

Vermonters
for a
Clean Environment

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June 14, 2013

Jay Strand
Forest Environmental (NEPA) Coordinator
Green Mountain and Finger Lakes National Forests
99 Ranger Road
Rochester, VT 05767
Via email to jstrand@fs.fed.us

RE: Draft Supplemental Information Report for the Deerfield Wind Project Final EIS

Dear Mr. Strand,

Vermonters for a Clean Environment (VCE) has reviewed the United States Forest Service's Deerfield Wind Post-Decision Supplemental Information Report for Blade Length Change, the Specialist Reports and documents related to Proposed Turbine Change,¹ for Iberdrola's requested increase in blade length and total turbine height. VCE appreciates the invitation to offer comments specific to the findings documented in the US Forest Service (USFS) Draft Deerfield Supplemental Information Report (SIR), dated May 2013, regarding the proposed tower and turbine-blade-length change and its environmental impacts.

Since the USFS moved to stay federal court proceedings in November, 2012² VCE has been closely following the operation of large wind projects in Massachusetts and Vermont to compare real world impacts to the modeling and predictions made by experts in regulatory proceedings. The information we have gathered is illustrative in the review of the revised Iberdrola proposal.

Specifically, VCE has been in frequent contact with neighbors of:

- Iberdrola's Hoosac Wind 19 1.5MW GE turbines
- Blittersdorf/Harrison Georgia Mountain Community Wind 4 2.5MW Goldwind turbines
- Green Mountain Power's (GMP) Lowell Mountain 21 3MW Vestas v112 turbines,
- First Wind's Sheffield Wind 16 2.5MW Clipper Liberty turbines

VCE is receiving reports of independent sound monitoring being conducted at locations between one and two miles from turbines, which is the same distance between the proposed Deerfield turbines and the George D. Aiken Wilderness as well as many residences. We are developing an

¹ <http://data.ecosystem-management.org/nepaweb/fs-usda-pop.php?project=7838>

² [Case 1:12-cv-00073-jgm, Document 52, Filed 11/02/12],

understanding of the types of sound created by these machines, how far those effects travel, and the types of effects that the unique sound characteristics have on human receptors and, to some extent, animals.

In short, our concerns about visual and noise impacts, and the failure of wind projects to achieve their promised capacity factors and climate-change reduction capabilities, have only increased since these major wind projects have become operational.

VCE has also had the opportunity to follow the work of Vermont's Energy Generation Policy Siting Commission, and participated in a field trip to New England's most efficient natural gas plant which is required by the grid operator, Independent System Operator of New England (ISO-NE) to ramp up and down in response to wind generation. These comments incorporate some of the information that we have accumulated from those interactions that has a bearing on the request to use taller wind turbines with longer blades on the western ridgeline, closest to the George D. Aiken Wilderness, and the information provided to the USFS in updated reports.

Noise

The SIR contains information that supports the contention of VCE and the other plaintiffs that the USFS should withdraw and re-evaluate the Deerfield Wind Project. The SIR (at p. 11 of 26) repeats the assertion in the FEIS that computer modeling projects a 7 db increase in turbine noise at the eastern edge of the Aiken Wilderness. But the National Park Service (NPS), in a Memorandum addressed to defendant Robert Bayer dated 26 February 2013 (attached), notes that the noise modeling software used by the USPS "slightly underestimates" actual noise levels. The NPS review also makes clear that the 7dB increase in noise level projected by the USFS is very significant.

As the NPS reviewers stated, the relevant American National Standards Institute standard provides that, "the percent of a community that is highly annoyed by noise doubles with every 5.5 dB increase in noise"³. Using this formula, there will be a 127 percent increase in the community that will be "highly annoyed" by the sound of the turbines near the eastern border of the Aiken.

Despite the fact that the USFS has had the benefit of a stay of the litigation for some eight months, it has failed to place any sound receivers within representative areas of the Aiken Wilderness or do any analysis of projected noise levels based on the data that such receivers could have provided. Incredibly, after nearly seven years of investigation, the USFS has never evaluated background noise levels in the Aiken Wilderness (which could be below 20 dBA), nor has the USFS sought to benefit from the information available about what is actually occurring

³ ANSI Standard S12.9/Part 4

in areas surrounding the large wind turbine installations now in operation since the requested stay.

As evaluated by acoustics expert Robert Rand in the accompanying memo, RSG did not assess impact on the aesthetics of the Aiken Wilderness, nor did it incorporate the special and complex characteristics of wind turbine noise including low frequency noise and infrasound that causes it to be more annoying at lower decibel levels than other types of noise. RSG's model fails to include the additional 3 dB uncertainty margin that has been found to occur at an actual ridgeline wind turbine installation in Mars Hill, Maine.

Since December 2012, VCE's staff has visited residents who live both within and beyond 1.3 miles of big wind projects in Sheffield, Lowell, and Georgia Mountain, Vermont, and Iberdrola's Hoosac Wind project in Massachusetts, which is located just 10 miles south of the proposed Deerfield Wind project. We have been alarmed by what is happening to the people who live around these projects, and are concerned for the domestic animals and wildlife based on what people are experiencing in their neighborhoods after the wind projects become operational.

Iberdrola's Hoosac Wind project is impacting neighbors in Massachusetts and Vermont who live within two miles of the 1.5MW GE wind turbines. These wind turbines are less than 400 feet tall, and have a much lower power output than the proposed Deerfield Wind turbines. Vermont neighbors who live 1.8 miles from the turbines report sleep disruption, nausea and dizziness, heart racing, and panic attacks, to the extent that residents are considering abandoning their homes.

This experience is replicated in Sheffield, Vermont, where wind turbine neighbors living as far as 2.5 miles away have reported to VCE that they are annoyed by the noise, experience health effects, and suffer from sleep disruption. Each of the four large wind projects VCE has visited in Vermont and Massachusetts are causing the same problems, at distances as far away as three miles, in all directions depending on wind direction and weather conditions.

Health effects include ringing in the ears, nausea, sleep disruption, dizziness, headaches, depression, and several cardiac issues.⁴

Given the lack of independent monitoring being required by state regulators who are permitting the wind industry to control the monitoring, neighbors of these big wind projects have purchased sophisticated sound monitoring equipment and collected their own data. They are also compiling logs that record noise levels and impacts.

⁴ Examples of the complaints people are experiencing can be read here:
http://www.vce.org/GMP_Lowell_NoiseComplaints.pdf

Through this process, they have developed an understanding of the sound levels to which they are being subjected, and the human response to those sound levels. They report:

- Turbine noise that is perceived by people as “loud” often measures 40 to 43 dBA. The 45 dBA “acceptable” standard currently used by the PSB is too high to be protective of human health. Maine has reduced its standard to 43 dBA.
- Turbine noise can be above 45 dBA, often up to 50 dBA or more, and still comply with the 45 dBA standard, because of the Leq one hour average allowed by regulators. Averaging the sound levels is inadequate to protect public health. Regulations should use a maximum level, not an averaged level.
- Neighbors are getting sick even when they do not hear the wind turbines. We would note that infrasound, which is the likely cause for these “non-audible” impacts, is not regulated by the Vermont PSB or by the USFS’s proposal for Deerfield Wind. It is currently being investigated by governments in Wisconsin, Canada, Germany and Australia as a potential factor in the public health issues that are arising everywhere big wind turbines are being placed too close to humans. According to Robert Rand, longer blades like the ones reviewed by the SIR seem to increase infrasound and its impacts on human health.
- Dogs barking at operating turbines and cows that are restless during operations, indicating that domestic animals are noticing the impacts of the wind turbines.
- Reduced wildlife activity near wind turbines.

The USFS’ reliance on inanimate receptors and modeling done by wind industry consultants ignores the human factor and how people experience wind turbine noise. The neighbors of existing ridgeline wind projects are the best receptors. In the following videos, audio, and news stories, neighbors speak about and react to what they are experiencing:

1. Video: Hoosac Wind, 2000 feet from turbines:
http://www.youtube.com/watch?v=-8HIgLkx_Do
2. Video: Hoosac Wind, 5000 feet from turbines:
<http://www.youtube.com/watch?v=9fobcC3MpQs>
3. Audio: Hoosac Wind, 1 to 1.8 miles from turbines:
<http://www.vce.org/Hoosac%20Wind%20Neighbors.mp3>
4. Video: Sheffield Wind, 3/4 to 2 miles from turbines :<https://vimeo.com/64765558>
5. TV News coverage: Iberdrola’s Hardscrabble and Hoosac Wind neighbors:
<http://iberdrolawatch.org/2013/04/30/special-report-is-going-green-destroying-the-lives-of-locals-4/>

6. News coverage: Iberdrola gives neighbors of Hardscrabble Wind project sound generating machines to drown out wind turbine noise: (copy and paste full link if page does not load) <http://www.wktv.com/news/local/Fairfield-residents-given-noise-generators-to-drown-out-sound-of-windmills-162627096.html>
7. News coverage: Neighbors of Iberdrola's Hardscrabble Wind project sue over sound levels, including sound consultant in the litigation: http://www.syracuse.com/news/index.ssf/2012/11/herkimer_county_residents_sue.html

This real world experience must not be dismissed, especially when the wind developers' paid experts, upon whom the USFS has relied almost exclusively for its evaluations, are being found to be wrong in their predictions. There is too much at stake here to be wrong. The potential and probable impacts to neighbors is clear and predictable. Allowing Iberdrola to use bigger turbines with longer blades next to the Aiken Wilderness and close to more than 120 residences is guaranteed, based on the real world experience of what is happening with ridgeline wind projects in Vermont and Massachusetts, to destroy the natural quiet of the Aiken Wilderness and the attributes that led to the creation of the Aiken Wilderness by an act of Congress in the first place, and result in health problems for neighbors.

In a recent presentation to Sandia Labs and NREL, acoustician Jim Cummings of the Acoustic Ecology Institute identified factors that result in noise complaints from neighbors⁵. On page five of his presentation, he notes, "When 100 or 200 homes are in this range, dozens of complaints can ensue (Hardscrabble, Falmouth)". As shown in the graphic (right), the Deerfield Wind project has 129 structures within two miles, which based on the experiences at existing wind projects indicates that noise will become a major issue. The USFS has failed to incorporate the latest information about sound problems from wind projects, especially projects using turbines with longer blades.



Visual Quality

While the SIR does include some revised models for visual impacts, the USFS did not take the opportunity provided by the eight month stay to do any analysis of the visual impacts from within the Aiken Wilderness. According to the SIR (at p. 2 of 26), the blades of some of the turbines will be 11.5 feet longer than before, and others 16.4 feet longer. Some of the tower heights will increase 10 feet, and others 26 feet, rising up to 415 feet.

⁵ <http://aeinews.org/archives/2378>

The USFS claims without evidence that the larger turbines will have no additional impact within the Aiken Wilderness, simply repeating the canard, utterly disproven by the photographs

Visual Impact of Deerfield Wind Project on the Aiken Wilderness
Locations of photos taken from within the wilderness showing affected ridgelines



submitted by VCE to the USFS during the administrative process, that people within the Aiken Wilderness will not notice the turbines.

Evidence provided previously by VCE, and reproduced in small part here, shows this contention to be completely false.⁶

Wilderness Character

The SIR's assessment of the impacts of the proposed turbine changes to the character of the Aiken Wilderness rely on Iberdrola's expert witnesses, Jean Vissering and Ken Kaliski. Their evaluations were paid for by Iberdrola as part of the PSB evaluation and should be dismissed by the USFS because of conflicts of interest. Yet the USFS continues to rely on their flawed evaluations, which fail to include simulations of the views from the Wilderness of the ridgelines proposed for wind turbines as documented by VCE, and use only sound modeling, not actual monitoring, of the Wilderness to evaluate the current sound levels.

While it is no surprise that Vissering and Kaliski find no perceptible changes in visual quality or sound levels associated with the proposed increases in turbine height and blade lengths, it is unacceptable that the USFS failed to take the opportunity of this stay in the federal court proceedings to bring in other, unbiased expertise to provide a fresh analysis of the potential impacts to the character of the Aiken Wilderness.

Avian (Songbird and Raptor) and Impacts on Bats

The USFS again in this section relies primarily on wind industry consultants, this time Stantec Consulting, for its review of impacts. In its evaluation, the USFS acknowledges that some birds

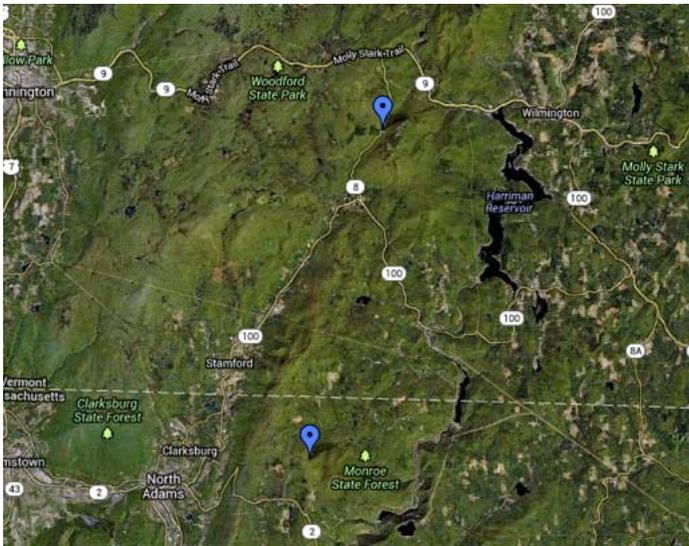
⁶ http://www.vce.org/VCE%20Deerfield%20Appeal_2-24-12.pdf, page 30

were killed by the Sheffield wind turbines, but no raptors. They claim that raptors have little difficulty avoiding turbines. However the SIR fails to mention that in fact one raptor, a sharp-shinned hawk, was killed at the Sheffield wind site⁷. This inaccuracy undermines the credibility of the SIR.

The SIR discounts the potential impact of increased blade length to bats, while admitting that the Sheffield wind project has killed more bats than anticipated. At the Lowell wind project, longer blades and an increased capacity factor were called out by the Towns of Albany and Craftsbury as potentially increasing the impacts to bats⁸. The same could be expected at Deerfield Wind.

VCE finds no reference in the SIR to cumulative impacts from Iberdrola's wind projects in the region, and we are especially concerned about the potential impacts to migratory bird populations from Iberdrola's current wind projects in Massachusetts, Vermont and New Hampshire.

The map below shows the Deerfield (upper pin) and Hoosac (lower pin) wind projects. Located less than 10 miles south of the Deerfield Wind proposal, Iberdrola's Hoosac Wind project is



already operating and should be considered in evaluations of the potential impacts of the Deerfield project to migratory birds and bats, along with Iberdrola's existing Lempster and Groton New Hampshire wind projects. Iberdrola's wind projects, taken together, present a clear danger to migratory bird and bat populations that depend on ridgelines for their migratory routes. VCE expected that the USFS would evaluate cumulative impacts, especially for a project proposing to use the largest

turbines yet in Iberdrola's New England projects, when evaluating potential impacts to migratory birds and bats.

The SFEIS acknowledges that the Deerfield Wind project will kill bats. But bat populations are in an historic, precipitous decline, and the evaluation of the proposed use of larger turbines with longer blades ignores the threats to the five bat species now listed as threatened or endangered in

⁷ <http://www.windaction.org/documents/37994>

⁸ http://energizevermont.org/wp-content/uploads/2011/06/2011-7-11_ALB-CFT_Letter7628.pdf

Vermont.⁹ The USFS's evaluation fails to acknowledge the rate of decline of the bat population, or the bats' value to agriculture and the economy

The fragile state of the bat populations in Vermont was made graphically clear by what has happened since the Sheffield and Lowell wind projects became operational. In both cases, the wind developers applied to the Vermont Agency of Natural Resources for taking permits, which if granted would allow (after the fact) the projects' killing of endangered bats. VCE is dismayed that regulators are even considering permitting the legal killing of endangered bats, and allowing larger turbines with longer blades that may increase the number of bats killed. As the bat population continues to decline, the negative impact on population viability from even a few deaths greatly increases. The USFS must use new, updated information and revise the impact analysis.

Climate Change and Air Quality

The Deerfield SIR relies on modeling by Synapse including a projected capacity factor (defined as the project's actual output vs. the "name plate" capacity of the turbines) of 35.74%.¹⁰

According to the U.S. Energy Information Administration's data¹¹, capacity factors for Vermont wind projects averaged 23.1% in 2012¹² and the Northeast region did not fare much better¹³. Wind projects in Pennsylvania, New York, Vermont and Maine are all proving to have capacity factors between 23 and 25%.

Specific to Vermont ridgeline wind projects, GMP's Lowell wind project initially promised a capacity factor of 27% or less. After the Vermont Public Service Board (PSB) issued its Certificate of Public Good (CPG), GMP decided to use Vestas v112 turbines instead of Vestas v90 turbines, the only difference being longer blades. In post-CPG filings, GMP provided testimony to the PSB that the millions of additional dollars needed to pay for the v112's would be offset by an increased capacity factor, from 27% to 35.78%¹⁴, a production level that the Towns of Albany and Craftsbury noted is "unheard of in the industry."

⁹ See full state listing here: (copy and paste full link if page is not found)
http://www.vtfishandwildlife.com/library/Reports_and_Documents/NonGame_and_Natural_Heritage/Rare_Threatened_and_Endangered_Species%20%20---%20lists/Endangered%20and%20Threatened%20Animals%20of%20Vermont.pdf

¹⁰ SIR at page 4 of 26

¹¹ <http://www.eia.gov/electricity/data/eia923/>

¹² <http://www.windaction.org/documents/38449>

¹³ [http://www.windaction.org/var/images/File/US-WINDmap\(1\).jpg](http://www.windaction.org/var/images/File/US-WINDmap(1).jpg)

¹⁴ [http://vce.org/2011-6-20_ALB-CFT_First_Comments_GMP_Filings\(7628\).pdf](http://vce.org/2011-6-20_ALB-CFT_First_Comments_GMP_Filings(7628).pdf)

GMP’s prediction of its revised capacity factor has, in fact, proven to be inaccurate. Vermont Electric Coop, which partnered with GMP to take the wind power at cost, projected a 32 percent capacity factor, but found in the first year of operation the factor was actually about 18 percent.¹⁵

At least some of the GMP project’s failure to achieve its projected capacity factor is due to curtailment, which could be corrected over time, especially with the installation of new equipment planned for 2013. However, in a presentation to VELCO’s transmission planning group on June 12, 2013¹⁶, VELCO’s Chief Operating Officer admitted that curtailment of the wind projects in northern New England has been difficult to forecast and has come as a surprise.

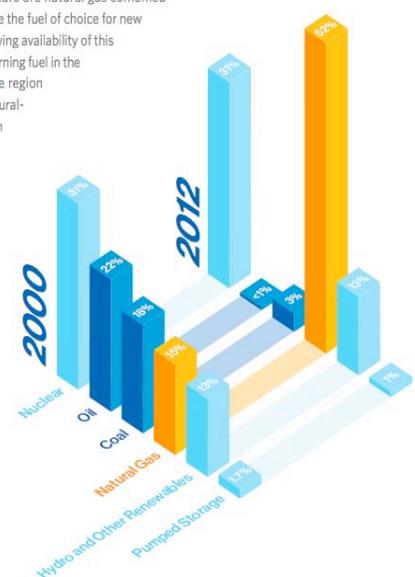
Taken as a group, Vermont’s wind projects are operating at about a 23% capacity factor, far below the optimistic projections supplied to regulators by experts paid by the wind industry to support their proposals. Given this history, VCE has no reason to believe that the modeling conducted by Synapse in its evaluation of the proposed change in blade length for Deerfield has any basis in the real world and what would actually happen once operation commences.

This failure to correctly forecast the wind turbines’ capacity factor means that wind developments in New England have failed to achieve their projected climate change and air quality promises.

A close examination of the operation of the New England grid, which accepts these projects’ generation, shows other ways in which the projects’ climate change promises are being unmet. As the graphic at the right shows, New England’s electricity generation increasingly comes from natural gas, with very little of the region’s energy mix coming from traditionally polluting sources such as oil and coal. It is quite likely that the Deerfield Wind’s promised displacement of fossil fuel emissions has already occurred because of relatively cheap, lower-emission natural gas energy. Achieving the increased emission reductions modeled by Synapse based on Iberdrola’s request to use larger turbines with longer blades and increased capacity factors does not acknowledge what has happened with the emissions reductions that have already occurred in

New England. Approximately 12,000 of the 14,000 MW of generating capacity built over the past 15 years are natural gas combined-cycle units, and gas continues to be the fuel of choice for new power plant construction. The growing availability of this relatively inexpensive and clean-burning fuel in the eastern part of the US benefits the region in many ways. The increase in natural-gas-fired generation has resulted in a significant decrease in both power plant emissions and the wholesale cost of electricity.

Dramatic changes in the energy mix
The fuels used to produce New England’s electric energy have shifted as a result of economic and environmental factors.



¹⁵ <http://www.vermontelectric.coop/ceo-blog/418-latest-news-in-vec-power-supply>
¹⁶ http://www.vce.org/TomDunnVELCO_061213.mp3

the New England region¹⁷. The Forest Services' review uses data from 2008 which no longer reflects the New England grid's energy mix.

We were able to further ground truth the modeling and predictions of wind industry developers and their experts through our participation in the Vermont Energy Generation Siting and Policy Commission's site visit to the Granite Ridge natural gas power plant in Londonderry, NH in January, 2013. This 750MW natural gas power plant came into service in about 2003 and operates as a ramping plant at ISO-NE's request. The plant operators state that it is 70% efficient. Its President and CEO made a presentation to our group¹⁸ and answered questions¹⁹.

After the meeting ended, VCE inquired of the CEO about the plant's interaction between wind energy and the wind industry promise that for every 1 MW of wind energy that enters the grid, 1 MW of fossil fuel energy is offset. The CEO said that under the current configuration of the New England grid, his plant operates most efficiently when it is maximizing its output (think of a car driving at a consistent 55 mph speed on a highway). When the ISO asks him to reduce output to let wind production onto the grid, his plant operates inefficiently (think of an automobile idling or moving through stop and go traffic). The natural gas plant does not turn off; it must get to a certain temperature in order to be in operation. When it ramps down to let the wind in, it is not saving fuel, and it may be increasing its emissions because of the heating and cooling that must be undertaken. His position clearly was that there is not a 1:1 offset of wind energy to fossil fuels.

While they exist in other parts of the country, the New England region does not have natural gas peaking plants specifically designed to ramp up and down efficiently in response to intermittent resources. Without those plants, the ability of wind (and other intermittent sources) to replace generation sources that cause more greenhouse gas emissions is limited.

VCE therefore questions the SIR's acceptance of Synapse's analysis that an increase in blade length will result in even more beneficial climate change and emissions reductions. Given what is actually happening with operating big wind projects in Vermont, and the current realities of the New England grid, we suggest the underlying assumptions based on 2008 data are seriously flawed.

¹⁷ http://www.iso-ne.com/aboutiso/fin/annl_reports/2000/2013_reo.pdf

¹⁸ (copy and paste full link if page is not found)

http://sitingcommission.vermont.gov/sites/cep/files/Siting_Commission/Publications/SiteVisit012313/GRE%20Presentation%20012313.pdf

¹⁹ http://www.youtube.com/watch?v=aHQbepNU_oo&feature=em-share_video_user

Conclusion

It would be incomplete for us to close our comments without noting the fact that by all appearances there is substantial political pressure on government agencies to approve renewable energy projects. The Deerfield Wind project is on President Obama's top ten infrastructure projects to expedite.

VCE is disappointed in the USFS's failure to use the time granted by the stay to develop an independent, unbiased review of Iberdrola's proposal to construct bigger turbines with longer blades, especially on the western ridgeline closest to the George D. Aiken Wilderness.

Science and logic clearly indicate that the SIR's conclusions are not credible, and that bigger turbines with longer blades will in fact create a greater negative impact on the Aiken Wilderness and surrounding areas.

Thank you again for the opportunity submit comments.

Sincerely,

A handwritten signature in black ink that reads "Annette Smith". The signature is written in a cursive style with a large, looped initial "A".

Annette Smith
Executive Director



United States Department of the Interior

NATIONAL PARK SERVICE

Natural and Night Skies Division

1201 Oak Ridge Drive, Suite 100

Fort Collins, CO 80525

TO: Robert Bayer, Manchester Ranger District, GMNF
FROM: Kurt Frstrup, NPS Natural Sounds and Night Skies Division
Megan McKenna, NPS Natural Sounds and Night Skies Division
DATE: 26 February 2013
Re: Deerfield Wind Project, blade change request analysis

Dear Robert Bayer:

As requested, the Natural Sounds and Night Skies Division (NSNSD) of the National Park Service (NPS) completed an internal review of changes in the acoustic analysis for the Deerfield Wind Project. The purpose of our review was to evaluate if noise impacts from modifications to the wind turbines specified in the Deerfield Wind Project EIS and Record of Decision (ROD) were adequately addressed. The modifications proposed by Iberdrola Renewables included changes in the types of turbines models to be deployed. In the original EIS, maximum sound power levels for the Gamesa G87 and Suzlon S88 were used in the acoustic model. Subsequently, the G80 turbine was found to be better suited and the acoustic analysis was revised- *Revised Noise Impact Study 2007*. In October 2012, Iberdrola Renewables provided a notice of change in the turbine models to be deployed. The stated reason for the notice and proposed change was because the G80 models were discontinued and a new model (G97) became available. The G97 is similar to the G87 but it has slightly longer blades and larger rotor diameter. The sound analysis was updated and published- *Sound update of Deerfield Wind Project Modifications* September 2012.

The Deerfield FEIS analyzed potential noise impacts during construction and operational phases of the project. Because the same numbers of turbines (15) are being deployed in the Reduced West Alternative, the stated noise impacts will not change for the construction phase of the project. There is a potential for the operational phase noise impacts to change- given that the new turbines have different maximum sound power levels. For example, five of the G80 turbines will be replaced with the G87 resulting in an increase in maximum sound power levels from 105 to 106 dBA. In addition, eight of the G87 turbines will be replaced with G97 resulting in an increase in maximum sound power levels from 106 to 108 dBA (as indicated in Table 3 of the RSG 2012 report).

The model framework and environmental parameters used to update the received sound levels at different receivers remained unchanged from previous analyses. The noise studies were prepared according to procedures of modeling sound as specified in the International Standards ISO 9613-2, *Acoustic Attenuation of Sound during Propagation Outdoors*, using Cadna A software. The model framework used (according to Appendix A: CADNA Modeling Parameters) slightly underestimates noise levels, according to a recent publication that compared the models to empirical measurements (Kaliskim and

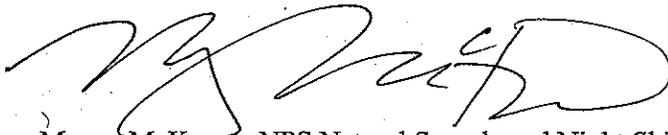
Duncan, 2008¹). As indicated above, the wind turbine maximum sound power levels used the propagation model changed from the original Reduced West Alternative in the EIS to represent the new wind turbine models. We compared Table 3.4-5 Reduced West Alternative in the EIS (page 114, also Table 1 in 2010 RSG report) to the Previously Approved, and Final Design in Table 2 of the *Sound update of Deerfield Wind Project Modifications* September 2012. Although noise levels did change at some of the sites, all levels are below the Project noise standard of 45 dBA (exterior)(Leq)(1hr). On page 3 of the EDR report the authors state that changes in sound levels of 3 dB are considered undetectable or barely perceptible. NPS does not agree with this statement. Perceived loudness is not the sole effect of noise. ANSI Standard S12.9/Part 4 states that the percent of a community that is highly annoyed by noise doubles with every 5.5 dB increase in noise, so a 3 dB increase would cause a bit more than a 40% increase in percent highly annoyed. It is also at odds with the masking effects of noise, in which a 3 dB increase, in most circumstances, will halve the area in which some sounds can be heard (Barber et al. 2010)². A more balanced presentation of noise impacts will not alter the conclusion regarding this project, but a more balanced presentation will enhance the credibility of the analysis.

Thank you for the opportunity to review this material. If you have any questions, please do not hesitate to contact us.

Sincerely,



Karen Trevino, NPS Natural Sounds and Night Skies Division



Megan McKenna, NPS Natural Sounds and Night Skies Division

¹Kaliski, K and E. Duncan (2008). *Propagation Modeling Parameters for Wind Power Projects*. Sound and Vibration. December: 12-15.

²Barber et al (2010). The costs of chronic noise exposure for terrestrial organisms. *Trends in Ecology and Evolution*. 25(3):180-189.

June 14, 2013

VIA EMAIL

Subject: Draft Deerfield SIR

SUMMARY

After reviewing the RSG report of 2012 on the proposed revised Deerfield wind project[1], I found a number of deficiencies, including:

1. Despite the reports' contention, additional information about impacts from turbines has come to light between 2007 and 2012. This information is not considered.
2. Noise impacts to Aiken Wilderness area were predicted *higher* by 3 dB (*double* the acoustic energy), but the range of impacts was not investigated or documented. See Figure 1.
3. Impacts resulting in natural quiet being lost are hidden due to simplistic modeling.
4. The effect that blade length change would have on peak sound levels and intrusive sound character were not considered.
5. Noise models have been incorrect in the past and were not fully considered. See Figure 2.
6. Conflict of Interest issues remain with the RSG.

It should be clear to any unbiased observer that the natural quiet of the Aiken Wilderness will be lost when the turbines are operating and audible. It will no longer be a wilderness experience. It will be an industrial noise filling the wilderness area. In my experience, the wilderness area would be subjected to a louder, more attention-getting noise due to the longer blades.

Figures and details on these deficiencies are attached. Thank you very kindly for the opportunity to provide comment.

Respectfully submitted,



Robert W, Rand, Member INCE

1 RSG, Sound Update For Deerfield Wind Modifications, 12 September, 2012, unsigned.

DETAIL

Deficiency #1: Despite the reports' contention, additional information about impacts from turbines has come to light between 2007 and 2012. This information is not considered.

Five years have passed since the original 2007 project review by RSG. Prior to 2007, wind turbines installed in New England were generally small. Between 2007 and 2012, large wind turbines, many in the range of 1.5 to 2 MW, were installed. Almost immediately, complaints and lawsuits surfaced from neighbors nearby when sited too close. Some people reported sleep deprivation, headaches and health impacts similar to seasickness.

Developers and communities are now well aware of the potential problems and there is a large amount of noise and reaction data available for those analyzing impacts to wilderness areas and people. Another wind developer noise consultant, Hessler Associates, had previously called for a limit of 39.5 dBA for large industrial wind turbines in this size range, a full 5.5 dBA below the project's permitted limit.

Despite these developments, the 2012 RSG report stated there would be "no changes to prior recommendations or conclusions." As an acoustic professional with many years experience in power plant noise control and community noise impact assessment, it is not clear to me how this statement is defensible.

Deficiency #2: Noise impacts to Aiken Wilderness area were predicted higher by 3 dB (double the acoustic energy), but the range of impacts was not investigated or documented.

“Natural quiet”—the sounds of nature uninterrupted by human-caused noise—has been identified by Congress and the National Park Service as an important resource in national parks that must be protected [2]. The US Forest Service (USFS) defines "noise" as, "a subjective term used to denote unwanted, typically annoying or disturbing, sound." Wilderness areas that experience noise from manmade activities have an adversely affected soundscape and visitor experiences.

The 2007 Environmental Impact Statement sections on noise impacts and standards were written by RSG. The section on "Noise Standards" omitted detailed assessments of impacts on Aiken Wilderness area's aesthetics. RSG instead reviewed a number of well known noise guidelines developed primarily to prevent hearing loss or speech or sleep interference, and proposed a "standard" of 45 dBA outdoors. RSG stated that this noise limit "would not result in an undue adverse affect to the aesthetics of the area"[3].

In RSG's 2012 report, the noise levels of the proposed larger turbines were compared to the project's permitted 45 dBA, one hour noise limits. RSG noted a 3 dB increase over the previous design, now a full 7 dB increase. Again, RSG omitted any detailed assessment of impacts on the wilderness area's aesthetics, and stated there would be "no changes to prior

2 NP Overflights Act of 1987; NP Air Tour Management Act of 2000; NPS Management Policies 2006.

3 RSG, Revised Noise Impact Study, Deerfield Wind Project, Searsburg/Readsboro, Vermont, 2007, unsigned.

recommendations or conclusions."

In fact, the RSG written reports did not include any detailed assessment of the impact on the aesthetics of the Aiken Wilderness, which should have been included given that the wilderness boundary is located only 1.3 miles west of the turbine locations. See Figure 1.

This omission is especially glaring when RSG's own predictions show a 7 dB increase at the Wilderness Area eastern boundary in the background 24-hour level, and a difference of 3 dB or *double the acoustic energy* compared to the 2007 prediction. Both results are clearly significant. So why did RSG find it unnecessary to investigate the impacts and predict noise levels and visitor noise reaction?

Deficiency #3: Impacts resulting in natural quiet being lost are hidden due to simplistic modeling.

It should be clear to any unbiased observer that the natural quiet of the Aiken Wilderness will be lost when the turbines are operating and audible. It will no longer be a wilderness experience. It will be an industrial noise filling the wilderness area.

My professional assessment is that at some distance into the Aiken Wilderness, wind turbine noise will become a low-pitched continuously varying thumping, bumping industrial noise similar to train yards and jet aircraft. In contrast, in both their 2007 and 2012 studies, RSG uses spectra that are based on distances much closer to the turbine locations. At the distances to the Aiken Wilderness, the wind turbine spectrum would be degraded into a thumping low frequency noise. Disturbance and annoyance from changes in noise level is much stronger at lower frequencies than at higher frequencies.

The sound signature of the wind turbine at these larger distances is distinctive, time-varying, and attention-getting. The wilderness area soundscape experience, normally very quiet, would be unduly impacted by intrusive wind turbine noise for the life of the project. It is unclear why RSG failed to use the correct spectra and account for modulations over time (whumps and thumps) in their modeling and analysis.

Deficiency #4: The effect that blade length change would have on peak sound levels and intrusive sound character were not considered.

Longer wind turbines blades are like canoe paddles. The bigger they are, the bigger the bite. The IEC 61400-11 noise test process is conducted in smooth winds, averages test data and A-weights the results, hiding peak noise levels and obscuring the additional low frequency energy created by longer blades. Longer blades are associated with lower frequency peak noise emissions [4]. At the distances to the Aiken Wilderness, the expected result from longer blades would be higher peak levels and a deeper, more emphasized whump especially when turbines turn synchronously, compared to the 2007 project.

4 Moller, H. and Pedersen, C., Low-frequency noise from large wind turbines, JASA 129(6), June 2011.

Deficiency #5: Noise models have been incorrect in the past and were not fully considered.

Review of the RSG model raises questions about its foundation. A similar ridge-top facility (Mars Hill, ME) measured 5 dB higher than predicted with no uncertainty factors. RSG used a 2 dB factor to account for the manufacturer's uncertainty margin. To match the 5 dB gap found at Mars Hill, RSG should have conservatively used an additional 3 dB uncertainty margin for a total of 5 dB. The under-prediction at Mars Hill is a strong indication that the RSG model could also under-predict actual average noise levels by 3 dB, and more beyond a 1/2 mile. No safety or design margin was used [5]. See Figure 2.

Deficiency #6 – Conflict of Interest issues remain with the RSG.

The original EIS noise assessments for the project were performed by Ken Kaliski of RSG. Mr. Kaliski was also an expert witness for Iberdrola, the project developer, in the PSB review. Conflicts of interest can arise when consultants to the developer are not at arms length to the EIS. For example, standards for noise limits could be proposed during the EIS process that may appear reasonable yet favor the developer and may be difficult to comprehend for regulators with regard to assessing impacts for wilderness protection and public well-being.

Conclusion

Our understanding of the acoustical impacts of noise turbines has changed significantly over the past few years. Thanks to more scientific inquiry and real-world data, we can now have a much better understanding of the impacts of the proposed facility. And those impacts would likely be significantly greater than those forecasted in the 2007 analysis. It is clear that the soundscape in the George E. Aiken Wilderness Area would no longer be a wilderness experience but instead be awash in more pronounced wind turbine noise. The RSG model likely under-predicts far-field sound levels. Questions of conflict of interest remain.

5 Since modeling is an imprecise process, noise consultants may add a safety margin of some number of decibels during the planning process to acknowledge unavoidable differences between maximum predicted sound levels and actual sound levels so that the project meets the noise limits under operating field conditions.

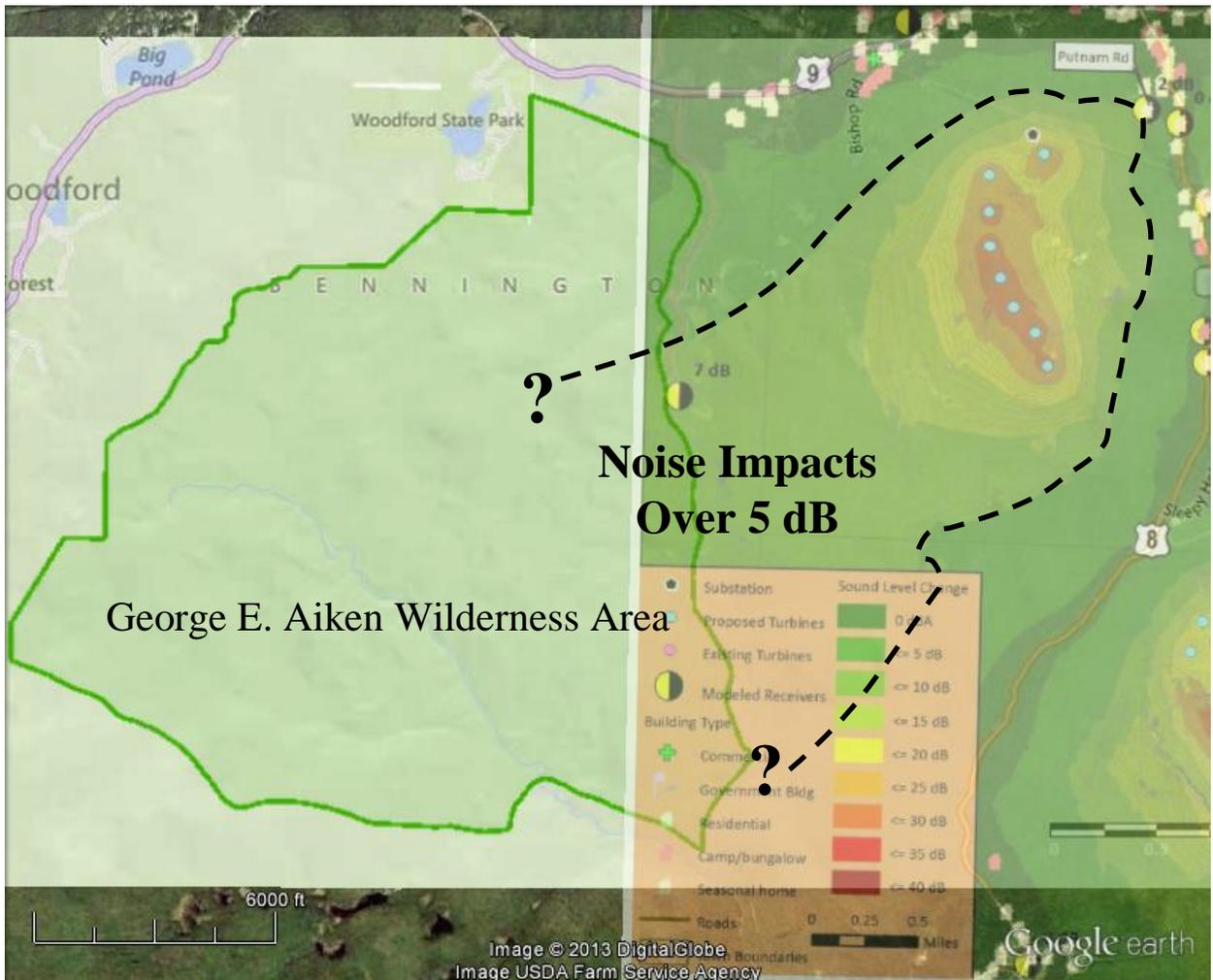


Figure 1. Predicted facility noise levels (RSG, 2012) impact wilderness area as much as 7 dB. RSG's figure legend obscured the extent of noise impacts into the Aiken Wilderness. The RSG figure did not show or quantify noise level changes in the Aiken Wilderness. Dashed lines and question marks on this figure infer and raise questions about the extent of total noise level changes over 5 dB, which is significant.

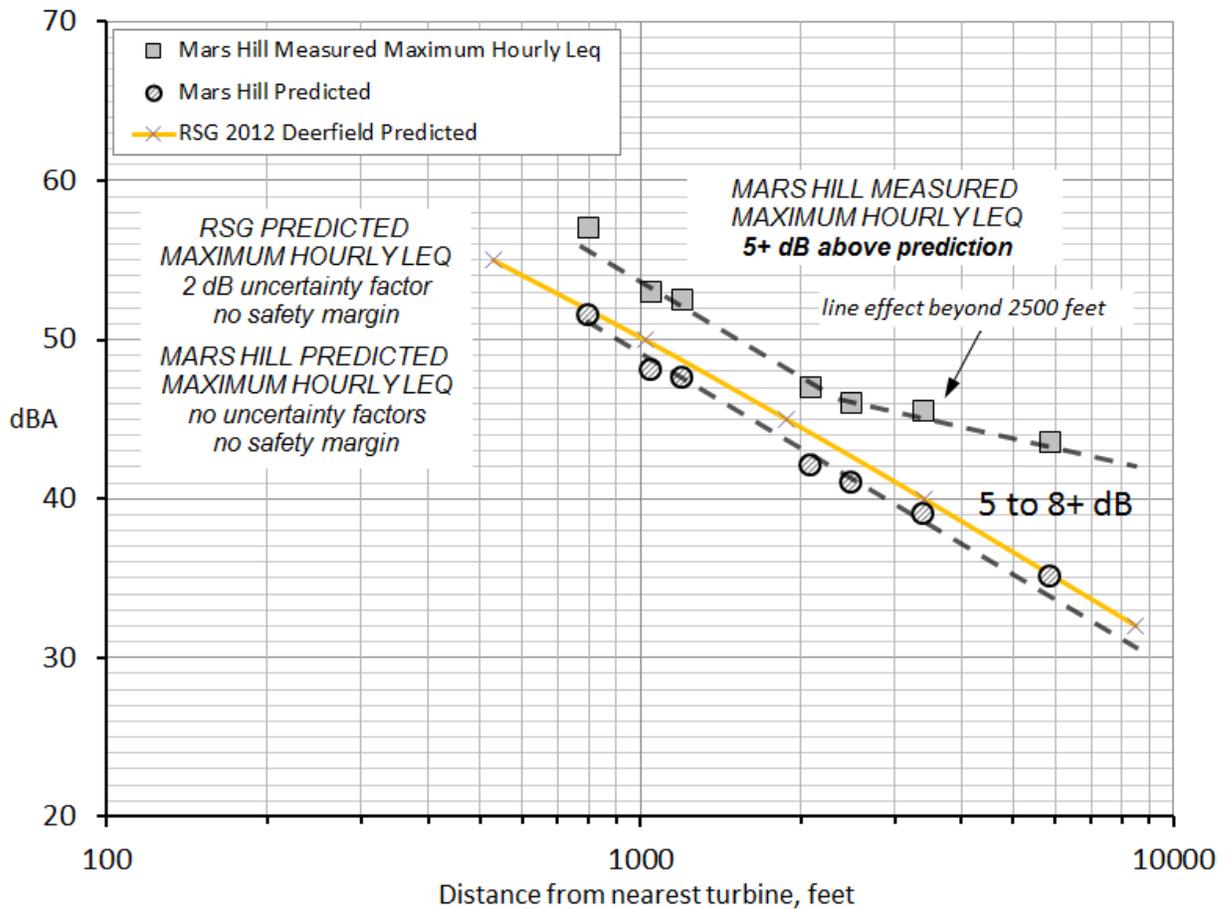


Figure 2. RSG's noise prediction for Deerfield appears to underpredict noise levels when compared to a similar ridge-line wind turbine project with smaller, lower sound power level turbines at Mars Hill [6].

6 Mars Hill data compiled from: Sound Level Study: Compilation Of Ambient & Quarterly Operations Sound Testing, October 15, 2008. Maine DEP Order No. L-21635-26-A-N.