		
25	06:26		19:30 (108)	06:55		07:25 (33)	07:25			07:56	07:31		16:08 (109)	07:55		
	20:57	37	20:07 (108)	20:20	38	08:03 (33)	19:28			18:42	17:12	34	16:42 (109)	17:14		
26	06:27		19:32 (108)	06:56		07:25 (33)	07:26			07:57	07:32		16:09 (109)	07:56		
	20:56	34	20:06 (108)	20:19	38	08:03 (33)	19:27			18:41	17:12	33	16:42 (109)	17:15		
27	06:28		19:33 (108)	06:57		07:26 (33)	07:27			07:58	07:33		16:09 (109)	07:56		
	20:56	30	20:03 (108)	20:17	36	08:02 (33)	19:25			18:40	17:12	33	16:42 (109)	17:16		
28	06:29		19:35 (108)	06:58		07:26 (33)	07:28			07:59	07:34		16:10 (109)	07:56		
	20:55	26	20:01 (108)	20:16	35	08:01 (33)	19:23			18:38	17:11	31	16:41 (109)	17:16		
29	06:30		19:38 (108)	06:59		07:26 (33)	07:29			08:00	07:35		16:11 (109)	07:57		16:37 (109)
	20:54	21	19:59 (108)	20:14	33	07:59 (33)	19:22			18:37	17:11	30	16:41 (109)	17:17	5	16:42 (109)
30	06:31		19:42 (108)	07:00		07:27 (33)	07:30			08:01	07:36		16:12 (109)	07:57		16:35 (109)
	20:53	13	19:55 (108)	20:12	31	07:58 (33)	19:20			18:36	17:10	29	16:41 (109)	17:18	8	16:43 (109)
31	06:31			07:01		07:28 (33)				08:02				07:57		16:34 (109)
	20:52			20:11	28	07:56 (33)				18:35				17:19	11	16:45 (109)
Potential sun hours	456			427			374			346	300			291		
Total, worst case		1450			880			61				938			285	
Sun reduction		0.60			0.60			0.61				0.37			0.50	
Oper. time red.		1.00			1.00			1.00				1.00			1.00	
Wind dir. red.		0.63			0.67			0.67				0.68			0.68	
Total reduction		0.38			0.40			0.41				0.25			0.34	
Total, real		549			354			25				236			97	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 11

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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 658 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6311)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January	February			March			April			May			June
1	07:57	07:45			07:10		07:33 (33)	07:20		17:43 (108)	06:36		07:04 (28)	06:08
	17:20	17:53			18:26	70	17:36 (108)	19:59	51	18:34 (108)	20:28	38	07:42 (28)	20:57
2	07:58	07:44			07:08		07:32 (33)	07:19		17:44 (108)	06:35		07:04 (28)	06:08
	17:21	17:54			18:27	76	17:37 (108)	20:00	49	18:33 (108)	20:29	39	07:43 (28)	20:58
3	07:58	07:43			07:07		07:31 (33)	07:17		17:46 (108)	06:33		07:04 (28)	06:07
	17:21	17:56			18:28	81	17:39 (108)	20:00	45	18:31 (108)	20:30	39	07:43 (28)	20:58
4	07:58	07:42			07:05		07:30 (33)	07:15		17:47 (108)	06:32		07:04 (28)	06:07
	17:22	17:57			18:29	85	17:40 (108)	20:01	42	18:29 (108)	20:31	39	07:43 (28)	20:59
5	07:58	07:41			07:04		07:30 (33)	07:14		17:48 (108)	06:31		07:03 (28)	06:07
	17:23	17:58			18:31	88	17:41 (108)	20:02	39	18:27 (108)	20:32	39	07:42 (28)	21:00
6	07:58	07:40			07:02		07:29 (33)	07:12		17:51 (108)	06:30		07:03 (28)	06:06
	17:24	17:59			18:32	91	17:42 (108)	20:03	34	18:25 (108)	20:33	39	07:42 (28)	21:00
7	07:58	07:39			07:01		07:29 (33)	07:11		17:53 (108)	06:29		07:03 (28)	06:06
	17:25	18:00			18:33	94	17:43 (108)	20:04	29	18:22 (108)	20:34	39	07:42 (28)	21:01
8	07:57	07:37			07:59		08:28 (33)	07:09		17:56 (108)	06:27		07:03 (28)	06:06
	17:26	18:02			19:34	96	18:44 (108)	20:05	23	18:19 (108)	20:35	38	07:41 (28)	21:02
9	07:57	07:36			07:57		08:27 (33)	07:07		18:01 (108)	06:26		07:04 (28)	06:06
	17:27	18:03			19:35	99	18:44 (108)	20:06	12	18:13 (108)	20:36	37	07:41 (28)	21:02
10	07:57	07:35			07:56		08:28 (33)	07:06			06:25		07:04 (28)	06:06
	17:28	18:04			19:36	99	18:45 (108)	20:07			20:37	37	07:41 (28)	21:03
11	07:57	07:34			07:54		08:28 (33)	07:04			06:24		07:04 (28)	06:05
	17:29	18:05			19:37	99	18:45 (108)	20:08			20:38	36	07:40 (28)	21:03
12	07:57	07:33			07:53		08:28 (33)	07:03			06:23		07:05 (28)	06:05
	17:30	18:06			19:38	99	18:46 (108)	20:09			20:39	34	07:39 (28)	21:04
13	07:56	07:32			07:51		08:28 (33)	07:01			06:22		07:05 (28)	06:05
	17:31	18:08			19:39	99	18:46 (108)	20:10			20:40	34	07:39 (28)	21:04
14	07:56	07:30			07:49		08:29 (33)	07:00			06:21		07:06 (28)	06:05
	17:32	18:09			19:40	96	18:45 (108)	20:11			20:41	32	07:38 (28)	21:05
15	07:56	07:29			07:48		08:30 (33)	06:58			06:20		07:06 (28)	06:05
	17:33	18:10			19:41	96	18:46 (108)	20:12			20:42	31	07:37 (28)	21:05
16	07:55	07:28			07:46		08:31 (33)	06:57			06:19		07:07 (28)	06:05
	17:34	18:11			19:42	94	18:46 (108)	20:13			20:43	29	07:36 (28)	21:06
17	07:55	07:27			07:45		08:32 (33)	06:55			06:18		07:09 (28)	06:05
	17:36	18:12			19:43	89	18:45 (108)	20:14			20:44	27	07:36 (28)	21:06
18	07:55	07:25			07:43		08:34 (33)	06:54			06:17		07:10 (28)	06:05
	17:37	18:14			19:44	86	18:46 (108)	20:15			20:45	25	07:35 (28)	21:07
19	07:54	07:24			07:41		08:37 (33)	06:52			06:17		07:11 (28)	06:05
	17:38	18:15			19:45	79	18:45 (108)	20:16			20:46	23	07:34 (28)	21:07
20	07:53	07:23			07:40		17:38 (108)	06:51		07:19 (28)	06:16		07:12 (28)	06:06
	17:39	18:16			19:46	67	18:45 (108)	20:17	13	07:32 (28)	20:47	20	07:32 (28)	21:07
21	07:53	07:21			07:38		17:38 (108)	06:49		07:15 (28)	06:15		07:13 (28)	06:06
	17:40	18:17			19:47	66	18:44 (108)	20:18	20	07:35 (28)	20:48	17	07:30 (28)	21:07
22	07:52	07:20			07:36		17:37 (108)	06:48		07:13 (28)	06:14		07:16 (28)	06:06
	17:41	18:18			19:49	67	18:44 (108)	20:19	24	07:37 (28)	20:49	13	07:29 (28)	21:08
23	07:52	07:18			07:35		17:38 (108)	06:47		07:12 (28)	06:13		07:18 (28)	06:06
	17:42	18:19			19:50	66	18:44 (108)	20:20	27	07:39 (28)	20:50	8	07:26 (28)	21:08
24	07:51	07:17			07:33		17:38 (108)	06:45		07:10 (28)	06:13			06:06
	17:44	18:20			19:51	65	18:43 (108)	20:21	29	07:39 (28)	20:50			21:08
25	07:50	07:16		07:42 (33)	07:32		17:38 (108)	06:44		07:09 (28)	06:12			06:07
	17:45	18:22	27	17:23 (108)	19:52	64	18:42 (108)	20:22	31	07:40 (28)	20:51			21:08
26	07:50	07:14		07:38 (33)	07:30		17:39 (108)	06:42		07:07 (28)	06:11			06:07
	17:46	18:23	43	17:27 (108)	19:53	62	18:41 (108)	20:23	33	07:40 (28)	20:52			21:08
27	07:49	07:13		07:36 (33)	07:28		17:39 (108)	06:41		07:06 (28)	06:11			06:07
	17:47	18:24	55	17:31 (108)	19:54	61	18:40 (108)	20:24	35	07:41 (28)	20:53			21:08
28	07:48	07:11		07:34 (33)	07:27		17:39 (108)	06:40		07:06 (28)	06:10			06:08
	17:48	18:25	63	17:33 (108)	19:55	60	18:39 (108)	20:25	36	07:42 (28)	20:54			21:08
29	07:47				07:25		17:41 (108)	06:38		07:05 (28)	06:10			06:08
	17:50				19:56	57	18:38 (108)	20:26	38	07:43 (28)	20:55			21:08
30	07:46				07:23		17:41 (108)	06:37		07:04 (28)	06:09			06:09
	17:51				19:57	56	18:37 (108)	20:27	38	07:42 (28)	20:55			21:08
31	07:45				07:22		17:42 (108)				06:09			
	17:52				19:58	53	18:35 (108)				20:56			
Potential sun hours	300	299			370			397			446			449
Total, worst case			188			2460			648			713		
Sun reduction			0.42			0.44			0.51			0.56		
Oper. time red.			1.00			1.00			1.00			1.00		
Wind dir. red.			0.66			0.66			0.67			0.67		
Total reduction			0.28			0.29			0.34			0.37		
Total, real			52			718			221			267		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 12

Licensed user:
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217 Montgomery St.
US-SYRACUSE, NY 13202
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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative**Shadow receptor:** 658 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6311)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November	December
1	06:09			06:32		07:15 (28)	07:02			07:31		08:07 (33)	07:04	07:37
	21:08			20:51	35	07:50 (28)	20:09			19:19	100	18:25 (108)	17:33	17:10
2	06:10			06:33		07:15 (28)	07:03			07:32		08:06 (33)	07:05	07:38
	21:08			20:50	36	07:51 (28)	20:08			19:17	100	18:24 (108)	17:32	17:10
3	06:10			06:34		07:14 (28)	07:04		17:59 (108)	07:33		08:06 (33)	07:06	07:39
	21:08			20:49	37	07:51 (28)	20:06	12	18:11 (108)	19:15	99	18:23 (108)	17:31	17:10
4	06:11			06:35		07:14 (28)	07:05		17:53 (108)	07:34		08:05 (33)	07:07	07:40
	21:08			20:48	38	07:52 (28)	20:05	23	18:16 (108)	19:14	98	18:22 (108)	17:30	17:10
5	06:11			06:36		07:13 (28)	07:06		17:50 (108)	07:35		08:05 (33)	07:08	07:41
	21:08			20:47	38	07:51 (28)	20:03	29	18:19 (108)	19:12	97	18:21 (108)	17:29	17:09
6	06:12			06:37		07:13 (28)	07:07		17:47 (108)	07:36		08:04 (33)	07:09	07:42
	21:08			20:45	38	07:51 (28)	20:01	34	18:21 (108)	19:10	95	18:19 (108)	17:28	17:09
7	06:12			06:38		07:13 (28)	07:08		17:44 (108)	07:37		08:04 (33)	07:10	07:43
	21:07			20:44	38	07:51 (28)	20:00	39	18:23 (108)	19:09	93	18:18 (108)	17:27	17:09
8	06:13			06:39		07:12 (28)	07:09		17:42 (108)	07:38		08:04 (33)	07:12	07:44
	21:07			20:43	40	07:52 (28)	19:57	42	18:24 (108)	19:07	91	18:17 (108)	17:26	17:09
9	06:14			06:40		07:12 (28)	07:10		17:39 (108)	07:39		08:04 (33)	07:13	07:45
	21:07			20:42	40	07:52 (28)	19:55	45	18:24 (108)	19:06	87	18:15 (108)	17:25	17:09
10	06:14			06:41		07:12 (28)	07:10		17:37 (108)	07:40		08:04 (33)	07:14	07:46
	21:06			20:41	39	07:51 (28)	19:53	49	18:26 (108)	19:04	83	18:13 (108)	17:24	17:09
11	06:15			06:42		07:13 (28)	07:11		17:36 (108)	07:41		08:05 (33)	07:15	07:47
	21:06			20:39	38	07:51 (28)	19:52	50	18:26 (108)	19:03	79	18:12 (108)	17:23	17:09
12	06:16			06:43		07:13 (28)	07:12		17:34 (108)	07:42		08:05 (33)	07:16	07:47
	21:06			20:38	38	07:51 (28)	19:50	53	18:27 (108)	19:01	74	18:09 (108)	17:22	17:10
13	06:16			06:44		07:13 (28)	07:13		17:33 (108)	07:43		08:07 (33)	07:17	07:48
	21:05			20:37	38	07:51 (28)	19:48	55	18:28 (108)	18:59	67	18:08 (108)	17:21	17:10
14	06:17			06:45		07:13 (28)	07:14		17:31 (108)	07:44		08:08 (33)	07:19	07:49
	21:05			20:36	37	07:50 (28)	19:47	57	18:28 (108)	18:58	60	18:05 (108)	17:20	17:10
15	06:18			06:46		07:14 (28)	07:15		17:30 (108)	07:45		08:10 (33)	07:20	07:50
	21:04			20:34	36	07:50 (28)	19:45	59	18:29 (108)	18:56	50	18:02 (108)	17:19	17:10
16	06:19			06:47		07:14 (28)	07:16		17:29 (108)	07:46		08:12 (33)	07:21	07:50
	21:04			20:33	35	07:49 (28)	19:43	60	18:29 (108)	18:55	38	17:58 (108)	17:18	17:10
17	06:19			06:48		07:14 (28)	07:17		17:28 (108)	07:47		08:15 (33)	07:22	07:51
	21:03			20:32	33	07:47 (28)	19:42	62	18:30 (108)	18:53	16	17:50 (108)	17:17	17:11
18	06:20			06:49		07:15 (28)	07:18		17:27 (108)	07:48			07:23	07:52
	21:02			20:30	31	07:46 (28)	19:40	63	18:30 (108)	18:52			17:17	17:11
19	06:21			06:50		07:16 (28)	07:19		17:26 (108)	07:49			07:24	07:52
	21:02			20:29	29	07:45 (28)	19:38	64	18:30 (108)	18:51			17:16	17:11
20	06:22			06:50		07:17 (28)	07:20		17:25 (108)	07:50			07:25	07:53
	21:01			20:27	26	07:43 (28)	19:37	65	18:30 (108)	18:49			17:15	17:12
21	06:23		07:26 (28)	06:51		07:18 (28)	07:21		17:23 (108)	07:51			07:27	07:53
	21:00	11	07:37 (28)	20:26	23	07:41 (28)	19:35	66	18:29 (108)	18:48			17:15	17:12
22	06:23		07:24 (28)	06:52		07:20 (28)	07:22		17:22 (108)	07:52			07:28	07:54
	21:00	16	07:40 (28)	20:25	19	07:39 (28)	19:33	67	18:29 (108)	18:46			17:14	17:13
23	06:24		07:23 (28)	06:53		07:23 (28)	07:23		17:22 (108)	07:53			07:29	07:54
	20:59	19	07:42 (28)	20:23	13	07:36 (28)	19:32	67	18:29 (108)	18:45			17:14	17:13
24	06:25		07:22 (28)	06:54			07:24		08:23 (33)	07:55			07:30	07:55
	20:58	21	07:43 (28)	20:22			19:30	73	18:28 (108)	18:44			17:13	17:14
25	06:26		07:21 (28)	06:55			07:25		08:18 (33)	07:56			07:31	07:55
	20:57	24	07:45 (28)	20:20			19:28	84	18:28 (108)	18:42			17:12	17:14
26	06:27		07:20 (28)	06:56			07:26		08:15 (33)	07:57			07:32	07:56
	20:57	26	07:46 (28)	20:19			19:27	89	18:28 (108)	18:41			17:12	17:15
27	06:28		07:18 (28)	06:57			07:27		08:13 (33)	07:58			07:33	07:56
	20:56	28	07:46 (28)	20:17			19:25	91	18:27 (108)	18:40			17:12	17:16
28	06:29		07:17 (28)	06:58			07:28		08:11 (33)	07:59			07:34	07:56
	20:55	30	07:47 (28)	20:16			19:23	96	18:27 (108)	18:38			17:11	17:16
29	06:30		07:17 (28)	06:59			07:29		08:10 (33)	08:00			07:35	07:57
	20:54	31	07:48 (28)	20:14			19:22	97	18:26 (108)	18:37			17:11	17:17
30	06:31		07:16 (28)	07:00			07:30		08:08 (33)	08:01			07:36	07:57
	20:53	33	07:49 (28)	20:13			19:20	98	18:25 (108)	18:36			17:10	17:18
31	06:31		07:16 (28)	07:01						08:02				07:57
	20:52	34	07:50 (28)	20:11						18:35				17:19
Potential sun hours	456			427			374			346			300	291
Total, worst case		273			775			1689			1327			
Sun reduction		0.60			0.60			0.61			0.56			
Oper. time red.		1.00			1.00			1.00			1.00			
Wind dir. red.		0.67			0.67			0.67			0.66			
Total reduction		0.40			0.40			0.41			0.37			
Total, real		109			310			689			489			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 13

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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 662 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6312)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		16:03 (32)	07:45		08:23 (108)	07:10			07:20		08:32 (83)	06:36			06:08		06:50 (82)
	17:20	29	16:32 (32)	17:53	28	08:51 (108)	18:26			19:59	3	08:35 (83)	20:28			20:57	91	20:25 (107)
2	07:58		16:04 (32)	07:44		08:24 (108)	07:08			07:19			06:35			06:08		06:51 (82)
	17:21	28	16:32 (32)	17:54	27	08:51 (108)	18:27			20:00			20:29			20:58	92	20:26 (107)
3	07:58		16:05 (32)	07:43		08:25 (108)	07:07			07:17			06:33			06:07		06:51 (82)
	17:21	28	16:33 (32)	17:56	25	08:50 (108)	18:28			20:00			20:30			20:59	94	20:27 (107)
4	07:58		16:05 (32)	07:42		08:26 (108)	07:05			07:15			06:32			06:07		06:50 (82)
	17:22	27	16:32 (32)	17:57	23	08:49 (108)	18:29			20:01			20:31			20:59	93	20:26 (107)
5	07:58		16:06 (32)	07:41		08:26 (108)	07:04			07:14			06:31			06:07		06:50 (82)
	17:23	26	16:32 (32)	17:58	21	08:47 (108)	18:31			20:02			20:32			21:00	95	20:27 (107)
6	07:58		16:07 (32)	07:40		08:28 (108)	07:02			07:12			06:30			06:06		06:51 (82)
	17:24	26	16:33 (32)	17:59	18	08:46 (108)	18:32			20:03			20:33			21:01	94	20:27 (107)
7	07:58		16:08 (32)	07:39		08:30 (108)	07:01		07:38 (83)	07:11			06:29			06:06		06:51 (82)
	17:25	25	16:33 (32)	18:01	14	08:44 (108)	18:33	8	07:46 (83)	20:04			20:34			21:01	95	20:28 (107)
8	07:58		08:26 (108)	07:37		08:35 (108)	07:59		08:32 (83)	07:09			06:27			06:06		06:50 (82)
	17:26	32	16:33 (32)	18:02	5	08:40 (108)	19:34	18	08:50 (83)	20:05			20:35			21:02	95	20:27 (107)
9	07:57		08:24 (108)	07:36			07:57		08:29 (83)	07:08			06:26			06:06		06:51 (82)
	17:27	35	16:33 (32)	18:03			19:35	23	08:52 (83)	20:06			20:36			21:02	96	20:28 (107)
10	07:57		08:24 (108)	07:35			07:56		08:27 (83)	07:06			06:25			06:06		06:51 (82)
	17:28	36	16:33 (32)	18:04			19:36	27	08:54 (83)	20:07			20:37			21:03	96	20:28 (107)
11	07:57		08:22 (108)	07:34			07:54		08:25 (83)	07:04			06:24		07:10 (82)	06:05		06:51 (82)
	17:29	37	16:32 (32)	18:05			19:37	30	08:55 (83)	20:08			20:38	11	07:21 (82)	21:04	96	20:29 (107)
12	07:57		08:22 (108)	07:33			07:53		08:24 (83)	07:03			06:23		07:06 (82)	06:05		06:51 (82)
	17:30	36	16:31 (32)	18:07			19:38	33	08:57 (83)	20:09			20:39	19	07:25 (82)	21:04	97	20:29 (107)
13	07:57		08:22 (108)	07:32			07:51		08:23 (83)	07:01			06:22		07:03 (82)	06:05		06:51 (82)
	17:31	35	16:31 (32)	18:08			19:39	34	08:57 (83)	20:10			20:40	24	07:27 (82)	21:05	97	20:29 (107)
14	07:56		08:21 (108)	07:30			07:49		08:21 (83)	07:00			06:21		07:01 (82)	06:05		06:52 (82)
	17:32	34	16:29 (32)	18:09			19:40	36	08:57 (83)	20:11			20:41	28	07:29 (82)	21:05	96	20:29 (107)
15	07:56		08:21 (108)	07:29			07:48		08:21 (83)	06:58			06:20		07:00 (82)	06:05		06:52 (82)
	17:33	31	16:28 (32)	18:10			19:41	37	08:58 (83)	20:12			20:42	35	20:06 (107)	21:05	96	20:30 (107)
16	07:55		08:20 (108)	07:28			07:46		08:20 (83)	06:57			06:19		06:58 (82)	06:05		06:52 (82)
	17:34	25	08:45 (108)	18:11			19:42	38	08:58 (83)	20:13			20:43	48	20:11 (107)	21:06	97	20:30 (107)
17	07:55		08:20 (108)	07:27			07:45		08:19 (83)	06:55			06:18		06:58 (82)	06:05		06:52 (82)
	17:36	26	08:46 (108)	18:12			19:43	39	08:58 (83)	20:14			20:44	54	20:14 (107)	21:06	97	20:30 (107)
18	07:55		08:19 (108)	07:25			07:43		08:19 (83)	06:54			06:17		06:57 (82)	06:05		06:52 (82)
	17:37	28	08:47 (108)	18:14			19:44	39	08:58 (83)	20:15			20:45	60	20:16 (107)	21:07	97	20:30 (107)
19	07:54		08:20 (108)	07:24			07:41		08:18 (83)	06:52			06:17		06:56 (82)	06:05		06:52 (82)
	17:38	28	08:48 (108)	18:15			19:45	39	08:57 (83)	20:16			20:46	65	20:17 (107)	21:07	97	20:30 (107)
20	07:54		08:19 (108)	07:23			07:40		08:18 (83)	06:51			06:16		06:55 (82)	06:06		06:53 (82)
	17:39	29	08:48 (108)	18:16			19:46	40	08:58 (83)	20:17			20:47	68	20:18 (107)	21:07	97	20:31 (107)
21	07:53		08:20 (108)	07:21			07:38		08:18 (83)	06:49			06:15		06:55 (82)	06:06		06:53 (82)
	17:40	30	08:50 (108)	18:17			19:48	39	08:57 (83)	20:18			20:48	72	20:20 (107)	21:07	97	20:31 (107)
22	07:52		08:20 (108)	07:20			07:37		08:17 (83)	06:48			06:14		06:54 (82)	06:06		06:53 (82)
	17:41	30	08:50 (108)	18:18			19:49	39	08:56 (83)	20:19			20:49	74	20:20 (107)	21:08	97	20:31 (107)
23	07:52		08:19 (108)	07:18			07:35		08:18 (83)	06:47			06:14		06:53 (82)	06:06		06:53 (82)
	17:42	31	08:50 (108)	18:19			19:50	38	08:56 (83)	20:20			20:50	77	20:21 (107)	21:08	97	20:31 (107)
24	07:51		08:19 (108)	07:17			07:33		08:18 (83)	06:45			06:13		06:52 (82)	06:06		06:53 (82)
	17:44	31	08:50 (108)	18:21			19:51	36	08:54 (83)	20:21			20:51	80	20:21 (107)	21:08	97	20:31 (107)
25	07:50		08:20 (108)	07:16			07:32		08:18 (83)	06:44			06:12		06:52 (82)	06:07		06:54 (82)
	17:45	31	08:51 (108)	18:22			19:52	35	08:53 (83)	20:22			20:51	82	20:22 (107)	21:08	97	20:32 (107)
26	07:50		08:20 (108)	07:14			07:30		08:19 (83)	06:42			06:11		06:51 (82)	06:07		06:54 (82)
	17:46	31	08:51 (108)	18:23			19:53	33	08:52 (83)	20:23			20:52	85	20:23 (107)	21:08	97	20:32 (107)
27	07:49		08:20 (108)	07:13			07:28		08:19 (83)	06:41			06:11		06:52 (82)	06:07		06:55 (82)
	17:47	31	08:51 (108)	18:24			19:54	32	08:51 (83)	20:24			20:53	86	20:24 (107)	21:08	97	20:33 (107)
28	07:48		08:20 (108)	07:11			07:27		08:20 (83)	06:40			06:10		06:51 (82)	06:08		06:55 (82)
	17:48	31	08:51 (108)	18:25			19:55	28	08:48 (83)	20:25			20:54	88	20:24 (107)	21:08	96	20:32 (107)
29	07:47		08:20 (108)				07:25		08:22 (83)	06:38			06:10		06:51 (82)	06:08		06:55 (82)
	17:50	31	08:51 (108)				19:56	25	08:47 (83)	20:26			20:55	89	20:25 (107)	21:08	96	20:32 (107)
30	07:46		08:21 (108)				07:23		08:23 (83)	06:37			06:09		06:51 (82)	06:09		06:55 (82)
	17:51	30	08:51 (108)				19:57	21	08:44 (83)	20:27			20:56	90	20:25 (107)	21:08	97	20:33 (107)
31	07:46		08:22 (108)				07:22		08:26 (83)				06:09		06:51 (82)			
	17:52	30	08:52 (108)				19:58	16	08:42 (83)				20:56	91	20:25 (107)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		938			161			783			3			1326			2876	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.63			0.60			0.63			0.63			0.66			0.66	
Total reduction		0.23			0.25			0.28			0.32			0.37			0.39	
Total, real		211			41			218			1			488			1129	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 14

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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 662 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6312)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:55 (82)	06:32		07:18 (82)	07:02			07:31		08:02 (83)	07:04			07:37		08:04 (108)
	21:08	97	20:33 (107)	20:51	16	07:34 (82)	20:09			19:19	34	08:36 (83)	17:33			17:10	37	16:14 (32)
2	06:10		06:56 (82)	06:33		07:23 (82)	07:03			07:32		08:03 (83)	07:05			07:38		08:06 (108)
	21:08	95	20:33 (107)	20:50	6	07:29 (82)	20:08			19:17	31	08:34 (83)	17:32			17:10	35	16:15 (32)
3	06:10		06:56 (82)	06:34			07:04			07:33		08:04 (83)	07:06		08:04 (108)	07:39		08:07 (108)
	21:08	96	20:33 (107)	20:49			20:06			19:15	28	08:32 (83)	17:31	7	08:11 (108)	17:10	35	16:16 (32)
4	06:11		06:56 (82)	06:35			07:05			07:34		08:06 (83)	07:07		08:00 (108)	07:40		08:09 (108)
	21:08	97	20:34 (107)	20:48			20:05			19:14	24	08:30 (83)	17:30	14	08:14 (108)	17:10	33	16:17 (32)
5	06:11		06:56 (82)	06:36			07:06			07:35		08:08 (83)	07:08		07:58 (108)	07:41		08:13 (108)
	21:08	95	20:33 (107)	20:47			20:03			19:12	20	08:28 (83)	17:29	18	08:16 (108)	17:09	27	16:18 (32)
6	06:12		06:57 (82)	06:37			07:07			07:36		08:11 (83)	07:09		07:57 (108)	07:42		15:53 (32)
	21:08	96	20:34 (107)	20:45			20:01			19:10	13	08:24 (83)	17:28	21	08:18 (108)	17:09	26	16:19 (32)
7	06:12		06:57 (82)	06:38			07:08			07:37			07:11		07:56 (108)	07:43		15:53 (32)
	21:07	94	20:33 (107)	20:44			20:00			19:09			17:27	23	08:19 (108)	17:09	26	16:19 (32)
8	06:13		06:57 (82)	06:39			07:09			07:38			07:12		07:55 (108)	07:44		15:53 (32)
	21:07	95	20:34 (107)	20:43			19:57			19:07			17:26	25	08:20 (108)	17:09	27	16:20 (32)
9	06:14		06:58 (82)	06:40			07:10			07:39			07:13		07:54 (108)	07:45		15:53 (32)
	21:07	94	20:34 (107)	20:42			19:55			19:06			17:25	27	08:21 (108)	17:09	28	16:21 (32)
10	06:14		06:58 (82)	06:41			07:11			07:40			07:14		07:54 (108)	07:46		15:54 (32)
	21:06	92	20:33 (107)	20:41			19:53			19:04			17:24	28	08:22 (108)	17:09	28	16:22 (32)
11	06:15		06:58 (82)	06:42			07:11			07:41			07:15		07:53 (108)	07:47		15:54 (32)
	21:06	93	20:34 (107)	20:39			19:52			19:03			17:23	30	08:23 (108)	17:09	29	16:23 (32)
12	06:16		06:59 (82)	06:43			07:12		08:18 (83)	07:42			07:16		07:53 (108)	07:47		15:53 (32)
	21:06	92	20:34 (107)	20:38			19:50	14	08:32 (83)	19:01			17:22	30	08:23 (108)	17:10	30	16:23 (32)
13	06:16		06:59 (82)	06:44			07:13		08:15 (83)	07:43			07:17		07:52 (108)	07:48		15:54 (32)
	21:05	90	20:33 (107)	20:37			19:48	20	08:35 (83)	19:00			17:21	31	08:23 (108)	17:10	29	16:23 (32)
14	06:17		06:59 (82)	06:45			07:14		08:12 (83)	07:44			07:19		07:53 (108)	07:49		15:54 (32)
	21:05	89	20:33 (107)	20:36			19:47	25	08:37 (83)	18:58			17:20	31	08:24 (108)	17:10	30	16:24 (32)
15	06:18		07:00 (82)	06:46			07:15		08:11 (83)	07:45			07:20		07:53 (108)	07:50		15:55 (32)
	21:04	87	20:33 (107)	20:34			19:45	27	08:38 (83)	18:57			17:19	31	08:24 (108)	17:10	30	16:25 (32)
16	06:19		07:01 (82)	06:47			07:16		08:09 (83)	07:46			07:21		07:53 (108)	07:50		15:55 (32)
	21:04	87	20:33 (107)	20:33			19:43	31	08:40 (83)	18:55			17:18	31	08:24 (108)	17:10	30	16:25 (32)
17	06:19		07:01 (82)	06:48			07:17		08:07 (83)	07:47			07:22		07:53 (108)	07:51		15:56 (32)
	21:03	85	20:32 (107)	20:32			19:42	33	08:40 (83)	18:54			17:17	31	08:24 (108)	17:11	30	16:26 (32)
18	06:20		07:01 (82)	06:49			07:18		08:06 (83)	07:48			07:23		07:53 (108)	07:52		15:56 (32)
	21:03	83	20:32 (107)	20:30			19:40	35	08:41 (83)	18:52			17:17	31	08:24 (108)	17:11	31	16:27 (32)
19	06:21		07:02 (82)	06:50			07:19		08:05 (83)	07:49			07:24		07:54 (108)	07:52		15:56 (32)
	21:02	81	20:32 (107)	20:29			19:38	37	08:42 (83)	18:51			17:16	31	08:25 (108)	17:11	31	16:27 (32)
20	06:22		07:03 (82)	06:51			07:20		08:04 (83)	07:50			07:25		07:55 (108)	07:53		15:57 (32)
	21:01	78	20:31 (107)	20:27			19:37	38	08:42 (83)	18:49			17:15	30	08:25 (108)	17:12	31	16:28 (32)
21	06:23		07:03 (82)	06:51			07:21		08:04 (83)	07:51			07:27		07:55 (108)	07:53		15:57 (32)
	21:01	76	20:30 (107)	20:26			19:35	38	08:42 (83)	18:48			17:15	30	08:25 (108)	17:12	31	16:28 (32)
22	06:24		07:04 (82)	06:52			07:22		08:02 (83)	07:52			07:28		07:55 (108)	07:54		15:58 (32)
	21:00	73	20:29 (107)	20:25			19:33	39	08:41 (83)	18:46			17:14	29	08:24 (108)	17:13	31	16:29 (32)
23	06:24		07:05 (82)	06:53			07:23		08:02 (83)	07:54			07:29		07:56 (108)	07:55		15:58 (32)
	20:59	70	20:29 (107)	20:23			19:32	39	08:41 (83)	18:45			17:14	28	08:24 (108)	17:13	31	16:29 (32)
24	06:25		07:06 (82)	06:54			07:24		08:01 (83)	07:55			07:30		07:57 (108)	07:55		15:59 (32)
	20:58	67	20:28 (107)	20:22			19:30	40	08:41 (83)	18:44			17:13	28	08:25 (108)	17:14	31	16:30 (32)
25	06:26		07:07 (82)	06:55			07:25		08:01 (83)	07:56			07:31		07:58 (108)	07:55		15:59 (32)
	20:57	62	20:27 (107)	20:20			19:28	40	08:41 (83)	18:42			17:13	26	08:24 (108)	17:15	31	16:30 (32)
26	06:27		07:08 (82)	06:56			07:26		08:01 (83)	07:57			07:32		07:59 (108)	07:56		15:59 (32)
	20:57	57	20:25 (107)	20:19			19:27	39	08:40 (83)	18:41			17:12	25	08:24 (108)	17:15	31	16:30 (32)
27	06:28		07:08 (82)	06:57			07:27		08:01 (83)	07:58			07:33		08:00 (108)	07:56		16:01 (32)
	20:56	52	20:23 (107)	20:17			19:25	38	08:39 (83)	18:40			17:12	30	16:06 (32)	17:16	30	16:31 (32)
28	06:29		07:09 (82)	06:58			07:28		08:01 (83)	07:59			07:34		08:01 (108)	07:56		16:01 (32)
	20:55	44	20:20 (107)	20:16			19:23	38	08:39 (83)	18:38			17:11	34	16:09 (32)	17:16	30	16:31 (32)
29	06:30		07:11 (82)	06:59			07:29		08:01 (83)	08:00			07:35		08:02 (108)	07:57		16:01 (32)
	20:54	30	07:41 (82)	20:14			19:22	37	08:38 (83)	18:37			17:11	35	16:11 (32)	17:17	30	16:31 (32)
30	06:31		07:13 (82)	07:00			07:30		08:02 (83)	08:01			07:36		08:03 (108)	07:57		16:02 (32)
	20:53	26	07:39 (82)	20:13			19:20	35	08:37 (83)	18:36			17:11	36	16:12 (32)	17:18	29	16:31 (32)
31	06:31		07:15 (82)	07:01						08:02						07:57		16:02 (32)
	20:52	22	07:37 (82)	20:11						18:35						17:19	30	16:32 (32)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		2395			22			643			150			771			938	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.66			0.68			0.63			0.63			0.61			0.67	
Total reduction		0.39			0.41			0.39			0.35			0.22			0.34	
Total, real		943			9			248			53			172			315	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 15

Licensed user:
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US-SYRACUSE, NY 13202
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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 732 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6313)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:19 (23)	07:44		08:29 (23)	07:10		07:45 (20)	07:20			06:36		19:51 (77)	06:08		
	17:20	41	16:50 (115)	17:53	18	16:50 (115)	18:26	46	08:31 (20)	19:59			20:28	13	20:04 (77)	20:57		
2	07:57		08:19 (23)	07:44		08:32 (23)	07:08		07:45 (20)	07:19			06:34		19:49 (77)	06:08		
	17:20	42	16:51 (115)	17:54	10	08:42 (23)	18:27	45	08:30 (20)	20:00			20:29	17	20:06 (77)	20:58		
3	07:58		08:19 (23)	07:43			07:07		07:45 (20)	07:17			06:33		19:48 (77)	06:07		
	17:21	44	16:52 (115)	17:56			18:28	46	08:31 (20)	20:00			20:30	19	20:07 (77)	20:58		
4	07:58		08:19 (23)	07:42			07:05		07:44 (20)	07:15		19:22 (116)	06:32		19:46 (77)	06:07		
	17:22	46	16:53 (115)	17:57			18:29	46	08:30 (20)	20:01	7	19:29 (116)	20:31	21	20:07 (77)	20:59		
5	07:58		08:19 (23)	07:41			07:04		07:44 (20)	07:14		19:17 (116)	06:31		19:45 (77)	06:07		
	17:23	47	16:53 (115)	17:58			18:30	46	08:30 (20)	20:02	16	19:33 (116)	20:32	23	20:08 (77)	21:00		
6	07:58		08:19 (23)	07:40			07:02		07:44 (20)	07:12		19:15 (116)	06:30		19:45 (77)	06:06		
	17:24	49	16:54 (115)	17:59			18:32	45	08:29 (20)	20:03	21	19:36 (116)	20:33	23	20:08 (77)	21:00		
7	07:58		08:19 (23)	07:38			07:00		07:43 (20)	07:11		19:12 (116)	06:28		19:45 (77)	06:06		
	17:25	50	16:55 (115)	18:00			18:33	45	08:28 (20)	20:04	25	19:37 (116)	20:34	24	20:09 (77)	21:01		
8	07:57		08:19 (23)	07:37			07:59		08:44 (20)	07:09		19:11 (116)	06:27		19:44 (77)	06:06		
	17:26	52	16:56 (115)	18:02			19:34	44	09:28 (20)	20:05	27	19:38 (116)	20:35	25	20:09 (77)	21:02		
9	07:57		08:19 (23)	07:36			07:57		08:44 (20)	07:07		19:09 (116)	06:26		19:44 (77)	06:06		
	17:27	54	16:57 (115)	18:03			19:35	43	09:27 (20)	20:06	30	19:39 (116)	20:36	25	20:09 (77)	21:02		
10	07:57		08:18 (23)	07:35			07:56		08:45 (20)	07:06		19:08 (116)	06:25		19:44 (77)	06:05		
	17:28	55	16:57 (115)	18:04			19:36	42	09:27 (20)	20:07	31	19:39 (116)	20:37	25	20:09 (77)	21:03		
11	07:57		08:18 (23)	07:34			07:54		08:45 (20)	07:04		19:07 (116)	06:24		19:44 (77)	06:05		
	17:29	56	16:57 (115)	18:05			19:37	40	09:25 (20)	20:08	33	19:40 (116)	20:38	25	20:09 (77)	21:03		
12	07:57		08:19 (23)	07:33			07:53		08:45 (20)	07:03		19:06 (116)	06:23		19:44 (77)	06:05		
	17:30	56	16:58 (115)	18:06			19:38	39	09:24 (20)	20:09	33	19:39 (116)	20:39	25	20:09 (77)	21:04		
13	07:56		08:19 (23)	07:32			07:51		08:47 (20)	07:01		19:06 (116)	06:22		19:44 (77)	06:05		
	17:31	59	16:59 (115)	18:08			19:39	36	09:23 (20)	20:10	34	19:40 (116)	20:40	25	20:09 (77)	21:04		
14	07:56		08:18 (23)	07:30			07:49		08:47 (20)	07:00		19:05 (116)	06:21		19:44 (77)	06:05		
	17:32	60	16:59 (115)	18:09			19:40	34	09:21 (20)	20:11	34	19:39 (116)	20:41	24	20:08 (77)	21:05		
15	07:56		08:19 (23)	07:29			07:48		08:49 (20)	06:58		19:05 (116)	06:20		19:45 (77)	06:05		
	17:33	60	17:00 (115)	18:10			19:41	30	09:19 (20)	20:12	35	19:40 (116)	20:42	23	20:08 (77)	21:05		
16	07:55		08:19 (23)	07:28			07:46		08:50 (20)	06:57		19:05 (116)	06:19		19:45 (77)	06:05		
	17:34	61	17:00 (115)	18:11			19:42	27	09:17 (20)	20:13	34	19:39 (116)	20:43	22	20:07 (77)	21:06		
17	07:55		08:19 (23)	07:26		08:04 (20)	07:45		08:52 (20)	06:55		19:05 (116)	06:18		19:46 (77)	06:05		
	17:35	62	17:01 (115)	18:12	11	08:15 (20)	19:43	22	09:14 (20)	20:14	34	19:39 (116)	20:44	21	20:07 (77)	21:06		
18	07:54		08:19 (23)	07:25		08:00 (20)	07:43		08:56 (20)	06:54		19:04 (116)	06:17		19:47 (77)	06:05		
	17:37	62	17:01 (115)	18:13	19	08:19 (20)	19:44	14	09:10 (20)	20:15	34	19:38 (116)	20:45	20	20:07 (77)	21:06		
19	07:54		08:20 (23)	07:24		07:57 (20)	07:41			06:52		19:05 (116)	06:16		19:48 (77)	06:05		
	17:38	61	17:01 (115)	18:15	24	08:21 (20)	19:45			20:16	33	19:38 (116)	20:46	18	20:06 (77)	21:07		
20	07:53		08:20 (23)	07:22		07:55 (20)	07:40			06:51		19:06 (116)	06:16		19:49 (77)	06:05		
	17:39	61	17:01 (115)	18:16	29	08:24 (20)	19:46			20:17	32	19:38 (116)	20:47	16	20:05 (77)	21:07		
21	07:53		08:20 (23)	07:21		07:53 (20)	07:38			06:49		19:06 (116)	06:15		19:50 (77)	06:06		
	17:40	60	17:01 (115)	18:17	32	08:25 (20)	19:47			20:18	30	19:36 (116)	20:48	13	20:03 (77)	21:07		
22	07:52		08:21 (23)	07:20		07:52 (20)	07:36			06:48		19:07 (116)	06:14		19:52 (77)	06:06		
	17:41	59	17:02 (115)	18:18	34	08:26 (20)	19:48			20:19	29	19:36 (116)	20:49	11	20:03 (77)	21:08		
23	07:52		08:21 (23)	07:18		07:51 (20)	07:35			06:46		19:07 (116)	06:13		19:54 (77)	06:06		
	17:42	58	17:01 (115)	18:19	37	08:28 (20)	19:49			20:20	27	19:34 (116)	20:50	6	20:00 (77)	21:08		
24	07:51		08:21 (23)	07:17		07:49 (20)	07:33			06:45		19:08 (116)	06:13			06:06		
	17:43	58	17:01 (115)	18:20	39	08:28 (20)	19:50			20:21	25	19:33 (116)	20:50			21:08		
25	07:50		08:22 (23)	07:15		07:48 (20)	07:31			06:44		19:10 (116)	06:12			06:07		
	17:45	55	17:01 (115)	18:21	41	08:29 (20)	19:52			20:22	21	19:31 (116)	20:51			21:08		
26	07:50		08:23 (23)	07:14		07:47 (20)	07:30			06:42		19:11 (116)	06:11			06:07		
	17:46	53	17:01 (115)	18:23	42	08:29 (20)	19:53			20:23	18	19:29 (116)	20:52			21:08		
27	07:49		08:23 (23)	07:13		07:47 (20)	07:28			06:41		19:14 (116)	06:11			06:07		
	17:47	51	17:00 (115)	18:24	43	08:30 (20)	19:54			20:24	12	19:26 (116)	20:53			21:08		
28	07:48		08:24 (23)	07:11		07:45 (20)	07:27			06:40			06:10			06:08		
	17:48	47	16:59 (115)	18:25	45	08:30 (20)	19:55			20:25			20:54			21:08		
29	07:47		08:25 (23)				07:25			06:38			06:10			06:08		
	17:49	43	16:58 (115)				19:56			20:26			20:55			21:08		
30	07:46		08:26 (23)				07:23			06:37		19:54 (77)	06:09			06:09		
	17:51	37	16:56 (115)				19:57			20:27	7	20:01 (77)	20:55			21:08		
31	07:45		08:28 (23)				07:22						06:09					
	17:52	30	16:54 (115)				19:58						20:56					
Potential sun hours	300			299			370			397			446			449		
Total, worst case		1629			424			690			662			464				
Sun reduction		0.36			0.42			0.44			0.51			0.56				
Oper. time red.		1.00			1.00			1.00			1.00			1.00				
Wind dir. red.		0.64			0.63			0.63			0.65			0.63				
Total reduction		0.23			0.26			0.28			0.33			0.35				
Total, real		375			112			192			218			164				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 16

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 732 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6313)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09			06:32		19:55 (77)	07:02		19:06 (116)	07:31		08:25 (20)	07:03			07:37		08:00 (23)
	21:08			20:51	25	20:20 (77)	20:09	33	19:39 (116)	19:18	38	09:03 (20)	17:33			17:10	58	16:40 (115)
2	06:09			06:33		19:55 (77)	07:03		19:07 (116)	07:32		08:24 (20)	07:05			07:38		08:01 (23)
	21:08			20:50	25	20:20 (77)	20:08	31	19:38 (116)	19:17	39	09:03 (20)	17:32			17:10	55	16:40 (115)
3	06:10			06:34		19:55 (77)	07:04		19:07 (116)	07:33		08:23 (20)	07:06			07:39		08:02 (23)
	21:08			20:49	25	20:20 (77)	20:06	30	19:37 (116)	19:15	41	09:04 (20)	17:31			17:10	54	16:40 (115)
4	06:11			06:35		19:54 (77)	07:05		19:08 (116)	07:34		08:22 (20)	07:07			07:40		08:03 (23)
	21:08			20:48	25	20:19 (77)	20:05	27	19:35 (116)	19:14	42	09:04 (20)	17:30			17:09	52	16:40 (115)
5	06:11			06:36		19:54 (77)	07:06		19:09 (116)	07:35		08:21 (20)	07:08			07:41		08:04 (23)
	21:08			20:47	25	20:19 (77)	20:03	25	19:34 (116)	19:12	44	09:05 (20)	17:29			17:09	50	16:40 (115)
6	06:12			06:37		19:54 (77)	07:07		19:11 (116)	07:36		08:20 (20)	07:09			07:42		08:05 (23)
	21:08			20:45	24	20:18 (77)	20:01	21	19:32 (116)	19:10	45	09:05 (20)	17:28			17:09	49	16:40 (115)
7	06:12			06:38		19:55 (77)	07:08		19:13 (116)	07:37		08:20 (20)	07:10			07:43		08:06 (23)
	21:07			20:44	23	20:18 (77)	20:00	16	19:29 (116)	19:09	45	09:05 (20)	17:26			17:09	47	16:40 (115)
8	06:13			06:39		19:55 (77)	07:08		19:15 (116)	07:38		08:19 (20)	07:12			07:44		08:07 (23)
	21:07			20:43	22	20:17 (77)	19:56	9	19:24 (116)	19:07	46	09:05 (20)	17:25			17:09	46	16:41 (115)
9	06:14			06:40		19:56 (77)	07:09			07:39		08:19 (20)	07:13		08:03 (23)	07:45		08:08 (23)
	21:07			20:42	20	20:16 (77)	19:55			19:06	46	09:05 (20)	17:24	10	08:13 (23)	17:09	44	16:41 (115)
10	06:14			06:41		19:57 (77)	07:10			07:40		08:18 (20)	07:14		08:00 (23)	07:46		08:09 (23)
	21:06			20:41	18	20:15 (77)	19:53			19:04	47	09:05 (20)	17:23	21	16:22 (115)	17:09	42	16:41 (115)
11	06:15			06:42		19:58 (77)	07:11			07:41		08:18 (20)	07:15		07:59 (23)	07:47		08:10 (23)
	21:06			20:39	16	20:14 (77)	19:52			19:02	46	09:04 (20)	17:22	31	16:26 (115)	17:09	41	16:41 (115)
12	06:16			06:43		20:00 (77)	07:12			07:42		08:18 (20)	07:16		07:58 (23)	07:47		08:10 (23)
	21:06			20:38	12	20:12 (77)	19:50			19:01	46	09:04 (20)	17:22	37	16:28 (115)	17:09	41	16:41 (115)
13	06:16			06:44		20:04 (77)	07:13			07:43		08:18 (20)	07:17		07:57 (23)	07:48		08:11 (23)
	21:05			20:37	4	20:08 (77)	19:48			18:59	45	09:03 (20)	17:21	43	16:30 (115)	17:10	39	16:41 (115)
14	06:17			06:45			07:14			07:44		08:19 (20)	07:18		07:56 (23)	07:49		08:12 (23)
	21:05			20:36			19:47			18:58	44	09:03 (20)	17:20	47	16:31 (115)	17:10	38	16:42 (115)
15	06:18			06:46		19:25 (116)	07:15			07:45		08:19 (20)	07:20		07:56 (23)	07:50		08:13 (23)
	21:04			20:34	5	19:30 (116)	19:45			18:56	44	09:03 (20)	17:19	51	16:33 (115)	17:10	36	16:42 (115)
16	06:18			06:47		19:20 (116)	07:16			07:46		08:20 (20)	07:21		07:56 (23)	07:50		08:14 (23)
	21:04			20:33	14	19:34 (116)	19:43			18:55	42	09:02 (20)	17:18	53	16:34 (115)	17:10	35	16:42 (115)
17	06:19			06:47		19:17 (116)	07:17			07:47		08:20 (20)	07:22		07:55 (23)	07:51		08:15 (23)
	21:03			20:31	19	19:36 (116)	19:42			18:53	41	09:01 (20)	17:17	55	16:34 (115)	17:11	33	16:42 (115)
18	06:20			06:48		19:15 (116)	07:18			07:48		08:21 (20)	07:23		07:55 (23)	07:52		08:16 (23)
	21:02			20:30	22	19:37 (116)	19:40			18:52	38	08:59 (20)	17:17	58	16:35 (115)	17:11	32	16:43 (115)
19	06:21			06:49		19:14 (116)	07:19			07:49		08:22 (20)	07:24		07:56 (23)	07:52		08:16 (23)
	21:02			20:29	25	19:39 (116)	19:38			18:50	36	08:58 (20)	17:16	58	16:36 (115)	17:11	32	16:43 (115)
20	06:22			06:50		19:13 (116)	07:20			07:50		08:23 (20)	07:25		07:56 (23)	07:53		08:17 (23)
	21:01			20:27	27	19:40 (116)	19:37			18:49	33	08:56 (20)	17:15	59	16:37 (115)	17:12	32	16:44 (115)
21	06:23		20:02 (77)	06:51		19:11 (116)	07:21			07:51		08:24 (20)	07:27		07:56 (23)	07:53		08:18 (23)
	21:00	9	20:11 (77)	20:26	29	19:40 (116)	19:35			18:48	31	08:55 (20)	17:15	60	16:37 (115)	17:12	30	16:44 (115)
22	06:23		20:01 (77)	06:52		19:10 (116)	07:22			07:52		08:25 (20)	07:28		07:56 (23)	07:54		08:19 (23)
	21:00	12	20:13 (77)	20:24	31	19:41 (116)	19:33			18:46	28	08:53 (20)	17:14	61	16:37 (115)	17:13	30	16:45 (115)
23	06:24		20:00 (77)	06:53		19:10 (116)	07:23			07:53		08:28 (20)	07:29		07:56 (23)	07:54		08:18 (23)
	20:59	14	20:14 (77)	20:23	32	19:42 (116)	19:32			18:45	23	08:51 (20)	17:13	61	16:37 (115)	17:13	32	16:45 (115)
24	06:25		19:59 (77)	06:54		19:09 (116)	07:24			07:55		08:31 (20)	07:30		07:56 (23)	07:55		08:18 (23)
	20:58	17	20:16 (77)	20:22	33	19:42 (116)	19:30			18:43	17	08:48 (20)	17:13	62	16:38 (115)	17:14	32	16:45 (115)
25	06:26		19:58 (77)	06:55		19:08 (116)	07:25		08:40 (20)	07:56		08:35 (20)	07:31		07:57 (23)	07:55		08:19 (23)
	20:57	19	20:17 (77)	20:20	34	19:42 (116)	19:28	11	08:51 (20)	18:42	8	08:43 (20)	17:12	62	16:39 (115)	17:14	32	16:46 (115)
26	06:27		19:56 (77)	06:56		19:08 (116)	07:26		08:36 (20)	07:57			07:32		07:58 (23)	07:56		08:19 (23)
	20:56	21	20:17 (77)	20:19	34	19:42 (116)	19:27	19	08:55 (20)	18:41			17:12	61	16:39 (115)	17:15	33	16:46 (115)
27	06:28		19:56 (77)	06:57		19:07 (116)	07:27		08:33 (20)	07:58			07:33		07:58 (23)	07:56		08:19 (23)
	20:56	22	20:18 (77)	20:17	35	19:42 (116)	19:25	24	08:57 (20)	18:39			17:11	60	16:39 (115)	17:16	34	16:47 (115)
28	06:29		19:56 (77)	06:58		19:06 (116)	07:28		08:30 (20)	07:59			07:34		07:59 (23)	07:56		08:19 (23)
	20:55	22	20:18 (77)	20:16	35	19:41 (116)	19:23	29	08:59 (20)	18:38			17:11	59	16:39 (115)	17:16	36	16:48 (115)
29	06:30		19:55 (77)	06:59		19:06 (116)	07:29		08:28 (20)	08:00			07:35		07:59 (23)	07:57		08:19 (23)
	20:54	24	20:19 (77)	20:14	34	19:40 (116)	19:22	33	09:01 (20)	18:37			17:11	59	16:39 (115)	17:17	38	16:49 (115)
30	06:30		19:55 (77)	07:00		19:06 (116)	07:30		08:27 (20)	08:01			07:36		08:00 (23)	07:57		08:19 (23)
	20:53	24	20:19 (77)	20:12	34	19:40 (116)	19:20	35	09:02 (20)	18:36			17:10	57	16:39 (115)	17:18	38	16:49 (115)
31	06:31		19:55 (77)	07:01		19:06 (116)				08:02						07:57		08:19 (23)
	20:52	25	20:20 (77)	20:11	33	19:39 (116)				18:34						17:19	40	16:50 (115)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		209			740			343			955			1125			1231	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.63			0.64			0.64			0.63			0.64			0.65	
Total reduction		0.38			0.38			0.39			0.35			0.24			0.32	
Total, real		79			285			134			338			266			398	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

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4/27/2012 3:34 PM / 17

Licensed user:
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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 736 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6314)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January	February			March			April			May			June		
1	07:57	07:44			07:10		07:35 (23)	07:20			06:36		07:19 (20)	06:08		20:01 (116)
	17:20	17:53			18:26	64	17:43 (115)	19:59			20:28	42	08:01 (20)	20:57	24	20:25 (116)
2	07:57	07:44			07:08		07:34 (23)	07:19			06:34		07:19 (20)	06:08		20:00 (116)
	17:20	17:54			18:27	63	17:42 (115)	20:00			20:29	41	08:00 (20)	20:58	26	20:26 (116)
3	07:58	07:43			07:07		07:35 (23)	07:17			06:33		07:20 (20)	06:07		20:00 (116)
	17:21	17:56			18:28	59	17:41 (115)	20:00			20:30	40	08:00 (20)	20:58	27	20:27 (116)
4	07:58	07:42			07:05		07:34 (23)	07:15			06:32		07:19 (20)	06:07		19:59 (116)
	17:22	17:57			18:29	57	17:39 (115)	20:01			20:31	39	07:58 (20)	20:59	28	20:27 (116)
5	07:58	07:41			07:04		07:35 (23)	07:14			06:31		07:20 (20)	06:07		19:59 (116)
	17:23	17:58			18:30	53	17:38 (115)	20:02			20:32	37	07:57 (20)	21:00	29	20:28 (116)
6	07:58	07:40			07:02		07:35 (23)	07:12			06:30		07:21 (20)	06:06		20:00 (116)
	17:24	17:59			18:32	48	17:36 (115)	20:03			20:33	36	07:57 (20)	21:00	29	20:29 (116)
7	07:58	07:38			07:00		07:36 (23)	07:11			06:28		07:22 (20)	06:06		19:59 (116)
	17:25	18:00			18:33	39	17:32 (115)	20:04			20:34	34	07:56 (20)	21:01	30	20:29 (116)
8	07:57	07:37			07:59		08:37 (23)	07:09			06:27		07:23 (20)	06:06		19:59 (116)
	17:26	18:02			19:34	29	18:29 (115)	20:05			20:35	32	07:55 (20)	21:02	30	20:29 (116)
9	07:57	07:36			07:57		08:39 (23)	07:07			06:26		07:24 (20)	06:06		19:59 (116)
	17:27	18:03			19:35	17	08:56 (23)	20:06			20:36	30	07:54 (20)	21:02	31	20:30 (116)
10	07:57	07:35			07:56		08:42 (23)	07:06			06:25		07:25 (20)	06:05		19:59 (116)
	17:28	18:04			19:36	11	08:53 (23)	20:07			20:37	28	07:53 (20)	21:03	31	20:30 (116)
11	07:57	07:34			07:54			07:04		07:40 (20)	06:24		07:26 (20)	06:05		19:59 (116)
	17:29	18:05			19:37			20:08	9	07:49 (20)	20:38	25	07:51 (20)	21:03	32	20:31 (116)
12	07:57	07:33		17:21 (115)	07:53			07:03		07:34 (20)	06:23		07:28 (20)	06:05		19:59 (116)
	17:30	18:06	11	17:32 (115)	19:38			20:09	19	07:53 (20)	20:39	21	07:49 (20)	21:04	32	20:31 (116)
13	07:56	07:32		17:18 (115)	07:51			07:01		07:32 (20)	06:22		07:29 (20)	06:05		19:59 (116)
	17:31	18:08	18	17:36 (115)	19:39			20:10	24	07:56 (20)	20:40	18	07:47 (20)	21:04	33	20:32 (116)
14	07:56	07:30		17:16 (115)	07:49			07:00		07:29 (20)	06:21		07:32 (20)	06:05		19:59 (116)
	17:32	18:09	22	17:38 (115)	19:40			20:11	28	07:57 (20)	20:41	13	07:45 (20)	21:05	33	20:32 (116)
15	07:56	07:29		17:14 (115)	07:48			06:58		07:28 (20)	06:20			06:05		19:59 (116)
	17:33	18:10	25	17:39 (115)	19:41			20:12	31	07:59 (20)	20:42			21:05	33	20:32 (116)
16	07:55	07:28		17:13 (115)	07:46			06:57		07:26 (20)	06:19			06:05		19:59 (116)
	17:34	18:11	28	17:41 (115)	19:42			20:13	34	08:00 (20)	20:43			21:06	34	20:33 (116)
17	07:55	07:26		17:12 (115)	07:45			06:55		07:25 (20)	06:18			06:05		19:59 (116)
	17:35	18:12	30	17:42 (115)	19:43			20:14	36	08:01 (20)	20:44			21:06	34	20:33 (116)
18	07:54	07:25		17:11 (115)	07:43			06:54		07:23 (20)	06:17			06:05		20:00 (116)
	17:37	18:13	32	17:43 (115)	19:44			20:15	38	08:01 (20)	20:45			21:06	33	20:33 (116)
19	07:54	07:24		17:10 (115)	07:41			06:52		07:23 (20)	06:16			06:05		20:00 (116)
	17:38	18:15	33	17:43 (115)	19:45			20:16	39	08:02 (20)	20:46			21:07	33	20:33 (116)
20	07:53	07:22		07:45 (23)	07:40			06:51		07:22 (20)	06:16			06:05		20:00 (116)
	17:39	18:16	47	17:44 (115)	19:46			20:17	41	08:03 (20)	20:47			21:07	33	20:33 (116)
21	07:53	07:21		07:41 (23)	07:38			06:49		07:21 (20)	06:15			06:06		20:01 (116)
	17:40	18:17	53	17:44 (115)	19:47			20:18	41	08:02 (20)	20:48			21:07	33	20:34 (116)
22	07:52	07:20		07:40 (23)	07:36			06:48		07:21 (20)	06:14			06:06		20:01 (116)
	17:41	18:18	58	17:45 (115)	19:48			20:19	42	08:03 (20)	20:49			21:08	33	20:34 (116)
23	07:52	07:18		07:39 (23)	07:35			06:46		07:19 (20)	06:13			06:06		20:01 (116)
	17:42	18:19	60	17:45 (115)	19:49			20:20	43	08:02 (20)	20:50			21:08	33	20:34 (116)
24	07:51	07:17		07:37 (23)	07:33			06:45		07:19 (20)	06:13			06:06		20:01 (116)
	17:44	18:20	63	17:45 (115)	19:50			20:21	44	08:03 (20)	20:50			21:08	33	20:34 (116)
25	07:50	07:15		07:37 (23)	07:31			06:44		07:19 (20)	06:12			06:07		20:02 (116)
	17:45	18:22	64	17:45 (115)	19:52			20:22	44	08:03 (20)	20:51			21:08	33	20:35 (116)
26	07:50	07:14		07:35 (23)	07:30			06:42		07:18 (20)	06:11		20:07 (116)	06:07		20:01 (116)
	17:46	18:23	65	17:44 (115)	19:53			20:23	44	08:02 (20)	20:52	10	20:17 (116)	21:08	34	20:35 (116)
27	07:49	07:13		07:35 (23)	07:28			06:41		07:19 (20)	06:11		20:06 (116)	06:07		20:01 (116)
	17:47	18:24	65	17:44 (115)	19:54			20:24	43	08:02 (20)	20:53	14	20:20 (116)	21:08	34	20:35 (116)
28	07:48	07:11		07:34 (23)	07:27			06:40		07:19 (20)	06:10		20:04 (116)	06:08		20:02 (116)
	17:48	18:25	65	17:43 (115)	19:55			20:25	43	08:02 (20)	20:54	17	20:21 (116)	21:08	33	20:35 (116)
29	07:47				07:25			06:38		07:19 (20)	06:10		20:03 (116)	06:08		20:02 (116)
	17:49				19:56			20:26	43	08:02 (20)	20:55	20	20:23 (116)	21:08	33	20:35 (116)
30	07:46				07:23			06:37		07:18 (20)	06:09		20:02 (116)	06:09		20:03 (116)
	17:51				19:57			20:27	43	08:01 (20)	20:55	21	20:23 (116)	21:08	33	20:36 (116)
31	07:45				07:22						06:09		20:02 (116)			
	17:52				19:58						20:56	23	20:25 (116)			
Potential sun hours	300	299			370			397			446			449		
Total, worst case			739			440			729			541			947	
Sun reduction			0.42			0.44			0.51			0.56			0.60	
Oper. time red.			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.			0.67			0.65			0.67			0.66			0.62	
Total reduction			0.28			0.29			0.34			0.37			0.37	
Total, real			207			127			249			200			352	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

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4/27/2012 3:34 PM / 18

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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 736 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6314)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November	December
1	06:09		20:03 (116)	06:32		07:38 (20)	07:02		07:39 (20)	07:31			07:03	07:37
	21:08	32	20:35 (116)	20:51	23	08:01 (20)	20:09	9	07:48 (20)	19:18			17:33	17:10
2	06:09		20:04 (116)	06:33		07:36 (20)	07:03			07:32			07:05	07:38
	21:08	32	20:36 (116)	20:50	26	08:02 (20)	20:08			19:17			17:32	17:10
3	06:10		20:04 (116)	06:34		07:35 (20)	07:04			07:33		08:21 (23)	07:06	07:39
	21:08	31	20:35 (116)	20:49	29	08:04 (20)	20:06			19:15	8	08:29 (23)	17:31	17:10
4	06:11		20:05 (116)	06:35		07:33 (20)	07:05			07:34		08:17 (23)	07:07	07:40
	21:08	31	20:36 (116)	20:48	31	08:04 (20)	20:05			19:14	15	08:32 (23)	17:30	17:09
5	06:11		20:05 (116)	06:36		07:32 (20)	07:06			07:35		08:15 (23)	07:08	07:41
	21:08	30	20:35 (116)	20:47	33	08:05 (20)	20:03			19:12	19	08:34 (23)	17:29	17:09
6	06:12		20:06 (116)	06:37		07:31 (20)	07:07			07:36		08:13 (23)	07:09	07:42
	21:08	29	20:35 (116)	20:45	35	08:06 (20)	20:01			19:10	35	18:07 (115)	17:28	17:09
7	06:12		20:05 (116)	06:38		07:30 (20)	07:08			07:37		08:11 (23)	07:10	07:43
	21:07	29	20:34 (116)	20:44	37	08:07 (20)	20:00			19:09	44	18:10 (115)	17:26	17:09
8	06:13		20:06 (116)	06:39		07:30 (20)	07:08			07:38		08:10 (23)	07:12	07:44
	21:07	29	20:35 (116)	20:43	37	08:07 (20)	19:56			19:07	51	18:12 (115)	17:25	17:09
9	06:14		20:07 (116)	06:40		07:29 (20)	07:09			07:39		08:09 (23)	07:13	07:45
	21:07	28	20:35 (116)	20:42	39	08:08 (20)	19:55			19:06	54	18:13 (115)	17:24	17:09
10	06:14		20:07 (116)	06:41		07:28 (20)	07:10			07:40		08:08 (23)	07:14	07:46
	21:06	27	20:34 (116)	20:41	41	08:09 (20)	19:53			19:04	58	18:14 (115)	17:23	17:09
11	06:15		20:09 (116)	06:42		07:28 (20)	07:11			07:41		08:08 (23)	07:15	07:47
	21:06	25	20:34 (116)	20:39	41	08:09 (20)	19:52			19:02	61	18:15 (115)	17:22	17:09
12	06:16		20:10 (116)	06:43		07:27 (20)	07:12			07:42		08:07 (23)	07:16	07:47
	21:06	23	20:33 (116)	20:38	42	08:09 (20)	19:50			19:01	63	18:15 (115)	17:22	17:09
13	06:16		20:10 (116)	06:44		07:27 (20)	07:13			07:43		08:07 (23)	07:17	07:48
	21:05	22	20:32 (116)	20:37	43	08:10 (20)	19:48			18:59	65	18:16 (115)	17:21	17:10
14	06:17		20:11 (116)	06:45		07:27 (20)	07:14			07:44		08:08 (23)	07:18	07:49
	21:05	21	20:32 (116)	20:36	43	08:10 (20)	19:47			18:58	65	18:17 (115)	17:20	17:10
15	06:18		20:13 (116)	06:46		07:26 (20)	07:15			07:45		08:08 (23)	07:20	07:50
	21:04	18	20:31 (116)	20:34	44	08:10 (20)	19:45			18:56	65	18:17 (115)	17:19	17:10
16	06:19		20:13 (116)	06:47		07:25 (20)	07:16			07:46		08:08 (23)	07:21	07:50
	21:04	16	20:29 (116)	20:33	44	08:09 (20)	19:43			18:55	65	18:17 (115)	17:18	17:10
17	06:19		20:16 (116)	06:47		07:25 (20)	07:17			07:47		08:08 (23)	07:22	07:51
	21:03	12	20:28 (116)	20:31	44	08:09 (20)	19:42			18:53	63	18:16 (115)	17:17	17:11
18	06:20		20:19 (116)	06:48		07:25 (20)	07:18			07:48		08:09 (23)	07:23	07:52
	21:02	6	20:25 (116)	20:30	44	08:09 (20)	19:40			18:52	62	18:16 (115)	17:17	17:11
19	06:21			06:49		07:25 (20)	07:19			07:49		08:10 (23)	07:24	07:52
	21:02			20:29	44	08:09 (20)	19:38			18:50	59	18:16 (115)	17:16	17:11
20	06:22			06:50		07:25 (20)	07:20			07:50		08:11 (23)	07:25	07:53
	21:01			20:27	43	08:08 (20)	19:37			18:49	56	18:15 (115)	17:15	17:12
21	06:23			06:51		07:25 (20)	07:21			07:51		08:13 (23)	07:27	07:53
	21:00			20:26	43	08:08 (20)	19:35			18:48	50	18:14 (115)	17:15	17:12
22	06:23			06:52		07:26 (20)	07:22			07:52		08:16 (23)	07:28	07:54
	21:00			20:24	41	08:07 (20)	19:33			18:46	44	18:14 (115)	17:14	17:13
23	06:24			06:53		07:26 (20)	07:23			07:53		17:40 (115)	07:29	07:54
	20:59			20:23	40	08:06 (20)	19:32			18:45	34	18:14 (115)	17:13	17:13
24	06:25			06:54		07:27 (20)	07:24			07:55		17:41 (115)	07:30	07:55
	20:58			20:22	39	08:06 (20)	19:30			18:43	32	18:13 (115)	17:13	17:14
25	06:26			06:55		07:27 (20)	07:25			07:56		17:42 (115)	07:31	07:55
	20:57			20:20	38	08:05 (20)	19:28			18:42	29	18:11 (115)	17:12	17:14
26	06:27			06:56		07:28 (20)	07:26			07:57		17:43 (115)	07:32	07:56
	20:56			20:19	36	08:04 (20)	19:27			18:41	27	18:10 (115)	17:12	17:15
27	06:28			06:57		07:29 (20)	07:27			07:58		17:44 (115)	07:33	07:56
	20:56			20:17	33	08:02 (20)	19:25			18:39	24	18:08 (115)	17:11	17:16
28	06:29			06:58		07:29 (20)	07:28			07:59		17:46 (115)	07:34	07:56
	20:55			20:16	31	08:00 (20)	19:23			18:38	21	18:07 (115)	17:11	17:16
29	06:30		07:45 (20)	06:59		07:30 (20)	07:29			08:00		17:48 (115)	07:35	07:57
	20:54	8	07:53 (20)	20:14	28	07:58 (20)	19:22			18:37	17	18:05 (115)	17:11	17:17
30	06:30		07:41 (20)	07:00		07:32 (20)	07:30			08:01		17:52 (115)	07:36	07:57
	20:53	16	07:57 (20)	20:12	24	07:56 (20)	19:20			18:36	9	18:01 (115)	17:10	17:18
31	06:31		07:39 (20)	07:01		07:35 (20)				08:02				07:57
	20:52	20	07:59 (20)	20:11	18	07:53 (20)				18:34				17:19
Potential sun hours	456			427			374			346			300	291
Total, worst case		485			1134			9			1195			
Sun reduction		0.60			0.60			0.61			0.56			
Oper. time red.		1.00			1.00			1.00			1.00			
Wind dir. red.		0.62			0.67			0.67			0.66			
Total reduction		0.37			0.40			0.41			0.37			
Total, real		182			455			4			444			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

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217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 739 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6315)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January	February			March			April			May			June		
1	07:57	07:44			07:10		17:29 (116)	07:20		19:09 (77)	06:36		07:14 (72)	06:08		06:59 (72)
	17:20	17:53			18:26	29	17:58 (116)	19:59	23	19:32 (77)	20:28	31	07:45 (72)	20:57	61	08:00 (72)
2	07:57	07:44			07:08		17:28 (116)	07:18		19:09 (77)	06:34		07:12 (72)	06:08		06:59 (72)
	17:20	17:54			18:27	29	17:57 (116)	20:00	22	19:31 (77)	20:29	35	07:47 (72)	20:58	61	08:00 (72)
3	07:58	07:43			07:07		17:29 (116)	07:17		19:10 (77)	06:33		07:11 (72)	06:07		07:00 (72)
	17:21	17:56			18:28	28	17:57 (116)	20:00	20	19:30 (77)	20:30	38	07:49 (72)	20:58	60	08:00 (72)
4	07:58	07:42			07:05		17:28 (116)	07:15		19:10 (77)	06:32		07:08 (72)	06:07		06:59 (72)
	17:22	17:57			18:29	28	17:56 (116)	20:01	19	19:29 (77)	20:31	42	07:50 (72)	20:59	61	08:00 (72)
5	07:58	07:41			07:04		17:29 (116)	07:14		19:11 (77)	06:31		07:07 (72)	06:07		07:00 (72)
	17:23	17:58			18:30	27	17:56 (116)	20:02	16	19:27 (77)	20:32	44	07:51 (72)	21:00	60	08:00 (72)
6	07:58	07:40			07:02		17:29 (116)	07:12		19:13 (77)	06:30		07:06 (72)	06:06		07:00 (72)
	17:24	17:59			18:31	26	17:55 (116)	20:03	12	19:25 (77)	20:33	46	07:52 (72)	21:00	60	08:00 (72)
7	07:58	07:38			07:00		17:30 (116)	07:11		19:15 (77)	06:28		07:05 (72)	06:06		07:00 (72)
	17:25	18:00			18:33	23	17:53 (116)	20:04	6	19:21 (77)	20:34	48	07:53 (72)	21:01	60	08:00 (72)
8	07:57	07:37			07:59		18:31 (116)	07:09			06:27		07:04 (72)	06:06		07:00 (72)
	17:26	18:02			19:34	21	18:52 (116)	20:05			20:35	50	07:54 (72)	21:02	60	08:00 (72)
9	07:57	07:36			07:57		18:33 (116)	07:07			06:26		07:03 (72)	06:06		07:01 (72)
	17:27	18:03			19:35	17	18:50 (116)	20:06			20:36	52	07:55 (72)	21:02	59	08:00 (72)
10	07:57	07:35			07:56		18:36 (116)	07:06			06:25		07:02 (72)	06:05		07:01 (72)
	17:28	18:04			19:36	11	18:47 (116)	20:07			20:37	53	07:55 (72)	21:03	59	08:00 (72)
11	07:57	07:34			07:54			07:04			06:24		07:02 (72)	06:05		07:02 (72)
	17:29	18:05			19:37			20:08			20:38	54	07:56 (72)	21:03	59	08:01 (72)
12	07:57	07:33			07:53			07:03			06:23		07:01 (72)	06:05		07:02 (72)
	17:30	18:06			19:38			20:09			20:39	55	07:56 (72)	21:04	59	08:01 (72)
13	07:56	07:32			07:51			07:01			06:22		07:01 (72)	06:05		07:02 (72)
	17:31	18:08			19:39			20:10			20:40	56	07:57 (72)	21:04	59	08:01 (72)
14	07:56	07:30			07:49			07:00			06:21		07:00 (72)	06:05		07:02 (72)
	17:32	18:09			19:40			20:11			20:41	57	07:57 (72)	21:05	59	08:01 (72)
15	07:56	07:29			07:48			06:58			06:20		06:59 (72)	06:05		07:03 (72)
	17:33	18:10			19:41			20:12			20:42	58	07:57 (72)	21:05	58	08:01 (72)
16	07:55	07:28			07:46			06:57			06:19		06:59 (72)	06:05		07:03 (72)
	17:34	18:11			19:42			20:13			20:43	58	07:57 (72)	21:06	58	08:01 (72)
17	07:55	07:26			07:45			06:55			06:18		06:59 (72)	06:05		07:03 (72)
	17:35	18:12			19:43			20:14			20:44	59	07:58 (72)	21:06	58	08:01 (72)
18	07:54	07:25			07:43			06:54			06:17		06:59 (72)	06:05		07:03 (72)
	17:37	18:13			19:44			20:15			20:45	60	07:59 (72)	21:06	58	08:01 (72)
19	07:54	07:24			07:41			06:52			06:16		06:59 (72)	06:05		07:03 (72)
	17:38	18:15			19:45			20:16			20:46	60	07:59 (72)	21:07	58	08:01 (72)
20	07:53	07:22		17:41 (116)	07:40			06:51			06:16		06:58 (72)	06:05		07:03 (72)
	17:39	18:16	6	17:47 (116)	19:46			20:17			20:47	61	07:59 (72)	21:07	59	08:02 (72)
21	07:53	07:21		17:37 (116)	07:38			06:49			06:15		06:58 (72)	06:06		07:04 (72)
	17:40	18:17	13	17:50 (116)	19:47			20:18			20:48	60	07:58 (72)	21:07	59	08:03 (72)
22	07:52	07:20		17:35 (116)	07:36			06:48			06:14		06:59 (72)	06:06		07:04 (72)
	17:41	18:18	18	17:53 (116)	19:48			20:19			20:49	60	07:59 (72)	21:08	59	08:03 (72)
23	07:52	07:18		17:33 (116)	07:35			06:46			06:13		06:58 (72)	06:06		07:04 (72)
	17:42	18:19	22	17:55 (116)	19:49			20:20			20:50	61	07:59 (72)	21:08	59	08:03 (72)
24	07:51	07:17		17:32 (116)	07:33		19:19 (77)	06:45			06:13		06:58 (72)	06:06		07:04 (72)
	17:43	18:20	23	17:55 (116)	19:50	8	19:27 (77)	20:21			20:50	61	07:59 (72)	21:08	58	08:02 (72)
25	07:50	07:15		17:31 (116)	07:31		19:15 (77)	06:44			06:12		06:58 (72)	06:07		07:05 (72)
	17:45	18:21	26	17:57 (116)	19:52	14	19:29 (77)	20:22			20:51	62	08:00 (72)	21:08	58	08:03 (72)
26	07:50	07:14		17:30 (116)	07:30		19:14 (77)	06:42			06:11		06:58 (72)	06:07		07:05 (72)
	17:46	18:23	27	17:57 (116)	19:53	17	19:31 (77)	20:23			20:52	61	07:59 (72)	21:08	58	08:03 (72)
27	07:49	07:13		17:29 (116)	07:28		19:12 (77)	06:41			06:11		06:59 (72)	06:07		07:05 (72)
	17:47	18:24	28	17:57 (116)	19:54	20	19:32 (77)	20:24			20:53	61	08:00 (72)	21:08	58	08:03 (72)
28	07:48	07:11		17:28 (116)	07:27		19:11 (77)	06:40		07:25 (72)	06:10		06:58 (72)	06:08		07:06 (72)
	17:48	18:25	29	17:57 (116)	19:55	21	19:32 (77)	20:25	11	07:36 (72)	20:54	61	07:59 (72)	21:08	58	08:04 (72)
29	07:47				07:25		19:10 (77)	06:38		07:19 (72)	06:10		06:59 (72)	06:08		07:05 (72)
	17:49				19:56	23	19:33 (77)	20:26	21	07:40 (72)	20:55	61	08:00 (72)	21:08	59	08:04 (72)
30	07:46				07:23		19:09 (77)	06:37		07:16 (72)	06:09		06:59 (72)	06:09		07:06 (72)
	17:51				19:57	23	19:32 (77)	20:27	27	07:43 (72)	20:55	61	08:00 (72)	21:08	59	08:05 (72)
31	07:45				07:22		19:09 (77)				06:09		06:59 (72)			
	17:52				19:58	23	19:32 (77)				20:56	61	08:00 (72)			
Potential sun hours	300	299			370			397			446			449		
Total, worst case			192			388			177			1687			1771	
Sun reduction			0.42			0.44			0.51			0.56			0.60	
Oper. time red.			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.			0.67			0.67			0.66			0.67			0.67	
Total reduction			0.28			0.29			0.34			0.38			0.40	
Total, real			54			114			60			638			717	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

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4/27/2012 3:34 PM / 20

Licensed user:
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4/27/2012 3:29 PM/2.7.490

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Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November	December
1	06:09		07:06 (72)	06:32		07:12 (72)	07:02			07:31			07:03	07:37
	21:08	59	08:05 (72)	20:51	55	08:07 (72)	20:09			19:18			17:33	17:10
2	06:09		07:06 (72)	06:33		07:13 (72)	07:03			07:32			07:05	07:38
	21:08	60	08:06 (72)	20:50	53	08:06 (72)	20:08			19:17			17:32	17:10
3	06:10		07:06 (72)	06:34		07:13 (72)	07:04			07:33		18:15 (116)	07:06	07:39
	21:08	59	08:05 (72)	20:49	53	08:06 (72)	20:06			19:15	8	18:23 (116)	17:31	17:10
4	06:11		07:07 (72)	06:35		07:13 (72)	07:05			07:34		18:11 (116)	07:07	07:40
	21:08	59	08:06 (72)	20:48	51	08:04 (72)	20:05			19:14	15	18:26 (116)	17:30	17:09
5	06:11		07:06 (72)	06:36		07:14 (72)	07:06		19:13 (77)	07:35		18:09 (116)	07:08	07:41
	21:08	60	08:06 (72)	20:47	49	08:03 (72)	20:03	5	19:18 (77)	19:12	19	18:28 (116)	17:29	17:09
6	06:12		07:07 (72)	06:37		07:15 (72)	07:07		19:09 (77)	07:36		18:07 (116)	07:09	07:42
	21:08	60	08:07 (72)	20:45	47	08:02 (72)	20:01	12	19:21 (77)	19:10	22	18:29 (116)	17:27	17:09
7	06:12		07:06 (72)	06:38		07:16 (72)	07:08		19:06 (77)	07:37		18:05 (116)	07:10	07:43
	21:07	60	08:06 (72)	20:44	45	08:01 (72)	20:00	16	19:22 (77)	19:09	25	18:30 (116)	17:26	17:09
8	06:13		07:07 (72)	06:39		07:17 (72)	07:08		19:04 (77)	07:38		18:04 (116)	07:12	07:44
	21:07	60	08:07 (72)	20:43	43	08:00 (72)	19:56	19	19:23 (77)	19:07	26	18:30 (116)	17:25	17:09
9	06:13		07:06 (72)	06:40		07:18 (72)	07:09		19:03 (77)	07:39		18:03 (116)	07:13	07:45
	21:07	61	08:07 (72)	20:42	41	07:59 (72)	19:55	20	19:23 (77)	19:06	28	18:31 (116)	17:24	17:09
10	06:14		07:07 (72)	06:41		07:20 (72)	07:10		19:02 (77)	07:40		18:02 (116)	07:14	07:46
	21:06	60	08:07 (72)	20:41	37	07:57 (72)	19:53	22	19:24 (77)	19:04	29	18:31 (116)	17:23	17:09
11	06:15		07:07 (72)	06:42		07:21 (72)	07:11		19:01 (77)	07:41		18:02 (116)	07:15	07:47
	21:06	61	08:08 (72)	20:39	35	07:56 (72)	19:52	23	19:24 (77)	19:02	29	18:31 (116)	17:22	17:09
12	06:16		07:06 (72)	06:43		07:23 (72)	07:12		19:01 (77)	07:42		18:01 (116)	07:16	07:47
	21:06	61	08:07 (72)	20:38	30	07:53 (72)	19:50	23	19:24 (77)	19:01	29	18:30 (116)	17:22	17:09
13	06:16		07:07 (72)	06:44		07:26 (72)	07:13		19:01 (77)	07:43		18:01 (116)	07:17	07:48
	21:05	61	08:08 (72)	20:37	25	07:51 (72)	19:48	22	19:23 (77)	18:59	29	18:30 (116)	17:21	17:10
14	06:17		07:07 (72)	06:45		07:29 (72)	07:14		19:00 (77)	07:44		18:02 (116)	07:18	07:49
	21:05	61	08:08 (72)	20:36	18	07:47 (72)	19:47	23	19:23 (77)	18:58	28	18:30 (116)	17:20	17:10
15	06:18		07:08 (72)	06:46		07:34 (72)	07:15		19:01 (77)	07:45		18:02 (116)	07:20	07:50
	21:04	61	08:09 (72)	20:34	6	07:40 (72)	19:45	21	19:22 (77)	18:56	28	18:30 (116)	17:19	17:10
16	06:18		07:07 (72)	06:47			07:16		19:01 (77)	07:46		18:02 (116)	07:21	07:50
	21:04	61	08:08 (72)	20:33			19:43	20	19:21 (77)	18:55	27	18:29 (116)	17:18	17:10
17	06:19		07:07 (72)	06:47			07:17		19:02 (77)	07:47		18:03 (116)	07:22	07:51
	21:03	62	08:09 (72)	20:31			19:42	18	19:20 (77)	18:53	25	18:28 (116)	17:17	17:11
18	06:20		07:08 (72)	06:48			07:18		19:03 (77)	07:48		18:03 (116)	07:23	07:52
	21:02	61	08:09 (72)	20:30			19:40	15	19:18 (77)	18:52	23	18:26 (116)	17:17	17:11
19	06:21		07:08 (72)	06:49			07:19		19:05 (77)	07:49		18:04 (116)	07:24	07:52
	21:02	61	08:09 (72)	20:29			19:38	10	19:15 (77)	18:50	21	18:25 (116)	17:16	17:11
20	06:22		07:07 (72)	06:50			07:20			07:50		18:06 (116)	07:25	07:53
	21:01	62	08:09 (72)	20:27			19:37			18:49	17	18:23 (116)	17:15	17:12
21	06:22		07:08 (72)	06:51			07:21			07:51		18:08 (116)	07:27	07:53
	21:00	61	08:09 (72)	20:26			19:35			18:48	12	18:20 (116)	17:15	17:12
22	06:23		07:08 (72)	06:52			07:22			07:52			07:28	07:54
	21:00	61	08:09 (72)	20:24			19:33			18:46			17:14	17:13
23	06:24		07:09 (72)	06:53			07:23			07:53			07:29	07:54
	20:59	60	08:09 (72)	20:23			19:32			18:45			17:13	17:13
24	06:25		07:09 (72)	06:54			07:24			07:55			07:30	07:55
	20:58	60	08:09 (72)	20:22			19:30			18:43			17:13	17:14
25	06:26		07:09 (72)	06:55			07:25			07:56			07:31	07:55
	20:57	60	08:09 (72)	20:20			19:28			18:42			17:12	17:14
26	06:27		07:09 (72)	06:56			07:26			07:57			07:32	07:56
	20:56	59	08:08 (72)	20:19			19:27			18:41			17:12	17:15
27	06:28		07:09 (72)	06:57			07:27			07:58			07:33	07:56
	20:56	59	08:08 (72)	20:17			19:25			18:39			17:11	17:16
28	06:29		07:10 (72)	06:58			07:28			07:59			07:34	07:56
	20:55	58	08:08 (72)	20:16			19:23			18:38			17:11	17:16
29	06:30		07:10 (72)	06:59			07:29			08:00			07:35	07:57
	20:54	58	08:08 (72)	20:14			19:22			18:37			17:11	17:17
30	06:30		07:11 (72)	07:00			07:30			08:01			07:36	07:57
	20:53	56	08:07 (72)	20:12			19:20			18:36			17:10	17:18
31	06:31		07:11 (72)	07:01						08:02				07:57
	20:52	56	08:07 (72)	20:11						18:34				17:19
Potential sun hours	456			427			374			346			300	291
Total, worst case		1858			588			269			440			
Sun reduction		0.60			0.60			0.61			0.56			
Oper. time red.		1.00			1.00			1.00			1.00			
Wind dir. red.		0.67			0.67			0.66			0.67			
Total reduction		0.40			0.40			0.40			0.38			
Total, real		752			238			108			166			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

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4/27/2012 3:34 PM / 21

Licensed user:
EDR
217 Montgomery St.
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(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 741 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6316)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March	April			May			June		
1	07:57		09:07 (21)	07:44		16:25 (20)	07:10	07:20			06:36		07:08 (18)	06:08		07:04 (18)
	17:20	50	16:44 (20)	17:53	30	16:55 (20)	18:26	19:59			20:28	32	07:40 (18)	20:57	83	20:21 (72)
2	07:57		09:08 (21)	07:44		16:26 (20)	07:08	07:18			06:34		07:07 (18)	06:08		07:05 (18)
	17:20	49	16:45 (20)	17:54	28	16:54 (20)	18:27	20:00			20:29	34	07:41 (18)	20:58	83	20:22 (72)
3	07:57		09:09 (21)	07:43		16:27 (20)	07:07	07:17			06:33		07:06 (18)	06:07		07:05 (18)
	17:21	49	16:46 (20)	17:55	26	16:53 (20)	18:28	20:00			20:30	36	07:42 (18)	20:58	84	20:22 (72)
4	07:58		09:11 (21)	07:42		16:29 (20)	07:05	07:15			06:32		07:04 (18)	06:07		07:06 (18)
	17:22	47	16:47 (20)	17:57	22	16:51 (20)	18:29	20:01			20:31	38	07:42 (18)	20:59	83	20:22 (72)
5	07:58		09:12 (21)	07:41		16:32 (20)	07:03	07:14			06:31		07:03 (18)	06:07		07:06 (18)
	17:23	45	16:47 (20)	17:58	17	16:49 (20)	18:30	20:02			20:32	40	07:43 (18)	21:00	83	20:23 (72)
6	07:58		09:15 (21)	07:39		16:35 (20)	07:02	07:12			06:30		07:03 (18)	06:06		07:07 (18)
	17:24	41	16:48 (20)	17:59	12	16:47 (20)	18:31	20:03			20:33	41	07:44 (18)	21:00	83	20:24 (72)
7	07:57		16:15 (20)	07:38			07:00	07:10			06:28		07:02 (18)	06:06		07:07 (18)
	17:25	34	16:49 (20)	18:00			18:33	20:04			20:34	43	07:45 (18)	21:01	82	20:23 (72)
8	07:57		16:15 (20)	07:37			07:59	07:09			06:27		07:02 (18)	06:06		07:08 (18)
	17:26	35	16:50 (20)	18:02			19:34	20:05			20:35	43	07:45 (18)	21:02	82	20:24 (72)
9	07:57		16:15 (20)	07:36			07:57	07:07			06:26		07:01 (18)	06:06		07:08 (18)
	17:27	36	16:51 (20)	18:03			19:35	20:06			20:36	44	07:45 (18)	21:02	81	20:24 (72)
10	07:57		16:15 (20)	07:35			07:56	07:06			06:25		07:01 (18)	06:05		07:09 (18)
	17:28	36	16:51 (20)	18:04			19:36	20:07			20:37	45	07:46 (18)	21:03	80	20:24 (72)
11	07:57		16:15 (20)	07:34			07:54	07:04			06:24		07:00 (18)	06:05		07:10 (18)
	17:29	37	16:52 (20)	18:05			19:37	20:08			20:38	46	07:46 (18)	21:03	80	20:25 (72)
12	07:57		16:16 (20)	07:33			07:53	07:03			06:23		07:00 (18)	06:05		07:10 (18)
	17:30	37	16:53 (20)	18:06			19:38	20:09			20:39	46	07:46 (18)	21:04	80	20:25 (72)
13	07:56		16:15 (20)	07:31			07:51	07:01			06:22		07:00 (18)	06:05		07:11 (18)
	17:31	38	16:53 (20)	18:08			19:39	20:10			20:40	46	07:46 (18)	21:04	79	20:26 (72)
14	07:56		16:16 (20)	07:30			07:49	07:00			06:21		07:00 (18)	06:05		07:11 (18)
	17:32	38	16:54 (20)	18:09			19:40	20:11			20:41	46	07:46 (18)	21:05	79	20:26 (72)
15	07:56		16:16 (20)	07:29			07:48	06:58			06:20		06:59 (18)	06:05		07:12 (18)
	17:33	39	16:55 (20)	18:10			19:41	20:12			20:42	50	19:59 (72)	21:05	78	20:26 (72)
16	07:55		16:16 (20)	07:28			07:46	06:57			06:19		06:59 (18)	06:05		07:12 (18)
	17:34	39	16:55 (20)	18:11			19:42	20:13			20:43	61	20:04 (72)	21:06	78	20:26 (72)
17	07:55		16:17 (20)	07:26			07:44	06:55			06:18		06:59 (18)	06:05		07:12 (18)
	17:35	39	16:56 (20)	18:12			19:43	20:14			20:44	66	20:07 (72)	21:06	77	20:26 (72)
18	07:54		16:16 (20)	07:25			07:43	06:54			06:17		07:00 (18)	06:05		07:12 (18)
	17:36	40	16:56 (20)	18:13			19:44	20:15			20:45	71	20:10 (72)	21:06	78	20:27 (72)
19	07:54		16:17 (20)	07:24			07:41	06:52			06:16		07:00 (18)	06:05		07:13 (18)
	17:38	40	16:57 (20)	18:15			19:45	20:16			20:46	72	20:11 (72)	21:07	77	20:27 (72)
20	07:53		16:17 (20)	07:22			07:40	06:51			06:16		07:00 (18)	06:05		07:13 (18)
	17:39	40	16:57 (20)	18:16			19:46	20:17			20:47	75	20:12 (72)	21:07	77	20:27 (72)
21	07:53		16:17 (20)	07:21			07:38	06:49			06:15		07:00 (18)	06:06		07:14 (18)
	17:40	40	16:57 (20)	18:17			19:47	20:18			20:48	76	20:13 (72)	21:07	77	20:28 (72)
22	07:52		16:18 (20)	07:20			07:36	06:48			06:14		07:01 (18)	06:06		07:14 (18)
	17:41	40	16:58 (20)	18:18			19:48	20:19			20:49	78	20:15 (72)	21:08	77	20:28 (72)
23	07:52		16:18 (20)	07:18			07:35	06:46			06:13		07:01 (18)	06:06		07:14 (18)
	17:42	39	16:57 (20)	18:19			19:49	20:20			20:50	81	20:16 (72)	21:08	77	20:28 (72)
24	07:51		16:18 (20)	07:17			07:33	06:45			06:13		07:01 (18)	06:06		07:14 (18)
	17:43	39	16:57 (20)	18:20			19:50	20:21			20:50	81	20:16 (72)	21:08	77	20:28 (72)
25	07:50		16:20 (20)	07:15			07:31	06:44			06:12		07:01 (18)	06:07		07:14 (18)
	17:45	38	16:58 (20)	18:21			19:51	20:22			20:51	82	20:17 (72)	21:08	77	20:28 (72)
26	07:49		16:20 (20)	07:14			07:30	06:42			06:11		07:01 (18)	06:07		07:14 (18)
	17:46	38	16:58 (20)	18:23			19:52	20:23			20:52	84	20:18 (72)	21:08	78	20:28 (72)
27	07:49		16:21 (20)	07:12			07:28	06:41		07:17 (18)	06:11		07:02 (18)	06:07		07:14 (18)
	17:47	36	16:57 (20)	18:24			19:54	20:24	15	07:32 (18)	20:53	83	20:19 (72)	21:08	78	20:28 (72)
28	07:48		16:21 (20)	07:11			07:27	06:40		07:14 (18)	06:10		07:02 (18)	06:08		07:14 (18)
	17:48	36	16:57 (20)	18:25			19:55	20:25	21	07:35 (18)	20:54	83	20:19 (72)	21:08	79	20:29 (72)
29	07:47		16:22 (20)				07:25	06:38		07:11 (18)	06:10		07:03 (18)	06:08		07:14 (18)
	17:49	35	16:57 (20)				19:56	20:26	26	07:37 (18)	20:55	84	20:20 (72)	21:08	79	20:29 (72)
30	07:46		16:23 (20)				07:23	06:37		07:10 (18)	06:09		07:03 (18)	06:08		07:14 (18)
	17:51	33	16:56 (20)				19:57	20:27	28	07:38 (18)	20:55	84	20:20 (72)	21:08	80	20:29 (72)
31	07:45		16:24 (20)				07:22				06:08		07:04 (18)			
	17:52	31	16:55 (20)				19:58				20:56	84	20:21 (72)			
Potential sun hours	300			299			370	397			446			449		
Total, worst case		1214			135				90			1875			2386	
Sun reduction		0.36			0.42				0.51			0.56			0.60	
Oper. time red.		1.00			1.00				1.00			1.00			1.00	
Wind dir. red.		0.67			0.67				0.67			0.66			0.64	
Total reduction		0.24			0.28				0.34			0.37			0.39	
Total, real		293			38				31			694			924	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 22

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 741 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6316)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September	October	November			December		
1	06:09		07:14 (18)	06:32		07:11 (18)	07:02	07:31	07:03			07:37		15:57 (20)
	21:08	80	20:29 (72)	20:51	46	07:57 (18)	20:09	19:18	17:33			17:10	37	16:34 (20)
2	06:09		07:13 (18)	06:33		07:11 (18)	07:03	07:31	07:05			07:38		15:58 (20)
	21:08	81	20:29 (72)	20:50	45	07:56 (18)	20:08	19:17	17:32			17:10	36	16:34 (20)
3	06:10		07:14 (18)	06:34		07:11 (18)	07:04	07:32	07:06			07:39		15:59 (20)
	21:08	80	20:29 (72)	20:49	44	07:55 (18)	20:06	19:15	17:31			17:10	35	16:34 (20)
4	06:10		07:14 (18)	06:35		07:11 (18)	07:05	07:33	07:07			07:40		15:59 (20)
	21:08	81	20:30 (72)	20:48	44	07:55 (18)	20:05	19:14	17:30			17:09	35	16:34 (20)
5	06:11		07:13 (18)	06:36		07:11 (18)	07:06	07:34	07:08		16:04 (20)	07:41		16:00 (20)
	21:08	82	20:29 (72)	20:46	44	07:55 (18)	20:03	19:12	17:29	13	16:17 (20)	17:09	34	16:34 (20)
6	06:12		07:14 (18)	06:37		07:12 (18)	07:07	07:35	07:09		16:01 (20)	07:42		09:01 (21)
	21:08	82	20:30 (72)	20:45	42	07:54 (18)	20:01	19:10	17:27	19	16:20 (20)	17:09	41	16:34 (20)
7	06:12		07:13 (18)	06:38		07:13 (18)	07:07	07:37	07:10		16:00 (20)	07:43		09:00 (21)
	21:07	82	20:29 (72)	20:44	40	07:53 (18)	20:00	19:09	17:26	22	16:22 (20)	17:09	45	16:35 (20)
8	06:13		07:13 (18)	06:39		07:13 (18)	07:08	07:38	07:12		15:58 (20)	07:44		08:59 (21)
	21:07	83	20:30 (72)	20:43	40	07:53 (18)	19:56	19:07	17:25	26	16:24 (20)	17:09	47	16:35 (20)
9	06:13		07:12 (18)	06:40		07:14 (18)	07:09	07:39	07:13		15:57 (20)	07:45		08:58 (21)
	21:07	84	20:29 (72)	20:42	38	07:52 (18)	19:55	19:06	17:24	28	16:25 (20)	17:09	49	16:35 (20)
10	06:14		07:12 (18)	06:41		07:15 (18)	07:10	07:40	07:14		15:55 (20)	07:46		08:58 (21)
	21:06	83	20:29 (72)	20:41	36	07:51 (18)	19:53	19:04	17:23	31	16:26 (20)	17:09	49	16:35 (20)
11	06:15		07:12 (18)	06:42		07:16 (18)	07:11	07:41	07:15		15:55 (20)	07:47		08:58 (21)
	21:06	83	20:29 (72)	20:39	34	07:50 (18)	19:52	19:02	17:22	32	16:27 (20)	17:09	50	16:35 (20)
12	06:15		07:12 (18)	06:43		07:17 (18)	07:12	07:42	07:16		15:54 (20)	07:47		08:57 (21)
	21:06	83	20:29 (72)	20:38	31	07:48 (18)	19:50	19:01	17:21	34	16:28 (20)	17:09	51	16:35 (20)
13	06:16		07:12 (18)	06:44		07:19 (18)	07:13	07:43	07:17		15:54 (20)	07:48		08:57 (21)
	21:05	84	20:29 (72)	20:37	28	07:47 (18)	19:48	18:59	17:21	35	16:29 (20)	17:10	51	16:35 (20)
14	06:17		07:12 (18)	06:45		07:20 (18)	07:14	07:44	07:18		15:53 (20)	07:49		08:58 (21)
	21:05	84	20:29 (72)	20:35	25	07:45 (18)	19:47	18:58	17:20	36	16:29 (20)	17:10	51	16:36 (20)
15	06:18		07:12 (18)	06:46		07:22 (18)	07:15	07:45	07:20		15:54 (20)	07:50		08:58 (21)
	21:04	84	20:29 (72)	20:34	19	07:41 (18)	19:45	18:56	17:19	36	16:30 (20)	17:10	51	16:36 (20)
16	06:18		07:11 (18)	06:46		07:25 (18)	07:16	07:46	07:21		15:53 (20)	07:50		08:58 (21)
	21:04	83	20:28 (72)	20:33	13	07:38 (18)	19:43	18:55	17:18	38	16:31 (20)	17:10	51	16:36 (20)
17	06:19		07:11 (18)	06:47			07:17	07:47	07:22		15:53 (20)	07:51		08:58 (21)
	21:03	82	20:27 (72)	20:31			19:42	18:53	17:17	38	16:31 (20)	17:11	51	16:36 (20)
18	06:20		07:11 (18)	06:48			07:18	07:48	07:23		15:52 (20)	07:52		08:58 (21)
	21:02	83	20:27 (72)	20:30			19:40	18:52	17:17	39	16:31 (20)	17:11	51	16:36 (20)
19	06:21		07:11 (18)	06:49			07:19	07:49	07:24		15:52 (20)	07:52		08:59 (21)
	21:02	82	20:27 (72)	20:29			19:38	18:50	17:16	39	16:31 (20)	17:11	51	16:37 (20)
20	06:22		07:10 (18)	06:50			07:20	07:50	07:25		15:53 (20)	07:53		08:59 (21)
	21:01	81	20:25 (72)	20:27			19:37	18:49	17:15	40	16:33 (20)	17:12	52	16:38 (20)
21	06:22		07:10 (18)	06:51			07:21	07:51	07:26		15:53 (20)	07:53		08:59 (21)
	21:00	80	20:25 (72)	20:26			19:35	18:48	17:15	40	16:33 (20)	17:12	52	16:38 (20)
22	06:23		07:10 (18)	06:52			07:22	07:52	07:28		15:53 (20)	07:54		09:00 (21)
	21:00	78	20:24 (72)	20:24			19:33	18:46	17:14	40	16:33 (20)	17:13	52	16:39 (20)
23	06:24		07:10 (18)	06:53			07:23	07:53	07:29		15:53 (20)	07:54		09:00 (21)
	20:59	76	20:23 (72)	20:23			19:32	18:45	17:13	40	16:33 (20)	17:13	52	16:39 (20)
24	06:25		07:10 (18)	06:54			07:24	07:54	07:30		15:53 (20)	07:55		09:01 (21)
	20:58	75	20:22 (72)	20:21			19:30	18:43	17:13	40	16:33 (20)	17:14	51	16:39 (20)
25	06:26		07:10 (18)	06:55			07:25	07:56	07:31		15:55 (20)	07:55		09:02 (21)
	20:57	72	20:21 (72)	20:20			19:28	18:42	17:12	39	16:34 (20)	17:14	51	16:40 (20)
26	06:27		07:10 (18)	06:56			07:26	07:57	07:32		15:55 (20)	07:56		09:02 (21)
	20:56	68	20:19 (72)	20:18			19:27	18:41	17:12	39	16:34 (20)	17:15	51	16:40 (20)
27	06:28		07:10 (18)	06:57			07:27	07:58	07:33		15:55 (20)	07:56		09:02 (21)
	20:56	64	20:17 (72)	20:17			19:25	18:39	17:11	39	16:34 (20)	17:16	52	16:41 (20)
28	06:29		07:10 (18)	06:58			07:28	07:59	07:34		15:56 (20)	07:56		09:04 (21)
	20:55	57	20:13 (72)	20:15			19:23	18:38	17:11	38	16:34 (20)	17:16	51	16:42 (20)
29	06:29		07:10 (18)	06:59			07:29	08:00	07:35		15:56 (20)	07:57		09:04 (21)
	20:54	47	07:57 (18)	20:14			19:22	18:37	17:11	38	16:34 (20)	17:17	51	16:42 (20)
30	06:30		07:10 (18)	07:00			07:30	08:01	07:36		15:57 (20)	07:57		09:05 (21)
	20:53	47	07:57 (18)	20:12			19:20	18:36	17:10	37	16:34 (20)	17:18	51	16:43 (20)
31	06:31		07:11 (18)	07:01				08:02				07:57		09:06 (21)
	20:52	46	07:57 (18)	20:11				18:34				17:19	51	16:44 (20)
Potential sun hours	456			427			374	346	300			291		
Total, worst case		2357			569					896			1483	
Sun reduction		0.60			0.60					0.37			0.50	
Oper. time red.		1.00			1.00					1.00			1.00	
Wind dir. red.		0.65			0.67					0.67			0.65	
Total reduction		0.39			0.40					0.25			0.33	
Total, real		923			230					224			482	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 23

Licensed user:
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217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 742 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6317)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May	June
1	07:57		15:58 (23)	07:44		16:07 (23)	07:10		07:55 (21)	07:20		09:05 (21)	06:36	06:08
	17:20	41	16:39 (23)	17:53	66	17:28 (25)	18:26	52	08:47 (21)	19:59	46	19:27 (20)	20:28	20:57
2	07:57		15:59 (23)	07:44		16:08 (23)	07:08		07:53 (21)	07:18		18:50 (20)	06:34	06:08
	17:20	41	16:40 (23)	17:54	64	17:28 (25)	18:27	55	08:48 (21)	20:00	37	19:27 (20)	20:29	20:58
3	07:57		15:59 (23)	07:43		16:09 (23)	07:07		07:53 (21)	07:17		18:50 (20)	06:33	06:07
	17:21	41	16:40 (23)	17:55	63	17:28 (25)	18:28	56	08:49 (21)	20:00	38	19:28 (20)	20:30	20:58
4	07:58		15:59 (23)	07:42		16:10 (23)	07:05		07:51 (21)	07:15		18:49 (20)	06:32	06:07
	17:22	42	16:41 (23)	17:57	60	17:28 (25)	18:29	58	08:49 (21)	20:01	38	19:27 (20)	20:31	20:59
5	07:58		15:59 (23)	07:41		16:12 (23)	07:03		07:51 (21)	07:14		18:49 (20)	06:31	06:07
	17:23	43	16:42 (23)	17:58	56	17:28 (25)	18:30	59	08:50 (21)	20:02	37	19:26 (20)	20:32	21:00
6	07:58		15:59 (23)	07:39		16:13 (23)	07:02		07:50 (21)	07:12		18:49 (20)	06:30	06:06
	17:24	44	16:43 (23)	17:59	52	17:27 (25)	18:31	60	08:50 (21)	20:03	37	19:26 (20)	20:33	21:00
7	07:57		16:00 (23)	07:38		16:15 (23)	07:00		07:49 (21)	07:10		18:49 (20)	06:28	06:06
	17:25	43	16:43 (23)	18:00	47	17:26 (25)	18:33	60	08:49 (21)	20:04	36	19:25 (20)	20:34	21:01
8	07:57		16:00 (23)	07:37		16:17 (23)	07:59		08:49 (21)	07:09		18:50 (20)	06:27	06:06
	17:26	44	16:44 (23)	18:02	41	17:25 (25)	19:34	61	09:50 (21)	20:05	35	19:25 (20)	20:35	21:02
9	07:57		16:00 (23)	07:36		16:19 (23)	07:57		08:48 (21)	07:07		18:50 (20)	06:26	06:06
	17:27	45	16:45 (23)	18:03	33	17:23 (25)	19:35	62	09:50 (21)	20:06	34	19:24 (20)	20:36	21:02
10	07:57		16:00 (23)	07:35		16:22 (23)	07:56		08:48 (21)	07:06		18:50 (20)	06:25	06:05
	17:28	45	16:45 (23)	18:04	19	16:41 (23)	19:36	62	09:50 (21)	20:07	32	19:22 (20)	20:37	21:03
11	07:57		16:00 (23)	07:34		16:26 (23)	07:54		08:47 (21)	07:04		18:51 (20)	06:24	06:05
	17:29	46	16:46 (23)	18:05	10	16:36 (23)	19:37	62	09:49 (21)	20:08	31	19:22 (20)	20:38	21:03
12	07:57		16:00 (23)	07:33			07:53		08:46 (21)	07:03		18:51 (20)	06:23	06:05
	17:30	47	16:47 (23)	18:06			19:38	63	09:49 (21)	20:09	29	19:20 (20)	20:39	21:04
13	07:56		16:00 (23)	07:31			07:51		08:46 (21)	07:01		18:53 (20)	06:22	06:05
	17:31	47	16:47 (23)	18:08			19:39	63	09:49 (21)	20:10	26	19:19 (20)	20:40	21:04
14	07:56		16:01 (23)	07:30			07:49		08:46 (21)	07:00		18:54 (20)	06:21	06:05
	17:32	47	16:48 (23)	18:09			19:40	62	09:48 (21)	20:11	22	19:16 (20)	20:41	21:05
15	07:56		16:01 (23)	07:29			07:48		08:46 (21)	06:58		18:56 (20)	06:20	06:05
	17:33	48	16:49 (23)	18:10			19:41	62	09:48 (21)	20:12	18	19:14 (20)	20:42	21:05
16	07:55		16:01 (23)	07:28			07:46		08:46 (21)	06:57		18:58 (20)	06:19	06:05
	17:34	48	16:49 (23)	18:11			19:42	61	09:47 (21)	20:13	13	19:11 (20)	20:43	21:06
17	07:55		16:01 (23)	07:26			07:44		08:46 (21)	06:55			06:18	06:05
	17:35	49	16:50 (23)	18:12			19:43	60	09:46 (21)	20:14			20:44	21:06
18	07:54		16:01 (23)	07:25			07:43		08:46 (21)	06:54			06:17	06:05
	17:36	49	16:50 (23)	18:13			19:44	60	09:46 (21)	20:15			20:45	21:06
19	07:54		16:02 (23)	07:24			07:41		08:46 (21)	06:52			06:16	06:05
	17:38	49	16:51 (23)	18:15			19:45	58	09:44 (21)	20:16			20:46	21:07
20	07:53		16:02 (23)	07:22		08:17 (21)	07:40		08:46 (21)	06:51			06:16	06:05
	17:39	49	16:51 (23)	18:16	10	08:27 (21)	19:46	57	09:43 (21)	20:17			20:47	21:07
21	07:53		16:02 (23)	07:21		08:11 (21)	07:38		08:47 (21)	06:49			06:15	06:06
	17:40	49	16:51 (23)	18:17	21	08:32 (21)	19:47	55	09:42 (21)	20:18			20:48	21:07
22	07:52		16:03 (23)	07:20		08:08 (21)	07:36		08:47 (21)	06:48			06:14	06:06
	17:41	54	17:17 (25)	18:18	28	08:36 (21)	19:48	54	09:41 (21)	20:19			20:49	21:08
23	07:52		16:03 (23)	07:18		08:04 (21)	07:35		08:47 (21)	06:46			06:13	06:06
	17:42	57	17:18 (25)	18:19	34	08:38 (21)	19:49	57	19:14 (20)	20:20			20:50	21:08
24	07:51		16:03 (23)	07:17		08:03 (21)	07:33		08:49 (21)	06:45			06:13	06:06
	17:43	60	17:19 (25)	18:20	37	08:40 (21)	19:50	64	19:19 (20)	20:21			20:50	21:08
25	07:50		16:04 (23)	07:15		08:01 (21)	07:31		08:49 (21)	06:44			06:12	06:07
	17:45	62	17:21 (25)	18:21	42	08:43 (21)	19:51	69	19:22 (20)	20:22			20:51	21:08
26	07:49		16:04 (23)	07:14		07:59 (21)	07:30		08:51 (21)	06:42			06:11	06:07
	17:46	64	17:22 (25)	18:23	45	08:44 (21)	19:52	69	19:24 (20)	20:23			20:52	21:08
27	07:49		16:05 (23)	07:12		07:58 (21)	07:28		08:52 (21)	06:41			06:11	06:07
	17:47	63	17:23 (25)	18:24	47	08:45 (21)	19:54	69	19:25 (20)	20:24			20:53	21:08
28	07:48		16:05 (23)	07:11		07:56 (21)	07:27		08:53 (21)	06:40			06:10	06:08
	17:48	65	17:24 (25)	18:25	50	08:46 (21)	19:55	68	19:25 (20)	20:25			20:54	21:08
29	07:47		16:05 (23)				07:25		08:55 (21)	06:38			06:10	06:08
	17:49	66	17:25 (25)				19:56	66	19:27 (20)	20:26			20:55	21:08
30	07:46		16:06 (23)				07:23		08:57 (21)	06:37			06:09	06:08
	17:51	66	17:26 (25)				19:57	62	19:27 (20)	20:27			20:55	21:08
31	07:45		16:07 (23)				07:22		08:59 (21)				06:08	
	17:52	66	17:28 (25)				19:58	57	19:27 (20)				20:56	
Potential sun hours	300			299			370			397			446	449
Total, worst case		1580			825			1883			509			
Sun reduction		0.36			0.42			0.44			0.51			
Oper. time red.		1.00			1.00			1.00			1.00			
Wind dir. red.		0.68			0.66			0.64			0.66			
Total reduction		0.24			0.28			0.28			0.34			
Total, real		386			230			529			172			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 24

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 742 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6317)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July		August			September			October			November			December		
1	06:09		06:32			07:02		18:50 (20)	07:31		08:26 (21)	07:03		15:50 (23)	07:37		15:42 (23)
	21:08		20:51			20:09	31	19:21 (20)	19:18	62	09:28 (21)	17:33	20	16:10 (23)	17:10	46	16:28 (23)
2	06:09		06:33			07:03		18:49 (20)	07:31		08:25 (21)	07:05		15:49 (23)	07:38		15:43 (23)
	21:08		20:50			20:08	32	19:21 (20)	19:17	63	09:28 (21)	17:32	34	16:53 (25)	17:10	45	16:28 (23)
3	06:10		06:34			07:04		18:48 (20)	07:32		08:25 (21)	07:06		15:46 (23)	07:39		15:43 (23)
	21:08		20:49			20:06	34	19:22 (20)	19:15	63	09:28 (21)	17:31	43	16:55 (25)	17:10	45	16:28 (23)
4	06:10		06:35			07:05		18:47 (20)	07:33		08:25 (21)	07:07		15:45 (23)	07:40		15:44 (23)
	21:08		20:48			20:05	35	19:22 (20)	19:14	62	09:27 (21)	17:30	48	16:56 (25)	17:09	44	16:28 (23)
5	06:11		06:36			07:06		18:46 (20)	07:34		08:25 (21)	07:08		15:43 (23)	07:41		15:45 (23)
	21:08		20:46			20:03	36	19:22 (20)	19:12	62	09:27 (21)	17:29	53	16:57 (25)	17:09	43	16:28 (23)
6	06:12		06:37			07:07		18:45 (20)	07:35		08:25 (21)	07:09		15:41 (23)	07:42		15:45 (23)
	21:08		20:45			20:01	37	19:22 (20)	19:10	61	09:26 (21)	17:27	57	16:57 (25)	17:09	44	16:29 (23)
7	06:12		06:38			07:07		18:44 (20)	07:37		08:25 (21)	07:10		15:41 (23)	07:43		15:46 (23)
	21:07		20:44			20:00	37	19:21 (20)	19:09	60	09:25 (21)	17:26	60	16:59 (25)	17:09	43	16:29 (23)
8	06:13		06:39			07:08		18:43 (20)	07:38		08:25 (21)	07:12		15:40 (23)	07:44		15:47 (23)
	21:07		20:43			19:56	38	19:21 (20)	19:07	60	09:25 (21)	17:25	63	16:59 (25)	17:09	42	16:29 (23)
9	06:13		06:40			07:09		18:43 (20)	07:39		08:26 (21)	07:13		15:39 (23)	07:45		15:48 (23)
	21:07		20:42			19:55	38	19:21 (20)	19:06	58	09:24 (21)	17:24	64	16:59 (25)	17:09	41	16:29 (23)
10	06:14		06:41			07:10		18:43 (20)	07:40		08:26 (21)	07:14		15:38 (23)	07:46		15:49 (23)
	21:06		20:41			19:53	37	19:20 (20)	19:04	57	09:23 (21)	17:23	66	16:59 (25)	17:09	41	16:30 (23)
11	06:15		06:42			07:11		08:58 (21)	07:41		08:27 (21)	07:15		15:39 (23)	07:47		15:49 (23)
	21:06		20:39			19:52	45	19:20 (20)	19:02	55	09:22 (21)	17:22	65	16:59 (25)	17:09	41	16:30 (23)
12	06:15		06:43			07:12		08:52 (21)	07:42		08:27 (21)	07:16		15:38 (23)	07:47		15:49 (23)
	21:06		20:38			19:50	56	19:19 (20)	19:01	54	09:21 (21)	17:21	66	16:58 (25)	17:09	40	16:29 (23)
13	06:16		06:44			07:13		08:48 (21)	07:43		08:28 (21)	07:17		15:37 (23)	07:48		15:50 (23)
	21:05		20:37			19:48	62	19:18 (20)	18:59	51	09:19 (21)	17:21	66	16:57 (25)	17:10	40	16:30 (23)
14	06:17		06:45			07:14		08:46 (21)	07:44		08:29 (21)	07:18		15:37 (23)	07:49		15:51 (23)
	21:05		20:35			19:47	65	19:17 (20)	18:58	49	09:18 (21)	17:20	65	16:56 (25)	17:10	39	16:30 (23)
15	06:18		06:46			07:15		08:43 (21)	07:45		08:31 (21)	07:20		15:38 (23)	07:50		15:52 (23)
	21:04		20:34			19:45	69	19:16 (20)	18:56	46	09:17 (21)	17:19	63	16:56 (25)	17:10	39	16:31 (23)
16	06:18		06:46			07:16		08:41 (21)	07:46		08:32 (21)	07:21		15:37 (23)	07:50		15:52 (23)
	21:04		20:33			19:43	69	19:14 (20)	18:55	43	09:15 (21)	17:18	64	16:55 (25)	17:10	38	16:30 (23)
17	06:19		06:47			07:17		08:39 (21)	07:47		08:33 (21)	07:22		15:37 (23)	07:51		15:53 (23)
	21:03		20:31			19:42	69	19:12 (20)	18:53	40	09:13 (21)	17:17	62	16:54 (25)	17:11	38	16:31 (23)
18	06:20		06:48			07:18		08:38 (21)	07:48		08:35 (21)	07:23		15:37 (23)	07:52		15:53 (23)
	21:02		20:30			19:40	68	19:10 (20)	18:52	36	09:11 (21)	17:17	60	16:53 (25)	17:11	38	16:31 (23)
19	06:21		06:49			07:19		08:35 (21)	07:49		08:37 (21)	07:24		15:37 (23)	07:52		15:54 (23)
	21:02		20:29			19:38	66	19:06 (20)	18:50	32	09:09 (21)	17:16	57	16:52 (25)	17:11	38	16:32 (23)
20	06:22		06:50			07:20		08:34 (21)	07:50		08:39 (21)	07:25		15:38 (23)	07:53		15:55 (23)
	21:01		20:27			19:37	60	19:02 (20)	18:49	27	09:06 (21)	17:15	54	16:52 (25)	17:12	37	16:32 (23)
21	06:22		06:51			07:21		08:33 (21)	07:51		08:43 (21)	07:26		15:38 (23)	07:53		15:55 (23)
	21:00		20:26			19:35	53	09:26 (21)	18:48	18	09:01 (21)	17:15	49	16:27 (23)	17:12	37	16:32 (23)
22	06:23		06:52			07:22		08:32 (21)	07:52			07:28		15:38 (23)	07:54		15:56 (23)
	21:00		20:24			19:33	54	09:26 (21)	18:46			17:14	49	16:27 (23)	17:13	37	16:33 (23)
23	06:24		06:53			07:23		08:31 (21)	07:53			07:29		15:38 (23)	07:54		15:56 (23)
	20:59		20:23			19:32	56	09:27 (21)	18:45			17:13	49	16:27 (23)	17:13	37	16:33 (23)
24	06:25		06:54			07:24		08:30 (21)	07:54			07:30		15:38 (23)	07:55		15:56 (23)
	20:58		20:21			19:30	57	09:27 (21)	18:43			17:13	49	16:27 (23)	17:14	38	16:34 (23)
25	06:26		06:55			07:25		08:29 (21)	07:56			07:31		15:39 (23)	07:55		15:57 (23)
	20:57		20:20			19:28	59	09:28 (21)	18:42			17:12	49	16:28 (23)	17:14	38	16:35 (23)
26	06:27		06:56			07:26		08:28 (21)	07:57			07:32		15:40 (23)	07:56		15:57 (23)
	20:56		20:18			19:27	60	09:28 (21)	18:41			17:12	48	16:28 (23)	17:15	38	16:35 (23)
27	06:28		06:57		19:00 (20)	07:27		08:27 (21)	07:58			07:33		15:40 (23)	07:56		15:57 (23)
	20:56		20:17	13	19:13 (20)	19:25	61	09:28 (21)	18:39			17:11	48	16:28 (23)	17:16	38	16:35 (23)
28	06:29		06:58		18:57 (20)	07:28		08:27 (21)	07:59			07:34		15:41 (23)	07:56		15:58 (23)
	20:55		20:15	19	19:16 (20)	19:23	61	09:28 (21)	18:38			17:11	47	16:28 (23)	17:16	39	16:37 (23)
29	06:29		06:59		18:55 (20)	07:29		08:26 (21)	08:00			07:35		15:41 (23)	07:57		15:58 (23)
	20:54		20:14	22	19:17 (20)	19:22	62	09:28 (21)	18:37			17:11	47	16:28 (23)	17:17	39	16:37 (23)
30	06:30		07:00		18:53 (20)	07:30		08:26 (21)	08:01			07:36		15:42 (23)	07:57		15:58 (23)
	20:53		20:12	26	19:19 (20)	19:20	62	09:28 (21)	18:36			17:10	46	16:28 (23)	17:18	40	16:38 (23)
31	06:31		07:01		18:51 (20)				08:02		16:54 (23)				07:57		15:58 (23)
	20:52		20:11	29	19:20 (20)				18:34	13	17:07 (23)				17:19	40	16:38 (23)
Potential sun hours	456		427			374			346			300			291		
Total, worst case				109			1569			1072			1611			1243	
Sun reduction				0.60			0.61			0.56			0.37			0.50	
Oper. time red.				1.00			1.00			1.00			1.00			1.00	
Wind dir. red.				0.66			0.64			0.63			0.68			0.68	
Total reduction				0.40			0.39			0.36			0.25			0.34	
Total, real				43			618			381			405			422	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 25

Licensed user:
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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative**Shadow receptor:** 743 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6318)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May	June
1	07:57		16:20 (23)	07:44		16:13 (23)	07:10		08:05 (21)	07:20		08:34 (21)	06:36	06:08
	17:20	16	16:36 (23)	17:53	68	17:29 (25)	18:26	14	08:19 (21)	19:59	82	19:30 (20)	20:28	20:57
2	07:57		16:19 (23)	07:44		16:14 (23)	07:08		07:59 (21)	07:18		08:35 (21)	06:34	06:08
	17:20	18	16:37 (23)	17:54	68	17:30 (25)	18:27	24	08:23 (21)	20:00	81	19:30 (20)	20:29	20:58
3	07:57		16:18 (23)	07:43		16:14 (23)	07:07		07:56 (21)	07:17		08:36 (21)	06:33	06:07
	17:21	20	16:38 (23)	17:55	70	17:31 (25)	18:28	31	08:27 (21)	20:00	81	19:32 (20)	20:30	20:58
4	07:58		16:18 (23)	07:42		16:14 (23)	07:05		07:53 (21)	07:15		08:36 (21)	06:32	06:07
	17:22	22	16:40 (23)	17:57	72	17:33 (25)	18:29	36	08:29 (21)	20:01	81	19:32 (20)	20:31	20:59
5	07:58		16:18 (23)	07:41		16:15 (23)	07:03		07:51 (21)	07:14		08:37 (21)	06:31	06:07
	17:23	23	16:41 (23)	17:58	70	17:33 (25)	18:30	40	08:31 (21)	20:02	79	19:32 (20)	20:32	21:00
6	07:58		16:17 (23)	07:39		16:16 (23)	07:02		07:48 (21)	07:12		08:39 (21)	06:30	06:06
	17:24	26	16:43 (23)	17:59	69	17:33 (25)	18:31	44	08:32 (21)	20:03	77	19:33 (20)	20:33	21:00
7	07:57		16:17 (23)	07:38		16:16 (23)	07:00		07:46 (21)	07:10		08:40 (21)	06:28	06:06
	17:25	27	16:44 (23)	18:00	68	17:33 (25)	18:33	47	08:33 (21)	20:04	73	19:32 (20)	20:34	21:01
8	07:57		16:17 (23)	07:37		16:17 (23)	07:59		08:45 (21)	07:09		08:42 (21)	06:27	06:06
	17:26	28	16:45 (23)	18:02	66	17:33 (25)	19:34	50	09:35 (21)	20:05	70	19:33 (20)	20:35	21:02
9	07:57		16:16 (23)	07:36		16:18 (23)	07:57		08:43 (21)	07:07		08:44 (21)	06:26	06:06
	17:27	31	16:47 (23)	18:03	63	17:32 (25)	19:35	53	09:36 (21)	20:06	65	19:32 (20)	20:36	21:02
10	07:57		16:15 (23)	07:35		16:19 (23)	07:56		08:42 (21)	07:06		08:46 (21)	06:25	06:05
	17:28	32	16:47 (23)	18:04	60	17:32 (25)	19:36	55	09:37 (21)	20:07	59	19:32 (20)	20:37	21:03
11	07:57		16:15 (23)	07:34		16:19 (23)	07:54		08:41 (21)	07:04		08:51 (21)	06:24	06:05
	17:29	34	16:49 (23)	18:05	55	17:30 (25)	19:37	56	09:37 (21)	20:08	49	19:32 (20)	20:38	21:03
12	07:57		16:15 (23)	07:33		16:21 (23)	07:53		08:39 (21)	07:03		18:54 (20)	06:23	06:05
	17:30	35	16:50 (23)	18:06	49	17:28 (25)	19:38	58	09:37 (21)	20:09	37	19:31 (20)	20:39	21:04
13	07:56		16:14 (23)	07:31		16:22 (23)	07:51		08:39 (21)	07:01		18:55 (20)	06:22	06:05
	17:31	37	16:51 (23)	18:08	40	17:25 (25)	19:39	59	09:38 (21)	20:10	36	19:31 (20)	20:40	21:04
14	07:56		16:14 (23)	07:30		16:24 (23)	07:49		08:37 (21)	07:00		18:55 (20)	06:21	06:05
	17:32	38	16:52 (23)	18:09	33	16:57 (23)	19:40	61	09:38 (21)	20:11	34	19:29 (20)	20:41	21:05
15	07:56		16:15 (23)	07:29		16:25 (23)	07:48		08:37 (21)	06:58		18:56 (20)	06:20	06:05
	17:33	38	16:53 (23)	18:10	29	16:54 (23)	19:41	62	09:39 (21)	20:12	33	19:29 (20)	20:42	21:05
16	07:55		16:14 (23)	07:28		16:28 (23)	07:46		08:36 (21)	06:57		18:56 (20)	06:19	06:05
	17:34	40	16:54 (23)	18:11	25	16:53 (23)	19:42	63	09:39 (21)	20:13	31	19:27 (20)	20:43	21:06
17	07:55		16:14 (23)	07:26		16:31 (23)	07:44		08:35 (21)	06:55		18:57 (20)	06:18	06:05
	17:35	41	16:55 (23)	18:12	19	16:50 (23)	19:43	63	09:38 (21)	20:14	30	19:27 (20)	20:44	21:06
18	07:54		16:13 (23)	07:25		16:34 (23)	07:43		08:35 (21)	06:54		18:57 (20)	06:17	06:05
	17:36	43	16:56 (23)	18:13	11	16:45 (23)	19:44	64	09:39 (21)	20:15	28	19:25 (20)	20:45	21:06
19	07:54		16:14 (23)	07:24			07:41		08:34 (21)	06:52		18:59 (20)	06:16	06:05
	17:38	43	16:57 (23)	18:15			19:45	64	09:38 (21)	20:16	24	19:23 (20)	20:46	21:07
20	07:53		16:13 (23)	07:22			07:40		08:33 (21)	06:51		19:01 (20)	06:16	06:05
	17:39	45	16:58 (23)	18:16			19:46	65	09:38 (21)	20:17	21	19:22 (20)	20:47	21:07
21	07:53		16:13 (23)	07:21			07:38		08:34 (21)	06:49		19:02 (20)	06:15	06:06
	17:40	45	16:58 (23)	18:17			19:47	64	09:38 (21)	20:18	17	19:19 (20)	20:48	21:07
22	07:52		16:13 (23)	07:20			07:36		08:33 (21)	06:48		19:06 (20)	06:14	06:06
	17:41	46	16:59 (23)	18:18			19:48	64	09:37 (21)	20:19	10	19:16 (20)	20:49	21:08
23	07:52		16:13 (23)	07:18			07:35		08:32 (21)	06:46			06:13	06:06
	17:42	47	17:00 (23)	18:19			19:49	64	09:36 (21)	20:20			20:50	21:08
24	07:51		16:12 (23)	07:17			07:33		08:33 (21)	06:45			06:13	06:06
	17:43	48	17:00 (23)	18:20			19:50	63	09:36 (21)	20:21			20:50	21:08
25	07:50		16:13 (23)	07:15			07:31		08:32 (21)	06:44			06:12	06:07
	17:45	48	17:01 (23)	18:21			19:51	63	09:35 (21)	20:22			20:51	21:08
26	07:49		16:13 (23)	07:14			07:30		08:33 (21)	06:42			06:11	06:07
	17:46	49	17:02 (23)	18:23			19:52	62	09:35 (21)	20:23			20:52	21:08
27	07:49		16:13 (23)	07:12			07:28		08:33 (21)	06:41			06:11	06:07
	17:47	56	17:23 (25)	18:24			19:54	61	09:34 (21)	20:24			20:53	21:08
28	07:48		16:13 (23)	07:11			07:27		08:32 (21)	06:40			06:10	06:08
	17:48	59	17:24 (25)	18:25			19:55	60	09:32 (21)	20:25			20:54	21:08
29	07:47		16:13 (23)				07:25		08:33 (21)	06:38			06:10	06:08
	17:49	61	17:25 (25)				19:56	73	19:24 (20)	20:26			20:55	21:08
30	07:46		16:13 (23)				07:23		08:33 (21)	06:37			06:09	06:08
	17:51	64	17:26 (25)				19:57	76	19:26 (20)	20:27			20:55	21:08
31	07:45		16:13 (23)				07:22		08:33 (21)				06:08	
	17:52	67	17:28 (25)				19:58	80	19:28 (20)				20:56	
Potential sun hours	300			299			370			397			446	449
Total, worst case		1227			935			1739			1098			
Sun reduction		0.36			0.42			0.44			0.51			
Oper. time red.		1.00			1.00			1.00			1.00			
Wind dir. red.		0.68			0.68			0.64			0.65			
Total reduction		0.24			0.29			0.28			0.33			
Total, real		300			267			488			364			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 26

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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 743 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6318)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July	August			September			October			November			December		
1	06:09	06:32			07:02		08:50 (21)	07:31		08:18 (21)	07:03		15:48 (23)	07:37		15:57 (23)
	21:08	20:51			20:09	49	19:31 (20)	19:18	59	09:17 (21)	17:33	60	17:01 (25)	17:10	34	16:31 (23)
2	06:09	06:33			07:03		08:45 (21)	07:31		08:19 (21)	07:05		15:48 (23)	07:38		15:58 (23)
	21:08	20:50			20:08	60	19:31 (20)	19:17	57	09:16 (21)	17:32	62	17:02 (25)	17:10	32	16:30 (23)
3	06:10	06:34			07:04		08:42 (21)	07:32		08:19 (21)	07:06		15:47 (23)	07:39		15:59 (23)
	21:08	20:49			20:06	65	19:30 (20)	19:15	56	09:15 (21)	17:31	66	17:03 (25)	17:10	31	16:30 (23)
4	06:10	06:35			07:05		08:39 (21)	07:33		08:20 (21)	07:07		15:46 (23)	07:40		16:01 (23)
	21:08	20:48			20:05	70	19:30 (20)	19:14	54	09:14 (21)	17:30	68	17:03 (25)	17:09	29	16:30 (23)
5	06:11	06:36			07:06		08:37 (21)	07:34		08:21 (21)	07:08		15:45 (23)	07:41		16:02 (23)
	21:08	20:46			20:03	73	19:29 (20)	19:12	51	09:12 (21)	17:29	69	17:03 (25)	17:09	27	16:29 (23)
6	06:12	06:37			07:07		08:35 (21)	07:35		08:22 (21)	07:09		15:45 (23)	07:42		16:03 (23)
	21:08	20:45			20:01	77	19:29 (20)	19:10	49	09:11 (21)	17:27	71	17:03 (25)	17:09	26	16:29 (23)
7	06:12	06:38			07:07		08:32 (21)	07:37		08:23 (21)	07:10		15:45 (23)	07:43		16:05 (23)
	21:07	20:44			20:00	79	19:27 (20)	19:09	46	09:09 (21)	17:26	71	17:03 (25)	17:09	23	16:28 (23)
8	06:13	06:39			07:08		08:31 (21)	07:38		08:25 (21)	07:12		15:45 (23)	07:44		16:06 (23)
	21:07	20:43			19:56	80	19:26 (20)	19:07	42	09:07 (21)	17:25	70	17:02 (25)	17:09	22	16:28 (23)
9	06:13	06:40			07:09		08:29 (21)	07:39		08:26 (21)	07:13		15:44 (23)	07:45		16:07 (23)
	21:07	20:42			19:55	81	19:25 (20)	19:06	39	09:05 (21)	17:24	70	17:01 (25)	17:09	21	16:28 (23)
10	06:14	06:41			07:10		08:28 (21)	07:40		08:28 (21)	07:14		15:44 (23)	07:46		16:09 (23)
	21:06	20:41			19:53	82	19:24 (20)	19:04	34	09:02 (21)	17:23	68	17:00 (25)	17:09	18	16:27 (23)
11	06:15	06:42			07:11		08:27 (21)	07:41		08:31 (21)	07:15		15:45 (23)	07:47		16:11 (23)
	21:06	20:39			19:52	81	19:22 (20)	19:02	28	08:59 (21)	17:22	66	16:59 (25)	17:09	16	16:27 (23)
12	06:15	06:43			07:12		08:25 (21)	07:42		08:34 (21)	07:16		15:45 (23)	07:47		16:11 (23)
	21:06	20:38			19:50	80	19:20 (20)	19:01	21	08:55 (21)	17:21	63	16:58 (25)	17:09	14	16:25 (23)
13	06:16	06:44			07:13		08:24 (21)	07:43		08:41 (21)	07:17		15:45 (23)	07:48		16:13 (23)
	21:05	20:37			19:48	79	19:18 (20)	18:59	6	08:47 (21)	17:21	61	16:57 (25)	17:10	12	16:25 (23)
14	06:17	06:45			07:14		08:24 (21)	07:44			07:18		15:45 (23)	07:49		16:15 (23)
	21:05	20:35			19:47	73	19:15 (20)	18:58			17:20	59	16:56 (25)	17:10	9	16:24 (23)
15	06:18	06:46			07:15		08:23 (21)	07:45			07:20		15:46 (23)	07:50		16:18 (23)
	21:04	20:34			19:45	62	19:08 (20)	18:56			17:19	56	16:56 (25)	17:10	5	16:23 (23)
16	06:18	06:46			07:16		08:22 (21)	07:46			07:21		15:46 (23)	07:50		
	21:04	20:33			19:43	61	09:23 (21)	18:55			17:18	49	16:35 (23)	17:10		
17	06:19	06:47			07:17		08:21 (21)	07:47			07:22		15:46 (23)	07:51		
	21:03	20:31			19:42	62	09:23 (21)	18:53			17:17	48	16:34 (23)	17:11		
18	06:20	06:48			07:18		08:21 (21)	07:48			07:23		15:46 (23)	07:52		
	21:02	20:30			19:40	62	09:23 (21)	18:52			17:17	48	16:34 (23)	17:11		
19	06:21	06:49			07:19		08:19 (21)	07:49			07:24		15:47 (23)	07:52		
	21:02	20:29			19:38	64	09:23 (21)	18:50			17:16	47	16:34 (23)	17:11		
20	06:22	06:50			07:20		08:19 (21)	07:50			07:25		15:48 (23)	07:53		
	21:01	20:27			19:37	64	09:23 (21)	18:49			17:15	46	16:34 (23)	17:12		
21	06:22	06:51		19:10 (20)	07:21		08:18 (21)	07:51			07:26		15:49 (23)	07:53		
	21:00	20:26	11	19:21 (20)	19:35	64	09:22 (21)	18:48			17:15	45	16:34 (23)	17:12		
22	06:23	06:52		19:07 (20)	07:22		08:18 (21)	07:52			07:28		15:49 (23)	07:54		
	21:00	20:24	17	19:24 (20)	19:33	64	09:22 (21)	18:46			17:14	45	16:34 (23)	17:13		
23	06:24	06:53		19:04 (20)	07:23		08:18 (21)	07:53			07:29		15:50 (23)	07:54		
	20:59	20:23	22	19:26 (20)	19:32	64	09:22 (21)	18:45			17:13	43	16:33 (23)	17:13		
24	06:25	06:54		19:02 (20)	07:24		08:17 (21)	07:54		17:04 (23)	07:30		15:50 (23)	07:55		
	20:58	20:21	26	19:28 (20)	19:30	65	09:22 (21)	18:43	14	17:18 (23)	17:13	43	16:33 (23)	17:14		
25	06:26	06:55		19:01 (20)	07:25		08:17 (21)	07:56		17:00 (23)	07:31		15:52 (23)	07:55		
	20:57	20:20	28	19:29 (20)	19:28	64	09:21 (21)	18:42	21	17:21 (23)	17:12	41	16:33 (23)	17:14		
26	06:27	06:56		19:00 (20)	07:26		08:17 (21)	07:57		16:57 (23)	07:32		15:53 (23)	07:56		
	20:56	20:18	30	19:30 (20)	19:27	64	09:21 (21)	18:41	26	17:23 (23)	17:12	40	16:33 (23)	17:15		
27	06:28	06:57		18:57 (20)	07:27		08:17 (21)	07:58		16:55 (23)	07:33		15:54 (23)	07:56		
	20:56	20:17	32	19:29 (20)	19:25	63	09:20 (21)	18:39	29	17:24 (23)	17:11	39	16:33 (23)	17:16		
28	06:29	06:58		18:56 (20)	07:28		08:17 (21)	07:59		16:53 (23)	07:34		15:54 (23)	07:56		16:24 (23)
	20:55	20:15	34	19:30 (20)	19:23	63	09:20 (21)	18:38	33	17:26 (23)	17:11	38	16:32 (23)	17:16	4	16:28 (23)
29	06:29	06:59		18:55 (20)	07:29		08:18 (21)	08:00		16:52 (23)	07:35		15:55 (23)	07:57		16:23 (23)
	20:54	20:14	35	19:30 (20)	19:22	61	09:19 (21)	18:37	43	17:56 (25)	17:11	37	16:32 (23)	17:17	8	16:31 (23)
30	06:30	07:00		18:55 (20)	07:30		08:18 (21)	08:01		16:50 (23)	07:36		15:56 (23)	07:57		16:22 (23)
	20:53	20:12	36	19:31 (20)	19:20	60	09:18 (21)	18:36	51	17:58 (25)	17:10	35	16:31 (23)	17:18	10	16:32 (23)
31	06:31	07:01		18:54 (20)				08:02		16:49 (23)				07:57		16:21 (23)
	20:52	20:11	37	19:31 (20)				18:34	56	18:00 (25)				17:19	13	16:34 (23)
Potential sun hours	456	427			374			346			300			291		
Total, worst case			308			2036			815			1624			354	
Sun reduction			0.60			0.61			0.56			0.37			0.50	
Oper. time red.			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.			0.66			0.64			0.65			0.68			0.68	
Total reduction			0.39			0.39			0.36			0.25			0.34	
Total, real			121			797			297			408			120	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 27

Licensed user:
EDR
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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 747 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6319)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March	April			May			June
1	07:57			07:44		08:10 (22)	07:09	07:20			06:36		06:57 (129)	06:08
	17:19			17:53	34	08:44 (22)	18:26	19:59			20:28	34	07:31 (129)	20:57
2	07:57			07:43		08:09 (22)	07:08	07:18			06:34		06:57 (129)	06:08
	17:20			17:54	36	08:45 (22)	18:27	20:00			20:29	35	07:32 (129)	20:58
3	07:57			07:42		08:09 (22)	07:06	07:17			06:33		06:57 (129)	06:07
	17:21			17:55	37	08:46 (22)	18:28	20:00			20:30	35	07:32 (129)	20:58
4	07:57			07:41		08:09 (22)	07:05	07:15			06:32		06:56 (129)	06:07
	17:22			17:57	37	08:46 (22)	18:29	20:01			20:31	35	07:31 (129)	20:59
5	07:57			07:40		08:09 (22)	07:03	07:14			06:31		06:56 (129)	06:06
	17:23			17:58	38	08:47 (22)	18:30	20:02			20:32	35	07:31 (129)	21:00
6	07:57			07:39		08:09 (22)	07:02	07:12			06:29		06:56 (129)	06:06
	17:24			17:59	38	08:47 (22)	18:31	20:03			20:33	35	07:31 (129)	21:00
7	07:57			07:38		08:09 (22)	07:00	07:10			06:28		06:56 (129)	06:06
	17:25			18:00	38	08:47 (22)	18:32	20:04			20:34	35	07:31 (129)	21:01
8	07:57			07:37		08:09 (22)	07:59	07:09			06:27		06:56 (129)	06:06
	17:26			18:01	39	08:48 (22)	19:34	20:05			20:35	35	07:31 (129)	21:02
9	07:57			07:36		08:09 (22)	07:57	07:07			06:26		06:57 (129)	06:05
	17:27			18:03	39	08:48 (22)	19:35	20:06			20:36	33	07:30 (129)	21:02
10	07:57			07:35		08:09 (22)	07:56	07:06			06:25		06:57 (129)	06:05
	17:28			18:04	39	08:48 (22)	19:36	20:07			20:37	33	07:30 (129)	21:03
11	07:57			07:34		08:09 (22)	07:54	07:04			06:24		06:57 (129)	06:05
	17:29			18:05	38	08:47 (22)	19:37	20:08			20:38	32	07:29 (129)	21:03
12	07:57			07:33		08:09 (22)	07:52	07:03			06:23		06:58 (129)	06:05
	17:30			18:06	38	08:47 (22)	19:38	20:09			20:39	31	07:29 (129)	21:04
13	07:56			07:31		08:10 (22)	07:51	07:01			06:22		06:58 (129)	06:05
	17:31			18:07	36	08:46 (22)	19:39	20:10			20:40	30	07:28 (129)	21:04
14	07:56			07:30		08:11 (22)	07:49	07:00			06:21		06:59 (129)	06:05
	17:32			18:09	35	08:46 (22)	19:40	20:11			20:41	28	07:27 (129)	21:05
15	07:56			07:29		08:11 (22)	07:48	06:58			06:20		07:00 (129)	06:05
	17:33			18:10	34	08:45 (22)	19:41	20:12			20:42	26	07:26 (129)	21:05
16	07:55			07:28		08:12 (22)	07:46	06:56			06:19		07:01 (129)	06:05
	17:34			18:11	32	08:44 (22)	19:42	20:13			20:43	24	07:25 (129)	21:06
17	07:55			07:26		08:13 (22)	07:44	06:55			06:18		07:01 (129)	06:05
	17:35			18:12	30	08:43 (22)	19:43	20:14			20:44	23	07:24 (129)	21:06
18	07:54			07:25		08:14 (22)	07:43	06:54			06:17		07:03 (129)	06:05
	17:36			18:13	27	08:41 (22)	19:44	20:15			20:45	21	07:24 (129)	21:06
19	07:54			07:24		08:16 (22)	07:41	06:52			06:16		07:05 (129)	06:05
	17:38			18:15	24	08:40 (22)	19:45	20:16			20:46	17	07:22 (129)	21:07
20	07:53			07:22		08:18 (22)	07:40	06:51			06:16		07:06 (129)	06:05
	17:39			18:16	20	08:38 (22)	19:46	20:17			20:47	14	07:20 (129)	21:07
21	07:53			07:21		08:20 (22)	07:38	06:49			06:15		07:08 (129)	06:06
	17:40			18:17	14	08:34 (22)	19:47	20:18			20:48	10	07:18 (129)	21:07
22	07:52			07:20			07:36	06:48		07:10 (129)	06:14			06:06
	17:41			18:18			19:48	20:19	13	07:23 (129)	20:49			21:07
23	07:52		08:20 (22)	07:18			07:35	06:46		07:06 (129)	06:13			06:06
	17:42	10	08:30 (22)	18:19			19:49	20:20	19	07:25 (129)	20:49			21:08
24	07:51		08:17 (22)	07:17			07:33	06:45		07:04 (129)	06:13			06:06
	17:43	16	08:33 (22)	18:20			19:50	20:21	23	07:27 (129)	20:50			21:08
25	07:50		08:16 (22)	07:15			07:31	06:44		07:03 (129)	06:12			06:07
	17:45	19	08:35 (22)	18:21			19:51	20:22	25	07:28 (129)	20:51			21:08
26	07:49		08:15 (22)	07:14			07:30	06:42		07:01 (129)	06:11			06:07
	17:46	23	08:38 (22)	18:23			19:52	20:23	28	07:29 (129)	20:52			21:08
27	07:49		08:14 (22)	07:12			07:28	06:41		07:00 (129)	06:11			06:07
	17:47	25	08:39 (22)	18:24			19:53	20:24	30	07:30 (129)	20:53			21:08
28	07:48		08:13 (22)	07:11			07:26	06:39		07:00 (129)	06:10			06:08
	17:48	27	08:40 (22)	18:25			19:54	20:25	31	07:31 (129)	20:54			21:08
29	07:47		08:12 (22)				07:25	06:38		06:58 (129)	06:09			06:08
	17:49	30	08:42 (22)				19:55	20:26	32	07:30 (129)	20:55			21:08
30	07:46		08:11 (22)				07:23	06:37		06:58 (129)	06:09			06:08
	17:51	32	08:43 (22)				19:57	20:27	33	07:31 (129)	20:55			21:08
31	07:45		08:10 (22)				07:22				06:08			
	17:52	33	08:43 (22)				19:58				20:56			
Potential sun hours	300			299			370	397			446			449
Total, worst case		215			703				234			601		
Sun reduction		0.36			0.42				0.51			0.56		
Oper. time red.		1.00			1.00				1.00			1.00		
Wind dir. red.		0.61			0.61				0.67			0.67		
Total reduction		0.22			0.26				0.34			0.37		
Total, real		47			180				80			224		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

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4/27/2012 3:34 PM / 28

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 747 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6319)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September	October			November			December
1	06:09			06:32		07:08 (129)	07:02	07:30			07:03		07:38 (22)	07:37
	21:08			20:51	32	07:40 (129)	20:09	19:18			17:33	39	08:17 (22)	17:10
2	06:09			06:33		07:08 (129)	07:03	07:31			07:05		07:38 (22)	07:38
	21:08			20:50	32	07:40 (129)	20:08	19:17			17:32	39	08:17 (22)	17:10
3	06:10			06:34		07:07 (129)	07:04	07:32			07:06		07:39 (22)	07:39
	21:08			20:49	33	07:40 (129)	20:06	19:15			17:31	38	08:17 (22)	17:10
4	06:10			06:35		07:06 (129)	07:05	07:33			07:07		07:38 (22)	07:40
	21:08			20:48	34	07:40 (129)	20:04	19:13			17:30	39	08:17 (22)	17:09
5	06:11			06:36		07:06 (129)	07:06	07:34			07:08		07:38 (22)	07:41
	21:08			20:46	34	07:40 (129)	20:03	19:12			17:28	39	08:17 (22)	17:09
6	06:12			06:37		07:06 (129)	07:06	07:35			07:09		07:38 (22)	07:42
	21:07			20:45	35	07:41 (129)	20:01	19:10			17:27	38	08:16 (22)	17:09
7	06:12			06:38		07:06 (129)	07:07	07:36			07:10		07:40 (22)	07:43
	21:07			20:44	35	07:41 (129)	20:00	19:09			17:26	37	08:17 (22)	17:09
8	06:13			06:39		07:06 (129)	07:08	07:37			07:11		07:40 (22)	07:44
	21:07			20:43	35	07:41 (129)	19:56	19:07			17:25	36	08:16 (22)	17:09
9	06:13			06:40		07:06 (129)	07:09	07:38			07:13		07:40 (22)	07:45
	21:07			20:42	35	07:41 (129)	19:55	19:05			17:24	36	08:16 (22)	17:09
10	06:14			06:41		07:06 (129)	07:10	07:40			07:14		07:41 (22)	07:46
	21:06			20:41	35	07:41 (129)	19:53	19:04			17:23	34	08:15 (22)	17:09
11	06:15			06:42		07:06 (129)	07:11	07:41			07:15		07:42 (22)	07:46
	21:06			20:39	34	07:40 (129)	19:51	19:02			17:22	33	08:15 (22)	17:09
12	06:15			06:43		07:06 (129)	07:12	07:42			07:16		07:43 (22)	07:47
	21:05			20:38	34	07:40 (129)	19:50	19:01			17:21	31	08:14 (22)	17:09
13	06:16			06:44		07:07 (129)	07:13	07:43			07:17		07:44 (22)	07:48
	21:05			20:37	32	07:39 (129)	19:48	18:59			17:21	29	08:13 (22)	17:09
14	06:17			06:44		07:06 (129)	07:14	07:44			07:18		07:45 (22)	07:49
	21:05			20:35	32	07:38 (129)	19:46	18:58			17:20	27	08:12 (22)	17:10
15	06:18			06:45		07:07 (129)	07:15	07:45			07:20		07:47 (22)	07:50
	21:04			20:34	30	07:37 (129)	19:45	18:56			17:19	25	08:12 (22)	17:10
16	06:18			06:46		07:07 (129)	07:16	07:46			07:21		07:48 (22)	07:50
	21:03			20:33	29	07:36 (129)	19:43	18:55			17:18	23	08:11 (22)	17:10
17	06:19			06:47		07:08 (129)	07:17	07:47			07:22		07:50 (22)	07:51
	21:03			20:31	27	07:35 (129)	19:42	18:53			17:17	19	08:09 (22)	17:10
18	06:20			06:48		07:09 (129)	07:18	07:48			07:23		07:51 (22)	07:52
	21:02			20:30	25	07:34 (129)	19:40	18:52			17:16	16	08:07 (22)	17:11
19	06:21			06:49		07:11 (129)	07:19	07:49			07:24		07:54 (22)	07:52
	21:02			20:29	21	07:32 (129)	19:38	18:50			17:16	10	08:04 (22)	17:11
20	06:22			06:50		07:12 (129)	07:20	07:50		08:55 (22)	07:25			07:53
	21:01			20:27	18	07:30 (129)	19:37	18:49	7	09:02 (22)	17:15			17:12
21	06:22			06:51		07:15 (129)	07:21	07:51		08:50 (22)	07:26			07:53
	21:00			20:26	12	07:27 (129)	19:35	18:48	16	09:06 (22)	17:14			17:12
22	06:23		07:21 (129)	06:52			07:22	07:52		08:47 (22)	07:28			07:54
	21:00	5	07:26 (129)	20:24			19:33	18:46	21	09:08 (22)	17:14			17:13
23	06:24		07:18 (129)	06:53			07:23	07:53		08:46 (22)	07:29			07:54
	20:59	12	07:30 (129)	20:23			19:32	18:45	25	09:11 (22)	17:13			17:13
24	06:25		07:16 (129)	06:54			07:24	07:54		08:44 (22)	07:30			07:55
	20:58	16	07:32 (129)	20:21			19:30	18:43	28	09:12 (22)	17:13			17:14
25	06:26		07:15 (129)	06:55			07:25	07:56		08:43 (22)	07:31			07:55
	20:57	19	07:34 (129)	20:20			19:28	18:42	30	09:13 (22)	17:12			17:14
26	06:27		07:13 (129)	06:56			07:26	07:57		08:42 (22)	07:32			07:56
	20:56	21	07:34 (129)	20:18			19:27	18:41	32	09:14 (22)	17:12			17:15
27	06:28		07:12 (129)	06:57			07:27	07:58		08:40 (22)	07:33			07:56
	20:55	23	07:35 (129)	20:17			19:25	18:39	34	09:14 (22)	17:11			17:16
28	06:29		07:11 (129)	06:58			07:27	07:59		08:40 (22)	07:34			07:56
	20:55	25	07:36 (129)	20:15			19:23	18:38	35	09:15 (22)	17:11			17:16
29	06:29		07:10 (129)	06:59			07:28	08:00		08:40 (22)	07:35			07:57
	20:54	27	07:37 (129)	20:14			19:22	18:37	36	09:16 (22)	17:11			17:17
30	06:30		07:09 (129)	07:00			07:29	08:01		08:39 (22)	07:36			07:57
	20:53	29	07:38 (129)	20:12			19:20	18:36	37	09:16 (22)	17:10			17:18
31	06:31		07:09 (129)	07:01				08:02		08:39 (22)				07:57
	20:52	30	07:39 (129)	20:11				18:34	38	09:17 (22)				17:18
Potential sun hours	456			427			374	346			300			291
Total, worst case		207			634				339			588		
Sun reduction		0.60			0.60				0.56			0.37		
Oper. time red.		1.00			1.00				1.00			1.00		
Wind dir. red.		0.67			0.67				0.61			0.61		
Total reduction		0.40			0.40				0.34			0.23		
Total, real		83			254				116			133		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 29

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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative**Shadow receptor:** 750 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6320)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January	February			March			April	May			June		
1	07:57	07:44			07:09		07:52 (22)	07:20	06:36			06:08		06:41 (129)
	17:19	17:53			18:26	50	18:02 (21)	19:59	20:28			20:57	33	07:14 (129)
2	07:57	07:43			07:08		07:52 (22)	07:18	06:34			06:08		06:41 (129)
	17:20	17:54			18:27	52	18:03 (21)	20:00	20:29			20:58	33	07:14 (129)
3	07:57	07:42			07:06		07:53 (22)	07:17	06:33			06:07		06:41 (129)
	17:21	17:55			18:28	52	18:04 (21)	20:00	20:30			20:58	32	07:13 (129)
4	07:57	07:41			07:05		07:54 (22)	07:15	06:32			06:07		06:42 (129)
	17:22	17:57			18:29	51	18:04 (21)	20:01	20:31			20:59	32	07:14 (129)
5	07:57	07:40			07:03		07:55 (22)	07:14	06:31			06:06		06:42 (129)
	17:23	17:58			18:30	49	18:04 (21)	20:02	20:32			21:00	32	07:14 (129)
6	07:57	07:39			07:02		07:57 (22)	07:12	06:29			06:06		06:43 (129)
	17:24	17:59			18:31	46	18:05 (21)	20:03	20:33			21:00	31	07:14 (129)
7	07:57	07:38			07:00		07:59 (22)	07:10	06:28		06:51 (129)	06:06		06:43 (129)
	17:25	18:00			18:32	42	18:05 (21)	20:04	20:34	11	07:02 (129)	21:01	30	07:13 (129)
8	07:57	07:37			07:59		09:04 (22)	07:09	06:27		06:48 (129)	06:06		06:43 (129)
	17:26	18:01			19:34	33	19:05 (21)	20:05	20:35	17	07:05 (129)	21:02	30	07:13 (129)
9	07:57	07:36		08:07 (22)	07:57		18:40 (21)	07:07	06:26		06:46 (129)	06:05		06:44 (129)
	17:27	18:03	7	08:14 (22)	19:35	24	19:04 (21)	20:06	20:36	20	07:06 (129)	21:02	29	07:13 (129)
10	07:57	07:35		08:03 (22)	07:56		18:41 (21)	07:06	06:25		06:45 (129)	06:05		06:44 (129)
	17:28	18:04	16	08:19 (22)	19:36	23	19:04 (21)	20:07	20:37	23	07:08 (129)	21:03	29	07:13 (129)
11	07:57	07:34		08:00 (22)	07:54		18:41 (21)	07:04	06:24		06:44 (129)	06:05		06:45 (129)
	17:29	18:05	21	08:21 (22)	19:37	22	19:03 (21)	20:08	20:38	25	07:09 (129)	21:03	28	07:13 (129)
12	07:57	07:33		07:58 (22)	07:52		18:41 (21)	07:03	06:23		06:43 (129)	06:05		06:45 (129)
	17:30	18:06	25	08:23 (22)	19:38	20	19:01 (21)	20:09	20:39	27	07:10 (129)	21:04	28	07:13 (129)
13	07:56	07:31		07:57 (22)	07:51		18:43 (21)	07:01	06:22		06:42 (129)	06:05		06:46 (129)
	17:31	18:07	28	08:25 (22)	19:39	17	19:00 (21)	20:10	20:40	29	07:11 (129)	21:04	28	07:14 (129)
14	07:56	07:30		07:56 (22)	07:49		18:44 (21)	07:00	06:21		06:41 (129)	06:05		06:46 (129)
	17:32	18:09	30	08:26 (22)	19:40	14	18:58 (21)	20:11	20:41	30	07:11 (129)	21:05	28	07:14 (129)
15	07:56	07:29		07:54 (22)	07:48		18:47 (21)	06:58	06:20		06:40 (129)	06:05		06:47 (129)
	17:33	18:10	33	08:27 (22)	19:41	7	18:54 (21)	20:12	20:42	32	07:12 (129)	21:05	27	07:14 (129)
16	07:55	07:28		07:53 (22)	07:46			06:56	06:19		06:40 (129)	06:05		06:47 (129)
	17:34	18:11	35	08:28 (22)	19:42			20:13	20:43	32	07:12 (129)	21:06	27	07:14 (129)
17	07:55	07:26		07:53 (22)	07:44			06:55	06:18		06:39 (129)	06:05		06:47 (129)
	17:35	18:12	36	08:29 (22)	19:43			20:14	20:44	33	07:12 (129)	21:06	27	07:14 (129)
18	07:54	07:25		07:51 (22)	07:43			06:54	06:17		06:40 (129)	06:05		06:47 (129)
	17:36	18:13	38	08:29 (22)	19:44			20:15	20:45	33	07:13 (129)	21:06	27	07:14 (129)
19	07:54	07:24		07:51 (22)	07:41			06:52	06:16		06:39 (129)	06:05		06:47 (129)
	17:38	18:15	39	08:30 (22)	19:45			20:16	20:46	34	07:13 (129)	21:07	27	07:14 (129)
20	07:53	07:22		07:51 (22)	07:40			06:51	06:16		06:39 (129)	06:05		06:48 (129)
	17:39	18:16	40	08:31 (22)	19:46			20:17	20:47	34	07:13 (129)	21:07	26	07:14 (129)
21	07:53	07:21		07:50 (22)	07:38			06:49	06:15		06:39 (129)	06:06		06:48 (129)
	17:40	18:17	40	08:30 (22)	19:47			20:18	20:48	34	07:13 (129)	21:07	26	07:14 (129)
22	07:52	07:20		07:50 (22)	07:36			06:48	06:14		06:39 (129)	06:06		06:49 (129)
	17:41	18:18	41	08:31 (22)	19:48			20:19	20:49	35	07:14 (129)	21:07	26	07:15 (129)
23	07:52	07:18		07:49 (22)	07:35			06:46	06:13		06:39 (129)	06:06		06:48 (129)
	17:42	18:19	41	08:30 (22)	19:49			20:20	20:49	35	07:14 (129)	21:08	27	07:15 (129)
24	07:51	07:17		07:50 (22)	07:33			06:45	06:13		06:39 (129)	06:06		06:48 (129)
	17:43	18:20	40	08:30 (22)	19:50			20:21	20:50	35	07:14 (129)	21:08	27	07:15 (129)
25	07:50	07:15		07:50 (22)	07:31			06:44	06:12		06:39 (129)	06:07		06:49 (129)
	17:45	18:21	40	08:30 (22)	19:51			20:22	20:51	35	07:14 (129)	21:08	27	07:16 (129)
26	07:49	07:14		07:50 (22)	07:30			06:42	06:11		06:39 (129)	06:07		06:49 (129)
	17:46	18:23	39	08:29 (22)	19:52			20:23	20:52	35	07:14 (129)	21:08	27	07:16 (129)
27	07:49	07:12		07:51 (22)	07:28			06:41	06:11		06:39 (129)	06:07		06:49 (129)
	17:47	18:24	38	08:29 (22)	19:53			20:24	20:53	35	07:14 (129)	21:08	27	07:16 (129)
28	07:48	07:11		07:51 (22)	07:26			06:39	06:10		06:40 (129)	06:08		06:49 (129)
	17:48	18:25	46	17:58 (21)	19:54			20:25	20:54	34	07:14 (129)	21:08	28	07:17 (129)
29	07:47				07:25			06:38	06:09		06:39 (129)	06:08		06:49 (129)
	17:49				19:55			20:26	20:54	35	07:14 (129)	21:08	28	07:17 (129)
30	07:46				07:23			06:37	06:09		06:40 (129)	06:08		06:49 (129)
	17:51				19:57			20:27	20:55	34	07:14 (129)	21:08	27	07:16 (129)
31	07:45				07:22				06:08		06:41 (129)			
	17:52				19:58				20:56	33	07:14 (129)			
Potential sun hours	300	299			370			397	446			449		
Total, worst case			673			502				760			854	
Sun reduction			0.42			0.44				0.56			0.60	
Oper. time red.			1.00			1.00				1.00			1.00	
Wind dir. red.			0.63			0.65				0.68			0.68	
Total reduction			0.26			0.29				0.38			0.41	
Total, real			177			143				289			348	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 30

Licensed user:
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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative**Shadow receptor:** 750 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6320)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December
1	06:09		06:49 (129)	06:32		06:54 (129)	07:02			07:30		18:21 (21)	07:03		07:32 (22)	07:37
	21:08	28	07:17 (129)	20:51	26	07:20 (129)	20:09			19:18	19	18:40 (21)	17:33	15	07:47 (22)	17:10
2	06:09		06:49 (129)	06:33		06:55 (129)	07:03			07:31		18:20 (21)	07:05		07:38 (22)	07:38
	21:08	28	07:17 (129)	20:50	24	07:19 (129)	20:08			19:17	21	18:41 (21)	17:32	3	07:41 (22)	17:10
3	06:10		06:49 (129)	06:34		06:55 (129)	07:04			07:32		18:19 (21)	07:06			07:39
	21:08	29	07:18 (129)	20:49	22	07:17 (129)	20:06			19:15	22	18:41 (21)	17:31			17:10
4	06:10		06:49 (129)	06:35		06:57 (129)	07:05			07:33		18:18 (21)	07:07			07:40
	21:08	29	07:18 (129)	20:48	19	07:16 (129)	20:04			19:13	24	18:42 (21)	17:30			17:09
5	06:11		06:49 (129)	06:36		06:59 (129)	07:06			07:34		18:17 (21)	07:08			07:41
	21:08	30	07:19 (129)	20:46	15	07:14 (129)	20:03			19:12	25	18:42 (21)	17:28			17:09
6	06:12		06:49 (129)	06:37		07:02 (129)	07:06			07:35		08:37 (22)	07:09			07:42
	21:07	31	07:20 (129)	20:45	8	07:10 (129)	20:01			19:10	38	18:41 (21)	17:27			17:09
7	06:12		06:49 (129)	06:38			07:07			07:36		08:34 (22)	07:10			07:43
	21:07	31	07:20 (129)	20:44			20:00			19:09	45	18:41 (21)	17:26			17:09
8	06:13		06:49 (129)	06:39			07:08			07:37		08:31 (22)	07:11			07:44
	21:07	32	07:21 (129)	20:43			19:56			19:07	49	18:40 (21)	17:25			17:09
9	06:13		06:48 (129)	06:40			07:09			07:38		08:29 (22)	07:13			07:45
	21:07	32	07:20 (129)	20:42			19:55			19:05	52	18:40 (21)	17:24			17:09
10	06:14		06:49 (129)	06:41			07:10			07:40		08:27 (22)	07:14			07:46
	21:06	32	07:21 (129)	20:41			19:53			19:04	52	18:38 (21)	17:23			17:09
11	06:15		06:49 (129)	06:42			07:11			07:41		08:26 (22)	07:15			07:46
	21:06	33	07:22 (129)	20:39			19:51			19:02	52	18:37 (21)	17:22			17:09
12	06:15		06:48 (129)	06:43			07:12			07:42		08:25 (22)	07:16			07:47
	21:05	34	07:22 (129)	20:38			19:50			19:01	51	18:35 (21)	17:21			17:09
13	06:16		06:48 (129)	06:44			07:13			07:43		08:24 (22)	07:17			07:48
	21:05	34	07:22 (129)	20:37			19:48			18:59	49	18:33 (21)	17:21			17:09
14	06:17		06:49 (129)	06:44			07:14			07:44		08:23 (22)	07:18			07:49
	21:05	34	07:23 (129)	20:35			19:46			18:58	43	18:29 (21)	17:20			17:10
15	06:18		06:49 (129)	06:45			07:15			07:45		08:23 (22)	07:20			07:50
	21:04	34	07:23 (129)	20:34			19:45			18:56	39	09:02 (22)	17:19			17:10
16	06:18		06:48 (129)	06:46			07:16			07:46		08:22 (22)	07:21			07:50
	21:03	35	07:23 (129)	20:33			19:43			18:55	40	09:02 (22)	17:18			17:10
17	06:19		06:48 (129)	06:47			07:17			07:47		08:22 (22)	07:22			07:51
	21:03	35	07:23 (129)	20:31			19:42			18:53	40	09:02 (22)	17:17			17:11
18	06:20		06:49 (129)	06:48			07:18			07:48		08:21 (22)	07:23			07:52
	21:02	35	07:24 (129)	20:30			19:40			18:52	41	09:02 (22)	17:17			17:11
19	06:21		06:49 (129)	06:49			07:19			07:49		08:21 (22)	07:24			07:52
	21:02	35	07:24 (129)	20:29			19:38			18:50	40	09:01 (22)	17:16			17:11
20	06:22		06:48 (129)	06:50			07:20			07:50		08:21 (22)	07:25			07:53
	21:01	35	07:23 (129)	20:27			19:37			18:49	40	09:01 (22)	17:15			17:12
21	06:22		06:49 (129)	06:51			07:21			07:51		08:21 (22)	07:26			07:53
	21:00	35	07:24 (129)	20:26			19:35			18:48	40	09:01 (22)	17:14			17:12
22	06:23		06:49 (129)	06:52			07:22			07:52		08:21 (22)	07:28			07:54
	21:00	35	07:24 (129)	20:24			19:33			18:46	39	09:00 (22)	17:14			17:13
23	06:24		06:49 (129)	06:53			07:23			07:53		08:22 (22)	07:29			07:54
	20:59	35	07:24 (129)	20:23			19:32			18:45	38	09:00 (22)	17:13			17:13
24	06:25		06:50 (129)	06:54			07:24			07:54		08:22 (22)	07:30			07:55
	20:58	34	07:24 (129)	20:21			19:30			18:43	38	09:00 (22)	17:13			17:14
25	06:26		06:50 (129)	06:55			07:25			07:56		08:23 (22)	07:31			07:55
	20:57	34	07:24 (129)	20:20			19:28			18:42	36	08:59 (22)	17:12			17:14
26	06:27		06:49 (129)	06:56			07:26			07:57		08:23 (22)	07:32			07:56
	20:56	34	07:23 (129)	20:18			19:27			18:41	35	08:58 (22)	17:12			17:15
27	06:28		06:50 (129)	06:57			07:27			07:58		08:24 (22)	07:33			07:56
	20:55	33	07:23 (129)	20:17			19:25			18:39	32	08:56 (22)	17:11			17:16
28	06:29		06:51 (129)	06:58			07:27			07:59		08:25 (22)	07:34			07:56
	20:55	31	07:22 (129)	20:15			19:23			18:38	30	08:55 (22)	17:11			17:16
29	06:29		06:51 (129)	06:59			07:28		18:26 (21)	08:00		08:27 (22)	07:35			07:56
	20:54	31	07:22 (129)	20:14			19:22	11	18:37 (21)	18:37	27	08:54 (22)	17:11			17:17
30	06:30		06:52 (129)	07:00			07:29		18:23 (21)	08:01		08:28 (22)	07:36			07:57
	20:53	30	07:22 (129)	20:12			19:20	16	18:39 (21)	18:36	24	08:52 (22)	17:10			17:18
31	06:31		06:53 (129)	07:01						08:02		08:30 (22)				07:57
	20:52	28	07:21 (129)	20:11						18:34	20	08:50 (22)				17:18
Potential sun hours	456			427			374			346			300			291
Total, worst case		1006			114			27			1141			18		
Sun reduction		0.60			0.60			0.61			0.56			0.37		
Oper. time red.		1.00			1.00			1.00			1.00			1.00		
Wind dir. red.		0.68			0.68			0.67			0.64			0.63		
Total reduction		0.41			0.41			0.41			0.36			0.23		
Total, real		410			46			11			407			4		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 31

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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 799 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6321)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:35 (72)	07:45		08:45 (72)	07:10			07:20		18:53 (117)	06:36			06:08		19:49 (74)
	17:20	54	09:29 (72)	17:53	53	09:38 (72)	18:26			19:59	36	19:29 (117)	20:28			20:57	25	20:14 (74)
2	07:57		08:35 (72)	07:44		08:46 (72)	07:08			07:18		18:52 (117)	06:34			06:08		19:50 (74)
	17:20	55	09:30 (72)	17:54	51	09:37 (72)	18:27			20:00	37	19:29 (117)	20:29			20:58	24	20:14 (74)
3	07:58		08:35 (72)	07:43		08:47 (72)	07:07			07:17		18:51 (117)	06:33			06:07		19:50 (74)
	17:21	55	09:30 (72)	17:55	49	09:36 (72)	18:28			20:00	39	19:30 (117)	20:30			20:58	24	20:14 (74)
4	07:58		08:35 (72)	07:42		08:48 (72)	07:05			07:15		18:50 (117)	06:32			06:07		19:50 (74)
	17:22	56	09:31 (72)	17:57	47	09:35 (72)	18:29			20:01	40	19:30 (117)	20:31			20:59	23	20:13 (74)
5	07:58		08:36 (72)	07:41		08:49 (72)	07:04			07:14		18:49 (117)	06:31			06:07		19:51 (74)
	17:23	56	09:32 (72)	17:58	46	09:35 (72)	18:30			20:02	41	19:30 (117)	20:32			21:00	22	20:13 (74)
6	07:58		08:36 (72)	07:40		08:50 (72)	07:02			07:12		18:49 (117)	06:30		19:54 (74)	06:06		19:52 (74)
	17:24	56	09:32 (72)	17:59	44	09:34 (72)	18:31			20:03	42	19:31 (117)	20:33	12	20:06 (74)	21:00	21	20:13 (74)
7	07:58		08:37 (72)	07:38		08:52 (72)	07:00			07:11		18:48 (117)	06:28		19:52 (74)	06:06		19:52 (74)
	17:25	56	09:33 (72)	18:00	40	09:32 (72)	18:33			20:04	42	19:30 (117)	20:34	16	20:08 (74)	21:01	20	20:12 (74)
8	07:57		08:37 (72)	07:37		08:53 (72)	07:59			07:09		18:48 (117)	06:27		19:50 (74)	06:06		19:53 (74)
	17:26	57	09:34 (72)	18:02	38	09:31 (72)	19:34			20:05	43	19:31 (117)	20:35	20	20:10 (74)	21:02	19	20:12 (74)
9	07:57		08:37 (72)	07:36		08:55 (72)	07:57			07:07		18:47 (117)	06:26		19:49 (74)	06:06		19:54 (74)
	17:27	58	09:35 (72)	18:03	35	09:30 (72)	19:35			20:06	43	19:30 (117)	20:36	22	20:11 (74)	21:02	18	20:12 (74)
10	07:57		08:37 (72)	07:35		08:57 (72)	07:56			07:06		18:47 (117)	06:25		19:48 (74)	06:05		19:55 (74)
	17:28	57	09:34 (72)	18:04	31	09:28 (72)	19:36			20:07	42	19:29 (117)	20:37	24	20:12 (74)	21:03	16	20:11 (74)
11	07:57		08:37 (72)	07:34		09:00 (72)	07:54			07:04		18:47 (117)	06:24		19:47 (74)	06:05		19:56 (74)
	17:29	58	09:35 (72)	18:05	26	09:26 (72)	19:37			20:08	42	19:29 (117)	20:38	26	20:13 (74)	21:03	15	20:11 (74)
12	07:57		08:38 (72)	07:33		09:02 (72)	07:53			07:03		18:47 (117)	06:23		19:46 (74)	06:05		19:56 (74)
	17:30	58	09:36 (72)	18:06	20	09:22 (72)	19:38			20:09	41	19:28 (117)	20:39	28	20:14 (74)	21:04	15	20:11 (74)
13	07:56		08:39 (72)	07:32		09:07 (72)	07:51			07:01		18:48 (117)	06:22		19:46 (74)	06:05		19:57 (74)
	17:31	58	09:37 (72)	18:08	10	09:17 (72)	19:39			20:10	40	19:28 (117)	20:40	28	20:14 (74)	21:04	14	20:11 (74)
14	07:56		08:38 (72)	07:30			07:49			07:00		18:47 (117)	06:21		19:45 (74)	06:05		19:58 (74)
	17:32	59	09:37 (72)	18:09			19:40			20:11	40	19:27 (117)	20:41	29	20:14 (74)	21:05	12	20:10 (74)
15	07:56		08:39 (72)	07:29			07:48			06:58		18:48 (117)	06:20		19:45 (74)	06:05		19:58 (74)
	17:33	59	09:38 (72)	18:10			19:41			20:12	39	19:27 (117)	20:42	30	20:15 (74)	21:05	12	20:10 (74)
16	07:55		08:39 (72)	07:28			07:46			06:57		18:48 (117)	06:19		19:44 (74)	06:05		19:59 (74)
	17:34	59	09:38 (72)	18:11			19:42			20:13	37	19:25 (117)	20:43	31	20:15 (74)	21:06	11	20:10 (74)
17	07:55		08:39 (72)	07:26			07:45			06:55		18:49 (117)	06:18		19:44 (74)	06:05		20:00 (74)
	17:35	59	09:38 (72)	18:12			19:43			20:14	36	19:25 (117)	20:44	31	20:15 (74)	21:06	10	20:10 (74)
18	07:54		08:39 (72)	07:25			07:43			06:54		18:50 (117)	06:17		19:45 (74)	06:05		20:00 (74)
	17:37	59	09:38 (72)	18:13			19:44			20:15	33	19:23 (117)	20:45	31	20:16 (74)	21:06	9	20:09 (74)
19	07:54		08:40 (72)	07:24			07:41			06:52		18:51 (117)	06:16		19:45 (74)	06:05		20:00 (74)
	17:38	59	09:39 (72)	18:15			19:45			20:16	31	19:22 (117)	20:46	31	20:16 (74)	21:07	9	20:09 (74)
20	07:53		08:40 (72)	07:22			07:40			06:51		18:53 (117)	06:16		19:44 (74)	06:05		20:01 (74)
	17:39	59	09:39 (72)	18:16			19:46			20:17	27	19:20 (117)	20:47	32	20:16 (74)	21:07	8	20:09 (74)
21	07:53		08:40 (72)	07:21			07:38			06:49		18:54 (117)	06:15		19:44 (74)	06:06		20:02 (74)
	17:40	59	09:39 (72)	18:17			19:47			20:18	24	19:18 (117)	20:48	31	20:15 (74)	21:07	8	20:10 (74)
22	07:52		08:41 (72)	07:20			07:36			06:48		18:56 (117)	06:14		19:45 (74)	06:06		20:02 (74)
	17:41	59	09:40 (72)	18:18			19:48			20:19	20	19:16 (117)	20:49	31	20:16 (74)	21:08	8	20:10 (74)
23	07:52		08:41 (72)	07:18			07:35			06:46		18:59 (117)	06:13		19:45 (74)	06:06		20:01 (74)
	17:42	59	09:40 (72)	18:19			19:49			20:20	13	19:12 (117)	20:50	31	20:16 (74)	21:08	9	20:10 (74)
24	07:51		08:41 (72)	07:17			07:33			06:45			06:13		19:45 (74)	06:06		20:01 (74)
	17:43	58	09:39 (72)	18:20			19:50			20:21			20:50	30	20:15 (74)	21:08	9	20:10 (74)
25	07:50		08:42 (72)	07:15			07:31			06:44			06:12		19:46 (74)	06:07		20:02 (74)
	17:45	58	09:40 (72)	18:21			19:52			20:22			20:51	30	20:16 (74)	21:08	10	20:12 (74)
26	07:50		08:42 (72)	07:14			07:30		19:11 (117)	06:42			06:11		19:46 (74)	06:07		20:01 (74)
	17:46	58	09:40 (72)	18:23			19:53	5	19:16 (117)	20:23			20:52	29	20:15 (74)	21:08	11	20:12 (74)
27	07:49		08:43 (72)	07:13			07:28		19:04 (117)	06:41			06:11		19:47 (74)	06:07		20:01 (74)
	17:47	57	09:40 (72)	18:24			19:54	17	19:21 (117)	20:24			20:53	29	20:16 (74)	21:08	11	20:12 (74)
28	07:48		08:43 (72)	07:11			07:27		19:01 (117)	06:40			06:10		19:47 (74)	06:08		20:01 (74)
	17:48	56	09:39 (72)	18:25			19:55	22	19:23 (117)	20:25			20:54	28	20:15 (74)	21:08	12	20:13 (74)
29	07:47		08:44 (72)				07:25		18:59 (117)	06:38			06:10		19:48 (74)	06:08		20:00 (74)
	17:49	55	09:39 (72)				19:56	27	19:26 (117)	20:26			20:55	27	20:15 (74)	21:08	14	20:14 (74)
30	07:46		08:44 (72)				07:23		18:56 (117)	06:37			06:09		19:48 (74)	06:09		20:01 (74)
	17:51	55	09:39 (72)				19:57	31	19:27 (117)	20:27			20:55	26	20:14 (74)	21:08	14	20:15 (74)
31	07:45		08:45 (72)				07:22		18:54 (117)				06:09		19:49 (74)			
	17:52	53	09:38 (72)				19:58	34	19:28 (117)				20:56	26	20:15 (74)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		1774			490			136			828			709			433	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.61			0.61			0.66			0.66			0.63			0.63	
Total reduction		0.22			0.25			0.29			0.33			0.35			0.38	
Total, real		387			125			39			276			249			163	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 32

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 799 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6321)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		20:00 (74)	06:32		19:57 (74)	07:02		18:46 (117)	07:31			07:04		08:26 (72)	07:37		08:19 (72)
	21:08	15	20:15 (74)	20:51	27	20:24 (74)	20:09	42	19:28 (117)	19:18			17:33	31	08:57 (72)	17:10	58	09:17 (72)
2	06:09		20:00 (74)	06:33		19:58 (74)	07:03		18:46 (117)	07:32			07:05		08:25 (72)	07:38		08:20 (72)
	21:08	16	20:16 (74)	20:50	25	20:23 (74)	20:08	42	19:28 (117)	19:17			17:32	35	09:00 (72)	17:10	57	09:17 (72)
3	06:10		19:59 (74)	06:34		19:59 (74)	07:04		18:45 (117)	07:33			07:06		08:23 (72)	07:39		08:20 (72)
	21:08	17	20:16 (74)	20:49	23	20:22 (74)	20:06	43	19:28 (117)	19:15			17:31	38	09:01 (72)	17:10	58	09:18 (72)
4	06:10		19:59 (74)	06:35		19:59 (74)	07:05		18:45 (117)	07:34			07:07		08:21 (72)	07:40		08:21 (72)
	21:08	19	20:18 (74)	20:48	21	20:20 (74)	20:05	43	19:28 (117)	19:14			17:30	41	09:02 (72)	17:09	57	09:18 (72)
5	06:11		19:59 (74)	06:36		20:01 (74)	07:06		18:45 (117)	07:35			07:08		08:20 (72)	07:41		08:22 (72)
	21:08	19	20:18 (74)	20:47	18	20:19 (74)	20:03	42	19:27 (117)	19:12			17:29	44	09:04 (72)	17:09	56	09:18 (72)
6	06:12		19:59 (74)	06:37		20:02 (74)	07:07		18:45 (117)	07:36			07:09		08:20 (72)	07:42		08:22 (72)
	21:08	20	20:19 (74)	20:45	15	20:17 (74)	20:01	42	19:27 (117)	19:10			17:27	46	09:06 (72)	17:09	56	09:18 (72)
7	06:12		19:58 (74)	06:38		20:05 (74)	07:08		18:44 (117)	07:37			07:10		08:19 (72)	07:43		08:23 (72)
	21:07	21	20:19 (74)	20:44	10	20:15 (74)	20:00	41	19:25 (117)	19:09			17:26	47	09:06 (72)	17:09	56	09:19 (72)
8	06:13		19:58 (74)	06:39			07:08		18:44 (117)	07:38			07:12		08:18 (72)	07:44		08:24 (72)
	21:07	22	20:20 (74)	20:43			19:56	40	19:24 (117)	19:07			17:25	49	09:07 (72)	17:09	55	09:19 (72)
9	06:13		19:57 (74)	06:40			07:09		18:44 (117)	07:39			07:13		08:17 (72)	07:45		08:24 (72)
	21:07	23	20:20 (74)	20:42			19:55	40	19:24 (117)	19:06			17:24	51	09:08 (72)	17:09	55	09:19 (72)
10	06:14		19:57 (74)	06:41			07:10		18:45 (117)	07:40			07:14		08:16 (72)	07:46		08:25 (72)
	21:06	24	20:21 (74)	20:41			19:53	38	19:23 (117)	19:04			17:23	52	09:08 (72)	17:09	55	09:20 (72)
11	06:15		19:57 (74)	06:42			07:11		18:46 (117)	07:41			07:15		08:17 (72)	07:47		08:26 (72)
	21:06	25	20:22 (74)	20:39			19:52	35	19:21 (117)	19:02			17:22	53	09:10 (72)	17:09	54	09:20 (72)
12	06:16		19:56 (74)	06:43			07:12		18:46 (117)	07:42			07:16		08:16 (72)	07:47		08:26 (72)
	21:06	26	20:22 (74)	20:38			19:50	34	19:20 (117)	19:01			17:22	54	09:10 (72)	17:09	54	09:20 (72)
13	06:16		19:56 (74)	06:44			07:13		18:47 (117)	07:43			07:17		08:16 (72)	07:48		08:26 (72)
	21:05	27	20:23 (74)	20:37			19:48	31	19:18 (117)	18:59			17:21	55	09:11 (72)	17:10	54	09:20 (72)
14	06:17		19:56 (74)	06:45			07:14		18:49 (117)	07:44			07:19		08:15 (72)	07:49		08:27 (72)
	21:05	27	20:23 (74)	20:36			19:47	27	19:16 (117)	18:58			17:20	56	09:11 (72)	17:10	54	09:21 (72)
15	06:18		19:56 (74)	06:46			07:15		18:51 (117)	07:45			07:20		08:16 (72)	07:50		08:28 (72)
	21:04	28	20:24 (74)	20:34			19:45	23	19:14 (117)	18:56			17:19	57	09:13 (72)	17:10	54	09:22 (72)
16	06:18		19:55 (74)	06:47			07:16		18:53 (117)	07:46			07:21		08:15 (72)	07:50		08:28 (72)
	21:04	29	20:24 (74)	20:33			19:43	18	19:11 (117)	18:55			17:18	58	09:13 (72)	17:10	53	09:21 (72)
17	06:19		19:55 (74)	06:47			07:17		18:57 (117)	07:47			07:22		08:15 (72)	07:51		08:29 (72)
	21:03	29	20:24 (74)	20:31			19:42	9	19:06 (117)	18:53			17:17	58	09:13 (72)	17:11	53	09:22 (72)
18	06:20		19:55 (74)	06:48			07:18			07:48			07:23		08:15 (72)	07:52		08:30 (72)
	21:02	30	20:25 (74)	20:30			19:40			18:52			17:17	58	09:13 (72)	17:11	53	09:23 (72)
19	06:21		19:55 (74)	06:49		19:10 (117)	07:19			07:49			07:24		08:16 (72)	07:52		08:30 (72)
	21:02	30	20:25 (74)	20:29	3	19:13 (117)	19:38			18:50			17:16	59	09:15 (72)	17:11	53	09:23 (72)
20	06:22		19:54 (74)	06:50		19:04 (117)	07:20			07:50			07:25		08:16 (72)	07:53		08:31 (72)
	21:01	31	20:25 (74)	20:27	14	19:18 (117)	19:37			18:49			17:15	59	09:15 (72)	17:12	52	09:23 (72)
21	06:22		19:55 (74)	06:51		19:01 (117)	07:21			07:51			07:27		08:16 (72)	07:53		08:31 (72)
	21:00	30	20:25 (74)	20:26	20	19:21 (117)	19:35			18:48			17:15	59	09:15 (72)	17:12	52	09:23 (72)
22	06:23		19:55 (74)	06:52		18:58 (117)	07:22			07:52			07:28		08:16 (72)	07:54		08:32 (72)
	21:00	31	20:26 (74)	20:24	25	19:23 (117)	19:33			18:46			17:14	59	09:15 (72)	17:13	52	09:24 (72)
23	06:24		19:55 (74)	06:53		18:56 (117)	07:23			07:53			07:29		08:16 (72)	07:54		08:32 (72)
	20:59	31	20:26 (74)	20:23	28	19:24 (117)	19:32			18:45			17:13	59	09:15 (72)	17:13	52	09:24 (72)
24	06:25		19:55 (74)	06:54		18:55 (117)	07:24			07:55			07:30		08:16 (72)	07:55		08:32 (72)
	20:58	31	20:26 (74)	20:22	31	19:26 (117)	19:30			18:43			17:13	59	09:15 (72)	17:14	52	09:24 (72)
25	06:26		19:55 (74)	06:55		18:53 (117)	07:25			07:56			07:31		08:17 (72)	07:55		08:33 (72)
	20:57	31	20:26 (74)	20:20	34	19:27 (117)	19:28			18:42			17:12	59	09:16 (72)	17:14	53	09:26 (72)
26	06:27		19:55 (74)	06:56		18:52 (117)	07:26			07:57			07:32		08:18 (72)	07:56		08:33 (72)
	20:56	30	20:25 (74)	20:19	35	19:27 (117)	19:27			18:41			17:12	59	09:17 (72)	17:15	53	09:26 (72)
27	06:28		19:55 (74)	06:57		18:50 (117)	07:27			07:58			07:33		08:18 (72)	07:56		08:33 (72)
	20:56	30	20:25 (74)	20:17	37	19:27 (117)	19:25			18:39			17:11	59	09:17 (72)	17:16	53	09:26 (72)
28	06:29		19:55 (74)	06:58		18:49 (117)	07:28			07:59			07:34		08:18 (72)	07:56		08:34 (72)
	20:55	30	20:25 (74)	20:16	39	19:28 (117)	19:23			18:38			17:11	59	09:17 (72)	17:16	53	09:27 (72)
29	06:29		19:56 (74)	06:59		18:48 (117)	07:29			08:00		09:35 (72)	07:35		08:19 (72)	07:57		08:34 (72)
	20:54	29	20:25 (74)	20:14	40	19:28 (117)	19:22			18:37	13	09:48 (72)	17:11	58	09:17 (72)	17:17	54	09:28 (72)
30	06:30		19:56 (74)	07:00		18:47 (117)	07:30			08:01		09:31 (72)	07:36		08:19 (72)	07:57		08:34 (72)
	20:53	29	20:25 (74)	20:12	41	19:28 (117)	19:20			18:36	21	09:52 (72)	17:10	58	09:17 (72)	17:18	54	09:28 (72)
31	06:31		19:57 (74)	07:01		18:47 (117)				08:02		09:28 (72)				07:57		08:34 (72)
	20:52	27	20:24 (74)	20:11	41	19:28 (117)				18:34	27	09:55 (72)				17:19	55	09:29 (72)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		807			527			590			61			1589			1680	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.63			0.65			0.66			0.61			0.61			0.61	
Total reduction		0.38			0.39			0.40			0.34			0.22			0.30	
Total, real		304			205			235			21			356			508	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 33

Licensed user:
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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 812 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6322)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:57	07:44	07:09	07:20	06:36	06:08	06:09	06:32	07:02	07:30	07:03	07:37
	17:19	17:53	18:26	19:59	20:28	20:57	21:08	20:51	20:09	19:18	17:33	17:10
2	07:57	07:43	07:08	07:18	06:34	06:08	06:09	06:33	07:03	07:31	07:05	07:38
	17:20	17:54	18:27	20:00	20:29	20:58	21:08	20:50	20:08	19:17	17:32	17:10
3	07:57	07:42	07:06	07:17	06:33	06:07	06:10	06:34	07:04	07:32	07:06	07:39
	17:21	17:55	18:28	20:00	20:30	20:58	21:08	20:49	20:06	19:15	17:31	17:10
4	07:58	07:41	07:05	07:15	06:32	06:07	06:10	06:35	07:05	07:33	07:07	07:40
	17:22	17:57	18:29	20:01	20:31	20:59	21:08	20:48	20:04	19:13	17:30	17:09
5	07:58	07:40	07:03	07:14	06:31	06:06	06:11	06:36	07:06	07:34	07:08	07:41
	17:23	17:58	18:30	20:02	20:32	21:00	21:08	20:46	20:03	19:12	17:28	17:09
6	07:57	07:39	07:02	07:12	06:29	06:06	06:12	06:37	07:06	07:35	07:09	07:42
	17:24	17:59	18:31	20:03	20:33	21:00	21:07	20:45	20:01	19:10	17:27	17:09
7	07:57	07:38	07:00	07:10	06:28	06:06	06:12	06:38	07:07	07:36	07:10	07:43
	17:25	18:00	18:32	20:04	20:34	21:01	21:07	20:44	20:00	19:09	17:26	17:09
8	07:57	07:37	07:59	07:09	06:27	06:06	06:13	06:39	07:08	07:37	07:11	07:44
	17:26	18:01	19:34	20:05	20:35	21:02	21:07	20:43	19:56	19:07	17:25	17:09
9	07:57	07:36	07:57	07:07	06:26	06:05	06:13	06:40	07:09	07:38	07:13	07:45
	17:27	18:03	19:35	20:06	20:36	21:02	21:07	20:42	19:55	19:05	17:24	17:09
10	07:57	07:35	07:56	07:06	06:25	06:05	06:14	06:41	07:10	07:40	07:14	07:46
	17:28	18:04	19:36	20:07	20:37	21:03	21:06	20:41	19:53	19:04	17:23	17:09
11	07:57	07:34	07:54	07:04	06:24	06:05	06:15	06:42	07:11	07:41	07:15	07:46
	17:29	18:05	19:37	20:08	20:38	21:03	21:06	20:39	19:51	19:02	17:22	17:09
12	07:57	07:33	07:52	07:03	06:23	06:05	06:15	06:43	07:12	07:42	07:16	07:47
	17:30	18:06	19:38	20:09	20:39	21:04	21:05	20:38	19:50	19:01	17:21	17:09
13	07:56	07:31	07:51	07:01	06:22	06:05	06:16	06:44	07:13	07:43	07:17	07:48
	17:31	18:07	19:39	20:10	20:40	21:04	21:05	20:37	19:48	18:59	17:21	17:09
14	07:56	07:30	07:49	07:00	06:21	06:05	06:17	06:44	07:14	07:44	07:18	07:49
	17:32	18:09	19:40	20:11	20:41	21:05	21:05	20:35	19:46	18:58	17:20	17:10
15	07:56	07:29	07:48	06:58	06:20	06:05	06:18	06:45	07:15	07:45	07:20	07:50
	17:33	18:10	19:41	20:12	20:42	21:05	21:04	20:34	19:45	18:56	17:19	17:10
16	07:55	07:28	07:46	06:56	06:19	06:05	06:18	06:46	07:16	07:46	07:21	07:50
	17:34	18:11	19:42	20:13	20:43	21:06	21:03	20:33	19:43	18:55	17:18	17:10
17	07:55	07:26	07:44	06:55	06:18	06:05	06:19	06:47	07:17	07:47	07:22	07:51
	17:35	18:12	19:43	20:14	20:44	21:06	21:03	20:31	19:42	18:53	17:17	17:10
18	07:54	07:25	07:43	06:54	06:17	06:05	06:20	06:48	07:18	07:48	07:23	07:52
	17:36	18:13	19:44	20:15	20:45	21:06	21:02	20:30	19:40	18:52	17:16	17:11
19	07:54	07:24	07:41	06:52	06:16	06:05	06:21	06:49	07:19	07:49	07:24	07:52
	17:38	18:14	19:45	20:16	20:46	21:07	21:02	20:29	19:38	18:50	17:16	17:11
20	07:53	07:22	07:40	06:51	06:16	06:05	06:22	06:50	07:20	07:50	07:25	07:53
	17:39	18:16	19:46	20:17	20:47	21:07	21:01	20:27	19:37	18:49	17:15	17:12
21	07:53	07:21	07:38	06:49	06:15	06:05	06:22	06:51	07:21	07:51	07:26	07:53
	17:40	18:17	19:47	20:18	20:48	21:07	21:00	20:26	19:35	18:47	17:14	17:12
22	07:52	07:20	07:36	06:48	06:14	06:06	06:23	06:52	07:22	07:52	07:28	07:54
	17:41	18:18	19:48	20:19	20:49	21:07	21:00	20:24	19:33	18:46	17:14	17:13
23	07:52	07:18	07:35	06:46	06:13	06:06	06:24	06:53	07:23	07:53	07:29	07:54
	17:42	18:19	19:49	20:20	20:49	21:08	20:59	20:23	19:32	18:45	17:13	17:13
24	07:51	07:17	07:33	06:45	06:13	06:06	06:25	06:54	07:24	07:54	07:30	07:55
	17:43	18:20	19:50	20:21	20:50	21:08	20:58	20:21	19:30	18:43	17:13	17:14
25	07:50	07:15	07:31	06:44	06:12	06:06	06:26	06:55	07:25	07:56	07:31	07:55
	17:45	18:21	19:51	20:22	20:51	21:08	20:57	20:20	19:28	18:42	17:12	17:14
26	07:49	07:14	07:30	06:42	06:11	06:07	06:27	06:56	07:26	07:57	07:32	07:56
	17:46	18:23	19:52	20:23	20:52	21:08	20:56	20:18	19:27	18:41	17:12	17:15
27	07:49	07:12	07:28	06:41	06:11	06:07	06:28	06:57	07:27	07:58	07:33	07:56
	17:47	18:24	19:53	20:24	20:53	21:08	20:55	20:17	19:25	18:39	17:11	17:16
28	07:48	07:11	07:26	06:39	06:10	06:08	06:28	06:58	07:27	07:59	07:34	07:56
	17:48	18:25	19:54	20:25	20:54	21:08	20:55	20:15	19:23	18:38	17:11	17:16
29	07:47		07:25	06:38	06:09	06:08	06:29	06:59	07:28	08:00	07:35	07:57
	17:49		19:55	20:26	20:55	21:08	20:54	20:14	19:22	18:37	17:11	17:17
30	07:46		07:23	06:37	06:09	06:08	06:30	07:00	07:29	08:01	07:36	07:57
	17:51		19:57	20:27	20:55	21:08	20:53	20:12	19:20	18:36	17:10	17:18
31	07:45		07:22		06:08		06:31	07:01		08:02		07:57
	17:52		19:58		20:56		20:52	20:11		18:34		17:18
Potential sun hours	300	299	370	397	446	449	456	427	374	346	300	291
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 34

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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 3380 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6323)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		15:48 (108)	07:45		08:08 (33)	07:10			07:20		07:46 (28)	06:36		18:59 (83)	06:08		18:54 (83)
	17:20	40	16:28 (108)	17:53	77	16:51 (108)	18:26			19:59	36	08:22 (28)	20:28	45	19:44 (83)	20:57	57	19:51 (83)
2	07:58		15:48 (108)	07:44		08:06 (33)	07:08			07:19		07:45 (28)	06:35		18:58 (83)	06:08		18:55 (83)
	17:21	41	16:29 (108)	17:54	81	16:52 (108)	18:27			20:00	37	08:22 (28)	20:29	47	19:45 (83)	20:58	56	19:51 (83)
3	07:58		15:48 (108)	07:43		08:04 (33)	07:07			07:17		07:45 (28)	06:33		18:57 (83)	06:07		18:56 (83)
	17:21	42	16:30 (108)	17:56	85	16:52 (108)	18:28			20:00	37	08:22 (28)	20:30	49	19:46 (83)	20:58	56	19:52 (83)
4	07:58		15:48 (108)	07:42		08:03 (33)	07:05			07:15		07:44 (28)	06:32		18:56 (83)	06:07		18:55 (83)
	17:22	43	16:31 (108)	17:57	88	16:52 (108)	18:29			20:01	37	08:21 (28)	20:31	51	19:47 (83)	20:59	56	19:51 (83)
5	07:58		15:48 (108)	07:41		08:01 (33)	07:04			07:14		07:43 (28)	06:31		18:55 (83)	06:07		18:56 (83)
	17:23	44	16:32 (108)	17:58	89	16:51 (108)	18:31			20:02	38	08:21 (28)	20:32	52	19:47 (83)	21:00	55	19:51 (83)
6	07:58		15:48 (108)	07:40		08:00 (33)	07:02			07:12		07:44 (28)	06:30		18:54 (83)	06:06		18:57 (83)
	17:24	45	16:33 (108)	17:59	91	16:51 (108)	18:32			20:03	37	08:21 (28)	20:33	54	19:48 (83)	21:00	55	19:52 (83)
7	07:58		15:48 (108)	07:39		08:00 (33)	07:01			07:11		07:44 (28)	06:29		18:53 (83)	06:06		18:57 (83)
	17:25	46	16:34 (108)	18:00	91	16:51 (108)	18:33			20:04	35	08:19 (28)	20:34	55	19:48 (83)	21:01	55	19:52 (83)
8	07:57		15:48 (108)	07:37		07:59 (33)	07:59			07:09		07:44 (28)	06:27		18:53 (83)	06:06		18:57 (83)
	17:26	47	16:35 (108)	18:02	93	16:51 (108)	19:34			20:05	35	08:19 (28)	20:35	56	19:49 (83)	21:02	54	19:51 (83)
9	07:57		15:48 (108)	07:36		07:59 (33)	07:57			07:07		07:44 (28)	06:26		18:53 (83)	06:06		18:57 (83)
	17:27	48	16:36 (108)	18:03	93	16:51 (108)	19:35			20:06	34	08:18 (28)	20:36	56	19:49 (83)	21:02	54	19:51 (83)
10	07:57		15:48 (108)	07:35		07:59 (33)	07:56			07:06		07:45 (28)	06:25		18:52 (83)	06:06		18:58 (83)
	17:28	49	16:37 (108)	18:04	92	16:50 (108)	19:36			20:07	32	08:17 (28)	20:37	58	19:50 (83)	21:03	53	19:51 (83)
11	07:57		15:47 (108)	07:34		07:59 (33)	07:54			07:04		07:45 (28)	06:24		18:52 (83)	06:05		18:58 (83)
	17:29	51	16:38 (108)	18:05	91	16:50 (108)	19:37			20:08	30	08:15 (28)	20:38	58	19:50 (83)	21:03	54	19:52 (83)
12	07:57		15:47 (108)	07:33		07:58 (33)	07:53			07:03		07:47 (28)	06:23		18:52 (83)	06:05		18:59 (83)
	17:30	52	16:39 (108)	18:06	91	16:49 (108)	19:38			20:09	27	08:14 (28)	20:39	58	19:50 (83)	21:04	53	19:52 (83)
13	07:56		15:47 (108)	07:32		07:58 (33)	07:51			07:01		07:48 (28)	06:22		18:51 (83)	06:05		18:59 (83)
	17:31	53	16:40 (108)	18:08	89	16:48 (108)	19:39			20:10	24	08:12 (28)	20:40	59	19:50 (83)	21:04	53	19:52 (83)
14	07:56		15:47 (108)	07:30		07:58 (33)	07:49			07:00		07:49 (28)	06:21		18:51 (83)	06:05		18:59 (83)
	17:32	53	16:40 (108)	18:09	88	16:48 (108)	19:40			20:11	21	08:10 (28)	20:41	59	19:50 (83)	21:05	53	19:52 (83)
15	07:56		15:47 (108)	07:29		07:59 (33)	07:48			06:58		07:51 (28)	06:20		18:51 (83)	06:05		19:00 (83)
	17:33	55	16:42 (108)	18:10	84	16:47 (108)	19:41			20:12	16	08:07 (28)	20:42	60	19:51 (83)	21:05	52	19:52 (83)
16	07:55		15:46 (108)	07:28		07:58 (33)	07:46			06:57		07:54 (28)	06:19		18:51 (83)	06:05		19:00 (83)
	17:34	56	16:42 (108)	18:11	82	16:45 (108)	19:42			20:13	9	08:03 (28)	20:43	60	19:51 (83)	21:06	52	19:52 (83)
17	07:55		15:47 (108)	07:27		07:59 (33)	07:45			06:55			06:18		18:51 (83)	06:05		19:00 (83)
	17:36	56	16:43 (108)	18:12	79	16:45 (108)	19:43			20:14			20:44	61	19:52 (83)	21:06	52	19:52 (83)
18	07:55		15:46 (108)	07:25		08:00 (33)	07:43			06:54			06:17		18:51 (83)	06:05		19:00 (83)
	17:37	58	16:44 (108)	18:14	75	16:44 (108)	19:44			20:15			20:45	60	19:51 (83)	21:07	52	19:52 (83)
19	07:54		15:47 (108)	07:24		08:00 (33)	07:41			06:52			06:17		18:51 (83)	06:05		19:01 (83)
	17:38	58	16:45 (108)	18:15	70	16:42 (108)	19:45			20:16			20:46	60	19:51 (83)	21:07	51	19:52 (83)
20	07:53		15:46 (108)	07:23		08:01 (33)	07:40			06:51			06:16		18:51 (83)	06:06		19:01 (83)
	17:39	59	16:45 (108)	18:16	64	16:40 (108)	19:46			20:17			20:47	60	19:51 (83)	21:07	51	19:52 (83)
21	07:53		15:46 (108)	07:21		08:02 (33)	07:38			06:49			06:15		18:51 (83)	06:06		19:02 (83)
	17:40	60	16:46 (108)	18:17	57	16:38 (108)	19:47			20:18			20:48	60	19:51 (83)	21:07	51	19:53 (83)
22	07:52		15:46 (108)	07:20		08:04 (33)	07:36			06:48			06:14		18:52 (83)	06:06		19:02 (83)
	17:41	61	16:47 (108)	18:18	48	16:35 (108)	19:49			20:19			20:49	60	19:52 (83)	21:08	51	19:53 (83)
23	07:52		15:46 (108)	07:18		08:06 (33)	07:35		08:03 (28)	06:47			06:13		18:52 (83)	06:06		19:02 (83)
	17:42	61	16:47 (108)	18:19	38	16:32 (108)	19:50	8	08:11 (28)	20:20			20:50	59	19:51 (83)	21:08	51	19:53 (83)
24	07:51		15:46 (108)	07:17		08:08 (33)	07:33		07:58 (28)	06:45		19:15 (83)	06:13		18:51 (83)	06:06		19:01 (83)
	17:44	62	16:48 (108)	18:20	21	16:26 (108)	19:51	17	08:15 (28)	20:21	15	19:30 (83)	20:50	60	19:51 (83)	21:08	52	19:53 (83)
25	07:50		15:46 (108)	07:16			07:32		07:55 (28)	06:44		19:11 (83)	06:12		18:52 (83)	06:07		19:02 (83)
	17:45	63	16:49 (108)	18:22			19:52	22	08:17 (28)	20:22	23	19:34 (83)	20:51	60	19:52 (83)	21:08	52	19:54 (83)
26	07:50		15:46 (108)	07:14			07:30		07:53 (28)	06:42		19:08 (83)	06:11		18:52 (83)	06:07		19:02 (83)
	17:46	63	16:49 (108)	18:23			19:53	26	08:19 (28)	20:23	28	19:36 (83)	20:52	59	19:51 (83)	21:08	52	19:54 (83)
27	07:49		15:46 (108)	07:13			07:28		07:51 (28)	06:41		19:05 (83)	06:11		18:53 (83)	06:07		19:02 (83)
	17:47	63	16:49 (108)	18:24			19:54	29	08:20 (28)	20:24	33	19:38 (83)	20:53	59	19:52 (83)	21:08	52	19:54 (83)
28	07:48		15:46 (108)	07:11			07:27		07:49 (28)	06:40		19:04 (83)	06:10		18:53 (83)	06:08		19:03 (83)
	17:48	64	16:50 (108)	18:25			19:55	31	08:20 (28)	20:25	36	19:40 (83)	20:54	58	19:51 (83)	21:08	52	19:55 (83)
29	07:47		15:46 (108)				07:25		07:49 (28)	06:38		19:02 (83)	06:10		18:54 (83)	06:08		19:02 (83)
	17:50	64	16:50 (108)				19:56	33	08:22 (28)	20:26	40	19:42 (83)	20:55	58	19:52 (83)	21:08	53	19:55 (83)
30	07:46		15:46 (108)				07:23		07:47 (28)	06:37		19:00 (83)	06:09		18:54 (83)	06:09		19:03 (83)
	17:51	64	16:50 (108)				19:57	35	08:22 (28)	20:27	43	19:43 (83)	20:55	57	19:51 (83)	21:08	53	19:56 (83)
31	07:45		08:12 (33)				07:22		07:46 (28)				06:09		18:54 (83)			
	17:52	66	16:50 (108)				19:58	35	08:21 (28)				20:56	58	19:52 (83)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		1687			1857			236			703			1766			1593	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.68			0.66			0.66			0.65			0.63			0.63	
Total reduction		0.24			0.28			0.29			0.33			0.36			0.38	
Total, real		412			515			69			235			630			609	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 35

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 3380 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6323)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		19:02 (83)	06:32		19:02 (83)	07:02		07:44 (28)	07:31			07:04		07:28 (33)	07:37		15:29 (108)
	21:08	54	19:56 (83)	20:51	59	20:01 (83)	20:09	30	08:14 (28)	19:19			17:33	91	16:19 (108)	17:10	51	16:20 (108)
2	06:10		19:03 (83)	06:33		19:03 (83)	07:03		07:43 (28)	07:32			07:05		07:29 (33)	07:38		15:30 (108)
	21:08	53	19:56 (83)	20:50	57	20:00 (83)	20:08	32	08:15 (28)	19:17			17:32	92	16:20 (108)	17:10	49	16:19 (108)
3	06:10		19:03 (83)	06:34		19:03 (83)	07:04		07:42 (28)	07:33			07:06		07:29 (33)	07:39		15:31 (108)
	21:08	53	19:56 (83)	20:49	57	20:00 (83)	20:06	34	08:16 (28)	19:15			17:31	93	16:21 (108)	17:10	48	16:19 (108)
4	06:11		19:03 (83)	06:35		19:03 (83)	07:05		07:41 (28)	07:34			07:07		07:30 (33)	07:40		15:32 (108)
	21:08	54	19:57 (83)	20:48	57	20:00 (83)	20:05	35	08:16 (28)	19:14			17:30	91	16:21 (108)	17:10	47	16:19 (108)
5	06:11		19:02 (83)	06:36		19:03 (83)	07:06		07:41 (28)	07:35			07:08		07:30 (33)	07:41		15:33 (108)
	21:08	55	19:57 (83)	20:47	55	19:58 (83)	20:03	36	08:17 (28)	19:12			17:29	91	16:21 (108)	17:09	46	16:19 (108)
6	06:12		19:03 (83)	06:37		19:03 (83)	07:07		07:40 (28)	07:36			07:09		07:32 (33)	07:42		15:34 (108)
	21:08	55	19:58 (83)	20:45	55	19:58 (83)	20:01	37	08:17 (28)	19:10			17:28	90	16:22 (108)	17:09	45	16:19 (108)
7	06:12		19:02 (83)	06:38		19:04 (83)	07:08		07:40 (28)	07:37			07:10		07:33 (33)	07:43		15:35 (108)
	21:07	55	19:57 (83)	20:44	53	19:57 (83)	20:00	37	08:17 (28)	19:09			17:27	88	16:22 (108)	17:09	44	16:19 (108)
8	06:13		19:03 (83)	06:39		19:04 (83)	07:09		07:39 (28)	07:38			07:12		07:34 (33)	07:44		15:36 (108)
	21:07	55	19:58 (83)	20:43	52	19:56 (83)	19:57	38	08:17 (28)	19:07			17:26	85	16:22 (108)	17:09	43	16:19 (108)
9	06:14		19:03 (83)	06:40		19:05 (83)	07:10		07:38 (28)	07:39			07:13		07:36 (33)	07:45		15:37 (108)
	21:07	56	19:59 (83)	20:42	50	19:55 (83)	19:55	37	08:15 (28)	19:06			17:24	82	16:22 (108)	17:09	42	16:19 (108)
10	06:14		19:02 (83)	06:41		19:06 (83)	07:10		07:38 (28)	07:40			07:14		07:39 (33)	07:46		15:38 (108)
	21:06	57	19:59 (83)	20:41	48	19:54 (83)	19:53	37	08:15 (28)	19:04			17:24	76	16:22 (108)	17:09	41	16:19 (108)
11	06:15		19:02 (83)	06:42		19:07 (83)	07:11		07:38 (28)	07:41			07:15		15:18 (108)	07:47		15:39 (108)
	21:06	57	19:59 (83)	20:39	46	19:53 (83)	19:52	36	08:14 (28)	19:03			17:23	64	16:22 (108)	17:09	40	16:19 (108)
12	06:16		19:03 (83)	06:43		19:08 (83)	07:12		07:38 (28)	07:42			07:16		15:18 (108)	07:47		15:39 (108)
	21:06	57	20:00 (83)	20:38	44	19:52 (83)	19:50	36	08:14 (28)	19:01			17:22	64	16:22 (108)	17:10	39	16:18 (108)
13	06:16		19:02 (83)	06:44		19:09 (83)	07:13		07:38 (28)	07:43			07:17		15:18 (108)	07:48		15:40 (108)
	21:05	57	19:59 (83)	20:37	42	19:51 (83)	19:48	35	08:13 (28)	18:59			17:21	64	16:22 (108)	17:10	38	16:18 (108)
14	06:17		19:02 (83)	06:45		19:10 (83)	07:14		07:39 (28)	07:44			07:19		15:18 (108)	07:49		15:41 (108)
	21:05	58	20:00 (83)	20:36	39	19:49 (83)	19:47	33	08:12 (28)	18:58			17:20	64	16:22 (108)	17:10	38	16:19 (108)
15	06:18		19:02 (83)	06:46		19:12 (83)	07:15		07:39 (28)	07:45			07:20		15:19 (108)	07:50		15:42 (108)
	21:04	59	20:01 (83)	20:34	36	19:48 (83)	19:45	32	08:11 (28)	18:56			17:19	63	16:22 (108)	17:10	37	16:19 (108)
16	06:19		19:02 (83)	06:47		19:14 (83)	07:16		07:40 (28)	07:46			07:21		15:19 (108)	07:50		15:42 (108)
	21:04	59	20:01 (83)	20:33	32	19:46 (83)	19:43	29	08:09 (28)	18:55			17:18	63	16:22 (108)	17:10	37	16:19 (108)
17	06:19		19:02 (83)	06:48		19:15 (83)	07:17		07:41 (28)	07:47		08:44 (33)	07:22		15:19 (108)	07:51		15:43 (108)
	21:03	59	20:01 (83)	20:32	27	19:42 (83)	19:42	27	08:08 (28)	18:53	4	08:48 (33)	17:17	63	16:22 (108)	17:11	36	16:19 (108)
18	06:20		19:02 (83)	06:49		19:18 (83)	07:18		07:43 (28)	07:48		08:39 (33)	07:23		15:20 (108)	07:52		15:44 (108)
	21:02	59	20:01 (83)	20:30	21	19:39 (83)	19:40	23	08:06 (28)	18:52	28	17:00 (108)	17:17	62	16:22 (108)	17:11	36	16:20 (108)
19	06:21		19:02 (83)	06:50		19:22 (83)	07:19		07:45 (28)	07:49		08:36 (33)	07:24		15:21 (108)	07:52		15:44 (108)
	21:02	59	20:01 (83)	20:29	12	19:34 (83)	19:38	18	08:03 (28)	18:51	42	17:04 (108)	17:16	61	16:22 (108)	17:11	36	16:20 (108)
20	06:22		19:02 (83)	06:50			07:20		07:48 (28)	07:50		08:34 (33)	07:25		15:21 (108)	07:53		15:45 (108)
	21:01	60	20:02 (83)	20:27			19:37	11	07:59 (28)	18:49	52	17:07 (108)	17:15	61	16:22 (108)	17:12	35	16:20 (108)
21	06:23		19:01 (83)	06:51			07:21			07:51		08:32 (33)	07:27		15:22 (108)	07:53		15:45 (108)
	21:00	60	20:01 (83)	20:26			19:35			18:48	59	17:09 (108)	17:15	60	16:22 (108)	17:12	35	16:20 (108)
22	06:23		19:01 (83)	06:52			07:22			07:52		08:32 (33)	07:28		15:22 (108)	07:54		15:46 (108)
	21:00	60	20:01 (83)	20:25			19:33			18:46	65	17:11 (108)	17:14	59	16:21 (108)	17:13	35	16:21 (108)
23	06:24		19:01 (83)	06:53			07:23			07:53		08:30 (33)	07:29		15:23 (108)	07:54		15:46 (108)
	20:59	61	20:02 (83)	20:23			19:32			18:45	72	17:13 (108)	17:14	58	16:21 (108)	17:13	35	16:21 (108)
24	06:25		19:02 (83)	06:54			07:24			07:55		08:30 (33)	07:30		15:24 (108)	07:55		15:46 (108)
	20:58	60	20:02 (83)	20:22			19:30			18:44	75	17:14 (108)	17:13	58	16:22 (108)	17:14	35	16:21 (108)
25	06:26		19:02 (83)	06:55			07:25			07:56		08:29 (33)	07:31		15:25 (108)	07:55		15:47 (108)
	20:57	60	20:02 (83)	20:20			19:28			18:42	80	17:15 (108)	17:12	56	16:21 (108)	17:14	36	16:23 (108)
26	06:27		19:02 (83)	06:56			07:26			07:57		08:28 (33)	07:32		15:25 (108)	07:56		15:47 (108)
	20:57	60	20:02 (83)	20:19			19:27			18:41	82	17:15 (108)	17:12	56	16:21 (108)	17:15	36	16:23 (108)
27	06:28		19:01 (83)	06:57		07:57 (28)	07:27			07:58		08:28 (33)	07:33		15:26 (108)	07:56		15:47 (108)
	20:56	60	20:01 (83)	20:17	9	08:06 (28)	19:25			18:40	85	17:16 (108)	17:12	55	16:21 (108)	17:16	36	16:23 (108)
28	06:29		19:01 (83)	06:58		07:53 (28)	07:28			07:59		08:28 (33)	07:34		15:27 (108)	07:56		15:48 (108)
	20:55	60	20:01 (83)	20:16	17	08:10 (28)	19:23			18:38	88	17:18 (108)	17:11	53	16:20 (108)	17:16	37	16:25 (108)
29	06:30		19:02 (83)	06:59		07:49 (28)	07:29			08:00		08:28 (33)	07:35		15:27 (108)	07:57		15:48 (108)
	20:54	59	20:01 (83)	20:14	22	08:11 (28)	19:22			18:37	89	17:18 (108)	17:11	53	16:20 (108)	17:17	38	16:26 (108)
30	06:31		19:02 (83)	07:00		07:47 (28)	07:30			08:01		08:28 (33)	07:36		15:28 (108)	07:57		15:48 (108)
	20:53	59	20:01 (83)	20:13	25	08:12 (28)	19:20			18:36	90	17:19 (108)	17:10	52	16:20 (108)	17:18	38	16:26 (108)
31	06:31		19:02 (83)	07:01		07:46 (28)				08:02		08:28 (33)				07:57		15:48 (108)
	20:52	59	20:01 (83)	20:11	27	08:13 (28)				18:35	91	17:19 (108)				17:19	39	16:27 (108)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		1789			942			633			1002			2068			1228	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.63			0.64			0.66			0.65			0.67			0.68	
Total reduction		0.38			0.38			0.40			0.37			0.25			0.34	
Total, real		684			362			256			369			515			417	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 36

Licensed user:
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217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 3417 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6324)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March	April	May	June		
1	07:58		15:53 (133)	07:45		15:56 (133)	07:10	07:20	06:36	06:08		
	17:20	51	16:44 (133)	17:53	66	17:02 (133)	18:26	19:59	20:28	20:57		
2	07:58		15:53 (133)	07:44		15:56 (133)	07:08	07:19	06:35	06:08		
	17:21	51	16:44 (133)	17:55	66	17:02 (133)	18:27	20:00	20:29	20:58		
3	07:58		15:53 (133)	07:43		15:57 (133)	07:07	07:17	06:33	06:07		
	17:22	52	16:45 (133)	17:56	65	17:02 (133)	18:28	20:00	20:30	20:59		
4	07:58		15:53 (133)	07:42		15:57 (133)	07:05	07:16	06:32	06:07		
	17:22	53	16:46 (133)	17:57	65	17:02 (133)	18:30	20:01	20:31	20:59		
5	07:58		15:53 (133)	07:41		15:58 (133)	07:04	07:14	06:31	06:07		
	17:23	54	16:47 (133)	17:58	64	17:02 (133)	18:31	20:02	20:33	21:00		
6	07:58		15:52 (133)	07:40		15:58 (133)	07:02	07:12	06:30	06:06		07:20 (87)
	17:24	55	16:47 (133)	17:59	63	17:01 (133)	18:32	20:03	20:34	21:01	4	07:24 (87)
7	07:58		15:53 (133)	07:39		15:58 (133)	07:01	07:11	06:29	06:06		07:15 (87)
	17:25	55	16:48 (133)	18:01	62	17:00 (133)	18:33	20:04	20:35	21:01	14	07:29 (87)
8	07:58		15:53 (133)	07:38		15:59 (133)	07:59	07:09	06:28	06:06		07:12 (87)
	17:26	56	16:49 (133)	18:02	61	17:00 (133)	19:34	20:05	20:36	21:02	19	07:31 (87)
9	07:58		15:53 (133)	07:36		16:00 (133)	07:58	07:08	06:26	06:06		07:11 (87)
	17:27	57	16:50 (133)	18:03	60	17:00 (133)	19:35	20:06	20:37	21:02	22	07:33 (87)
10	07:57		15:53 (133)	07:35		16:01 (133)	07:56	07:06	06:25	06:06		07:10 (87)
	17:28	58	16:51 (133)	18:04	58	16:59 (133)	19:36	20:07	20:38	21:03	25	07:35 (87)
11	07:57		15:53 (133)	07:34		16:02 (133)	07:54	07:04	06:24	06:05		07:09 (87)
	17:29	58	16:51 (133)	18:05	57	16:59 (133)	19:37	20:08	20:38	21:04	27	07:36 (87)
12	07:57		15:53 (133)	07:33		16:02 (133)	07:53	07:03	06:23	06:05		07:08 (87)
	17:30	59	16:52 (133)	18:07	55	16:57 (133)	19:38	20:09	20:39	21:04	29	07:37 (87)
13	07:57		15:53 (133)	07:32		16:04 (133)	07:51	07:01	06:22	06:05		07:08 (87)
	17:31	60	16:53 (133)	18:08	53	16:57 (133)	19:39	20:10	20:40	21:05	30	07:38 (87)
14	07:56		15:53 (133)	07:30		16:05 (133)	07:50	07:00	06:21	06:05		07:07 (87)
	17:32	60	16:53 (133)	18:09	51	16:56 (133)	19:40	20:11	20:41	21:05	32	07:39 (87)
15	07:56		15:53 (133)	07:29		16:07 (133)	07:48	06:58	06:20	06:05		07:07 (87)
	17:33	61	16:54 (133)	18:10	48	16:55 (133)	19:41	20:12	20:42	21:06	33	07:40 (87)
16	07:56		15:53 (133)	07:28		16:07 (133)	07:46	06:57	06:19	06:05		07:07 (87)
	17:35	61	16:54 (133)	18:11	46	16:53 (133)	19:42	20:13	20:43	21:06	33	07:40 (87)
17	07:55		15:53 (133)	07:27		16:09 (133)	07:45	06:55	06:18	06:05		07:07 (87)
	17:36	63	16:56 (133)	18:13	43	16:52 (133)	19:43	20:14	20:44	21:06	34	07:41 (87)
18	07:55		15:53 (133)	07:25		16:12 (133)	07:43	06:54	06:18	06:05		07:06 (87)
	17:37	63	16:56 (133)	18:14	39	16:51 (133)	19:44	20:15	20:45	21:07	35	07:41 (87)
19	07:54		15:53 (133)	07:24		16:13 (133)	07:41	06:52	06:17	06:06		07:06 (87)
	17:38	64	16:57 (133)	18:15	35	16:48 (133)	19:46	20:16	20:46	21:07	36	07:42 (87)
20	07:54		15:53 (133)	07:23		16:16 (133)	07:40	06:51	06:16	06:06		07:07 (87)
	17:39	64	16:57 (133)	18:16	30	16:46 (133)	19:47	20:17	20:47	21:07	36	07:43 (87)
21	07:53		15:54 (133)	07:21		16:20 (133)	07:38	06:49	06:15	06:06		07:07 (87)
	17:40	64	16:58 (133)	18:17	23	16:43 (133)	19:48	20:18	20:48	21:08	36	07:43 (87)
22	07:52		15:53 (133)	07:20		16:24 (133)	07:37	06:48	06:14	06:06		07:07 (87)
	17:41	66	16:59 (133)	18:18	14	16:38 (133)	19:49	20:19	20:49	21:08	36	07:43 (87)
23	07:52		15:53 (133)	07:19			07:35	06:47	06:14	06:06		07:07 (87)
	17:43	66	16:59 (133)	18:19			19:50	20:20	20:50	21:08	36	07:43 (87)
24	07:51		15:54 (133)	07:17			07:33	06:45	06:13	06:07		07:08 (87)
	17:44	66	17:00 (133)	18:21			19:51	20:21	20:51	21:08	35	07:43 (87)
25	07:50		15:54 (133)	07:16			07:32	06:44	06:12	06:07		07:08 (87)
	17:45	66	17:00 (133)	18:22			19:52	20:22	20:52	21:08	35	07:43 (87)
26	07:50		15:54 (133)	07:14			07:30	06:42	06:12	06:07		07:09 (87)
	17:46	66	17:00 (133)	18:23			19:53	20:23	20:52	21:08	34	07:43 (87)
27	07:49		15:54 (133)	07:13			07:28	06:41	06:11	06:08		07:10 (87)
	17:47	66	17:00 (133)	18:24			19:54	20:24	20:53	21:09	33	07:43 (87)
28	07:48		15:54 (133)	07:11			07:27	06:40	06:10	06:08		07:10 (87)
	17:48	66	17:00 (133)	18:25			19:55	20:25	20:54	21:09	32	07:42 (87)
29	07:47		15:54 (133)				07:25	06:38	06:10	06:08		07:11 (87)
	17:50	67	17:01 (133)				19:56	20:26	20:55	21:09	31	07:42 (87)
30	07:46		15:55 (133)				07:24	06:37	06:09	06:09		07:12 (87)
	17:51	67	17:02 (133)				19:57	20:27	20:56	21:09	30	07:42 (87)
31	07:46		15:56 (133)				07:22		06:09			
	17:52	66	17:02 (133)				19:58		20:56			
Potential sun hours	300			299			370	397	446	449		
Total, worst case		1881			1124						747	
Sun reduction		0.36			0.42						0.60	
Oper. time red.		1.00			1.00						1.00	
Wind dir. red.		0.68			0.68						0.68	
Total reduction		0.24			0.28						0.41	
Total, real		457			319						306	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 37

Licensed user:
EDR
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US-SYRACUSE, NY 13202
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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 3417 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6324)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August	September	October			November			December		
1	06:09		07:13 (87)	06:32	07:02	07:31			07:04		15:31 (133)	07:38		15:35 (133)
	21:09	28	07:41 (87)	20:51	20:10	19:19			17:33	58	16:29 (133)	17:10	58	16:33 (133)
2	06:10		07:15 (87)	06:33	07:03	07:32			07:05		15:30 (133)	07:39		15:35 (133)
	21:08	25	07:40 (87)	20:50	20:08	19:17			17:32	60	16:30 (133)	17:10	58	16:33 (133)
3	06:10		07:16 (87)	06:34	07:04	07:33			07:06		15:29 (133)	07:40		15:36 (133)
	21:08	23	07:39 (87)	20:49	20:06	19:15			17:31	61	16:30 (133)	17:10	57	16:33 (133)
4	06:11		07:18 (87)	06:35	07:05	07:34			07:07		15:28 (133)	07:41		15:37 (133)
	21:08	20	07:38 (87)	20:48	20:05	19:14			17:30	62	16:30 (133)	17:10	56	16:33 (133)
5	06:11		07:19 (87)	06:36	07:06	07:35			07:08		15:27 (133)	07:41		15:38 (133)
	21:08	16	07:35 (87)	20:47	20:03	19:12			17:29	63	16:30 (133)	17:10	55	16:33 (133)
6	06:12		07:23 (87)	06:37	07:07	07:36			07:09		15:28 (133)	07:42		15:38 (133)
	21:08	10	07:33 (87)	20:46	20:02	19:11			17:28	63	16:31 (133)	17:09	55	16:33 (133)
7	06:12			06:38	07:08	07:37			07:11		15:27 (133)	07:43		15:39 (133)
	21:08			20:44	20:00	19:09			17:27	65	16:32 (133)	17:09	54	16:33 (133)
8	06:13			06:39	07:09	07:38			07:12		15:27 (133)	07:44		15:40 (133)
	21:07			20:43	19:57	19:07			17:26	65	16:32 (133)	17:09	53	16:33 (133)
9	06:14			06:40	07:10	07:39			07:13		15:26 (133)	07:45		15:41 (133)
	21:07			20:42	19:55	19:06			17:25	66	16:32 (133)	17:09	52	16:33 (133)
10	06:14			06:41	07:11	07:40			07:14		15:27 (133)	07:46		15:42 (133)
	21:07			20:41	19:53	19:04			17:24	66	16:33 (133)	17:09	52	16:34 (133)
11	06:15			06:42	07:12	07:41			07:15		15:26 (133)	07:47		15:43 (133)
	21:06			20:40	19:52	19:03			17:23	67	16:33 (133)	17:10	51	16:34 (133)
12	06:16			06:43	07:12	07:42			07:16		15:26 (133)	07:48		15:44 (133)
	21:06			20:38	19:50	19:01			17:22	67	16:33 (133)	17:10	50	16:34 (133)
13	06:16			06:44	07:13	07:43			07:18		15:26 (133)	07:48		15:44 (133)
	21:05			20:37	19:48	19:00			17:21	67	16:33 (133)	17:10	50	16:34 (133)
14	06:17			06:45	07:14	07:44			07:19		15:27 (133)	07:49		15:45 (133)
	21:05			20:36	19:47	18:58			17:20	66	16:33 (133)	17:10	49	16:34 (133)
15	06:18			06:46	07:15	07:45			07:20		15:27 (133)	07:50		15:46 (133)
	21:04			20:34	19:45	18:57			17:19	66	16:33 (133)	17:10	49	16:35 (133)
16	06:19			06:47	07:16	07:46			07:21		15:27 (133)	07:51		15:46 (133)
	21:04			20:33	19:43	18:55			17:18	66	16:33 (133)	17:11	48	16:34 (133)
17	06:19			06:48	07:17	07:47			07:22		15:27 (133)	07:51		15:47 (133)
	21:03			20:32	19:42	18:54			17:18	66	16:33 (133)	17:11	48	16:35 (133)
18	06:20			06:49	07:18	07:48			07:23		15:28 (133)	07:52		15:48 (133)
	21:03			20:30	19:40	18:52			17:17	66	16:34 (133)	17:11	47	16:35 (133)
19	06:21			06:50	07:19	07:49			07:24		15:28 (133)	07:52		15:48 (133)
	21:02			20:29	19:39	18:51			17:16	66	16:34 (133)	17:12	47	16:35 (133)
20	06:22			06:51	07:20	07:50		16:52 (133)	07:26		15:28 (133)	07:53		15:49 (133)
	21:01			20:28	19:37	18:49	18	17:10 (133)	17:15	66	16:34 (133)	17:12	47	16:36 (133)
21	06:23			06:52	07:21	07:51		16:49 (133)	07:27		15:29 (133)	07:54		15:49 (133)
	21:01			20:26	19:35	18:48	26	17:15 (133)	17:15	64	16:33 (133)	17:12	47	16:36 (133)
22	06:24			06:52	07:22	07:53		16:46 (133)	07:28		15:29 (133)	07:54		15:50 (133)
	21:00			20:25	19:34	18:46	31	17:17 (133)	17:14	64	16:33 (133)	17:13	47	16:37 (133)
23	06:24			06:53	07:23	07:54		16:43 (133)	07:29		15:29 (133)	07:55		15:50 (133)
	20:59			20:23	19:32	18:45	36	17:19 (133)	17:14	64	16:33 (133)	17:13	47	16:37 (133)
24	06:25			06:54	07:24	07:55		16:41 (133)	07:30		15:31 (133)	07:55		15:51 (133)
	20:58			20:22	19:30	18:44	40	17:21 (133)	17:13	63	16:34 (133)	17:14	47	16:38 (133)
25	06:26			06:55	07:25	07:56		16:39 (133)	07:31		15:31 (133)	07:55		15:51 (133)
	20:58			20:20	19:29	18:42	43	17:22 (133)	17:13	63	16:34 (133)	17:15	47	16:38 (133)
26	06:27			06:56	07:26	07:57		16:37 (133)	07:32		15:32 (133)	07:56		15:51 (133)
	20:57			20:19	19:27	18:41	46	17:23 (133)	17:12	61	16:33 (133)	17:15	48	16:39 (133)
27	06:28			06:57	07:27	07:58		16:36 (133)	07:33		15:32 (133)	07:56		15:52 (133)
	20:56			20:17	19:25	18:40	49	17:25 (133)	17:12	61	16:33 (133)	17:16	48	16:40 (133)
28	06:29			06:58	07:28	07:59		16:35 (133)	07:34		15:33 (133)	07:57		15:52 (133)
	20:55			20:16	19:24	18:38	51	17:26 (133)	17:11	60	16:33 (133)	17:17	48	16:40 (133)
29	06:30			06:59	07:29	08:00		16:33 (133)	07:35		15:33 (133)	07:57		15:52 (133)
	20:54			20:14	19:22	18:37	54	17:27 (133)	17:11	60	16:33 (133)	17:17	49	16:41 (133)
30	06:31			07:00	07:30	08:01		16:32 (133)	07:36		15:34 (133)	07:57		15:52 (133)
	20:53			20:13	19:20	18:36	55	17:27 (133)	17:11	59	16:33 (133)	17:18	49	16:41 (133)
31	06:32			07:01		08:03		16:31 (133)				07:57		15:52 (133)
	20:52			20:11		18:35	57	17:28 (133)				17:19	50	16:42 (133)
Potential sun hours	456			427	374	346			300			291		
Total, worst case		122					506			1911			1563	
Sun reduction		0.60					0.56			0.37			0.50	
Oper. time red.		1.00					1.00			1.00			1.00	
Wind dir. red.		0.68					0.68			0.68			0.68	
Total reduction		0.41					0.38			0.25			0.34	
Total, real		50					191			477			528	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 38

Licensed user:
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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 3426 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6325)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January	February			March			April			May			June		
1	07:57	07:44			07:09		08:07 (22)	07:20			06:36		06:55 (129)	06:08		06:57 (129)
	17:19	17:53			18:26	16	08:23 (22)	19:59			20:28	20	07:15 (129)	20:57	16	07:13 (129)
2	07:57	07:43			07:08		08:11 (22)	07:18			06:34		06:54 (129)	06:08		06:59 (129)
	17:20	17:54			18:27	7	08:18 (22)	20:00			20:29	22	07:16 (129)	20:58	13	07:12 (129)
3	07:57	07:42		08:11 (22)	07:06			07:17			06:33		06:53 (129)	06:07		07:00 (129)
	17:21	17:55	9	08:20 (22)	18:28			20:00			20:30	25	07:18 (129)	20:58	10	07:10 (129)
4	07:57	07:41		08:07 (22)	07:05			07:15			06:32		06:51 (129)	06:07		07:02 (129)
	17:22	17:57	17	08:24 (22)	18:29			20:01			20:31	27	07:18 (129)	20:59	7	07:09 (129)
5	07:57	07:40		08:05 (22)	07:03			07:14			06:31		06:50 (129)	06:06		
	17:23	17:58	21	08:26 (22)	18:30			20:02			20:32	29	07:19 (129)	21:00		
6	07:57	07:39		08:04 (22)	07:02			07:12			06:29		06:49 (129)	06:06		
	17:24	17:59	24	08:28 (22)	18:31			20:03			20:33	30	07:19 (129)	21:00		
7	07:57	07:38		08:03 (22)	07:00			07:10			06:28		06:48 (129)	06:06		
	17:25	18:00	27	08:30 (22)	18:32			20:04			20:34	32	07:20 (129)	21:01		
8	07:57	07:37		08:02 (22)	07:59			07:09			06:27		06:48 (129)	06:06		
	17:26	18:01	29	08:31 (22)	19:34			20:05			20:35	32	07:20 (129)	21:02		
9	07:57	07:36		08:01 (22)	07:57			07:07			06:26		06:48 (129)	06:05		
	17:27	18:03	31	08:32 (22)	19:35			20:06			20:36	33	07:21 (129)	21:02		
10	07:57	07:35		08:00 (22)	07:56			07:06			06:25		06:47 (129)	06:05		
	17:28	18:04	34	08:34 (22)	19:36			20:07			20:37	34	07:21 (129)	21:03		
11	07:57	07:34		07:59 (22)	07:54			07:04			06:24		06:47 (129)	06:05		
	17:29	18:05	35	08:34 (22)	19:37			20:08			20:38	34	07:21 (129)	21:03		
12	07:57	07:33		07:58 (22)	07:52			07:03			06:23		06:47 (129)	06:05		
	17:30	18:06	36	08:34 (22)	19:38			20:09			20:39	34	07:21 (129)	21:04		
13	07:56	07:31		07:58 (22)	07:51			07:01			06:22		06:47 (129)	06:05		
	17:31	18:07	37	08:35 (22)	19:39			20:10			20:40	34	07:21 (129)	21:04		
14	07:56	07:30		07:58 (22)	07:49			07:00			06:21		06:47 (129)	06:05		
	17:32	18:09	38	08:36 (22)	19:40			20:11			20:41	34	07:21 (129)	21:05		
15	07:56	07:29		07:57 (22)	07:48			06:58			06:20		06:47 (129)	06:05		
	17:33	18:10	38	08:35 (22)	19:41			20:12			20:42	34	07:21 (129)	21:05		
16	07:55	07:28		07:57 (22)	07:46			06:56			06:19		06:47 (129)	06:05		
	17:34	18:11	39	08:36 (22)	19:42			20:13			20:43	34	07:21 (129)	21:06		
17	07:55	07:26		07:57 (22)	07:44			06:55			06:18		06:47 (129)	06:05		
	17:35	18:12	39	08:36 (22)	19:43			20:14			20:44	33	07:20 (129)	21:06		
18	07:54	07:25		07:56 (22)	07:43			06:54			06:17		06:48 (129)	06:05		
	17:36	18:13	39	08:35 (22)	19:44			20:15			20:45	33	07:21 (129)	21:06		
19	07:54	07:24		07:57 (22)	07:41			06:52			06:16		06:48 (129)	06:05		
	17:38	18:15	38	08:35 (22)	19:45			20:16			20:46	32	07:20 (129)	21:07		
20	07:53	07:22		07:57 (22)	07:40			06:51			06:16		06:48 (129)	06:05		
	17:39	18:16	38	08:35 (22)	19:46			20:17			20:47	32	07:20 (129)	21:07		
21	07:53	07:21		07:57 (22)	07:38			06:49			06:15		06:48 (129)	06:06		
	17:40	18:17	37	08:34 (22)	19:47			20:18			20:48	31	07:19 (129)	21:07		
22	07:52	07:20		07:58 (22)	07:36			06:48			06:14		06:49 (129)	06:06		
	17:41	18:18	36	08:34 (22)	19:48			20:19			20:49	31	07:20 (129)	21:07		
23	07:52	07:18		07:58 (22)	07:35			06:46			06:13		06:49 (129)	06:06		
	17:42	18:19	35	08:33 (22)	19:49			20:20			20:49	30	07:19 (129)	21:08		
24	07:51	07:17		07:59 (22)	07:33			06:45			06:13		06:50 (129)	06:06		
	17:43	18:20	33	08:32 (22)	19:50			20:21			20:50	28	07:18 (129)	21:08		
25	07:50	07:15		08:00 (22)	07:31			06:44			06:12		06:51 (129)	06:07		
	17:45	18:21	31	08:31 (22)	19:51			20:22			20:51	27	07:18 (129)	21:08		
26	07:49	07:14		08:01 (22)	07:30			06:42			06:11		06:51 (129)	06:07		
	17:46	18:23	28	08:29 (22)	19:52			20:23			20:52	26	07:17 (129)	21:08		
27	07:49	07:12		08:03 (22)	07:28			06:41			06:11		06:52 (129)	06:07		
	17:47	18:24	25	08:28 (22)	19:53			20:24			20:53	24	07:16 (129)	21:08		
28	07:48	07:11		08:04 (22)	07:26			06:39			06:10		06:53 (129)	06:08		
	17:48	18:25	22	08:26 (22)	19:54			20:25			20:54	23	07:16 (129)	21:08		
29	07:47				07:25			06:38		07:00 (129)	06:09		06:53 (129)	06:08		
	17:49				19:55			20:26	9	07:09 (129)	20:54	22	07:15 (129)	21:08		
30	07:46				07:23			06:37		06:57 (129)	06:09		06:55 (129)	06:08		
	17:51				19:57			20:27	16	07:13 (129)	20:55	20	07:15 (129)	21:08		
31	07:45				07:22						06:08		06:56 (129)			
	17:52				19:58						20:56	18	07:14 (129)			
Potential sun hours	300	299			370			397			446			449		
Total, worst case			816			23			25			898			46	
Sun reduction			0.42			0.44			0.51			0.56			0.60	
Oper. time red.			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.			0.62			0.62			0.68			0.68			0.68	
Total reduction			0.26			0.27			0.34			0.38			0.40	
Total, real			213			6			9			339			19	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 39

Licensed user:
EDR
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US-SYRACUSE, NY 13202
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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 3426 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6325)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September	October			November			December
1	06:09			06:32		06:57 (129)	07:02	07:30			07:03		07:29 (22)	07:37
	21:08			20:51	35	07:32 (129)	20:09	19:18			17:33	33	08:02 (22)	17:10
2	06:09			06:33		06:58 (129)	07:03	07:31			07:05		07:30 (22)	07:38
	21:08			20:50	34	07:32 (129)	20:08	19:17			17:32	31	08:01 (22)	17:10
3	06:10			06:34		06:57 (129)	07:04	07:32			07:06		07:32 (22)	07:39
	21:08			20:49	34	07:31 (129)	20:06	19:15			17:31	29	08:01 (22)	17:10
4	06:10			06:35		06:57 (129)	07:05	07:33			07:07		07:33 (22)	07:40
	21:08			20:48	33	07:30 (129)	20:04	19:13			17:30	26	07:59 (22)	17:09
5	06:11			06:36		06:58 (129)	07:06	07:34			07:08		07:34 (22)	07:41
	21:08			20:46	32	07:30 (129)	20:03	19:12			17:28	24	07:58 (22)	17:09
6	06:12			06:37		06:58 (129)	07:06	07:35			07:09		07:35 (22)	07:42
	21:07			20:45	31	07:29 (129)	20:01	19:10			17:27	21	07:56 (22)	17:09
7	06:12			06:38		06:59 (129)	07:07	07:36			07:10		07:39 (22)	07:43
	21:07			20:44	30	07:29 (129)	20:00	19:09			17:26	15	07:54 (22)	17:09
8	06:13		07:11 (129)	06:39		07:00 (129)	07:08	07:37			07:11		07:42 (22)	07:44
	21:07	3	07:14 (129)	20:43	28	07:28 (129)	19:56	19:07			17:25	8	07:50 (22)	17:09
9	06:13		07:08 (129)	06:40		07:01 (129)	07:09	07:38			07:13			07:45
	21:07	9	07:17 (129)	20:42	26	07:27 (129)	19:55	19:05			17:24			17:09
10	06:14		07:07 (129)	06:41		07:02 (129)	07:10	07:40			07:14			07:46
	21:06	12	07:19 (129)	20:41	24	07:26 (129)	19:53	19:04			17:23			17:09
11	06:15		07:06 (129)	06:42		07:03 (129)	07:11	07:41			07:15			07:46
	21:06	14	07:20 (129)	20:39	22	07:25 (129)	19:51	19:02			17:22			17:09
12	06:15		07:04 (129)	06:43		07:04 (129)	07:12	07:42		08:42 (22)	07:16			07:47
	21:05	17	07:21 (129)	20:38	19	07:23 (129)	19:50	19:01	12	08:54 (22)	17:21			17:09
13	06:16		07:04 (129)	06:44		07:06 (129)	07:13	07:43		08:38 (22)	07:17			07:48
	21:05	18	07:22 (129)	20:37	15	07:21 (129)	19:48	18:59	19	08:57 (22)	17:21			17:09
14	06:17		07:03 (129)	06:44		07:09 (129)	07:14	07:44		08:36 (22)	07:18			07:49
	21:05	21	07:24 (129)	20:35	6	07:15 (129)	19:46	18:58	23	08:59 (22)	17:20			17:10
15	06:18		07:03 (129)	06:45			07:15	07:45		08:35 (22)	07:20			07:50
	21:04	22	07:25 (129)	20:34			19:45	18:56	26	09:01 (22)	17:19			17:10
16	06:18		07:01 (129)	06:46			07:16	07:46		08:33 (22)	07:21			07:50
	21:03	24	07:25 (129)	20:33			19:43	18:55	29	09:02 (22)	17:18			17:10
17	06:19		07:01 (129)	06:47			07:17	07:47		08:32 (22)	07:22			07:51
	21:03	25	07:26 (129)	20:31			19:42	18:53	31	09:03 (22)	17:17			17:11
18	06:20		07:01 (129)	06:48			07:18	07:48		08:30 (22)	07:23			07:52
	21:02	26	07:27 (129)	20:30			19:40	18:52	34	09:04 (22)	17:17			17:11
19	06:21		07:00 (129)	06:49			07:19	07:49		08:29 (22)	07:24			07:52
	21:02	28	07:28 (129)	20:29			19:38	18:50	36	09:05 (22)	17:16			17:11
20	06:22		06:59 (129)	06:50			07:20	07:50		08:28 (22)	07:25			07:53
	21:01	29	07:28 (129)	20:27			19:37	18:49	37	09:05 (22)	17:15			17:12
21	06:22		06:59 (129)	06:51			07:21	07:51		08:28 (22)	07:26			07:53
	21:00	30	07:29 (129)	20:26			19:35	18:48	37	09:05 (22)	17:14			17:12
22	06:23		06:59 (129)	06:52			07:22	07:52		08:27 (22)	07:28			07:54
	21:00	30	07:29 (129)	20:24			19:33	18:46	38	09:05 (22)	17:14			17:13
23	06:24		06:59 (129)	06:53			07:23	07:53		08:28 (22)	07:29			07:54
	20:59	31	07:30 (129)	20:23			19:32	18:45	38	09:06 (22)	17:13			17:13
24	06:25		06:58 (129)	06:54			07:24	07:54		08:27 (22)	07:30			07:55
	20:58	33	07:31 (129)	20:21			19:30	18:43	39	09:06 (22)	17:13			17:14
25	06:26		06:58 (129)	06:55			07:25	07:56		08:27 (22)	07:31			07:55
	20:57	33	07:31 (129)	20:20			19:28	18:42	39	09:06 (22)	17:12			17:14
26	06:27		06:57 (129)	06:56			07:26	07:57		08:27 (22)	07:32			07:56
	20:56	34	07:31 (129)	20:18			19:27	18:41	38	09:05 (22)	17:12			17:15
27	06:28		06:57 (129)	06:57			07:27	07:58		08:27 (22)	07:33			07:56
	20:55	34	07:31 (129)	20:17			19:25	18:39	38	09:05 (22)	17:11			17:16
28	06:29		06:57 (129)	06:58			07:27	07:59		08:27 (22)	07:34			07:56
	20:55	34	07:31 (129)	20:15			19:23	18:38	37	09:04 (22)	17:11			17:16
29	06:29		06:57 (129)	06:59			07:28	08:00		08:28 (22)	07:35			07:56
	20:54	35	07:32 (129)	20:14			19:22	18:37	37	09:05 (22)	17:11			17:17
30	06:30		06:57 (129)	07:00			07:29	08:01		08:28 (22)	07:36			07:57
	20:53	35	07:32 (129)	20:12			19:20	18:36	36	09:04 (22)	17:10			17:18
31	06:31		06:57 (129)	07:01				08:02		08:28 (22)				07:57
	20:52	35	07:32 (129)	20:11				18:34	35	09:03 (22)				17:18
Potential sun hours	456			427			374	346			300			291
Total, worst case		612			369				659			187		
Sun reduction		0.60			0.60				0.56			0.37		
Oper. time red.		1.00			1.00				1.00			1.00		
Wind dir. red.		0.68			0.68				0.62			0.62		
Total reduction		0.40			0.40				0.35			0.23		
Total, real		248			149				229			43		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 40

Licensed user:
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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 3429 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6326)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April	May	June
1	07:57		09:36 (129)	07:44		09:35 (129)	07:09		09:40 (129)	07:20	06:36	06:08
	17:19	92	11:08 (129)	17:53	114	11:29 (129)	18:26	93	11:13 (129)	19:59	20:28	20:57
2	07:57		09:36 (129)	07:43		09:35 (129)	07:08		09:40 (129)	07:18	06:34	06:08
	17:20	92	11:08 (129)	17:54	114	11:29 (129)	18:27	91	11:11 (129)	20:00	20:29	20:58
3	07:57		09:36 (129)	07:42		09:34 (129)	07:06		09:41 (129)	07:17	06:33	06:07
	17:21	93	11:09 (129)	17:55	116	11:30 (129)	18:28	88	11:09 (129)	20:00	20:30	20:58
4	07:57		09:36 (129)	07:41		09:34 (129)	07:05		09:42 (129)	07:15	06:32	06:07
	17:22	94	11:10 (129)	17:57	116	11:30 (129)	18:29	85	11:07 (129)	20:01	20:31	20:59
5	07:57		09:37 (129)	07:40		09:34 (129)	07:03		09:42 (129)	07:14	06:31	06:06
	17:23	94	11:11 (129)	17:58	116	11:30 (129)	18:30	82	11:04 (129)	20:02	20:32	21:00
6	07:57		09:37 (129)	07:39		09:35 (129)	07:02		09:43 (129)	07:12	06:29	06:06
	17:24	95	11:12 (129)	17:59	115	11:30 (129)	18:31	79	11:02 (129)	20:03	20:33	21:00
7	07:57		09:37 (129)	07:38		09:35 (129)	07:00		09:44 (129)	07:10	06:28	06:06
	17:25	96	11:13 (129)	18:00	116	11:31 (129)	18:32	75	10:59 (129)	20:04	20:34	21:01
8	07:57		09:37 (129)	07:37		09:35 (129)	07:59		10:46 (129)	07:09	06:27	06:06
	17:26	97	11:14 (129)	18:01	116	11:31 (129)	19:34	71	11:57 (129)	20:05	20:35	21:02
9	07:57		09:37 (129)	07:36		09:35 (129)	07:57		10:46 (129)	07:07	06:26	06:05
	17:27	98	11:15 (129)	18:03	116	11:31 (129)	19:35	67	11:53 (129)	20:06	20:36	21:02
10	07:57		09:37 (129)	07:35		09:35 (129)	07:56		10:48 (129)	07:06	06:25	06:05
	17:28	98	11:15 (129)	18:04	116	11:31 (129)	19:36	63	11:51 (129)	20:07	20:37	21:03
11	07:57		09:37 (129)	07:34		09:34 (129)	07:54		10:49 (129)	07:04	06:24	06:05
	17:29	99	11:16 (129)	18:05	116	11:30 (129)	19:37	58	11:47 (129)	20:08	20:38	21:03
12	07:57		09:37 (129)	07:33		09:35 (129)	07:52		10:51 (129)	07:03	06:23	06:05
	17:30	100	11:17 (129)	18:06	115	11:30 (129)	19:38	52	11:43 (129)	20:09	20:39	21:04
13	07:56		09:36 (129)	07:31		09:35 (129)	07:51		10:53 (129)	07:01	06:22	06:05
	17:31	101	11:17 (129)	18:07	115	11:30 (129)	19:39	46	11:39 (129)	20:10	20:40	21:04
14	07:56		09:37 (129)	07:30		09:35 (129)	07:49		10:56 (129)	06:59	06:21	06:05
	17:32	101	11:18 (129)	18:09	115	11:30 (129)	19:40	39	11:35 (129)	20:11	20:41	21:05
15	07:56		09:37 (129)	07:29		09:35 (129)	07:48		10:58 (129)	06:58	06:20	06:05
	17:33	102	11:19 (129)	18:10	114	11:29 (129)	19:41	31	11:29 (129)	20:12	20:42	21:05
16	07:55		09:36 (129)	07:28		09:35 (129)	07:46		11:04 (129)	06:56	06:19	06:05
	17:34	104	11:20 (129)	18:11	113	11:28 (129)	19:42	19	11:23 (129)	20:13	20:43	21:06
17	07:55		09:37 (129)	07:26		09:36 (129)	07:44			06:55	06:18	06:05
	17:35	104	11:21 (129)	18:12	112	11:28 (129)	19:43			20:14	20:44	21:06
18	07:54		09:36 (129)	07:25		09:35 (129)	07:43			06:53	06:17	06:05
	17:36	105	11:21 (129)	18:13	112	11:27 (129)	19:44			20:15	20:45	21:06
19	07:54		09:37 (129)	07:24		09:36 (129)	07:41			06:52	06:16	06:05
	17:38	106	11:23 (129)	18:14	110	11:26 (129)	19:45			20:16	20:46	21:07
20	07:53		09:36 (129)	07:22		09:36 (129)	07:40			06:51	06:16	06:05
	17:39	107	11:23 (129)	18:16	110	11:26 (129)	19:46			20:17	20:47	21:07
21	07:53		09:36 (129)	07:21		09:36 (129)	07:38			06:49	06:15	06:05
	17:40	107	11:23 (129)	18:17	108	11:24 (129)	19:47			20:18	20:48	21:07
22	07:52		09:36 (129)	07:20		09:37 (129)	07:36			06:48	06:14	06:06
	17:41	109	11:25 (129)	18:18	107	11:24 (129)	19:48			20:19	20:49	21:07
23	07:51		09:36 (129)	07:18		09:36 (129)	07:35			06:46	06:13	06:06
	17:42	109	11:25 (129)	18:19	106	11:22 (129)	19:49			20:20	20:49	21:08
24	07:51		09:36 (129)	07:17		09:37 (129)	07:33			06:45	06:12	06:06
	17:43	109	11:25 (129)	18:20	104	11:21 (129)	19:50			20:21	20:50	21:08
25	07:50		09:35 (129)	07:15		09:38 (129)	07:31			06:43	06:12	06:06
	17:45	111	11:26 (129)	18:21	102	11:20 (129)	19:51			20:22	20:51	21:08
26	07:49		09:36 (129)	07:14		09:38 (129)	07:30			06:42	06:11	06:07
	17:46	111	11:27 (129)	18:22	100	11:18 (129)	19:52			20:23	20:52	21:08
27	07:49		09:36 (129)	07:12		09:39 (129)	07:28			06:41	06:11	06:07
	17:47	111	11:27 (129)	18:24	98	11:17 (129)	19:53			20:24	20:53	21:08
28	07:48		09:35 (129)	07:11		09:39 (129)	07:26			06:39	06:10	06:08
	17:48	113	11:28 (129)	18:25	96	11:15 (129)	19:54			20:25	20:54	21:08
29	07:47		09:35 (129)				07:25			06:38	06:09	06:08
	17:49	113	11:28 (129)				19:55			20:26	20:54	21:08
30	07:46		09:35 (129)				07:23			06:37	06:09	06:08
	17:51	113	11:28 (129)				19:56			20:27	20:55	21:08
31	07:45		09:35 (129)				07:22				06:08	
	17:52	114	11:29 (129)				19:58				20:56	
Potential sun hours	300			299			370			397	446	449
Total, worst case		3198			3108			1039				
Sun reduction		0.36			0.42			0.44				
Oper. time red.		1.00			1.00			1.00				
Wind dir. red.		0.60			0.60			0.60				
Total reduction		0.21			0.25			0.26				
Total, real		686			778			272				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 41

Licensed user:
EDR
217 Montgomery St.
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(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 3429 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6326)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July	August	September			October			November			December		
1	06:09	06:32	07:02			07:30		10:31 (129)	07:03		09:04 (129)	07:37		09:19 (129)
	21:08	20:51	20:09			19:18	50	11:21 (129)	17:33	116	11:00 (129)	17:10	99	10:58 (129)
2	06:09	06:33	07:03			07:31		10:29 (129)	07:05		09:04 (129)	07:38		09:20 (129)
	21:08	20:50	20:08			19:17	55	11:24 (129)	17:32	116	11:00 (129)	17:10	98	10:58 (129)
3	06:10	06:34	07:04			07:32		10:27 (129)	07:06		09:05 (129)	07:39		09:20 (129)
	21:08	20:49	20:06			19:15	60	11:27 (129)	17:31	116	11:01 (129)	17:09	98	10:58 (129)
4	06:10	06:35	07:05			07:33		10:25 (129)	07:07		09:04 (129)	07:40		09:21 (129)
	21:08	20:47	20:04			19:13	64	11:29 (129)	17:30	116	11:00 (129)	17:09	97	10:58 (129)
5	06:11	06:36	07:06			07:34		10:23 (129)	07:08		09:04 (129)	07:41		09:22 (129)
	21:08	20:46	20:03			19:12	69	11:32 (129)	17:28	116	11:00 (129)	17:09	96	10:58 (129)
6	06:12	06:37	07:06			07:35		10:21 (129)	07:09		09:04 (129)	07:42		09:23 (129)
	21:07	20:45	20:01			19:10	73	11:34 (129)	17:27	116	11:00 (129)	17:09	95	10:58 (129)
7	06:12	06:38	07:07			07:36		10:20 (129)	07:10		09:05 (129)	07:43		09:24 (129)
	21:07	20:44	20:00			19:09	76	11:36 (129)	17:26	116	11:01 (129)	17:09	94	10:58 (129)
8	06:13	06:39	07:08			07:37		10:18 (129)	07:11		09:05 (129)	07:44		09:24 (129)
	21:07	20:43	19:56			19:07	80	11:38 (129)	17:25	116	11:01 (129)	17:09	94	10:58 (129)
9	06:13	06:40	07:09			07:38		10:17 (129)	07:13		09:05 (129)	07:45		09:25 (129)
	21:07	20:42	19:55			19:05	83	11:40 (129)	17:24	115	11:00 (129)	17:09	93	10:58 (129)
10	06:14	06:41	07:10			07:39		10:15 (129)	07:14		09:06 (129)	07:46		09:26 (129)
	21:06	20:40	19:53			19:04	87	11:42 (129)	17:23	114	11:00 (129)	17:09	92	10:58 (129)
11	06:15	06:42	07:11			07:41		10:14 (129)	07:15		09:07 (129)	07:46		09:26 (129)
	21:06	20:39	19:51			19:02	90	11:44 (129)	17:22	114	11:01 (129)	17:09	92	10:58 (129)
12	06:15	06:43	07:12			07:42		10:13 (129)	07:16		09:07 (129)	07:47		09:27 (129)
	21:05	20:38	19:50			19:01	92	11:45 (129)	17:21	113	11:00 (129)	17:09	91	10:58 (129)
13	06:16	06:44	07:13			07:43		10:12 (129)	07:17		09:07 (129)	07:48		09:28 (129)
	21:05	20:37	19:48			18:59	95	11:47 (129)	17:20	113	11:00 (129)	17:09	90	10:58 (129)
14	06:17	06:44	07:14			07:44		10:11 (129)	07:18		09:07 (129)	07:49		09:29 (129)
	21:05	20:35	19:46			18:58	97	11:48 (129)	17:20	113	11:00 (129)	17:10	90	10:59 (129)
15	06:18	06:45	07:15			07:45		10:10 (129)	07:20		09:09 (129)	07:50		09:29 (129)
	21:04	20:34	19:45			18:56	99	11:49 (129)	17:19	111	11:00 (129)	17:10	89	10:58 (129)
16	06:18	06:46	07:16			07:46		10:10 (129)	07:21		09:09 (129)	07:50		09:30 (129)
	21:03	20:33	19:43			18:55	101	11:51 (129)	17:18	111	11:00 (129)	17:10	89	10:59 (129)
17	06:19	06:47	07:17			07:47		10:09 (129)	07:22		09:09 (129)	07:51		09:31 (129)
	21:03	20:31	19:41			18:53	103	11:52 (129)	17:17	111	11:00 (129)	17:10	89	11:00 (129)
18	06:20	06:48	07:18			07:48		10:09 (129)	07:23		09:10 (129)	07:52		09:31 (129)
	21:02	20:30	19:40			18:52	104	11:53 (129)	17:16	109	10:59 (129)	17:11	88	10:59 (129)
19	06:21	06:49	07:19			07:49		10:08 (129)	07:24		09:10 (129)	07:52		09:32 (129)
	21:02	20:29	19:38			18:50	106	11:54 (129)	17:16	109	10:59 (129)	17:11	88	11:00 (129)
20	06:22	06:50	07:20			07:50		10:07 (129)	07:25		09:11 (129)	07:53		09:32 (129)
	21:01	20:27	19:36			18:49	107	11:54 (129)	17:15	109	11:00 (129)	17:12	88	11:00 (129)
21	06:22	06:51	07:21			07:51		10:06 (129)	07:26		09:12 (129)	07:53		09:33 (129)
	21:00	20:26	19:35			18:47	109	11:55 (129)	17:14	107	10:59 (129)	17:12	88	11:01 (129)
22	06:23	06:52	07:22			07:52		10:06 (129)	07:27		09:12 (129)	07:54		09:33 (129)
	21:00	20:24	19:33			18:46	110	11:56 (129)	17:14	107	10:59 (129)	17:13	88	11:01 (129)
23	06:24	06:53	07:23			07:53		10:06 (129)	07:29		09:13 (129)	07:54		09:34 (129)
	20:59	20:23	19:31			18:45	111	11:57 (129)	17:13	106	10:59 (129)	17:13	88	11:02 (129)
24	06:25	06:54	07:24			07:54		10:06 (129)	07:30		09:13 (129)	07:55		09:34 (129)
	20:58	20:21	19:30			18:43	112	11:58 (129)	17:13	105	10:58 (129)	17:14	88	11:02 (129)
25	06:26	06:55	07:25			07:55		10:05 (129)	07:31		09:14 (129)	07:55		09:35 (129)
	20:57	20:20	19:28			18:42	113	11:58 (129)	17:12	104	10:58 (129)	17:14	88	11:03 (129)
26	06:27	06:56	07:26			07:57		10:05 (129)	07:32		09:15 (129)	07:56		09:35 (129)
	20:56	20:18	19:27			18:41	113	11:58 (129)	17:12	104	10:59 (129)	17:15	89	11:04 (129)
27	06:28	06:57	07:26		10:49 (129)	07:58		10:04 (129)	07:33		09:16 (129)	07:56		09:35 (129)
	20:55	20:17	19:25	11	11:00 (129)	18:39	114	11:58 (129)	17:11	103	10:59 (129)	17:16	89	11:04 (129)
28	06:28	06:58	07:27		10:42 (129)	07:59		10:04 (129)	07:34		09:17 (129)	07:56		09:36 (129)
	20:55	20:15	19:23	26	11:08 (129)	18:38	115	11:59 (129)	17:11	101	10:58 (129)	17:16	89	11:05 (129)
29	06:29	06:59	07:28		10:37 (129)	08:00		10:05 (129)	07:35		09:17 (129)	07:56		09:36 (129)
	20:54	20:14	19:22	36	11:13 (129)	18:37	115	12:00 (129)	17:11	101	10:58 (129)	17:17	90	11:06 (129)
30	06:30	07:00	07:29		10:34 (129)	08:01		10:04 (129)	07:36		09:18 (129)	07:57		09:36 (129)
	20:53	20:12	19:20	43	11:17 (129)	18:35	116	12:00 (129)	17:10	100	10:58 (129)	17:18	90	11:06 (129)
31	06:31	07:01				08:02		10:04 (129)				07:57		09:36 (129)
	20:52	20:11				18:34	116	12:00 (129)				17:18	91	11:07 (129)
Potential sun hours	456	427	374			346			300			291		
Total, worst case				116			2935			3308			2828	
Sun reduction				0.61			0.56			0.37			0.50	
Oper. time red.				1.00			1.00			1.00			1.00	
Wind dir. red.				0.60			0.60			0.60			0.60	
Total reduction				0.36			0.33			0.22			0.30	
Total, real				42			980			730			843	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 42

Licensed user:
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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 3431 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6327)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57			07:44		08:06 (129)	07:09			07:20			06:36		07:04 (100)	06:08		07:00 (100)
	17:19			17:53	19	08:25 (129)	18:26			19:59			20:28	31	07:35 (100)	20:57	38	07:38 (100)
2	07:57			07:43		08:04 (129)	07:08		17:47 (18)	07:18			06:34		07:03 (100)	06:08		07:01 (100)
	17:20			17:54	23	08:27 (129)	18:27	9	17:56 (18)	20:00			20:29	33	07:36 (100)	20:58	37	07:38 (100)
3	07:57			07:42		08:03 (129)	07:06		17:45 (18)	07:17			06:33		07:02 (100)	06:07		07:01 (100)
	17:21			17:55	25	08:28 (129)	18:28	15	18:00 (18)	20:00			20:30	36	07:38 (100)	20:58	37	07:38 (100)
4	07:57			07:41		08:03 (129)	07:05		17:42 (18)	07:15			06:32		07:00 (100)	06:07		07:02 (100)
	17:22			17:57	26	08:29 (129)	18:29	19	18:01 (18)	20:01			20:31	38	07:38 (100)	20:59	36	07:38 (100)
5	07:58			07:40		08:02 (129)	07:03		17:40 (18)	07:14			06:31		06:59 (100)	06:06		07:02 (100)
	17:23			17:58	28	08:30 (129)	18:30	22	18:02 (18)	20:02			20:32	39	07:38 (100)	21:00	36	07:38 (100)
6	07:57			07:39		08:01 (129)	07:02		17:39 (18)	07:12			06:29		06:58 (100)	06:06		07:03 (100)
	17:24			17:59	30	08:31 (129)	18:31	24	18:03 (18)	20:03			20:33	41	07:39 (100)	21:00	35	07:38 (100)
7	07:57			07:38		08:01 (129)	07:00		17:38 (18)	07:10			06:28		06:58 (100)	06:06		07:03 (100)
	17:25			18:00	30	08:31 (129)	18:32	25	18:03 (18)	20:04			20:34	42	07:40 (100)	21:01	34	07:37 (100)
8	07:57			07:37		08:01 (129)	07:59		18:38 (18)	07:09			06:27		06:57 (100)	06:06		07:04 (100)
	17:26			18:01	31	08:32 (129)	19:34	26	19:04 (18)	20:05			20:35	43	07:40 (100)	21:02	33	07:37 (100)
9	07:57			07:36		08:01 (129)	07:57		18:37 (18)	07:07			06:26		06:57 (100)	06:05		07:04 (100)
	17:27			18:03	32	08:33 (129)	19:35	27	19:04 (18)	20:06			20:36	44	07:41 (100)	21:02	33	07:37 (100)
10	07:57			07:35		08:01 (129)	07:56		18:37 (18)	07:06			06:25		06:56 (100)	06:05		07:05 (100)
	17:28			18:04	32	08:33 (129)	19:36	27	19:04 (18)	20:07			20:37	45	07:41 (100)	21:03	32	07:37 (100)
11	07:57			07:34		08:00 (129)	07:54		18:37 (18)	07:04			06:24		06:56 (100)	06:05		07:06 (100)
	17:29			18:05	32	08:32 (129)	19:37	26	19:03 (18)	20:08			20:38	45	07:41 (100)	21:03	31	07:37 (100)
12	07:57			07:33		08:01 (129)	07:52		18:37 (18)	07:03			06:23		06:56 (100)	06:05		07:06 (100)
	17:30			18:06	31	08:32 (129)	19:38	25	19:02 (18)	20:09			20:39	45	07:41 (100)	21:04	31	07:37 (100)
13	07:56			07:31		08:01 (129)	07:51		18:37 (18)	07:01			06:22		06:56 (100)	06:05		07:07 (100)
	17:31			18:07	31	08:32 (129)	19:39	25	19:02 (18)	20:10			20:40	45	07:41 (100)	21:04	29	07:36 (100)
14	07:56			07:30		08:02 (129)	07:49		18:37 (18)	07:00			06:21		06:55 (100)	06:05		07:07 (100)
	17:32			18:09	30	08:32 (129)	19:40	24	19:01 (18)	20:11			20:41	46	07:41 (100)	21:05	29	07:36 (100)
15	07:56			07:29		08:01 (129)	07:48		18:38 (18)	06:58			06:20		06:55 (100)	06:05		07:08 (100)
	17:33			18:10	30	08:31 (129)	19:41	21	18:59 (18)	20:12			20:42	46	07:41 (100)	21:05	28	07:36 (100)
16	07:55			07:28		08:02 (129)	07:46		18:40 (18)	06:56			06:19		06:55 (100)	06:05		07:08 (100)
	17:34			18:11	29	08:31 (129)	19:42	18	18:58 (18)	20:13			20:43	46	07:41 (100)	21:06	28	07:36 (100)
17	07:55			07:26		08:03 (129)	07:44		18:41 (18)	06:55			06:18		06:55 (100)	06:05		07:08 (100)
	17:35			18:12	27	08:30 (129)	19:43	15	18:56 (18)	20:14			20:44	46	07:41 (100)	21:06	28	07:36 (100)
18	07:54			07:25		08:04 (129)	07:43		18:44 (18)	06:54			06:17		06:56 (100)	06:05		07:09 (100)
	17:36			18:13	24	08:28 (129)	19:44	9	18:53 (18)	20:15			20:45	46	07:42 (100)	21:06	27	07:36 (100)
19	07:54			07:24		08:05 (129)	07:41			06:52			06:16		06:56 (100)	06:05		07:09 (100)
	17:38			18:15	22	08:27 (129)	19:45			20:16			20:46	45	07:41 (100)	21:07	27	07:36 (100)
20	07:53			07:22		08:07 (129)	07:40			06:51			06:16		06:56 (100)	06:05		07:09 (100)
	17:39			18:16	19	08:26 (129)	19:46			20:17			20:47	45	07:41 (100)	21:07	27	07:36 (100)
21	07:53			07:21		08:09 (129)	07:38			06:49			06:15		06:55 (100)	06:06		07:09 (100)
	17:40			18:17	14	08:23 (129)	19:47			20:18			20:48	46	07:41 (100)	21:07	27	07:36 (100)
22	07:52			07:20		08:13 (129)	07:36			06:48			06:14		06:56 (100)	06:06		07:10 (100)
	17:41			18:18	6	08:19 (129)	19:48			20:19			20:49	45	07:41 (100)	21:07	27	07:37 (100)
23	07:52			07:18			07:35			06:46			06:13		06:56 (100)	06:06		07:10 (100)
	17:42			18:19			19:49			20:20			20:49	45	07:41 (100)	21:08	27	07:37 (100)
24	07:51			07:17			07:33			06:45			06:13		06:56 (100)	06:06		07:10 (100)
	17:43			18:20			19:50			20:21			20:50	44	07:40 (100)	21:08	27	07:37 (100)
25	07:50			07:15			07:31			06:44			06:12		06:57 (100)	06:07		07:10 (100)
	17:45			18:21			19:51			20:22			20:51	43	07:40 (100)	21:08	28	07:38 (100)
26	07:49			07:14			07:30			06:42			06:11		06:57 (100)	06:07		07:10 (100)
	17:46			18:23			19:52			20:23			20:52	43	07:40 (100)	21:08	28	07:38 (100)
27	07:49			07:12			07:28			06:41		07:13 (100)	06:11		06:57 (100)	06:07		07:10 (100)
	17:47			18:24			19:53			20:24	14	07:27 (100)	20:53	42	07:39 (100)	21:08	28	07:38 (100)
28	07:48			07:11			07:26			06:39		07:10 (100)	06:10		06:58 (100)	06:08		07:10 (100)
	17:48			18:25			19:54			20:25	20	07:30 (100)	20:54	41	07:39 (100)	21:08	29	07:39 (100)
29	07:47						07:25			06:38		07:07 (100)	06:09		06:58 (100)	06:08		07:10 (100)
	17:49						19:55			20:26	25	07:32 (100)	20:55	41	07:39 (100)	21:08	29	07:39 (100)
30	07:46		08:09 (129)				07:23			06:37		07:05 (100)	06:09		06:59 (100)	06:08		07:09 (100)
	17:51	12	08:21 (129)				19:57			20:27	28	07:33 (100)	20:55	40	07:39 (100)	21:08	31	07:40 (100)
31	07:45		08:07 (129)				07:22						06:08		07:00 (100)			
	17:52	16	08:23 (129)				19:58						20:56	39	07:39 (100)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		28			571			357			87			1316			917	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.62			0.62			0.67			0.67			0.67			0.67	
Total reduction		0.22			0.26			0.29			0.34			0.38			0.40	
Total, real		6			148			104			30			496			370	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 43

Licensed user:
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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 3431 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6327)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December
1	06:09		07:10 (100)	06:32		07:06 (100)	07:02			07:30		18:16 (18)	07:03		07:30 (129)	07:37
	21:08	31	07:41 (100)	20:51	46	07:52 (100)	20:09			19:18	26	18:42 (18)	17:33	32	08:02 (129)	17:10
2	06:09		07:09 (100)	06:33		07:07 (100)	07:03			07:31		18:16 (18)	07:05		07:31 (129)	07:38
	21:08	32	07:41 (100)	20:50	45	07:52 (100)	20:08			19:17	26	18:42 (18)	17:32	31	08:02 (129)	17:10
3	06:10		07:10 (100)	06:34		07:06 (100)	07:04			07:32		18:15 (18)	07:06		07:31 (129)	07:39
	21:08	32	07:42 (100)	20:49	44	07:50 (100)	20:06			19:15	27	18:42 (18)	17:31	31	08:02 (129)	17:10
4	06:10		07:09 (100)	06:35		07:07 (100)	07:05			07:33		18:15 (18)	07:07		07:31 (129)	07:40
	21:08	33	07:42 (100)	20:48	43	07:50 (100)	20:04			19:13	26	18:41 (18)	17:30	30	08:01 (129)	17:09
5	06:11		07:09 (100)	06:36		07:07 (100)	07:06			07:34		18:14 (18)	07:08		07:31 (129)	07:41
	21:08	34	07:43 (100)	20:46	43	07:50 (100)	20:03			19:12	27	18:41 (18)	17:28	30	08:01 (129)	17:09
6	06:12		07:09 (100)	06:37		07:08 (100)	07:06			07:35		18:15 (18)	07:09		07:32 (129)	07:42
	21:07	35	07:44 (100)	20:45	41	07:49 (100)	20:01			19:10	25	18:40 (18)	17:27	28	08:00 (129)	17:09
7	06:12		07:09 (100)	06:38		07:08 (100)	07:07			07:36		18:15 (18)	07:10		07:33 (129)	07:43
	21:07	35	07:44 (100)	20:44	41	07:49 (100)	20:00			19:09	24	18:39 (18)	17:26	27	08:00 (129)	17:09
8	06:13		07:09 (100)	06:39		07:09 (100)	07:08			07:37		18:15 (18)	07:11		07:34 (129)	07:44
	21:07	36	07:45 (100)	20:43	39	07:48 (100)	19:56			19:07	23	18:38 (18)	17:25	25	07:59 (129)	17:09
9	06:13		07:08 (100)	06:40		07:10 (100)	07:09			07:38		18:16 (18)	07:13		07:35 (129)	07:45
	21:07	37	07:45 (100)	20:42	37	07:47 (100)	19:55			19:05	20	18:36 (18)	17:24	22	07:57 (129)	17:09
10	06:14		07:08 (100)	06:41		07:11 (100)	07:10			07:40		18:17 (18)	07:14		07:37 (129)	07:46
	21:06	37	07:45 (100)	20:41	35	07:46 (100)	19:53			19:04	18	18:35 (18)	17:23	19	07:56 (129)	17:09
11	06:15		07:08 (100)	06:42		07:12 (100)	07:11			07:41		18:19 (18)	07:15		07:39 (129)	07:46
	21:06	38	07:46 (100)	20:39	33	07:45 (100)	19:51			19:02	13	18:32 (18)	17:22	16	07:55 (129)	17:09
12	06:15		07:07 (100)	06:43		07:13 (100)	07:12			07:42		18:23 (18)	07:16		07:42 (129)	07:47
	21:05	39	07:46 (100)	20:38	30	07:43 (100)	19:50			19:01	4	18:27 (18)	17:21	10	07:52 (129)	17:09
13	06:16		07:07 (100)	06:44		07:14 (100)	07:13			07:43			07:17			07:48
	21:05	40	07:47 (100)	20:37	28	07:42 (100)	19:48			18:59			17:21			17:09
14	06:17		07:08 (100)	06:44		07:15 (100)	07:14			07:44			07:18			07:49
	21:05	40	07:48 (100)	20:35	24	07:39 (100)	19:46			18:58			17:20			17:10
15	06:18		07:08 (100)	06:45		07:18 (100)	07:15			07:45			07:20			07:50
	21:04	41	07:49 (100)	20:34	18	07:36 (100)	19:45			18:56			17:19			17:10
16	06:18		07:07 (100)	06:46		07:21 (100)	07:16			07:46			07:21			07:50
	21:03	41	07:48 (100)	20:33	11	07:32 (100)	19:43			18:55			17:18			17:10
17	06:19		07:07 (100)	06:47			07:17			07:47			07:22			07:51
	21:03	42	07:49 (100)	20:31			19:42			18:53			17:17			17:10
18	06:20		07:07 (100)	06:48			07:18			07:48			07:23			07:52
	21:02	43	07:50 (100)	20:30			19:40			18:52			17:16			17:11
19	06:21		07:07 (100)	06:49			07:19			07:49			07:24			07:52
	21:02	43	07:50 (100)	20:29			19:38			18:50			17:16			17:11
20	06:22		07:06 (100)	06:50			07:20			07:50		08:42 (129)	07:25			07:53
	21:01	44	07:50 (100)	20:27			19:37			18:49	9	08:51 (129)	17:15			17:12
21	06:22		07:06 (100)	06:51			07:21			07:51		08:39 (129)	07:26			07:53
	21:00	44	07:50 (100)	20:26			19:35			18:47	15	08:54 (129)	17:14			17:12
22	06:23		07:06 (100)	06:52			07:22			07:52		08:36 (129)	07:28			07:54
	21:00	45	07:51 (100)	20:24			19:33			18:46	20	08:56 (129)	17:14			17:13
23	06:24		07:06 (100)	06:53			07:23			07:53		08:35 (129)	07:29			07:54
	20:59	45	07:51 (100)	20:23			19:32			18:45	23	08:58 (129)	17:13			17:13
24	06:25		07:06 (100)	06:54			07:24			07:54		08:34 (129)	07:30			07:55
	20:58	46	07:52 (100)	20:21			19:30			18:43	25	08:59 (129)	17:13			17:14
25	06:26		07:06 (100)	06:55			07:25		18:29 (18)	07:56		08:33 (129)	07:31			07:55
	20:57	46	07:52 (100)	20:20			19:28	4	18:33 (18)	18:42	27	09:00 (129)	17:12			17:14
26	06:27		07:05 (100)	06:56			07:26		18:24 (18)	07:57		08:32 (129)	07:32			07:56
	20:56	46	07:51 (100)	20:18			19:27	13	18:37 (18)	18:41	29	09:01 (129)	17:12			17:15
27	06:28		07:05 (100)	06:57			07:27		18:22 (18)	07:58		08:31 (129)	07:33			07:56
	20:55	47	07:52 (100)	20:17			19:25	17	18:39 (18)	18:39	30	09:01 (129)	17:11			17:16
28	06:28		07:06 (100)	06:58			07:27		18:20 (18)	07:59		08:30 (129)	07:34			07:56
	20:55	46	07:52 (100)	20:15			19:23	20	18:40 (18)	18:38	31	09:01 (129)	17:11			17:16
29	06:29		07:06 (100)	06:59			07:28		18:18 (18)	08:00		08:31 (129)	07:35			07:57
	20:54	46	07:52 (100)	20:14			19:22	23	18:41 (18)	18:37	31	09:02 (129)	17:11			17:17
30	06:30		07:06 (100)	07:00			07:29		18:17 (18)	08:01		08:30 (129)	07:36			07:57
	20:53	46	07:52 (100)	20:12			19:20	24	18:41 (18)	18:36	32	09:02 (129)	17:10			17:18
31	06:31		07:06 (100)	07:01						08:02		08:30 (129)				07:57
	20:52	46	07:52 (100)	20:11						18:34	32	09:02 (129)				17:18
Potential sun hours	456			427			374			346			300			291
Total, worst case		1256			558			101			563			301		
Sun reduction		0.60			0.60			0.61			0.56			0.37		
Oper. time red.		1.00			1.00			1.00			1.00			1.00		
Wind dir. red.		0.67			0.67			0.67			0.64			0.62		
Total reduction		0.40			0.40			0.41			0.36			0.23		
Total, real		507			225			41			202			69		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

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4/27/2012 3:34 PM / 44

Licensed user:
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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 7825 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6328)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June
1	07:57		08:19 (28)	07:45		08:28 (28)	07:10		17:27 (82)	07:20			06:36		19:28 (81)	06:08
	17:20	56	15:54 (83)	17:53	13	08:41 (28)	18:26	25	17:52 (82)	19:59			20:28	37	20:05 (81)	20:57
2	07:58		08:19 (28)	07:44		08:32 (28)	07:08		17:24 (82)	07:19			06:35		19:28 (81)	06:08
	17:21	57	15:54 (83)	17:54	5	08:37 (28)	18:27	30	17:54 (82)	20:00			20:29	37	20:05 (81)	20:58
3	07:58		08:19 (28)	07:43			07:07		17:23 (82)	07:17			06:33		19:27 (81)	06:07
	17:21	57	15:54 (83)	17:56			18:28	33	17:56 (82)	20:00			20:30	38	20:05 (81)	20:58
4	07:58		08:19 (28)	07:42			07:05		17:21 (82)	07:15			06:32		19:27 (81)	06:07
	17:22	57	15:54 (83)	17:57			18:29	36	17:57 (82)	20:01			20:31	39	20:06 (81)	20:59
5	07:58		08:19 (28)	07:41			07:04		17:19 (82)	07:14			06:31		19:26 (81)	06:07
	17:23	57	15:54 (83)	17:58			18:31	40	17:59 (82)	20:02			20:32	39	20:05 (81)	21:00
6	07:58		08:19 (28)	07:40			07:02		17:18 (82)	07:12			06:30		19:26 (81)	06:06
	17:24	57	15:54 (83)	17:59			18:32	42	18:00 (82)	20:03			20:33	39	20:05 (81)	21:01
7	07:58		08:19 (28)	07:39			07:01		17:17 (82)	07:11			06:29		19:26 (81)	06:06
	17:25	58	15:55 (83)	18:00			18:33	44	18:01 (82)	20:04			20:34	39	20:05 (81)	21:01
8	07:58		08:19 (28)	07:37			07:59		18:16 (82)	07:09			06:27		19:26 (81)	06:06
	17:26	58	15:55 (83)	18:02			19:34	45	19:01 (82)	20:05			20:35	39	20:05 (81)	21:02
9	07:57		08:19 (28)	07:36			07:57		18:14 (82)	07:07			06:26		19:26 (81)	06:06
	17:27	57	15:55 (83)	18:03			19:35	47	19:01 (82)	20:06			20:36	39	20:05 (81)	21:02
10	07:57		08:19 (28)	07:35			07:56		18:14 (82)	07:06			06:25		19:27 (81)	06:05
	17:28	57	15:55 (83)	18:04			19:36	48	19:02 (82)	20:07			20:37	38	20:05 (81)	21:03
11	07:57		08:18 (28)	07:34			07:54		18:13 (82)	07:04			06:24		19:27 (81)	06:05
	17:29	56	15:53 (83)	18:05			19:37	49	19:02 (82)	20:08			20:38	38	20:05 (81)	21:03
12	07:57		08:18 (28)	07:33			07:53		18:13 (82)	07:03			06:23		19:27 (81)	06:05
	17:30	55	15:53 (83)	18:06			19:38	50	19:03 (82)	20:09			20:39	37	20:04 (81)	21:04
13	07:56		08:18 (28)	07:32			07:51		18:12 (82)	07:01			06:22		19:27 (81)	06:05
	17:31	55	15:53 (83)	18:08			19:39	51	19:03 (82)	20:10			20:40	37	20:04 (81)	21:04
14	07:56		08:17 (28)	07:30			07:49		18:11 (82)	07:00			06:21		19:28 (81)	06:05
	17:32	52	15:51 (83)	18:09			19:40	51	19:02 (82)	20:11			20:41	35	20:03 (81)	21:05
15	07:56		08:17 (28)	07:29			07:48		18:12 (82)	06:58			06:20		19:28 (81)	06:05
	17:33	51	15:51 (83)	18:10			19:41	51	19:03 (82)	20:12			20:42	35	20:03 (81)	21:05
16	07:55		08:16 (28)	07:28			07:46		18:11 (82)	06:57			06:19		19:29 (81)	06:05
	17:34	48	15:49 (83)	18:11			19:42	51	19:02 (82)	20:13			20:43	33	20:02 (81)	21:06
17	07:55		08:16 (28)	07:27			07:45		18:11 (82)	06:55			06:18		19:30 (81)	06:05
	17:36	44	15:47 (83)	18:12			19:43	50	19:01 (82)	20:14			20:44	32	20:02 (81)	21:06
18	07:55		08:16 (28)	07:25			07:43		18:11 (82)	06:54			06:17		19:31 (81)	06:05
	17:37	36	15:43 (83)	18:14			19:44	50	19:01 (82)	20:15			20:45	31	20:02 (81)	21:07
19	07:54		08:16 (28)	07:24			07:41		18:11 (82)	06:52			06:17		19:31 (81)	06:05
	17:38	30	08:46 (28)	18:15			19:45	49	19:00 (82)	20:16			20:46	30	20:01 (81)	21:07
20	07:53		08:16 (28)	07:23			07:40		18:12 (82)	06:51			06:16		19:32 (81)	06:06
	17:39	29	08:45 (28)	18:16			19:46	48	19:00 (82)	20:17			20:47	28	20:00 (81)	21:07
21	07:53		08:17 (28)	07:21			07:38		18:12 (82)	06:49			06:15		19:32 (81)	06:06
	17:40	29	08:46 (28)	18:17			19:47	47	18:59 (82)	20:18			20:48	27	19:59 (81)	21:07
22	07:52		08:17 (28)	07:20			07:36		18:12 (82)	06:48		19:43 (81)	06:14		19:34 (81)	06:06
	17:41	29	08:46 (28)	18:18			19:49	46	18:58 (82)	20:19	10	19:53 (81)	20:49	24	19:58 (81)	21:08
23	07:52		08:18 (28)	07:18			07:35		18:13 (82)	06:47		19:40 (81)	06:13		19:35 (81)	06:06
	17:42	28	08:46 (28)	18:19			19:50	44	18:57 (82)	20:20	17	19:57 (81)	20:50	22	19:57 (81)	21:08
24	07:51		08:18 (28)	07:17			07:33		18:13 (82)	06:45		19:37 (81)	06:13		19:36 (81)	06:06
	17:44	28	08:46 (28)	18:20			19:51	43	18:56 (82)	20:21	21	19:58 (81)	20:51	20	19:56 (81)	21:08
25	07:50		08:19 (28)	07:16			07:32		18:14 (82)	06:44		19:35 (81)	06:12		19:38 (81)	06:07
	17:45	27	08:46 (28)	18:22			19:52	40	18:54 (82)	20:22	25	20:00 (81)	20:51	17	19:55 (81)	21:08
26	07:50		08:20 (28)	07:14			07:30		18:16 (82)	06:42		19:33 (81)	06:11		19:40 (81)	06:07
	17:46	26	08:46 (28)	18:23			19:53	37	18:53 (82)	20:23	28	20:01 (81)	20:52	13	19:53 (81)	21:08
27	07:49		08:20 (28)	07:13		17:37 (82)	07:28		18:16 (82)	06:41		19:32 (81)	06:11		19:43 (81)	06:07
	17:47	25	08:45 (28)	18:24	6	17:43 (82)	19:54	35	18:51 (82)	20:24	30	20:02 (81)	20:53	8	19:51 (81)	21:08
28	07:48		08:21 (28)	07:11		17:30 (82)	07:27		18:18 (82)	06:40		19:31 (81)	06:10			06:08
	17:48	24	08:45 (28)	18:25	19	17:49 (82)	19:55	31	18:49 (82)	20:25	32	20:03 (81)	20:54			21:08
29	07:47		08:22 (28)				07:25		18:20 (82)	06:38		19:30 (81)	06:10			06:08
	17:50	22	08:44 (28)				19:56	27	18:47 (82)	20:26	34	20:04 (81)	20:55			21:08
30	07:46		08:23 (28)				07:23		18:22 (82)	06:37		19:29 (81)	06:09			06:09
	17:51	20	08:43 (28)				19:57	21	18:43 (82)	20:27	35	20:04 (81)	20:55			21:08
31	07:45		08:26 (28)				07:22		18:25 (82)				06:09			
	17:52	16	08:42 (28)				19:58	14	18:39 (82)				20:56			
Potential sun hours	300			299			370			397			446			449
Total, worst case		1301			43			1275			232			851		
Sun reduction		0.36			0.42			0.44			0.51			0.56		
Oper. time red.		1.00			1.00			1.00			1.00			1.00		
Wind dir. red.		0.63			0.64			0.67			0.63			0.63		
Total reduction		0.23			0.27			0.29			0.32			0.35		
Total, real		296			12			373			75			302		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 45

Licensed user:
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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 7825 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6328)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09			06:32		19:38 (81)	07:02			07:31		17:51 (82)	07:04			07:37		08:00 (28)
	21:08			20:51	37	20:15 (81)	20:09			19:19	51	18:42 (82)	17:33			17:10	56	15:35 (83)
2	06:10			06:33		19:37 (81)	07:03			07:32		17:51 (82)	07:05			07:38		08:01 (28)
	21:08			20:50	38	20:15 (81)	20:08			19:17	50	18:41 (82)	17:32			17:10	58	15:37 (83)
3	06:10			06:34		19:37 (81)	07:04			07:33		17:51 (82)	07:06			07:39		08:02 (28)
	21:08			20:49	39	20:16 (81)	20:06			19:15	49	18:40 (82)	17:31			17:10	57	15:38 (83)
4	06:11			06:35		19:37 (81)	07:05			07:34		17:52 (82)	07:07			07:40		08:03 (28)
	21:08			20:48	39	20:16 (81)	20:05			19:14	47	18:39 (82)	17:30			17:10	58	15:39 (83)
5	06:11			06:36		19:36 (81)	07:06			07:35		17:52 (82)	07:08			07:41		08:04 (28)
	21:08			20:47	39	20:15 (81)	20:03			19:12	46	18:38 (82)	17:29			17:09	58	15:40 (83)
6	06:12			06:37		19:36 (81)	07:07			07:36		17:52 (82)	07:09			07:42		08:05 (28)
	21:08			20:45	39	20:15 (81)	20:01			19:10	45	18:37 (82)	17:28			17:09	58	15:41 (83)
7	06:12			06:38		19:36 (81)	07:08			07:37		17:53 (82)	07:10			07:43		08:06 (28)
	21:07			20:44	39	20:15 (81)	20:00			19:09	43	18:36 (82)	17:27			17:09	57	15:41 (83)
8	06:13			06:39		19:36 (81)	07:09			07:38		17:54 (82)	07:12			07:44		08:07 (28)
	21:07			20:43	39	20:15 (81)	19:57			19:07	40	18:34 (82)	17:26			17:09	57	15:42 (83)
9	06:14			06:40		19:36 (81)	07:10			07:39		17:54 (82)	07:13		08:01 (28)	07:45		08:08 (28)
	21:07			20:42	38	20:14 (81)	19:55			19:06	39	18:33 (82)	17:24	7	08:08 (28)	17:09	57	15:43 (83)
10	06:14			06:41		19:36 (81)	07:10			07:40		17:56 (82)	07:14		07:59 (28)	07:46		08:09 (28)
	21:06			20:41	38	20:14 (81)	19:53			19:04	35	18:31 (82)	17:24	13	08:12 (28)	17:09	58	15:44 (83)
11	06:15			06:42		19:37 (81)	07:11			07:41		17:57 (82)	07:15		07:57 (28)	07:47		08:10 (28)
	21:06			20:39	37	20:14 (81)	19:52			19:03	32	18:29 (82)	17:23	16	08:13 (28)	17:09	57	15:45 (83)
12	06:16			06:43		19:37 (81)	07:12		18:18 (82)	07:42		17:59 (82)	07:16		07:55 (28)	07:47		08:10 (28)
	21:06			20:38	36	20:13 (81)	19:50	12	18:30 (82)	19:01	28	18:27 (82)	17:22	20	08:15 (28)	17:10	57	15:45 (83)
13	06:16			06:44		19:37 (81)	07:13		18:14 (82)	07:43		18:02 (82)	07:17		07:54 (28)	07:48		08:11 (28)
	21:05			20:37	35	20:12 (81)	19:48	20	18:34 (82)	18:59	23	18:25 (82)	17:21	22	08:16 (28)	17:10	57	15:46 (83)
14	06:17			06:45		19:38 (81)	07:14		18:11 (82)	07:44		18:06 (82)	07:19		07:54 (28)	07:49		08:12 (28)
	21:05			20:36	34	20:12 (81)	19:47	26	18:37 (82)	18:58	14	18:20 (82)	17:20	24	08:18 (28)	17:10	56	15:47 (83)
15	06:18			06:46		19:39 (81)	07:15		18:08 (82)	07:45			07:20		07:53 (28)	07:50		08:13 (28)
	21:04			20:34	32	20:11 (81)	19:45	30	18:38 (82)	18:56			17:19	25	08:18 (28)	17:10	55	15:48 (83)
16	06:19		19:53 (81)	06:47		19:40 (81)	07:16		18:06 (82)	07:46			07:21		07:53 (28)	07:50		08:13 (28)
	21:04	4	19:57 (81)	20:33	30	20:10 (81)	19:43	34	18:40 (82)	18:55			17:18	26	08:19 (28)	17:10	56	15:48 (83)
17	06:19		19:50 (81)	06:48		19:40 (81)	07:17		18:04 (82)	07:47			07:22		07:52 (28)	07:51		08:14 (28)
	21:03	11	20:01 (81)	20:32	27	20:07 (81)	19:42	37	18:41 (82)	18:53			17:17	27	08:19 (28)	17:11	54	15:48 (83)
18	06:20		19:48 (81)	06:49		19:41 (81)	07:18		18:02 (82)	07:48			07:23		07:52 (28)	07:52		08:15 (28)
	21:02	15	20:03 (81)	20:30	25	20:06 (81)	19:40	40	18:42 (82)	18:52			17:17	28	08:20 (28)	17:11	54	15:49 (83)
19	06:21		19:47 (81)	06:49		19:43 (81)	07:19		18:01 (82)	07:49			07:24		07:53 (28)	07:52		08:15 (28)
	21:02	18	20:05 (81)	20:29	21	20:04 (81)	19:38	42	18:43 (82)	18:51			17:16	28	08:21 (28)	17:11	54	15:49 (83)
20	06:22		19:46 (81)	06:50		19:45 (81)	07:20		18:00 (82)	07:50			07:25		07:52 (28)	07:53		08:16 (28)
	21:01	21	20:07 (81)	20:27	16	20:01 (81)	19:37	43	18:43 (82)	18:49			17:15	29	08:21 (28)	17:12	54	15:50 (83)
21	06:23		19:44 (81)	06:51		19:49 (81)	07:21		17:57 (82)	07:51			07:27		07:52 (28)	07:53		08:16 (28)
	21:00	23	20:07 (81)	20:26	8	19:57 (81)	19:35	46	18:43 (82)	18:48			17:15	29	08:21 (28)	17:12	54	15:50 (83)
22	06:23		19:43 (81)	06:52			07:22		17:56 (82)	07:52			07:28		07:52 (28)	07:54		08:17 (28)
	21:00	25	20:08 (81)	20:25			19:33	47	18:43 (82)	18:46			17:14	30	08:22 (28)	17:13	54	15:51 (83)
23	06:24		19:43 (81)	06:53			07:23		17:55 (82)	07:53			07:29		07:53 (28)	07:54		08:17 (28)
	20:59	27	20:10 (81)	20:23			19:32	48	18:43 (82)	18:45			17:14	29	08:22 (28)	17:13	54	15:51 (83)
24	06:25		19:42 (81)	06:54			07:24		17:54 (82)	07:55			07:30		07:54 (28)	07:55		08:18 (28)
	20:58	29	20:11 (81)	20:22			19:30	50	18:44 (82)	18:44			17:13	36	15:21 (83)	17:14	54	15:52 (83)
25	06:26		19:41 (81)	06:55			07:25		17:54 (82)	07:56			07:31		07:54 (28)	07:55		08:18 (28)
	20:57	31	20:12 (81)	20:20			19:28	50	18:44 (82)	18:42			17:12	44	15:25 (83)	17:14	54	15:52 (83)
26	06:27		19:41 (81)	06:56			07:26		17:53 (82)	07:57			07:32		07:55 (28)	07:56		08:18 (28)
	20:57	31	20:12 (81)	20:19			19:27	51	18:44 (82)	18:41			17:12	48	15:28 (83)	17:15	54	15:52 (83)
27	06:28		19:39 (81)	06:57			07:27		17:53 (82)	07:58			07:33		07:56 (28)	07:56		08:18 (28)
	20:56	33	20:12 (81)	20:17			19:25	50	18:43 (82)	18:40			17:12	51	15:30 (83)	17:16	54	15:52 (83)
28	06:29		19:39 (81)	06:58			07:28		17:52 (82)	07:59			07:34		07:57 (28)	07:56		08:19 (28)
	20:55	34	20:13 (81)	20:16			19:23	51	18:43 (82)	18:38			17:11	52	15:31 (83)	17:16	56	15:54 (83)
29	06:30		19:39 (81)	06:59			07:29		17:52 (82)	08:00			07:35		07:58 (28)	07:57		08:19 (28)
	20:54	35	20:14 (81)	20:14			19:22	51	18:43 (82)	18:37			17:11	54	15:33 (83)	17:17	56	15:54 (83)
30	06:31		19:38 (81)	07:00			07:30		17:51 (82)	08:01			07:36		07:59 (28)	07:57		08:19 (28)
	20:53	36	20:14 (81)	20:13			19:20	51	18:42 (82)	18:36			17:10	55	15:34 (83)	17:18	57	15:54 (83)
31	06:31		19:38 (81)	07:01						08:02						07:57		08:19 (28)
	20:52	37	20:15 (81)	20:11						18:35						17:19	56	15:54 (83)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		410			686			779			542			693			1731	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.63			0.63			0.67			0.67			0.62			0.65	
Total reduction		0.38			0.38			0.41			0.37			0.23			0.33	
Total, real		156			261			316			202			158			566	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 46

Licensed user:
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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 8224 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6329)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January	February	March			April			May			June		
1	07:57	07:45	07:10			07:20		08:10 (118)	06:36			06:08		06:50 (119)
	17:20	17:53	18:26			19:59	16	08:26 (118)	20:28			20:57	29	07:19 (119)
2	07:57	07:44	07:08			07:19		08:12 (118)	06:35			06:08		06:51 (119)
	17:21	17:55	18:27			20:00	10	08:22 (118)	20:29			20:58	28	07:19 (119)
3	07:58	07:43	07:07			07:17			06:33			06:08		06:52 (119)
	17:22	17:56	18:28			20:00			20:30			20:58	27	07:19 (119)
4	07:58	07:42	07:05			07:15			06:32			06:07		06:52 (119)
	17:22	17:57	18:29			20:01			20:31			20:59	26	07:18 (119)
5	07:58	07:41	07:04			07:14			06:31		07:00 (119)	06:07		06:52 (119)
	17:23	17:58	18:31			20:02			20:32	10	07:10 (119)	21:00	26	07:18 (119)
6	07:58	07:40	07:02			07:12			06:30		06:56 (119)	06:07		06:53 (119)
	17:24	17:59	18:32			20:03			20:33	16	07:12 (119)	21:00	26	07:19 (119)
7	07:58	07:39	07:01			07:11			06:29		06:54 (119)	06:06		06:54 (119)
	17:25	18:01	18:33			20:04			20:34	20	07:14 (119)	21:01	25	07:19 (119)
8	07:57	07:37	07:59			07:09			06:28		06:53 (119)	06:06		06:55 (119)
	17:26	18:02	19:34			20:05			20:35	22	07:15 (119)	21:02	24	07:19 (119)
9	07:57	07:36	07:57			07:08			06:26		06:52 (119)	06:06		06:54 (119)
	17:27	18:03	19:35			20:06			20:36	24	07:16 (119)	21:02	23	07:17 (119)
10	07:57	07:35	07:56			07:06			06:25		06:51 (119)	06:06		06:55 (119)
	17:28	18:04	19:36			20:07			20:37	26	07:17 (119)	21:03	22	07:17 (119)
11	07:57	07:34	07:54			07:04			06:24		06:50 (119)	06:06		06:56 (119)
	17:29	18:05	19:37			20:08			20:38	28	07:18 (119)	21:03	21	07:17 (119)
12	07:57	07:33	07:53			07:03			06:23		06:49 (119)	06:05		06:56 (119)
	17:30	18:07	19:38			20:09			20:39	30	07:19 (119)	21:04	21	07:17 (119)
13	07:56	07:32	07:51		08:19 (118)	07:01			06:22		06:48 (119)	06:05		06:57 (119)
	17:31	18:08	19:39	10	08:29 (118)	20:10			20:40	31	07:19 (119)	21:04	20	07:17 (119)
14	07:56	07:30	07:49		08:15 (118)	07:00			06:21		06:48 (119)	06:05		06:58 (119)
	17:32	18:09	19:40	17	08:32 (118)	20:11			20:41	31	07:19 (119)	21:05	19	07:17 (119)
15	07:56	07:29	07:48		08:13 (118)	06:58			06:20		06:47 (119)	06:05		06:58 (119)
	17:33	18:10	19:41	21	08:34 (118)	20:12			20:42	33	07:20 (119)	21:05	19	07:17 (119)
16	07:55	07:28	07:46		08:11 (118)	06:57			06:19		06:48 (119)	06:05		06:58 (119)
	17:35	18:11	19:42	24	08:35 (118)	20:13			20:43	33	07:21 (119)	21:06	19	07:17 (119)
17	07:55	07:27	07:45		08:09 (118)	06:55			06:18		06:48 (119)	06:05		06:59 (119)
	17:36	18:12	19:43	27	08:36 (118)	20:14			20:44	33	07:21 (119)	21:06	18	07:17 (119)
18	07:54	07:25	07:43		08:08 (118)	06:54			06:18		06:47 (119)	06:05		06:59 (119)
	17:37	18:14	19:44	29	08:37 (118)	20:15			20:45	34	07:21 (119)	21:06	18	07:17 (119)
19	07:54	07:24	07:41		08:07 (118)	06:52			06:17		06:47 (119)	06:06		06:59 (119)
	17:38	18:15	19:45	30	08:37 (118)	20:16			20:46	34	07:21 (119)	21:07	18	07:17 (119)
20	07:53	07:23	07:40		08:06 (118)	06:51			06:16		06:47 (119)	06:06		07:00 (119)
	17:39	18:16	19:46	32	08:38 (118)	20:17			20:47	34	07:21 (119)	21:07	18	07:18 (119)
21	07:53	07:21	07:38		08:05 (118)	06:49			06:15		06:48 (119)	06:06		07:00 (119)
	17:40	18:17	19:48	33	08:38 (118)	20:18			20:48	33	07:21 (119)	21:07	18	07:18 (119)
22	07:52	07:20	07:37		08:04 (118)	06:48			06:14		06:47 (119)	06:06		07:00 (119)
	17:41	18:18	19:49	33	08:37 (118)	20:19			20:49	34	07:21 (119)	21:08	18	07:18 (119)
23	07:52	07:18	07:35		08:05 (118)	06:47			06:14		06:47 (119)	06:06		07:00 (119)
	17:43	18:19	19:50	33	08:38 (118)	20:20			20:50	34	07:21 (119)	21:08	18	07:18 (119)
24	07:51	07:17	07:33		08:04 (118)	06:45			06:13		06:48 (119)	06:07		07:01 (119)
	17:44	18:21	19:51	33	08:37 (118)	20:21			20:50	33	07:21 (119)	21:08	18	07:19 (119)
25	07:50	07:16	07:32		08:04 (118)	06:44			06:12		06:48 (119)	06:07		07:01 (119)
	17:45	18:22	19:52	32	08:36 (118)	20:22			20:51	33	07:21 (119)	21:08	18	07:19 (119)
26	07:50	07:14	07:30		08:04 (118)	06:42			06:12		06:48 (119)	06:07		07:01 (119)
	17:46	18:23	19:53	32	08:36 (118)	20:23			20:52	32	07:20 (119)	21:08	18	07:19 (119)
27	07:49	07:13	07:28		08:04 (118)	06:41			06:11		06:49 (119)	06:08		07:01 (119)
	17:47	18:24	19:54	30	08:34 (118)	20:24			20:53	32	07:21 (119)	21:08	19	07:20 (119)
28	07:48	07:11	07:27		08:04 (118)	06:40			06:10		06:48 (119)	06:08		07:01 (119)
	17:48	18:25	19:55	29	08:33 (118)	20:25			20:54	32	07:20 (119)	21:08	19	07:20 (119)
29	07:47		07:25		08:06 (118)	06:38			06:10		06:49 (119)	06:08		07:00 (119)
	17:50		19:56	26	08:32 (118)	20:26			20:55	31	07:20 (119)	21:08	20	07:20 (119)
30	07:46		07:24		08:06 (118)	06:37			06:09		06:49 (119)	06:09		07:01 (119)
	17:51		19:57	24	08:30 (118)	20:27			20:55	31	07:20 (119)	21:08	20	07:21 (119)
31	07:45		07:22		08:08 (118)				06:09		06:50 (119)			
	17:52		19:58	21	08:29 (118)				20:56	30	07:20 (119)			
Potential sun hours	300	299	370			397			446			449		
Total, worst case				516			26			794			633	
Sun reduction				0.44			0.51			0.56			0.60	
Oper. time red.				1.00			1.00			1.00			1.00	
Wind dir. red.				0.65			0.65			0.68			0.68	
Total reduction				0.28			0.33			0.38			0.41	
Total, real				147			9			302			258	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 47

Licensed user:
EDR
217 Montgomery St.
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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 8224 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6329)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October	November	December
1	06:09		07:00 (119)	06:33		07:00 (119)	07:02			07:31	07:04	07:37
	21:08	21	07:21 (119)	20:51	29	07:29 (119)	20:09			19:19	17:33	17:10
2	06:10		07:00 (119)	06:33		07:01 (119)	07:03			07:32	07:05	07:38
	21:08	22	07:22 (119)	20:50	27	07:28 (119)	20:08			19:17	17:32	17:10
3	06:10		07:00 (119)	06:34		07:02 (119)	07:04			07:33	07:06	07:39
	21:08	22	07:22 (119)	20:49	26	07:28 (119)	20:06			19:15	17:31	17:10
4	06:11		07:00 (119)	06:35		07:03 (119)	07:05			07:34	07:07	07:40
	21:08	24	07:24 (119)	20:48	24	07:27 (119)	20:05			19:14	17:30	17:10
5	06:11		06:59 (119)	06:36		07:04 (119)	07:06			07:35	07:08	07:41
	21:08	25	07:24 (119)	20:47	21	07:25 (119)	20:03			19:12	17:29	17:10
6	06:12		07:00 (119)	06:37		07:04 (119)	07:07			07:36	07:09	07:42
	21:08	25	07:25 (119)	20:45	19	07:23 (119)	20:01			19:11	17:28	17:09
7	06:13		07:00 (119)	06:38		07:06 (119)	07:08			07:37	07:10	07:43
	21:07	26	07:26 (119)	20:44	15	07:21 (119)	20:00			19:09	17:27	17:09
8	06:13		06:59 (119)	06:39		07:10 (119)	07:09			07:38	07:12	07:44
	21:07	26	07:25 (119)	20:43	7	07:17 (119)	19:57			19:07	17:26	17:09
9	06:14		06:59 (119)	06:40			07:10			07:39	07:13	07:45
	21:07	27	07:26 (119)	20:42			19:55			19:06	17:25	17:09
10	06:14		06:58 (119)	06:41			07:11		08:06 (118)	07:40	07:14	07:46
	21:06	28	07:26 (119)	20:41			19:53	8	08:14 (118)	19:04	17:24	17:09
11	06:15		06:58 (119)	06:42			07:11		08:02 (118)	07:41	07:15	07:47
	21:06	29	07:27 (119)	20:39			19:52	16	08:18 (118)	19:03	17:23	17:10
12	06:16		06:59 (119)	06:43			07:12		07:59 (118)	07:42	07:16	07:47
	21:06	29	07:28 (119)	20:38			19:50	21	08:20 (118)	19:01	17:22	17:10
13	06:17		06:58 (119)	06:44			07:13		07:58 (118)	07:43	07:17	07:48
	21:05	30	07:28 (119)	20:37			19:48	23	08:21 (118)	19:00	17:21	17:10
14	06:17		06:58 (119)	06:45			07:14		07:56 (118)	07:44	07:19	07:49
	21:05	30	07:28 (119)	20:36			19:47	26	08:22 (118)	18:58	17:20	17:10
15	06:18		06:58 (119)	06:46			07:15		07:55 (118)	07:45	07:20	07:50
	21:04	31	07:29 (119)	20:34			19:45	28	08:23 (118)	18:57	17:19	17:10
16	06:19		06:58 (119)	06:47			07:16		07:54 (118)	07:46	07:21	07:50
	21:04	32	07:30 (119)	20:33			19:43	29	08:23 (118)	18:55	17:18	17:11
17	06:20		06:57 (119)	06:48			07:17		07:53 (118)	07:47	07:22	07:51
	21:03	32	07:29 (119)	20:32			19:42	31	08:24 (118)	18:54	17:18	17:11
18	06:20		06:57 (119)	06:49			07:18		07:52 (118)	07:48	07:23	07:52
	21:02	33	07:30 (119)	20:30			19:40	32	08:24 (118)	18:52	17:17	17:11
19	06:21		06:57 (119)	06:50			07:19		07:51 (118)	07:49	07:24	07:52
	21:02	33	07:30 (119)	20:29			19:38	33	08:24 (118)	18:51	17:16	17:12
20	06:22		06:58 (119)	06:51			07:20		07:51 (118)	07:50	07:25	07:53
	21:01	33	07:31 (119)	20:27			19:37	33	08:24 (118)	18:49	17:15	17:12
21	06:23		06:58 (119)	06:52			07:21		07:51 (118)	07:51	07:27	07:53
	21:00	33	07:31 (119)	20:26			19:35	33	08:24 (118)	18:48	17:15	17:12
22	06:24		06:57 (119)	06:52			07:22		07:50 (118)	07:52	07:28	07:54
	21:00	34	07:31 (119)	20:25			19:33	32	08:22 (118)	18:46	17:14	17:13
23	06:24		06:57 (119)	06:53			07:23		07:50 (118)	07:53	07:29	07:54
	20:59	34	07:31 (119)	20:23			19:32	31	08:21 (118)	18:45	17:14	17:13
24	06:25		06:57 (119)	06:54			07:24		07:50 (118)	07:55	07:30	07:55
	20:58	34	07:31 (119)	20:22			19:30	31	08:21 (118)	18:44	17:13	17:14
25	06:26		06:58 (119)	06:55			07:25		07:50 (118)	07:56	07:31	07:55
	20:57	33	07:31 (119)	20:20			19:28	30	08:20 (118)	18:42	17:13	17:15
26	06:27		06:58 (119)	06:56			07:26		07:51 (118)	07:57	07:32	07:56
	20:56	33	07:31 (119)	20:19			19:27	28	08:19 (118)	18:41	17:12	17:15
27	06:28		06:58 (119)	06:57			07:27		07:52 (118)	07:58	07:33	07:56
	20:56	33	07:31 (119)	20:17			19:25	25	08:17 (118)	18:40	17:12	17:16
28	06:29		06:58 (119)	06:58			07:28		07:53 (118)	07:59	07:34	07:56
	20:55	32	07:30 (119)	20:16			19:23	22	08:15 (118)	18:38	17:11	17:17
29	06:30		06:58 (119)	06:59			07:29		07:54 (118)	08:00	07:35	07:57
	20:54	32	07:30 (119)	20:14			19:22	19	08:13 (118)	18:37	17:11	17:17
30	06:31		06:59 (119)	07:00			07:30		07:57 (118)	08:01	07:36	07:57
	20:53	31	07:30 (119)	20:13			19:20	13	08:10 (118)	18:36	17:11	17:18
31	06:32		06:59 (119)	07:01						08:02		07:57
	20:52	30	07:29 (119)	20:11						18:35		17:19
Potential sun hours	456			426			374			346	300	291
Total, worst case		917			168			544				
Sun reduction		0.60			0.60			0.61				
Oper. time red.		1.00			1.00			1.00				
Wind dir. red.		0.68			0.68			0.65				
Total reduction		0.41			0.41			0.39				
Total, real		373			68			214				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 48

Licensed user:
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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 8226 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6330)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February	March			April			May			June		
1	07:57		16:02 (49)	07:45	07:10			07:20		07:54 (118)	06:36			06:08		06:45 (119)
	17:20	38	16:40 (49)	17:53	18:26			19:59	28	08:22 (118)	20:28			20:57	28	07:13 (119)
2	07:57		16:03 (49)	07:44	07:08			07:19		07:54 (118)	06:35			06:08		06:46 (119)
	17:21	38	16:41 (49)	17:55	18:27			20:00	27	08:21 (118)	20:29			20:58	28	07:14 (119)
3	07:58		16:03 (49)	07:43	07:07			07:17		07:55 (118)	06:33			06:08		06:47 (119)
	17:22	38	16:41 (49)	17:56	18:28			20:00	25	08:20 (118)	20:30			20:58	27	07:14 (119)
4	07:58		16:03 (49)	07:42	07:05			07:15		07:56 (118)	06:32			06:07		06:46 (119)
	17:22	39	16:42 (49)	17:57	18:29			20:01	22	08:18 (118)	20:31			20:59	27	07:13 (119)
5	07:58		16:04 (49)	07:41	07:04			07:14		07:58 (118)	06:31			06:07		06:47 (119)
	17:23	38	16:42 (49)	17:58	18:31			20:02	18	08:16 (118)	20:32			21:00	26	07:13 (119)
6	07:58		16:04 (49)	07:40	07:02			07:12		07:59 (118)	06:30			06:07		06:48 (119)
	17:24	39	16:43 (49)	17:59	18:32			20:03	14	08:13 (118)	20:33			21:00	25	07:13 (119)
7	07:58		16:05 (49)	07:39	07:01			07:11		08:03 (118)	06:29			06:06		06:49 (119)
	17:25	39	16:44 (49)	18:01	18:33			20:04	5	08:08 (118)	20:34			21:01	24	07:13 (119)
8	07:57		16:05 (49)	07:37	07:59			07:09			06:28		06:53 (119)	06:06		06:49 (119)
	17:26	39	16:44 (49)	18:02	19:34			20:05			20:35	11	07:04 (119)	21:02	24	07:13 (119)
9	07:57		16:06 (49)	07:36	07:57			07:08			06:26		06:51 (119)	06:06		06:49 (119)
	17:27	39	16:45 (49)	18:03	19:35			20:06			20:36	15	07:06 (119)	21:02	23	07:12 (119)
10	07:57		16:06 (49)	07:35	07:56			07:06			06:25		06:49 (119)	06:06		06:50 (119)
	17:28	39	16:45 (49)	18:04	19:36			20:07			20:37	19	07:08 (119)	21:03	22	07:12 (119)
11	07:57		16:06 (49)	07:34	07:54			07:04			06:24		06:48 (119)	06:06		06:50 (119)
	17:29	39	16:45 (49)	18:05	19:37			20:08			20:38	21	07:09 (119)	21:03	22	07:12 (119)
12	07:57		16:07 (49)	07:33	07:53			07:03			06:23		06:47 (119)	06:05		06:51 (119)
	17:30	39	16:46 (49)	18:07	19:38			20:09			20:39	23	07:10 (119)	21:04	21	07:12 (119)
13	07:56		16:08 (49)	07:32	07:51			07:01			06:22		06:46 (119)	06:05		06:51 (119)
	17:31	39	16:47 (49)	18:08	19:39			20:10			20:40	25	07:11 (119)	21:04	21	07:12 (119)
14	07:56		16:08 (49)	07:30	07:49			07:00			06:21		06:45 (119)	06:05		06:52 (119)
	17:32	38	16:46 (49)	18:09	19:40			20:11			20:41	27	07:12 (119)	21:05	20	07:12 (119)
15	07:56		16:09 (49)	07:29	07:48			06:58			06:20		06:44 (119)	06:05		06:52 (119)
	17:33	38	16:47 (49)	18:10	19:41			20:12			20:42	28	07:12 (119)	21:05	20	07:12 (119)
16	07:55		16:09 (49)	07:28	07:46			06:57			06:19		06:45 (119)	06:05		06:53 (119)
	17:35	38	16:47 (49)	18:11	19:42			20:13			20:43	28	07:13 (119)	21:06	19	07:12 (119)
17	07:55		16:10 (49)	07:27	07:45			06:55			06:18		06:44 (119)	06:05		06:53 (119)
	17:36	37	16:47 (49)	18:12	19:43			20:14			20:44	30	07:14 (119)	21:06	19	07:12 (119)
18	07:54		16:10 (49)	07:25	07:43			06:54			06:18		06:44 (119)	06:05		06:53 (119)
	17:37	37	16:47 (49)	18:14	19:44			20:15			20:45	30	07:14 (119)	21:06	19	07:12 (119)
19	07:54		16:11 (49)	07:24	07:41		08:07 (118)	06:52			06:17		06:43 (119)	06:06		06:53 (119)
	17:38	36	16:47 (49)	18:15	19:45	10	08:17 (118)	20:16			20:46	31	07:14 (119)	21:07	19	07:12 (119)
20	07:53		16:12 (49)	07:23	07:40		08:04 (118)	06:51			06:16		06:43 (119)	06:06		06:54 (119)
	17:39	35	16:47 (49)	18:16	19:46	17	08:21 (118)	20:17			20:47	31	07:14 (119)	21:07	19	07:13 (119)
21	07:53		16:12 (49)	07:21	07:38		08:01 (118)	06:49			06:15		06:44 (119)	06:06		06:54 (119)
	17:40	34	16:46 (49)	18:17	19:48	21	08:22 (118)	20:18			20:48	31	07:15 (119)	21:07	19	07:13 (119)
22	07:52		16:14 (49)	07:20	07:37		07:59 (118)	06:48			06:14		06:43 (119)	06:06		06:54 (119)
	17:41	33	16:47 (49)	18:18	19:49	24	08:23 (118)	20:19			20:49	31	07:14 (119)	21:08	19	07:13 (119)
23	07:52		16:14 (49)	07:18	07:35		07:58 (118)	06:47			06:14		06:43 (119)	06:06		06:54 (119)
	17:43	32	16:46 (49)	18:19	19:50	26	08:24 (118)	20:20			20:50	31	07:14 (119)	21:08	19	07:13 (119)
24	07:51		16:15 (49)	07:17	07:33		07:57 (118)	06:45			06:13		06:44 (119)	06:07		06:55 (119)
	17:44	30	16:45 (49)	18:21	19:51	27	08:24 (118)	20:21			20:50	31	07:15 (119)	21:08	19	07:14 (119)
25	07:50		16:17 (49)	07:16	07:32		07:55 (118)	06:44			06:12		06:44 (119)	06:07		06:55 (119)
	17:45	29	16:46 (49)	18:22	19:52	29	08:24 (118)	20:22			20:51	31	07:15 (119)	21:08	19	07:14 (119)
26	07:50		16:18 (49)	07:14	07:30		07:55 (118)	06:42			06:12		06:43 (119)	06:07		06:55 (119)
	17:46	27	16:45 (49)	18:23	19:53	30	08:25 (118)	20:23			20:52	31	07:14 (119)	21:08	19	07:14 (119)
27	07:49		16:19 (49)	07:13	07:28		07:54 (118)	06:41			06:11		06:44 (119)	06:08		06:55 (119)
	17:47	25	16:44 (49)	18:24	19:54	31	08:25 (118)	20:24			20:53	31	07:15 (119)	21:08	20	07:15 (119)
28	07:48		16:21 (49)	07:11	07:27		07:53 (118)	06:40			06:10		06:44 (119)	06:08		06:55 (119)
	17:48	21	16:42 (49)	18:25	19:55	31	08:24 (118)	20:25			20:54	30	07:14 (119)	21:08	20	07:15 (119)
29	07:47		16:23 (49)		07:25		07:54 (118)	06:38			06:10		06:45 (119)	06:08		06:55 (119)
	17:50	17	16:40 (49)		19:56	30	08:24 (118)	20:26			20:55	29	07:14 (119)	21:08	20	07:15 (119)
30	07:46		16:26 (49)		07:24		07:53 (118)	06:37			06:09		06:45 (119)	06:09		06:55 (119)
	17:51	12	16:38 (49)		19:57	30	08:23 (118)	20:27			20:55	29	07:14 (119)	21:08	21	07:16 (119)
31	07:45				07:22		07:54 (118)				06:09		06:45 (119)			
	17:52				19:58	29	08:23 (118)				20:56	29	07:14 (119)			
Potential sun hours	300			299	370			397			446			449		
Total, worst case		1022				335			139			653			648	
Sun reduction		0.36				0.44			0.51			0.56			0.60	
Oper. time red.		1.00				1.00			1.00			1.00			1.00	
Wind dir. red.		0.68				0.65			0.65			0.68			0.68	
Total reduction		0.24				0.29			0.33			0.38			0.41	
Total, real		249				97			46			249			265	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 49

Licensed user:
EDR
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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 8226 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6330)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October	November			December		
1	06:09		06:54 (119)	06:33		06:58 (119)	07:02			07:31	07:04			07:37		15:48 (49)
	21:08	22	07:16 (119)	20:51	22	07:20 (119)	20:09			19:19	17:33			17:10	39	16:27 (49)
2	06:10		06:55 (119)	06:33		06:59 (119)	07:03			07:32	07:05			07:38		15:49 (49)
	21:08	22	07:17 (119)	20:50	20	07:19 (119)	20:08			19:17	17:32			17:10	39	16:28 (49)
3	06:10		06:54 (119)	06:34		07:00 (119)	07:04			07:33	07:06			07:39		15:49 (49)
	21:08	23	07:17 (119)	20:49	18	07:18 (119)	20:06			19:15	17:31			17:10	39	16:28 (49)
4	06:11		06:55 (119)	06:35		07:02 (119)	07:05			07:34	07:07			07:40		15:49 (49)
	21:08	23	07:18 (119)	20:48	14	07:16 (119)	20:05			19:14	17:30			17:10	39	16:28 (49)
5	06:11		06:54 (119)	06:36		07:05 (119)	07:06		08:00 (118)	07:35	07:08			07:41		15:50 (49)
	21:08	24	07:18 (119)	20:47	8	07:13 (119)	20:03	5	08:05 (118)	19:12	17:29			17:10	39	16:29 (49)
6	06:12		06:54 (119)	06:37			07:07		07:55 (118)	07:36	07:09			07:42		15:50 (49)
	21:08	25	07:19 (119)	20:45			20:01	14	08:09 (118)	19:11	17:28			17:09	39	16:29 (49)
7	06:13		06:55 (119)	06:38			07:08		07:53 (118)	07:37	07:10			07:43		15:51 (49)
	21:07	25	07:20 (119)	20:44			20:00	18	08:11 (118)	19:09	17:27			17:09	39	16:30 (49)
8	06:13		06:54 (119)	06:39			07:09		07:51 (118)	07:38	07:12			07:44		15:52 (49)
	21:07	26	07:20 (119)	20:43			19:57	22	08:13 (118)	19:07	17:26			17:09	38	16:30 (49)
9	06:14		06:54 (119)	06:40			07:10		07:48 (118)	07:39	07:13			07:45		15:52 (49)
	21:07	27	07:21 (119)	20:42			19:55	25	08:13 (118)	19:06	17:25			17:09	38	16:30 (49)
10	06:14		06:53 (119)	06:41			07:11		07:47 (118)	07:40	07:14			07:46		15:53 (49)
	21:06	28	07:21 (119)	20:41			19:53	27	08:14 (118)	19:04	17:24			17:09	38	16:31 (49)
11	06:15		06:53 (119)	06:42			07:11		07:46 (118)	07:41	07:15			07:47		15:53 (49)
	21:06	29	07:22 (119)	20:39			19:52	28	08:14 (118)	19:03	17:23			17:10	38	16:31 (49)
12	06:16		06:54 (119)	06:43			07:12		07:45 (118)	07:42	07:16		15:57 (49)	07:47		15:53 (49)
	21:06	28	07:22 (119)	20:38			19:50	29	08:14 (118)	19:01	17:22	13	16:10 (49)	17:10	38	16:31 (49)
13	06:17		06:53 (119)	06:44			07:13		07:45 (118)	07:43	07:17		15:55 (49)	07:48		15:54 (49)
	21:05	29	07:22 (119)	20:37			19:48	30	08:15 (118)	19:00	17:21	18	16:13 (49)	17:10	38	16:32 (49)
14	06:17		06:53 (119)	06:45			07:14		07:44 (118)	07:44	07:19		15:53 (49)	07:49		15:55 (49)
	21:05	30	07:23 (119)	20:36			19:47	31	08:15 (118)	18:58	17:20	21	16:14 (49)	17:10	37	16:32 (49)
15	06:18		06:53 (119)	06:46			07:15		07:44 (118)	07:45	07:20		15:52 (49)	07:50		15:56 (49)
	21:04	30	07:23 (119)	20:34			19:45	30	08:14 (118)	18:57	17:19	25	16:17 (49)	17:10	37	16:33 (49)
16	06:19		06:53 (119)	06:47			07:16		07:43 (118)	07:46	07:21		15:51 (49)	07:50		15:55 (49)
	21:04	31	07:24 (119)	20:33			19:43	31	08:14 (118)	18:55	17:18	27	16:18 (49)	17:11	38	16:33 (49)
17	06:20		06:53 (119)	06:48			07:17		07:43 (118)	07:47	07:22		15:50 (49)	07:51		15:56 (49)
	21:03	30	07:23 (119)	20:32			19:42	31	08:14 (118)	18:54	17:18	29	16:19 (49)	17:11	37	16:33 (49)
18	06:20		06:53 (119)	06:49			07:18		07:44 (118)	07:48	07:23		15:49 (49)	07:52		15:56 (49)
	21:02	31	07:24 (119)	20:30			19:40	29	08:13 (118)	18:52	17:17	30	16:19 (49)	17:11	37	16:33 (49)
19	06:21		06:53 (119)	06:50			07:19		07:44 (118)	07:49	07:24		15:49 (49)	07:52		15:57 (49)
	21:02	31	07:24 (119)	20:29			19:38	28	08:12 (118)	18:51	17:16	32	16:21 (49)	17:12	37	16:34 (49)
20	06:22		06:53 (119)	06:51			07:20		07:44 (118)	07:50	07:25		15:49 (49)	07:53		15:58 (49)
	21:01	32	07:25 (119)	20:27			19:37	27	08:11 (118)	18:49	17:15	33	16:22 (49)	17:12	37	16:35 (49)
21	06:23		06:54 (119)	06:52			07:21		07:45 (118)	07:51	07:27		15:48 (49)	07:53		15:58 (49)
	21:00	31	07:25 (119)	20:26			19:35	24	08:09 (118)	18:48	17:15	34	16:22 (49)	17:12	37	16:35 (49)
22	06:24		06:53 (119)	06:52			07:22		07:45 (118)	07:52	07:28		15:48 (49)	07:54		15:59 (49)
	21:00	31	07:24 (119)	20:25			19:33	22	08:07 (118)	18:46	17:14	35	16:23 (49)	17:13	37	16:36 (49)
23	06:24		06:53 (119)	06:53			07:23		07:47 (118)	07:53	07:29		15:47 (49)	07:54		15:59 (49)
	20:59	31	07:24 (119)	20:23			19:32	18	08:05 (118)	18:45	17:14	36	16:23 (49)	17:13	37	16:36 (49)
24	06:25		06:54 (119)	06:54			07:24		07:49 (118)	07:55	07:30		15:47 (49)	07:55		15:59 (49)
	20:58	30	07:24 (119)	20:22			19:30	13	08:02 (118)	18:44	17:13	37	16:24 (49)	17:14	37	16:36 (49)
25	06:26		06:54 (119)	06:55			07:25			07:56	07:31		15:48 (49)	07:55		16:00 (49)
	20:57	30	07:24 (119)	20:20			19:28			18:42	17:13	37	16:25 (49)	17:15	37	16:37 (49)
26	06:27		06:54 (119)	06:56			07:26			07:57	07:32		15:48 (49)	07:56		16:00 (49)
	20:56	30	07:24 (119)	20:19			19:27			18:41	17:12	38	16:26 (49)	17:15	37	16:37 (49)
27	06:28		06:55 (119)	06:57			07:27			07:58	07:33		15:48 (49)	07:56		16:00 (49)
	20:56	29	07:24 (119)	20:17			19:25			18:40	17:12	38	16:26 (49)	17:16	38	16:38 (49)
28	06:29		06:55 (119)	06:58			07:28			07:59	07:34		15:48 (49)	07:56		16:01 (49)
	20:55	28	07:23 (119)	20:16			19:23			18:38	17:11	38	16:26 (49)	17:17	38	16:39 (49)
29	06:30		06:55 (119)	06:59			07:29			08:00	07:35		15:48 (49)	07:57		16:02 (49)
	20:54	27	07:22 (119)	20:14			19:22			18:37	17:11	39	16:27 (49)	17:17	37	16:39 (49)
30	06:31		06:56 (119)	07:00			07:30			08:01	07:36		15:48 (49)	07:57		16:02 (49)
	20:53	26	07:22 (119)	20:13			19:20			18:36	17:11	39	16:27 (49)	17:18	37	16:39 (49)
31	06:32		06:57 (119)	07:01						08:02				07:57		16:02 (49)
	20:52	24	07:21 (119)	20:11						18:35				17:19	38	16:40 (49)
Potential sun hours	456			426			374			346	300			291		
Total, worst case		863			82			482				599			1171	
Sun reduction		0.60			0.60			0.61				0.37			0.50	
Oper. time red.		1.00			1.00			1.00				1.00			1.00	
Wind dir. red.		0.68			0.68			0.65				0.68			0.68	
Total reduction		0.41			0.41			0.40				0.25			0.34	
Total, real		353			33			193				150			396	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 50

Licensed user:
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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 8343 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6331)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:25 (100)	07:44		08:45 (100)	07:09		07:29 (126)	07:20			06:36			06:08		06:33 (15)
	17:19	36	09:01 (100)	17:53	15	09:00 (100)	18:26	3	07:32 (126)	19:59			20:28			20:57	34	07:07 (15)
2	07:57		08:25 (100)	07:43		08:49 (100)	07:08		07:27 (126)	07:18			06:34			06:08		06:33 (15)
	17:20	36	09:01 (100)	17:54	7	08:56 (100)	18:27	6	07:33 (126)	20:00			20:29			20:58	35	07:08 (15)
3	07:57		08:25 (100)	07:43			07:06		07:26 (126)	07:17			06:33			06:07		06:33 (15)
	17:21	37	09:02 (100)	17:55			18:28	9	07:35 (126)	20:00			20:30			20:58	35	07:08 (15)
4	07:58		08:25 (100)	07:42			07:05		07:24 (126)	07:15			06:32			06:07		06:33 (15)
	17:22	38	09:03 (100)	17:57			18:29	12	07:36 (126)	20:01			20:31			20:59	35	07:08 (15)
5	07:58		08:26 (100)	07:40			07:03		07:22 (126)	07:14			06:31			06:06		06:33 (15)
	17:23	37	09:03 (100)	17:58			18:30	14	07:36 (126)	20:02			20:32			21:00	36	07:09 (15)
6	07:58		08:26 (100)	07:39			07:02		07:21 (126)	07:12			06:29			06:06		06:33 (15)
	17:24	38	09:04 (100)	17:59			18:31	16	07:37 (126)	20:03			20:33			21:00	37	07:10 (15)
7	07:57		08:26 (100)	07:38			07:00		07:19 (126)	07:10			06:28			06:06		06:33 (15)
	17:25	39	09:05 (100)	18:00			18:32	17	07:36 (126)	20:04			20:34			21:01	36	07:09 (15)
8	07:57		08:27 (100)	07:37			07:59		08:18 (126)	07:09		19:29 (16)	06:27			06:06		06:33 (15)
	17:26	38	09:05 (100)	18:01			19:34	19	08:37 (126)	20:05	4	19:33 (16)	20:35			21:02	37	07:10 (15)
9	07:57		08:27 (100)	07:36			07:57		08:16 (126)	07:07		19:25 (16)	06:26			06:05		06:33 (15)
	17:27	39	09:06 (100)	18:03			19:35	20	08:36 (126)	20:06	13	19:38 (16)	20:36			21:02	37	07:10 (15)
10	07:57		08:27 (100)	07:35			07:56		08:15 (126)	07:06		19:22 (16)	06:25			06:05		06:33 (15)
	17:28	39	09:06 (100)	18:04			19:36	21	08:36 (126)	20:07	17	19:39 (16)	20:37			21:03	38	07:11 (15)
11	07:57		08:28 (100)	07:34			07:54		08:15 (126)	07:04		19:21 (16)	06:24			06:05		06:33 (15)
	17:29	38	09:06 (100)	18:05			19:37	19	08:34 (126)	20:08	20	19:41 (16)	20:38			21:03	38	07:11 (15)
12	07:57		08:28 (100)	07:33			07:52		08:15 (126)	07:03		19:19 (16)	06:23			06:05		06:34 (15)
	17:30	39	09:07 (100)	18:06			19:38	18	08:33 (126)	20:09	23	19:42 (16)	20:39			21:04	37	07:11 (15)
13	07:56		08:28 (100)	07:31			07:51		08:17 (126)	07:01		19:18 (16)	06:22			06:05		06:34 (15)
	17:31	39	09:07 (100)	18:07			19:39	15	08:32 (126)	20:10	25	19:43 (16)	20:40			21:04	38	07:12 (15)
14	07:56		08:29 (100)	07:30			07:49		08:19 (126)	07:00		19:17 (16)	06:21			06:05		06:34 (15)
	17:32	39	09:08 (100)	18:09			19:40	10	08:29 (126)	20:11	26	19:43 (16)	20:41			21:05	38	07:12 (15)
15	07:56		08:29 (100)	07:29			07:48			06:58		19:16 (16)	06:20			06:05		06:34 (15)
	17:33	40	09:09 (100)	18:10			19:41			20:12	27	19:43 (16)	20:42			21:05	38	07:12 (15)
16	07:55		08:29 (100)	07:28			07:46			06:56		19:15 (16)	06:19			06:05		06:34 (15)
	17:34	39	09:08 (100)	18:11			19:42			20:13	28	19:43 (16)	20:43			21:06	38	07:12 (15)
17	07:55		08:30 (100)	07:26			07:44			06:55		19:16 (16)	06:18			06:05		06:34 (15)
	17:35	39	09:09 (100)	18:12			19:43			20:14	27	19:43 (16)	20:44			21:06	38	07:12 (15)
18	07:54		08:30 (100)	07:25			07:43			06:54		19:15 (16)	06:17			06:05		06:34 (15)
	17:36	39	09:09 (100)	18:13			19:44			20:15	27	19:42 (16)	20:45			21:06	39	07:13 (15)
19	07:54		08:31 (100)	07:24			07:41			06:52		19:15 (16)	06:16		06:46 (15)	06:05		06:34 (15)
	17:38	38	09:09 (100)	18:14			19:45			20:16	27	19:42 (16)	20:46	7	06:53 (15)	21:07	39	07:13 (15)
20	07:53		08:31 (100)	07:22			07:40			06:51		19:15 (16)	06:16		06:42 (15)	06:05		06:35 (15)
	17:39	38	09:09 (100)	18:16			19:46			20:17	26	19:41 (16)	20:47	14	06:56 (15)	21:07	38	07:13 (15)
21	07:53		08:32 (100)	07:21			07:38			06:49		19:15 (16)	06:15		06:40 (15)	06:05		06:35 (15)
	17:40	37	09:09 (100)	18:17			19:47			20:18	26	19:41 (16)	20:48	18	06:58 (15)	21:07	38	07:13 (15)
22	07:52		08:33 (100)	07:20			07:36			06:48		19:16 (16)	06:14		06:39 (15)	06:06		06:36 (15)
	17:41	36	09:09 (100)	18:18			19:48			20:19	25	19:41 (16)	20:49	21	07:00 (15)	21:07	38	07:14 (15)
23	07:52		08:33 (100)	07:18			07:35			06:46		19:16 (16)	06:13		06:38 (15)	06:06		06:35 (15)
	17:42	36	09:09 (100)	18:19			19:49			20:20	23	19:39 (16)	20:49	23	07:01 (15)	21:08	39	07:14 (15)
24	07:51		08:34 (100)	07:17			07:33			06:45		19:18 (16)	06:13		06:37 (15)	06:06		06:35 (15)
	17:43	34	09:08 (100)	18:20			19:50			20:21	20	19:38 (16)	20:50	24	07:01 (15)	21:08	39	07:14 (15)
25	07:50		08:35 (100)	07:15			07:31			06:44		19:19 (16)	06:12		06:36 (15)	06:06		06:36 (15)
	17:45	34	09:09 (100)	18:21			19:51			20:22	18	19:37 (16)	20:51	27	07:03 (15)	21:08	38	07:14 (15)
26	07:49		08:36 (100)	07:14			07:30			06:42		19:20 (16)	06:11		06:35 (15)	06:07		06:36 (15)
	17:46	32	09:08 (100)	18:23			19:52			20:23	14	19:34 (16)	20:52	29	07:04 (15)	21:08	38	07:14 (15)
27	07:49		08:37 (100)	07:12			07:28			06:41		19:24 (16)	06:11		06:34 (15)	06:07		06:36 (15)
	17:47	30	09:07 (100)	18:24			19:53			20:24	7	19:31 (16)	20:53	30	07:04 (15)	21:08	38	07:14 (15)
28	07:48		08:38 (100)	07:11			07:26			06:39			06:10		06:34 (15)	06:08		06:37 (15)
	17:48	28	09:06 (100)	18:25			19:54			20:25			20:54	31	07:05 (15)	21:08	38	07:15 (15)
29	07:47		08:39 (100)				07:25			06:38			06:09		06:34 (15)	06:08		06:37 (15)
	17:49	26	09:05 (100)				19:56			20:26			20:55	31	07:05 (15)	21:08	38	07:15 (15)
30	07:46		08:41 (100)				07:23			06:37			06:09		06:34 (15)	06:08		06:37 (15)
	17:51	23	09:04 (100)				19:57			20:27			20:55	32	07:06 (15)	21:08	37	07:14 (15)
31	07:45		08:43 (100)				07:22						06:08		06:34 (15)			
	17:52	19	09:02 (100)				19:58						20:56	33	07:07 (15)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		1100			22			199			423			320			1122	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.61			0.61			0.63			0.64			0.68			0.68	
Total reduction		0.22			0.25			0.28			0.32			0.38			0.41	
Total, real		238			6			55			137			121			456	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 51

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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 8343 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6331)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:38 (15)	06:32			07:02		19:20 (16)	07:30		07:55 (126)	07:03			07:37		08:10 (100)
	21:08	37	07:15 (15)	20:51			20:09	20	19:40 (16)	19:18	17	08:12 (126)	17:33			17:10	39	08:49 (100)
2	06:09		06:37 (15)	06:33			07:03		19:21 (16)	07:31		07:54 (126)	07:05			07:38		08:10 (100)
	21:08	38	07:15 (15)	20:50			20:08	17	19:38 (16)	19:17	19	08:13 (126)	17:32			17:10	39	08:49 (100)
3	06:10		06:38 (15)	06:34			07:04		19:23 (16)	07:32		07:53 (126)	07:06			07:39		08:11 (100)
	21:08	37	07:15 (15)	20:49			20:06	13	19:36 (16)	19:15	20	08:13 (126)	17:31			17:09	38	08:49 (100)
4	06:10		06:38 (15)	06:35			07:05		19:27 (16)	07:33		07:53 (126)	07:07			07:40		08:11 (100)
	21:08	37	07:15 (15)	20:48			20:04	5	19:32 (16)	19:13	20	08:13 (126)	17:30			17:09	38	08:49 (100)
5	06:11		06:39 (15)	06:36			07:06			07:34		07:54 (126)	07:08			07:41		08:12 (100)
	21:08	36	07:15 (15)	20:46			20:03			19:12	19	08:13 (126)	17:28			17:09	38	08:50 (100)
6	06:12		06:39 (15)	06:37			07:06			07:35		07:55 (126)	07:09			07:42		08:12 (100)
	21:07	37	07:16 (15)	20:45			20:01			19:10	18	08:13 (126)	17:27			17:09	38	08:50 (100)
7	06:12		06:39 (15)	06:38			07:07			07:36		07:56 (126)	07:10			07:43		08:13 (100)
	21:07	36	07:15 (15)	20:44			20:00			19:09	17	08:13 (126)	17:26			17:09	37	08:50 (100)
8	06:13		06:40 (15)	06:39			07:08			07:37		07:57 (126)	07:11			07:44		08:13 (100)
	21:07	36	07:16 (15)	20:43			19:56			19:07	15	08:12 (126)	17:25			17:09	38	08:51 (100)
9	06:13		06:40 (15)	06:40			07:09			07:38		07:58 (126)	07:13		08:19 (100)	07:45		08:14 (100)
	21:07	35	07:15 (15)	20:42			19:55			19:05	13	08:11 (126)	17:24	8	08:27 (100)	17:09	37	08:51 (100)
10	06:14		06:40 (15)	06:41			07:10			07:40		07:59 (126)	07:14		08:16 (100)	07:46		08:15 (100)
	21:06	35	07:15 (15)	20:41			19:53			19:04	11	08:10 (126)	17:23	15	08:31 (100)	17:09	36	08:51 (100)
11	06:15		06:41 (15)	06:42			07:11			07:41		08:00 (126)	07:15		08:14 (100)	07:46		08:15 (100)
	21:06	34	07:15 (15)	20:39			19:51			19:02	8	08:08 (126)	17:22	20	08:34 (100)	17:09	36	08:51 (100)
12	06:15		06:41 (15)	06:43			07:12			07:42		08:01 (126)	07:16		08:13 (100)	07:47		08:15 (100)
	21:05	34	07:15 (15)	20:38			19:50			19:01	5	08:06 (126)	17:21	23	08:36 (100)	17:09	36	08:51 (100)
13	06:16		06:42 (15)	06:44			07:13			07:43			07:17		08:11 (100)	07:48		08:16 (100)
	21:05	33	07:15 (15)	20:37			19:48			18:59			17:21	26	08:37 (100)	17:09	36	08:52 (100)
14	06:17		06:43 (15)	06:44			07:14			07:44			07:18		08:10 (100)	07:49		08:17 (100)
	21:05	32	07:15 (15)	20:35			19:46			18:58			17:20	28	08:38 (100)	17:10	36	08:53 (100)
15	06:18		06:44 (15)	06:45			07:15			07:45			07:20		08:10 (100)	07:50		08:18 (100)
	21:04	31	07:15 (15)	20:34			19:45			18:56			17:19	30	08:40 (100)	17:10	35	08:53 (100)
16	06:18		06:43 (15)	06:46		19:29 (16)	07:16			07:46			07:21		08:09 (100)	07:50		08:18 (100)
	21:04	30	07:13 (15)	20:33	10	19:39 (16)	19:43			18:55			17:18	32	08:41 (100)	17:10	35	08:53 (100)
17	06:19		06:44 (15)	06:47		19:27 (16)	07:17			07:47			07:22		08:08 (100)	07:51		08:19 (100)
	21:03	29	07:13 (15)	20:31	14	19:41 (16)	19:42			18:53			17:17	34	08:42 (100)	17:10	35	08:54 (100)
18	06:20		06:45 (15)	06:48		19:25 (16)	07:18			07:48			07:23		08:08 (100)	07:52		08:19 (100)
	21:02	28	07:13 (15)	20:30	18	19:43 (16)	19:40			18:52			17:16	34	08:42 (100)	17:11	34	08:53 (100)
19	06:21		06:47 (15)	06:49		19:23 (16)	07:19			07:49			07:24		08:07 (100)	07:52		08:19 (100)
	21:02	25	07:12 (15)	20:29	21	19:44 (16)	19:38			18:50			17:16	36	08:43 (100)	17:11	35	08:54 (100)
20	06:22		06:47 (15)	06:50		19:22 (16)	07:20			07:50			07:25		08:08 (100)	07:53		08:20 (100)
	21:01	24	07:11 (15)	20:27	23	19:45 (16)	19:37			18:49			17:15	36	08:44 (100)	17:12	35	08:55 (100)
21	06:22		06:48 (15)	06:51		19:21 (16)	07:21			07:51			07:26		08:08 (100)	07:53		08:20 (100)
	21:00	22	07:10 (15)	20:26	24	19:45 (16)	19:35			18:47			17:14	37	08:45 (100)	17:12	35	08:55 (100)
22	06:23		06:50 (15)	06:52		19:20 (16)	07:22			07:52			07:28		08:08 (100)	07:54		08:21 (100)
	21:00	19	07:09 (15)	20:24	26	19:46 (16)	19:33			18:46			17:14	37	08:45 (100)	17:13	35	08:56 (100)
23	06:24		06:52 (15)	06:53		19:20 (16)	07:23			07:53			07:29		08:07 (100)	07:54		08:21 (100)
	20:59	15	07:07 (15)	20:23	26	19:46 (16)	19:32			18:45			17:13	38	08:45 (100)	17:13	35	08:56 (100)
24	06:25		06:54 (15)	06:54		19:19 (16)	07:24			07:54			07:30		08:07 (100)	07:55		08:21 (100)
	20:58	11	07:05 (15)	20:21	27	19:46 (16)	19:30			18:43			17:13	39	08:46 (100)	17:14	35	08:56 (100)
25	06:26			06:55		19:19 (16)	07:25			07:56			07:31		08:08 (100)	07:55		08:22 (100)
	20:57			20:20	27	19:46 (16)	19:28			18:42			17:12	39	08:47 (100)	17:14	35	08:57 (100)
26	06:27			06:56		19:17 (16)	07:26			07:57			07:32		08:08 (100)	07:56		08:23 (100)
	20:56			20:18	28	19:45 (16)	19:27			18:41			17:12	39	08:47 (100)	17:15	35	08:58 (100)
27	06:28			06:57		19:17 (16)	07:27			07:58			07:33		08:09 (100)	07:56		08:23 (100)
	20:55			20:17	28	19:45 (16)	19:25			18:39			17:11	39	08:48 (100)	17:16	35	08:58 (100)
28	06:28			06:58		19:17 (16)	07:27			07:59			07:34		08:09 (100)	07:56		08:24 (100)
	20:55			20:15	27	19:44 (16)	19:23			18:38			17:11	39	08:48 (100)	17:16	35	08:59 (100)
29	06:29			06:59		19:18 (16)	07:28		08:01 (126)	08:00			07:35		08:09 (100)	07:57		08:24 (100)
	20:54			20:14	26	19:44 (16)	19:22	7	08:08 (126)	18:37			17:11	39	08:48 (100)	17:17	35	08:59 (100)
30	06:30			07:00		19:18 (16)	07:29		07:57 (126)	08:01			07:36		08:09 (100)	07:57		08:24 (100)
	20:53			20:12	25	19:43 (16)	19:20	13	08:10 (126)	18:36			17:10	39	08:48 (100)	17:18	36	09:00 (100)
31	06:31			07:01		19:19 (16)				08:02						07:57		08:24 (100)
	20:52			20:11	23	19:42 (16)				18:34						17:18	36	09:00 (100)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		731			373			75			182			707			1118	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.68			0.64			0.64			0.63			0.61			0.61	
Total reduction		0.41			0.38			0.39			0.35			0.22			0.30	
Total, real		297			142			29			64			157			336	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 52

Licensed user:
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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 8351 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6332)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:25 (108)	07:45			07:10		07:44 (83)	07:20			06:36		07:24 (82)	06:08		06:29 (106)
	17:20	29	08:54 (108)	17:53			18:26	38	08:22 (83)	19:59			20:28	89	19:58 (107)	20:57	45	19:53 (107)
2	07:58		08:25 (108)	07:44			07:08		07:44 (83)	07:19			06:35		07:24 (82)	06:08		06:29 (106)
	17:21	29	08:54 (108)	17:54			18:27	37	08:21 (83)	20:00			20:29	91	19:59 (107)	20:58	43	19:52 (107)
3	07:58		08:26 (108)	07:43			07:07		07:44 (83)	07:17			06:33		07:24 (82)	06:07		06:29 (106)
	17:21	30	08:56 (108)	17:56			18:28	37	08:21 (83)	20:00			20:30	92	20:00 (107)	20:59	43	19:52 (107)
4	07:58		08:26 (108)	07:42			07:05		07:44 (83)	07:15			06:32		07:25 (82)	06:07		06:28 (106)
	17:22	29	08:55 (108)	17:57			18:29	36	08:20 (83)	20:01			20:31	91	20:00 (107)	20:59	43	19:51 (107)
5	07:58		08:26 (108)	07:41			07:04		07:44 (83)	07:14			06:31		07:24 (82)	06:07		06:29 (106)
	17:23	30	08:56 (108)	17:58			18:31	36	08:20 (83)	20:02			20:32	92	20:00 (107)	21:00	40	19:50 (107)
6	07:58		08:27 (108)	07:40			07:02		07:44 (83)	07:12			06:30		07:24 (82)	06:06		06:29 (106)
	17:24	29	08:56 (108)	17:59			18:32	35	08:19 (83)	20:03			20:33	91	20:00 (107)	21:01	39	19:50 (107)
7	07:58		08:27 (108)	07:39			07:01		07:45 (83)	07:11			06:29		07:25 (82)	06:06		06:29 (106)
	17:25	30	08:57 (108)	18:01			18:33	34	08:19 (83)	20:04			20:34	91	20:01 (107)	21:01	37	19:49 (107)
8	07:58		08:28 (108)	07:37			07:59		08:45 (83)	07:09			06:27		07:25 (82)	06:06		06:28 (106)
	17:26	29	08:57 (108)	18:02			19:34	32	09:17 (83)	20:05			20:35	91	20:01 (107)	21:02	36	19:47 (107)
9	07:57		08:29 (108)	07:36			07:57		08:46 (83)	07:08			06:26		07:26 (82)	06:06		06:28 (106)
	17:27	29	08:58 (108)	18:03			19:35	29	09:15 (83)	20:06			20:36	90	20:01 (107)	21:02	33	19:46 (107)
10	07:57		08:29 (108)	07:35			07:56		08:47 (83)	07:06		07:50 (82)	06:25		07:27 (82)	06:06		06:29 (106)
	17:28	29	08:58 (108)	18:04			19:36	27	09:14 (83)	20:07	11	08:01 (82)	20:37	88	20:01 (107)	21:03	27	19:44 (107)
11	07:57		08:29 (108)	07:34			07:54		08:48 (83)	07:04		07:44 (82)	06:24		07:27 (82)	06:05		06:29 (106)
	17:29	29	08:58 (108)	18:05			19:37	24	09:12 (83)	20:08	21	08:05 (82)	20:38	87	20:01 (107)	21:04	24	06:53 (106)
12	07:57		08:30 (108)	07:33			07:53		08:51 (83)	07:03		07:41 (82)	06:23		07:28 (82)	06:05		06:29 (106)
	17:30	29	08:59 (108)	18:07			19:38	19	09:10 (83)	20:09	27	08:08 (82)	20:39	85	20:01 (107)	21:04	24	06:53 (106)
13	07:57		08:31 (108)	07:32			07:51		08:53 (83)	07:01		07:38 (82)	06:22		07:29 (82)	06:05		06:29 (106)
	17:31	28	08:59 (108)	18:08			19:39	13	09:06 (83)	20:10	31	08:09 (82)	20:40	83	20:01 (107)	21:05	25	06:54 (106)
14	07:56		08:31 (108)	07:30			07:49			07:00		07:37 (82)	06:21		07:30 (82)	06:05		06:29 (106)
	17:32	28	08:59 (108)	18:09			19:40			20:11	34	08:11 (82)	20:41	80	20:00 (107)	21:05	25	06:54 (106)
15	07:56		08:32 (108)	07:29			07:48			06:58		07:35 (82)	06:20		07:31 (82)	06:05		06:30 (106)
	17:33	27	08:59 (108)	18:10			19:41			20:12	37	08:12 (82)	20:42	77	20:00 (107)	21:05	24	06:54 (106)
16	07:55		08:32 (108)	07:28			07:46			06:57		07:33 (82)	06:19		07:32 (82)	06:05		06:30 (106)
	17:34	27	08:59 (108)	18:11			19:42			20:13	41	08:14 (82)	20:43	75	20:00 (107)	21:06	24	06:54 (106)
17	07:55		08:33 (108)	07:27			07:45			06:55		07:32 (82)	06:18		07:34 (82)	06:05		06:30 (106)
	17:36	26	08:59 (108)	18:12			19:43			20:14	42	08:14 (82)	20:44	71	20:00 (107)	21:06	24	06:54 (106)
18	07:55		08:34 (108)	07:25		07:59 (83)	07:43			06:54		07:31 (82)	06:17		07:35 (82)	06:05		06:30 (106)
	17:37	24	08:58 (108)	18:14	11	08:10 (83)	19:44			20:15	44	08:15 (82)	20:45	69	20:00 (107)	21:07	24	06:54 (106)
19	07:54		08:35 (108)	07:24		07:55 (83)	07:41			06:52		07:29 (82)	06:17		07:36 (82)	06:05		06:30 (106)
	17:38	24	08:59 (108)	18:15	18	08:13 (83)	19:45			20:16	46	08:15 (82)	20:46	65	19:59 (107)	21:07	25	06:55 (106)
20	07:54		08:36 (108)	07:23		07:53 (83)	07:40			06:51		07:29 (82)	06:16		07:38 (82)	06:06		06:31 (106)
	17:39	22	08:58 (108)	18:16	22	08:15 (83)	19:46			20:17	47	08:16 (82)	20:47	60	19:59 (107)	21:07	25	06:56 (106)
21	07:53		08:37 (108)	07:21		07:52 (83)	07:38			06:49		07:27 (82)	06:15		07:41 (82)	06:06		06:31 (106)
	17:40	21	08:58 (108)	18:17	25	08:17 (83)	19:48			20:18	49	08:16 (82)	20:48	55	19:59 (107)	21:07	25	06:56 (106)
22	07:52		08:38 (108)	07:20		07:50 (83)	07:37			06:48		07:27 (82)	06:14		07:43 (82)	06:06		06:31 (106)
	17:41	19	08:57 (108)	18:18	28	08:18 (83)	19:49			20:19	49	08:16 (82)	20:49	48	19:58 (107)	21:08	25	06:56 (106)
23	07:52		08:40 (108)	07:18		07:49 (83)	07:35			06:47		07:27 (82)	06:14		19:20 (107)	06:06		06:31 (106)
	17:42	15	08:55 (108)	18:19	31	08:20 (83)	19:50			20:20	60	19:46 (107)	20:50	38	19:58 (107)	21:08	25	06:56 (106)
24	07:51		08:42 (108)	07:17		07:47 (83)	07:33			06:45		07:25 (82)	06:13		19:21 (107)	06:06		06:31 (106)
	17:44	11	08:53 (108)	18:21	33	08:20 (83)	19:51			20:21	69	19:49 (107)	20:51	36	19:57 (107)	21:08	25	06:56 (106)
25	07:50		08:46 (108)	07:16		07:47 (83)	07:32			06:44		07:25 (82)	06:12		19:22 (107)	06:07		06:32 (106)
	17:45	5	08:51 (108)	18:22	34	08:21 (83)	19:52			20:22	75	19:52 (107)	20:51	35	19:57 (107)	21:08	24	06:56 (106)
26	07:50			07:14		07:45 (83)	07:30			06:42		07:25 (82)	06:11		06:34 (106)	06:07		06:32 (106)
	17:46			18:23	36	08:21 (83)	19:53			20:23	79	19:54 (107)	20:52	42	19:56 (107)	21:08	24	06:56 (106)
27	07:49			07:13		07:45 (83)	07:28			06:41		07:24 (82)	06:11		06:33 (106)	06:07		06:32 (106)
	17:47			18:24	36	08:21 (83)	19:54			20:24	82	19:55 (107)	20:53	43	19:56 (107)	21:08	24	06:56 (106)
28	07:48			07:11		07:44 (83)	07:27			06:40		07:24 (82)	06:10		06:32 (106)	06:08		06:32 (106)
	17:48			18:25	37	08:21 (83)	19:55			20:25	85	19:56 (107)	20:54	44	19:55 (107)	21:08	25	06:57 (106)
29	07:47						07:25			06:38		07:24 (82)	06:10		06:31 (106)	06:08		06:32 (106)
	17:50						19:56			20:26	87	19:57 (107)	20:55	46	19:55 (107)	21:08	25	06:57 (106)
30	07:46						07:23			06:37		07:24 (82)	06:09		06:30 (106)	06:09		06:33 (106)
	17:51						19:57			20:27	88	19:58 (107)	20:56	46	19:54 (107)	21:08	24	06:57 (106)
31	07:46						07:22						06:09		06:30 (106)			
	17:52						19:58						20:56	45	19:54 (107)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		628			311			397			1104			2136			876	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.61			0.63			0.63			0.66			0.65			0.67	
Total reduction		0.22			0.26			0.28			0.34			0.36			0.40	
Total, real		137			82			110			371			774			353	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 53

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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 8351 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6332)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:33 (106)	06:32		07:38 (82)	07:02		07:43 (82)	07:31		08:30 (83)	07:04			07:37		08:11 (108)
	21:08	24	06:57 (106)	20:51	85	20:11 (107)	20:09	21	08:04 (82)	19:19	17	08:47 (83)	17:33			17:10	29	08:40 (108)
2	06:10		06:34 (106)	06:33		07:38 (82)	07:03		07:48 (82)	07:32		08:28 (83)	07:05			07:38		08:11 (108)
	21:08	24	06:58 (106)	20:50	86	20:11 (107)	20:08	11	07:59 (82)	19:17	22	08:50 (83)	17:32			17:10	29	08:40 (108)
3	06:10		06:34 (106)	06:34		07:37 (82)	07:04			07:33		08:26 (83)	07:06			07:39		08:12 (108)
	21:08	30	19:50 (107)	20:49	88	20:11 (107)	20:06			19:15	25	08:51 (83)	17:31			17:10	29	08:41 (108)
4	06:11		06:34 (106)	06:35		07:36 (82)	07:05			07:34		08:24 (83)	07:07			07:40		08:12 (108)
	21:08	34	19:52 (107)	20:48	89	20:11 (107)	20:05			19:14	28	08:52 (83)	17:30			17:10	29	08:41 (108)
5	06:11		06:34 (106)	06:36		07:35 (82)	07:06			07:35		08:22 (83)	07:08			07:41		08:12 (108)
	21:08	36	19:53 (107)	20:47	90	20:10 (107)	20:03			19:12	31	08:53 (83)	17:29			17:09	30	08:42 (108)
6	06:12		06:35 (106)	06:37		07:34 (82)	07:07			07:36		08:21 (83)	07:09			07:42		08:13 (108)
	21:08	38	19:55 (107)	20:45	92	20:10 (107)	20:01			19:10	33	08:54 (83)	17:28			17:09	29	08:42 (108)
7	06:12		06:35 (106)	06:38		07:34 (82)	07:08			07:37		08:20 (83)	07:11			07:43		08:13 (108)
	21:07	40	19:56 (107)	20:44	91	20:10 (107)	20:00			19:09	34	08:54 (83)	17:27			17:09	30	08:43 (108)
8	06:13		06:36 (106)	06:39		07:34 (82)	07:09			07:38		08:19 (83)	07:12			07:44		08:14 (108)
	21:07	40	19:57 (107)	20:43	91	20:09 (107)	19:57			19:07	36	08:55 (83)	17:26			17:09	29	08:43 (108)
9	06:14		06:36 (106)	06:40		07:33 (82)	07:10			07:39		08:19 (83)	07:13			07:45		08:14 (108)
	21:07	43	19:59 (107)	20:42	92	20:09 (107)	19:55			19:06	36	08:55 (83)	17:25			17:09	30	08:44 (108)
10	06:14		06:36 (106)	06:41		07:33 (82)	07:11			07:40		08:18 (83)	07:14			07:46		08:15 (108)
	21:06	44	19:59 (107)	20:41	90	20:08 (107)	19:53			19:04	37	08:55 (83)	17:24			17:09	29	08:44 (108)
11	06:15		06:37 (106)	06:42		07:33 (82)	07:11			07:41		08:18 (83)	07:15			07:47		08:16 (108)
	21:06	45	20:01 (107)	20:39	91	20:08 (107)	19:52			19:03	37	08:55 (83)	17:23			17:09	29	08:45 (108)
12	06:16		06:38 (106)	06:43		07:32 (82)	07:12			07:42		08:17 (83)	07:16			07:47		08:16 (108)
	21:06	46	20:02 (107)	20:38	90	20:07 (107)	19:50			19:01	37	08:54 (83)	17:22			17:10	28	08:44 (108)
13	06:16		06:38 (106)	06:44		07:32 (82)	07:13			07:43		08:18 (83)	07:17			07:48		08:16 (108)
	21:05	46	20:02 (107)	20:37	89	20:06 (107)	19:48			19:00	37	08:55 (83)	17:21			17:10	29	08:45 (108)
14	06:17		06:39 (106)	06:45		07:32 (82)	07:14			07:44		08:18 (83)	07:19			07:49		08:17 (108)
	21:05	45	20:03 (107)	20:36	87	20:05 (107)	19:47			18:58	36	08:54 (83)	17:20			17:10	28	08:45 (108)
15	06:18		06:40 (106)	06:46		07:32 (82)	07:15			07:45		08:18 (83)	07:20			07:50		08:18 (108)
	21:04	46	20:04 (107)	20:34	85	20:04 (107)	19:45			18:57	36	08:54 (83)	17:19			17:10	28	08:46 (108)
16	06:19		06:42 (106)	06:47		07:32 (82)	07:16			07:46		08:18 (83)	07:21			07:50		08:18 (108)
	21:04	44	20:05 (107)	20:33	81	20:02 (107)	19:43			18:55	35	08:53 (83)	17:18			17:10	28	08:46 (108)
17	06:19		06:43 (106)	06:48		07:31 (82)	07:17			07:47		08:18 (83)	07:22		08:19 (108)	07:51		08:19 (108)
	21:03	42	20:05 (107)	20:32	79	20:00 (107)	19:42			18:54	34	08:52 (83)	17:17	5	08:24 (108)	17:11	28	08:47 (108)
18	06:20		06:45 (106)	06:49		07:31 (82)	07:18			07:48		08:19 (83)	07:23		08:16 (108)	07:52		08:19 (108)
	21:03	39	20:06 (107)	20:30	73	19:57 (107)	19:40			18:52	32	08:51 (83)	17:17	11	08:27 (108)	17:11	28	08:47 (108)
19	06:21		19:31 (107)	06:50		07:31 (82)	07:19			07:49		08:20 (83)	07:24		08:15 (108)	07:52		08:19 (108)
	21:02	36	20:07 (107)	20:29	68	19:55 (107)	19:38			18:51	30	08:50 (83)	17:16	15	08:30 (108)	17:11	28	08:47 (108)
20	06:22		19:31 (107)	06:51		07:31 (82)	07:20			07:50		08:21 (83)	07:25		08:13 (108)	07:53		08:20 (108)
	21:01	37	20:08 (107)	20:27	59	19:50 (107)	19:37			18:49	27	08:48 (83)	17:15	19	08:32 (108)	17:12	28	08:48 (108)
21	06:23		07:56 (82)	06:51		07:32 (82)	07:21			07:51		08:22 (83)	07:27		08:12 (108)	07:54		08:20 (108)
	21:01	41	20:08 (107)	20:26	49	08:21 (82)	19:35			18:48	24	08:46 (83)	17:15	21	08:33 (108)	17:12	28	08:48 (108)
22	06:24		07:51 (82)	06:52		07:32 (82)	07:22			07:52		08:24 (83)	07:28		08:12 (108)	07:54		08:21 (108)
	21:00	52	20:08 (107)	20:25	48	08:20 (82)	19:33			18:46	21	08:45 (83)	17:14	22	08:34 (108)	17:13	28	08:49 (108)
23	06:24		07:49 (82)	06:53		07:33 (82)	07:23			07:54		08:26 (83)	07:29		08:11 (108)	07:55		08:21 (108)
	20:59	58	20:09 (107)	20:23	47	08:20 (82)	19:32			18:45	17	08:43 (83)	17:14	24	08:35 (108)	17:13	28	08:49 (108)
24	06:25		07:47 (82)	06:54		07:33 (82)	07:24			07:55		08:30 (83)	07:30		08:12 (108)	07:55		08:22 (108)
	20:58	63	20:10 (107)	20:22	46	08:19 (82)	19:30			18:44	8	08:38 (83)	17:13	24	08:36 (108)	17:14	28	08:50 (108)
25	06:26		07:46 (82)	06:55		07:34 (82)	07:25			07:56			07:31		08:11 (108)	07:55		08:22 (108)
	20:57	66	20:10 (107)	20:20	44	08:18 (82)	19:28			18:42			17:13	26	08:37 (108)	17:15	28	08:50 (108)
26	06:27		07:45 (82)	06:56		07:35 (82)	07:26			07:57			07:32		08:11 (108)	07:56		08:23 (108)
	20:57	70	20:11 (107)	20:19	42	08:17 (82)	19:27			18:41			17:12	27	08:38 (108)	17:15	27	08:50 (108)
27	06:28		07:43 (82)	06:57		07:35 (82)	07:27			07:58			07:33		08:11 (108)	07:56		08:24 (108)
	20:56	73	20:10 (107)	20:17	40	08:15 (82)	19:25			18:40			17:12	27	08:38 (108)	17:16	28	08:52 (108)
28	06:29		07:42 (82)	06:58		07:37 (82)	07:28			07:59			07:34		08:11 (108)	07:56		08:24 (108)
	20:55	76	20:10 (107)	20:16	37	08:14 (82)	19:23			18:38			17:11	28	08:39 (108)	17:16	28	08:52 (108)
29	06:30		07:41 (82)	06:59		07:37 (82)	07:29			08:00			07:35		08:11 (108)	07:57		08:24 (108)
	20:54	79	20:11 (107)	20:14	34	08:11 (82)	19:22			18:37			17:11	28	08:39 (108)	17:17	28	08:52 (108)
30	06:31		07:40 (82)	07:00		07:38 (82)	07:30		08:35 (83)	08:01			07:36		08:11 (108)	07:57		08:24 (108)
	20:53	81	20:11 (107)	20:13	31	08:09 (82)	19:20	9	08:44 (83)	18:36			17:11	29	08:40 (108)	17:18	29	08:53 (108)
31	06:31		07:39 (82)	07:01		07:41 (82)				08:02						07:57		08:24 (108)
	20:52	83	20:11 (107)	20:11	26	08:07 (82)				18:35						17:19	29	08:53 (108)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		1521			2140			41			710			306			884	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.65			0.66			0.66			0.63			0.61			0.61	
Total reduction		0.39			0.39			0.40			0.35			0.22			0.30	
Total, real		593			840			16			251			68			267	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

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4/27/2012 3:34 PM / 54

Licensed user:
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US-SYRACUSE, NY 13202
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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 8352 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6333)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:26 (108)	07:45			07:10		07:45 (83)	07:20			06:36		07:23 (82)	06:08		06:29 (106)
	17:20	29	08:55 (108)	17:53			18:26	37	08:22 (83)	19:59			20:28	92	19:59 (107)	20:57	41	19:52 (107)
2	07:58		08:26 (108)	07:44			07:08		07:44 (83)	07:19			06:35		07:23 (82)	06:08		06:29 (106)
	17:21	29	08:55 (108)	17:54			18:27	38	08:22 (83)	20:00			20:29	93	20:00 (107)	20:58	39	19:51 (107)
3	07:58		08:27 (108)	07:43			07:07		07:45 (83)	07:17			06:33		07:23 (82)	06:07		06:29 (106)
	17:21	30	08:57 (108)	17:56			18:28	37	08:22 (83)	20:00			20:30	93	20:00 (107)	20:59	39	19:51 (107)
4	07:58		08:27 (108)	07:42			07:05		07:44 (83)	07:15			06:32		07:23 (82)	06:07		06:28 (106)
	17:22	29	08:56 (108)	17:57			18:29	37	08:21 (83)	20:01			20:31	94	20:01 (107)	20:59	37	19:49 (107)
5	07:58		08:27 (108)	07:41			07:04		07:45 (83)	07:14			06:31		07:23 (82)	06:07		06:28 (106)
	17:23	30	08:57 (108)	17:58			18:31	36	08:21 (83)	20:02			20:32	93	20:00 (107)	21:00	34	19:48 (107)
6	07:58		08:28 (108)	07:40			07:02		07:45 (83)	07:12			06:30		07:23 (82)	06:06		06:29 (106)
	17:24	29	08:57 (108)	17:59			18:32	35	08:20 (83)	20:03			20:33	93	20:00 (107)	21:01	32	19:47 (107)
7	07:58		08:28 (108)	07:39			07:01		07:45 (83)	07:11			06:29		07:23 (82)	06:06		06:29 (106)
	17:25	30	08:58 (108)	18:01			18:33	35	08:20 (83)	20:04			20:34	94	20:01 (107)	21:01	28	19:45 (107)
8	07:58		08:29 (108)	07:37			07:59		08:46 (83)	07:09			06:27		07:24 (82)	06:06		06:28 (106)
	17:26	29	08:58 (108)	18:02			19:34	32	09:18 (83)	20:05			20:35	93	20:01 (107)	21:02	22	06:50 (106)
9	07:57		08:29 (108)	07:36			07:57		08:46 (83)	07:08			06:26		07:24 (82)	06:06		06:28 (106)
	17:27	30	08:59 (108)	18:03			19:35	30	09:16 (83)	20:06			20:36	92	20:01 (107)	21:02	23	06:51 (106)
10	07:57		08:30 (108)	07:35			07:56		08:48 (83)	07:06			06:25		07:25 (82)	06:06		06:28 (106)
	17:28	29	08:59 (108)	18:04			19:36	27	09:15 (83)	20:07			20:37	90	20:01 (107)	21:03	23	06:51 (106)
11	07:57		08:30 (108)	07:34			07:54		08:48 (83)	07:04		07:48 (82)	06:24		07:25 (82)	06:05		06:28 (106)
	17:29	29	08:59 (108)	18:05			19:37	25	09:13 (83)	20:08	12	08:00 (82)	20:38	90	20:01 (107)	21:04	24	06:52 (106)
12	07:57		08:31 (108)	07:33			07:53		08:51 (83)	07:03		07:44 (82)	06:23		07:26 (82)	06:05		06:28 (106)
	17:30	29	09:00 (108)	18:07			19:38	20	09:11 (83)	20:09	21	08:05 (82)	20:39	88	20:01 (107)	21:04	24	06:52 (106)
13	07:57		08:32 (108)	07:32			07:51		08:53 (83)	07:01		07:40 (82)	06:22		07:26 (82)	06:05		06:29 (106)
	17:31	28	09:00 (108)	18:08			19:39	15	09:08 (83)	20:10	27	08:07 (82)	20:40	87	20:01 (107)	21:05	23	06:52 (106)
14	07:56		08:32 (108)	07:30			07:49		08:58 (83)	07:00		07:38 (82)	06:21		07:27 (82)	06:05		06:29 (106)
	17:32	28	09:00 (108)	18:09			19:40	3	09:01 (83)	20:11	31	08:09 (82)	20:41	84	20:00 (107)	21:05	24	06:53 (106)
15	07:56		08:33 (108)	07:29			07:48			06:58		07:36 (82)	06:20		07:28 (82)	06:05		06:29 (106)
	17:33	27	09:00 (108)	18:10			19:41			20:12	35	08:11 (82)	20:42	81	20:00 (107)	21:05	24	06:53 (106)
16	07:55		08:33 (108)	07:28			07:46			06:57		07:34 (82)	06:19		07:28 (82)	06:05		06:29 (106)
	17:34	26	08:59 (108)	18:11			19:42			20:13	38	08:12 (82)	20:43	80	20:00 (107)	21:06	24	06:53 (106)
17	07:55		08:34 (108)	07:27			07:45			06:55		07:32 (82)	06:18		07:30 (82)	06:05		06:29 (106)
	17:36	26	09:00 (108)	18:12			19:43			20:14	41	08:13 (82)	20:44	77	20:00 (107)	21:06	24	06:53 (106)
18	07:55		08:35 (108)	07:25		07:59 (83)	07:43			06:54		07:31 (82)	06:17		07:31 (82)	06:05		06:29 (106)
	17:37	24	08:59 (108)	18:14	12	08:11 (83)	19:44			20:15	43	08:14 (82)	20:45	75	20:00 (107)	21:07	25	06:54 (106)
19	07:54		08:36 (108)	07:24		07:55 (83)	07:41			06:52		07:29 (82)	06:17		07:32 (82)	06:05		06:29 (106)
	17:38	23	08:59 (108)	18:15	19	08:14 (83)	19:45			20:16	45	08:14 (82)	20:46	72	19:59 (107)	21:07	25	06:54 (106)
20	07:54		08:37 (108)	07:23		07:53 (83)	07:40			06:51		07:29 (82)	06:16		07:33 (82)	06:06		06:30 (106)
	17:39	21	08:58 (108)	18:16	23	08:16 (83)	19:46			20:17	46	08:15 (82)	20:47	68	19:59 (107)	21:07	25	06:55 (106)
21	07:53		08:39 (108)	07:21		07:52 (83)	07:38			06:49		07:27 (82)	06:15		07:35 (82)	06:06		06:30 (106)
	17:40	19	08:58 (108)	18:17	26	08:18 (83)	19:48			20:18	48	08:15 (82)	20:48	65	19:59 (107)	21:07	25	06:55 (106)
22	07:52		08:40 (108)	07:20		07:50 (83)	07:37			06:48		07:27 (82)	06:14		07:36 (82)	06:06		06:30 (106)
	17:41	17	08:57 (108)	18:18	29	08:19 (83)	19:49			20:19	49	08:16 (82)	20:49	61	19:58 (107)	21:08	25	06:55 (106)
23	07:52		08:41 (108)	07:18		07:49 (83)	07:35			06:47		07:26 (82)	06:14		07:38 (82)	06:06		06:30 (106)
	17:42	15	08:56 (108)	18:19	31	08:20 (83)	19:50			20:20	62	19:47 (107)	20:50	55	19:57 (107)	21:08	25	06:55 (106)
24	07:51		08:44 (108)	07:17		07:48 (83)	07:33			06:45		07:25 (82)	06:13		07:39 (82)	06:06		06:30 (106)
	17:44	9	08:53 (108)	18:21	33	08:21 (83)	19:51			20:21	70	19:50 (107)	20:51	51	19:56 (107)	21:08	25	06:55 (106)
25	07:50			07:16		07:47 (83)	07:32			06:44		07:25 (82)	06:12		07:43 (82)	06:07		06:31 (106)
	17:45			18:22	35	08:22 (83)	19:52			20:22	76	19:53 (107)	20:51	45	19:57 (107)	21:08	24	06:55 (106)
26	07:50			07:14		07:46 (83)	07:30			06:42		07:25 (82)	06:11		19:24 (107)	06:07		06:31 (106)
	17:46			18:23	36	08:22 (83)	19:53			20:23	80	19:55 (107)	20:52	32	19:56 (107)	21:08	24	06:55 (106)
27	07:49			07:13		07:46 (83)	07:28			06:41		07:24 (82)	06:11		06:35 (106)	06:07		06:31 (106)
	17:47			18:24	36	08:22 (83)	19:54			20:24	82	19:55 (107)	20:53	36	19:56 (107)	21:08	24	06:55 (106)
28	07:48			07:11		07:45 (83)	07:27			06:40		07:24 (82)	06:10		06:33 (106)	06:08		06:32 (106)
	17:48			18:25	37	08:22 (83)	19:55			20:25	85	19:57 (107)	20:54	39	19:55 (107)	21:08	24	06:56 (106)
29	07:47						07:25			06:38		07:24 (82)	06:10		06:32 (106)	06:08		06:32 (106)
	17:50						19:56			20:26	88	19:58 (107)	20:55	39	19:54 (107)	21:08	24	06:56 (106)
30	07:46						07:23			06:37		07:23 (82)	06:09		06:31 (106)	06:09		06:33 (106)
	17:51						19:57			20:27	90	19:58 (107)	20:56	40	19:53 (107)	21:08	23	06:56 (106)
31	07:46						07:22						06:09		06:30 (106)			
	17:52						19:58						20:56	40	19:53 (107)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		615			317			407			1069			2232			803	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.61			0.63			0.63			0.66			0.65			0.68	
Total reduction		0.22			0.26			0.28			0.34			0.36			0.40	
Total, real		134			84			113			359			810			325	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 55

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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 8352 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6333)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:32 (106)	06:32		07:36 (82)	07:02		07:47 (82)	07:31		08:30 (83)	07:04			07:37		08:12 (108)
	21:08	24	06:56 (106)	20:51	88	20:11 (107)	20:09	12	07:59 (82)	19:19	19	08:49 (83)	17:33			17:10	29	08:41 (108)
2	06:10		06:33 (106)	06:33		07:36 (82)	07:03			07:32		08:28 (83)	07:05			07:38		08:12 (108)
	21:08	24	06:57 (106)	20:50	90	20:12 (107)	20:08			19:17	23	08:51 (83)	17:32			17:10	30	08:42 (108)
3	06:10		06:33 (106)	06:34		07:35 (82)	07:04			07:33		08:26 (83)	07:06			07:39		08:13 (108)
	21:08	23	06:56 (106)	20:49	91	20:12 (107)	20:06			19:15	26	08:52 (83)	17:31			17:10	29	08:42 (108)
4	06:11		06:34 (106)	06:35		07:35 (82)	07:05			07:34		08:24 (83)	07:07			07:40		08:13 (108)
	21:08	23	06:57 (106)	20:48	92	20:12 (107)	20:05			19:14	29	08:53 (83)	17:30			17:10	29	08:42 (108)
5	06:11		06:34 (106)	06:36		07:33 (82)	07:06			07:35		08:23 (83)	07:08			07:41		08:13 (108)
	21:08	25	19:49 (107)	20:47	92	20:10 (107)	20:03			19:12	31	08:54 (83)	17:29			17:09	30	08:43 (108)
6	06:12		06:35 (106)	06:37		07:33 (82)	07:07			07:36		08:21 (83)	07:09			07:42		08:14 (108)
	21:08	30	19:52 (107)	20:45	93	20:10 (107)	20:01			19:10	34	08:55 (83)	17:28			17:09	29	08:43 (108)
7	06:12		06:34 (106)	06:38		07:33 (82)	07:08			07:37		08:20 (83)	07:11			07:43		08:14 (108)
	21:07	35	19:54 (107)	20:44	93	20:10 (107)	20:00			19:09	35	08:55 (83)	17:27			17:09	30	08:44 (108)
8	06:13		06:35 (106)	06:39		07:32 (82)	07:09			07:38		08:20 (83)	07:12			07:44		08:15 (108)
	21:07	36	19:56 (107)	20:43	95	20:10 (107)	19:57			19:07	35	08:55 (83)	17:26			17:09	29	08:44 (108)
9	06:14		06:36 (106)	06:40		07:32 (82)	07:10			07:39		08:19 (83)	07:13			07:45		08:15 (108)
	21:07	37	19:57 (107)	20:42	93	20:09 (107)	19:55			19:06	37	08:56 (83)	17:25			17:09	30	08:45 (108)
10	06:14		06:36 (106)	06:41		07:32 (82)	07:11			07:40		08:18 (83)	07:14			07:46		08:16 (108)
	21:06	39	19:58 (107)	20:41	93	20:09 (107)	19:53			19:04	38	08:56 (83)	17:24			17:09	29	08:45 (108)
11	06:15		06:37 (106)	06:42		07:32 (82)	07:11			07:41		08:18 (83)	07:15			07:47		08:17 (108)
	21:06	39	19:59 (107)	20:39	91	20:08 (107)	19:52			19:03	37	08:55 (83)	17:23			17:09	29	08:46 (108)
12	06:16		06:38 (106)	06:43		07:31 (82)	07:12			07:42		08:18 (83)	07:16			07:47		08:16 (108)
	21:06	41	20:01 (107)	20:38	91	20:07 (107)	19:50			19:01	37	08:55 (83)	17:22			17:10	29	08:45 (108)
13	06:16		06:38 (106)	06:44		07:31 (82)	07:13			07:43		08:18 (83)	07:17			07:48		08:17 (108)
	21:05	41	20:01 (107)	20:37	89	20:06 (107)	19:48			19:00	38	08:56 (83)	17:21			17:10	29	08:46 (108)
14	06:17		06:40 (106)	06:45		07:31 (82)	07:14			07:44		08:18 (83)	07:19			07:49		08:18 (108)
	21:05	40	20:02 (107)	20:36	87	20:05 (107)	19:47			18:58	37	08:55 (83)	17:20			17:10	29	08:47 (108)
15	06:18		06:41 (106)	06:46		07:31 (82)	07:15			07:45		08:18 (83)	07:20			07:50		08:19 (108)
	21:04	39	20:03 (107)	20:34	85	20:04 (107)	19:45			18:57	37	08:55 (83)	17:19			17:10	28	08:47 (108)
16	06:19		06:43 (106)	06:47		07:31 (82)	07:16			07:46		08:19 (83)	07:21			07:50		08:18 (108)
	21:04	38	20:05 (107)	20:33	83	20:03 (107)	19:43			18:55	35	08:54 (83)	17:18			17:10	29	08:47 (108)
17	06:19		19:33 (107)	06:48		07:30 (82)	07:17			07:47		08:19 (83)	07:22			07:51		08:19 (108)
	21:03	32	20:05 (107)	20:32	80	20:00 (107)	19:42			18:54	34	08:53 (83)	17:17			17:11	29	08:48 (108)
18	06:20		07:54 (82)	06:49		07:31 (82)	07:18			07:48		08:19 (83)	07:23		08:18 (108)	07:52		08:20 (108)
	21:03	40	20:06 (107)	20:30	74	19:58 (107)	19:40			18:52	33	08:52 (83)	17:17	9	08:27 (108)	17:11	29	08:49 (108)
19	06:21		07:51 (82)	06:50		07:31 (82)	07:19			07:49		08:20 (83)	07:24		08:16 (108)	07:52		08:20 (108)
	21:02	48	20:07 (107)	20:29	68	19:55 (107)	19:38			18:51	31	08:51 (83)	17:16	15	08:31 (108)	17:11	29	08:49 (108)
20	06:22		07:49 (82)	06:51		07:31 (82)	07:20			07:50		08:21 (83)	07:25		08:15 (108)	07:53		08:21 (108)
	21:01	53	20:07 (107)	20:27	60	19:51 (107)	19:37			18:49	28	08:49 (83)	17:15	17	08:32 (108)	17:12	28	08:49 (108)
21	06:23		07:46 (82)	06:51		07:32 (82)	07:21			07:51		08:22 (83)	07:27		08:14 (108)	07:54		08:21 (108)
	21:01	58	20:07 (107)	20:26	49	08:21 (82)	19:35			18:48	25	08:47 (83)	17:15	19	08:33 (108)	17:12	28	08:49 (108)
22	06:24		07:45 (82)	06:52		07:32 (82)	07:22			07:52		08:25 (83)	07:28		08:13 (108)	07:54		08:22 (108)
	21:00	62	20:08 (107)	20:25	48	08:20 (82)	19:33			18:46	21	08:46 (83)	17:14	21	08:34 (108)	17:13	28	08:50 (108)
23	06:24		07:44 (82)	06:53		07:33 (82)	07:23			07:54		08:27 (83)	07:29		08:12 (108)	07:55		08:22 (108)
	20:59	67	20:09 (107)	20:23	46	08:19 (82)	19:32			18:45	17	08:44 (83)	17:14	23	08:35 (108)	17:13	28	08:50 (108)
24	06:25		07:43 (82)	06:54		07:33 (82)	07:24			07:55		08:30 (83)	07:30		08:13 (108)	07:55		08:23 (108)
	20:58	69	20:09 (107)	20:22	45	08:18 (82)	19:30			18:44	10	08:40 (83)	17:13	24	08:37 (108)	17:14	29	08:52 (108)
25	06:26		07:42 (82)	06:55		07:34 (82)	07:25			07:56			07:31		08:12 (108)	07:55		08:23 (108)
	20:57	73	20:10 (107)	20:20	43	08:17 (82)	19:28			18:42			17:13	26	08:38 (108)	17:15	29	08:52 (108)
26	06:27		07:41 (82)	06:56		07:35 (82)	07:26			07:57			07:32		08:12 (108)	07:56		08:23 (108)
	20:57	75	20:10 (107)	20:19	41	08:16 (82)	19:27			18:41			17:12	27	08:39 (108)	17:15	29	08:52 (108)
27	06:28		07:39 (82)	06:57		07:36 (82)	07:27			07:58			07:33		08:12 (108)	07:56		08:24 (108)
	20:56	79	20:10 (107)	20:17	38	08:14 (82)	19:25			18:40			17:12	27	08:39 (108)	17:16	29	08:53 (108)
28	06:29		07:39 (82)	06:58		07:38 (82)	07:28			07:59			07:34		08:12 (108)	07:56		08:25 (108)
	20:55	80	20:10 (107)	20:16	34	08:12 (82)	19:23			18:38			17:11	28	08:40 (108)	17:16	28	08:53 (108)
29	06:30		07:38 (82)	06:59		07:38 (82)	07:29			08:00			07:35		08:12 (108)	07:57		08:25 (108)
	20:54	83	20:11 (107)	20:14	31	08:09 (82)	19:22			18:37			17:11	28	08:40 (108)	17:17	29	08:54 (108)
30	06:31		07:37 (82)	07:00		07:40 (82)	07:30		08:34 (83)	08:01			07:36		08:12 (108)	07:57		08:25 (108)
	20:53	85	20:11 (107)	20:13	27	08:07 (82)	19:20	12	08:46 (83)	18:36			17:11	29	08:41 (108)	17:18	29	08:54 (108)
31	06:31		07:37 (82)	07:01		07:43 (82)				08:02						07:57		08:25 (108)
	20:52	86	20:11 (107)	20:11	21	08:04 (82)				18:35						17:19	29	08:54 (108)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		1524			2151			24			727			293			897	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.65			0.66			0.65			0.63			0.61			0.61	
Total reduction		0.39			0.39			0.40			0.35			0.22			0.30	
Total, real		595			845			9			257			66			271	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 56

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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 8353 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6334)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:30 (108)	07:45			07:10		07:49 (83)	07:20			06:36		07:26 (82)	06:08		06:30 (106)
	17:20	30	09:00 (108)	17:53			18:26	38	08:27 (83)	19:59			20:28	96	19:57 (107)	20:57	17	06:47 (106)
2	07:58		08:30 (108)	07:44			07:08		07:49 (83)	07:19			06:35		07:26 (82)	06:08		06:30 (106)
	17:21	30	09:00 (108)	17:54			18:27	37	08:26 (83)	20:00			20:29	97	19:58 (107)	20:58	19	06:49 (106)
3	07:58		08:31 (108)	07:43			07:07		07:49 (83)	07:17			06:33		07:27 (82)	06:07		06:30 (106)
	17:21	30	09:01 (108)	17:56			18:28	37	08:26 (83)	20:00			20:30	95	19:58 (107)	20:59	20	06:50 (106)
4	07:58		08:31 (108)	07:42			07:05		07:49 (83)	07:15			06:32		07:27 (82)	06:07		06:29 (106)
	17:22	30	09:01 (108)	17:57			18:29	36	08:25 (83)	20:01			20:31	95	19:58 (107)	20:59	20	06:49 (106)
5	07:58		08:32 (108)	07:41			07:04		07:50 (83)	07:14			06:31		07:26 (82)	06:07		06:29 (106)
	17:23	29	09:01 (108)	17:58			18:31	35	08:25 (83)	20:02			20:32	95	19:57 (107)	21:00	21	06:50 (106)
6	07:58		08:32 (108)	07:40			07:02		07:50 (83)	07:12			06:30		07:27 (82)	06:06		06:29 (106)
	17:24	29	09:01 (108)	17:59			18:32	33	08:23 (83)	20:03			20:33	93	19:57 (107)	21:01	22	06:51 (106)
7	07:58		08:33 (108)	07:39			07:01		07:52 (83)	07:11			06:29		07:27 (82)	06:06		06:29 (106)
	17:25	29	09:02 (108)	18:01			18:33	30	08:22 (83)	20:04			20:34	93	19:57 (107)	21:01	23	06:52 (106)
8	07:58		08:34 (108)	07:37			07:59		08:52 (83)	07:09			06:27		07:28 (82)	06:06		06:28 (106)
	17:26	28	09:02 (108)	18:02			19:34	28	09:20 (83)	20:05			20:35	91	19:57 (107)	21:02	23	06:51 (106)
9	07:57		08:34 (108)	07:36			07:57		08:53 (83)	07:08		07:54 (82)	06:26		07:28 (82)	06:06		06:28 (106)
	17:27	29	09:03 (108)	18:03			19:35	25	09:18 (83)	20:06	10	08:04 (82)	20:36	91	19:57 (107)	21:02	24	06:52 (106)
10	07:57		08:35 (108)	07:35			07:56		08:56 (83)	07:06		07:49 (82)	06:25		07:29 (82)	06:06		06:29 (106)
	17:28	28	09:03 (108)	18:04			19:36	20	09:16 (83)	20:07	21	08:10 (82)	20:37	87	19:56 (107)	21:03	23	06:52 (106)
11	07:57		08:35 (108)	07:34			07:54		08:58 (83)	07:04		07:45 (82)	06:24		07:29 (82)	06:05		06:29 (106)
	17:29	27	09:02 (108)	18:05			19:37	15	09:13 (83)	20:08	27	08:12 (82)	20:38	86	19:56 (107)	21:04	24	06:53 (106)
12	07:57		08:36 (108)	07:33			07:53			07:03		07:43 (82)	06:23		07:30 (82)	06:05		06:29 (106)
	17:30	27	09:03 (108)	18:07			19:38			20:09	32	08:15 (82)	20:39	84	19:56 (107)	21:04	24	06:53 (106)
13	07:57		08:37 (108)	07:32			07:51			07:01		07:40 (82)	06:22		07:31 (82)	06:05		06:29 (106)
	17:31	26	09:03 (108)	18:08			19:39			20:10	36	08:16 (82)	20:40	80	19:55 (107)	21:05	24	06:53 (106)
14	07:56		08:38 (108)	07:30			07:49			07:00		07:39 (82)	06:21		07:31 (82)	06:05		06:29 (106)
	17:32	24	09:02 (108)	18:09			19:40			20:11	39	08:18 (82)	20:41	79	19:55 (107)	21:05	25	06:54 (106)
15	07:56		08:39 (108)	07:29		08:04 (83)	07:48			06:58		07:37 (82)	06:20		07:32 (82)	06:05		06:29 (106)
	17:33	24	09:03 (108)	18:10	12	08:16 (83)	19:41			20:12	41	08:18 (82)	20:42	75	19:54 (107)	21:05	25	06:54 (106)
16	07:55		08:40 (108)	07:28		08:00 (83)	07:46			06:57		07:36 (82)	06:19		07:33 (82)	06:05		06:29 (106)
	17:34	22	09:02 (108)	18:11	18	08:18 (83)	19:42			20:13	44	08:20 (82)	20:43	72	19:53 (107)	21:06	25	06:54 (106)
17	07:55		08:41 (108)	07:27		07:58 (83)	07:45			06:55		07:34 (82)	06:18		07:35 (82)	06:05		06:29 (106)
	17:36	21	09:02 (108)	18:12	23	08:21 (83)	19:43			20:14	46	08:20 (82)	20:44	69	19:54 (107)	21:06	25	06:54 (106)
18	07:55		08:42 (108)	07:25		07:57 (83)	07:43			06:54		07:33 (82)	06:17		07:36 (82)	06:05		06:30 (106)
	17:37	19	09:01 (108)	18:14	26	08:23 (83)	19:44			20:15	48	08:21 (82)	20:45	66	19:53 (107)	21:07	24	06:54 (106)
19	07:54		08:44 (108)	07:24		07:55 (83)	07:41			06:52		07:32 (82)	06:17		07:37 (82)	06:05		06:30 (106)
	17:38	16	09:00 (108)	18:15	29	08:24 (83)	19:45			20:16	49	08:21 (82)	20:46	61	19:52 (107)	21:07	24	06:54 (106)
20	07:54		08:46 (108)	07:23		07:54 (83)	07:40			06:51		07:31 (82)	06:16		07:38 (82)	06:06		06:31 (106)
	17:39	12	08:58 (108)	18:16	31	08:25 (83)	19:46			20:17	66	19:46 (107)	20:47	57	19:51 (107)	21:07	24	06:55 (106)
21	07:53		08:49 (108)	07:21		07:53 (83)	07:38			06:49		07:30 (82)	06:15		07:40 (82)	06:06		06:31 (106)
	17:40	8	08:57 (108)	18:17	33	08:26 (83)	19:48			20:18	73	19:49 (107)	20:48	52	19:50 (107)	21:07	25	06:56 (106)
22	07:52			07:20		07:52 (83)	07:37			06:48		07:29 (82)	06:14		07:42 (82)	06:06		06:31 (106)
	17:41			18:18	34	08:26 (83)	19:49			20:19	78	19:51 (107)	20:49	46	19:49 (107)	21:08	25	06:56 (106)
23	07:52			07:18		07:51 (83)	07:35			06:47		07:29 (82)	06:14		07:43 (82)	06:06		06:31 (106)
	17:42			18:19	36	08:27 (83)	19:50			20:20	83	19:53 (107)	20:50	41	19:48 (107)	21:08	24	06:55 (106)
24	07:51			07:17		07:50 (83)	07:33			06:45		07:28 (82)	06:13		07:46 (82)	06:06		06:31 (106)
	17:44			18:21	37	08:27 (83)	19:51			20:21	85	19:53 (107)	20:51	32	19:46 (107)	21:08	24	06:55 (106)
25	07:50			07:16		07:50 (83)	07:32			06:44		07:28 (82)	06:12		19:28 (107)	06:07		06:31 (106)
	17:45			18:22	38	08:28 (83)	19:52			20:22	88	19:55 (107)	20:51	17	19:45 (107)	21:08	25	06:56 (106)
26	07:50			07:14		07:49 (83)	07:30			06:42		07:28 (82)	06:11		19:30 (107)	06:07		06:31 (106)
	17:46			18:23	38	08:27 (83)	19:53			20:23	91	19:56 (107)	20:52	13	19:43 (107)	21:08	25	06:56 (106)
27	07:49			07:13		07:49 (83)	07:28			06:41		07:27 (82)	06:11		06:35 (106)	06:07		06:31 (106)
	17:47			18:24	39	08:28 (83)	19:54			20:24	92	19:56 (107)	20:53	15	19:41 (107)	21:08	25	06:56 (106)
28	07:48			07:11		07:49 (83)	07:27			06:40		07:27 (82)	06:10		06:33 (106)	06:08		06:32 (106)
	17:48			18:25	38	08:27 (83)	19:55			20:25	93	19:56 (107)	20:54	10	06:43 (106)	21:08	25	06:57 (106)
29	07:47						07:25			06:38		07:27 (82)	06:10		06:32 (106)	06:08		06:32 (106)
	17:50						19:56			20:26	94	19:57 (107)	20:55	13	06:45 (106)	21:08	24	06:56 (106)
30	07:46						07:23			06:37		07:26 (82)	06:09		06:31 (106)	06:09		06:33 (106)
	17:51						19:57			20:27	96	19:57 (107)	20:56	15	06:46 (106)	21:08	24	06:57 (106)
31	07:46						07:22						06:09		06:31 (106)			
	17:52						19:58						20:56	16	06:47 (106)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		518			432			334			1332			1932			702	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.61			0.63			0.63			0.66			0.65			0.68	
Total reduction		0.22			0.26			0.28			0.34			0.36			0.41	
Total, real		113			114			92			446			704			287	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 57

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 8353 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6334)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:33 (106)	06:32		07:40 (82)	07:02		07:44 (82)	07:31			07:04			07:37		08:17 (108)
	21:08	24	06:57 (106)	20:51	85	20:07 (107)	20:09	27	08:11 (82)	19:19			17:33			17:10	28	08:45 (108)
2	06:10		06:34 (106)	06:33		07:40 (82)	07:03		07:47 (82)	07:32		08:38 (83)	07:05			07:38		08:17 (108)
	21:08	23	06:57 (106)	20:50	87	20:07 (107)	20:08	21	08:08 (82)	19:17	11	08:49 (83)	17:32			17:10	28	08:45 (108)
3	06:10		06:33 (106)	06:34		07:39 (82)	07:04		07:52 (82)	07:33		08:34 (83)	07:06			07:39		08:18 (108)
	21:08	24	06:57 (106)	20:49	89	20:07 (107)	20:06	11	08:03 (82)	19:15	19	08:53 (83)	17:31			17:10	28	08:46 (108)
4	06:11		06:34 (106)	06:35		07:39 (82)	07:05			07:34		08:32 (83)	07:07			07:40		08:18 (108)
	21:08	23	06:57 (106)	20:48	89	20:07 (107)	20:05			19:14	23	08:55 (83)	17:30			17:10	28	08:46 (108)
5	06:11		06:34 (106)	06:36		07:37 (82)	07:06			07:35		08:30 (83)	07:08			07:41		08:18 (108)
	21:08	23	06:57 (106)	20:47	92	20:07 (107)	20:03			19:12	26	08:56 (83)	17:29			17:09	29	08:47 (108)
6	06:12		06:35 (106)	06:37		07:37 (82)	07:07			07:36		08:28 (83)	07:09			07:42		08:18 (108)
	21:08	22	06:57 (106)	20:45	93	20:07 (107)	20:01			19:10	29	08:57 (83)	17:28			17:09	30	08:48 (108)
7	06:12		06:35 (106)	06:38		07:36 (82)	07:08			07:37		08:26 (83)	07:11			07:43		08:19 (108)
	21:07	22	06:57 (106)	20:44	95	20:07 (107)	20:00			19:09	32	08:58 (83)	17:27			17:09	29	08:48 (108)
8	06:13		06:36 (106)	06:39		07:36 (82)	07:09			07:38		08:25 (83)	07:12			07:44		08:19 (108)
	21:07	21	06:57 (106)	20:43	95	20:07 (107)	19:57			19:07	34	08:59 (83)	17:26			17:09	30	08:49 (108)
9	06:14		06:37 (106)	06:40		07:36 (82)	07:10			07:39		08:24 (83)	07:13			07:45		08:20 (108)
	21:07	20	06:57 (106)	20:42	96	20:07 (107)	19:55			19:06	35	08:59 (83)	17:25			17:09	29	08:49 (108)
10	06:14		06:37 (106)	06:41		07:35 (82)	07:11			07:40		08:23 (83)	07:14			07:46		08:20 (108)
	21:06	19	06:56 (106)	20:41	96	20:06 (107)	19:53			19:04	37	09:00 (83)	17:24			17:09	30	08:50 (108)
11	06:15		06:38 (106)	06:42		07:35 (82)	07:11			07:41		08:23 (83)	07:15			07:47		08:21 (108)
	21:06	18	06:56 (106)	20:39	95	20:06 (107)	19:52			19:03	37	09:00 (83)	17:23			17:09	30	08:51 (108)
12	06:16		06:39 (106)	06:43		07:35 (82)	07:12			07:42		08:22 (83)	07:16			07:47		08:20 (108)
	21:06	17	06:56 (106)	20:38	96	20:06 (107)	19:50			19:01	38	09:00 (83)	17:22			17:10	30	08:50 (108)
13	06:16		06:39 (106)	06:44		07:35 (82)	07:13			07:43		08:22 (83)	07:17			07:48		08:21 (108)
	21:05	16	06:55 (106)	20:37	95	20:05 (107)	19:48			19:00	39	09:01 (83)	17:21			17:10	30	08:51 (108)
14	06:17		06:40 (106)	06:45		07:35 (82)	07:14			07:44		08:22 (83)	07:19			07:49		08:22 (108)
	21:05	14	06:54 (106)	20:36	95	20:05 (107)	19:47			18:58	39	09:01 (83)	17:20			17:10	30	08:52 (108)
15	06:18		06:42 (106)	06:46		07:34 (82)	07:15			07:45		08:22 (83)	07:20			07:50		08:22 (108)
	21:04	11	06:53 (106)	20:34	94	20:04 (107)	19:45			18:57	38	09:00 (83)	17:19			17:10	30	08:52 (108)
16	06:19		06:44 (106)	06:47		07:34 (82)	07:16			07:46		08:22 (83)	07:21			07:50		08:22 (108)
	21:04	10	19:48 (107)	20:33	93	20:03 (107)	19:43			18:55	38	09:00 (83)	17:18			17:10	30	08:52 (108)
17	06:19		19:41 (107)	06:48		07:33 (82)	07:17			07:47		08:22 (83)	07:22			07:51		08:23 (108)
	21:03	10	19:51 (107)	20:32	90	20:01 (107)	19:42			18:54	37	08:59 (83)	17:17			17:11	30	08:53 (108)
18	06:20		19:39 (107)	06:49		07:34 (82)	07:18			07:48		08:22 (83)	07:23			07:52		08:24 (108)
	21:03	15	19:54 (107)	20:30	87	20:00 (107)	19:40			18:52	37	08:59 (83)	17:17			17:11	30	08:54 (108)
19	06:21		07:58 (82)	06:50		07:34 (82)	07:19			07:49		08:22 (83)	07:24			07:52		08:24 (108)
	21:02	27	19:56 (107)	20:29	85	19:59 (107)	19:38			18:51	36	08:58 (83)	17:16			17:11	30	08:54 (108)
20	06:22		07:55 (82)	06:51		07:34 (82)	07:20			07:50		08:22 (83)	07:25			07:53		08:25 (108)
	21:01	37	19:58 (107)	20:27	81	19:57 (107)	19:37			18:49	35	08:57 (83)	17:15			17:12	30	08:55 (108)
21	06:23		07:52 (82)	06:51		07:34 (82)	07:21			07:51		08:23 (83)	07:27		08:24 (108)	07:53		08:25 (108)
	21:01	43	19:58 (107)	20:26	77	19:55 (107)	19:35			18:48	33	08:56 (83)	17:15	8	08:32 (108)	17:12	30	08:55 (108)
22	06:24		07:50 (82)	06:52		07:35 (82)	07:22			07:52		08:25 (83)	07:28		08:22 (108)	07:54		08:26 (108)
	21:00	50	19:59 (107)	20:25	71	19:53 (107)	19:33			18:46	30	08:55 (83)	17:14	12	08:34 (108)	17:13	30	08:56 (108)
23	06:24		07:49 (82)	06:53		07:35 (82)	07:23			07:54		08:26 (83)	07:29		08:20 (108)	07:55		08:26 (108)
	20:59	54	20:01 (107)	20:23	65	19:50 (107)	19:32			18:45	28	08:54 (83)	17:14	16	08:36 (108)	17:13	30	08:56 (108)
24	06:25		07:48 (82)	06:54		07:35 (82)	07:24			07:55		08:27 (83)	07:30		08:20 (108)	07:55		08:27 (108)
	20:58	59	20:02 (107)	20:22	50	08:25 (82)	19:30			18:44	25	08:52 (83)	17:13	19	08:39 (108)	17:14	30	08:57 (108)
25	06:26		07:47 (82)	06:55		07:36 (82)	07:25			07:56		08:28 (83)	07:31		08:19 (108)	07:55		08:27 (108)
	20:57	64	20:03 (107)	20:20	48	08:24 (82)	19:28			18:42	22	08:50 (83)	17:13	21	08:40 (108)	17:15	30	08:57 (108)
26	06:27		07:46 (82)	06:56		07:37 (82)	07:26			07:57		08:31 (83)	07:32		08:19 (108)	07:56		08:27 (108)
	20:57	67	20:04 (107)	20:19	46	08:23 (82)	19:27			18:41	16	08:47 (83)	17:12	22	08:41 (108)	17:15	30	08:57 (108)
27	06:28		07:44 (82)	06:57		07:38 (82)	07:27			07:58		08:34 (83)	07:33		08:18 (108)	07:56		08:28 (108)
	20:56	70	20:03 (107)	20:17	44	08:22 (82)	19:25			18:40	9	08:43 (83)	17:12	24	08:42 (108)	17:16	30	08:58 (108)
28	06:29		07:43 (82)	06:58		07:39 (82)	07:28			07:59			07:34		08:18 (108)	07:56		08:28 (108)
	20:55	74	20:04 (107)	20:16	41	08:20 (82)	19:23			18:38			17:11	24	08:42 (108)	17:16	30	08:58 (108)
29	06:30		07:42 (82)	06:59		07:39 (82)	07:29			08:00			07:35		08:18 (108)	07:57		08:28 (108)
	20:54	77	20:05 (107)	20:14	39	08:18 (82)	19:22			18:37			17:11	25	08:43 (108)	17:17	31	08:59 (108)
30	06:31		07:42 (82)	07:00		07:40 (82)	07:30			08:01			07:36		08:17 (108)	07:57		08:29 (108)
	20:53	79	20:06 (107)	20:13	36	08:16 (82)	19:20			18:36			17:11	27	08:44 (108)	17:18	30	08:59 (108)
31	06:31		07:41 (82)	07:01		07:42 (82)				08:02						07:57		08:29 (108)
	20:52	82	20:06 (107)	20:11	32	08:14 (82)				18:35						17:19	30	08:59 (108)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		1115			2377			59			783			198			920	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.66			0.66			0.67			0.63			0.61			0.61	
Total reduction		0.39			0.39			0.41			0.35			0.22			0.30	
Total, real		440			933			24			276			44			279	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 58

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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 8354 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6335)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:28 (108)	07:45			07:10		07:47 (83)	07:20			06:36		07:24 (82)	06:08		06:30 (106)
	17:20	30	08:58 (108)	17:53			18:26	38	08:25 (83)	19:59			20:28	93	19:58 (107)	20:57	23	19:43 (107)
2	07:58		08:28 (108)	07:44			07:08		07:46 (83)	07:19			06:35		07:24 (82)	06:08		06:29 (106)
	17:21	30	08:58 (108)	17:54			18:27	38	08:24 (83)	20:00			20:29	95	19:59 (107)	20:58	18	06:47 (106)
3	07:58		08:29 (108)	07:43			07:07		07:47 (83)	07:17			06:33		07:24 (82)	06:07		06:29 (106)
	17:21	30	08:59 (108)	17:56			18:28	37	08:24 (83)	20:00			20:30	95	19:59 (107)	20:59	19	06:48 (106)
4	07:58		08:29 (108)	07:42			07:05		07:46 (83)	07:15			06:32		07:24 (82)	06:07		06:28 (106)
	17:22	30	08:59 (108)	17:57			18:29	37	08:23 (83)	20:01			20:31	96	20:00 (107)	20:59	20	06:48 (106)
5	07:58		08:29 (108)	07:41			07:04		07:47 (83)	07:14			06:31		07:23 (82)	06:07		06:28 (106)
	17:23	30	08:59 (108)	17:58			18:31	36	08:23 (83)	20:02			20:32	95	19:59 (107)	21:00	21	06:49 (106)
6	07:58		08:30 (108)	07:40			07:02		07:47 (83)	07:12			06:30		07:24 (82)	06:06		06:29 (106)
	17:24	30	09:00 (108)	17:59			18:32	35	08:22 (83)	20:03			20:33	94	19:59 (107)	21:01	21	06:50 (106)
7	07:58		08:30 (108)	07:39			07:01		07:48 (83)	07:11			06:29		07:24 (82)	06:06		06:29 (106)
	17:25	30	09:00 (108)	18:01			18:33	33	08:21 (83)	20:04			20:34	94	19:59 (107)	21:01	21	06:50 (106)
8	07:58		08:31 (108)	07:37			07:59		08:48 (83)	07:09			06:27		07:24 (82)	06:06		06:28 (106)
	17:26	30	09:01 (108)	18:02			19:34	32	09:20 (83)	20:05			20:35	93	19:59 (107)	21:02	22	06:50 (106)
9	07:57		08:32 (108)	07:36			07:57		08:49 (83)	07:08			06:26		07:25 (82)	06:06		06:28 (106)
	17:27	29	09:01 (108)	18:03			19:35	29	09:18 (83)	20:06			20:36	92	19:59 (107)	21:02	22	06:50 (106)
10	07:57		08:33 (108)	07:35			07:56		08:51 (83)	07:06			06:25		07:25 (82)	06:06		06:28 (106)
	17:28	29	09:02 (108)	18:04			19:36	26	09:17 (83)	20:07			20:37	91	19:59 (107)	21:03	23	06:51 (106)
11	07:57		08:33 (108)	07:34			07:54		08:52 (83)	07:04		07:48 (82)	06:24		07:26 (82)	06:05		06:28 (106)
	17:29	28	09:01 (108)	18:05			19:37	22	09:14 (83)	20:08	15	08:03 (82)	20:38	89	19:59 (107)	21:04	23	06:51 (106)
12	07:57		08:34 (108)	07:33			07:53		08:55 (83)	07:03		07:45 (82)	06:23		07:26 (82)	06:05		06:28 (106)
	17:30	28	09:02 (108)	18:07			19:38	17	09:12 (83)	20:09	22	08:07 (82)	20:39	89	19:59 (107)	21:04	24	06:52 (106)
13	07:57		08:35 (108)	07:32			07:51		08:58 (83)	07:01		07:41 (82)	06:22		07:27 (82)	06:05		06:29 (106)
	17:31	27	09:02 (108)	18:08			19:39	9	09:07 (83)	20:10	28	08:09 (82)	20:40	87	19:59 (107)	21:05	23	06:52 (106)
14	07:56		08:35 (108)	07:30			07:49			07:00		07:39 (82)	06:21		07:27 (82)	06:05		06:29 (106)
	17:32	26	09:01 (108)	18:09			19:40			20:11	33	08:12 (82)	20:41	84	19:58 (107)	21:05	23	06:52 (106)
15	07:56		08:36 (108)	07:29			07:48			06:58		07:37 (82)	06:20		07:28 (82)	06:05		06:29 (106)
	17:33	26	09:02 (108)	18:10			19:41			20:12	36	08:13 (82)	20:42	82	19:58 (107)	21:05	24	06:53 (106)
16	07:55		08:36 (108)	07:28			07:46			06:57		07:35 (82)	06:19		07:29 (82)	06:05		06:29 (106)
	17:34	25	09:01 (108)	18:11			19:42			20:13	40	08:15 (82)	20:43	79	19:57 (107)	21:06	24	06:53 (106)
17	07:55		08:38 (108)	07:27		08:00 (83)	07:45			06:55		07:33 (82)	06:18		07:30 (82)	06:05		06:29 (106)
	17:36	23	09:01 (108)	18:12	14	08:14 (83)	19:43			20:14	42	08:15 (82)	20:44	77	19:58 (107)	21:06	24	06:53 (106)
18	07:55		08:38 (108)	07:25		07:58 (83)	07:43			06:54		07:32 (82)	06:17		07:31 (82)	06:05		06:29 (106)
	17:37	22	09:00 (108)	18:14	19	08:17 (83)	19:44			20:15	44	08:16 (82)	20:45	74	19:57 (107)	21:07	24	06:53 (106)
19	07:54		08:40 (108)	07:24		07:55 (83)	07:41			06:52		07:30 (82)	06:17		07:32 (82)	06:05		06:29 (106)
	17:38	20	09:00 (108)	18:15	24	08:19 (83)	19:45			20:16	47	08:17 (82)	20:46	71	19:56 (107)	21:07	24	06:53 (106)
20	07:54		08:41 (108)	07:23		07:53 (83)	07:40			06:51		07:30 (82)	06:16		07:33 (82)	06:06		06:30 (106)
	17:39	18	08:59 (108)	18:16	28	08:21 (83)	19:46			20:17	48	08:18 (82)	20:47	66	19:55 (107)	21:07	24	06:54 (106)
21	07:53		08:43 (108)	07:21		07:52 (83)	07:38			06:49		07:28 (82)	06:15		07:35 (82)	06:06		06:30 (106)
	17:40	16	08:59 (108)	18:17	30	08:22 (83)	19:48			20:18	53	19:42 (107)	20:48	64	19:56 (107)	21:07	24	06:54 (106)
22	07:52		08:45 (108)	07:20		07:51 (83)	07:37			06:48		07:28 (82)	06:14		07:36 (82)	06:06		06:30 (106)
	17:41	12	08:57 (108)	18:18	32	08:23 (83)	19:49			20:19	65	19:48 (107)	20:49	60	19:55 (107)	21:08	24	06:54 (106)
23	07:52		08:48 (108)	07:18		07:50 (83)	07:35			06:47		07:27 (82)	06:14		07:37 (82)	06:06		06:30 (106)
	17:42	6	08:54 (108)	18:19	34	08:24 (83)	19:50			20:20	73	19:51 (107)	20:50	56	19:54 (107)	21:08	24	06:54 (106)
24	07:51			07:17		07:49 (83)	07:33			06:45		07:26 (82)	06:13		07:38 (82)	06:06		06:30 (106)
	17:44			18:21	35	08:24 (83)	19:51			20:21	77	19:52 (107)	20:51	51	19:53 (107)	21:08	24	06:54 (106)
25	07:50			07:16		07:48 (83)	07:32			06:44		07:26 (82)	06:12		07:40 (82)	06:07		06:31 (106)
	17:45			18:22	37	08:25 (83)	19:52			20:22	82	19:54 (107)	20:51	46	19:52 (107)	21:08	24	06:55 (106)
26	07:50			07:14		07:47 (83)	07:30			06:42		07:26 (82)	06:11		07:42 (82)	06:07		06:31 (106)
	17:46			18:23	38	08:25 (83)	19:53			20:23	85	19:56 (107)	20:52	39	19:51 (107)	21:08	24	06:55 (106)
27	07:49			07:13		07:47 (83)	07:28			06:41		07:24 (82)	06:11		07:46 (82)	06:07		06:31 (106)
	17:47			18:24	38	08:25 (83)	19:54			20:24	89	19:56 (107)	20:53	31	19:51 (107)	21:08	24	06:55 (106)
28	07:48			07:11		07:46 (83)	07:27			06:40		07:24 (82)	06:10		06:34 (106)	06:08		06:32 (106)
	17:48			18:25	39	08:25 (83)	19:55			20:25	91	19:57 (107)	20:54	27	19:49 (107)	21:08	24	06:56 (106)
29	07:47						07:25			06:38		07:24 (82)	06:10		06:33 (106)	06:08		06:32 (106)
	17:50						19:56			20:26	92	19:58 (107)	20:55	29	19:49 (107)	21:08	23	06:55 (106)
30	07:46						07:23			06:37		07:23 (82)	06:09		06:31 (106)	06:09		06:32 (106)
	17:51						19:57			20:27	94	19:58 (107)	20:56	29	19:47 (107)	21:08	24	06:56 (106)
31	07:46						07:22						06:09		06:31 (106)			
	17:52						19:58						20:56	27	19:46 (107)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		575			368			389			1156			2195			686	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.61			0.63			0.63			0.66			0.65			0.68	
Total reduction		0.22			0.26			0.28			0.34			0.36			0.41	
Total, real		125			97			108			388			799			280	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 59

Licensed user:
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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 8354 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6335)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:32 (106)	06:32		07:37 (82)	07:02		07:48 (82)	07:31		08:35 (83)	07:04			07:37		08:15 (108)
	21:08	24	06:56 (106)	20:51	88	20:10 (107)	20:09	14	08:02 (82)	19:19	14	08:49 (83)	17:33			17:10	28	08:43 (108)
2	06:10		06:33 (106)	06:33		07:36 (82)	07:03			07:32		08:31 (83)	07:05			07:38		08:15 (108)
	21:08	23	06:56 (106)	20:50	91	20:10 (107)	20:08			19:17	21	08:52 (83)	17:32			17:10	29	08:44 (108)
3	06:10		06:33 (106)	06:34		07:36 (82)	07:04			07:33		08:29 (83)	07:06			07:39		08:15 (108)
	21:08	23	06:56 (106)	20:49	92	20:10 (107)	20:06			19:15	24	08:53 (83)	17:31			17:10	29	08:44 (108)
4	06:11		06:34 (106)	06:35		07:35 (82)	07:05			07:34		08:27 (83)	07:07			07:40		08:15 (108)
	21:08	22	06:56 (106)	20:48	93	20:10 (107)	20:05			19:14	28	08:55 (83)	17:30			17:10	30	08:45 (108)
5	06:11		06:34 (106)	06:36		07:34 (82)	07:06			07:35		08:25 (83)	07:08			07:41		08:16 (108)
	21:08	22	06:56 (106)	20:47	94	20:09 (107)	20:03			19:12	31	08:56 (83)	17:29			17:09	29	08:45 (108)
6	06:12		06:35 (106)	06:37		07:34 (82)	07:07			07:36		08:24 (83)	07:09			07:42		08:16 (108)
	21:08	21	06:56 (106)	20:45	94	20:09 (107)	20:01			19:10	33	08:57 (83)	17:28			17:09	30	08:46 (108)
7	06:12		06:35 (106)	06:38		07:33 (82)	07:08			07:37		08:23 (83)	07:11			07:43		08:16 (108)
	21:07	20	06:55 (106)	20:44	96	20:09 (107)	20:00			19:09	34	08:57 (83)	17:27			17:09	30	08:46 (108)
8	06:13		06:35 (106)	06:39		07:33 (82)	07:09			07:38		08:22 (83)	07:12			07:44		08:17 (108)
	21:07	20	06:55 (106)	20:43	96	20:09 (107)	19:57			19:07	36	08:58 (83)	17:26			17:09	30	08:47 (108)
9	06:14		06:36 (106)	06:40		07:33 (82)	07:10			07:39		08:21 (83)	07:13			07:45		08:17 (108)
	21:07	20	06:56 (106)	20:42	94	20:08 (107)	19:55			19:06	37	08:58 (83)	17:25			17:09	30	08:47 (108)
10	06:14		06:36 (106)	06:41		07:33 (82)	07:11			07:40		08:20 (83)	07:14			07:46		08:18 (108)
	21:06	19	06:55 (106)	20:41	94	20:08 (107)	19:53			19:04	38	08:58 (83)	17:24			17:09	30	08:48 (108)
11	06:15		06:38 (106)	06:42		07:32 (82)	07:11			07:41		08:20 (83)	07:15			07:47		08:19 (108)
	21:06	16	06:54 (106)	20:39	96	20:08 (107)	19:52			19:03	38	08:58 (83)	17:23			17:09	30	08:49 (108)
12	06:16		06:39 (106)	06:43		07:32 (82)	07:12			07:42		08:19 (83)	07:16			07:47		08:18 (108)
	21:06	25	19:53 (107)	20:38	94	20:07 (107)	19:50			19:01	39	08:58 (83)	17:22			17:10	30	08:48 (108)
13	06:16		06:39 (106)	06:44		07:32 (82)	07:13			07:43		08:20 (83)	07:17			07:48		08:19 (108)
	21:05	27	19:54 (107)	20:37	93	20:06 (107)	19:48			19:00	38	08:58 (83)	17:21			17:10	30	08:49 (108)
14	06:17		06:40 (106)	06:45		07:32 (82)	07:14			07:44		08:20 (83)	07:19			07:49		08:20 (108)
	21:05	29	19:56 (107)	20:36	91	20:05 (107)	19:47			18:58	38	08:58 (83)	17:20			17:10	30	08:50 (108)
15	06:18		06:42 (106)	06:46		07:32 (82)	07:15			07:45		08:20 (83)	07:20			07:50		08:20 (108)
	21:04	29	19:58 (107)	20:34	90	20:05 (107)	19:45			18:57	38	08:58 (83)	17:19			17:10	30	08:50 (108)
16	06:19		06:46 (106)	06:47		07:32 (82)	07:16			07:46		08:20 (83)	07:21			07:50		08:20 (108)
	21:04	24	20:00 (107)	20:33	87	20:03 (107)	19:43			18:55	37	08:57 (83)	17:18			17:10	30	08:50 (108)
17	06:19		07:53 (82)	06:48		07:31 (82)	07:17			07:47		08:20 (83)	07:22			07:51		08:21 (108)
	21:03	35	20:00 (107)	20:32	85	20:01 (107)	19:42			18:54	36	08:56 (83)	17:17			17:11	30	08:51 (108)
18	06:20		07:51 (82)	06:49		07:32 (82)	07:18			07:48		08:20 (83)	07:23			07:52		08:22 (108)
	21:03	42	20:01 (107)	20:30	81	20:00 (107)	19:40			18:52	35	08:55 (83)	17:17			17:11	30	08:52 (108)
19	06:21		07:49 (82)	06:50		07:32 (82)	07:19			07:49		08:21 (83)	07:24		08:23 (108)	07:52		08:22 (108)
	21:02	48	20:02 (107)	20:29	77	19:58 (107)	19:38			18:51	33	08:54 (83)	17:16	6	08:29 (108)	17:11	29	08:51 (108)
20	06:22		07:48 (82)	06:51		07:32 (82)	07:20			07:50		08:22 (83)	07:25		08:20 (108)	07:53		08:23 (108)
	21:01	54	20:04 (107)	20:27	72	19:55 (107)	19:37			18:49	31	08:53 (83)	17:15	12	08:32 (108)	17:12	29	08:52 (108)
21	06:23		07:46 (82)	06:51		07:33 (82)	07:21			07:51		08:22 (83)	07:27		08:18 (108)	07:53		08:23 (108)
	21:01	57	20:04 (107)	20:26	64	19:52 (107)	19:35			18:48	29	08:51 (83)	17:15	16	08:34 (108)	17:12	29	08:52 (108)
22	06:24		07:45 (82)	06:52		07:33 (82)	07:22			07:52		08:25 (83)	07:28		08:17 (108)	07:54		08:24 (108)
	21:00	62	20:05 (107)	20:25	49	08:22 (82)	19:33			18:46	26	08:51 (83)	17:14	18	08:35 (108)	17:13	29	08:53 (108)
23	06:24		07:44 (82)	06:53		07:34 (82)	07:23			07:54		08:26 (83)	07:29		08:16 (108)	07:55		08:24 (108)
	20:59	64	20:05 (107)	20:23	47	08:21 (82)	19:32			18:45	23	08:49 (83)	17:14	20	08:36 (108)	17:13	29	08:53 (108)
24	06:25		07:43 (82)	06:54		07:34 (82)	07:24			07:55		08:28 (83)	07:30		08:16 (108)	07:55		08:25 (108)
	20:58	69	20:06 (107)	20:22	46	08:20 (82)	19:30			18:44	18	08:46 (83)	17:13	22	08:38 (108)	17:14	29	08:54 (108)
25	06:26		07:42 (82)	06:55		07:35 (82)	07:25			07:56		08:31 (83)	07:31		08:16 (108)	07:55		08:25 (108)
	20:57	72	20:07 (107)	20:20	44	08:19 (82)	19:28			18:42	12	08:43 (83)	17:13	23	08:39 (108)	17:15	30	08:55 (108)
26	06:27		07:41 (82)	06:56		07:36 (82)	07:26			07:57			07:32		08:15 (108)	07:56		08:25 (108)
	20:57	76	20:08 (107)	20:19	42	08:18 (82)	19:27			18:41			17:12	25	08:40 (108)	17:15	30	08:55 (108)
27	06:28		07:40 (82)	06:57		07:37 (82)	07:27			07:58			07:33		08:15 (108)	07:56		08:26 (108)
	20:56	77	20:07 (107)	20:17	39	08:16 (82)	19:25			18:40			17:12	26	08:41 (108)	17:16	30	08:56 (108)
28	06:29		07:39 (82)	06:58		07:39 (82)	07:28			07:59			07:34		08:15 (108)	07:56		08:26 (108)
	20:55	80	20:08 (107)	20:16	36	08:15 (82)	19:23			18:38			17:11	26	08:41 (108)	17:16	30	08:56 (108)
29	06:30		07:38 (82)	06:59		07:39 (82)	07:29			08:00			07:35		08:15 (108)	07:57		08:27 (108)
	20:54	83	20:08 (107)	20:14	33	08:12 (82)	19:22			18:37			17:11	27	08:42 (108)	17:17	29	08:56 (108)
30	06:31		07:38 (82)	07:00		07:41 (82)	07:30			08:01			07:36		08:15 (108)	07:57		08:27 (108)
	20:53	85	20:09 (107)	20:13	28	08:09 (82)	19:20			18:36			17:11	28	08:43 (108)	17:18	30	08:57 (108)
31	06:31		07:37 (82)	07:01		07:44 (82)				08:02						07:57		08:27 (108)
	20:52	87	20:09 (107)	20:11	22	08:06 (82)				18:35						17:19	30	08:57 (108)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		1355			2248			14			767			249			918	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.66			0.66			0.67			0.63			0.61			0.61	
Total reduction		0.39			0.39			0.41			0.35			0.22			0.30	
Total, real		532			883			6			271			56			278	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 60

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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 8355 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6336)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:24 (108)	07:45			07:10		07:45 (83)	07:20			06:36		07:29 (82)	06:08		06:30 (106)
	17:20	29	08:53 (108)	17:53			18:26	37	08:22 (83)	19:59			20:28	88	19:57 (107)	20:57	47	19:49 (107)
2	07:58		08:25 (108)	07:44			07:08		07:45 (83)	07:19			06:35		07:30 (82)	06:08		06:30 (106)
	17:21	28	08:53 (108)	17:54			18:27	36	08:21 (83)	20:00			20:29	88	19:58 (107)	20:58	45	19:49 (107)
3	07:58		08:26 (108)	07:43			07:07		07:46 (83)	07:17			06:33		07:30 (82)	06:07		06:31 (106)
	17:21	29	08:55 (108)	17:56			18:28	35	08:21 (83)	20:00			20:30	87	19:58 (107)	20:59	43	19:48 (107)
4	07:58		08:26 (108)	07:42			07:05		07:45 (83)	07:15			06:32		07:31 (82)	06:07		06:30 (106)
	17:22	28	08:54 (108)	17:57			18:29	35	08:20 (83)	20:01			20:31	87	19:59 (107)	20:59	42	19:47 (107)
5	07:58		08:26 (108)	07:41			07:04		07:46 (83)	07:14			06:31		07:31 (82)	06:07		06:30 (106)
	17:23	29	08:55 (108)	17:58			18:31	33	08:19 (83)	20:02			20:32	85	19:58 (107)	21:00	40	19:46 (107)
6	07:58		08:26 (108)	07:40			07:02		07:46 (83)	07:12			06:30		07:32 (82)	06:06		06:31 (106)
	17:24	29	08:55 (108)	17:59			18:32	32	08:18 (83)	20:03			20:33	83	19:58 (107)	21:01	37	19:45 (107)
7	07:58		08:27 (108)	07:39			07:01		07:48 (83)	07:11		07:50 (82)	06:29		07:33 (82)	06:06		06:31 (106)
	17:25	29	08:56 (108)	18:01			18:33	29	08:17 (83)	20:04	16	08:06 (82)	20:34	82	19:59 (107)	21:01	34	19:44 (107)
8	07:58		08:28 (108)	07:37			07:59		08:48 (83)	07:09		07:47 (82)	06:27		07:34 (82)	06:06		06:30 (106)
	17:26	28	08:56 (108)	18:02			19:34	27	09:15 (83)	20:05	23	08:10 (82)	20:35	80	19:59 (107)	21:02	30	19:41 (107)
9	07:57		08:28 (108)	07:36			07:57		08:49 (83)	07:08		07:44 (82)	06:26		07:35 (82)	06:06		06:31 (106)
	17:27	29	08:57 (108)	18:03			19:35	24	09:13 (83)	20:06	28	08:12 (82)	20:36	78	19:59 (107)	21:02	24	06:55 (106)
10	07:57		08:29 (108)	07:35			07:56		08:51 (83)	07:06		07:42 (82)	06:25		07:36 (82)	06:06		06:31 (106)
	17:28	28	08:57 (108)	18:04			19:36	20	09:11 (83)	20:07	32	08:14 (82)	20:37	76	19:59 (107)	21:03	24	06:55 (106)
11	07:57		08:29 (108)	07:34			07:54		08:53 (83)	07:04		07:40 (82)	06:24		07:38 (82)	06:05		06:31 (106)
	17:29	28	08:57 (108)	18:05			19:37	15	09:08 (83)	20:08	35	08:15 (82)	20:38	72	19:59 (107)	21:04	25	06:56 (106)
12	07:57		08:30 (108)	07:33			07:53		08:59 (83)	07:03		07:38 (82)	06:23		07:39 (82)	06:05		06:31 (106)
	17:30	28	08:58 (108)	18:07			19:38	4	09:03 (83)	20:09	39	08:17 (82)	20:39	68	19:58 (107)	21:04	25	06:56 (106)
13	07:57		08:31 (108)	07:32			07:51			07:01		07:36 (82)	06:22		07:42 (82)	06:05		06:32 (106)
	17:31	27	08:58 (108)	18:08			19:39			20:10	41	08:17 (82)	20:40	63	19:58 (107)	21:05	24	06:56 (106)
14	07:56		08:31 (108)	07:30			07:49			07:00		07:36 (82)	06:21		07:44 (82)	06:05		06:32 (106)
	17:32	27	08:58 (108)	18:09			19:40			20:11	42	08:18 (82)	20:41	58	19:58 (107)	21:05	24	06:56 (106)
15	07:56		08:32 (108)	07:29			07:48			06:58		07:34 (82)	06:20		19:13 (107)	06:05		06:32 (106)
	17:33	26	08:58 (108)	18:10			19:41			20:12	44	08:18 (82)	20:42	45	19:58 (107)	21:05	25	06:57 (106)
16	07:55		08:32 (108)	07:28			07:46			06:57		07:33 (82)	06:19		19:14 (107)	06:05		06:32 (106)
	17:34	25	08:57 (108)	18:11			19:42			20:13	46	08:19 (82)	20:43	43	19:57 (107)	21:06	25	06:57 (106)
17	07:55		08:33 (108)	07:27		07:59 (83)	07:45			06:55		07:32 (82)	06:18		19:15 (107)	06:05		06:32 (106)
	17:36	25	08:58 (108)	18:12	12	08:11 (83)	19:43			20:14	47	08:19 (82)	20:44	43	19:58 (107)	21:06	25	06:57 (106)
18	07:55		08:34 (108)	07:25		07:56 (83)	07:43			06:54		07:32 (82)	06:17		19:15 (107)	06:05		06:32 (106)
	17:37	23	08:57 (108)	18:14	18	08:14 (83)	19:44			20:15	48	08:20 (82)	20:45	42	19:57 (107)	21:07	25	06:57 (106)
19	07:54		08:35 (108)	07:24		07:53 (83)	07:41			06:52		07:30 (82)	06:17		19:15 (107)	06:05		06:33 (106)
	17:38	22	08:57 (108)	18:15	23	08:16 (83)	19:45			20:16	49	08:19 (82)	20:46	42	19:57 (107)	21:07	24	06:57 (106)
20	07:54		08:36 (108)	07:23		07:52 (83)	07:40			06:51		07:30 (82)	06:16		19:16 (107)	06:06		06:34 (106)
	17:39	20	08:56 (108)	18:16	26	08:18 (83)	19:46			20:17	50	08:20 (82)	20:47	40	19:56 (107)	21:07	24	06:58 (106)
21	07:53		08:38 (108)	07:21		07:51 (83)	07:38			06:49		07:29 (82)	06:15		19:17 (107)	06:06		06:34 (106)
	17:40	18	08:56 (108)	18:17	28	08:19 (83)	19:48			20:18	50	08:19 (82)	20:48	39	19:56 (107)	21:07	24	06:58 (106)
22	07:52		08:39 (108)	07:20		07:49 (83)	07:37			06:48		07:29 (82)	06:14		06:37 (106)	06:06		06:34 (106)
	17:41	16	08:55 (108)	18:18	31	08:20 (83)	19:49			20:19	66	19:46 (107)	20:49	46	19:56 (107)	21:08	24	06:58 (106)
23	07:52		08:40 (108)	07:18		07:48 (83)	07:35			06:47		07:29 (82)	06:14		06:35 (106)	06:06		06:34 (106)
	17:42	13	08:53 (108)	18:19	33	08:21 (83)	19:50			20:20	73	19:49 (107)	20:50	48	19:55 (107)	21:08	24	06:58 (106)
24	07:51		08:43 (108)	07:17		07:47 (83)	07:33			06:45		07:28 (82)	06:13		06:33 (106)	06:06		06:33 (106)
	17:44	8	08:51 (108)	18:21	34	08:21 (83)	19:51			20:21	77	19:50 (107)	20:51	50	19:54 (107)	21:08	25	06:58 (106)
25	07:50			07:16		07:47 (83)	07:32			06:44		07:29 (82)	06:12		06:33 (106)	06:07		06:34 (106)
	17:45			18:22	35	08:22 (83)	19:52			20:22	79	19:52 (107)	20:51	51	19:54 (107)	21:08	25	06:59 (106)
26	07:50			07:14		07:46 (83)	07:30			06:42		07:29 (82)	06:11		06:32 (106)	06:07		06:34 (106)
	17:46			18:23	35	08:21 (83)	19:53			20:23	83	19:54 (107)	20:52	50	19:53 (107)	21:08	25	06:59 (106)
27	07:49			07:13		07:46 (83)	07:28			06:41		07:28 (82)	06:11		06:32 (106)	06:07		06:34 (106)
	17:47			18:24	36	08:22 (83)	19:54			20:24	84	19:54 (107)	20:53	51	19:53 (107)	21:08	25	06:59 (106)
28	07:48			07:11		07:45 (83)	07:27			06:40		07:29 (82)	06:10		06:31 (106)	06:08		06:35 (106)
	17:48			18:25	36	08:21 (83)	19:55			20:25	85	19:55 (107)	20:54	51	19:52 (107)	21:08	24	06:59 (106)
29	07:47						07:25			06:38		07:29 (82)	06:10		06:31 (106)	06:08		06:35 (106)
	17:50						19:56			20:26	86	19:56 (107)	20:55	50	19:52 (107)	21:08	24	06:59 (106)
30	07:46						07:23			06:37		07:29 (82)	06:09		06:30 (106)	06:09		06:35 (106)
	17:51						19:57			20:27	87	19:56 (107)	20:56	50	19:51 (107)	21:08	25	07:00 (106)
31	07:46						07:22						06:09		06:31 (106)			
	17:52						19:58						20:56	47	19:50 (107)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		592			347			327			1310			1883			857	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.61			0.63			0.63			0.66			0.65			0.68	
Total reduction		0.22			0.26			0.28			0.34			0.36			0.40	
Total, real		129			92			91			440			680			347	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 61

Licensed user:
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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 8355 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6336)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:35 (106)	06:32		07:49 (82)	07:02		07:39 (82)	07:31			07:04			07:37		08:11 (108)
	21:08	25	07:00 (106)	20:51	71	20:09 (107)	20:09	35	08:14 (82)	19:19			17:33			17:10	28	08:39 (108)
2	06:10		06:36 (106)	06:33		07:48 (82)	07:03		07:40 (82)	07:32		08:33 (83)	07:05			07:38		08:11 (108)
	21:08	24	07:00 (106)	20:50	73	20:09 (107)	20:08	32	08:12 (82)	19:17	12	08:45 (83)	17:32			17:10	28	08:39 (108)
3	06:10		06:36 (106)	06:34		07:46 (82)	07:04		07:42 (82)	07:33		08:30 (83)	07:06			07:39		08:11 (108)
	21:08	24	07:00 (106)	20:49	77	20:09 (107)	20:06	28	08:10 (82)	19:15	18	08:48 (83)	17:31			17:10	29	08:40 (108)
4	06:11		06:36 (106)	06:35		07:45 (82)	07:05		07:44 (82)	07:34		08:27 (83)	07:07			07:40		08:12 (108)
	21:08	25	07:01 (106)	20:48	79	20:09 (107)	20:05	23	08:07 (82)	19:14	23	08:50 (83)	17:30			17:10	28	08:40 (108)
5	06:11		06:36 (106)	06:36		07:43 (82)	07:06		07:47 (82)	07:35		08:25 (83)	07:08			07:41		08:12 (108)
	21:08	32	19:48 (107)	20:47	81	20:08 (107)	20:03	16	08:03 (82)	19:12	26	08:51 (83)	17:29			17:09	29	08:41 (108)
6	06:12		06:37 (106)	06:37		07:42 (82)	07:07			07:36		08:24 (83)	07:09			07:42		08:13 (108)
	21:08	35	19:50 (107)	20:45	83	20:08 (107)	20:01			19:10	28	08:52 (83)	17:28			17:09	28	08:41 (108)
7	06:12		06:36 (106)	06:38		07:41 (82)	07:08			07:37		08:22 (83)	07:11			07:43		08:13 (108)
	21:07	38	19:51 (107)	20:44	84	20:08 (107)	20:00			19:09	31	08:53 (83)	17:27			17:09	29	08:42 (108)
8	06:13		06:37 (106)	06:39		07:40 (82)	07:09			07:38		08:21 (83)	07:12			07:44		08:14 (108)
	21:07	41	19:53 (107)	20:43	86	20:08 (107)	19:57			19:07	33	08:54 (83)	17:26			17:09	28	08:42 (108)
9	06:14		06:38 (106)	06:40		07:40 (82)	07:10			07:39		08:20 (83)	07:13			07:45		08:14 (108)
	21:07	42	19:55 (107)	20:42	86	20:07 (107)	19:55			19:06	34	08:54 (83)	17:25			17:09	29	08:43 (108)
10	06:14		06:37 (106)	06:41		07:39 (82)	07:11			07:40		08:19 (83)	07:14			07:46		08:15 (108)
	21:06	45	19:55 (107)	20:41	88	20:07 (107)	19:53			19:04	35	08:54 (83)	17:24			17:09	28	08:43 (108)
11	06:15		06:38 (106)	06:42		07:38 (82)	07:11			07:41		08:19 (83)	07:15			07:47		08:15 (108)
	21:06	46	19:57 (107)	20:39	87	20:06 (107)	19:52			19:03	35	08:54 (83)	17:23			17:09	29	08:44 (108)
12	06:16		06:39 (106)	06:43		07:38 (82)	07:12			07:42		08:18 (83)	07:16			07:47		08:15 (108)
	21:06	47	19:58 (107)	20:38	88	20:06 (107)	19:50			19:01	36	08:54 (83)	17:22			17:10	28	08:43 (108)
13	06:16		06:38 (106)	06:44		07:37 (82)	07:13			07:43		08:19 (83)	07:17			07:48		08:16 (108)
	21:05	48	19:58 (107)	20:37	87	20:05 (107)	19:48			19:00	36	08:55 (83)	17:21			17:10	28	08:44 (108)
14	06:17		06:39 (106)	06:45		07:37 (82)	07:14			07:44		08:19 (83)	07:19			07:49		08:17 (108)
	21:05	50	20:00 (107)	20:36	87	20:04 (107)	19:47			18:58	36	08:55 (83)	17:20			17:10	28	08:45 (108)
15	06:18		06:40 (106)	06:46		07:36 (82)	07:15			07:45		08:18 (83)	07:20			07:50		08:17 (108)
	21:04	50	20:01 (107)	20:34	86	20:03 (107)	19:45			18:57	36	08:54 (83)	17:19			17:10	28	08:45 (108)
16	06:19		06:41 (106)	06:47		07:36 (82)	07:16			07:46		08:18 (83)	07:21			07:50		08:17 (108)
	21:04	50	20:02 (107)	20:33	84	20:02 (107)	19:43			18:55	36	08:54 (83)	17:18			17:10	28	08:45 (108)
17	06:19		06:41 (106)	06:48		07:35 (82)	07:17			07:47		08:19 (83)	07:22			07:51		08:18 (108)
	21:03	51	20:02 (107)	20:32	81	19:59 (107)	19:42			18:54	34	08:53 (83)	17:17			17:11	28	08:46 (108)
18	06:20		06:42 (106)	06:49		07:34 (82)	07:18			07:48		08:19 (83)	07:23		08:17 (108)	07:52		08:19 (108)
	21:03	51	20:03 (107)	20:30	79	19:58 (107)	19:40			18:52	33	08:52 (83)	17:17	8	08:25 (108)	17:11	28	08:47 (108)
19	06:21		06:43 (106)	06:50		07:34 (82)	07:19			07:49		08:19 (83)	07:24		08:15 (108)	07:52		08:19 (108)
	21:02	50	20:04 (107)	20:29	76	19:56 (107)	19:38			18:51	32	08:51 (83)	17:16	13	08:28 (108)	17:11	27	08:46 (108)
20	06:22		06:45 (106)	06:51		07:34 (82)	07:20			07:50		08:20 (83)	07:25		08:14 (108)	07:53		08:20 (108)
	21:01	49	20:05 (107)	20:27	70	19:53 (107)	19:37			18:49	30	08:50 (83)	17:15	16	08:30 (108)	17:12	27	08:47 (108)
21	06:23		06:45 (106)	06:51		07:34 (82)	07:21			07:51		08:21 (83)	07:27		08:13 (108)	07:54		08:20 (108)
	21:01	48	20:05 (107)	20:26	64	19:50 (107)	19:35			18:48	27	08:48 (83)	17:15	18	08:31 (108)	17:12	27	08:47 (108)
22	06:24		06:49 (106)	06:52		07:34 (82)	07:22			07:52		08:23 (83)	07:28		08:12 (108)	07:54		08:21 (108)
	21:00	41	20:05 (107)	20:25	50	08:24 (82)	19:33			18:46	25	08:48 (83)	17:14	20	08:32 (108)	17:13	27	08:48 (108)
23	06:24		19:26 (107)	06:53		07:34 (82)	07:23			07:54		08:24 (83)	07:29		08:11 (108)	07:55		08:21 (108)
	20:59	40	20:06 (107)	20:23	49	08:23 (82)	19:32			18:45	22	08:46 (83)	17:14	22	08:33 (108)	17:13	27	08:48 (108)
24	06:25		19:26 (107)	06:54		07:34 (82)	07:24			07:55		08:26 (83)	07:30		08:12 (108)	07:55		08:22 (108)
	20:58	41	20:07 (107)	20:22	49	08:23 (82)	19:30			18:44	17	08:43 (83)	17:13	23	08:35 (108)	17:14	27	08:49 (108)
25	06:26		19:26 (107)	06:55		07:35 (82)	07:25			07:56		08:29 (83)	07:31		08:11 (108)	07:55		08:22 (108)
	20:57	41	20:07 (107)	20:20	47	08:22 (82)	19:28			18:42	11	08:40 (83)	17:13	25	08:36 (108)	17:15	27	08:49 (108)
26	06:27		19:25 (107)	06:56		07:35 (82)	07:26			07:57			07:32		08:11 (108)	07:56		08:22 (108)
	20:57	43	20:08 (107)	20:19	47	08:22 (82)	19:27			18:41			17:12	25	08:36 (108)	17:15	28	08:50 (108)
27	06:28		19:24 (107)	06:57		07:35 (82)	07:27			07:58			07:33		08:11 (108)	07:56		08:23 (108)
	20:56	43	20:07 (107)	20:17	46	08:21 (82)	19:25			18:40			17:12	26	08:37 (108)	17:16	28	08:51 (108)
28	06:29		19:24 (107)	06:58		07:36 (82)	07:28			07:59			07:34		08:11 (108)	07:56		08:23 (108)
	20:55	44	20:08 (107)	20:16	44	08:20 (82)	19:23			18:38			17:11	27	08:38 (108)	17:16	28	08:51 (108)
29	06:30		07:58 (82)	06:59		07:36 (82)	07:29			08:00			07:35		08:11 (108)	07:57		08:24 (108)
	20:54	51	20:08 (107)	20:14	42	08:18 (82)	19:22			18:37			17:11	27	08:38 (108)	17:17	27	08:51 (108)
30	06:31		07:54 (82)	07:00		07:36 (82)	07:30			08:01			07:36		08:11 (108)	07:57		08:24 (108)
	20:53	60	20:09 (107)	20:13	41	08:17 (82)	19:20			18:36			17:11	28	08:39 (108)	17:18	28	08:52 (108)
31	06:31		07:51 (82)	07:01		07:37 (82)				08:02						07:57		08:24 (108)
	20:52	66	20:09 (107)	20:11	39	08:16 (82)				18:35						17:19	28	08:52 (108)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		1341			2151			134			686			278			865	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.65			0.65			0.67			0.63			0.61			0.61	
Total reduction		0.39			0.39			0.41			0.35			0.22			0.30	
Total, real		523			843			54			242			62			261	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 62

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 8356 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6337)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:24 (108)	07:45			07:10		07:44 (83)	07:20			06:36		07:25 (82)	06:08		06:29 (106)
	17:20	28	08:52 (108)	17:53			18:26	36	08:20 (83)	19:59			20:28	88	19:58 (107)	20:57	50	19:54 (107)
2	07:58		08:24 (108)	07:44			07:08		07:43 (83)	07:19			06:35		07:25 (82)	06:08		06:29 (106)
	17:21	29	08:53 (108)	17:54			18:27	37	08:20 (83)	20:00			20:29	89	19:59 (107)	20:58	50	19:54 (107)
3	07:58		08:26 (108)	07:43			07:07		07:44 (83)	07:17			06:33		07:26 (82)	06:07		06:30 (106)
	17:21	28	08:54 (108)	17:56			18:28	36	08:20 (83)	20:00			20:30	90	20:00 (107)	20:59	48	19:53 (107)
4	07:58		08:25 (108)	07:42			07:05		07:43 (83)	07:15			06:32		07:26 (82)	06:07		06:29 (106)
	17:22	29	08:54 (108)	17:57			18:29	36	08:19 (83)	20:01			20:31	89	20:00 (107)	20:59	47	19:52 (107)
5	07:58		08:25 (108)	07:41			07:04		07:44 (83)	07:14			06:31		07:26 (82)	06:07		06:29 (106)
	17:23	29	08:54 (108)	17:58			18:31	35	08:19 (83)	20:02			20:32	90	20:00 (107)	21:00	46	19:52 (107)
6	07:58		08:26 (108)	07:40			07:02		07:44 (83)	07:12			06:30		07:26 (82)	06:06		06:29 (106)
	17:24	29	08:55 (108)	17:59			18:32	34	08:18 (83)	20:03			20:33	89	20:00 (107)	21:01	46	19:52 (107)
7	07:58		08:26 (108)	07:39			07:01		07:45 (83)	07:11			06:29		07:27 (82)	06:06		06:30 (106)
	17:25	29	08:55 (108)	18:01			18:33	32	08:17 (83)	20:04			20:34	87	20:00 (107)	21:01	43	19:51 (107)
8	07:58		08:27 (108)	07:37			07:59		08:45 (83)	07:09			06:27		07:28 (82)	06:06		06:29 (106)
	17:26	29	08:56 (108)	18:02			19:34	31	09:16 (83)	20:05			20:35	87	20:01 (107)	21:02	42	19:50 (107)
9	07:57		08:28 (108)	07:36			07:57		08:45 (83)	07:08		07:49 (82)	06:26		07:28 (82)	06:06		06:29 (106)
	17:27	28	08:56 (108)	18:03			19:35	29	09:14 (83)	20:06	12	08:01 (82)	20:36	87	20:01 (107)	21:02	40	19:49 (107)
10	07:57		08:28 (108)	07:35			07:56		08:47 (83)	07:06		07:45 (82)	06:25		07:29 (82)	06:06		06:29 (106)
	17:28	29	08:57 (108)	18:04			19:36	26	09:13 (83)	20:07	21	08:06 (82)	20:37	85	20:01 (107)	21:03	40	19:49 (107)
11	07:57		08:28 (108)	07:34			07:54		08:48 (83)	07:04		07:41 (82)	06:24		07:30 (82)	06:05		06:30 (106)
	17:29	29	08:57 (108)	18:05			19:37	22	09:10 (83)	20:08	27	08:08 (82)	20:38	83	20:01 (107)	21:04	37	19:48 (107)
12	07:57		08:29 (108)	07:33			07:53		08:51 (83)	07:03		07:40 (82)	06:23		07:31 (82)	06:05		06:30 (106)
	17:30	28	08:57 (108)	18:07			19:38	17	09:08 (83)	20:09	30	08:10 (82)	20:39	81	20:01 (107)	21:04	34	19:47 (107)
13	07:57		08:30 (108)	07:32			07:51		08:54 (83)	07:01		07:37 (82)	06:22		07:32 (82)	06:05		06:30 (106)
	17:31	28	08:58 (108)	18:08			19:39	10	09:04 (83)	20:10	34	08:11 (82)	20:40	78	20:01 (107)	21:05	33	19:46 (107)
14	07:56		08:30 (108)	07:30			07:49			07:00		07:36 (82)	06:21		07:33 (82)	06:05		06:30 (106)
	17:32	27	08:57 (108)	18:09			19:40			20:11	37	08:13 (82)	20:41	75	20:00 (107)	21:05	30	19:45 (107)
15	07:56		08:31 (108)	07:29			07:48			06:58		07:34 (82)	06:20		07:35 (82)	06:05		06:30 (106)
	17:33	27	08:58 (108)	18:10			19:41			20:12	40	08:14 (82)	20:42	70	20:00 (107)	21:05	25	06:55 (106)
16	07:55		08:31 (108)	07:28			07:46			06:57		07:33 (82)	06:19		07:36 (82)	06:05		06:31 (106)
	17:34	26	08:57 (108)	18:11			19:42			20:13	42	08:15 (82)	20:43	68	20:00 (107)	21:06	24	06:55 (106)
17	07:55		08:32 (108)	07:27			07:45			06:55		07:31 (82)	06:18		07:39 (82)	06:05		06:31 (106)
	17:36	26	08:58 (108)	18:12			19:43			20:14	44	08:15 (82)	20:44	64	20:01 (107)	21:06	24	06:55 (106)
18	07:55		08:32 (108)	07:25		07:59 (83)	07:43			06:54		07:30 (82)	06:17		07:41 (82)	06:05		06:31 (106)
	17:37	25	08:57 (108)	18:14	10	08:09 (83)	19:44			20:15	46	08:16 (82)	20:45	58	20:00 (107)	21:07	24	06:55 (106)
19	07:54		08:34 (108)	07:24		07:55 (83)	07:41			06:52		07:29 (82)	06:17		07:45 (82)	06:05		06:31 (106)
	17:38	24	08:58 (108)	18:15	17	08:12 (83)	19:45			20:16	47	08:16 (82)	20:46	50	20:00 (107)	21:07	24	06:55 (106)
20	07:54		08:34 (108)	07:23		07:53 (83)	07:40			06:51		07:29 (82)	06:16		19:17 (107)	06:06		06:32 (106)
	17:39	23	08:57 (108)	18:16	21	08:14 (83)	19:46			20:17	47	08:16 (82)	20:47	42	19:59 (107)	21:07	25	06:57 (106)
21	07:53		08:36 (108)	07:21		07:51 (83)	07:38			06:49		07:27 (82)	06:15		19:18 (107)	06:06		06:32 (106)
	17:40	21	08:57 (108)	18:17	25	08:16 (83)	19:48			20:18	49	08:16 (82)	20:48	42	20:00 (107)	21:07	25	06:57 (106)
22	07:52		08:37 (108)	07:20		07:49 (83)	07:37			06:48		07:27 (82)	06:14		19:19 (107)	06:06		06:32 (106)
	17:41	19	08:56 (108)	18:18	28	08:17 (83)	19:49			20:19	50	08:17 (82)	20:49	40	19:59 (107)	21:08	25	06:57 (106)
23	07:52		08:38 (108)	07:18		07:48 (83)	07:35			06:47		07:27 (82)	06:14		19:19 (107)	06:06		06:32 (106)
	17:42	17	08:55 (108)	18:19	30	08:18 (83)	19:50			20:20	58	19:45 (107)	20:50	39	19:58 (107)	21:08	25	06:57 (106)
24	07:51		08:40 (108)	07:17		07:47 (83)	07:33			06:45		07:26 (82)	06:13		06:36 (106)	06:06		06:32 (106)
	17:44	13	08:53 (108)	18:21	32	08:19 (83)	19:51			20:21	67	19:48 (107)	20:51	44	19:58 (107)	21:08	24	06:56 (106)
25	07:50		08:43 (108)	07:16		07:46 (83)	07:32			06:44		07:26 (82)	06:12		06:34 (106)	06:07		06:33 (106)
	17:45	9	08:52 (108)	18:22	34	08:20 (83)	19:52			20:22	73	19:51 (107)	20:51	48	19:58 (107)	21:08	24	06:57 (106)
26	07:50			07:14		07:45 (83)	07:30			06:42		07:26 (82)	06:11		06:33 (106)	06:07		06:33 (106)
	17:46			18:23	35	08:20 (83)	19:53			20:23	77	19:53 (107)	20:52	49	19:57 (107)	21:08	24	06:57 (106)
27	07:49			07:13		07:45 (83)	07:28			06:41		07:25 (82)	06:11		06:32 (106)	06:07		06:32 (106)
	17:47			18:24	35	08:20 (83)	19:54			20:24	81	19:54 (107)	20:53	50	19:57 (107)	21:08	25	06:57 (106)
28	07:48			07:11		07:44 (83)	07:27			06:40		07:25 (82)	06:10		06:31 (106)	06:08		06:33 (106)
	17:48			18:25	36	08:20 (83)	19:55			20:25	84	19:56 (107)	20:54	51	19:56 (107)	21:08	30	19:48 (107)
29	07:47						07:25			06:38		07:25 (82)	06:10		06:31 (106)	06:08		06:33 (106)
	17:50						19:56			20:26	86	19:57 (107)	20:55	51	19:56 (107)	21:08	32	19:49 (107)
30	07:46						07:23			06:37		07:25 (82)	06:09		06:30 (106)	06:09		06:34 (106)
	17:51						19:57			20:27	87	19:57 (107)	20:56	50	19:55 (107)	21:08	34	19:51 (107)
31	07:46						07:22						06:09		06:30 (106)			
	17:52						19:58						20:56	50	19:55 (107)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		629			303			381			1139			2064			1000	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.61			0.63			0.63			0.66			0.65			0.67	
Total reduction		0.22			0.26			0.28			0.34			0.36			0.40	
Total, real		137			80			106			383			747			401	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 63

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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 8356 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6337)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:34 (106)	06:32		07:41 (82)	07:02		07:41 (82)	07:31		08:31 (83)	07:04			07:37		08:10 (108)
	21:08	36	19:52 (107)	20:51	81	20:11 (107)	20:09	26	08:07 (82)	19:19	15	08:46 (83)	17:33			17:10	29	08:39 (108)
2	06:10		06:34 (106)	06:33		07:40 (82)	07:03		07:43 (82)	07:32		08:28 (83)	07:05			07:38		08:10 (108)
	21:08	38	19:53 (107)	20:50	83	20:11 (107)	20:08	21	08:04 (82)	19:17	20	08:48 (83)	17:32			17:10	29	08:39 (108)
3	06:10		06:34 (106)	06:34		07:40 (82)	07:04		07:47 (82)	07:33		08:25 (83)	07:06			07:39		08:11 (108)
	21:08	40	19:54 (107)	20:49	84	20:11 (107)	20:06	12	07:59 (82)	19:15	25	08:50 (83)	17:31			17:10	29	08:40 (108)
4	06:11		06:35 (106)	06:35		07:39 (82)	07:05			07:34		08:24 (83)	07:07			07:40		08:11 (108)
	21:08	42	19:56 (107)	20:48	86	20:11 (107)	20:05			19:14	27	08:51 (83)	17:30			17:10	29	08:40 (108)
5	06:11		06:35 (106)	06:36		07:37 (82)	07:06			07:35		08:22 (83)	07:08			07:41		08:11 (108)
	21:08	43	19:56 (107)	20:47	87	20:10 (107)	20:03			19:12	30	08:52 (83)	17:29			17:09	29	08:40 (108)
6	06:12		06:35 (106)	06:37		07:36 (82)	07:07			07:36		08:21 (83)	07:09			07:42		08:12 (108)
	21:08	44	19:57 (107)	20:45	88	20:10 (107)	20:01			19:10	32	08:53 (83)	17:28			17:09	29	08:41 (108)
7	06:12		06:35 (106)	06:38		07:36 (82)	07:08			07:37		08:20 (83)	07:11			07:43		08:12 (108)
	21:07	46	19:58 (107)	20:44	89	20:10 (107)	20:00			19:09	33	08:53 (83)	17:27			17:09	29	08:41 (108)
8	06:13		06:36 (106)	06:39		07:35 (82)	07:09			07:38		08:19 (83)	07:12			07:44		08:13 (108)
	21:07	47	19:59 (107)	20:43	89	20:09 (107)	19:57			19:07	34	08:53 (83)	17:26			17:09	29	08:42 (108)
9	06:14		06:37 (106)	06:40		07:35 (82)	07:10			07:39		08:18 (83)	07:13			07:45		08:14 (108)
	21:07	47	20:00 (107)	20:42	90	20:09 (107)	19:55			19:06	36	08:54 (83)	17:25			17:09	28	08:42 (108)
10	06:14		06:36 (106)	06:41		07:34 (82)	07:11			07:40		08:18 (83)	07:14			07:46		08:14 (108)
	21:06	49	20:01 (107)	20:41	89	20:08 (107)	19:53			19:04	36	08:54 (83)	17:24			17:09	29	08:43 (108)
11	06:15		06:37 (106)	06:42		07:34 (82)	07:11			07:41		08:17 (83)	07:15			07:47		08:15 (108)
	21:06	50	20:02 (107)	20:39	88	20:07 (107)	19:52			19:03	36	08:53 (83)	17:23			17:09	28	08:43 (108)
12	06:16		06:38 (106)	06:43		07:34 (82)	07:12			07:42		08:17 (83)	07:16			07:47		08:15 (108)
	21:06	51	20:03 (107)	20:38	88	20:07 (107)	19:50			19:01	36	08:53 (83)	17:22			17:10	28	08:43 (108)
13	06:16		06:38 (106)	06:44		07:33 (82)	07:13			07:43		08:18 (83)	07:17			07:48		08:15 (108)
	21:05	51	20:03 (107)	20:37	87	20:06 (107)	19:48			19:00	36	08:54 (83)	17:21			17:10	28	08:43 (108)
14	06:17		06:39 (106)	06:45		07:33 (82)	07:14			07:44		08:17 (83)	07:19			07:49		08:16 (108)
	21:05	51	20:04 (107)	20:36	84	20:04 (107)	19:47			18:58	36	08:53 (83)	17:20			17:10	28	08:44 (108)
15	06:18		06:40 (106)	06:46		07:33 (82)	07:15			07:45		08:17 (83)	07:20			07:50		08:17 (108)
	21:04	50	20:05 (107)	20:34	83	20:03 (107)	19:45			18:57	36	08:53 (83)	17:19			17:10	28	08:45 (108)
16	06:19		06:41 (106)	06:47		07:33 (82)	07:16			07:46		08:18 (83)	07:21			07:50		08:17 (108)
	21:04	51	20:06 (107)	20:33	81	20:02 (107)	19:43			18:55	34	08:52 (83)	17:18			17:10	27	08:44 (108)
17	06:19		06:41 (106)	06:48		07:32 (82)	07:17			07:47		08:18 (83)	07:22		08:16 (108)	07:51		08:18 (108)
	21:03	50	20:06 (107)	20:32	76	19:59 (107)	19:42			18:54	33	08:51 (83)	17:17	9	08:25 (108)	17:11	27	08:45 (108)
18	06:20		06:43 (106)	06:49		07:32 (82)	07:18			07:48		08:18 (83)	07:23		08:14 (108)	07:52		08:19 (108)
	21:03	49	20:07 (107)	20:30	72	19:57 (107)	19:40			18:52	32	08:50 (83)	17:17	13	08:27 (108)	17:11	27	08:46 (108)
19	06:21		06:45 (106)	06:50		07:32 (82)	07:19			07:49		08:19 (83)	07:24		08:13 (108)	07:52		08:19 (108)
	21:02	46	20:08 (107)	20:29	66	19:54 (107)	19:38			18:51	30	08:49 (83)	17:16	17	08:30 (108)	17:11	27	08:46 (108)
20	06:22		19:30 (107)	06:51		07:32 (82)	07:20			07:50		08:20 (83)	07:25		08:12 (108)	07:53		08:20 (108)
	21:01	38	20:08 (107)	20:27	54	19:47 (107)	19:37			18:49	27	08:47 (83)	17:15	19	08:31 (108)	17:12	26	08:46 (108)
21	06:23		19:28 (107)	06:51		07:32 (82)	07:21			07:51		08:21 (83)	07:27		08:11 (108)	07:54		08:20 (108)
	21:01	40	20:08 (107)	20:26	49	08:21 (82)	19:35			18:48	24	08:45 (83)	17:15	21	08:32 (108)	17:12	26	08:46 (108)
22	06:24		19:28 (107)	06:52		07:32 (82)	07:22			07:52		08:24 (83)	07:28		08:10 (108)	07:54		08:21 (108)
	21:00	41	20:09 (107)	20:25	49	08:21 (82)	19:33			18:46	20	08:44 (83)	17:14	23	08:33 (108)	17:13	26	08:47 (108)
23	06:24		19:28 (107)	06:53		07:33 (82)	07:23			07:54		08:26 (83)	07:29		08:10 (108)	07:55		08:21 (108)
	20:59	41	20:09 (107)	20:23	47	08:20 (82)	19:32			18:45	15	08:41 (83)	17:14	24	08:34 (108)	17:13	26	08:47 (108)
24	06:25		19:28 (107)	06:54		07:33 (82)	07:24			07:55		08:30 (83)	07:30		08:10 (108)	07:55		08:22 (108)
	20:58	42	20:10 (107)	20:22	47	08:20 (82)	19:30			18:44	7	08:37 (83)	17:13	25	08:35 (108)	17:14	27	08:49 (108)
25	06:26		07:53 (82)	06:55		07:33 (82)	07:25			07:56			07:31		08:10 (108)	07:55		08:22 (108)
	20:57	54	20:10 (107)	20:20	46	08:19 (82)	19:28			18:42			17:13	26	08:36 (108)	17:15	27	08:49 (108)
26	06:27		07:51 (82)	06:56		07:34 (82)	07:26			07:57			07:32		08:10 (108)	07:56		08:22 (108)
	20:57	61	20:11 (107)	20:19	44	08:18 (82)	19:27			18:41			17:12	26	08:36 (108)	17:15	27	08:49 (108)
27	06:28		07:48 (82)	06:57		07:35 (82)	07:27			07:58			07:33		08:10 (108)	07:56		08:23 (108)
	20:56	65	20:10 (107)	20:17	42	08:17 (82)	19:25			18:40			17:12	27	08:37 (108)	17:16	27	08:50 (108)
28	06:29		07:46 (82)	06:58		07:36 (82)	07:28			07:59			07:34		08:10 (108)	07:56		08:23 (108)
	20:55	70	20:11 (107)	20:16	39	08:15 (82)	19:23			18:38			17:11	27	08:37 (108)	17:16	27	08:50 (108)
29	06:30		07:45 (82)	06:59		07:36 (82)	07:29			08:00			07:35		08:10 (108)	07:57		08:23 (108)
	20:54	73	20:11 (107)	20:14	37	08:13 (82)	19:22			18:37			17:11	28	08:38 (108)	17:17	28	08:51 (108)
30	06:31		07:43 (82)	07:00		07:37 (82)	07:30		08:36 (83)	08:01			07:36		08:10 (108)	07:57		08:23 (108)
	20:53	76	20:11 (107)	20:13	34	08:11 (82)	19:20	5	08:41 (83)	18:36			17:11	28	08:38 (108)	17:18	28	08:51 (108)
31	06:31		07:42 (82)	07:01		07:39 (82)				08:02						07:57		08:24 (108)
	20:52	78	20:11 (107)	20:11	30	08:09 (82)				18:35						17:19	27	08:51 (108)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		1560			2109			64			690			313			859	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.65			0.66			0.66			0.63			0.61			0.61	
Total reduction		0.39			0.39			0.40			0.35			0.22			0.30	
Total, real		607			828			26			244			70			260	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 64

Licensed user:
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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 10055 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6338)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April	May			June		
1	07:57		16:24 (39)	07:45			07:10		08:07 (108)	07:20	06:36			06:08		07:01 (83)
	17:20	23	16:47 (39)	17:53			18:26	36	08:43 (108)	19:59	20:28			20:57	64	08:05 (83)
2	07:58		16:25 (39)	07:44			07:08		08:07 (108)	07:19	06:35		07:28 (83)	06:08		07:02 (83)
	17:21	22	16:47 (39)	17:54			18:27	34	08:41 (108)	20:00	20:29	11	07:39 (83)	20:58	63	08:05 (83)
3	07:58		16:25 (39)	07:43		08:19 (108)	07:07		08:09 (108)	07:17	06:33		07:23 (83)	06:07		07:02 (83)
	17:21	23	16:48 (39)	17:56	15	08:34 (108)	18:28	31	08:40 (108)	20:00	20:30	21	07:44 (83)	20:58	64	08:06 (83)
4	07:58		16:26 (39)	07:42		08:16 (108)	07:05		08:10 (108)	07:15	06:32		07:20 (83)	06:07		07:02 (83)
	17:22	22	16:48 (39)	17:57	21	08:37 (108)	18:29	27	08:37 (108)	20:01	20:31	27	07:47 (83)	20:59	63	08:05 (83)
5	07:58		16:27 (39)	07:41		08:13 (108)	07:04		08:13 (108)	07:14	06:31		07:17 (83)	06:07		07:02 (83)
	17:23	21	16:48 (39)	17:58	25	08:38 (108)	18:31	22	08:35 (108)	20:02	20:32	32	07:49 (83)	21:00	64	08:06 (83)
6	07:58		16:28 (39)	07:40		08:11 (108)	07:02		08:15 (108)	07:12	06:30		07:15 (83)	06:06		07:02 (83)
	17:24	20	16:48 (39)	17:59	29	08:40 (108)	18:32	16	08:31 (108)	20:03	20:33	36	07:51 (83)	21:01	64	08:06 (83)
7	07:58		16:28 (39)	07:39		08:10 (108)	07:01			07:11	06:29		07:13 (83)	06:06		07:03 (83)
	17:25	20	16:48 (39)	18:01	32	08:42 (108)	18:33			20:04	20:34	39	07:52 (83)	21:01	64	08:07 (83)
8	07:58		16:30 (39)	07:37		08:09 (108)	07:59			07:09	06:27		07:12 (83)	06:06		07:02 (83)
	17:26	19	16:49 (39)	18:02	34	08:43 (108)	19:34			20:05	20:35	42	07:54 (83)	21:02	64	08:06 (83)
9	07:57		16:31 (39)	07:36		08:08 (108)	07:57			07:07	06:26		07:11 (83)	06:06		07:03 (83)
	17:27	18	16:49 (39)	18:03	37	08:45 (108)	19:35			20:06	20:36	44	07:55 (83)	21:02	63	08:06 (83)
10	07:57		16:32 (39)	07:35		08:07 (108)	07:56			07:06	06:25		07:10 (83)	06:06		07:03 (83)
	17:28	17	16:49 (39)	18:04	50	17:41 (32)	19:36			20:07	20:37	46	07:56 (83)	21:03	64	08:07 (83)
11	07:57		16:32 (39)	07:34		08:07 (108)	07:54			07:04	06:24		07:09 (83)	06:05		07:03 (83)
	17:29	16	16:48 (39)	18:05	55	17:43 (32)	19:37			20:08	20:38	48	07:57 (83)	21:03	64	08:07 (83)
12	07:57		16:34 (39)	07:33		08:05 (108)	07:53			07:03	06:23		07:08 (83)	06:05		07:03 (83)
	17:30	14	16:48 (39)	18:07	60	17:43 (32)	19:38			20:09	20:39	50	07:58 (83)	21:04	64	08:07 (83)
13	07:56		16:36 (39)	07:32		08:05 (108)	07:51			07:01	06:22		07:07 (83)	06:05		07:04 (83)
	17:31	11	16:47 (39)	18:08	64	17:45 (32)	19:39			20:10	20:40	52	07:59 (83)	21:04	63	08:07 (83)
14	07:56		16:37 (39)	07:30		08:05 (108)	07:49			07:00	06:21		07:06 (83)	06:05		07:04 (83)
	17:32	8	16:45 (39)	18:09	66	17:46 (32)	19:40			20:11	20:41	53	07:59 (83)	21:05	64	08:08 (83)
15	07:56			07:29		08:04 (108)	07:48			06:58	06:20		07:05 (83)	06:05		07:04 (83)
	17:33			18:10	71	17:48 (32)	19:41			20:12	20:42	55	08:00 (83)	21:05	64	08:08 (83)
16	07:55			07:28		08:03 (108)	07:46			06:57	06:19		07:04 (83)	06:05		07:04 (83)
	17:34			18:11	72	17:48 (32)	19:42			20:13	20:43	56	08:00 (83)	21:06	64	08:08 (83)
17	07:55			07:27		08:03 (108)	07:45			06:55	06:18		07:05 (83)	06:05		07:04 (83)
	17:36			18:12	74	17:49 (32)	19:43			20:14	20:44	56	08:01 (83)	21:06	64	08:08 (83)
18	07:55			07:25		08:03 (108)	07:43			06:54	06:17		07:04 (83)	06:05		07:05 (83)
	17:37			18:14	74	17:49 (32)	19:44			20:15	20:45	58	08:02 (83)	21:07	63	08:08 (83)
19	07:54			07:24		08:03 (108)	07:41			06:52	06:17		07:03 (83)	06:05		07:05 (83)
	17:38			18:15	74	17:49 (32)	19:45			20:16	20:46	59	08:02 (83)	21:07	63	08:08 (83)
20	07:54			07:23		08:03 (108)	07:40			06:51	06:16		07:03 (83)	06:06		07:06 (83)
	17:39			18:16	75	17:49 (32)	19:46			20:17	20:47	59	08:02 (83)	21:07	63	08:09 (83)
21	07:53			07:21		08:02 (108)	07:38			06:49	06:15		07:03 (83)	06:06		07:06 (83)
	17:40			18:17	74	17:48 (32)	19:48			20:18	20:48	60	08:03 (83)	21:07	63	08:09 (83)
22	07:52			07:20		08:03 (108)	07:37			06:48	06:14		07:03 (83)	06:06		07:06 (83)
	17:41			18:18	72	17:48 (32)	19:49			20:19	20:49	60	08:03 (83)	21:08	63	08:09 (83)
23	07:52			07:18		08:03 (108)	07:35			06:47	06:13		07:02 (83)	06:06		07:06 (83)
	17:42			18:19	71	17:48 (32)	19:50			20:20	20:50	61	08:03 (83)	21:08	63	08:09 (83)
24	07:51			07:17		08:03 (108)	07:33			06:45	06:13		07:01 (83)	06:06		07:06 (83)
	17:44			18:20	68	17:46 (32)	19:51			20:21	20:51	62	08:03 (83)	21:08	63	08:09 (83)
25	07:50			07:16		08:04 (108)	07:32			06:44	06:12		07:02 (83)	06:07		07:06 (83)
	17:45			18:22	65	17:46 (32)	19:52			20:22	20:51	62	08:04 (83)	21:08	64	08:10 (83)
26	07:50			07:14		08:04 (108)	07:30			06:42	06:11		07:01 (83)	06:07		07:06 (83)
	17:46			18:23	61	17:44 (32)	19:53			20:23	20:52	63	08:04 (83)	21:08	64	08:10 (83)
27	07:49			07:13		08:05 (108)	07:28			06:41	06:11		07:02 (83)	06:07		07:06 (83)
	17:47			18:24	56	17:42 (32)	19:54			20:24	20:53	63	08:05 (83)	21:08	64	08:10 (83)
28	07:48			07:11		08:05 (108)	07:27			06:40	06:10		07:01 (83)	06:08		07:07 (83)
	17:48			18:25	47	17:38 (32)	19:55			20:25	20:54	63	08:04 (83)	21:08	64	08:11 (83)
29	07:47						07:25			06:38	06:10		07:02 (83)	06:08		07:07 (83)
	17:50						19:56			20:26	20:55	63	08:05 (83)	21:08	63	08:10 (83)
30	07:46						07:23			06:37	06:09		07:01 (83)	06:09		07:08 (83)
	17:51						19:57			20:27	20:55	64	08:05 (83)	21:08	63	08:11 (83)
31	07:46						07:22				06:09		07:02 (83)			
	17:52						19:58				20:56	63	08:05 (83)			
Potential sun hours	300			299			370			397	446			449		
Total, worst case		254			1442			166				1528			1907	
Sun reduction		0.36			0.42			0.44				0.56			0.60	
Oper. time red.		1.00			1.00			1.00				1.00			1.00	
Wind dir. red.		0.68			0.64			0.62				0.68			0.68	
Total reduction		0.24			0.27			0.27				0.38			0.40	
Total, real		62			386			45				577			772	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 65

Licensed user:
EDR
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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 10055 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6338)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September	October			November			December		
1	06:09		07:07 (83)	06:32		07:19 (83)	07:02	07:31			07:04		07:36 (108)	07:37		16:14 (39)
	21:08	64	08:11 (83)	20:51	49	08:08 (83)	20:09	19:19			17:33	49	17:09 (32)	17:10	16	16:30 (39)
2	06:10		07:08 (83)	06:33		07:20 (83)	07:03	07:32			07:05		07:38 (108)	07:38		16:14 (39)
	21:08	64	08:12 (83)	20:50	47	08:07 (83)	20:08	19:17			17:32	36	08:14 (108)	17:10	17	16:31 (39)
3	06:10		07:08 (83)	06:34		07:21 (83)	07:04	07:33			07:06		07:39 (108)	07:39		16:14 (39)
	21:08	63	08:11 (83)	20:49	45	08:06 (83)	20:06	19:15			17:31	34	08:13 (108)	17:10	18	16:32 (39)
4	06:11		07:08 (83)	06:35		07:22 (83)	07:05	07:34			07:07		07:40 (108)	07:40		16:14 (39)
	21:08	64	08:12 (83)	20:48	43	08:05 (83)	20:05	19:14			17:30	31	08:11 (108)	17:10	19	16:33 (39)
5	06:11		07:08 (83)	06:36		07:22 (83)	07:06	07:35			07:08		07:42 (108)	07:41		16:14 (39)
	21:08	64	08:12 (83)	20:47	41	08:03 (83)	20:03	19:12			17:29	28	08:10 (108)	17:09	20	16:34 (39)
6	06:12		07:09 (83)	06:37		07:24 (83)	07:07	07:36			07:09		07:44 (108)	07:42		16:14 (39)
	21:08	63	08:12 (83)	20:45	37	08:01 (83)	20:01	19:10			17:28	25	08:09 (108)	17:09	20	16:34 (39)
7	06:12		07:08 (83)	06:38		07:25 (83)	07:08	07:37		08:53 (108)	07:11		07:46 (108)	07:43		16:14 (39)
	21:07	64	08:12 (83)	20:44	35	08:00 (83)	20:00	19:09	11	09:04 (108)	17:27	20	08:06 (108)	17:09	21	16:35 (39)
8	06:13		07:09 (83)	06:39		07:27 (83)	07:09	07:38		08:49 (108)	07:12		07:49 (108)	07:44		16:14 (39)
	21:07	64	08:13 (83)	20:43	31	07:58 (83)	19:57	19:07	19	09:08 (108)	17:26	14	08:03 (108)	17:09	22	16:36 (39)
9	06:14		07:09 (83)	06:40		07:30 (83)	07:10	07:39		08:46 (108)	07:13			07:45		16:14 (39)
	21:07	64	08:13 (83)	20:42	25	07:55 (83)	19:55	19:06	25	09:11 (108)	17:25			17:09	23	16:37 (39)
10	06:14		07:09 (83)	06:41		07:33 (83)	07:11	07:40		08:44 (108)	07:14			07:46		16:15 (39)
	21:06	64	08:13 (83)	20:41	19	07:52 (83)	19:53	19:04	29	09:13 (108)	17:24			17:09	22	16:37 (39)
11	06:15		07:10 (83)	06:42		07:40 (83)	07:11	07:41		08:42 (108)	07:15			07:47		16:15 (39)
	21:06	63	08:13 (83)	20:39	5	07:45 (83)	19:52	19:03	32	09:14 (108)	17:23			17:09	23	16:38 (39)
12	06:16		07:10 (83)	06:43			07:12	07:42		08:40 (108)	07:16			07:47		16:15 (39)
	21:06	64	08:14 (83)	20:38			19:50	19:01	35	09:15 (108)	17:22			17:10	23	16:38 (39)
13	06:16		07:10 (83)	06:44			07:13	07:43		08:39 (108)	07:17			07:48		16:15 (39)
	21:05	63	08:13 (83)	20:37			19:48	19:00	38	09:17 (108)	17:21			17:10	24	16:39 (39)
14	06:17		07:10 (83)	06:45			07:14	07:44		08:38 (108)	07:19			07:49		16:16 (39)
	21:05	63	08:13 (83)	20:36			19:47	18:58	51	18:13 (32)	17:20			17:10	23	16:39 (39)
15	06:18		07:11 (83)	06:46			07:15	07:45		08:37 (108)	07:20			07:50		16:17 (39)
	21:04	63	08:14 (83)	20:34			19:45	18:57	57	18:15 (32)	17:19			17:10	23	16:40 (39)
16	06:19		07:11 (83)	06:47			07:16	07:46		08:36 (108)	07:21			07:50		16:16 (39)
	21:04	63	08:14 (83)	20:33			19:43	18:55	63	18:17 (32)	17:18			17:10	24	16:40 (39)
17	06:19		07:11 (83)	06:48			07:17	07:47		08:35 (108)	07:22			07:51		16:17 (39)
	21:03	62	08:13 (83)	20:32			19:42	18:54	67	18:18 (32)	17:17			17:11	24	16:41 (39)
18	06:20		07:11 (83)	06:49			07:18	07:48		08:34 (108)	07:23			07:52		16:18 (39)
	21:02	62	08:13 (83)	20:30			19:40	18:52	69	18:18 (32)	17:17			17:11	24	16:42 (39)
19	06:21		07:12 (83)	06:50			07:19	07:49		08:34 (108)	07:24			07:52		16:18 (39)
	21:02	62	08:14 (83)	20:29			19:38	18:51	72	18:19 (32)	17:16			17:11	24	16:42 (39)
20	06:22		07:12 (83)	06:50			07:20	07:50		08:33 (108)	07:25			07:53		16:19 (39)
	21:01	62	08:14 (83)	20:27			19:37	18:49	74	18:19 (32)	17:15			17:12	24	16:43 (39)
21	06:23		07:12 (83)	06:51			07:21	07:51		08:33 (108)	07:27			07:53		16:19 (39)
	21:00	61	08:13 (83)	20:26			19:35	18:48	74	18:19 (32)	17:15			17:12	24	16:43 (39)
22	06:24		07:12 (83)	06:52			07:22	07:52		08:34 (108)	07:28			07:54		16:20 (39)
	21:00	61	08:13 (83)	20:25			19:33	18:46	74	18:20 (32)	17:14			17:13	24	16:44 (39)
23	06:24		07:13 (83)	06:53			07:23	07:54		08:33 (108)	07:29			07:54		16:20 (39)
	20:59	60	08:13 (83)	20:23			19:32	18:45	74	18:19 (32)	17:14			17:13	24	16:44 (39)
24	06:25		07:14 (83)	06:54			07:24	07:55		08:33 (108)	07:30			07:55		16:21 (39)
	20:58	59	08:13 (83)	20:22			19:30	18:44	75	18:19 (32)	17:13			17:14	24	16:45 (39)
25	06:26		07:14 (83)	06:55			07:25	07:56		08:33 (108)	07:31			07:55		16:21 (39)
	20:57	58	08:12 (83)	20:20			19:28	18:42	73	18:18 (32)	17:13			17:15	24	16:45 (39)
26	06:27		07:15 (83)	06:56			07:26	07:57		08:33 (108)	07:32			07:56		16:21 (39)
	20:57	57	08:12 (83)	20:19			19:27	18:41	72	18:18 (32)	17:12			17:15	24	16:45 (39)
27	06:28		07:14 (83)	06:57			07:27	07:58		08:33 (108)	07:33			07:56		16:22 (39)
	20:56	57	08:11 (83)	20:17			19:25	18:40	69	18:16 (32)	17:12			17:16	24	16:46 (39)
28	06:29		07:15 (83)	06:58			07:28	07:59		08:34 (108)	07:34		16:17 (39)	07:56		16:23 (39)
	20:55	56	08:11 (83)	20:16			19:23	18:38	67	18:16 (32)	17:11	8	16:25 (39)	17:16	23	16:46 (39)
29	06:30		07:16 (83)	06:59			07:29	08:00		08:35 (108)	07:35		16:16 (39)	07:57		16:23 (39)
	20:54	54	08:10 (83)	20:14			19:22	18:37	63	18:14 (32)	17:11	11	16:27 (39)	17:17	23	16:46 (39)
30	06:31		07:17 (83)	07:00			07:30	08:01		08:35 (108)	07:36		16:15 (39)	07:57		16:23 (39)
	20:53	52	08:09 (83)	20:13			19:20	18:36	60	18:13 (32)	17:11	14	16:29 (39)	17:18	24	16:47 (39)
31	06:31		07:18 (83)	07:01				08:02		08:36 (108)				07:57		16:24 (39)
	20:52	51	08:09 (83)	20:11				18:35	54	18:11 (32)				17:19	23	16:47 (39)
Potential sun hours	456			427			374	346			300			291		
Total, worst case		1891			377				1397			270			695	
Sun reduction		0.60			0.60				0.56			0.37			0.50	
Oper. time red.		1.00			1.00				1.00			1.00			1.00	
Wind dir. red.		0.68			0.68				0.64			0.63			0.68	
Total reduction		0.40			0.40				0.36			0.23			0.34	
Total, real		765			153				499			63			234	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 66

Licensed user:
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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 10056 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6339)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		16:28 (39)	07:45			07:10		07:41 (108)	07:20			06:36			06:08		06:52 (83)
	17:20	25	16:53 (39)	17:53			18:26	65	17:59 (32)	19:59			20:28			20:57	29	07:21 (83)
2	07:58		16:28 (39)	07:44			07:08		07:39 (108)	07:19			06:35			06:08		06:51 (83)
	17:21	26	16:54 (39)	17:54			18:27	67	17:58 (32)	20:00			20:29			20:58	32	07:23 (83)
3	07:58		16:29 (39)	07:43			07:07		07:39 (108)	07:17			06:33			06:07		06:51 (83)
	17:21	25	16:54 (39)	17:56			18:28	67	17:58 (32)	20:00			20:30			20:58	33	07:24 (83)
4	07:58		16:29 (39)	07:42			07:05		07:37 (108)	07:15			06:32			06:07		06:50 (83)
	17:22	26	16:55 (39)	17:57			18:29	69	17:57 (32)	20:01			20:31			20:59	34	07:24 (83)
5	07:58		16:29 (39)	07:41			07:04		07:37 (108)	07:14			06:31			06:07		06:50 (83)
	17:23	26	16:55 (39)	17:58			18:31	69	17:57 (32)	20:02			20:32			21:00	35	07:25 (83)
6	07:58		16:30 (39)	07:40			07:02		07:36 (108)	07:12			06:30			06:06		06:49 (83)
	17:24	26	16:56 (39)	17:59			18:32	67	17:55 (32)	20:03			20:33			21:01	37	07:26 (83)
7	07:58		16:30 (39)	07:39			07:01		07:35 (108)	07:11			06:29			06:06		06:49 (83)
	17:25	27	16:57 (39)	18:01			18:33	67	17:54 (32)	20:04			20:34			21:01	38	07:27 (83)
8	07:58		16:31 (39)	07:37			07:59		08:34 (108)	07:09			06:27			06:06		06:48 (83)
	17:26	26	16:57 (39)	18:02			19:34	65	18:52 (32)	20:05			20:35			21:02	39	07:27 (83)
9	07:57		16:32 (39)	07:36			07:57		08:34 (108)	07:07			06:26			06:06		06:48 (83)
	17:27	26	16:58 (39)	18:03			19:35	61	18:50 (32)	20:06			20:36			21:02	40	07:28 (83)
10	07:57		16:32 (39)	07:35			07:56		08:34 (108)	07:06			06:25			06:06		06:48 (83)
	17:28	26	16:58 (39)	18:04			19:36	55	18:47 (32)	20:07			20:37			21:03	40	07:28 (83)
11	07:57		16:32 (39)	07:34			07:54		08:33 (108)	07:04			06:24			06:05		06:48 (83)
	17:29	26	16:58 (39)	18:05			19:37	45	09:18 (108)	20:08			20:38			21:03	41	07:29 (83)
12	07:57		16:33 (39)	07:33			07:53		08:34 (108)	07:03			06:23			06:05		06:48 (83)
	17:30	26	16:59 (39)	18:07			19:38	44	09:18 (108)	20:09			20:39			21:04	42	07:30 (83)
13	07:56		16:34 (39)	07:32			07:51		08:33 (108)	07:01			06:22			06:05		06:48 (83)
	17:31	25	16:59 (39)	18:08			19:39	44	09:17 (108)	20:10			20:40			21:04	42	07:30 (83)
14	07:56		16:34 (39)	07:30			07:49		08:33 (108)	07:00			06:21			06:05		06:48 (83)
	17:32	25	16:59 (39)	18:09			19:40	43	09:16 (108)	20:11			20:41			21:05	42	07:30 (83)
15	07:56		16:35 (39)	07:29			07:48		08:34 (108)	06:58			06:20			06:05		06:48 (83)
	17:33	24	16:59 (39)	18:10			19:41	42	09:16 (108)	20:12			20:42			21:05	43	07:31 (83)
16	07:55		16:35 (39)	07:28			07:46		08:34 (108)	06:57			06:19			06:05		06:48 (83)
	17:34	24	16:59 (39)	18:11			19:42	40	09:14 (108)	20:13			20:43			21:06	43	07:31 (83)
17	07:55		16:36 (39)	07:27			07:45		08:34 (108)	06:55			06:18			06:05		06:48 (83)
	17:36	23	16:59 (39)	18:12			19:43	39	09:13 (108)	20:14			20:44			21:06	43	07:31 (83)
18	07:55		16:36 (39)	07:25			07:43		08:35 (108)	06:54			06:17			06:05		06:48 (83)
	17:37	23	16:59 (39)	18:14			19:44	37	09:12 (108)	20:15			20:45			21:07	44	07:32 (83)
19	07:54		16:38 (39)	07:24		17:43 (32)	07:41		08:36 (108)	06:52			06:17			06:05		06:48 (83)
	17:38	21	16:59 (39)	18:15	3	17:46 (32)	19:45	34	09:10 (108)	20:16			20:46			21:07	44	07:32 (83)
20	07:54		16:39 (39)	07:23		17:38 (32)	07:40		08:37 (108)	06:51			06:16			06:06		06:49 (83)
	17:39	19	16:58 (39)	18:16	13	17:51 (32)	19:46	32	09:09 (108)	20:17			20:47			21:07	44	07:33 (83)
21	07:53		16:40 (39)	07:21		17:35 (32)	07:38		08:38 (108)	06:49			06:15			06:06		06:49 (83)
	17:40	18	16:58 (39)	18:17	18	17:53 (32)	19:48	29	09:07 (108)	20:18			20:48			21:07	44	07:33 (83)
22	07:52		16:42 (39)	07:20		17:34 (32)	07:37		08:40 (108)	06:48			06:14			06:06		06:49 (83)
	17:41	15	16:57 (39)	18:18	21	17:55 (32)	19:49	24	09:04 (108)	20:19			20:49			21:08	44	07:33 (83)
23	07:52		16:43 (39)	07:18		17:33 (32)	07:35		08:43 (108)	06:47			06:14			06:06		06:49 (83)
	17:42	12	16:55 (39)	18:19	24	17:57 (32)	19:50	18	09:01 (108)	20:20			20:50			21:08	44	07:33 (83)
24	07:51		16:45 (39)	07:17		07:54 (108)	07:33		08:47 (108)	06:45			06:13			06:06		06:49 (83)
	17:44	8	16:53 (39)	18:20	36	17:57 (32)	19:51	9	08:56 (108)	20:21			20:51			21:08	44	07:33 (83)
25	07:50			07:16		07:50 (108)	07:32			06:44			06:12			06:07		06:50 (83)
	17:45			18:22	45	17:58 (32)	19:52			20:22			20:51			21:08	43	07:33 (83)
26	07:50			07:14		07:46 (108)	07:30			06:42			06:11		07:03 (83)	06:07		06:50 (83)
	17:46			18:23	53	17:58 (32)	19:53			20:23			20:52	5	07:08 (83)	21:08	43	07:33 (83)
27	07:49			07:13		07:44 (108)	07:28			06:41			06:11		07:00 (83)	06:07		06:50 (83)
	17:47			18:24	59	17:59 (32)	19:54			20:24			20:53	13	07:13 (83)	21:08	43	07:33 (83)
28	07:48			07:11		07:42 (108)	07:27			06:40			06:10		06:57 (83)	06:08		06:51 (83)
	17:48			18:25	62	17:58 (32)	19:55			20:25			20:54	18	07:15 (83)	21:08	43	07:34 (83)
29	07:47						07:25			06:38			06:10		06:56 (83)	06:08		06:51 (83)
	17:50						19:56			20:26			20:55	22	07:18 (83)	21:08	42	07:33 (83)
30	07:46						07:23			06:37			06:09		06:54 (83)	06:09		06:52 (83)
	17:51						19:57			20:27			20:55	25	07:19 (83)	21:08	42	07:34 (83)
31	07:46						07:22						06:09		06:53 (83)			
	17:52						19:58						20:56	28	07:21 (83)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		548			334			1132						111			1217	
Sun reduction		0.36			0.42			0.44						0.56			0.60	
Oper. time red.		1.00			1.00			1.00						1.00			1.00	
Wind dir. red.		0.67			0.66			0.64						0.68			0.68	
Total reduction		0.24			0.28			0.28						0.38			0.41	
Total, real		133			93			320						42			499	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 67

Licensed user:
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217 Montgomery St.
US-SYRACUSE, NY 13202
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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 10056 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6339)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August		September			October			November			December		
1	06:09		06:52 (83)	06:32		07:02			07:31		08:12 (108)	07:04			07:37		16:14 (39)
	21:08	41	07:33 (83)	20:51		20:09			19:19	44	08:56 (108)	17:33			17:10	26	16:40 (39)
2	06:10		06:53 (83)	06:33		07:03			07:32		08:12 (108)	07:05			07:38		16:14 (39)
	21:08	41	07:34 (83)	20:50		20:08			19:17	44	08:56 (108)	17:32			17:10	26	16:40 (39)
3	06:10		06:53 (83)	06:34		07:04			07:33		08:11 (108)	07:06			07:39		16:15 (39)
	21:08	40	07:33 (83)	20:49		20:06			19:15	50	18:22 (32)	17:31			17:10	26	16:41 (39)
4	06:11		06:54 (83)	06:35		07:05			07:34		08:11 (108)	07:07			07:40		16:15 (39)
	21:08	39	07:33 (83)	20:48		20:05			19:14	59	18:26 (32)	17:30			17:10	26	16:41 (39)
5	06:11		06:54 (83)	06:36		07:06			07:35		08:11 (108)	07:08			07:41		16:15 (39)
	21:08	38	07:32 (83)	20:47		20:03			19:12	62	18:28 (32)	17:29			17:09	27	16:42 (39)
6	06:12		06:55 (83)	06:37		07:07			07:36		08:11 (108)	07:09			07:42		16:16 (39)
	21:08	38	07:33 (83)	20:45		20:01			19:10	65	18:29 (32)	17:28			17:09	26	16:42 (39)
7	06:12		06:56 (83)	06:38		07:08			07:37		08:11 (108)	07:11			07:43		16:17 (39)
	21:07	36	07:32 (83)	20:44		20:00			19:09	67	18:30 (32)	17:27			17:09	25	16:42 (39)
8	06:13		06:57 (83)	06:39		07:09			07:38		08:11 (108)	07:12			07:44		16:17 (39)
	21:07	35	07:32 (83)	20:43		19:57			19:07	68	18:31 (32)	17:26			17:09	26	16:43 (39)
9	06:14		06:58 (83)	06:40		07:10			07:39		08:11 (108)	07:13			07:45		16:18 (39)
	21:07	33	07:31 (83)	20:42		19:55			19:06	69	18:31 (32)	17:25			17:09	25	16:43 (39)
10	06:14		06:58 (83)	06:41		07:11			07:40		08:12 (108)	07:14			07:46		16:18 (39)
	21:06	32	07:30 (83)	20:41		19:53			19:04	69	18:32 (32)	17:24			17:09	26	16:44 (39)
11	06:15		06:59 (83)	06:42		07:11			07:41		08:12 (108)	07:15			07:47		16:19 (39)
	21:06	31	07:30 (83)	20:39		19:52			19:03	68	18:32 (32)	17:23			17:09	25	16:44 (39)
12	06:16		07:01 (83)	06:43		07:12			07:42		08:13 (108)	07:16			07:47		16:19 (39)
	21:06	28	07:29 (83)	20:38		19:50			19:01	65	18:31 (32)	17:22			17:10	25	16:44 (39)
13	06:16		07:02 (83)	06:44		07:13			07:43		08:15 (108)	07:17			07:48		16:20 (39)
	21:05	26	07:28 (83)	20:37		19:48			19:00	63	18:32 (32)	17:21			17:10	24	16:44 (39)
14	06:17		07:03 (83)	06:45		07:14			07:44		08:16 (108)	07:19			07:49		16:20 (39)
	21:05	24	07:27 (83)	20:36		19:47			18:58	61	18:32 (32)	17:20			17:10	25	16:45 (39)
15	06:18		07:05 (83)	06:46		07:15			07:45		08:18 (108)	07:20			07:50		16:21 (39)
	21:04	21	07:26 (83)	20:34		19:45			18:57	56	18:31 (32)	17:19			17:10	24	16:45 (39)
16	06:19		07:08 (83)	06:47		07:16			07:46		08:20 (108)	07:21			07:50		16:21 (39)
	21:04	16	07:24 (83)	20:33		19:43			18:55	50	18:30 (32)	17:18			17:10	24	16:45 (39)
17	06:19		07:10 (83)	06:48		07:17			07:47		08:22 (108)	07:22			07:51		16:22 (39)
	21:03	10	07:20 (83)	20:32		19:42			18:54	44	18:29 (32)	17:17			17:11	23	16:45 (39)
18	06:20			06:49		07:18			07:48		08:29 (108)	07:23		16:19 (39)	07:52		16:23 (39)
	21:02			20:30		19:40			18:52	28	18:28 (32)	17:17	8	16:27 (39)	17:11	23	16:46 (39)
19	06:21			06:50		07:19		08:36 (108)	07:49		18:04 (32)	07:24		16:18 (39)	07:52		16:23 (39)
	21:02			20:29		19:38	5	08:41 (108)	18:51	23	18:27 (32)	17:16	12	16:30 (39)	17:11	23	16:46 (39)
20	06:22			06:50		07:20		08:30 (108)	07:50		18:05 (32)	07:25		16:17 (39)	07:53		16:24 (39)
	21:01			20:27		19:37	17	08:47 (108)	18:49	20	18:25 (32)	17:15	15	16:32 (39)	17:12	23	16:47 (39)
21	06:23			06:51		07:21		08:27 (108)	07:51		18:06 (32)	07:27		16:15 (39)	07:53		16:24 (39)
	21:00			20:26		19:35	22	08:49 (108)	18:48	17	18:23 (32)	17:15	18	16:33 (39)	17:12	23	16:47 (39)
22	06:24			06:52		07:22		08:23 (108)	07:52		18:10 (32)	07:28		16:15 (39)	07:54		16:25 (39)
	21:00			20:25		19:33	27	08:50 (108)	18:46	11	18:21 (32)	17:14	19	16:34 (39)	17:13	23	16:48 (39)
23	06:24			06:53		07:23		08:21 (108)	07:54			07:29		16:14 (39)	07:54		16:25 (39)
	20:59			20:23		19:32	31	08:52 (108)	18:45			17:14	21	16:35 (39)	17:13	23	16:48 (39)
24	06:25			06:54		07:24		08:20 (108)	07:55			07:30		16:14 (39)	07:55		16:26 (39)
	20:58			20:22		19:30	33	08:53 (108)	18:44			17:13	23	16:37 (39)	17:14	23	16:49 (39)
25	06:26			06:55		07:25		08:18 (108)	07:56			07:31		16:14 (39)	07:55		16:26 (39)
	20:57			20:20		19:28	36	08:54 (108)	18:42			17:13	23	16:37 (39)	17:15	23	16:49 (39)
26	06:27			06:56		07:26		08:17 (108)	07:57			07:32		16:14 (39)	07:56		16:26 (39)
	20:57			20:19		19:27	38	08:55 (108)	18:41			17:12	24	16:38 (39)	17:15	23	16:49 (39)
27	06:28			06:57		07:27		08:16 (108)	07:58			07:33		16:14 (39)	07:56		16:27 (39)
	20:56			20:17		19:25	39	08:55 (108)	18:40			17:12	24	16:38 (39)	17:16	24	16:51 (39)
28	06:29			06:58		07:28		08:15 (108)	07:59			07:34		16:14 (39)	07:56		16:27 (39)
	20:55			20:16		19:23	41	08:56 (108)	18:38			17:11	25	16:39 (39)	17:16	24	16:51 (39)
29	06:30			06:59		07:29		08:14 (108)	08:00			07:35		16:14 (39)	07:57		16:27 (39)
	20:54			20:14		19:22	42	08:56 (108)	18:37			17:11	25	16:39 (39)	17:17	25	16:52 (39)
30	06:31			07:00		07:30		08:13 (108)	08:01			07:36		16:14 (39)	07:57		16:28 (39)
	20:53			20:13		19:20	43	08:56 (108)	18:36			17:11	26	16:40 (39)	17:18	24	16:52 (39)
31	06:31			07:01					08:02						07:57		16:28 (39)
	20:52			20:11					18:35						17:19	25	16:53 (39)
Potential sun hours	456			427		374			346			300			291		
Total, worst case		529					374			1103			263			758	
Sun reduction		0.60					0.61			0.56			0.37			0.50	
Oper. time red.		1.00					1.00			1.00			1.00			1.00	
Wind dir. red.		0.68					0.63			0.65			0.67			0.67	
Total reduction		0.41					0.39			0.36			0.25			0.34	
Total, real		217					145			402			66			255	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 68

Licensed user:
EDR
217 Montgomery St.
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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 10168 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6340)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March	April	May			June		
1	07:57		14:36 (127)	07:44		15:04 (127)	07:09	07:20	06:36			06:08		19:58 (22)
	17:19	75	15:51 (127)	17:53	43	15:47 (127)	18:26	19:58	20:28			20:57	28	20:26 (22)
2	07:57		14:37 (127)	07:43		15:07 (127)	07:08	07:18	06:34			06:07		19:58 (22)
	17:20	74	15:51 (127)	17:54	39	15:46 (127)	18:27	20:00	20:29			20:57	28	20:26 (22)
3	07:57		14:37 (127)	07:42		15:09 (127)	07:06	07:17	06:33			06:07		19:58 (22)
	17:21	74	15:51 (127)	17:55	35	15:44 (127)	18:28	20:00	20:30			20:58	28	20:26 (22)
4	07:57		14:38 (127)	07:41		15:12 (127)	07:05	07:15	06:32			06:07		19:58 (22)
	17:22	74	15:52 (127)	17:57	30	15:42 (127)	18:29	20:01	20:31			20:59	29	20:27 (22)
5	07:57		14:38 (127)	07:40		15:16 (127)	07:03	07:14	06:31			06:06		19:58 (22)
	17:23	74	15:52 (127)	17:58	23	15:39 (127)	18:30	20:02	20:32			21:00	29	20:27 (22)
6	07:57		14:39 (127)	07:39		15:21 (127)	07:02	07:12	06:29			06:06		19:59 (22)
	17:24	74	15:53 (127)	17:59	14	15:35 (127)	18:31	20:03	20:33			21:00	29	20:28 (22)
7	07:57		14:40 (127)	07:38			07:00	07:10	06:28			06:06		19:58 (22)
	17:25	73	15:53 (127)	18:00			18:32	20:04	20:34			21:01	29	20:27 (22)
8	07:57		14:40 (127)	07:37			07:59	07:09	06:27			06:06		19:58 (22)
	17:26	74	15:54 (127)	18:01			19:34	20:05	20:35			21:02	30	20:28 (22)
9	07:57		14:41 (127)	07:36			07:57	07:07	06:26			06:05		19:58 (22)
	17:27	73	15:54 (127)	18:03			19:35	20:06	20:36			21:02	30	20:28 (22)
10	07:57		14:41 (127)	07:35			07:56	07:06	06:25			06:05		19:59 (22)
	17:28	73	15:54 (127)	18:04			19:36	20:07	20:37			21:03	30	20:29 (22)
11	07:57		14:42 (127)	07:34			07:54	07:04	06:24			06:05		19:59 (22)
	17:29	72	15:54 (127)	18:05			19:37	20:08	20:38			21:03	30	20:29 (22)
12	07:56		14:43 (127)	07:33			07:52	07:03	06:23			06:05		19:59 (22)
	17:30	72	15:55 (127)	18:06			19:38	20:09	20:39			21:04	30	20:29 (22)
13	07:56		14:43 (127)	07:31			07:51	07:01	06:22			06:05		19:59 (22)
	17:31	71	15:54 (127)	18:07			19:39	20:10	20:40			21:04	31	20:30 (22)
14	07:56		14:44 (127)	07:30			07:49	06:59	06:21			06:05		20:00 (22)
	17:32	71	15:55 (127)	18:09			19:40	20:11	20:41			21:05	30	20:30 (22)
15	07:56		14:45 (127)	07:29			07:48	06:58	06:20			06:05		20:00 (22)
	17:33	70	15:55 (127)	18:10			19:41	20:12	20:42			21:05	30	20:30 (22)
16	07:55		14:45 (127)	07:28			07:46	06:56	06:19			06:05		20:00 (22)
	17:34	70	15:55 (127)	18:11			19:42	20:13	20:43			21:06	30	20:30 (22)
17	07:55		14:47 (127)	07:26			07:44	06:55	06:18			06:05		20:00 (22)
	17:35	68	15:55 (127)	18:12			19:43	20:14	20:44			21:06	30	20:30 (22)
18	07:54		14:47 (127)	07:25			07:43	06:53	06:17			06:05		20:00 (22)
	17:36	68	15:55 (127)	18:13			19:44	20:15	20:45			21:06	30	20:30 (22)
19	07:54		14:47 (127)	07:24			07:41	06:52	06:16			06:05		20:00 (22)
	17:38	67	15:54 (127)	18:14			19:45	20:16	20:46			21:07	30	20:30 (22)
20	07:53		14:49 (127)	07:22			07:39	06:51	06:16		20:10 (22)	06:05		20:00 (22)
	17:39	66	15:55 (127)	18:16			19:46	20:17	20:47	2	20:12 (22)	21:07	31	20:31 (22)
21	07:53		14:49 (127)	07:21			07:38	06:49	06:15		20:05 (22)	06:05		20:00 (22)
	17:40	65	15:54 (127)	18:17			19:47	20:18	20:48	11	20:16 (22)	21:07	31	20:31 (22)
22	07:52		14:51 (127)	07:20			07:36	06:48	06:14		20:04 (22)	06:06		20:01 (22)
	17:41	64	15:55 (127)	18:18			19:48	20:19	20:48	14	20:18 (22)	21:07	31	20:32 (22)
23	07:51		14:52 (127)	07:18			07:35	06:46	06:13		20:03 (22)	06:06		20:01 (22)
	17:42	62	15:54 (127)	18:19			19:49	20:20	20:49	16	20:19 (22)	21:08	31	20:32 (22)
24	07:51		14:52 (127)	07:17			07:33	06:45	06:12		20:01 (22)	06:06		20:01 (22)
	17:43	62	15:54 (127)	18:20			19:50	20:21	20:50	19	20:20 (22)	21:08	30	20:31 (22)
25	07:50		14:53 (127)	07:15			07:31	06:43	06:12		20:01 (22)	06:06		20:01 (22)
	17:45	60	15:53 (127)	18:21			19:51	20:22	20:51	21	20:22 (22)	21:08	30	20:31 (22)
26	07:49		14:55 (127)	07:14			07:30	06:42	06:11		20:00 (22)	06:07		20:02 (22)
	17:46	58	15:53 (127)	18:22			19:52	20:23	20:52	22	20:22 (22)	21:08	30	20:32 (22)
27	07:49		14:57 (127)	07:12			07:28	06:41	06:11		19:59 (22)	06:07		20:02 (22)
	17:47	55	15:52 (127)	18:24			19:53	20:24	20:53	24	20:23 (22)	21:08	30	20:32 (22)
28	07:48		14:58 (127)	07:11			07:26	06:39	06:10		19:59 (22)	06:08		20:03 (22)
	17:48	54	15:52 (127)	18:25			19:54	20:25	20:54	25	20:24 (22)	21:08	30	20:33 (22)
29	07:47		14:59 (127)				07:25	06:38	06:09		19:58 (22)	06:08		20:03 (22)
	17:49	52	15:51 (127)				19:55	20:26	20:54	26	20:24 (22)	21:08	30	20:33 (22)
30	07:46		15:01 (127)				07:23	06:37	06:09		19:59 (22)	06:08		20:02 (22)
	17:51	49	15:50 (127)				19:56	20:27	20:55	26	20:25 (22)	21:08	30	20:32 (22)
31	07:45		15:03 (127)				07:22		06:08		19:59 (22)			
	17:52	46	15:49 (127)				19:57		20:56	27	20:26 (22)			
Potential sun hours	300			299			370	397	446			449		
Total, worst case		2060			184					233			895	
Sun reduction		0.36			0.42					0.56			0.60	
Oper. time red.		1.00			1.00					1.00			1.00	
Wind dir. red.		0.66			0.66					0.62			0.62	
Total reduction		0.24			0.28					0.35			0.38	
Total, real		495			52					82			336	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 10168 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6340)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August	September	October	November			December		
1	06:09		20:03 (22)	06:32	07:02	07:30	07:03			07:37		14:24 (127)
	21:08	30	20:33 (22)	20:51	20:09	19:18	17:33			17:10	72	15:36 (127)
2	06:09		20:03 (22)	06:33	07:03	07:31	07:04			07:38		14:24 (127)
	21:08	30	20:33 (22)	20:50	20:08	19:17	17:32			17:10	73	15:37 (127)
3	06:10		20:04 (22)	06:34	07:04	07:32	07:06			07:39		14:24 (127)
	21:08	29	20:33 (22)	20:49	20:06	19:15	17:31			17:09	73	15:37 (127)
4	06:10		20:03 (22)	06:35	07:05	07:33	07:07			07:40		14:24 (127)
	21:08	30	20:33 (22)	20:47	20:04	19:13	17:30			17:09	74	15:38 (127)
5	06:11		20:04 (22)	06:36	07:05	07:34	07:08		14:50 (127)	07:41		14:25 (127)
	21:08	30	20:34 (22)	20:46	20:03	19:12	17:28	15	15:05 (127)	17:09	73	15:38 (127)
6	06:11		20:05 (22)	06:37	07:06	07:35	07:09		14:45 (127)	07:42		14:25 (127)
	21:07	29	20:34 (22)	20:45	20:01	19:10	17:27	24	15:09 (127)	17:09	74	15:39 (127)
7	06:12		20:04 (22)	06:38	07:07	07:36	07:10		14:43 (127)	07:43		14:25 (127)
	21:07	30	20:34 (22)	20:44	20:00	19:09	17:26	30	15:13 (127)	17:09	74	15:39 (127)
8	06:13		20:05 (22)	06:39	07:08	07:37	07:11		14:40 (127)	07:44		14:26 (127)
	21:07	29	20:34 (22)	20:43	19:56	19:07	17:25	35	15:15 (127)	17:09	74	15:40 (127)
9	06:13		20:05 (22)	06:40	07:09	07:38	07:13		14:37 (127)	07:45		14:26 (127)
	21:07	28	20:33 (22)	20:42	19:55	19:05	17:24	40	15:17 (127)	17:09	74	15:40 (127)
10	06:14		20:05 (22)	06:41	07:10	07:39	07:14		14:35 (127)	07:46		14:27 (127)
	21:06	29	20:34 (22)	20:40	19:53	19:04	17:23	43	15:18 (127)	17:09	74	15:41 (127)
11	06:15		20:06 (22)	06:42	07:11	07:40	07:15		14:34 (127)	07:46		14:26 (127)
	21:06	28	20:34 (22)	20:39	19:51	19:02	17:22	47	15:21 (127)	17:09	75	15:41 (127)
12	06:15		20:06 (22)	06:43	07:12	07:42	07:16		14:33 (127)	07:47		14:27 (127)
	21:05	27	20:33 (22)	20:38	19:50	19:01	17:21	49	15:22 (127)	17:09	74	15:41 (127)
13	06:16		20:07 (22)	06:43	07:13	07:43	07:17		14:31 (127)	07:48		14:27 (127)
	21:05	26	20:33 (22)	20:37	19:48	18:59	17:20	52	15:23 (127)	17:09	75	15:42 (127)
14	06:17		20:07 (22)	06:44	07:14	07:44	07:18		14:30 (127)	07:49		14:28 (127)
	21:04	26	20:33 (22)	20:35	19:46	18:58	17:20	54	15:24 (127)	17:10	75	15:43 (127)
15	06:18		20:07 (22)	06:45	07:15	07:45	07:19		14:28 (127)	07:49		14:28 (127)
	21:04	25	20:32 (22)	20:34	19:45	18:56	17:19	56	15:24 (127)	17:10	74	15:42 (127)
16	06:18		20:08 (22)	06:46	07:16	07:46	07:21		14:28 (127)	07:50		14:28 (127)
	21:03	24	20:32 (22)	20:33	19:43	18:55	17:18	58	15:26 (127)	17:10	75	15:43 (127)
17	06:19		20:09 (22)	06:47	07:17	07:47	07:22		14:27 (127)	07:51		14:29 (127)
	21:03	23	20:32 (22)	20:31	19:41	18:53	17:17	60	15:27 (127)	17:10	75	15:44 (127)
18	06:20		20:10 (22)	06:48	07:18	07:48	07:23		14:26 (127)	07:51		14:29 (127)
	21:02	22	20:32 (22)	20:30	19:40	18:52	17:16	61	15:27 (127)	17:11	75	15:44 (127)
19	06:21		20:11 (22)	06:49	07:19	07:49	07:24		14:26 (127)	07:52		14:30 (127)
	21:02	20	20:31 (22)	20:29	19:38	18:50	17:16	62	15:28 (127)	17:11	75	15:45 (127)
20	06:22		20:11 (22)	06:50	07:20	07:50	07:25		14:26 (127)	07:53		14:30 (127)
	21:01	18	20:29 (22)	20:27	19:36	18:49	17:15	64	15:30 (127)	17:12	75	15:45 (127)
21	06:22		20:13 (22)	06:51	07:21	07:51	07:26		14:25 (127)	07:53		14:31 (127)
	21:00	16	20:29 (22)	20:26	19:35	18:47	17:14	65	15:30 (127)	17:12	75	15:46 (127)
22	06:23		20:15 (22)	06:52	07:22	07:52	07:27		14:25 (127)	07:54		14:31 (127)
	20:59	12	20:27 (22)	20:24	19:33	18:46	17:14	66	15:31 (127)	17:13	75	15:46 (127)
23	06:24		20:17 (22)	06:53	07:23	07:53	07:29		14:24 (127)	07:54		14:32 (127)
	20:59	8	20:25 (22)	20:23	19:31	18:45	17:13	67	15:31 (127)	17:13	75	15:47 (127)
24	06:25			06:54	07:24	07:54	07:30		14:24 (127)	07:55		14:32 (127)
	20:58			20:21	19:30	18:43	17:13	68	15:32 (127)	17:14	75	15:47 (127)
25	06:26			06:55	07:25	07:55	07:31		14:24 (127)	07:55		14:33 (127)
	20:57			20:20	19:28	18:42	17:12	68	15:32 (127)	17:14	75	15:48 (127)
26	06:27			06:56	07:25	07:57	07:32		14:24 (127)	07:55		14:33 (127)
	20:56			20:18	19:26	18:41	17:12	70	15:34 (127)	17:15	75	15:48 (127)
27	06:28			06:57	07:26	07:58	07:33		14:24 (127)	07:56		14:33 (127)
	20:55			20:17	19:25	18:39	17:11	70	15:34 (127)	17:15	75	15:48 (127)
28	06:28			06:58	07:27	07:59	07:34		14:24 (127)	07:56		14:34 (127)
	20:54			20:15	19:23	18:38	17:11	71	15:35 (127)	17:16	74	15:48 (127)
29	06:29			06:59	07:28	08:00	07:35		14:24 (127)	07:56		14:35 (127)
	20:54			20:14	19:22	18:37	17:11	71	15:35 (127)	17:17	75	15:50 (127)
30	06:30			07:00	07:29	08:01	07:36		14:24 (127)	07:57		14:35 (127)
	20:53			20:12	19:20	18:35	17:10	72	15:36 (127)	17:18	75	15:50 (127)
31	06:31			07:01		08:02				07:57		14:36 (127)
	20:52			20:11		18:34				17:18	74	15:50 (127)
Potential sun hours	456			427	374	346	300			291		
Total, worst case		569						1438			2306	
Sun reduction		0.60						0.37			0.50	
Oper. time red.		1.00						1.00			1.00	
Wind dir. red.		0.62						0.66			0.66	
Total reduction		0.38						0.25			0.33	
Total, real		214						355			770	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 70

Licensed user:
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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 10206 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6341)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May	June
1	07:57		08:34 (72)	07:44		08:38 (72)	07:10			07:20		19:07 (117)	06:36	06:08
	17:20	68	16:54 (116)	17:53	59	09:37 (72)	18:26			19:59	20	19:27 (117)	20:28	20:57
2	07:57		08:34 (72)	07:44		08:38 (72)	07:08			07:18		19:04 (117)	06:34	06:08
	17:20	68	16:54 (116)	17:54	59	09:37 (72)	18:27			20:00	24	19:28 (117)	20:29	20:58
3	07:58		08:34 (72)	07:43		08:39 (72)	07:07			07:17		19:02 (117)	06:33	06:07
	17:21	70	16:55 (116)	17:55	58	09:37 (72)	18:28			20:00	29	19:31 (117)	20:30	20:58
4	07:58		08:34 (72)	07:42		08:39 (72)	07:05			07:15		19:00 (117)	06:32	06:07
	17:22	72	16:56 (116)	17:57	57	09:36 (72)	18:29			20:01	31	19:31 (117)	20:31	20:59
5	07:58		08:34 (72)	07:41		08:40 (72)	07:04			07:14		18:58 (117)	06:31	06:07
	17:23	73	16:57 (116)	17:58	56	09:36 (72)	18:30			20:02	34	19:32 (117)	20:32	21:00
6	07:58		08:35 (72)	07:40		08:41 (72)	07:02			07:12		18:57 (117)	06:30	06:06
	17:24	74	16:58 (116)	17:59	55	09:36 (72)	18:31			20:03	36	19:33 (117)	20:33	21:00
7	07:58		08:35 (72)	07:38		08:41 (72)	07:00			07:11		18:56 (117)	06:28	06:06
	17:25	76	16:59 (116)	18:00	54	09:35 (72)	18:33			20:04	38	19:34 (117)	20:34	21:01
8	07:57		08:35 (72)	07:37		08:42 (72)	07:59			07:09		18:55 (117)	06:27	06:06
	17:26	77	17:00 (116)	18:02	53	09:35 (72)	19:34			20:05	40	19:35 (117)	20:35	21:02
9	07:57		08:35 (72)	07:36		08:43 (72)	07:57			07:07		18:54 (117)	06:26	06:06
	17:27	78	17:01 (116)	18:03	51	09:34 (72)	19:35			20:06	40	19:34 (117)	20:36	21:02
10	07:57		08:35 (72)	07:35		08:44 (72)	07:56			07:06		18:53 (117)	06:25	06:05
	17:28	78	17:01 (116)	18:04	49	09:33 (72)	19:36			20:07	41	19:34 (117)	20:37	21:03
11	07:57		08:35 (72)	07:34		08:46 (72)	07:54			07:04		18:53 (117)	06:24	06:05
	17:29	78	17:01 (116)	18:05	46	09:32 (72)	19:37			20:08	42	19:35 (117)	20:38	21:03
12	07:57		08:35 (72)	07:33		08:46 (72)	07:53			07:03		18:52 (117)	06:23	06:05
	17:30	81	17:02 (116)	18:06	44	09:30 (72)	19:38			20:09	42	19:34 (117)	20:39	21:04
13	07:56		08:36 (72)	07:32		08:48 (72)	07:51			07:01		18:52 (117)	06:22	06:05
	17:31	81	17:03 (116)	18:08	41	09:29 (72)	19:39			20:10	42	19:34 (117)	20:40	21:04
14	07:56		08:35 (72)	07:30		08:49 (72)	07:49			07:00		18:51 (117)	06:21	06:05
	17:32	81	17:02 (116)	18:09	38	09:27 (72)	19:40			20:11	43	19:34 (117)	20:41	21:05
15	07:56		08:36 (72)	07:29		08:50 (72)	07:48			06:58		18:52 (117)	06:20	06:05
	17:33	81	17:03 (116)	18:10	35	09:25 (72)	19:41			20:12	42	19:34 (117)	20:42	21:05
16	07:55		08:35 (72)	07:28		08:53 (72)	07:46			06:57		18:51 (117)	06:19	06:05
	17:34	82	17:03 (116)	18:11	30	09:23 (72)	19:42			20:13	42	19:33 (117)	20:43	21:06
17	07:55		08:36 (72)	07:26		08:55 (72)	07:45			06:55		18:52 (117)	06:18	06:05
	17:35	81	17:03 (116)	18:12	25	09:20 (72)	19:43			20:14	41	19:33 (117)	20:44	21:06
18	07:54		08:35 (72)	07:25		08:59 (72)	07:43			06:54		18:51 (117)	06:17	06:05
	17:37	82	17:03 (116)	18:13	18	09:17 (72)	19:44			20:15	41	19:32 (117)	20:45	21:06
19	07:54		08:36 (72)	07:24			07:41			06:52		18:52 (117)	06:16	06:05
	17:38	80	17:03 (116)	18:15			19:45			20:16	39	19:31 (117)	20:46	21:07
20	07:53		08:36 (72)	07:22			07:40			06:51		18:53 (117)	06:16	06:05
	17:39	80	17:03 (116)	18:16			19:46			20:17	38	19:31 (117)	20:47	21:07
21	07:53		08:35 (72)	07:21			07:38			06:49		18:53 (117)	06:15	06:06
	17:40	79	17:02 (116)	18:17			19:47			20:18	36	19:29 (117)	20:48	21:07
22	07:52		08:36 (72)	07:20			07:36			06:48		18:54 (117)	06:14	06:06
	17:41	77	17:02 (116)	18:18			19:48			20:19	35	19:29 (117)	20:49	21:08
23	07:52		08:36 (72)	07:18			07:35			06:46		18:55 (117)	06:13	06:06
	17:42	76	17:01 (116)	18:19			19:49			20:20	32	19:27 (117)	20:50	21:08
24	07:51		08:36 (72)	07:17			07:33			06:45		18:56 (117)	06:13	06:06
	17:43	73	16:59 (116)	18:20			19:50			20:21	30	19:26 (117)	20:50	21:08
25	07:50		08:37 (72)	07:15			07:31			06:44		18:57 (117)	06:12	06:07
	17:45	68	16:58 (116)	18:21			19:52			20:22	28	19:25 (117)	20:51	21:08
26	07:50		08:37 (72)	07:14			07:30			06:42		18:58 (117)	06:11	06:07
	17:46	61	09:38 (72)	18:23			19:53			20:23	24	19:22 (117)	20:52	21:08
27	07:49		08:37 (72)	07:13			07:28			06:41		19:01 (117)	06:11	06:07
	17:47	61	09:38 (72)	18:24			19:54			20:24	19	19:20 (117)	20:53	21:08
28	07:48		08:37 (72)	07:11			07:27			06:40		19:04 (117)	06:10	06:08
	17:48	61	09:38 (72)	18:25			19:55			20:25	13	19:17 (117)	20:54	21:08
29	07:47		08:37 (72)				07:25			06:38			06:10	06:08
	17:49	61	09:38 (72)				19:56			20:26			20:55	21:08
30	07:46		08:37 (72)				07:23			06:37			06:09	06:09
	17:51	60	09:37 (72)				19:57			20:27			20:55	21:08
31	07:45		08:37 (72)				07:22		19:10 (117)				06:09	
	17:52	60	09:37 (72)				19:58	13	19:23 (117)				20:56	
Potential sun hours	300			299			370			397			446	449
Total, worst case		2278			828			13			962			
Sun reduction		0.36			0.42			0.44			0.51			
Oper. time red.		1.00			1.00			1.00			1.00			
Wind dir. red.		0.62			0.61			0.65			0.65			
Total reduction		0.22			0.25			0.29			0.33			
Total, real		509			210			4			319			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 71

Licensed user:
EDR
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US-SYRACUSE, NY 13202
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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 10206 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6341)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09			06:32			07:02		18:52 (117)	07:31			07:04		08:13 (72)	07:37		08:17 (72)
	21:08			20:51			20:09	42	19:34 (117)	19:18			17:33	49	09:02 (72)	17:10	79	16:43 (116)
2	06:09			06:33			07:03		18:52 (117)	07:32			07:05		08:13 (72)	07:38		08:18 (72)
	21:08			20:50			20:08	41	19:33 (117)	19:17			17:32	51	09:04 (72)	17:10	79	16:44 (116)
3	06:10			06:34			07:04		18:52 (117)	07:33			07:06		08:12 (72)	07:39		08:18 (72)
	21:08			20:49			20:06	40	19:32 (117)	19:15			17:31	52	09:04 (72)	17:10	78	16:44 (116)
4	06:10			06:35			07:05		18:52 (117)	07:34			07:07		08:11 (72)	07:40		08:19 (72)
	21:08			20:48			20:05	40	19:32 (117)	19:14			17:30	54	09:05 (72)	17:09	77	16:44 (116)
5	06:11			06:36			07:06		18:53 (117)	07:35			07:08		08:10 (72)	07:41		08:20 (72)
	21:08			20:47			20:03	38	19:31 (117)	19:12			17:29	56	09:06 (72)	17:09	75	16:44 (116)
6	06:12			06:37			07:07		18:53 (117)	07:36			07:09		08:11 (72)	07:42		08:21 (72)
	21:08			20:45			20:01	36	19:29 (117)	19:10			17:27	56	09:07 (72)	17:09	74	16:44 (116)
7	06:12			06:38			07:08		18:53 (117)	07:37			07:10		08:10 (72)	07:43		08:21 (72)
	21:07			20:44			20:00	34	19:27 (117)	19:09			17:26	57	09:07 (72)	17:09	73	16:44 (116)
8	06:13			06:39			07:08		18:54 (117)	07:38			07:12		08:10 (72)	07:44		08:22 (72)
	21:07			20:43			19:56	32	19:26 (117)	19:07			17:25	58	09:08 (72)	17:09	72	16:44 (116)
9	06:13			06:40			07:09		18:55 (117)	07:39			07:13		08:09 (72)	07:45		08:23 (72)
	21:07			20:42			19:55	29	19:24 (117)	19:06			17:24	59	09:08 (72)	17:09	70	16:44 (116)
10	06:14			06:41			07:10		18:57 (117)	07:40			07:14		08:09 (72)	07:46		08:24 (72)
	21:06			20:41			19:53	25	19:22 (117)	19:04			17:23	59	09:08 (72)	17:09	69	16:44 (116)
11	06:15			06:42			07:11		18:59 (117)	07:41			07:15		08:09 (72)	07:47		08:25 (72)
	21:06			20:39			19:52	20	19:19 (117)	19:02			17:22	60	09:09 (72)	17:09	68	16:45 (116)
12	06:16			06:43			07:12		19:02 (117)	07:42			07:16		08:09 (72)	07:47		08:25 (72)
	21:06			20:38			19:50	13	19:15 (117)	19:01			17:22	60	09:09 (72)	17:09	67	16:44 (116)
13	06:16			06:44			07:13			07:43			07:17		08:09 (72)	07:48		08:26 (72)
	21:05			20:37			19:48			18:59			17:21	61	09:10 (72)	17:10	66	16:44 (116)
14	06:17			06:45		19:15 (117)	07:14			07:44			07:19		08:09 (72)	07:49		08:27 (72)
	21:05			20:36	6	19:21 (117)	19:47			18:58			17:20	61	09:10 (72)	17:10	65	16:45 (116)
15	06:18			06:46		19:10 (117)	07:15			07:45			07:20		08:10 (72)	07:50		08:28 (72)
	21:04			20:34	15	19:25 (117)	19:45			18:56			17:19	61	09:11 (72)	17:10	64	16:45 (116)
16	06:18			06:47		19:07 (117)	07:16			07:46			07:21		08:10 (72)	07:50		08:28 (72)
	21:04			20:33	20	19:27 (117)	19:43			18:55			17:18	61	09:11 (72)	17:10	63	16:45 (116)
17	06:19			06:47		19:05 (117)	07:17			07:47			07:22		08:10 (72)	07:51		08:29 (72)
	21:03			20:31	24	19:29 (117)	19:42			18:53			17:17	68	16:31 (116)	17:11	62	16:45 (116)
18	06:20			06:48		19:03 (117)	07:18			07:48			07:23		08:10 (72)	07:52		08:30 (72)
	21:02			20:30	28	19:31 (117)	19:40			18:52			17:17	73	16:33 (116)	17:11	62	16:46 (116)
19	06:21			06:49		19:01 (117)	07:19			07:49			07:24		08:11 (72)	07:52		08:30 (72)
	21:02			20:29	31	19:32 (117)	19:38			18:50			17:16	76	16:36 (116)	17:11	61	16:46 (116)
20	06:22			06:50		19:00 (117)	07:20			07:50			07:25		08:11 (72)	07:53		08:31 (72)
	21:01			20:27	33	19:33 (117)	19:37			18:49			17:15	77	16:37 (116)	17:12	61	16:47 (116)
21	06:22			06:51		18:59 (117)	07:21			07:51			07:27		08:11 (72)	07:53		08:31 (72)
	21:00			20:26	35	19:34 (117)	19:35			18:48			17:15	79	16:38 (116)	17:12	61	16:47 (116)
22	06:23			06:52		18:58 (117)	07:22			07:52			07:28		08:12 (72)	07:54		08:32 (72)
	21:00			20:24	36	19:34 (117)	19:33			18:46			17:14	80	16:39 (116)	17:13	61	16:48 (116)
23	06:24			06:53		18:57 (117)	07:23			07:53		09:33 (72)	07:29		08:12 (72)	07:54		08:32 (72)
	20:59			20:23	38	19:35 (117)	19:32			18:45	10	09:43 (72)	17:13	80	16:39 (116)	17:13	61	16:48 (116)
24	06:25			06:54		18:56 (117)	07:24			07:55		09:28 (72)	07:30		08:12 (72)	07:55		08:32 (72)
	20:58			20:22	39	19:35 (117)	19:30			18:43	20	09:48 (72)	17:13	82	16:40 (116)	17:14	61	16:48 (116)
25	06:26			06:55		18:55 (117)	07:25			07:56		09:24 (72)	07:31		08:14 (72)	07:55		08:33 (72)
	20:57			20:20	41	19:36 (117)	19:28			18:42	27	09:51 (72)	17:12	81	16:41 (116)	17:14	62	16:49 (116)
26	06:27			06:56		18:55 (117)	07:26			07:57		09:22 (72)	07:32		08:14 (72)	07:56		08:33 (72)
	20:56			20:19	41	19:36 (117)	19:27			18:41	31	09:53 (72)	17:12	82	16:42 (116)	17:15	62	16:49 (116)
27	06:28			06:57		18:53 (117)	07:27			07:58		09:20 (72)	07:33		08:15 (72)	07:56		08:33 (72)
	20:56			20:17	42	19:35 (117)	19:25			18:39	35	09:55 (72)	17:11	81	16:42 (116)	17:16	63	16:50 (116)
28	06:29			06:58		18:53 (117)	07:28			07:59		09:19 (72)	07:34		08:15 (72)	07:56		08:34 (72)
	20:55			20:16	42	19:35 (117)	19:23			18:38	39	09:58 (72)	17:11	81	16:42 (116)	17:16	64	16:51 (116)
29	06:29			06:59		18:52 (117)	07:29			08:00		09:17 (72)	07:35		08:16 (72)	07:57		08:34 (72)
	20:54			20:14	43	19:35 (117)	19:22			18:37	42	09:59 (72)	17:11	81	16:43 (116)	17:17	64	16:51 (116)
30	06:30			07:00		18:52 (117)	07:30			08:01		09:16 (72)	07:36		08:16 (72)	07:57		08:34 (72)
	20:53			20:12	42	19:34 (117)	19:20			18:36	44	10:00 (72)	17:10	81	16:43 (116)	17:18	65	16:52 (116)
31	06:31			07:01		18:52 (117)				08:02		09:14 (72)				07:57		08:34 (72)
	20:52			20:11	42	19:34 (117)				18:34	47	10:01 (72)				17:19	67	16:53 (116)
Potential sun hours	456			427			374			346			300			291		
Total, worst case					598			390			295			2017			2076	
Sun reduction					0.60			0.61			0.56			0.37			0.50	
Oper. time red.					1.00			1.00			1.00			1.00			1.00	
Wind dir. red.					0.65			0.65			0.61			0.62			0.63	
Total reduction					0.39			0.40			0.34			0.23			0.31	
Total, real					233			155			100			459			649	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 72

Licensed user:
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217 Montgomery St.
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Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 10280 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6342)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May			June		
1	07:57		08:25 (108)	07:45			07:10		07:43 (83)	07:20			06:36		07:20 (82)	06:08		06:30 (106)
	17:20	29	08:54 (108)	17:53			18:26	38	08:21 (83)	19:59			20:28	88	19:59 (107)	20:57	47	19:57 (107)
2	07:58		08:25 (108)	07:44			07:08		07:43 (83)	07:19			06:35		07:20 (82)	06:08		06:30 (106)
	17:21	29	08:54 (108)	17:54			18:27	37	08:20 (83)	20:00			20:29	89	20:00 (107)	20:58	40	19:56 (107)
3	07:58		08:26 (108)	07:43			07:07		07:43 (83)	07:17			06:33		07:20 (82)	06:07		06:29 (106)
	17:21	30	08:56 (108)	17:56			18:28	38	08:21 (83)	20:00			20:30	91	20:01 (107)	20:59	41	19:56 (107)
4	07:58		08:26 (108)	07:42			07:05		07:42 (83)	07:15			06:32		07:20 (82)	06:07		06:28 (106)
	17:22	29	08:55 (108)	17:57			18:29	38	08:20 (83)	20:01			20:31	93	20:02 (107)	20:59	41	19:55 (107)
5	07:58		08:26 (108)	07:41			07:04		07:43 (83)	07:14			06:31		07:19 (82)	06:07		06:28 (106)
	17:23	30	08:56 (108)	17:58			18:31	37	08:20 (83)	20:02			20:32	93	20:01 (107)	21:00	40	19:55 (107)
6	07:58		08:27 (108)	07:40			07:02		07:42 (83)	07:12			06:30		07:19 (82)	06:06		06:28 (106)
	17:24	29	08:56 (108)	17:59			18:32	37	08:19 (83)	20:03			20:33	94	20:02 (107)	21:01	39	19:54 (107)
7	07:58		08:27 (108)	07:39			07:01		07:43 (83)	07:11			06:29		07:19 (82)	06:06		06:28 (106)
	17:25	30	08:57 (108)	18:01			18:33	36	08:19 (83)	20:04			20:34	95	20:02 (107)	21:01	39	19:54 (107)
8	07:58		08:28 (108)	07:37			07:59		08:43 (83)	07:09			06:27		07:19 (82)	06:06		06:27 (106)
	17:26	30	08:58 (108)	18:02			19:34	35	09:18 (83)	20:05			20:35	95	20:03 (107)	21:02	39	19:53 (107)
9	07:57		08:28 (108)	07:36			07:57		08:43 (83)	07:08			06:26		07:20 (82)	06:06		06:27 (106)
	17:27	30	08:58 (108)	18:03			19:35	33	09:16 (83)	20:06			20:36	94	20:03 (107)	21:02	37	19:52 (107)
10	07:57		08:29 (108)	07:35			07:56		08:44 (83)	07:06			06:25		07:20 (82)	06:06		06:27 (106)
	17:28	30	08:59 (108)	18:04			19:36	32	09:16 (83)	20:07			20:37	94	20:03 (107)	21:03	35	19:51 (107)
11	07:57		08:29 (108)	07:34			07:54		08:45 (83)	07:04			06:24		07:20 (82)	06:05		06:28 (106)
	17:29	29	08:58 (108)	18:05			19:37	29	09:14 (83)	20:08			20:38	93	20:03 (107)	21:04	33	19:51 (107)
12	07:57		08:30 (108)	07:33			07:53		08:46 (83)	07:03			06:23		07:21 (82)	06:05		06:28 (106)
	17:30	29	08:59 (108)	18:07			19:38	27	09:13 (83)	20:09			20:39	92	20:03 (107)	21:04	32	19:50 (107)
13	07:57		08:30 (108)	07:32			07:51		08:47 (83)	07:01			06:22		07:21 (82)	06:05		06:28 (106)
	17:31	30	09:00 (108)	18:08			19:39	23	09:10 (83)	20:10			20:40	91	20:03 (107)	21:05	29	19:49 (107)
14	07:56		08:30 (108)	07:30			07:49		08:49 (83)	07:00		07:43 (82)	06:21		07:21 (82)	06:05		06:28 (106)
	17:32	29	08:59 (108)	18:09			19:40	18	09:07 (83)	20:11	16	07:59 (82)	20:41	90	20:03 (107)	21:05	27	19:48 (107)
15	07:56		08:31 (108)	07:29			07:48		08:53 (83)	06:58		07:38 (82)	06:20		07:22 (82)	06:05		06:28 (106)
	17:33	29	09:00 (108)	18:10			19:41	11	09:04 (83)	20:12	24	08:02 (82)	20:42	89	20:03 (107)	21:05	23	06:51 (106)
16	07:55		08:32 (108)	07:28			07:46			06:57		07:36 (82)	06:19		07:22 (82)	06:05		06:28 (106)
	17:34	27	08:59 (108)	18:11			19:42			20:13	29	08:05 (82)	20:43	87	20:02 (107)	21:06	23	06:51 (106)
17	07:55		08:33 (108)	07:27			07:45			06:55		07:33 (82)	06:18		07:24 (82)	06:05		06:28 (106)
	17:36	27	09:00 (108)	18:12			19:43			20:14	33	08:06 (82)	20:44	85	20:03 (107)	21:06	23	06:51 (106)
18	07:55		08:33 (108)	07:25			07:43			06:54		07:32 (82)	06:17		07:24 (82)	06:05		06:28 (106)
	17:37	26	08:59 (108)	18:14			19:44			20:15	36	08:08 (82)	20:45	84	20:03 (107)	21:07	23	06:51 (106)
19	07:54		08:34 (108)	07:24		07:59 (83)	07:41			06:52		07:29 (82)	06:17		07:25 (82)	06:05		06:28 (106)
	17:38	25	08:59 (108)	18:15	8	08:07 (83)	19:45			20:16	40	08:09 (82)	20:46	81	20:02 (107)	21:07	23	06:51 (106)
20	07:54		08:35 (108)	07:23		07:55 (83)	07:40			06:51		07:28 (82)	06:16		07:25 (82)	06:06		06:29 (106)
	17:39	24	08:59 (108)	18:16	16	08:11 (83)	19:46			20:17	42	08:10 (82)	20:47	80	20:02 (107)	21:07	24	06:53 (106)
21	07:53		08:37 (108)	07:21		07:53 (83)	07:38			06:49		07:27 (82)	06:15		07:27 (82)	06:06		06:29 (106)
	17:40	22	08:59 (108)	18:17	21	08:14 (83)	19:48			20:18	43	08:10 (82)	20:48	77	20:02 (107)	21:07	24	06:53 (106)
22	07:52		08:38 (108)	07:20		07:50 (83)	07:37			06:48		07:26 (82)	06:14		07:27 (82)	06:06		06:29 (106)
	17:41	20	08:58 (108)	18:18	25	08:15 (83)	19:49			20:19	45	08:11 (82)	20:49	74	20:01 (107)	21:08	24	06:53 (106)
23	07:52		08:39 (108)	07:18		07:49 (83)	07:35			06:47		07:25 (82)	06:14		07:28 (82)	06:06		06:29 (106)
	17:42	18	08:57 (108)	18:19	28	08:17 (83)	19:50			20:20	47	08:12 (82)	20:50	72	20:01 (107)	21:08	24	06:53 (106)
24	07:51		08:40 (108)	07:17		07:47 (83)	07:33			06:45		07:24 (82)	06:13		07:29 (82)	06:06		06:29 (106)
	17:44	15	08:55 (108)	18:21	31	08:18 (83)	19:51			20:21	48	08:12 (82)	20:51	69	20:00 (107)	21:08	23	06:52 (106)
25	07:50		08:43 (108)	07:16		07:47 (83)	07:32			06:44		07:23 (82)	06:12		07:30 (82)	06:07		06:30 (106)
	17:45	11	08:54 (108)	18:22	32	08:19 (83)	19:52			20:22	64	19:50 (107)	20:51	66	20:00 (107)	21:08	23	06:53 (106)
26	07:50		08:48 (108)	07:14		07:45 (83)	07:30			06:42		07:23 (82)	06:11		07:31 (82)	06:07		06:30 (106)
	17:46	2	08:50 (108)	18:23	34	08:19 (83)	19:53			20:23	70	19:53 (107)	20:52	64	20:00 (107)	21:08	23	06:53 (106)
27	07:49			07:13		07:45 (83)	07:28			06:41		07:21 (82)	06:11		07:33 (82)	06:07		06:30 (106)
	17:47			18:24	35	08:20 (83)	19:54			20:24	77	19:55 (107)	20:53	59	20:00 (107)	21:08	23	06:53 (106)
28	07:48			07:11		07:44 (83)	07:27			06:40		07:21 (82)	06:10		07:34 (82)	06:08		06:31 (106)
	17:48			18:25	36	08:20 (83)	19:55			20:25	80	19:57 (107)	20:54	56	19:59 (107)	21:08	25	19:49 (107)
29	07:47						07:25			06:38		07:21 (82)	06:10		07:36 (82)	06:08		06:31 (106)
	17:50						19:56			20:26	84	19:58 (107)	20:55	52	19:59 (107)	21:08	29	19:52 (107)
30	07:46						07:23			06:37		07:20 (82)	06:09		06:32 (106)	06:09		06:32 (106)
	17:51						19:57			20:27	86	19:58 (107)	20:56	56	19:58 (107)	21:08	31	19:54 (107)
31	07:46						07:22						06:09		06:31 (106)			
	17:52						19:58						20:56	53	19:58 (107)			
Potential sun hours	300			299			370			397			446			449		
Total, worst case		659			266			469			864			2496			907	
Sun reduction		0.36			0.42			0.44			0.51			0.56			0.60	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.61			0.63			0.63			0.66			0.65			0.67	
Total reduction		0.22			0.27			0.28			0.34			0.36			0.40	
Total, real		143			71			130			291			908			363	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative

Printed/Page
4/27/2012 3:34 PM / 73

Licensed user:
EDR
217 Montgomery St.
US-SYRACUSE, NY 13202
(315) 471 0688
Steve Curtis / aspinks@kishmish.com

Calculated:
4/27/2012 3:29 PM/2.7.490

SHADOW - Calendar

Calculation: 11052 Buckeye Wind I and II ASFA_w-Obstacles_cumulative **Shadow receptor:** 10280 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (6342)

Assumptions for shadow calculations

Maximum distance for influence	1,100	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	1	minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.36	0.42	0.44	0.51	0.56	0.60	0.60	0.60	0.61	0.56	0.37	0.50

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
280	307	482	420	473	385	412	385	596	797	832	727	858	745	631	430	8,760

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December		
1	06:09		06:32 (106)	06:32		07:31 (82)	07:02			07:31		08:26 (83)	07:04			07:37		08:11 (108)
	21:08	33	19:54 (107)	20:51	93	20:14 (107)	20:09			19:19	25	08:51 (83)	17:33			17:10	30	08:41 (108)
2	06:10		06:33 (106)	06:33		07:31 (82)	07:03			07:32		08:24 (83)	07:05			07:38		08:11 (108)
	21:08	34	19:56 (107)	20:50	94	20:14 (107)	20:08			19:17	28	08:52 (83)	17:32			17:10	30	08:41 (108)
3	06:10		06:32 (106)	06:34		07:30 (82)	07:04			07:33		08:22 (83)	07:06			07:39		08:11 (108)
	21:08	37	19:57 (107)	20:49	95	20:14 (107)	20:06			19:15	31	08:53 (83)	17:31			17:10	30	08:41 (108)
4	06:11		06:33 (106)	06:35		07:30 (82)	07:05			07:34		08:21 (83)	07:07			07:40		08:12 (108)
	21:08	37	19:58 (107)	20:48	94	20:13 (107)	20:05			19:14	33	08:54 (83)	17:30			17:10	30	08:42 (108)
5	06:11		06:33 (106)	06:36		07:29 (82)	07:06			07:35		08:20 (83)	07:08			07:41		08:12 (108)
	21:08	39	19:59 (107)	20:47	94	20:12 (107)	20:03			19:12	34	08:54 (83)	17:29			17:09	30	08:42 (108)
6	06:12		06:34 (106)	06:37		07:29 (82)	07:07			07:36		08:19 (83)	07:09			07:42		08:13 (108)
	21:08	40	20:00 (107)	20:45	94	20:12 (107)	20:01			19:10	35	08:54 (83)	17:28			17:09	30	08:43 (108)
7	06:12		06:34 (106)	06:38		07:29 (82)	07:08			07:37		08:18 (83)	07:11			07:43		08:13 (108)
	21:07	41	20:01 (107)	20:44	94	20:11 (107)	20:00			19:09	37	08:55 (83)	17:27			17:09	30	08:43 (108)
8	06:13		06:35 (106)	06:39		07:29 (82)	07:09			07:38		08:17 (83)	07:12			07:44		08:14 (108)
	21:07	41	20:02 (107)	20:43	93	20:11 (107)	19:57			19:07	38	08:55 (83)	17:26			17:09	29	08:43 (108)
9	06:14		06:36 (106)	06:40		07:28 (82)	07:10			07:39		08:17 (83)	07:13			07:45		08:14 (108)
	21:07	41	20:03 (107)	20:42	93	20:10 (107)	19:55			19:06	38	08:55 (83)	17:25			17:09	30	08:44 (108)
10	06:14		06:36 (106)	06:41		07:28 (82)	07:11			07:40		08:16 (83)	07:14			07:46		08:15 (108)
	21:06	42	20:03 (107)	20:41	92	20:10 (107)	19:53			19:04	38	08:54 (83)	17:24			17:09	29	08:44 (108)
11	06:15		06:38 (106)	06:42		07:28 (82)	07:11			07:41		08:16 (83)	07:15			07:47		08:16 (108)
	21:06	41	20:05 (107)	20:39	90	20:09 (107)	19:52			19:03	38	08:54 (83)	17:23			17:09	29	08:45 (108)
12	06:16		06:39 (106)	06:43		07:28 (82)	07:12			07:42		08:16 (83)	07:16			07:47		08:16 (108)
	21:06	51	20:06 (107)	20:38	89	20:08 (107)	19:50			19:01	38	08:54 (83)	17:22			17:10	28	08:44 (108)
13	06:16		06:40 (106)	06:44		07:29 (82)	07:13			07:43		08:17 (83)	07:17			07:48		08:16 (108)
	21:05	54	20:06 (107)	20:37	86	20:07 (107)	19:48			19:00	37	08:54 (83)	17:21			17:10	29	08:45 (108)
14	06:17		06:43 (106)	06:45		07:29 (82)	07:14			07:44		08:17 (83)	07:19			07:49		08:17 (108)
	21:05	53	20:07 (107)	20:36	82	20:05 (107)	19:47			18:58	36	08:53 (83)	17:20			17:10	29	08:46 (108)
15	06:18		07:44 (82)	06:46		07:29 (82)	07:15			07:45		08:17 (83)	07:20			07:50		08:18 (108)
	21:04	54	20:08 (107)	20:34	79	20:04 (107)	19:45			18:57	36	08:53 (83)	17:19			17:10	28	08:46 (108)
16	06:19		07:43 (82)	06:47		07:29 (82)	07:16			07:46		08:18 (83)	07:21		08:20 (108)	07:50		08:18 (108)
	21:04	58	20:09 (107)	20:33	75	20:02 (107)	19:43			18:55	34	08:52 (83)	17:18	3	08:23 (108)	17:10	28	08:46 (108)
17	06:19		07:41 (82)	06:48		07:29 (82)	07:17			07:47		08:18 (83)	07:22		08:16 (108)	07:51		08:19 (108)
	21:03	62	20:09 (107)	20:32	69	19:59 (107)	19:42			18:54	32	08:50 (83)	17:17	11	08:27 (108)	17:11	28	08:47 (108)
18	06:20		07:40 (82)	06:49		07:29 (82)	07:18			07:48		08:19 (83)	07:23		08:14 (108)	07:52		08:20 (108)
	21:03	64	20:09 (107)	20:30	62	19:55 (107)	19:40			18:52	30	08:49 (83)	17:17	15	08:29 (108)	17:11	28	08:48 (108)
19	06:21		07:40 (82)	06:50		07:29 (82)	07:19			07:49		08:20 (83)	07:24		08:14 (108)	07:52		08:19 (108)
	21:02	67	20:10 (107)	20:29	49	08:18 (82)	19:38			18:51	27	08:47 (83)	17:16	18	08:32 (108)	17:11	28	08:47 (108)
20	06:22		07:39 (82)	06:51		07:30 (82)	07:20			07:50		08:21 (83)	07:25		08:13 (108)	07:53		08:20 (108)
	21:01	71	20:11 (107)	20:27	47	08:17 (82)	19:37			18:49	24	08:45 (83)	17:15	20	08:33 (108)	17:12	28	08:48 (108)
21	06:23		07:37 (82)	06:51		07:31 (82)	07:21			07:51		08:23 (83)	07:27		08:12 (108)	07:53		08:20 (108)
	21:01	74	20:11 (107)	20:26	45	08:16 (82)	19:35			18:48	20	08:43 (83)	17:15	22	08:34 (108)	17:12	28	08:48 (108)
22	06:24		07:37 (82)	06:52		07:31 (82)	07:22			07:52		08:27 (83)	07:28		08:11 (108)	07:54		08:21 (108)
	21:00	75	20:11 (107)	20:25	44	08:15 (82)	19:33			18:46	14	08:41 (83)	17:14	24	08:35 (108)	17:13	28	08:49 (108)
23	06:24		07:36 (82)	06:53		07:32 (82)	07:23			07:54			07:29		08:10 (108)	07:55		08:21 (108)
	20:59	78	20:12 (107)	20:23	42	08:14 (82)	19:32			18:45			17:14	26	08:36 (108)	17:13	28	08:49 (108)
24	06:25		07:36 (82)	06:54		07:33 (82)	07:24			07:55			07:30		08:11 (108)	07:55		08:22 (108)
	20:58	79	20:12 (107)	20:22	39	08:12 (82)	19:30			18:44			17:13	26	08:37 (108)	17:14	28	08:50 (108)
25	06:26		07:35 (82)	06:55		07:35 (82)	07:25			07:56			07:31		08:11 (108)	07:55		08:23 (108)
	20:57	83	20:13 (107)	20:20	36	08:11 (82)	19:28			18:42			17:13	27	08:38 (108)	17:15	28	08:51 (108)
26	06:27		07:35 (82)	06:56		07:36 (82)	07:26			07:57			07:32		08:11 (108)	07:56		08:23 (108)
	20:57	84	20:13 (107)	20:19	33	08:09 (82)	19:27			18:41			17:12	27	08:38 (108)	17:15	28	08:51 (108)
27	06:28		07:33 (82)	06:57		07:38 (82)	07:27			07:58			07:33		08:10 (108)	07:56		08:24 (108)
	20:56	87	20:13 (107)	20:17	29	08:07 (82)	19:25			18:40			17:12	29	08:39 (108)	17:16	28	08:52 (108)
28	06:29		07:33 (82)	06:58		07:41 (82)	07:28		08:36 (83)	07:59			07:34		08:10 (108)	07:56		08:24 (108)
	20:55	88	20:13 (107)	20:16	23	08:04 (82)	19:23	6	08:42 (83)	18:38			17:11	29	08:39 (108)	17:16	28	08:52 (108)
29	06:30		07:32 (82)	06:59		07:43 (82)	07:29		08:31 (83)	08:00			07:35		08:11 (108)	07:57		08:24 (108)
	20:54	90	20:13 (107)	20:14	16	07:59 (82)	19:22	16	08:47 (83)	18:37			17:11	29	08:40 (108)	17:17	29	08:53 (108)
30	06:31		07:32 (82)	07:00			07:30		08:28 (83)	08:01			07:36		08:11 (108)	07:57		08:24 (108)
	20:53	90	20:13 (107)	20:13			19:20	21	08:49 (83)	18:36			17:11	29	08:40 (108)	17:18	29	08:53 (108)
31	06:31		07:31 (82)	07:01						08:02						07:57		08:24 (108)
	20:52	93	20:14 (107)	20:11						18:35						17:19	29	08:53 (108)
Potential sun hours	456			427			374			346			300			291		
Total, worst case		1881			1971			43			703			335			892	
Sun reduction		0.60			0.60			0.61			0.56			0.37			0.50	
Oper. time red.		1.00			1.00			1.00			1.00			1.00			1.00	
Wind dir. red.		0.65			0.66			0.63			0.63			0.61			0.61	
Total reduction		0.39			0.39			0.38			0.35			0.22			0.30	
Total, real		734			775			17			248			75			270	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)