

**STATE OF VERMONT
PUBLIC SERVICE BOARD**

Docket No. _____

Petition of EMDC, LLC d/b/a East Haven Windfarm)
for a Certificate of Public Good pursuant to)
30 V.S.A. sections 231 and 248, authorizing it to construct)
a 6 MW wind electric generation facility, and)
associated transmission and interconnection facilities,)
in East Haven, Vermont, and operate the same.)

**PREFILED DIRECT TESTIMONY OF
TERRENCE J. BOYLE AND MICHAEL J. BUSCHER**

ON BEHALF OF EAST HAVEN WINDFARM

November 17, 2003

Summary:

The testimony of Terrence J. Boyle and Michael J. Buscher presents a viewshed analysis and visual assessment of the Project. It shows that the Project will be visible from very few public viewpoints, and those viewpoints are quite distant from the Project. The testimony also applies the so-called Quechee analysis to the Project, and concludes that effects of the Project on aesthetics will not be adverse, or, in the alternative, any adverse effects will not be undue.

1 **I. INTRODUCTION**

2 **Q. Please state your name, occupation and qualifications.**

3 A. Terrence J. Boyle: My name is Terrence J. Boyle and I am a landscape architect.
4 I am principal of the 5 person firm, T. J. Boyle & Associates, located in
5 Burlington. I have been engaged in the practice of landscape architecture,
6 including performing analyses like that described below, for over 30 years. My
7 resume is attached as *Exhibit EHWF-TB-1*.

8 Michael J. Buscher: My name is Michael J. Buscher and I am an associate with
9 the firm of T.J. Boyle & Associates. In the past three years of my employment
10 with the firm, I have worked on several projects in which aesthetics and visual
11 sensitivity are controversial topics. My responsibilities include production of
12 visual aids to help evaluate the impacts of projects including viewshed analysis
13 maps and computer generated photographic simulations, in addition to field work
14 and testimony. My resume is attached as *Exhibit EHWF-TB-2*.

15

16 **Q. Have you testified before the Public Service Board (PSB) previously?**

17 A. TJB: Yes, on many occasions since the enactment of Section 248, Title 30 in
18 1969, relating to generation projects, substations and transmission lines. I
19 testified on aesthetics issues in the proceeding in which a Certificate of Public
20 Good (CPG) was granted for the Searsburg Wind Project.

21 MJB: This is the first time I have testified before the PSB, though I have
22 provided testimony to other regulatory bodies, in Vermont and New York State.

1

2 **Q. What is the purpose of your testimony in this proceeding?**

3 A. Our testimony presents the viewshed analysis and visual assessment that we
4 performed on behalf of EHWF. It shows that the Project will be visible from very
5 few public viewpoints, and those viewpoints are quite distant from the Project.
6 This analysis was performed primarily by Michael Buscher, with field verification
7 by and under the direction of Terry Boyle. Our testimony also applies the so-
8 called Quechee analysis to the Project, and concludes that effects of the Project on
9 aesthetics will not be adverse. However, we conclude that if effects of the Project
10 are determined to be adverse, for several reasons they are not undue. The
11 Quechee analysis was performed by Terry Boyle.

12 **II. VIEWSHED ANALYSIS AND VISUAL ASSESSMENT**

13 **Q. Have you prepared a report explaining the methodology you employed in**
14 **determining the extent of visibility of the Project?**

15 A. Yes. The report is attached as *Exhibit EHWF-TB-3*. It explains the visual
16 assessment process in detail.

17

18 **Q. Please outline the methodology you used to complete the viewshed analysis.**

19 A. The methodology we used is standard in our profession, and is very similar to the
20 methodology used in the Searsburg case. In that case, we examined topographic
21 maps and took a few cross sections of the topography from certain areas with

1 suspected sightlines to the turbine sites, to develop a strategy for locating
2 potential viewer positions. Segments of road, usually at high elevations with an
3 open foreground, were prime candidates for views. Other large areas, such as
4 areas with open meadows or water body foregrounds, were also likely candidates
5 for examination. I conducted a survey of the identified views and provided my
6 opinion to the PSB.

7 The methodology we used for the East Mountain project is essentially the same,
8 but our tools are different. With current computer capabilities we can now
9 conduct a viewshed analysis that indicates areas, within a given distance, from
10 which the turbines may be seen. By selecting an elevation on the proposed
11 turbines, for example, the top of nacelle or the top of the blade tip, a line of sight
12 broadcast indicates where intervening topography would block views of the
13 turbines. On this a GIS vegetative layer can be overlaid to indicate where existing
14 canopy will likely block further views.

15

16 **Q. Did you verify this computer analysis in the field?**

17 A. Yes. After the computer-based viewshed analysis was completed and likely
18 areas of visibility were determined, we then drove to the areas indicated as having
19 potential views. These were usually areas along the higher elevation roadways
20 that had unobstructed views to East Mountain. Using the viewshed maps created
21 with GIS data, orthophotos, the Vermont Gazetteer, and in some cases, USGS
22 maps, we traveled to these locations to see if, in fact, views to East Mountain

1 existed. Our efforts were aided by the existing 65' tall radar tower on the summit
2 of East Mountain. We then took representative photographs at these visually
3 accessible locations along the roadways with film and digital cameras. In the
4 situation that exists on Darling Hill Road, north of East Burke, a high quality
5 photo was shot on slide film. The photo was digitally scanned. A computer
6 generated simulation of the proposed turbines was then overlaid on the
7 photograph to provide an example of how the turbines would look in place. This
8 process is explained in greater detail in our report, *Exhibit EHWF-TB-3*.

9

10 **Q. Did your field investigation confirm the computer-based viewshed analysis?**

11 A. We found from the field investigation that the computer-based analysis in fact
12 significantly overstates the visibility of the Project, due largely to the fact that
13 low-level vegetation, especially along roadways, obscures views to a greater
14 degree than the computer data indicate. We added the results of our field
15 investigation to the computer-generated viewshed analysis, and produced a Field
16 Investigation Map, figure 4 in our report, which shows the locations from which
17 the turbines actually are visible. The Project is actually visible from a remarkably
18 small number of locations. In our experience, it would be difficult to find a high-
19 elevation (i.e., windy) location in Vermont, with an existing road to the summit,
20 that is as hidden from view as East Mountain.

21

22

1 **Q. Please summarize where you determined the turbines will be seen from.**

2 A. As the report indicates, there were three primary areas of viewing.

3 To the west there are views to the project site, from Darling Hill Road extension
4 to Burke Green Road to Center Pond Road. This is a continuous north-south
5 ridge road, paralleling VT Rt. 114. (Route 114 itself, which is further to the east,
6 runs in a valley that affords no views of the proposed turbines.) Because of the
7 presence of some open foregrounds north from Darling Hill Road, due to current
8 or past agricultural practices, views to East Mountain are afforded intermittently
9 from a distance of 7 to 10 miles. (Figure 6, View Point #1) The report includes a
10 simulation from this area. As the map and report indicate, there are a few open
11 areas on Newark Street and Sugarhouse Road where the turbines will likely be
12 seen at a distance of approximately 9 miles.

13 Another location that was identified on the viewshed map was the east side of
14 Maidstone Lake, approximately 6 miles from the East Mountain summit. This
15 was verified in a site visit as shown in Figure 13, View Point #9, *Exhibit EHWF-*
16 *TB-3*, which was taken from the Day-Use beach area of Maidstone State Park.
17 This view represents a location where a concentration of viewers from a public
18 resource will have a view of the turbines.

19 The third location where there will be unobstructed views of East Mountain is a
20 short segment on Victory Road heading north as it traverses the bridge at the
21 Victory Basin Wildlife Management Area (WMA). The open foreground for
22 several hundred feet affords views of East Mountain at a distance of 10 miles. A

1 photograph from this location is included in the report (Figure 14, View Point
2 #10, *Exhibit EHWF-TB-3*) and the existing radar tower can be identified.

3

4 **Q. Were there other state or public lands from which the Project will be visible**
5 **and the views will be prominent?**

6 A. Yes, there are a few intermittent views when descending Burke Mountain from
7 the summit, at a distance of approximately eight miles.(Figure 16, View Point
8 #12) There is a view north to East Mountain from the Fire Tower, but not from
9 the parking area or the summit lift. From Wenlock Crossing at Rt. 105 south to
10 South America Pond and east to Maidstone Lake through newly acquired State
11 lands there are no views because of forest cover.

12

13 **Q. How does the visibility of these turbines compare with the visibility of the**
14 **turbines at Searsburg?**

15 A. These turbines are remote when compared to Searsburg. The nearest locations
16 where they are visible to the general public will be approximately 6 to 8 miles,
17 whereas at Searsburg there are locations on local and state roads as close as ½
18 mile. The number of people expected to have visual access is also much less,
19 being primarily local travel on minor roads with a few residences.

20

21

1 **III. QUECHEE ANALYSIS**

2 **Q. Please summarize the analysis you performed after completing the viewshed**
3 **analysis and visual assessment described above.**

4 A. Section 248 requires the Board to make a finding that the Project will not have an
5 undue adverse effect on aesthetics, giving due consideration to various Act 250
6 criteria, including the Act 250 criterion that requires a project subject to Act 250
7 not to have an undue adverse effect on aesthetics. The Board has, in earlier cases,
8 relied upon the Environmental Board's methodology for determining what are
9 "undue" adverse effects, as outlined in the so-called Quechee Lakes decision.
10 The Quechee analysis involves a two-step inquiry. First, will the impact of the
11 proposed project be adverse? If the answer is no, the inquiry ends. If the answer
12 is yes, the second step is to determine whether such an impact would be "undue."
13 Such a finding would be required if: (1) a project violates a clear written
14 community standard intended to preserve the aesthetics or scenic beauty of the
15 area; (2) it would offend the sensibilities of the average person; or (3) generally
16 available mitigating steps will not be taken to improve the harmony of the project
17 or its surroundings. I applied this analysis to our findings, as expressed in the
18 viewshed analysis and visual assessment.

19

20 **Q. Do you conclude that the proposed towers on East Mountain create an**
21 **adverse impact?**

22 A. On balance, no. However, the relevant considerations are mixed.

1 1. This was formerly an active radar base complete with housing. Components of
2 that facility still exist and the tallest structure can be seen for several miles from
3 locations where views of the proposed turbines are likely. From a use
4 perspective, the wind turbines are not out of context.

5 2. Yes, the turbines are 220' tall to the top of the nacelle, and 328' to the top of
6 the blades, arguably adverse in the context of scale of objects in the wooded
7 mountain landscape. In reality, the scale of the turbines diminishes as the viewing
8 distance increases because the proposed turbines will be a small component of the
9 panorama as seen from seven (7) miles and more. By comparison, the Searsburg
10 site is closer to more population, thereby affording more visibility including major
11 travel corridors and was therefore felt to be adverse in that case, even with smaller
12 structures than at East Mountain.

13 3. Regarding visibility, no. Visibility is limited to a very few locations, and those
14 locations are at distances greater than 7 miles. At such distances, the eye's cone
15 of vision embraces a very large sweep of the landscape, including sky. Relatively
16 speaking, the towers are an extremely small piece of the view for the few people
17 that will observe them.

18 4. Public opinion is mixed as to the visual adversity of wind turbines. Most
19 people recognize the environmental benefits of wind power over alternatives and
20 this influences their perception. Others who have not experienced wind turbines
21 often imagine the worst because it is a change to the landscape they know. The
22 perceptions of many people change after seeing the turbines constructed and

1 appreciate the silent slow moving blades at work harvesting the wind. This is
2 witnessed by the large number of visitors and bus tours to see the turbines at
3 Searsburg and a general acceptance of their presence in the landscape, with
4 increased levels of public acceptance after construction as shown by the post-
5 construction study there.

6 On balance, I conclude that the aesthetic impacts are not adverse.

7

8 **Q. How does the required lighting for towers greater than 200' affect your**
9 **analysis of adversity?**

10 A. The FAA lighting requirements appear to require two flashing dual beacons
11 (L864/L865) on top of the generator housing. The L864 is a flashing red light for
12 nighttime and the L865 is a medium intensity flashing white light for daytime and
13 twilight use. The L864 will flash at 20 flashes per minute (fpm) and the L865 at
14 40 fpm. The lights have lenses designed to focus the candlepower of the light
15 between horizontal and 3° above the horizontal plane, for obvious reasons: that is
16 the band at which aviators who may need to be alerted by these lights are likely to
17 be traveling. Below the horizontal plane the intensity of the light drops
18 dramatically. The Darling Hill area, which has an unobstructed though distant
19 view of the towers, is at 3° below horizontal from the light source. At this angle,
20 the lights produce 350 candela (one candela equals the light emitted from one
21 candle), rather than 1500 candela at the horizontal. By comparison, the lights are
22 designed to produce 2000 candela at a slight angle above horizontal. The 350

1 candela at 3° below horizontal, 7–10 miles away, would be minimally visible in
2 the nighttime, even to someone stationary at that point and taking in the night sky.

3 I observed an L864 light in operation at night from a distance of about 7.5 miles,
4 and at an angle slightly below horizontal, but not as large an angle below
5 horizontal as Darling Hill would be from the lights on East Mountain. It was
6 difficult to find the light at first. Once I found it, it appeared to have the intensity
7 of a star, pulsating once every three seconds. The intermittency of the light did
8 not attract the eye. In fact, if a viewer is sweeping the sky he or she may not pick
9 it up, as it is off 2/3 of the time. In general, I found that one really had to be
10 looking for the light to pick it out. The user of a public way – such as the traveler,
11 recreational user or tourist – is either not likely to be out and about at night or not
12 focused on this relatively small object in the distance. In summary, under the
13 circumstances, the lighting included with this project makes very little difference
14 to the visual analysis and in my opinion will not cause an adverse impact.

15

16 **Q. Will the access road or the power line that will parallel the access road create**
17 **an adverse effect on aesthetics?**

18 A. No. The access road and the poles presently in place are not currently visible.
19 Even with taller transmission poles there will be no adverse effect. The poles
20 will not skyline and will not likely exceed the tree canopy height, or not exceed it
21 by very much near the summit, where the tree cover is reduced from about 60'
22 height to ±20' height.. They should not be visible from 7 miles.

1

2 **Q. Do you agree with the views expressed by EHWF witness Peter Owens with**
3 **respect to the context within which wind turbines should be analyzed, to**
4 **determine whether their impacts are adverse?**

5 A. Yes. I have reviewed Mr. Owens' analysis and agree with it. In particular, I
6 support the idea that "fit" means more than just "sameness." The Vermont
7 landscape is varied, and it changes over time. To conclude that something does
8 not fit – and therefore has adverse aesthetic impacts – just because it is not the
9 same as its surroundings ignores several qualities about the Vermont landscape
10 that Mr. Owens describes in some detail. I believe it is appropriate for the Board
11 to take a much more expansive view of the concept of "fit," especially when
12 permitting projects that it determines to be in the public good and that provide
13 significant societal benefits.

14

15 **Q. In summary, is it your opinion that the East Mountain Wind Turbines are**
16 **not adverse?**

17 A. Yes, largely because of previous uses and existing infrastructure, remoteness,
18 diminished scale, number of turbines, topographic context of East Mountain, and
19 educational value.

20 **Q. If the Board determines that these turbines do not fit, and their impacts on**
21 **aesthetics are therefore adverse, what would be your response under the**
22 **second prong of the Quechee Test – whether the impacts are undue?**

1 A. Any aesthetic impacts of the Project would not be unduly adverse for the reasons
2 mentioned above and for the following reasons:

3 1. There is no clear written community standard for wind turbines in the
4 Regional Plan for the Northeast Kingdom (ref. *Exhibit EHWF-MR-17*).
5 There is a general goal that development must be in keeping with existing
6 uses in the area (C3 on page 35) but this does not constitute a clear written
7 standard for preservation of aesthetics or scenic beauty. East Haven does
8 not have a town plan, and the town of Burke Municipal Plan (to the extent
9 it may apply) contains no clear written standard as to aesthetics. Like
10 most town plans it advises wise use of open lands (pg. 14; I. Agricultural),
11 which accounts for 21% of the land use. A few of these open spaces
12 afford views to East Mountain as we have described in our report *EHWF-*
13 *TB-3*. The open space on Sugarhouse Road is an area identified where
14 views are likely. From this location views of Burke Mountain and its
15 obvious development are also possible. The Burke Town Plan is very
16 supportive of Burke Mountain as an economic asset and is silent on
17 aesthetic observations.

18 2. They will not seem shocking and offensive to the average objective citizen
19 who recognizes the ecological benefits of wind generation over alternative
20 generation types. For others, such as individuals whose residence focuses
21 easterly and have views of the turbines, they may be offensive. My
22 impression however, is that most people would not consider them
23 offensive in this instance.

1 3. Mitigation has been afforded in:

2 a) The use of an abandoned mountain top facility for productive purposes.

3 b) Existing roads and some transmission facilities exist and will only need
4 to be upgraded.

5 c) The required FAA lighting will be the minimum necessary to protect
6 the flying public.

7 d) An interpretive center is planned to explain East Mountain history and
8 proposed use for Wind Power.

9 **Q. Does this conclude your testimony at this time?**

10 A. Yes, it does.