Tom Stacy
6628 County Road 10
Zanesfield, OH 43360
(937) 407-6258
tfstacy@gmail.com

Thank you for the opportunity to offer comments on rulemaking for industrial wind energy siting. I will comment on items A, C, D and O.

A: Reconstruction and enlargement.

Industrial wind turbine minimum setbacks are measured from non-participating property lines and public road right-of-ways. It is my assertion that the measure applied should be a multiple of total turbine height and not contain a fixed distance such as the 1,125 ft. portion currently legislated. This is because newer machines are being designed to be larger and taller, not smaller and shorter, in the natural course of improving the technology's economic efficiency. Wind energy machinery size is limited only by the physical properties of the best available materials used in tower and blade manufacture - and material science is advancing.

In fact, if these machines were getting shorter and smaller, the fixed distance of 1,125 feet eventually becomes unnecessarily large. But since these machines are getting taller, the fixed distance will eventually impose greater impacts onto non-participant properties. Indeed, the very reason minimum setbacks for industrial wind energy machines are in place today is a result of the unusually tall machine heights relative to all other kinds of machinery, their massive exposed moving parts, and the prospect of visual, audible and physical imposition those characteristics dictate.

I assert that as height, weight, blade length and tip speed increase, so should setback minimums from non-participant properties. This would ensure a consistent level of property rights protection over time. The effective setback today is about 1,290 ft. That is, 1,125 ft. fixed distance plus 165 ft. blade length. The typical total turbine height today is roughly 430 ft., making the average setback for a new applicant today, 3X total height. That 3:1 ratio of setback to total machine height should never be compromised as taller machines are selected for future projects. For example, a 490 ft. machine should dictate a minimum setback of 490 x 3, or 1,470 ft. from nearest non-participating property line. Contrary to wind industry lobbyist's opinion, this is not some "passive aggressive scheme" to "effectively make wind development impossible." This consideration is offered in the simple spirit of fairness and in consideration of the physics and existing land use circumstances at play.

As you know, Ohio's current setback minimum for new wind applicants is not only based on fixed distance. It is a hybrid of one component of total machine height (the blade length) plus a fixed distance of 1,125 feet. In contemplating the incentives inherent in this metric, I argue Ohio's mixed metric benefits no interested party including wind developers, nearby inhabitants or avian wildlife. The measurement rule encourages wind energy developers to use the shortest possible tower while their economic incentive is to use the tallest possible tower. Then, regardless of elevation above grade or average wind speed at that elevation, the longest possible blade is preferred by developers because swept area relates directly to the available energy per

structure and micro-site. Maximizing rotor diameter while minimizing tower height quickly erodes the distance from ground level to the bottom of the machine's rotor circle. The Honda Transmission turbine designs illustrate this phenomenon. (Photo)

For nonparticipating receptors nearby it brings the sound pressure source closer to the elevation of nearby residences.

For avian wildlife, the short tower, large rotor selection moves more of the rotor circle into the most commonly navigated airspace of more avian species[1]. Lower rotors as a result of shorter towers also produce less energy per unit of rotor swept area, resulting in a higher avian mortality per MWh generated than a measurement relying only on a multiple of total machine height.

I do recognize minimum setback is a legislated matter not subject to rulemaking. However, I believe it is warranted to bring this perspective and reasoning to OPSB staff's attention at this time in the event rules can be drafted with possible future law changes in mind, and to encourage the OPSB's legal discretion to require greater than the legislated minimum setback in the spirit of public convenience and necessity. In other words, the concept above could signal to OPSB that for taller turbines application of a minimum setback greater than the currently legislated minimum might be appropriate.

C: Safety Manuals of Wind Turbine Manufacturers

In 2007 and 2008 the public domain provided wind turbine manufacturer minimum safety related setback and employee safety "do not linger" distance recommendations from Nordex and Vestas. Since that time we have seen instances where applicants have requested - and I believe have in at least one instance been granted - confidentiality of similar documents in siting cases. Secrecy in the matter of property rights and safety obviously undermines the public trust in the OPSB and the developer. The arguments supporting confidentiality of safety manuals are, in my opinion, specious, I believe citing "competitive secrecy." Administrative law judges might do well by the public to more thoughtfully consider the validity of arguments in favor of allowing documents related to public safety to be withheld from that public, especially in the name of competitive advantage that is not well explained to the magistrate or the public.

D: Wind Turbine Noise Measurement

Peak noise - or a near peak average like L-90 is important as opposed to a simple average sound pressure level of wind energy machinery and background over time, or averages across multiple receptors. Again, I suggest that property rights are not a collective right which can be averaged, but rather individual rights which must be applied on an individual basis.

Furthermore, OPSB might bear in mind that a new wind energy machine is far quieter than one that has been running a few years. Here are a few questions that come to my mind in this regard:

- What will OPSB require (not if but when) gear box and bearing wear, and blade surface erosion make the machines louder over time?

[1] https://web.stanford.edu/group/stanfordbirds/text/essays/How_Fast.html

- How will such changes be documented?
- What will OPSB do if the standards are not met even when the machines are new?
- Do the standards only apply during the application process, or are they enforceable with well-defined and appropriate corrective and protective/punitive actions detailed in the rules?

The unique circumstance here is one of permitting not only a sprawling industrial presence, the visual, audible and safety effects of which extend a great distance from each machine in the collection, but that the machinery is high in the air with exposed moving parts which are not even housed within a building. This industrial presence bears no resemblance to agriculture or even to most conventional mechanized industrial machinery applications, which are almost always A) at ground level, B) housed within buildings, and C) encouraged to be installed in particular areas zoned for industrial activity – where residential development is at least forewarned if not discouraged or prohibited.

Another opportunity for improvement in the rules and permitting process for commercial wind energy facilities may arise from considering the potential benefits of fair, uniform and scientific measurement standards. Sound measurement equipment left in place for long enough to capture the range of effects of combinations of varying wind speed, wind direction, relative humidity, temperature and wind shear at each property line measuring point might significantly improve the quality of OPSB analysis as a prerequisite to permitting.

The public interest might be better served if OPSB retained in-house staff and expertise sufficient to perform all measurement and testing itself, rather than rely on and trust the subcontractors preferred and hired by applicants. It seems likely that application fees sufficient to support such direct staff and effort would constitute a tiny fraction of total development costs.

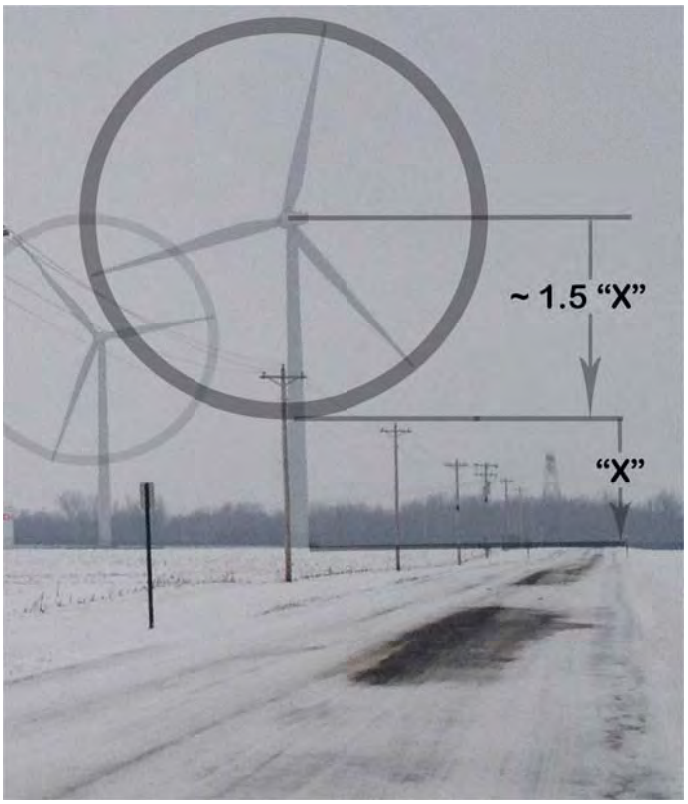
O: Vantages of Images Used to Consider Appropriate Siting Locations and Industrial Imposition.

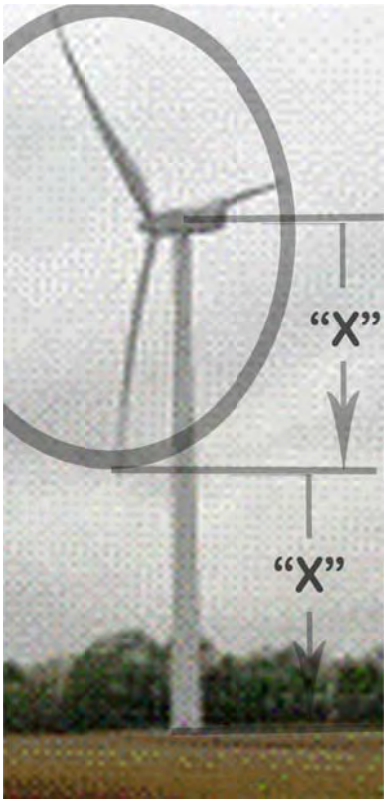
I would begin by saying that lens zoom level and focal length must be specified in addition to vantage distance because of the influence it has on relative size perception of photographic images. It seems appropriate for OPSB to be able to specify vantages, distances and zoom levels on a case by case basis based on input from community members and thorough site visits from staff. Sometimes visual presence of wind energy machinery is most relevant from within 1/4 mile of a turbine and/or residence using a wide angle (macro) lens. In other cases vantages from one to two miles using a greater zoom level might best represent the impacts.

Also audio visual (animation or video overlay) can be more useful that still photographs in analyzing the impact of large and elevated animated machinery. There are myriad software platforms available to create moving models or to superimpose “green screen” video onto landscape video from a vantage. Machine motion and noise is an important part of visual impact that is not represented in still photographs and I believe this should be carefully considered by OPSB.

Finally, I wish to point out that, because these machines are placed at great distances from each other, and because each machine today has a nameplate rating less than 5MW, the machines employed in projects with interconnection of less than 5 MW are often the same machines deployed in larger projects, and which therefore have substantially similar impacts to nearby non-participating property owners. In my opinion the statute, the terms of which were negotiated between OPSB leadership and lawmakers at the time, is arbitrary. As seen in projects at Cooper Farms, Haviland Drainage, Honda of America Transmission Manufacturing (HTM), Lincoln Electric and now with a split interconnection project of 7.5 MW at Ball Corporation and Whirlpool in Findlay, Ohio, public safety and property rights protections can and are being subverted. Again I acknowledge the 5 MW threshold is a legislative matter and does not speak directly to any one of the silo topics crafted for this hearing, it is perhaps relevant to the way OPSB drafts rules in consideration of how laws might be amended in the future.

Thank you for your consideration of my thoughts in this matter.





The machine on the left is at Honda Transmission Manufacturing, Russells Point, OH. The blade length is roughly 2/3 tower height and the rotor circle approximately 3.4 total height. Total height is roughly 420 feet[2]. The machine on the right is at Bowling Green, OH. The blade length is roughly ½ tower height and rotor circle approximately 2/3 total height. Total height is roughly 390 feet[3].

[2] http://www.examiner.org/news/20032-wind-power-to-fuel-htm
[3] http://www.amppartners.org/generation/wind-power