

**STATE OF VERMONT
PUBLIC SERVICE BOARD**

Docket No. 7250

Amended Petition of Deerfield Wind, LLC for a certificate)
of public good authorizing it to construct and operate 17 turbine,)
34 to 35.7 MW wind generation facility, and associated transmission)
and interconnection facilities, on approximately 80 acres in the)
Green Mountain National Forest, located in Searsburg and)
Readsboro, Vermont, with 7 turbines to be placed on the east side)
of Route 8 on the same ridgeline as the existing GMP Searsburg)
wind facility (Eastern Project Area), and 10 turbines along the)
ridgeline to the west of Route 8 in the northwesterly orientation)
(Western Project Area))

**PREFILED REBUTTAL TESTIMONY OF NEIL HABIG, KRISTEN GOLAND,
AND EDWARD CHERIAN**

ON BEHALF OF DEERFIELD WIND, LLC

July 3, 2008

Summary: The Habig/Goland/Cherian panel testimony responds to the direct prefiled testimony of other parties in this case. In particular, they describe changes to the number, type, and configuration of the wind turbines and associated infrastructure, in response to concerns regarding the potential impact to black bear habitat. The testimony also responds to issues regarding project construction and operation that were raised by the other parties.

1 **Q. Please state your names and positions relative to this Project.**

2 Response:

3 My name is Neil Habig. I am a Senior Developer with Iberdrola Renewables
4 (“IBE”), formerly PPM Energy, and the Lead Developer for the Deerfield Wind
5 Project. My business address is 330 Province Lane Road, Skillman, NJ 08558.

6 My name is Kristen Goland. I am the Northeast Wind Permitting Manager
7 for Iberdrola Renewables (“IBE”). My business address is 11A Hanson Street,
8 Boston, MA 02118.

9 My name is Edward Cherian. I am a Senior Developer with Iberdrola
10 Renewables (“IBE”) and the Project Manager for IBE’s Lempster Wind Power
11 Project. My business address is Lempster Wind, LLC, 106 Bean Mountain Road,
12 P.O. Box 231, Lempster, NH 03605-0231.

13 Note that on April 23, 2007, PPM Energy joined the Iberdrola SA family of
14 companies through the acquisition of Scottish Power. As of May 1, 2008, Iberdrola
15 Renovables S.A. changed its name to Iberdrola Renewables (“IBE”). Deerfield
16 Wind, LLC is owned by IBE.

17

18 **Q. What is the purpose of your testimony?**

19 Response: Our testimony responds to the prefiled direct testimony of other parties
20 in this case. In particular, we describe changes to the number, type, and
21 configuration of the wind turbines and associated infrastructure in response to
22 certain concerns regarding the potential impact to black bear habitat. Our testimony

1 also responds to other issues regarding project construction and operation that were
2 raised by the other parties.

3

4 **Q. Have you previously filed testimony in this proceeding?**

5 Response: No.

6

7 **Q. Please describe your qualifications and experience.**

8 Response:

9 Neil Habig – I have worked in the wind energy industry since 2002 on all
10 aspects of project development including real estate, permitting, design, power
11 marketing, interconnection, and financial modeling. Prior to becoming involved in
12 the wind industry, I worked in managing large telecommunications infrastructure
13 projects, primarily fiber optic cable systems, terrestrial and undersea. I have an
14 undergraduate degree in Mechanical Engineering and a master’s degree in Industrial
15 Management. See my resume attached as *Exhibit DFLD-HGC-1a*.

16 Kristen Goland – I joined PPM Energy, now Iberdrola Renewables (“IBE”),
17 in early 2007 and have worked in the wind energy sector since 2002, focusing
18 primarily on the siting and permitting of wind facilities in New England. Before
19 moving into the private sector in 2007, I worked for the state of Massachusetts for
20 eight years on wind energy development, urban sprawl initiatives and regional
21 planning efforts. See my resume attached as *Exhibit DFLD-HGC-1b*.

22 Edward Cherian – I have worked in renewable energy since 2000, including
23 numerous wind power and hydropower projects. This work includes project

1 development, permitting, environmental, engineering, land agreements, power
2 purchase agreements, contract management, and site construction management.
3 Prior to working for Iberdrola Renewables, I worked for engineering and
4 environmental consulting companies supporting renewable energy projects. See my
5 resume attached as *Exhibit DFLD-HGC-1c*.

6

7 **Project Revisions and New Information Concerning Environmental Impacts**

8 **Q. What modifications have been made to the layout of the Project's wind**
9 **turbines and roads and why were they made?**

10 Response: The primary changes to the turbine layout and design of the access roads
11 occurred in the Western Site Area and are principally designed to reduce the
12 potential for impacts to black bear habitat that have been identified by witnesses for
13 the Agency of Natural Resources (Forrest Hammond) and Save Vermont Ridgelines
14 (William Kilpatrick). Although Deerfield Wind's outside bear experts do not
15 necessarily agree with Mr. Hammond's or Dr. Kilpatrick's statements regarding the
16 degree of potential impacts to bears, in the interest of compromise Deerfield Wind
17 has taken all reasonable and feasible steps to revise the Project to reduce potential
18 impacts to bears. Deerfield Wind has made these efforts to mitigate potential
19 impacts to black bear on the only land that it has available to it for this Project; it
20 does not own or control any other land in the project area.

21 The three southern-most wind turbines on the Western Site Area have been
22 eliminated from the project plan, and an additional turbine has been included toward
23 the northern end of the western turbine string closer to the existing transmission

1 line. The access road in the Western Site Area has been shortened and the road has
2 been slightly rerouted to fit with the new turbine layout. The smaller “foot print”
3 resulting from elimination of these turbines and corresponding new access roads will
4 significantly reduce the length of the western turbine string and thus the total acreage
5 of potential indirect impacts to black bear, and will significantly reduce the number
6 of bear-scarred beech (“BSB”) trees that may be directly impacted by the Project.

7 The road layout on the Eastern Site Area has also been slightly revised to
8 reflect refined engineering for delivery vehicle and crane access. The modifications
9 are reflected generally on the overall revised site plan prepared by our consultant
10 John Zimmerman -- *Exhibit DFLD-JZ-30a & b* -- and on the revised design plans
11 prepared by our consultant Jason Krzanowski, *Exhibit DFLD-JK-11*.

12
13 **Q. What are the changes that have been made regarding the sizes of the rotor**
14 **blades on the wind turbines to be used in the Project, and why have these changes**
15 **been necessary?**

16 Response: Given the elimination of the three southern-most turbines in the western
17 array, Deerfield Wind has looked for ways to minimize the corresponding reduction
18 in power production and to otherwise maximize the efficiency of the layout. As
19 noted above, one additional turbine was added to the northern portion of the
20 Western Project Area. In addition, Deerfield Wind is now intending to use two sizes
21 of rotor blades on the Gamesa 2.0 MW wind turbines – 80 and 87 meter rotors – to

1 better match the site-specific wind conditions at each turbine site, and to make the
2 Project more efficient from an energy production perspective.¹

3 In general, larger rotors allow turbines to extract more power from the wind
4 and are specified for sites with lower wind conditions. Smaller diameter rotors are
5 used with the same drive train and generator at higher wind speed sites or sites with
6 higher wind turbulence in order to reduce the structural loads on the supporting
7 components and stay within design specifications. Turbines with 80 m rotors are
8 now planned for the five windiest sites in the Eastern Project Area (as specified by
9 the turbine manufacturer), while the 87 m rotors can be used on the remaining ten
10 turbines sited at locations with lower (albeit still strong) wind speeds and/or
11 turbulence. The rotor diameter for each individual turbine site is noted on the
12 revised site plan included as *Exhibit DFLD-JZ-30a*.

13 All of the turbines will use the same tower, which is 76.2 meters (250 feet) in
14 height, with a hub height of approximately 78 meters (256 feet), unchanged from the
15 prior project layout. The two rotor diameters now specified are 80 meters (262 feet)
16 for the G80 and 87 meters (285 feet) for the G87.

17

¹ In John Zimmermans's second supplemental testimony filed in December 2007, he noted at that time that the turbine type was being switched from the Gamesa G87 to the G80 turbines. The effect of that change was a loss in projected capacity factor, from 37% to 33.5%. Moving to a mixed G87/G80 turbine array will now improve the capacity factor, recapturing some of the production loss associated with a 15-turbine rather than 17-turbine layout.

1 **Q. Beyond the rotor size specifications and modifications in the Western Project**
2 **Area, are there any other changes to the Project's physical layout or impacts on the**
3 **land?**

4 Response: Because we were able to remove turbines from the southern portion of
5 the array, we have been able to run our collection line underground from the
6 southernmost turbine on the west to the end of the ridge. This buried collection line
7 requires no more than 15 feet of temporary disturbance and is routed to avoid the
8 taking of any BSB trees. In addition, the overhead collector that runs down the ridge
9 has been slightly moved south to avoid the few BSB trees on that lower portion of
10 the ridge.

11 The eight remaining turbines in the western array have been reconfigured to
12 a more compact array to take advantage of the two existing clear cut areas where no
13 BSB exist. Although these clear cut areas sit east of the center of the ridge and are
14 less than optimal from a performance standpoint, we were able to locate three
15 turbine areas and one vehicle turnaround within those cleared areas. The more
16 compact array reduces the overall visual impact and should allow for the reduction
17 of FAA lights, from seven or eight lights to six or seven. Deerfield Wind's
18 proposed lighting plan is attached as *Exhibit DFLD-HGC-4*.

19 Roads have also been designed to reduce the amount of direct impact to
20 BSB. The access road width has been decreased by 42% to accommodate the use of
21 a narrow track crane which requires a 22-foot (rather than a 38-foot) road. The 16-
22 foot reduction of road has allowed for greater flexibility in road placement to avoid
23 BSB.

1 We expect further reductions in BSB impact can occur with micro-siting
2 during the final design, and will work with ANR to achieve such reductions within
3 engineering constraints and the need to avoid any other sensitive environmental
4 resources.

5

6 **Q. What effect will these revisions to the Project have on compliance with the**
7 **section 248 criteria?**

8 Response. There will be a positive impact resulting from the Project's smaller
9 footprint in the Western Site Area, and in particular less potential disruption to black
10 bear that may utilize habitat in this area. At the same time, it should be noted that
11 the approximately 11% reduction in capacity and 5% reduction in energy production
12 due to the elimination of two turbines will mean that there will be less renewable
13 energy (and the corresponding environmental benefits) available to Vermont and
14 other New England utilities.

15 A 15-turbine, 30 MW project is within the range of project layouts
16 contemplated in the original Petition filed in January 2007, and has been evaluated by
17 Deerfield Wind and its consultants. Deerfield Wind's other witnesses have filed
18 rebuttal testimony that addresses specific issues raised by other parties, as well as
19 their review of the new project revisions. In sum, the project revisions do not have
20 the potential for significant negative impacts under the section 248 criteria:

21 ▪ Section 248(b)(1) – orderly development: no substantial changes, given that the
22 location, size, and overall scope of the Project remains largely the same. See the
23 rebuttal testimony of Jean Vissering/Mike Buscher.

- 1 ▪ Section 248(b)(2) – need for the project: no substantial changes. See the rebuttal
2 testimony of Ezra Hausman.
- 3 ▪ Section 248(b)(3) – system stability and reliability: no substantial changes. ISO-
4 NE has been informed of the changes to the project layout, and a final System
5 Impact Study is expected in July 2008.
- 6 ▪ Section 248(b)(4) – economic benefits: no substantial changes, given that the
7 location, size, and overall scope of the Project remains largely the same. The
8 Project will still provide a net economic benefit. See the rebuttal testimony of
9 Ezra Hausman and Thomas Kavet.
- 10 ▪ Section 248(b)(5) – aesthetics (visual and noise) and historic/archaeological sites:
11 no substantial changes. Modest decrease in overall visual impacts due to smaller
12 project size and fewer lights. See the rebuttal testimony of Jean
13 Vissering/Michael Buscher, Kenneth Kaliski, and Hope Luhman.
- 14 ▪ Section 248(b)(5) and (8) – environmental considerations: reduction in potential
15 impact to black bear habitat; otherwise, no substantial changes. See the rebuttal
16 testimony of Jason Krzanowski, Michael Lew-Smith, Jeffrey Parsons, Jeffrey
17 Wallin, and Steven Pelletier.
- 18 ▪ Section 248(b)(6) – Integrated Resource Planning: no substantial changes, given
19 that the location, size, and overall scope of the Project remains largely the same.
- 20 ▪ Section 248(b)(7) – Electric Energy Plan: no substantial changes, given that the
21 location, size, and overall scope of the Project remains largely the same.
- 22 ▪ Section 248(b)(10) – transmission facilities: no substantial changes, given that the
23 location, size, and overall scope of the Project remains largely the same.

1 **Q. Has the Project obtained additional data or information concerning**
2 **environmental impacts, aside from that related to the configuration change?**

3 Response. Yes. Deerfield Wind has attempted to revise the Project wherever
4 possible to reduce impacts expressed by members of the community and
5 environmental agencies. We have:

- 6 ■ Conducted additional BSB mapping at the request of ANR. See *Exhibit*
7 *DFLD-JW-9a & b and JW-11a & b,*
- 8 ■ Provided detailed stormwater and erosion plans, at the request of ANR. See
9 *Exhibit DFLD-JN/KR-2 and -3,* and
- 10 ■ Provided a draft Spill Prevention, Control & Countermeasures Plan (SPCC). See
11 *Exhibit DFLD-HGC-3.*

12 We remain committed to working with the environmental community to
13 ensure that the Project is designed and constructed from an environmentally
14 conscious perspective. Although we may not agree with the merits of every concern
15 expressed, we continue to reduce the overall impact of the Project.

16 We have expressed an interest in working with ANR on a post-construction
17 avian and bat fatality plan. Although details have not yet been discussed with the
18 Agency, we will commit to up to 3 years of post-construction fatality monitoring for
19 both birds and bats. As the testimony of Scott Darling for ANR has pointed out,
20 there is no single scientifically verified survey methodology available, although
21 several comprehensive east coast studies are underway. We will work in concert with
22 ANR to ensure that:

- 23 ■ A third party conducts the studies;

- 1 ▪ Study periods will cover both spring and fall migration;
- 2 ▪ Scavenging rates and searcher efficiency controls are established for each period
- 3 of study;
- 4 ▪ Scientifically and statistically valid survey protocols will be employed based on
- 5 the best available scientific information;
- 6 ▪ The methodology minimally impacts other natural resources within the project
- 7 area including bear and moose habitat; and
- 8 ▪ ANR reviews the study results at the end of each study year.

9

10 **Q. Has Deerfield Wind taken any steps to avoid, reduce, or minimize the**
11 **Project’s potential impacts on bear habitat?**

12 Response: Yes. Deerfield has twice reduced the total number of turbines proposed
13 on the project, first from a maximum of 24 down to 17, and then again from 17
14 down to 15. As a result of the layout changes described above, we estimate that the
15 Project’s overall direct impact on beech trees has been reduced 27% from the
16 previous 17-turbine layout, and more than 43% from the original 24-turbine project
17 layout, from 643 trees down to 366 trees. These reductions in project size have come
18 at the expense of total capacity and power production (from 45 MW to 30 MW).
19 With respect to project design and construction activities, Deerfield Wind has
20 attempted to place turbines and project infrastructure in areas with as few BSB as
21 possible, while still maintaining an economically viable project that can actually be
22 constructed. Deerfield Wind has also committed to a number of other measures to
23 minimize and avoid impacts during construction. Deerfield Wind intends to use a

1 narrow-track crane, which while more expensive, will not require as much clearing
2 for roads on the ridgelines in areas of identified bear habitat. Deerfield wind also
3 intends to micro-site turbines, roads and other infrastructure to the extent possible
4 during construction to further avoid BSB impacts where possible.

5 Deerfield Wind is also proposing a series of operations and maintenance
6 protocols to ensure that the Project's potential impacts on bear habitat will be
7 reduced as much as possible. Mr. Hammond has testified that restricting human
8 access to the Project site is an important factor in limiting the indirect impacts on
9 black bear habitat. To that end, Deerfield Wind has proposed the following controls
10 to minimize the impact of the Project:

- 11 ■ Access roads will be gated and access to facility roads will be limited to
12 authorized personnel only;
- 13 ■ Deerfield Wind will prohibit major scheduled repairs and maintenance
14 activities during fall periods when bear may be using beech trees in the
15 vicinity of the project;
- 16 ■ Deerfield Wind personnel will be prohibited on the site during the nighttime
17 hours and during the crepuscular periods that have been shown to be
18 important periods for bear activity (one hour before and after sunrise and
19 sunset), except in emergency situations and wildlife study periods.

20 Deerfield Wind is committed to reducing the Project's impacts on bear
21 habitat as much as feasible and believes that additional reduction in the Project's
22 potential impact on bear habitat, beyond slight alignment shifts, is not economically
23 feasible. In order to eliminate two turbines from the western ridge, Deerfield Wind

1 has made considerable efforts to maximize, as much as possible, the capacity factor
2 of the remaining eight turbines on the west side. Additional loss of power from
3 further reduction in the number of turbines is infeasible.

4

5 **Q. Is Deerfield Wind willing to consider mitigation measures to address any**
6 **potential impacts on bear habitat?**

7 Response: Yes. Deerfield Wind has expressed interest in and is willing to work with
8 ANR to identify a range of potential mitigation measures that may be appropriate for
9 addressing any remaining impacts to bear habitat. However, the potential range of
10 mitigation measures in this case is somewhat complicated by the fact that the Federal
11 Government owns and controls both the land on which the Project will be located
12 and surrounding land. This is not a situation in which a private land owner is in the
13 position to implement extensive conservation measures on the land surrounding a
14 proposed project. The Forest Service is the land owner, and the primary bear habitat
15 that may be impacted by the Project is located on Forest Service land. The Forest
16 Service is in the process of evaluating the Project under the National Environmental
17 Policy Act and the National Forestry Management Act. Ultimately, the Forest
18 Service will make a decision about whether to issue a special use authorization,
19 whether mitigation is necessary, and if so, what types of mitigation may or may not
20 be appropriate. Deerfield Wind does not have any control over the Forest Service's
21 decision in this regard. Moreover, the vast majority of bear habitat in the general
22 region is already owned and controlled by the Forest Service, limiting the potential
23 for other mitigation options.

1 Deerfield Wind has asked the Forest Service to evaluate in its environmental
2 review process a range of mitigation options so that this information is available for
3 consideration. Deerfield Wind is willing to work with both the Forest Service and
4 ANR to further evaluate the potential value of these or other mitigation measures on
5 Forest Service Land. But, ultimately, Deerfield Wind is not in a position to ensure
6 implementation of any broad mitigation measures on Forest Service land.

7 The potential range of mitigation measures Deerfield Wind has or will
8 encourage the Forest Service to evaluate during the EIS process include, but are not
9 limited to:

- 10 ▪ Measures to identify other areas of concentrated BSB in the four Forest
11 Service management compartments surrounding the Project, and changes in
12 Forest Service management practices that would preserve or protect these
13 areas;
- 14 ▪ Measures to identify other areas of other fall mast sources in the four Forest
15 Service management compartments surrounding the Project, and changes in
16 Forest Service management practices that would preserve or protect these
17 areas;
- 18 ▪ Changes to Forest Service management practices that would promote beech
19 recruitment, growth, and regeneration in the four management
20 compartments around the Project;
- 21 ▪ Measures to increase the diversity of bear food sources in the four
22 compartments around the Project. This step may include measures to
23 encourage apple tree release and growth; measures to encourage oak tree

1 release and growth, and measures to encourage growth of other important
2 food resources, including Jack-in-the-pulpit, berries, etc.; and
3 ■ Measures to identify and preserve important bear crossing corridors on or
4 adjacent to Forest Service land.

5 It is not clear that the Forest Service will ultimately conclude that mitigation
6 of the Project's impacts is required, nor is it clear that any of these particular
7 mitigation measures are necessary or appropriate, but Deerfield Wind will encourage
8 a thorough evaluation of the potential value of these mitigation measures during the
9 federal EIS process.

10 Deerfield Wind is also willing to consider other alternative mitigation
11 measures in consultation with ANR.

12

13 **Power Generation Estimate/ Capacity Factor**

14 **Q. What is the effect of the project revisions on the estimated annual energy**
15 **production from the Project?**

16 Response: IBE's meteorological staff have updated the estimated long-term annual
17 energy projection to reflect the changes to the turbine rotor size and the project
18 layout. Using industry-standard methods, Deerfield Wind estimates the annual
19 long-term net energy production from this plant to be approximately 95,659
20 megawatt-hours/year (+/- 10%), or a 36.4% net capacity factor.

21

22 **Q. How did Deerfield Wind derive its estimate of the Project's gross annual**
23 **energy production?**

1 Response: Deerfield Wind followed industry standard practice to determine gross
2 annual energy production. This practice involves establishing average hub height
3 wind speed at each chosen turbine location, taking the speed and correlating it to a
4 manufacturer's power curve (which is basically a table that provides the annual
5 capacity factor for a given wind speed). Hub height wind speed is determined by
6 using computer modeling to extrapolate the hub height wind speed at a turbine
7 location from inputs of topography, ground cover, and local met tower data (speed
8 and direction).

9
10 **Q. Please explain what is meant by the plant's "net capacity factor."**

11 Response: Net capacity factor means the actual average output expected at a
12 facility's substation after taking into account a number of losses that occur in wind
13 generation and subtracting these from a theoretical gross capacity factor that would
14 be realized if it were not for the various loss factors. Specifically; wake loss or array
15 loss, which is essentially reduction in wind speed at a turbine resulting from upwind
16 turbines; electrical loss – physical resistance in the collection lines and transformers;
17 availability, an allowance for planned and unplanned maintenance; icing, allowance
18 for shut down during icing conditions; high wind hysteresis, or high wind shut down
19 events; and a miscellaneous loss factor to account for minor factors such as blade
20 soiling and yaw errors are all factors that reduce actual output.

21
22 **Q. How did Deerfield Wind derive its estimate of the revised Project's net**
23 **capacity factor?**

1 Response: Wind speed and direction and air temperature data were collected at the
2 proposed Project site over many years, using instruments mounted at multiple levels
3 on meteorological towers. This data was reviewed for quality control, and input to a
4 sophisticated model that incorporates ground cover and the elevation of the project
5 area to create a map of wind speed at turbine hub height. Prospective turbine sites
6 were then assessed for energy potential based on wind speed and other constraints
7 including spacing with respect to other turbines for turbulence and wake loss
8 considerations. Once an array was designed, it was run through a modeling system
9 that estimates energy production based on wind data, array losses, and a variety of
10 other penalties for factors such as icing, maintenance, cold temperature shutdown,
11 electrical losses, and high wind hysteresis. This analysis was performed by qualified
12 meteorologists with specialization in assessing wind resources.

13

14 **Q. Mr. Hewson testifies that Deerfield Wind may be overestimating unit**
15 **availability (97%), and that this project is likely to experience lower than average**
16 **availability (Hewson pft at 13)². How do you respond?**

17 Response: Availability in this context refers to annual hours of planned and
18 unplanned maintenance. Ninety-seven percent (97%) availability assumes 262 hours
19 of annual down time per turbine. Planned maintenance is expected to take 80 hours,
20 leaving 182 hours for unplanned events. This assumption is consistent with industry
21 practice. It is true that operating history in the industry shows availability below 97%
22 in the first year of operations, perhaps as low as 90%. But availability climbs to

² Citations to the prefiled testimony of Mr. Hewson are to the version filed under seal.

1 approximately 97% on average as start up issues are resolved. Ninety-seven percent
2 (97%) availability is also a typical performance commitment made by the turbine
3 vendors.

4 Mr. Hewson bases his prediction for lower than average availability in part
5 on a comparison to the existing Searsburg (Zond) turbines. The Searsburg turbines
6 are very early-generation machines. Technological advances in turbine reliability
7 have been dramatic and continuous over the 15 years since the Zond turbines were
8 designed. Differences between the Zond and G80 turbines in, for example, parts
9 availability, lightning protection, and fundamental design make Mr. Hewson's
10 comparison to the Searsburg experience invalid.

11 Mr. Hewson suggests that the G80 has limited operational experience. In
12 fact, the G80 has been deployed widely in Europe. Also, the G80 is an outgrowth of
13 the Vestas V80 design, and the V80 operational experience is even more extensive.
14 As the revised configuration also includes the G87, we note that the G87 also has
15 extensive operational history in both the US and Europe.

16

17 **Q. Mr. Hewson states that Deerfield Wind underestimates losses due to icing,**
18 **high-wind hysteresis, and power line losses (Hewson pft at 9-15). How do you**
19 **respond to this claim?**

20 Response:

21 Power line losses: Power line loss is a precise and accurate formulaic
22 calculation, which is not related to grid congestion as Mr. Hewson states. We agree
23 that other projects may have significantly higher line losses than what we have

1 estimated for this project. This difference would be expected given the longer lines
2 required on most other projects. Deerfield Wind has the good fortune of having the
3 transmission line pass directly adjacent to the project area. Deerfield Wind has not
4 as yet run the detailed line loss calculations. But from experience, given the short
5 average distance to the substation, an estimate of 2% is conservative.

6 High wind hysteresis: The calculation of losses due to high wind hysteresis is
7 based on review of site-specific data, in this case a very substantial data set collected
8 over several years. The wind data was made available in discovery and the
9 appropriate high wind hysteresis penalty can be calculated from the data and
10 knowledge of the cut out wind speed for the turbine of choice. We believe that we
11 have appropriately accounted for this loss. Mr. Hewson's suggestion that average
12 wind speeds correlate precisely and uniquely to penalties for high wind hysteresis
13 independent of the site is simply not valid. While in general windier sites would be
14 expected to see higher frequency of high wind hysteresis, local topography, ground
15 cover as well as other factors affect a local wind regime.

16 Icing: Losses due to icing are a more empirical estimate based on experience
17 and knowledge. We consider the Deerfield site a relatively high icing environment
18 and have applied a relatively high penalty for icing of 5%. Mr. Hewson states that
19 the icing losses at Deerfield should be higher than at the proposed Hoosac Project
20 site, which is at a lower elevation. We agree. AWS Truewind estimated icing losses
21 for the Hoosac Project at 4%, and we have used a value that is 25% higher.

22 Mr. Hewson discounts the comparability of the Hoosac estimate, which he
23 does not dispute, on the grounds that the Hoosac site is several miles away. In fact,

1 it is less than 8 miles away along the same mountain ridge. Mr. Hewson also
2 suggests that the Hoosac site is much lower than the Deerfield site by comparing the
3 base elevation of Hoosac turbines (2550-2800 ft.) to the blade tip elevation of the
4 Deerfield turbines (3500 ft.). He thereby exaggerates the difference in the elevation
5 of the two sites by almost 400 ft. In fact, several of the turbines at Deerfield have the
6 same base elevation as those at Hoosac. The extrapolation from Hoosac is fair and
7 appropriate.

8 In general, Mr. Hewson opines that the loss estimates for the Deerfield
9 project are understated. He does not mention Deerfield's 2% loss allocation for
10 "blade soiling, yaw etc," which is essentially a miscellaneous loss category to add
11 conservatism. Nor does he comment on the fact that all loss allocations total 13%,
12 which is relatively high by industry standards. In summary, Deerfield Wind's loss
13 estimates are properly determined by qualified meteorologists and related specialists.
14 We note that there is no incentive for a developer planning to own and operate a
15 wind farm to understate such losses.

16

17 **Q. Mr. Hewson refers to potential constraints in the grid network (Hewson pft at**
18 **14). Do you have any concerns about this issue?**

19 **Response:** Mr. Hewson incorrectly mixes the concepts of congestion-related
20 curtailment and line loss. The two are unrelated. While curtailment can be a
21 problem at other sites, as Mr. Hewson states, the interconnection studies performed
22 for the Project find that it is not expected to occur for the Deerfield project. Put

1 another way, the local load, generation and transmission capacities are such that
2 curtailment at Deerfield is not anticipated.

3 **Q. Mr. Hewson argues that because the November 2004 VERA power**
4 **production estimates assumed a 37.9% capacity factor (cf), Deerfield Wind has**
5 **overestimated the benefits of the Project (Hewson pft at 5-6). How do you respond?**

6 Response: Mr. Hewson appears to have misread both the prefiled testimony and the
7 discovery materials (documents and depositions) Deerfield Wind provided to Save
8 Vermont Ridgelines. John Zimmerman's original testimony filed in January 2007
9 indicated a cf of 35%, based upon the turbine type and layout assumed at that time.
10 The July 2007 and December 2007 project revisions assumed a cf of 37% and 33.5%,
11 respectively, based upon changes to the number and type of turbines. As Deerfield
12 Wind indicated through discovery, all cf estimates provided in the 248 filings were
13 based upon the work of Ibredrola's (PPM Energy) staff, not Mr. Zimmerman's
14 earlier estimates provided to the Project's prior owner (enXco).

15 Deerfield Wind's revised estimated energy production reflecting the project
16 changes described in this testimony have now been used to revise the estimates of
17 economic benefits associated with the 15-turbine Project, as described in the rebuttal
18 testimony of Ezra Hausman and Thomas Kavet.

19
20 **Q. Mr. Hewson argues that Deerfield Wind's estimated capacity factor is high**
21 **when compared to other existing wind projects (Hewson pft at 6-8). How do you**
22 **respond?**

1 With regard to Mr. Hewson’s speculation on the negotiation between IBE
2 and GMP, we would agree that the price IBE has offered is relatively high compared
3 to *historical* levels. This is due to the relatively high capital costs estimated (a
4 reflection of the overall increase in costs being seen throughout the industry).
5 However, Mr. Hewson also fails to clarify that the cited indicative price offered by
6 IBE includes RECs and Capacity value. In today’s market, the cited indicative price
7 is not so different from current levels for Power, RECs and Capacity. We thus
8 remain confident that we can construct terms that will be attractive to Vermont
9 utilities in today’s market.

10 Finally, we note that it is an ongoing negotiation. In that context, it is not
11 necessarily surprising that a buyer might suggest that an offer was too rich.

12

13 **Q. Please describe the status of Deerfield Wind’s negotiation of power purchase**
14 **agreements with Green Mountain Power.**

15 Response: Currently IBE is running modeling to support a revised offer to GMP
16 based on the revised project configuration. We expect to meet with GMP to present
17 and discuss revised pricing sometime in July of 2008.

18

19 **Q. Mr. Thomas states that to meet a “public good” test, Deerfield Wind must**
20 **show it has entered into a stably priced power contract with Vermont utilities**
21 **(Thomas pft at 6-9). How do you respond to this claim?**

22 Response: Deerfield Wind is aware of the Public Service Board’s decision in the
23 UPC-Sheffield Wind Project case, Docket 7156, and understands the Board’s

1 directive that at least a portion of the Project's output be sold to Vermont utilities
2 under stable pricing terms. Because the negotiations with GMP or potentially other
3 utilities may not reach fruition within the limited time remaining prior to hearing
4 (particularly given the evolving nature of the market), we believe it would be
5 appropriate for the Board to impose a CPG condition similar to the one in the UPC-
6 Sheffield case, i.e., requiring Deerfield Wind to submit power contracts with any
7 Vermont utility for Board review and approval.

8

9 **Q. Mr. Hewson claims that Deerfield Wind's estimated capital costs for the**
10 **Project are far higher than the capital costs he has seen for other wind projects**
11 **(Hewson pft at 21). How do you respond?**

12 Response: We agree with Mr. Hewson that on a unit cost basis Deerfield is
13 historically and relatively high in capital costs. This is in part because general costs
14 for wind farms are up dramatically over the past few years and because of the
15 relatively high fixed cost structure at Deerfield in comparison to a relatively small
16 project. While project capital costs are above average, however, so too are the wind
17 resource, power and REC markets.

18

19 **Q. Mr. Ide states that the proposed decommissioning plan is inadequate because**
20 **it is not funded until year 15 of the Project, rather than fully funded prior to**
21 **construction, and too heavily relies on salvage value (Ide pft at 10-12). How do you**
22 **respond to this claim?**

1 representation of the wind project developer that it would be responsible for any
2 costs associated with system changes or improvements that are necessitated by the
3 Project. Deerfield Wind has already made a similar representation, and in addition
4 has provided testimony from a qualified electrical engineer that the Project can
5 comply with sections 248(b)(3) and (b)(10). Therefore, we believe the Board can and
6 should take a similar approach as in the UPC case, and allow the studies to be
7 submitted post-CPG, if they are not available sooner.

8

9 **Q. Mr. Jordan testifies that the relative costs and environmental impacts of the**
10 **three substation alternatives have not been quantified and that the construction**
11 **feasibility and impact on output from the Searsburg facility have not been**
12 **determined for the Sleepy Hollow expansion alternative (Jordan pft at 4-5). What is**
13 **your response to this statement?**

14 Response: Deerfield Wind has provided information to the Department of Public
15 Service in discovery responses regarding the initial substation alternatives that were
16 considered. In addition, Deerfield Wind's testimony demonstrates that the proposed
17 substation off of Putnam Road will not pose any undue adverse impacts to the
18 environment. Impact on output from the Searsburg facility has been investigated
19 through the feasibility study (*Exhibit DFLD-DE-9*), and no adverse impacts to the
20 GMP facility were identified. Thus at this stage Deerfield Wind does not believe
21 that any further analysis of substation alternatives is called for, particularly as
22 Deerfield Wind will bear the costs of the substation and any associated transmission
23 system improvements (should the final ISIS study determine that any are necessary).

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Construction/Operation Issues

Q. As reflected in the detailed questions that follow, some parties to this proceeding have raised concerns about Deerfield Wind’s ability to construct and operate the project in a manner that will not unduly burden nearby municipalities or threaten public health and safety. Do you have a general response to these concerns?

Response: The Project will not unduly burden local municipalities or threaten public safety and health. The Project will not impose burdens on local roads beyond temporary use during construction. Given the limited number of anticipated permanent operations staff, the Project will not impose burdens on local schools or infrastructure. Deerfield Wind will construct and operate the Project consistent with our corporate commitment to meeting all applicable state and Federal OSHA safety regulations.

IBE holds itself and its employees to a very high standard on safety. All construction general contractors are required to meet strict safety qualifications. IBE has a very good Environmental Health and Safety record over the last 8 years with underlying supporting programs, and our approach and culture is captured by the title of our EHS Policy: “People & the Environment First.” As an example of our safety record to the present, IBE and its predecessor PPM has had only one employee lost-time accident for all company operations in the US and Canada for eight years. All IBE technicians are trained and ready for emergencies. All

1 technicians are trained in tower rescue, first aid and CPR, and crews are equipped
2 with tower rescue equipment, first aid kits, and automatic external defibrillators, and
3 fire extinguishers are on company vehicles. We have enjoyed excellent relations with
4 local emergency services, and periodically meet with them to be proactive on safety
5 and inform them about the wind business and safety hazards associated with
6 electricity. Our Safety Director has also served as the Vice Chairman of the
7 American Wind Energy Association Safety Committee for more than two years, and
8 has presented numerous times at conferences on safety in the wind industry,
9 including emergency preparedness and public safety. We also ensure our landowners
10 are educated on safety issues related to the wind plant and construction, and all
11 plants are constructed in accordance with applicable standards.

12 IBE has worked very closely with local Fire and Police departments,
13 including by conducting site reviews of project safety programs and emergency
14 response procedures, and intend to do so for this Project at the appropriate juncture.
15 This cooperation will include providing tower rescue training to the local fire
16 department.

17

18 **Q. Ms. Streeter and Mr. Wheeler testify that the Town of Wilmington's**
19 **Selectboard is concerned about the use of Wilmington's roadways by oversized**
20 **tractor-trailers and construction equipment (Streeter pft. at 6, Wheeler pft. at 6).**
21 **How do you respond?**

22 Response: Deerfield Wind has had the transportation route options evaluated in a
23 study, attached as *Exhibit DFLD-HGC-5*. The study indicates that Deerfield

1 Wind can mitigate impacts to Wilmington's commercial center by working with
2 VTrans and local officials to schedule loads so as to minimize disruption, and by
3 paying for police details to assist traffic control as necessary. Deerfield Wind will
4 implement these recommendations. In addition, Deerfield Wind will obtain all
5 required VTrans permits for oversized vehicles. All contractors used for
6 construction and transport will be fully licensed and bonded. Deerfield Wind will
7 also review routes and vehicle configurations with VTrans and local officials to
8 minimize disruption of municipal services, local businesses and travelers. Routes for
9 oversized vehicles will be provided to the Town of Wilmington well in advance.
10 Deerfield Wind will also pay to repair any damage to town roads caused by Deerfield
11 construction or other oversized vehicles.

12
13 **Q. Ms. Linowes for IWAG argues that while Jason Krzanowski claims the roads**
14 **will revegetate to 16 feet, Deerfield Wind admits that only herbs and shrubs will grow**
15 **on revegetated roads. She believes that the road areas will likely never return to a**
16 **forested state during the Project's duration (Linowes pft at 8). Ms. Matthews for the**
17 **Town of Wilmington expresses similar concerns about the environmental impact of**
18 **road construction (Matthews pft at 6). How do you respond to this claim?**

19 Response: The additional six feet of road width necessary for use of a narrow track
20 crane can and will be allowed to re-vegetate. At the beginning of construction,
21 topsoil is removed and stockpiled. Once construction is complete, any areas not
22 necessary for the day to day operations of the project will be covered in enough
23 topsoil to allow for re-vegetation. Deerfield Wind will facilitate establishment of

1 grasses by seeding and mulching within weeks (this is also a matter of stormwater
2 management, since Vermont regulations require cover of exposed soils). This
3 procedure will also serve to enhance the natural re-vegetation process.

4 The low level revegetation is by design. Because the wider road width may
5 still be necessary during the life of the Project, the embankments and grades must be
6 maintained to allow for future operations. For this reason, it is not anticipated that
7 trees will grow back over this six-foot wide shoulder during the life of the Project.

8 It is important to put the re-vegetation issue in context. These mountains
9 have existing thin soils that cover weathered bedrock. Frequently, one cannot bang a
10 stake into the ground in the site area due to stony material that is gravel sized or
11 larger. Vegetation growth on re-loamed embankments of modified rock fill, gravel,
12 and soil even compacted by construction traffic, would be similar to the vegetation
13 growth in the existing soils on top of boulders and ledge.

14 The anticipated maintenance of this shoulder is dependent upon regrowth of
15 the brush. Substantial re-vegetation with trees may require tree removal in the
16 future, however, in many instances, hobblebush has established itself in cleared areas
17 on both ridges. Moose browsing will act as natural maintenance if this phenomenon
18 occurs. These re-vegetated road shoulders will also provide valuable habitat and
19 local grasses to support other wildlife, including bear. Wildlife use of the re-
20 vegetated shoulders may also reduce the need for any removal of saplings.

21

1 **Q. Mr. Shea on his own behalf testifies that he has safety concerns due to the**
2 **possibility that a turbine might spin out of control and break up, potentially throwing**
3 **debris to nearby areas (Shea pft at 6). How do you respond to this claim?**

4 Response: Overall, the safety history for modern wind turbines is very good.
5 Redundant safety features and computer control systems are designed to avoid such
6 failures by shutting down and stopping the turbine with braking systems, and
7 pitching/feathering the blades in high wind events to automatically lower the speed.
8 Instances of overspeed failure are extremely rare; only a few have been reported and
9 none to our knowledge with the Gamesa 2 MW class turbines.

10

11 **Q. Mr. Duncan for the Town of Wilmington argues that because Searsburg has**
12 **no fire department, Wilmington would have to pay for improvements to the**
13 **Wilmington Fire Department to cover the Project's needs (Duncan pft for**
14 **Wilmington at 4-5). Mr. Shea states that he fears Wilmington will withdraw fire**
15 **coverage of Searsburg, resulting in higher taxes for Searsburg residents (Shea pft at**
16 **6). Finally, Ms. Streeter also expresses concern about the Project's impact on the fire**
17 **agreement between the towns (Streeter pft at 6). How do you respond to their**
18 **claims?**

19 Response: While we can appreciate the concerns of local municipalities regarding
20 their ability to provide fire protection services and the associated costs, as explained
21 below, the Deerfield Wind Project will not pose any undue burdens.

1 First, Deerfield Wind has agreed to compensate the Town of Searsburg for
2 any incremental fire protection service costs related to the Deerfield facility, should
3 any be incurred.

4 Second, Deerfield Wind has provided the Town of Wilmington with a scope
5 of requirements for fire protection services for the wind facility and has held
6 discussions with town officials regarding fire protection services. The Town never
7 suggested to Deerfield Wind that it would not or could not provide the services or
8 would withdraw from the present Searsburg agreement. To the contrary,
9 Wilmington agreed to respond with a proposal for the incremental services.³

10 Third, and most importantly, Deerfield Wind's requirements do not differ
11 materially from the scope of services required for the existing Searsburg wind facility.
12 Wilmington has provided fire protection services to the Town of Searsburg,
13 including the Searsburg wind facility, for more than ten years. We are not aware of
14 any problems associated with Wilmington providing emergency services to the
15 Searsburg facility during this time period.

16 Finally, if for some reason Wilmington decided to exclude the Deerfield
17 facility from the fire protection services agreement with Searsburg, the facility could
18 be covered by an agreement with Readsboro, which is a comparable distance from
19 the facility site (7-8 miles).

20

³ The Wilmington and Readsboro fire chiefs previously confirmed to Deerfield Wind's representatives that the proposed facility would not pose a burden. See Zimmerman prefiled direct testimony at page 61.

1 **Q. Mr. Shea testifies that he expects the risk of a fire spreading to his property to**
2 **increase and that he fears the risk of fire in the Project's turbines (Shea pft at 6). Mr.**
3 **Wheeler testifies that Wilmington is not equipped to handle fires that might spread**
4 **from turbines to the forest (Wheeler pft at 5). How do you respond to these claims?**

5 Response: The likelihood of turbine fires is very low. Each turbine and all electrical
6 equipment will be inspected under rigorous commissioning procedures, as well as by
7 the utilities (for grid and system safety), prior to being brought on line. Once
8 turbines are commissioned, qualified personnel will routinely inspect and repair them
9 as necessary pursuant to preventive maintenance schedules. Also, built-in safety and
10 design systems minimize the chance of fire occurring in the turbines or electrical
11 stations. For example, turbines have high temperature sensors and automatically
12 shut down if they begin to overheat.

13 Although an extremely unlikely event, if a fire were to occur inside the
14 nacelle it would be detected by the System Control and Data Acquisition (SCADA)
15 system and reported to the project control center where turbine messages are
16 monitored. The turbine would automatically shut down and project maintenance
17 personnel would notify local officials and respond as appropriate, pursuant to IBE's
18 detailed emergency procedures that address response to fire and other substation
19 emergencies. Power to the section of the project with the turbine fire would be
20 disconnected. IBE provides training to fire departments on electrical fires to ensure
21 the safety of both fire fighters and the public. It should be emphasized that a fire in
22 the nacelle would be allowed to burn itself out (with fire control and suppression

1 taking place at ground level), so no specialized fire trucks would need to be deployed
2 to reach the top of the tower.

3 In instances where fires have broken out near our wind farms, the access
4 roads have provided access to remote areas where firefighters could fight the fire
5 closer to the source. Additionally, they have served as firebreaks that saved land and
6 property from the flames. In the rare situations when fires have broken out near
7 projects, IBE employees have responded immediately and worked in tandem with
8 the local departments to save lives and homes from destruction by fire.

9
10 **Q. Mr. Shea testifies that he believes Deerfield Wind may seek to deny public**
11 **access to the National Forest throughout the Project's installation (Shea pft at 5).**
12 **How do you respond to this claim?**

13 Response: This issue is discussed in the direct testimony of John Zimmerman at
14 pages 37-38. As Mr. Zimmerman has explained, new Project access roads will be
15 gated year round at the intersections with present public roads. Public access to the
16 Project site will be further limited per the conditions of the U.S. Forest Service
17 Special Use Permit and any state requirements.

18 Access to the National Forest lands is managed by the U.S. Forest Service,
19 not Deerfield Wind. Deerfield Wind will work with the U.S. Forest Service, with
20 input from the public, to ensure the facility is operated in a manner that is both safe
21 and consistent with management objectives for surrounding national forest land.
22 Deerfield Wind anticipates developing a public access management plan similar to
23 the plan currently in effect for the existing Searsburg facility.

1

2 **Q. Mr. Darling testifies that ANR recommends the establishment and funding of**
3 **an escrow account by Deerfield to support a post-construction bat mortality study**
4 **(Darling pft at 19-22). How do you respond?**

5 Response: We do not believe an escrow account to support post-construction
6 monitoring studies is either necessary or appropriate in this situation. First, IBE has
7 a proven track record at its other projects of post-construction permit compliance
8 and has demonstrated a significant commitment, as well as a managerial and financial
9 capability to conduct the surveys. Secondly, a CPG condition that clearly establishes
10 required post-construction practices serves the same purpose: a petitioner who fails
11 to comply with study-related requirements would be subject to the Board's authority
12 to impose operational restrictions, monetary penalties, CPG suspension, and/or
13 CPG revocation. These enforcement mechanisms adequately protect the public, and
14 provide clear financial incentives for a petitioner to fully comply with the CPG.

15

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

17 Response: Yes it does.