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September 4, 2012

Frank DeFiore, Planning Board Chair
Rick Kavanagh
Helen Larson
Pete Hellier
John Sayegh
Ed Allen, Planning Board Members
Town of Allegany Town Hall
52 West Main Street
Allegany, NY 14706

Re: Everpower request for change in turbine type

Dear Frank and Board Members:

The Allegany zoning ordinance requires an assessment of low frequency noise impacts and the impacts of impulsive noise expected from operating wind turbines. *See* Ord. II § 5.25(B)(3)(h)(i). Everpower provided neither assessment in its original application. Now that it is seeking approval of a turbine type with substantially larger rotors (blades), the Planning Board needs to obtain information on the low frequency and impulsive noise effects of the change.

As we noted in previous comments on the Everpower special use permit application, a Minnesota Department of Public Health report on wind turbine noise[1] finds that wind turbine noise is more annoying than other noise sources emitting the same A-weighted (dBA) sound level because of its characteristic "impulsiveness, low frequency noise and persistence of the noise."[2]

The Minnesota report also concludes that noise modeling in terms of A-weighted sound, as Everpower has done in the past, does not predict the occurrence of annoyance during operations of a wind farm; a 6 dB "penalty" must be added to dB(A) when dB(C) – dB(A) is greater than 15 dB. This is because "A-weighted" measures of sound reflect mid-frequencies, and wind turbine noise is predominantly low frequency. Low frequencies are usually assessed by

[1] Minnesota Department of Health, PUBLIC HEALTH IMPACTS OF WIND TURBINES (2009) <http://www.health.state.mn.us/divs/eh/hazardous/topics/windturbines.pdf>.

[2] *Id.*, p. 20.

utilizing "C-weighted" measures.[3]

The Minnesota report also relies on World Health Organization (WHO) guidelines for determining how much noise should be limited in order to preserve the ability to sleep undisturbed:

> In their noise guidance, the WHO (1999) recommends 30 dB(A) as a limit for "a good night's sleep". However, they also suggest that guidance for noise with predominating low frequencies be less than 30 dB(A).[4]

DEC also noted in its comments on the Everpower application that pulsating or beating noise from wind turbines is more annoying than the same decibel level of noise generated by rail, traffic or airplanes. Where the noise assessment utilizes an average of sound levels measured, or Leq, as did Everpower, DEC recommended adding 10 decibels to the 24-hour calculated average where the noise source operates at night. I have enclosed a copy of the relevant portions of DEC's comment letter for your convenience (*from* Everpower FEIS, Appendix N, Comment #1, dated April 30, 2010.)

I have also enclosed a photo of a portion of the 195-turbine Maple Ridge wind farm in the Tug Hill region of the Adirondacks. These turbines are, including the rotor, 390 feet high.[5] The Planning Board approved turbines that are 492 feet high for the Everpower project. Even higher turbines would result in increased noise impacts, whatever method is utilized.

In its comments on the Everpower application, at p. 10, DEC noted that nighttime conditions often include "atmospheric stability," the phenomenon of winds calming at ground level after sunset, while wind speed at the height of wind turbine remains sufficient to operate the turbines:

> wind velocity may be nearly double that anticipated at hub height during nighttime stable atmospheric conditions. Thus resultant sound levels might be much higher than anticipated relative to background. In any case, whether this proves to be an issue or not, care should be taken to compare likely lower background noise levels at night and consequent possible higher spreads between background and wind turbine generated sound at a time when annoyance may be the greatest. Stable atmospheric conditions at night when the difference between ground level wind and hub height wind speeds may be most pronounced should be

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[3] *Id.*

[4] *Id.*, p. 22.

[5] *See* <http://www.adirondackstughill.com/windpower.php>. *See also* the operating company's website, <http://www.iberdrolarenewables.us/cs_mapleridge.html>.

carefully examined.

Everpower responded to this comment in the FEIS: "atmospheric stability can enhance the generation and propagation of wind turbine noise; however, there is no way this effect can be quantitatively calculated or modeled." (FEIS, Sec. 4.8, at p. 28.) This response defies common sense, as I indicated in my May 13, 2011 comments to the Planning Board. There I noted that Dr. Paul Schomer, an acoustic engineer and past president of the American Acoustical Society, addressed the same failed approach to noise assessment for wind farms in a project proposed in Cape Vincent, New York. Like DEC, Dr. Schomer noted that atmospheric stability is not an infrequent occurrence and urged that modeling take this into account by assuming, as a worst case condition, that residents would experience the full effect of wind turbine with no wind-induced masking noise:

> regularly and frequently, especially at night, the relation between wind speed and altitude cited by [the project sponsor's acoustic consultant] breaks down completely. It is simply wrong. This is not some idle theory; it is a well known and well documented fact.[6]

In other words, there is a simple way to quantitatively calculate or model the effect of atomospheric stability on noise at night: assume the air is calm at ground level when turbines are operating. Everpower's noise assessment did not do this; instead, it added decibels to the measured background sound to reflect wind-induced noise, and then concluded the increase in sound level from operations would not be significant. Both DEC and CCCC recommend that the Planning Board evaluate the condition where there is no wind-induced "masking" noise at ground level and turbines are operating. But you did not do so.

This issue is now squarely before the Planning Board because noise is the result of air turbulence caused by motion. Turbulence is encountered by rotors when they pass from one wind speed to another, and they do so whenever rotors cross a wind shear boundary. This causes a characteristic impulse noise, "swishing" or "thumping" in time to the rotation of the rotor.[7]

Everpower will likely renew its facile argument, that wind turbines only produce noise when the wind is blowing. This belief depends on an incorrect assumption that the winds at the surface of the earth are always related or connected to the winds at the height of the turbine's

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[6] *See* FEIS, Appendix N, Comment 4, attachment, p. 3 (R. James report, dated May 3, 2010, quoting Schomer).

[7] *See* Jim Cummings, AEI SPECIAL REPORT: WIND TURBINE NOISE IMPACTS, Acoustic Ecology Institute (Santa Fe, NM) 2009, at 7 <AcousticEcology.org/srwind.html> ("While overall noise levels per unit of energy output are dropping, today's turbines are far larger than older ones, so total noise output is not necessarily decreasing, and is now mostly generated by the sound of the turbine arms swinging through huge arcs in the air.").

blades. As noted above, it is very common for elevated winds to be disconnected from the atmosphere closer to the surface of the earth. It happens after most sunsets and can occur all night.

It is very important that the Planning Board obtain sufficient information on the increased rotor-swept area of the turbine types Everpower now proposes, and obtain advice from a truly independent acoustic consultant (one who has not acquiesced in the much-criticized noise prediction approach Everpower utilizes) about the impact of larger turbines. An increase in the rotor-swept area can be predicted to result in more noise because more turbulence will result.

Sincerely,

Gary A. Abraham

gaa/encs.: 1. NYS DEC Comments on the Everpower DEIS, dated April 30, 2010 (portions commenting on noise impacts)

2. Maple Ridge Wind Farm, Lowville, NY (photo)

cc: Carol Horowitz (via email)

New York State Department of Environmental Conservation
Division of Environmental Permits, 4th Floor
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Alexander B. Grannis
Commissioner

RECEIVED MAY - 3 2010

April 30, 2010

Town of Allegany Planning Board
Town Hall
52 West Main Street
Allegany, New York 14706

Re: State Environmental Quality Review (SEQR)
Allegany Wind Power Project
Town of Allegany, Cattaraugus County

Dear Town of Allegany Planning Board:

The New York State Department of Environmental Conservation (DEC) has reviewed the Draft Environmental Impact Statement (DEIS) for the proposed Allegany Wind Power Project, Town of Allegany, Cattaraugus County, New York, February 2010, prepared by Environmental Design and Research (EDR) P.C.

The project sponsor, Allegany Wind, LLC (a subsidiary of EverPower Renewables), proposes construction and operation of a maximum capacity 72.5 megawatt (MW) wind power project consisting of up to 29 Nordex N100 wind turbine (or equivalent), each with a rated capacity of 2.5 MW, over a project area of 9,119 acres. The project area includes two parallel ridges on either side of Chipmunk Road. Each WTG, though the manufacturer is yet to be finalized and will be subject to availability, will have total height of approximately 492 feet (including hub height and tip of rotor blade). In addition to the wind turbines, the project will involve construction of two permanent 80-meter meteorological towers, an operations and maintenance (O&M) facility up to 2.5 acre in size, 8.2 miles of access roads, approximately 10.7 miles of buried electrical interconnect lines, a collection station and an interconnection substation, a 6.4 mile long buried transmission line, and a staging area up to five acres in size. The applicant's intention is to construct the project in one continuous phase in the calendar year 2011.

Endangered and Threatened Species.

The DEC's Natural Heritage Inventory Program reveals no listed animal species within the proposed project area. One plant species, Appalachian Shoestring Fern (Vittaria Appalachiana), is present. Impacts on this species need to be discussed further with our technical staff.

Although not indicated on the Natural Heritage Inventory maps there is some information available on the possible breeding of a listed "special concern" bird species within the project area. This species Cerulean Warbler, (Dendroica cerulea) was detected by the Allegany Wind Project consultants during a June, 2007 breeding bird survey of the project area. In addition the Second Atlas of Breeding Birds in New York State indicates that Cerulean Warbler was a possible breeder in BBA Block 1966C which is a block immediately west of the project. This species is a bird of large intact forests and is very sensitive to forest fragmentation. If it is present on the project site the increased forest fragmentation resulting from the construction of the towers and connection lines would likely have negative impacts on Cerulean Warblers using the project area as habitat. The Allegany State Park and Vicinity Population of Cerulean Warblers is one of the most significant populations of this species in New York. The number of blocks reporting Cerulean Warblers within the Appalachian Plateau declined by 17% from the first atlas to the second and most recent atlas.

Although no other endangered, threatened or listed animal species are shown in the Natural Heritage Inventory new information on the presence of such species may become available in the future and possibly during the planning and construction of the Allegany Wind Power Project. At such time protection of such species and their associated habitats may be required by this Department

Noise

On Proper Determination of Ambient Levels.

The NYS DEC policy document, "Assessing and Mitigating Noise Impacts" places stress on reducing impacts above background levels. And this is emphasized in the DEIS. Moreover, the applicant employs the more conservative L90 metric in the analysis which is to be commended. As determining the impact of the proposed wind farm on the local community depends on accurately determining existing background levels, an analysis should carefully justify the number of chosen background sampling points, their specific location, and any factors which may have an influence on the respective result.

Number and Location of Background Sampling Points

As the project area spans over 9,000 acres, the background analysis should include a justification for the number of sampling locations chosen based on statistical analysis of what would be representative of such a large area. In a rough fashion, the clusters of home possibly effected by the wind project in terms of noise would include, clockwise from the north: 1) homes along Upper Birch Road; 2) homes in the proximity of Boulder Ridge Road; 3) homes along Geiger Hollow Road; 4) homes near the intersection of Bucher Hollow Road; 5) homes near the intersection of Knapp Creek Road; 6) homes in Nichols Run; 7) homes in Harrisburg; 8) homes in the west along Nichols Run near the intersection of Quinn Road; 9) homes in the proximity of Chipmunk. Of these, 2), 3), 5), 6), 7), and 8) would appear to be closest (though topography needs to be considered and proximity may not be perfectly indicative of effect). Moreover, homes in the vicinity of Geiger Hollow Road and west along Nichols Run near the intersection of Quinn Road have no representation in background analysis. For a project spanning such a large area, the background analysis should include discussion of the following question – do we have enough data to characterize the background in the area of each cluster of homes? Moreover, additional background analysis points may be called for given the nearly 20 dBA divergence between readings that occasionally occurred at the same time between background points. Also, it may be advised to analyze each identifiable cluster of homes which could be affected and present the respective existing background levels along with potential impacts from the wind project. While Plot 1 does make considerable steps towards addressing this question, a closer look at the home clusters within the anticipated 40dBA line or in close proximity to it would be helpful in better characterizing potential community impacts.

Potential Confounding Factors Influencing Background Levels

The DEC recommends a more detailed discussion of any factors that may cause a given location to be influenced towards a less conservative ambient level. Such factors could include work or hobbies conducted nearby (such as tractor or ATV use), traffic on nearby roads, higher wind levels (due to elevation and exposure), and quite a few other possibilities including brook noise as discussed by the applicant. Background levels are, of course, influenced by such factors as road noise and wind, but it is important that the applicant explain the choice of locations with care to show that the results could not be unduly biased towards higher readings by non-representative events.

Given that the majority of the background sampling points were in close proximity to roads, more so then nearby homes, some discussion of this influence, as well as other activities in the nearby area, should be discussed. For example, do nearby residents use tractors or ATVs? How heavy is the car and truck traffic on the nearby road? While stream noise is natural in the vicinity of many of the homes, the fact that the work was done in the Spring during greatest flow may raise some

questions of how representative the background would be over the course of the entire year.

Moreover, while pictures were provided from two perspectives, it would be preferable to have photos to cover a 360 degree view, or at least multiple vantage points. Furthermore, it should be kept in mind that some (possibly many) residences may be in relatively wind sheltered locations while still being within a reasonable distance of the turbines. If this is the case, and background survey locations do not reflect this, the difference between background and wind turbine generator sound levels may be greater then anticipated.

On the Nature of Sound Characteristic of Wind Turbines

Appendix N, Environmental Sound Survey, discusses that sound from wind turbines as unsteady and variable and periodic thus can be discerned at larger distances then if it were continuous (page 26). The characteristic of the sound generated is important in considering its impact on the public (as discussed in our guidelines). As wind turbine generator noise is characterized by amplitude modulation (whooshing, for example), this should be considered in the analysis as some studies have shown amplitude modulation as an annoyance factor for the public. In this light, per the "Factors to Consider" section (under "Evaluation of Sound Characteristics") of the DEC guidelines, it may be advisable to add a calculated number of dBA to the generated sound in an attempt to compensate for this characteristic.

On Need to Consider Nighttime Impacts.

As our guidelines discuss (below), given situations which involve night-time noise (such as that generated by wind projects), a discussion of impacts on residents should consider possible disruption during the night. As mentioned below in the quote from our Guidelines, weighting night-time noise more heavily, such as the Ldn, may be appropriate as an supplemental means to assess possible effects on local residents. As stated in our guidelines:

> "....Equivalent Sound Level (Leq) .... can be combined with other types of noise analyses such as Composite Noise Rating, Community Noise Equivalent Level and daynight noise levels characterized by Ldn where an Leq(24) is measured and 10 dBA is added to all noise levels measured between 10 pm and 7 am. These different types of noise analyses basically combine noise measurements into measures of cumulative noise exposure and may weight noise occurring at different times by adding decibels to the actual decibel level. Some of these analyses require more complex noise analysis than is mentioned in this guidance."

However, care should be taken that this approach not substitute for analysis involving short term worse case analysis – such as worse case 10 minute nighttime sound pressure level.

Moreover, while the analysis does assume atmospheric stability according to Mr. Hessler, a Swedish study does indicate ("Human Response to Wind Turbine Noise", Eja Pedersen, Goteborgs Universitet, 2007) that an additional complicating factor may be at play: wind velocity may be nearly double that anticipated at hub height during nighttime stable atmospheric conditions. Thus resultant sound levels might be much higher than anticipated relative to background. In any case, whether this proves to be an issue or not, care should be taken to compare likely lower background noise levels at night and consequent possible higher spreads between background and wind turbine generated sound at a time when annoyance may be the greatest. Stable atmospheric conditions at night when the difference between ground level wind and hub height wind speeds may be most pronounced should be carefully examined.

On Need to More Closely Examine Point Source Assumption and In Phase Generation.

The sound study provided by the applicant assumes that wind turbine generators (WTG) will act as a point source in generating sound. However, as WTG are commonly configured in a line, noise may not drop off as quickly as possibly assumed. It is not clear if this consideration is examined.

Furthermore, particularly at night, wind speeds may be relatively uniform and thus a synchronicity in the sound from various WTGs may result in an unexpected additive effect from an "in phase" generation of sound from the various WTGs. This is particularly the case since WTG blades are at most 60 degrees out of phase.

On Need to Consider Error Margins.

Error is a component of any study. Some discussion is encouraged to focus on the likely degree of measurement and model error. An analysis should be included in the Final Environmental Impact Assessment to ensure that the results are not in danger of underestimating possible impacts. One possible source of error to discuss is the fact that sampling represented only several days and this may not represent atmospheric conditions common over the course of a year.

Cultural Resources.

Per New York State Office of Parks, Recreation, and Historic Preservation the proposed windpark will have an adverse impact on culture resources within the Area of Potential Impact surveyed. Consequently, the project sponsor must work in consultation with OPRHP to pursue feasible and prudent plans that avoid or mitigate the adverse impacts. The DEIS includes a discussion of cultural resources in the project area and the Area of Potential Effect (APE) for visual impacts to historic resources as well as possible mitigation actions.

According to correspondence this month with OPRHP, they have not received any submissions from Allegany Wind LLC or its representatives since 2008. Please ensure OPRHP is in receipt of your recent work.

In conclusion, DEC appreciates the opportunity to comment on the DEIS for this project. We look forward to continuing to work with the Town of Allegany as Lead Agency throughout the remainder of the SEQR and permit review processes. If you have any questions or comments, please contact me at (518) 402.9150.

Sincerely,

Rudyard G. Edick

Rudyard G. Edick
Project Manager

cc: Allegany Wind LLC
B. Brazell, EDR
C. McGraw, CRA
D. Ward, Young Sommer
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M. Brower, Ag. & Mkts.
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