

STATE OF NEW HAMPSHIRE
SITE EVALUATION COMMITTEE

Docket No. 2012-01

RE: APPLICATION FOR CERTIFICATE OF SITE AND FACILITY
ANTRIM WIND ENERGY LLC

PREFILED DIRECT TESTIMONY OF DR. KENNETH D. KIMBALL

July 31, 2012

1 **Qualifications**

2 **Q. Please state your name and business address.**

3 A. Dr. Kenneth D. Kimball, Appalachian Mountain Club, PO Box 298, Gorham, NH
4 03581.

5 **Q. What is your current position?**

6 A. Director of Research, a position I have held since 1983.

7 **Q. What are your qualifications?**

8 A. For nearly 20 years I have overseen AMC's efforts to promote the appropriate siting
9 of terrestrial commercial wind power projects in AMC's mission area (the northern Appalachian
10 region). I have overseen AMC's efforts to promote the development and adoption of state and
11 national regulations that guide wind power development to sites with lower levels of impact on
12 significant natural resource values. This has included chairing a multi-stakeholder group that
13 developed proposed wind power siting guidelines for New Hampshire¹. I have overseen our
14 landscape-level GIS-based research that evaluates conflicts between potential wind power
15 development sites and natural resources. I have participated in seven interventions by AMC in
16 the permitting of specific projects (two in New Hampshire and five in Maine), including serving
17 as an expert witness for AMC. In two of these interventions I led successful efforts to develop
18 agreements with developers for significant conservation of high-elevation areas as mitigation for
19 project impacts.

20

¹ These guidelines are posted on the SEC home page.

1 **Testimony**

2 **Q. What is AMC’s position on commercial (aka industrial scale) wind power**
3 **development?**

4 A. AMC’s position on wind power is set forth in the Club’s overall energy policy².
5 AMC is committed to promoting the use of clean alternative energy to reduce air pollution and
6 protect the region's mountain environment from the effects of climate change. However, AMC
7 recognizes that commercial wind power development is not without negative impacts on some of
8 the very resources we seek to protect. Our efforts are directed at guiding wind power
9 development away from areas where they will have a significant negative impact on important
10 ecological, recreational and/or scenic resources of state, regional or national importance, and to
11 encourage states to adopt consistent wind power siting guidelines.

12 **Q. When does AMC intervene in a wind power permitting process?**

13 A. AMC has finite resources and cannot nor does it intervene in all commercial wind
14 projects. There are two important drivers in determining if AMC will actively intervene in a
15 project. They are: First, if the project has the potential to have a significant impact on resources
16 that have a strong nexus to AMC’s mission – primarily ecological, recreational or scenic
17 resources of state, regional (i.e. northeastern US) or national significance. In general AMC does
18 not engage in projects that primarily impact resources of local significance. Second, if the
19 project involves major precedence that has significant implications for the permitting of future
20 projects relative to AMC’s interests, including precedence for the adequacy of applications or the
21 use of best available technology to minimize or mitigate unavoidable adverse impacts, AMC
22 may intervene. It is for the latter reason that AMC intervened in this Project.

23 **Q. What is AMC’s position on the Antrim Wind Energy project?**

24 A. Previously AMC had not taken a formal position either in support of or opposition to
25 this Project. As part of an agreement reached with the Applicant to address AMC’s issues of
26 concern with the Project (described in the testimony that follows), AMC has agreed not to
27 oppose the Project. However, the agreement between AMC and the Applicant in no way implies
28 that AMC now supports the Project, or that issues raised by other Interveners are without merit
29 or in any way resolved by the terms of the Agreement. (It is common for AMC not to formally
30 support a project even with modifications to reduce or mitigate impacts of concern to AMC).

² See <http://www.outdoors.org/pdf/upload/AMC-Conservation-AMC-Energy-Policy.pdf>.

1 **Q. What are AMC’s issues with the project?**

2 A. There are two issues of concern to AMC:

- 3 1. The application does not include a commitment to utilize the best available
4 technology to mitigate certain visual impacts, in particular the use of a radar-
5 activated lighting control system to eliminate the need for constant use of flashing
6 nighttime aircraft warning lighting.
- 7 2. The Visual Impacts Assessment (Application Appendix 9A) is inadequate and
8 does not conform to either SEC precedent or currently accepted standards.

9 As this testimony was being prepared, the AMC reached an agreement with the Applicant
10 that resolved these issues to AMC’s satisfaction. This prefiled testimony is based on the
11 Applicant filing an amendment to their application as specified in the Terms of Agreement (the
12 “Agreement”) between AMC and Antrim Wind Energy (AWE) dated July 31, 2012. This
13 testimony is being presented in support of AMC’s request that should the SEC approve the
14 Certificate for this Project that the terms outlined in the Agreement and the revisions to AWE’s
15 application specified in the Agreement be required as conditions of the Certificate.

16 **Q. Why do you believe that the use of a radar-activated lighting control system**
17 **should be required for this project?**

18 A. There are two components to visual impact of wind power projects – daytime and
19 nighttime. Nighttime impact is created by the need for flashing strobe lights as a warning to
20 aircraft in the vicinity. These lights can be visible from significant distances.

21 The generally dark sky that is characteristic of rural New England away from urban
22 centers is an important but often undervalued resource. For example, the New Hampshire Space
23 Grant Consortium states³:

24 “The dark, star-filled night skies that still prevail in New Hampshire are an important but
25 diminishing natural resource for anyone interested in stargazing. The pale arc of the
26 Milky Way, the constellations, bright planets and an occasional passing comet that are
27 easily seen on moonless nights form an essential component of the state’s rural character
28 – and a part of nature now lost to most Americans who live in densely lighted urban areas
29 where ‘light pollution’ washes out the stars.”

30 The multiple flashing warning lights on the project would be a significant visual intrusion
31 on the night sky from many open spaces in the project vicinity where people may go to observe
32 the night sky. From some locations the impact of the project would be cumulative with the

³ <http://www.nhsgc.sr.unh.edu/roadtrips/astro.shtml>.

1 impact from the existing Lempster project (approximately 14 miles to the northwest). In
2 particular, on a clear night the lights from both projects would likely be prominently visible from
3 many low lying areas as well as the summits of Mount Sunapee (approximately 20 miles to the
4 north of the Project), Mount Monadnock (approximately 14 miles to the south) and Pitcher
5 Mountain along the Monadnock-Sunapee Greenway Trail (6 miles to the west).

6 Should more projects be constructed in this region of the state, cumulatively this
7 nighttime light “intrusion” impact could be considered “unreasonable adverse” as the term is
8 used in the criteria for approval set forth in NH RSA 162-16:H.IV. However, we strongly
9 believe that where reasonable technology exists (or is likely to be available in the near future) to
10 mitigate for an impact, then the use of that technology should be required as a condition of
11 approval of this (or any future) project.

12 Radar-activated lighting control systems are now an available technology that is currently
13 approved for use by the FAA for structures other than wind turbines. These systems utilize on-
14 site radar to detect approaching aircraft and turn on warning lights when an aircraft is in
15 proximity to the structure. However, at all other times the warning lights remain off, which
16 mostly eliminates the nighttime visual impact of tower-based aircraft warning lighting systems.

17 In their initial filings with the FAA, the Applicant indicated their intent to utilize this
18 technology if it was approved (see Application Appendix 2E). The FAA responded that this
19 technology was not yet approved for use on wind turbines, and the Applicant amended their
20 applications to the FAA⁴. However, Mike Blaich of the FAA⁵ stated that he was “90% sure” that
21 FAA would approve this technology in the near future, though he could not give a time frame for
22 this approval. He also stated that the FAA was aware of the strong interest of many parties in
23 having FAA approve this technology. He indicated that the FAA was working as quickly as
24 possible (with due diligence to their primary responsibility for aircraft safety) to reach a decision.

25 Therefore, the AMC contends that: 1) the technology exists to significantly mitigate the
26 visual impacts of nighttime lighting created by the Project, 2) there is a high likelihood that the
27 FAA will approve this technology in the near future (as compared to the life span of the Project),

⁴ See AWE Responses to Tech Session Data Requests, Request No. TS 1-35, Attachment TS 1-35(a).

⁵ Phone conversation between Mike Blaich (FAA OE Airspace Specialist Wind Turbines East) and AMC Senior Staff Scientist David Publicover. Mr. Blaich was provided as the appropriate FAA contact by the Applicant (AWE Responses to Tech Session Data Requests, Request No. TS 1-36).

1 and 3) the use of this technology should be required as a condition of approval for the Project,
2 even to the extent of post-construction retrofitting.

3 There is regional precedent for requiring post-construction retrofitting of this technology.
4 As a condition of approval for the Deerfield Wind project in Vermont⁶, the Green Mountain
5 National Forest required that the project install radar-activated lighting technology within six
6 months of FAA approval.

7 **Q: Describe the agreement that AMC has reached with the Applicant.**

8 A: In brief, the agreement requires the Applicant to install and utilize this technology on
9 the Project, either simultaneously with construction (if FAA approval occurs more than 60 days
10 prior to commencement of construction) or within one year of FAA approval (if the approval
11 occurs later than this). The Applicant will amend their application to SEC to include this
12 commitment and request that this commitment be included as a condition of approval of the
13 Certificate if issued.

14 **Q: Does this agreement resolve AMC’s issue regarding the use of best available
15 technology to mitigate the visual impacts of nighttime lighting?**

16 A: Yes.

17 **Q: Does the agreement resolve all issues related to visual impact of the Project?**

18 A: No. The agreement in no way addresses daytime visual impacts. The towers are
19 purposefully colored to make them as visible as possible during the daytime to approaching
20 aircraft and they can be visible up to 20 or more miles away. Furthermore, this Project will use
21 the tallest towers to date in the region. Any commercial wind power project located in a
22 generally rural area will be a highly visible and generally discordant presence in the landscape.
23 However, with the exception of the Monadnock-Sunapee Greenway Trail (which we consider a
24 resource of “state regional” significance), the impacts of the Project are to resources which are
25 more local or regional to this part of the state in nature. As stated previously, the AMC normally
26 does not take positions on impacts at this level.

27 The AMC takes no position as to whether the daytime visual impacts of the Project rise to
28 the level of “unreasonable adverse” relative to local and state-regional resources or cumulatively
29 with other projects within the area. The Agreement between AMC and the Applicant in no way

⁶ See http://a123.g.akamai.net/7/123/11558/abc123/forestservice.download.akamai.com/11558/www/nepa/9046_FSPL_T2_121589.pdf.

1 implies that AMC now supports the Project, or that issues raised by other Interveners are without
2 merit or in any way resolved by the terms of the Agreement.

3 **Q. Is there technology available to mitigate daytime visual impacts?**

4 A. There is existing technology, such as the Obstacle Collision and Avoidance System
5 (OCAS) that includes a radar-activated audio warning to approaching pilots. Use of this or other
6 systems could eliminate the need for turbines to be highly visible to aircraft and allow them to be
7 painted a more neutral color, reducing their daytime visibility.

8 However, AMC is not pursuing this possibility in this intervention for the following
9 reasons:

- 10 – It is our understanding that the OCAS system is only available for use on Vestas
11 turbines, and we are unaware if similar systems are currently available.
- 12 – In our conversation with Mike Blaich, he indicated that it was less likely that the
13 FAA would be approving this particular technology in the immediate future, and
14 provided no information on if or how it would address the turbine coloration
15 issue.
- 16 – We have no information to date as to whether it is technically or economically
17 feasible to retrofit projects with this technology (which would require repainting
18 the turbines in place).

19 We do believe it is reasonable to assume that at some point in the future newer
20 technology could be approved by the FAA, that would allow for turbine coloration that reduces
21 daytime visual impact, and at that time it should be considered to be best available mitigation
22 technology whose use should be required on all projects.

23 **Q: Regarding AMC’s second issue, what are your concerns with the Visual Impacts
24 Assessment (Application Appendix 9A)?**

25 A: There is no basis for limiting the VIA to a radius of five miles, or for the Applicant’s
26 contention (Appendix 9A, Section 1.1) that “Beyond this distance it is assumed that natural
27 conditions of atmospheric and linear perspective will mitigate potential visual impacts.” A study
28 conducted by the National Academy of Sciences on the environmental impacts of wind power
29 projects⁷ stated:

⁷ National Academy of Sciences. 2007. *Environmental Impacts of Wind-Energy Projects*. Committee on Environmental Impacts of Wind Energy Projects, National Research Council.

1 “Modern wind turbines of 1.5-3 MW can be seen in the landscape from 20 miles away or
2 more (barring topographic or vegetative screening), but as one moves away from the
3 project itself, the turbines appear smaller and smaller, and occupy an increasingly small
4 part of the overall view. The most significant impacts are likely to occur within 3 miles of
5 the project, with impacts possible from sensitive viewing areas up to 8 miles of the
6 project. At 10 miles away the project is less likely to result in significant impacts unless it
7 is located in or can be seen from a particularly sensitive site or the project is in an area
8 that might be considered a regional focal point. Thus, a 10-mile radius provides a good
9 basis for analysis including viewshed mapping and field assessment for current turbines.”

10 The two previous projects before the SEC (Granite Reliable Power and Groton Wind)
11 conducted visual impact assessments to a distance of ten miles. Maine’s Wind Siting Law
12 requires an assessment to a distance of three miles but with the option of extending this to eight
13 miles. In practice all projects have conducted their analysis to eight miles and this has become
14 the *de facto* standard. However, concern has arisen that even this standard is inadequate. In its
15 report to the Maine legislature on a review of the state’s current wind power policies and
16 regulations⁸, the Maine Office of Energy Independence and Security included a recommendation
17 to “*Amend the wind law to require scenic impact evaluations to eight miles, with a fifteen mile*
18 *standard option and provisions made for review to greater distances.*”

19 Experience with existing projects also demonstrates that they are clearly visible from
20 distances greater than five miles. For example, the Granite Reliable Project is clearly visible
21 from Route 16 in the vicinity of Pontook Dam at a distance of 6.5 to 7 miles (Appendix A). (We
22 note that the turbines proposed for the Antrim project are over 80 feet taller than the turbines
23 shown in the photograph.) The Spruce Mountain project in Woodstock, ME is clearly visible
24 from Route 2 in the vicinity of Rumford Center at the same distance. On a clear day the Kibby
25 project in western Maine is easily seen from the summit of Bigelow Mountain at a distance of
26 about 18 miles (though it occupies a small part of the visual field).

27 The visibility of wind power projects is influenced by a number of factors, including not
28 only distance and atmospheric conditions but also direction of view. On a clear day turbines are
29 likely to be visible at a greater distance from viewpoints to the south, as the sun will be reflecting
30 directly off the bright white face of the turbine facing the viewer.

31 Based on the above information, the AMC contends that the visual impacts of the Project
32 cannot be adequately evaluated without additional information and assessment beyond the

⁸ See <http://maine.gov/energy/pdf/Binder1.pdf>.

1 current five mile limit. In particular, we note that the area between five and ten miles from the
2 project includes an extensive stretch of the Monadnock-Sunapee Greenway Trail.

3 In response to Technical Session Data Request TS 1-38, the Applicant took the first step
4 to address this deficiency by extending the viewshed analysis to ten miles and listing additional
5 receptors from which the Project would be visible. The list provided by the Applicant includes
6 two state parks (Pillsbury State Park at 8.8 miles and Greenfield State Park at 8.5 miles) and
7 three viewpoints along the Monadnock-Sunapee Greenway Trail (an unnamed viewpoint in
8 Pillsbury State Park at 8.8 miles⁹, Pitcher Mountain at 6.3 miles, and an unnamed viewpoint at
9 4.7 miles.)

10 Pitcher Mountain in particular is a regionally significant viewpoint from which additional
11 analysis (including visual simulation) is necessary. It lies slightly closer to the Project than the
12 view of the GRP project does from Route 16 as shown in Appendix A (though the Antrim
13 turbines will be significantly taller). It is included in AMC's *Southern New Hampshire Trail*
14 *Guide*, and has an open summit with a fire tower providing 360° views. Several websites note its
15 easy accessibility and spectacular summit views¹⁰. The impact from this Project would be
16 cumulative with the existing impact from the Lempster project (about 10 miles north of Pitcher
17 Mountain).

18 **Q. Describe the agreement you have reached with the Applicant regarding the**
19 **Visual Impact Assessment.**

20 A. The applicant has agreed to extend the viewshed analysis to a distance of ten miles,
21 which has already been done in response to Technical Session Data Request TS 1-38. In
22 addition, the Applicant will perform at least two and up to four additional visual simulations for
23 locations within the five to 10 mile zone, with one of these simulations being from Pitcher
24 Mountain.

25 **Q. Does this satisfy AMC's concerns regarding the adequacy of the Visual Impact**
26 **Assessment?**

27 A. Yes, the agreement satisfies AMC's specific issues regarding the need to extend the
28 viewshed analysis to ten miles and to conduct additional visual simulations from viewpoints in
29 the five to ten mile range, in particular the regionally significant viewpoint of Pitcher Mountain.

⁹ This may be Lovewell Mountain.

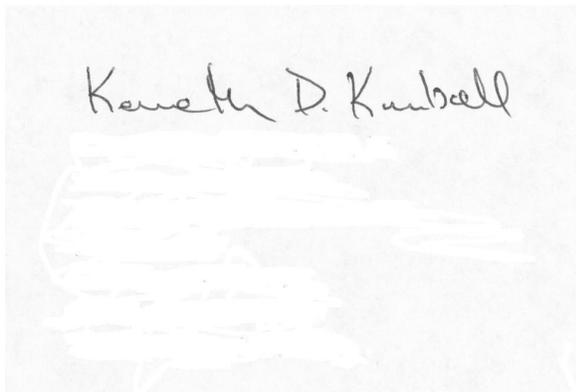
¹⁰ See for example <http://www.theheartofnewengland.com/travel-PitcherMountain.html> and
<http://www.summitpost.org/pitcher-mountain/152081>.

1 However, it is important to understand that this agreement only addresses AMC's
2 specific concerns. It does not imply any conclusion on the part of AMC as to whether the visual
3 impacts rise to the level of "unreasonable adverse". (It would be impossible to reach such a
4 conclusion without the additional visual simulations.) The AMC takes no position on the
5 severity of the visual impacts. Nor does the agreement imply that AMC has concluded that the
6 Visual Impact Analysis is sufficient to address issues raised by other parties. As stated
7 previously, the agreement does not imply that AMC supports the Project (though we have agreed
8 not to oppose it), or that issues raised by other Interveners are without merit or in any way
9 resolved by the terms of this agreement.

10 **Q. Does this conclude your testimony?**

11 A. Yes.

I hereby affirm, under penalty of perjury, that this testimony is true to the best of my knowledge and belief.

A photograph of a handwritten signature in cursive script that reads "Kenneth D. Kimball". The signature is written in dark ink on a light-colored, slightly textured paper. Below the signature, there are several horizontal lines of faint, illegible text, likely from the reverse side of the page or a stamp.



Appendix A. Photograph of Granite Reliable Windpark from Route 16 in the vicinity of Pontook Dam at a distance of 6.5 to 7 miles. Photograph taken by Kenneth Kimball on September 30, 2011.