STATE OF VERMONT
PUBLIC SERVICE BOARD

Docket No. 7628

Petition of Green Mountain Power Corporation, Vermont Electric Cooperative, Inc., and Vermont Electric Power Company, Inc., for a certificate of public good, pursuant to 30 V.S.A. Section 248, to construct up to a 63 MW wind electric generation facility and associated facilities on Lowell Mountain in Lowell, Vermont, and the installation or upgrade of Approximately 16.9 miles of transmission line and Associated substations in Lowell, Westfield and Jay, Vermont	)	Technical Hearings held at Montpelier, Vermont February 3-4, 7-10, 22-24, 2011

Order Entered: _____

PROPOSED DECISION
SUBMITTED ON BEHALF OF PETITIONERS

MARCH 21, 2011

PRESENT: James Volz, Chairman
David C. Coen, Board Member
John D. Burke, Board Member

APPEARANCES: (*See Attachment A*)

FINDINGS AND ORDER

Table of Contents

I. PROCEDURAL HISTORY

On February 23, 2010, Petitioners sent advance notice to the towns of Lowell, Westfield and Jay and to the Northeastern Vermont Development Association ("NVDA"), pursuant to 30 V.S.A. § 248(f), of its intention to file a Section 248 petition requesting approval of 20-24 turbine wind-powered electrical generating facility with a maximum capacity of up to 63 MW on Lowell Mountain in Lowell and associated transmission and substation upgrades in Lowell, Westfield, and Jay, Vermont (the "Project"). Copies of the notice were also sent to all towns within a ten-mile radius of the Project.

On May 21, 2010, Petitioners Green Mountain Power Corporation ("GMP"), Vermont Electric Cooperative, Inc. ("VEC"), Vermont Electric Power Co., Inc., and Vermont Transco LLC (together, "VELCO," and with GMP and VEC the "Petitioners") filed with the Vermont Public Service Board ("Board") a petition for a Certificate of Public Good ("CPG"), pursuant to 30 V.S.A. § 248 and Board Rule 5.400, requesting approval to construct and operate a 20-21 turbine wind-powered electrical generating facility on Lowell Mountain and the associated transmission and substation facilities. The Petition included direct testimony and exhibits for Petitioners' witnesses. The Petition and supporting documents were served on the statutory parties named in 30 V.S.A. § 248(a)(4)(C). A copy of the Petition was sent to all towns in the Project's ten-mile radius. Adjoining landowners also received notice of the filing of the application, which indicated that application materials were available on GMP's website.

On July 7, 2010, the Board held a prehearing conference to establish a schedule for this Docket. Appearances were entered on behalf of GMP, VEC, VELCO, the Vermont Department of Public Service ("DPS"), and the Vermont Agency of Natural Resources ("ANR"). In addition, adjoining landowners and other potential intervenors were present.

At Petitioners' suggestion, the Board scheduled a workshop for July 23, 2010, to provide an opportunity for parties and potential parties to better understand the proposed Project prior to the discovery phase of the proceeding.

The Board subsequently granted the following parties' requests to intervene in the Docket: the Conservation Law Foundation ("CLF"), Vermont Public Interest Research Group ("VPIRG"), the Towns of Albany, Craftsbury, and Lowell, Central Vermont Public Service

("CVPS"), Lowell Mountains Group, Inc. ("LMG"), Green Mountain Club ("GMC"), Dyer-Dunn, Inc., Donald and Shirley Nelson, Kevin McGrath, Milo and Bonnie Day, and Jack Brooks.[1]

The Board held a public hearing on September 23, 2010, in Lowell.

The Board also conducted a site visit on September 23, 2010 in the towns of Lowell, Eden, Craftsbury, Albany, Irasburg, and Jay. A second site visit to Wild Branch Wildlife Management Area, Eden Dog Sledding, and to hike part of the ridgeline on the Project site occurred on November 12, 2010. A final site visit to Tillotson Camp on the Long Trail was held on January 11, 2011.

Prefiled testimony and exhibits were filed by the Petitioners, DPS, ANR, DHP, the towns of Albany, Craftsbury, and Lowell, CVPS, LMG, GMC, Dyer-Dunn, Inc., the Nelsons, the Days, and Jack Brooks.

The Board held technical hearings on February 3-4, 7-10 and 22-24, 2011 in Montpelier, Vermont. The parties filed initial briefs on March 21, 2011 and reply briefs on April 4, 2011.

II. COMMENTS OF THE PUBLIC

Although Vermont law requires the Board to base its decision on the evidence submitted during technical hearings, the Board provided several opportunities for public comment through public hearings and the ability to submit written comments. Notice of the public hearing in Lowell was published in *The Caledonian Record* and *The Newport Daily Express*. Of the more than 200 people who attended the September 23, 2010 public hearing, 57 spoke.

Speakers at the hearing noted a number of concerns, including the Project's potential impact on aesthetics, wildlife habitat, and tourism. Others were concerned about the impact of the turbines on property values and the possibility that asbestos will be found during construction. Several people commented on the rights of private property owners to use their land as they wish. Many commenters discussed the turbine lighting requirements and several suggested that the Board consider specific mitigation measures related to lighting the turbines. Others expressed support for renewable energy and reducing dependence on fossil-based fuels.

[1] *See* Orders dated August 24, 2010 and September 3, 2010.

Other commenters indicated that this Project addressed a need for power that outweighed other concerns such as aesthetics.

The Board reviewed all the public hearing and written comments it received and found them to be helpful. All the comments provided assistance to the Board in developing the questions for parties and its witnesses during the technical hearings.

III. PROJECT DESCRIPTION

Site Location and Project Owners

1. The Project consists of a 20-21 turbine wind-powered electrical generating facility (the "Wind Farm" or "Wind Farm Component") to be constructed on approximately 3.2 miles of the Lowell Mountains ridgeline on private lands in Lowell, Vermont and associated transmission and substation facilities (the "Transmission Component") located in Lowell, Westfield, and Jay, Vermont. Exh. Pet.-DR-2 at 2-3; Estey pf. at 3-10.

2. GMP selected this site for the Wind Farm because it is highly favorable for a wind electric generation facility based on a number of factors, including the anticipated level of the wind resource, the length of ridgeline available for wind turbines, the presence of existing roads and the proximity to existing transmission infrastructure, and the absence of environmental or other impacts that would preclude the ability to obtain necessary permits. Pughe pf. at 12.

3. GMP will own and be responsible for operating the Wind Farm. Pughe pf. at 15.

Project Components

4. The Project will consist of 20-21 turbines, each with a capacity of 2.5-3.0 MW and an aggregate capacity of up to 63 MW. The final number and capacity of the wind turbines have not yet been determined, and will depend in large part on the results of on-site wind resource assessment, environmental, and other studies. Pughe pf. at 5.

5. Four models of turbines are currently being considered for the site: GE 2.5xl, Vestas 90 3.0, Vestas V112 3.0, and Siemens SWT 3.0-101. The Vestas V112 3.0 is the largest of the turbines under consideration. Its hub height is 84 meters (275.5 feet), the rotor diameter is 112

meters (367 feet), and the total tip height is 140 meters (459 feet). Pughe pf. at 5; Pughe reb. at 2; Exhs. Pet.-CP-2,10, 11.

6. All turbine towers and blades will be painted white or off white. Pughe pf. at 6.

7. Access to the turbines will be over an approximately 2.5 mile gravel and stone access road from Route 100 in Lowell to the Lowell Mountain ridgeline. The width of the travel portion of the access road will generally be 18 feet and there will be three pull-over areas where the road width will be 32 feet, to permit vehicles to pass each other. The disturbed area of the access road will also include cut and fill slopes, an Erosion Control Zone ("ECZ"), and Stormwater Treatment Practice ("STP") measures. Pughe pf. at 6; Tr. 2-3-2011 at 203 (Jewkes).

8. Along the ridgeline, there will be a turbine crane path with a minimum passable width of 34 feet, to allow a large crawler type crane to travel between wind turbine sites without the need for disassembly and reassembly. Additional width shall be added to the access road for cut and fill, ECZ, and STP measures, as needed. Pughe pf. at 6; Exh. Pet.-IAJ-2 (Rev); Tr. 2-3-2011 at 203 (Jewkes).

9. The Project's electric collection system will consist of an underground 34.5 kV line that connects the wind turbines along the ridgeline, an overhead 34.5 kV line on wooden poles ranging from approximately 43 feet to 52 feet in height, and a step-up, or collector, substation ("KCW Substation"), which will be located adjacent to a proposed maintenance building approximately 1.3 miles from Route 100. Pughe pf. at 7; Jewkes pf. at 5; Exh. Pet.-DPE-5 (Revised), 6.

10. The KCW Substation will transform the collector system voltage from 34.5 kV to 46 kV. The KCW Substation will be approximately 140 feet by 140 feet and 45 feet in height and will consist of open steel structures, a 34 kV/46 kV step up transformer on a concrete foundation, an oil containment system typical for this type of facility, yard lights on a manual switch for maintenance purposes, and perimeter fencing. The control building will be approximately 20 feet by 15 feet and 10 feet high. Pughe pf. at 8; Exh. Pet.-DPE-7.

11. The maintenance building will be constructed with a metal frame and insulated steel siding. The building will be approximately 30 feet deep by 70 feet wide by 30 feet high. The building roof and siding colors will be selected from among the manufacturer's standard colors

to minimize the contrast with the surrounding landscape. The building will be used by on-site staff for office space, inventory, tools, and equipment storage. The building will be equipped with a drive in bay. Pughe pf. at 8; Exh. Pet.-CP-4.

12. Another portion of the electric collector system will extend west from the KCW Substation to Route 100, on wooden poles with an above-ground height of approximately 35-52 feet, and then north approximately 2.5 miles along Route 100 to the proposed VEC Lowell #5 Substation, on approximately 35-52 foot-high poles. There will be a 50-foot wide cleared area along the overhead collector line, to protect the line from tree damage. Pughe pf. at 7-8; Exh. Pet.-DPE-5 6; Jewkes reb. at 3.

13. The existing VEC Lowell #5 Substation will be consolidated with the VEC Irasburg #21 Substation, located approximately 50 feet away at 2337 VT Route 100 in Lowell. The new VEC Lowell # 5 Substation will consist of an upgrade from 34.5 kV to 46 kV voltage, with all components to be located within the existing substation fence. The existing Lowell #5 facilities will be decommissioned and the components will be removed. The height of the tallest components will increase from approximately 24 feet to approximately 36 feet. The new substation will be equipped with perimeter fence lighting on a switched circuit. Pughe pf. at 8-10; Exh. Pet.-DPE-11.

14. The existing 10.4-mile VEC 34.5 kV transmission line will be upgraded to 46 kV between the VEC Lowell #5 Substation and the VEC Jay 17 Substation, located southeast of the intersection of State Route 242 and Cross Road. The proposed transmission line right-of-way width will be 50 feet between the point where the 46 kV collector system meets Route 100 in Lowell, up to the intersection of Cross Road and Route 105. Pughe pf. at 9; Castonguay reb. at 2.

15. The upgraded transmission line will be built in a single-pole configuration similar to the existing transmission line, consisting of open wire on cross arm construction with a distribution under build. The current pole heights of 27-52 feet will be increased to 43-52 feet. Pughe pf. at 9.

16. The VEC Jay 17 Substation will be upgraded from 35 kV to 46 kV voltage. The existing substation structures and transformer will be removed from service. The new substation

will include a new 46 kV to 12.7 kV step down transformer, and a distribution buss structure incorporating 4 distribution breakers. The existing underground distribution circuits will be reused with the new substation layout. The new substation will be equipped with perimeter fence lighting on a switched circuit to allow for emergency services. All improvements will be within the existing substation fence, and the height of the tallest components will increase from approximately 24 feet to approximately 45 feet. Pughe pf. at 10; Exh. Pet.-DPE-13.

17. The two-mile VEC distribution line between the Jay 17 Substation and the existing VELCO 46 kV transmission line at the intersection of Route 105 and Cross Road will be rebuilt as a 46 kV transmission line with a distribution line underbuild. The upgraded line will be built in a single-pole configuration similar to the existing line, consisting of open wire on cross arm construction for the transmission and distribution lines. The current pole heights range from approximately 35 feet to 52 feet and will be increased to approximately 43 feet to 61 feet. Pughe pf. at 10.

18. The existing two-mile VELCO 46 kV transmission line will be reconductored between the Route 105/Cross Road intersection and a rebuilt 46 kV VEC Jay Tap Switching Station and an adjacent new VELCO Jay Tap Substation are both to be located west of Levitt Circle and south of Route 105. Pughe pf. at 11.

19. Improvements to the VEC Jay Tap Switching Station will involve replacement of the existing pole-mounted switches with circuit breakers. Pughe pf. at 11; *Petition of Vermont Electric Cooperative, Inc.*, Docket No. 7604 (Vt. Pub. Serv. Bd. Aug. 6, 2010) at 8.

20. The new VELCO Jay Tap Substation will include a 115 kV step up transformer and 115 kV taps to interconnect the new substation with the VELCO 115 kV transmission system. There will also be new switching structures installed at the intersection of the new 46 kV line and the VELCO 46 kV line. Pughe pf. at 11.

21. The improvements to the VEC Jay Tap Switching Station and the VELCO Jay Tap Substation are not a part of this Petition. The Board approved the replacement of the existing VEC Jay Tap Switching Station with a new facility on August 6, 2010 and VEC is planning to place the switching station in service in Spring 2011. Pughe pf. at 11; *see generally Petition of Vermont Electric Cooperative, Inc.*, Docket No. 7604 (Vt. Pub. Serv. Bd. Aug. 6, 2010).

22. VEC recently requested Board approval to amend its Certificate of Public Good to make improvements to the switching station in the event that the Board approves the construction of the VELCO Jay Tap Substation. *Petition of Vermont Electric Cooperative, Inc.*, Docket No. 7604 (Vt. Pub. Serv. Bd. Jan. 21, 2011).

23. VELCO filed a request for Section 248 approval of the VELCO Jay Tap Substation on January 19, 2011, in Docket No. 7708, and hopes to complete permitting and construction in time to commence commercial operation by mid-2012. Pughe pf. at 12; Castonguay reb. at 5.

24. GMP will not begin construction on the Project until the VELCO Jay Tap Substation CPG and the amendment to the VEC Jay Tap Switching Station have been obtained. Petition at 2; Tr. 2-3-2011 at 121 (Pughe).

25. GMP and VEC have negotiated a Joint Ownership Agreement ("JOA"), which reflects the provisions of the letter of intent filed with the Board as Exh. Pet.-CP-5.

26. Under the JOA, certain jointly owned facilities will be owned 58.46% by GMP and 41.54% by VEC. In the JOA, these percentages are defined as each party's joint ownership share. Jointly owned property under the JOA will be owned by GMP and VEC as tenants in common. Castonguay reb. at 5-6; Exh. Pet.-JC-2.

27. Under the JOA, GMP will be entitled to capacity in the upgraded transmission and distribution facilities equal to 75 MW or the Wind Farm capacity (whichever is less), and VEC is entitled to the remaining capacity. GMP will use its share to transmit the Wind Farm output to the VELCO 115 kV system, including the share VEC will purchase under the Renewable Energy Purchase Agreement ("REPA"). Pughe pf. at 17; Exh. Pet.-JC-2.

28. Under the JOA, VEC will convey to GMP 58.46% of its interest in the transmission facilities between the Lowell #5 Substation and the proposed VEC Jay Tap Switching Station and associated easements, and VEC will retain a 41.54% share. This allocation reflects the anticipated allocation of use of the upgraded facilities between GMP and VEC. Pughe pf. at 17; Exh. Pet.-JC-2.

29. GMP and VEC will outsource the design and construction of the jointly-owned facilities, by competitive bid, to mutually agreeable vendors and they will jointly approve all designs. Once built, VEC will maintain the upgraded transmission facilities. The cost of

construction and maintenance of the upgraded transmission facilities will be allocated on the same 58.46% / 41.54% basis. GMP will not own nor pay for any distribution equipment, except for distribution-related costs necessary to facilitate transmission upgrades. Pughe pf. at 17; Exh. Pet.-JC-2.

30. GMP and VEC have agreed to the terms of the REPA, which reflects the provisions of the letter of intent filed with the Board as Exh. Pet.-CP-5, under which VEC would purchase part of the Wind Farm's output. If the Wind Farm is developed to the maximum size of 63 MW, VEC would purchase 8 MW of output, leaving approximately 55 MW of output for GMP. The 55 MW share of project output would provide estimated net energy production of 130,409 MWh per year, which would represent about 6.5 percent of GMP's current annual energy requirements. The delivery point for energy into the New England market is expected to be at a node defined by ISO-NE at a new VELCO Jay Tap Substation, which will interconnect the 46 kV line with the VELCO 115 kV transmission line system. For capacity, the Project is expected to be recognized in the ISO-NE "Rest-of-Pool" settlement and reliability grouping. Exh. Pet.-CP-9; Smith pf. at 18-19.

31. The REPA will not be executed until after the 90-day notice period under Rule 5.200 has expired. Pughe reb. at 1-2; Exh. Pet.-CP-9; Exh. Pet.-CP-5.

32. Under the REPA, VEC will pay GMP for VEC's percentage share of all costs incurred by the Wind Farm on a monthly basis, regardless of output. In addition, VEC will pay GMP a development premium equal to two times VEC's percentage share of the development costs associated with the Wind Farm, subject to a dollar cap. Exh. Pet.-CP-9, Exh. D; Kieny pf. at 2-3.

33. The REPA and JOA allow VEC to receive all the benefits of owning its percentage share in the Project. Among these benefits is ownership of products in the ISO-NE administered energy and capacity markets and of Renewable Energy Certificates ("RECs") in certain states in the Northeast. Kieny pf. at 2.

34. The Project is expected to operate for 25 years, based on routine maintenance and component refurbishment, and for a longer period if the Wind Farm is repowered by refurbishing the turbines. While the cost to repower the Wind Farm after 25 years is difficult to predict with

accuracy, the most expensive parts of the infrastructure (for example, the road) will already be in place. Pughe pf. at 19; Tr. 2-3-2011 at 148 (Powell).

Construction

35. The Project and the Jay Tap Substation must be in service by December 31, 2012 in order to take advantage of the federal production tax credit ("PTC"). In order to meet that deadline, Project construction must commence by the beginning of August, 2011. Tr. 2-3-2011 at 93, 99, 120 (Pughe).

36. To facilitate construction of the Wind Farm, there will be two main staging areas, an approximately 5.4 acre area at the intersection of the Project access road and Vermont Route 100, and an approximately 0.75 acre area located approximately 1.3 miles up the access road from Route 100 adjacent to the site of the KCW collector substation and maintenance building. Pughe pf. at 6; Jewkes reb. at 1-2.

37. In addition to the proposed access road, Meek Road (Town Highway 25) will be used during the initial weeks of construction to provide access for construction equipment to the upper staging area. Use of Meek Road will reduce the length of the construction period by permitting GMP to construct the access road in two directions with two separate crews. Access road construction is expected to take approximately nine weeks. Pughe pf. at 6-7.

38. After construction of the access road, Meek Road will continue to be used to provide an alternate access for automobiles and light truck traffic, which will minimize the amount of vehicle idling time while waiting to pass oversize equipment in access road turnouts. Pughe pf. at 7.

39. Under conventional road design, the road location is fixed by the civil design prior to commencement of construction. A conventional civil design identifies where existing topography must be excavated (cut) or where the existing topography must be filled in (fill), to assure the proper design elevation for the road. In almost all road construction projects, there will be an excess of either cuts or fills and when this occurs it is known as an "unbalanced" site. Jewkes pf. at 8.

40. Petitioners will employ a micro-siting technique known as Variable Road Location Detail ("VRLD") to construct the access road and crane path. VRLD differs from conventional road design, by balancing the cuts and fills of the road on a local basis (approximately every 300 to 500 linear feet). More accurate balancing occurs due to the ability to vary the actual road elevation and/or the actual road location within a corridor, instead of constructing the road in a fixed location, as with a conventional civil design. Jewkes pf. at 8; Exh. Pet.-IAJ-3.

41. VRLD provides a number of benefits. The micro-siting process reduces the amount of material that must be transported by dump trucks either to or from the site along public roads, thus reducing exhaust emissions, fuel consumption, and truck traffic. By using VRLD, Petitioners will avoid transporting approximately 125,000 cubic yards associated with excess cuts and fills, which translates into avoiding approximately 9,000 to 12,000 dump truck round trips to haul this excess fill to and from site. Jewkes pf. at 9.

42. The VRLD process is efficient and will significantly reduce the overall project site work schedule. Thus, a shortened schedule will reduce site equipment emissions and fuel consumption. The shortened schedule will also reduce potential erosion arising during the period between soil disturbance and final site stabilization, as well as construction costs. Jewkes pf. at 9.

43. Based on discussions between Petitioners and the ANR, the use of VRLD will not require more tree cutting than conventional road building. GMP has moved the crane path near proposed turbine 21 and reduced the impact to the adjacent wetland by approximately 70%. The revised VRLD continues to maintain that the final total Project disturbed area not be greater than the total disturbed area of the approved design documents. As a result of these changes, GMP has eliminated approximately 18 acres of tree cutting. These changes will be accomplished by first surveying and laying out the design centerline of the proposed access road, and cutting only those existing trees necessary to allow for the road centerline survey layout. The VRLD requires that trees cut to survey and lay out the centerline of the roadway will always fall within the constructed Project limit, which is the minimum area that trees need to be cut to construct the Project. Prior to any further tree cutting necessary for the road width beyond the centerline, GMP will require its contractor to determine any necessary horizontal and/or vertical re-

alignment on the portion of the road being constructed. In this manner, tree cutting will be limited to that necessary to construct the roadway and crane path. Jewkes reb. at 2.

44. GMP plans to transport major Project components, including the wind turbines, installation cranes and other oversize equipment, to the Project site from Interstate I-91, along Vermont Routes 58 and 100. A Vermont Agency of Transportation ("VAOT") permit for the work will be obtained prior to the scheduled transport of materials. Pughe pf. at 14.

45. The Nelsons, who own land adjoining the proposed Wind Farm site, claim that Project infrastructure encroaches on land owned by them. They provided no survey or other documentary evidence supporting their claim and stated that they will address their claims in Orleans Superior Court. Nelson surreb. at 2.

46. GMP stated that all aspects of the proposed Wind Farm are on property on which GMP has the requisite property rights to construct the Project in the manner requested by Petitioners. Pughe reb. at 3-4.

Discussion

The Nelsons claim that the Project may encroach onto their property.[2] They did not present any documentation supporting their claim. They also did not seek any Board determination on the issue and instead claimed that they would pursue the issue in Orleans Superior Court.[3]

Although it is the developer's "obligation to ensure that it has appropriate legal rights to use the as-built site," the Board does not have jurisdiction to resolve property line disputes.[4] In the absence of any substantiation in evidence of the Nelsons' claims, nor even a request that the Board address the issue, there is no basis for the Board to address their claim.

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[2] Nelson surreb. at 2.
[3] *Id.*
[4] *In re Petition of Vermont Community Wind*, Docket No. 7526 (Vt. Pub. Serv. Bd. Jan. 6, 2010) at 12; *see also In re Amended Petition of Vermont Community Wind*, Docket No. 7518 (Vt. Pub. Serv. Bd. Aug. 28, 2009) at 8 n. 5; *Amended Petition of UPC Vermont Wind*, Docket 7156 (Vt. Pub. Serv. Bd. Aug. 8, 2007) ("Sheffield Order") at 59 n. 62 (CPG granted notwithstanding pending litigation concerning developer's access rights to project property).

IV. SUBSTANTIVE CRITERIA OF SECTION 248(B)

Pursuant to statute, the Board is required to make positive findings related to criteria set out in 30 V.S.A. § 248(b) before it may issue a certificate of public good to a project. Below, each of these criteria is addressed.

Orderly Development Of The Region
[30 V.S.A. § 248(b)(1)]

47. The Project will not unduly interfere with the orderly development of the region, with due consideration having been given to the recommendations of the municipal and regional planning commissions, the recommendations of municipal legislative bodies, and the land conversation measures contained in the plan of any affected municipality. This finding is supported by findings ___ through ___, below.

48. The Wind Farm Component of the Project is located in the Town of Lowell. The Transmission Component of the Project is located in the towns of Lowell, Westfield, and Jay. All three towns are subject to the NVDA's Regional Plan that went into effect on August 6, 2006. Exh. Pet.-DR-2 at 67; Estey pf. at 3-10.

49. Other towns in the ten-mile radius of the Project include Albany, Barton, Belvidere, Coventry, Craftsbury, Eden, Glover, Greensboro, Hyde Park, Irasburg, Johnson, Montgomery, Troy, and Wolcott. Exh. Pet.-LP-1 at 2; Exh. Pet.-DR-2 at Appendix 1.

50. The Petitioners began outreach efforts in early 2009 by providing information about the Project and wind energy technology to property owners surrounding the Project area. This effort included approximately 18 local meetings by January 2010, involving approximately 200 people. The Petitioners also participated in a February 18, 2010 meeting sponsored by community members concerned about the impacts of the Project and in a February 25, 2010 informational meeting sponsored by the Lowell Selectboard. Dostis pf. at 8-9; Pion pf. at 2.

51. Outreach efforts included discussions with a variety of constituencies, including town residents in small groups and in public forum settings, selectboard and planning board members from Lowell and surrounding towns, representatives of the area Regional Planning Commissions, and editorial boards of several newspapers. Dostis pf. at 8.

52. On Town Meeting Day, March 2, 2010, of 456 residents voting, representing 78 percent of registered voters, 342 (75% of those voting) voted in favor of the Project and 114 voted against. Dostis pf. at 9; Pion pf. at 3.

53. The Lowell Town Plan, which was readopted on April 14, 2009 does not identify Lowell Mountain as a scenic area where development should be prohibited, but does recommend that "that all land above 2,000 [feet]" "should have a very low intensity of development" (pg. 5). Exh. Pet.-DR-2 at 67.

54. It also specifically recommends the development of renewable energy resources, including wind energy. Exh. Pet.-DR-2 at 67.

55. Lowell's Zoning Bylaws specifically identify "windmills" as a conditional use in the Conservation Mountain District. Exh. Pet.-DR-2 at 67.

56. The Project is thus consistent with the Lowell Town Plan. Exh. Pet.-DR-2 at 67.

57. No town plan within the 10-mile radius prohibits wind power. Raphael reb. at 16.

58. The Project is consistent with the NVDA Regional Plan, which provides guidelines for wind energy development, but also defers to individual communities' decisions on renewable energy projects. Exh. Pet.-DR-2 at 68.

59. The Lowell Mountains are not identified in the local or regional plan as a significant visual or recreational resource. Raphael reb. at 16.

60. The Project is also consistent with the current use and development of the property as a managed forest for timber harvesting. Exh. Pet.-DR-2 at 68.

61. The Transmission Component of the Project is largely sited within an existing transmission corridor and the upgrades to the lines and substations will sustain and enhance the orderly development of the region. Exh. Pet.-DR-2 at 68.

62. There are no adverse impacts on traffic or on the local economy that would be unfavorable to the development of the region. Pughe pf. at 21-22; Kavet pf. at 2.

Discussion

Section 248(b)(1) provides that, before the Board may issue a CPG for an in-state facility, the Board shall find that the facility:

> will not unduly interfere with the orderly development of the region with due consideration having been given to the recommendations of the municipal and regional planning commissions, the recommendations of the municipal legislative bodies, and the land conservation measures contained in the plan of any affected municipality.

The Project meets this criterion, based on several factors in this case. First, the Lowell Town Plan, although encouraging low intensity development above 2,000 feet, does not prohibit development on Lowell Mountain. Second, although zoning ordinances are not controlling, the Lowell Zoning Bylaws permit wind projects as a conditional use.[5] Third, the Regional Plan defers to communities with respect to renewable energy projects. Finally, the residents of Lowell voted overwhelmingly in favor of the Project. In this regard, it should be noted from the quality and amount of public participation that the public was well-informed and was provided with extensive factual information (including the KCW website maintained by GMP) and the public hearing was well attended.[6]

Need For Present And Future Demand For Service
[30 V.S.A. § 248(B)(2)]

63. The Project is required to meet the present and future demand for services which could not be otherwise provided in a more cost-effective manner through energy conservation programs and measures and energy efficiency and load management measures. This finding is supported by findings ___ through ___, below.

64. GMP has a substantial need for new stably-priced power supply sources, primarily because the Company's two largest long-term power purchases (Vermont Yankee, and Hydro-Quebec Vermont Joint Owners Schedules B and C-3) expire in 2012 and 2015, respectively. Even though GMP signed a long-term power purchase agreement with H.Q. Energy Services U.S. Inc. ("HQUS"), which is currently being considered for approval in Docket 7670, the

[5] Exh. Pet.-DR-2 at 67.
[6] Tr. 9-23-2010 at 11 (Coen).

revised supply/demand outlook shows committed sources providing less than half of GMP's projected long-term needs. GMP still needs substantial new power sources – including long-term sources that feature meaningful price stability and low emission profiles, and new renewable resources, because energy efficiency is insufficient to adequately serve this need. Smith pf. at 3-4, 9, 32; Smith reb. at 2, 3-4; Exh. Pet.-DCS-2 (Revised).

65. The Project is consistent with GMP's power supply strategy – which focuses on the themes of low cost, low carbon emissions, and high reliability. This strategy includes the acquisition (through power purchase agreements and/or ownership) of significant new renewable electricity sources including wind power, as cost-effectively as possible. Smith pf. at 3.

66. If the Project is built to its maximum potential size of 63 MW, it will generate an estimated 149,000 MWh per year. After accounting for the sale of a portion of the Project output to VEC, GMP's share of Project output is estimated at about 130,409 MWh per year, or about 6.5 percent of the Company's current annual energy requirements. Smith pf. at 3-4.

67. The Project will provide a new long-term, stable-priced source in GMP's power supply portfolio that reduces its customers' exposure to potential future increases in electricity market prices and enhances the fuel and technology diversity of GMP's power supply portfolio. Unlike a typical power purchase agreement, the Project will provide this price stability without requiring GMP to provide collateral. Smith pf. at 4.

68. The Project is projected to be among the most cost-effective new renewable electricity sources available to GMP. Over the Project's economic life, its projected cost per kWh is competitive with the prices of the most attractive potential new renewable purchases that GMP has identified, is lower than most of the recently established standard contract prices for small instate renewables, and is similar to GMP's most recent reference case outlook for the future price of energy, capacity, and RECs in the New England market. Smith pf. at 4.

69. The Project is also needed by VEC. For 2010 and 2011, VEC has, or had, sufficient committed resources to cover and/or hedge approximately 95% of its projected annual energy requirements. The hedged percentage decreases to approximately 50% by 2013 with the expiration of several power supply contracts, and further decreases to 20% by 2015 with the expiration of various short-term contracts. Kieny pf. at 7.

70. The Project is consistent with state law that encourages increased use of new instate renewable resources, including wind power, to meet Vermont electricity requirements. The Project will help to meet the state's substantial renewable energy goals cost-effectively. Smith pf. at 4-5.

71. The Project will help GMP and VEC meet the goals of Vermont's Sustainably Priced Energy Enterprise Development ("SPEED") legislation, 30 V.S.A. §8001 et. seq., which sets a statewide goal of 20% of 2017 load being served by SPEED qualifying resources. Kieny pf. at 8.

72. In addition to its direct benefits as a power supply resource for GMP and VEC, the Project will benefit electric customers in Vermont and New England by displacing the output of fossil-fired power plants in New England. This displacement will tend to reduce regional air emissions, reduce fossil fuel consumption, and reduce electricity market prices. Smith pf. at 5.

73. The Transmission Components of the Project will replace and improve aged VEC facilities and thus improve system reliability. The VEC Lowell #5 Substation was constructed in 1954 and the VEC Jay 17 Substation in 1969. The Jay 17, Lowell #5 and Irasburg #21 substations were specifically identified for upgrade or replacement in the VEC System Condition Assessment that VEC performed in 2008 in response to it Business Process Review and Audit. Wright pf. at 4-5.

74. VEC and VELCO have recently completed the Jay Area Reliability Study. The study identified an overall need for multiple transmission solutions in the northeast part of Vermont. One of the projects identified is the construction of a new 115 kV injection into the 46 kV transmission network along northern Vermont. Castonguay reb. at 5.

75. Although not a part of this proceeding, the VELCO Jay Tap Substation will (1) reinforce VEC's 46 kV system that feeds Enosburg, East Berkshire, Richford, Jay, North Troy, Irasburg, and Newport, (2) provide another injection point at the mid-point of VEC's 60 mile long northern loop (Highgate to Irasburg), and (3) help to reinforce the area around Jay, which is the fastest growing area in VEC's territory due to the recent construction activities at the Jay Peak Resort. Wright pf. at 5.

Discussion

Section 248(b)(2) of Title 30 requires that the Board find that the proposed project:

> is required to meet the need for present and future demand for service which could not otherwise be provided in a more cost effective manner through energy conservation programs and measures and energy-efficiency and load management measures, including but not limited to those developed pursuant to the provisions of subsection 209(d), section 218c, and subsection 218(b) of this title.

As indicated above, the Project meets this standard because GMP and VEC's need cannot be met solely through energy efficiency and related measures, and because the Project advances the state's goal of stably-priced renewable resources.

LMG witness Holland claimed that this standard "requires that an approved project be more cost-effective than other alternatives," and that Section 218c requires that "the project must be the 'lowest present value life cycle cost' of all alternatives."[7] He claims the Project has not been shown to meet these standards.[8]

In fact, Section 248(b)(2) requires that a project "is required to meet the need ... for service which could not otherwise be provided in a more cost effective manner," through energy conservation and efficiency, and load management, and Section 218c requires "a plan for meeting the public's need ... at the lowest present value life cycle cost."[9] In other words, Section 248 does not require that a proposed project have a lower cost than any alternative. Instead it requires that the company's unmet need (which is typically greater in amount than the proposed project's output) cannot be completely served by less costly alternatives. As a result, a project should not be rejected unless the unmet need can be met through less costly alternatives, even if the proposed project itself is more expensive than some of the sources that are available to meet the need. This critical distinction was addressed in the recent Granite order.

> It is reasonable to expect that some significant amount of future energy efficiency can be obtained at an effective cost lower than the price of the Granite PPA. It is not realistic, however, to expect that cost-effective energy efficiency or other

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[7] Holland pf. at 2 (emphasis added).
[8] *Id.*
[9] 30 V.S.A. §§218c (emphasis added), 248 (emphasis added).

> demand-side resources could meet anything close to the amount of GMP's resource needs.[10]

GMP and VEC both demonstrated a substantial need for new power sources that cannot be met by the Project, and that the Project provides resource diversity, long-term price stability, lack of air emissions, and a cost that makes the Project one of the most cost effective new renewable power options.[11]

As indicated in the findings, the Project will help GMP and VEC meet the goals of the State's SPEED legislation. In that connection, GMP will be filing a request under Board Rule 4.305(A) for certification of the Project as a SPEED project.

System Stability And Reliability
[30 V.S.A. § 248(b)(3)]

76. The Project will not adversely affect system stability and reliability. This finding is supported by findings ___ through ___, below.

77. VEC's members in Westfield, Troy, and Jay are presently served by a radial VEC transmission line that originates at the CVPS Lowell Substation and that is nearing the end of its useful life. Loss of the VEC radial line results in power outages to the entire area, affecting approximately 600 members served by the VEC Jay 17 Substation. There is no back up source for the Jay 17 Substation. This proposed upgrade will result in replacement of these aging transmission facilities and will also provide a back up to CVPS for the loss of any portion of their 34.5 kV system between VELCO Irasburg and Lamoille County. Wright pf. at 5-6.

78. A Feasibility Study was completed on July 19, 2010. Its primary objective was to determine if interconnecting the Project would have significant adverse impact on the reliability and operating characteristics of the VELCO or VEC transmission systems, the transmission facilities of another transmission owner, or the system of a market participant. Exh. Pet.-DPE-18 (Revised) at iv.

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[10] *Petition of Green Mountain Power Corp.*, Docket No. 7590 (Vt. Pub. Serv. Bd. May 13, 2010) at 7.
[11] Smith reb. at 4, 11-13; Kieny pf. at 7-9.

79. The Final Feasibility Study concluded that the Project, in conjunction with several recommended network upgrades, poses no significant adverse impact on the reliability and operating characteristics of these systems. Exh. Pet.-DPE-18 (Revised) at vii.

80. A System Impact Study ("SIS"), which is not yet completed, will consider interconnection stability impacts as well as thermal and voltage issues. The preliminary results of the SIS indicate that in relation to VEC's system, the proposed Project does not have an adverse impact on stability and reliability. Tr. 2-4-2011 at 227 (Estey). Provided that any system upgrades and operational improvements identified in the final SIS are implemented, the Project will pose no significant adverse effects to the Vermont high voltage transmission system's reliability and stability. Estey reb. at 2.

81. On February 22, 2011 GMP and the Department entered into a Memorandum of Understanding ("DPS MOU") confirming that, provided the Project is built consistent with the recommendations of the SIS, it would not adversely affect electric system stability and reliability. Exh. GMP-DPS-1.

82. On January 14, 2011 GMP and CVPS entered into a Memorandum of Understanding ("CVPS MOU") regarding Project effects to the CVPS distribution system. Under the CVPS MOU, CVPS and GMP will collaborate to design any mitigation strategies necessary or required to avoid adverse effects on the reliability and stability of the CVPS electric system as a result of Project contingencies identified in the SIS. GMP and CVPS agreed to design and implement their mitigation strategies to meet least-cost planning objectives. Exh. CVPS-1.

83. If the CVPS-GMP MOU were approved by the Board, all of CVPS's concerns regarding impacts to its system and regarding electric system stability and reliability would be addressed. Tr. 2-4-2011 at 40 (Jones).

Discussion

The Project will not adversely affect system stability and reliability, as demonstrated by the Feasibility Study and DPS MOU.

The Board has typically not required the filing of an SIS before concluding that a proposed project will have no adverse effect on system stability or reliability, as long as an SIS is

filed and subject to review prior to construction and that the developer is responsible for any improvements required by the SIS.[12] Here, Petitioners have filed a Final Feasibility Study that concludes no significant adverse impact on reliability so long as the proposed upgrades to the system are completed and have provided expert testimony indicating that preliminary results of the SIS identify no adverse impact and the there will be no significant adverse effects on reliability and stability.[13] These facts support a positive finding under Section 248(b)(3), provided that the final SIS is filed with the Board before any construction activities can begin.

Economic Benefit
[30 V.S.A. § 248(b)(4)]

84. The Project will result in economic and social benefits to the State of Vermont and its residents. This finding is supported by findings __ through __, below.

85. Under the REPA, if the Wind Farm is developed to the maximum size of 63 MW, VEC would purchase 8 MW of output, leaving approximately 55 MW of output for GMP. The 55 MW share of project output would provide estimated net energy production of 130,409 MWh per year, which would represent about 6.5 percent of GMP's current annual energy requirements. The delivery point for energy into the New England market is expected to be at a node defined by ISO-NE at a new VELCO Jay Tap Substation, which will interconnect the 46 kV line with the VELCO 115 kV transmission line system. For capacity, the Project is expected to be recognized in the ISO-NE "Rest-of-Pool" settlement and reliability grouping. Exh. Pet.-CP-9; Smith pf. at 18-19.

86. In the event the high side of the proposed VELCO Jay Tap Substation are treated as Pool Transmission Facilities ("PTF"), with only a small portion allocated to GMP, the estimated cost of construction is $136,000,000, the first year costs are $18,230,000, and the projected annual levelized base case cost is $13,400,000. The first year base case cost is $.14/kWh, declining to $.069/kWh in year 25, and the projected levelized base case cost is $.103/kWh,

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[12] *Petition of Georgia Community Wind, LLC,* Docket No. 7508 (Vt. Pub. Serv. Bd. June 11, 2010) ("Georgia Order") at 23; *Amended Petition of Deerfield Wind, LLC*, Docket No. 7250 (Vt. Pub. Serv. Bd. April 16, 2009) ("Deerfield Order") at 26; Sheffield Order at 31.
[13] Estey reb. at 2.

before factoring in costs associated with the ANR MOU, addressed below. Kvedar reb. at 1-2; Exh. Pet.-AJK-1 (Revised); Exh. Pet.-AJK-2 (Revised); Exh. Pet.-AJK-3 (Revised).

87. In the event that GMP is responsible for all of the costs associated with the high side of the proposed VELCO Jay Tap Substation, the estimated cost of construction is $152,770,000, and the first year costs are $20,690,000 with a projected annual levelized of $15,180,000. The first year cost per kilowatt hour is $.159/kWh, declining to $.077/kWh in year 25 and a projected levelized Alternative 2 cost of $.116/kWh. Kvedar reb. at 1-2; Exh. Pet.-AJK-4 (Revised); Exh. Pet.-AJK-5 (Revised); Exh. Pet.-AJK-6 (Revised).

88. VEC has undertaken planning studies to verify that the VELCO Jay Tap Substation is required to meet VEC's load and thereby qualify certain substation components for PTF treatment. It is likely that the substation components will qualify for PTF treatment. Tr. 2-4-2011 at 12 (Castonguay).

89. The Project will provide a new long-term, stable-priced source in GMP's power supply portfolio that reduces our customers' exposure to potential future increases in electricity market prices and enhances the fuel and technology diversity of GMP's power supply portfolio. Unlike a typical power purchase agreement, the Project will provide this price stability without requiring GMP to provide collateral. Smith pf. at 4; Smith reb. at 11-12.

90. The Project will increase the diversity of GMP's supply portfolio, in terms of technology and fuel source, together with GMP's existing 6 MW Searsburg wind plant and the 25 MW Granite Reliable long-term wind PPA. Smith pf. at 20.

91. The Project will increase the stability of GMP's future power supply costs because it will not incur fuel expenses or other variable operating costs. New renewable sources, including the Project, can be excellent resources to provide long-term price stability, in a market in which long-term stable-priced options are limited. As a local source with no fuel expense, the Project is expected to provide about 6.5 percent of GMP's energy supply at a stable, cost-based price – without the type of collateral requirements that most stably priced market purchases would require. Smith pf. at 20.

92. In general, power supply sources located within the state tend to be more effective hedges against future electricity market price changes than out-of-state sources. The energy

revenues (i.e., locational marginal prices or LMPs) for instate projects are more likely to be well correlated with the Vermont load zone prices that Vermont utilities pay to meet their load requirements, and instate generation tends to lower local LMPs. Smith pf. at 24.

93. Finally, because the Project is located in Vermont, the LMP at the generator node at which VEC will be credited with revenue from the Project in the ISO Settlement system should be more highly correlated to the Vermont Load Zone price at which load is settled than out-of-state resources, thus providing VEC some protection against congestion and loss differentials between the Vermont Load Zone and its supply resources. Kieny pf. at 4-5.

94. The Project will also theoretically lower the LMP in New England as well as the Vermont Load Zone, and thus lower the cost of VEC's entire load in the ISO Settlement system. In addition, this Project is the least expensive SPEED resource available to VEC at this time. Kieny pf. at 4, 8, 10-2011; Tr. 2-4-2011 at 220 (Kieny).

95. With or without PTF treatment, the Project would represent one of the most cost-effective new renewable sources that GMP has explored through formal solicitations or bilateral discussions. The Project's projected cost of power is equal to or below the price of new renewable proposals that would deliver for a similar term. The only alternatives with materially lower levelized prices than the Project (for both PTF and non-PTF treatment) would involve much shorter terms, and therefore are not directly comparable to the Project. Smith pf. at 21.

96. The cost of Project power will be lower than the standard contract prices for most technologies in the SPEED program, particularly for those technologies (i.e., solar and farm methane) that seem most likely to be developed soon and in significant scale. Although the output from some of the standard contract sources will be more valuable in the electricity market than wind (due to greater capacity value and less intermittence), this advantage is more than offset by the higher contract price. Smith pf. at 22.

97. The cost range for Project power is generally consistent with GMP's updated reference case market outlook for the energy, capacity, and REC products. CONFID. Exh. Pet.-DCS-10 (Revised).

98. If the Project's original equipment operates well for a period longer than 25 years, GMP will receive additional energy for some period of time while incurring only operation and

maintenance costs (i.e., without a major new capital investment). Under such an outcome the effective cost of the Project's additional output would likely be well below then-current market prices, reducing GMP's net power supply costs. Smith pf. at 24.

99. It is also possible that at the end of the useful life of the Project's original equipment, it would be cost-effective for GMP to replace that equipment (i.e., repower the Project), which would likely have several advantages over a new-build wind project at that time, including: a permitted site with well-understood wind characteristics; an existing road, a functioning generation site and electricity collection system; existing transmission infrastructure with significant remaining life; and lease agreements with the land owners. These advantages tend to reduce the expected cost and risk profile of repowering the Project, relative to a new-build wind project. To the extent that wholesale power prices increase in the future and/or new wind sites are difficult to obtain, this option could have substantial value to customers, in terms of below-market power supply costs. Smith pf. at 24-25.

100. The cost of the transmission upgrade necessary to interconnect the Wind Farm to the 115 kV transmission system is less than the cost of alternative transmission routes. In the cost comparison, the proposed transmission route included the costs of the proposed VELCO Jay Tap Substation, assuming PTF treatment. Exh. Pet.-JC-1; Exh. GMP-DPS-1 at 2 ¶ 4.

101. The Project will bring significant economic benefits to the host towns, Orleans County, and the State of Vermont. Kavet pf. at 2; Dostis pf. at 3.

102. Based on Petitioners' economic analysis, the Project will result in the creation of more than 700 jobs (direct and secondary) during the construction and development period in 2010-2012, and about 30 permanent new jobs in 2013 and beyond. About 80% of the initial employment gains and about half of the new permanent jobs are expected to be in Orleans County. Kavet pf. at 2.

103. The initial economic investment associated with the Project is expected to total approximately $150 million, with ongoing annual expenditures of more than $4 million, concentrated in Orleans County. The average net output of the facility is expected to be sufficient to provide enough energy to power approximately 20,000 Vermont homes. Exh. Pet.-TEK-2 at 1.

104. Orleans County has the highest unemployment rate of any county in the State, and has experienced one of the steepest increases in unemployment of any county in Vermont during the current economic downturn. The Town of Lowell reported a 13.6% average annual unemployment rate in 2009. Kavet pf. at 3; Exh. Pet.-TEK-2 at 3-4.

105. In addition to these jobs, the Project will generate growth in total state economic output of more than $50 million during construction and development, with ongoing annual disposable income gains of nearly $3 million per year. Exh. Pet.-TEK-2 at 4.

106. State General and Transportation Fund fiscal impacts (excluding Education Fund property taxes) are expected to exceed $2 million during the construction and development phase and total more than $13 million over the first 25 years of the Project's operation. Exh. Pet.-TEK-2 at 4.

107. Initial direct State and local property tax payments are expected to total nearly $1 million per year, with escalating land lease payments (most of which are local) expected to start at more than $320,000 per year. Exh. Pet.-TEK-2 at 4.

108. Because the Project is expected to generate very little in the way of new demand for state or local services, most of the Project property tax payments are expected to result in reductions in local property taxes and concomitant increases in disposable income among existing host town residents. Exh. Pet.-TEK-2 at 4.

109. The Project is likely to generate more than $2 million in state tax revenues during the construction and development phase, with ongoing state revenues totaling about $24 million over the 25 year initial life of the facility. Kavet pf. at 2.

110. Although individual properties may be affected, there is no empirical basis for a conclusion that the Project will have a negative impact on property values on a town-wide or county basis. Exh. Pet.-TEK-2 at 5.

111. The most rigorous, unbiased study on this topic to date is an analysis recently released by the highly respected Lawrence Berkeley National Laboratory ("Berkeley Study"), an analysis of 7,459 property transactions associated with 10 study areas surrounding 24 wind facilities in 9 states, which found that "the results are consistent across all models in that none

uncovers conclusive evidence of the existence of any widespread property value impacts" as a result of Wind Farm projects. Exh. Pet.-TEK-2 at 6.

112. Because the evidence provides no basis to conclude that property values may be affected, there is no basis for requests from various landowners for a proposed condition that Petitioners be required to provide property value guarantees to nearby property owners. Deerfield Order at 34.

113. GMP entered into an agreement with the Town of Lowell ("Lowell Agreement") that provides for minimum annual payments to Lowell, expected to result in total payments of approximately $15 million over the Lowell Agreement's 25-year term, if a 63 MW Project is built. The initial minimum annual payment amount is equal to $400,000, plus $5000/MW to the extent the Project size exceeds 36 MW. This payment is comparable in size to the Town of Lowell's municipal budget. Dostis pf. at 3; Exh. Pet.-RAD-1.

114. There are several ambiguities in the terms of the Lowell Agreement. GMP agreed to work with Lowell to address these ambiguities and file an amended agreement, if necessary. Tr. 2-4-2011 at 85 (Pion).

115. GMP has agreed to provide periodic training to local and regional first responders on fighting turbine fires and dealing with turbine-related emergencies. Tr. 2-3-2011 at 102-03 (Pughe).

116. GMP is also creating a Kingdom Community Wind Good Neighbor Fund (the "Fund") to provide payments to the towns of Albany, Eden, Craftsbury, Irasburg, and Westfield, which are the communities (other than Lowell) that are located within a five-mile radius of the wind turbines. Each town will receive a minimum annual payment of $10,000. However, assuming the Project generates approximately 149,000 MWh per year the projected annual payments to each town would be: Albany- $54,030; Craftsbury- $26,171; Eden- $59,855; Irasburg- $10,000; and Westfield- $10,000. Dostis pf. at 5-6.

Discussion

The Project will provide an economic benefit to the state and its residents because it constitutes a new long-term, stable-priced source, it will represent one of the most cost-effective

new renewable sources with a projected cost generally consistent with the projected market price of power, and it will provide tax, job-related, and other benefits to Lowell and the Northeast Kingdom.

Although the DPS was initially concerned that Petitioners had provided insufficient evidence demonstrating that a 46 kV connection to Jay was the least cost interconnection alternative the analysis contained in the DPS MOU (Exh. GMP-DPS-1) provides adequate information to support the economic benefits of the chosen transmission route.[14] The analysis contains detailed estimates concerning the number of miles of required reconductoring, the required equipment and the aggregate cost and line losses associated with each of the proposed transmission interconnection alternatives. These alternatives included connecting to VELCO's 115 kV system using a 115 kV transmission line instead of the proposed 46 kV line and connecting to the CVPS system using either a 34.5 kV line or a 46 kV line to a CVPS substation in Irasburg. Based on this analysis, the DPS determined that the proposed route was the least cost alternative.[15]

During the hearing, Board staff raised concerns that a transmission interconnection to the CVPS system at Johnson might address Northern Loop reliability issues.[16] As the Board has recognized in its final order for the Lamoille Project, the next upgrade required for Northern Loop reliability would involve the addition of certain capacitors by 2015, which would provide for Northern Loop system reliability through the year 2021.[17] The relatively small costs associated with capacitor banks are far less than the increased costs associated with alternatives to the proposed Project interconnection.

There is no indication that the Project will cause a negative impact to real property values or to tourism. Concerns raised by the Days and the Towns of Albany and Craftsbury were not supported by rigorous analysis or empirical evidence. To the contrary, the most recent and

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[14] St. Peter pf. at 4.
[15] Exh. GMP-DPS-1.
[16] Tr. 2-4-2011 at 22 (Watts).
[17] *In re Lamoille County Project*, Docket. No. 7032 (Vt. Pub. Serv. Bd. March 16, 2006) at 20-21.

significant research appears to indicate that wind projects have not negatively impacted property values.[18]

The Days requested that Petitioners provide a property value guaranty to mitigate for possible adverse economic effects for any adjoining landowners who are adversely affected by the Project.[19] As the Board indicated in the Deerfield case, there is no basis to conclude that property values will be negatively affected and therefore the Days' proposed condition that Petitioners provide property value guarantees to the Project's adjoining property owners should be rejected.[20]

During Mr. Pion's examination, the Board staff raised issues concerning the interpretation of the Lowell Agreement.[21] GMP and the Town of Lowell have agreed to review the agreement, to make any changes necessary to address these issues and to a file the revised agreement with the Board and the parties.

Aesthetics, Historic Sites And Water Purity,
The Natural Environment And Public Health And Safety
[30 V.S.A. § 248(b)(5)]

117. The Project will not have an undue adverse effect on aesthetics, historic sites, the natural environment and the public health and safety. This finding is supported by findings ___ through ___, below, with due consideration given to the criteria specified in 10 V.S.A. §§1424a(d) and 6086(a)(1)-(8) and (9)(K).

Public Health And Safety
[30 V.S.A. § 248(b)(5)]

118. The Project will not have an undue adverse impact on public health and safety. This finding is supported by findings __ through __, below.

Ice Drop, Ice Throw

[18] Exh.Pet.-TEK-2 at 6, 7.
[19] Days pf. at 15.
[20] Deerfield Order at 34.
[21] Tr. 2-4-2011 at 79-85 (Cotter).

119. Icing is caused by (1) freezing precipitation that glazes exposed surfaces, including wind turbine rotors, or (2) rime ice accretions caused by super cooled water droplets in clouds or fog that freeze upon contact with a surface that is below the freezing point. Zimmerman pf. at 13-14.

120. Under certain conditions, a rotor may release the built-up ice ("ice throw"), which can cause injury to persons sufficiently close to the wind turbine. The risk to humans of being injured by ice falling or thrown from a wind turbine rotor decreases with distance from the wind turbine. Zimmerman pf. at 14.

121. Ice detectors are typically mounted to the nacelle of a turbine or nearby meteorological tower and monitored by the Wind Farm control system, triggering an automatic or remote manual shutdown of the Wind Farm in the event that icing conditions are detected. Exh. Pet.-ML-3 at 6.

122. It is also generally accepted in the wind industry that any ice build up on the blades of an operating turbine will lead to additional vibration. This is caused by both mass and aerodynamic imbalances. All turbines are equipped with vibration monitors, which will shut the machine down during these periods. Exh. Pet.-ML-3 at 6.

123. The risk related to ice throw is sufficiently mitigated by implementing a winter operating protocol with redundancies that curtails the operation of the wind turbines when any of the following circumstances occur: installed ice monitoring devices detect unsafe conditions; ice accretion is recognized by a remote or on-site operator; meteorological conditions are conducive to ice formation; air temperature is several degrees above freezing after icing conditions; and any other weather condition which appears unsafe. Exh. Pet.-ML-3 at 6; Tr. 2-10-2011 at 214-15 (LeBlanc).

124. During any of the above-described events, GMP's proposed protocol will provide that turbines which present a safety risk to the public are to be placed in Pause mode, in which the units are inoperative. Exh. Pet.-ML-3 at 6; Tr. 2-10-2011 at 197 (LeBlanc).

125. The risk of a fragment of ice dropping and landing in a square meter a distance from a Project turbine drops sharply for distances beyond 60 m (in the range of the overhang of the wind turbine model). Exh. Pet.-ML-3 at 11 (Revised).

126. The risk analysis conducted by Garrad Hassan for GMP indicates that only very high winds in a specific direction may cause fragments of any significant mass to be blown beyond 60 meters of the turbine base with a probability of fragment strike per square meter of approximately once in 65,000 years with respect to ice throw and approximately once in every 938,000 years for ice drop. Assuming 25 days of icing per year, this amounts to an individual risk for a stationary person present for all icing events located at 60 meters of the turbine base of once in 10 years for ice throw and once in 112 years for ice drop. Exh. Pet.-ML-3 at 17 (Revised).

127. Signage will be posted around the wind turbines to alert hikers or hunters who are present in close proximity to the wind turbines, to the potential danger from ice during winter operating conditions. Zimmerman pf. at 15.

128. Maintenance personnel will also be trained to follow industry standard safety procedures when working in close proximity to wind turbines when icing conditions are present. Zimmerman pf. at 15.

129. Turbine control systems are the subject of rigorous specification in the design standards for wind turbines and exhaustive analysis in the certification process and as such, most systems operate in a safe and reliable manner. Exh. Pet.-ML-4 at 5.

130. Blade failure is extremely rare with full blade failure at any speed estimated in literature reviews to be 1 in 2,400 turbines per year. Failure of a tip or piece of a blade is even lower: 1 in 4,000 turbines per year. Blade failure is most often caused by design, manufacturing, or installation defects or unforeseen environmental events such as lightning. Exh. Pet.-ML-4 at 2.

131. Blade failure rates in recent years have declined by a factor of three as compared to failures in the 1990s. Exh. Pet.-ML-4 at 2.

132. The risk of blade failure is on a par with natural hazards. Exh. Pet.-ML-4 at 6.

133. Research suggests that turbine tower failure is somewhat lower than blade failure at 1 in 7,700 turbines per year. The probability of the failure during the operational lifetime of a turbine meeting the International Electrotechnical Commission ("IEC") 61400-1 or IEC

WT01:2001 certification requirements is lower than the probability of a blade failure. Exh. Pet.-ML-4 at 3, 6.

134. GMP will be obligated to select a turbine that meets one of these certification requirements.

Shadow Flicker

135. Shadow flicker is defined as the modulation of light levels resulting from the periodic passage of a rotating wind turbine blade between the sun and a viewer. LeBlanc reb. at 2.

136. Petitioners' consultant, Garrad Hassan America, Inc., undertook a shadow flicker analysis that accounted for 89 dwellings located within 1.5 km of the turbines. Exh. Pet.-ML-2 at 2.

137. Based on the modeling using Vestas V112 wind turbines with blade tip height of 140 meters, none of the 89 dwellings are predicted to experience more than 30 hours of shadow flicker per year or more than 30 minutes per day. The results of the modeling are conservative because they do not take into account the effects of weather patterns and cloud cover that would reduce the amount of time that shadow flicker could conceivably occur, do not consider the shielding effects of surrounding vegetation, and do not consider turbine shut down. Exh. Pet.-ML-2 at 5.

138. It is generally accepted that shadow flicker does not occur at a distance expressed as 10 times the sum of hub height plus rotor radius. For the Vestas V112, a viewer does not perceive chopping light by turbines beyond 1400 meters. Exh. Pet.-ML-2 at 4.

Discussion

As indicated above, the Project will not have an undue adverse impact on public health and safety. Petitioners have identified residences that will experience shadow flicker from the turbines. However, no residence will be affected, in a worst-case scenario, for more than 30 hours a year, and no more than 30 minutes a day. This estimate is conservative and will likely be significantly lower due to meteorological conditions such as cloud cover not considered in the analysis. Given the conservative nature of the analysis and consistent with Board decisions in

other wind cases, shadow flicker will not have an undue adverse effect public health because of the limited exposure and short duration of the phenomenon.[22]

With respect to ice throw, ice drop, and tower failure, the Board is not required to approve a project only if it finds that it is risk free. Indeed, in the Board's *East Haven* order, it discussed the type of risks that are acceptable,

> To enable the enjoyment of the benefits of a reliable electric supply, we tolerate emissions from power plants which have documented health effects on those downwind. The Board does not need to find that the proposed Project would present no risks. It would be impossible to make such a finding for any project. However, the minuscule risk presented by shed ice from the proposed Project is an acceptable one.[23]

GMP will site the turbines so that no turbine is within 60 meters of a non-participating adjoining landowner property line, thereby assuring that the risk of ice drop is once in 112 years, as described in Mr. LeBlanc's analysis. GMP will file for Board review a winter operating protocol meeting the requirements identified by Mr. LeBlanc to assure that the risks of ice throw are minimal. Finally, the selected turbine will be certified and therefore the risk of tower failure is minimal.

Outstanding Resource Waters
[30 V.S.A. § 248(b)(8)] & [10 V.S.A. § 1424a(d)]

139. There are no outstanding resource waters within the vicinity of the Project. Nelson pf. at 5.

Water and Air Pollution
[10 V.S.A. § 6086(a)(1)]

Air Pollution

140. The Project will not cause undue air pollution. This finding is supported by findings __ through ___, below.

141. Zero-emission wind generation is expected to be a primary tool for achieving regional and/or national emission targets under "cap and trade" programs. Smith pf. at 35.

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[22] Georgia Order at 31.
[23] *Petition of EMDC*, Docket 6911 (Vt. Pub. Serv. Bd. July 17, 2006) ("East Haven Order") at 32.

142. GMP has made a strategic commitment to increasing the number of cost effective renewable energy resources to deliver a low carbon portfolio of energy resources. Tr. 2-3-2011 at 137-138 (Powell).

143. The Project will benefit electric customers in Vermont and New England by displacing the output of fossil-fired power plants in New England. This displacement will tend to reduce regional air emissions, reduce fossil fuel consumption, and reduce electricity market prices. Smith pf. at 5.

144. The most recent NEPOOL Marginal Emissions study shows a regional marginal emission rate of roughly 1,000 lbs of CO_2 per MWh. In the near term, the Project will displace regional power plant emissions of CO_2 by about 72,000 tons per year. Over the long term, due to an increase in new, efficient gas-fired combined cycle plants, the displacement of CO_2 is still about 60,000 tons per year. Smith pf. at 35.

145. No air emissions will occur during the operational phase of the Project. Nelson pf. at 7.

146. During the construction phase, to control construction dust, Erosion Prevention and Sediment Control ("EPSC") activities will include mulching, temporary and permanent plantings, application of erosion control blankets, and limiting the amount of land area disturbed at one time. Nelson pf. at 6.

147. The VRLD allows for a balancing of cuts and fills in the road building process based on variations in topography, which reduces the amount of material that must be transported to or from the site, thus reducing exhaust emissions, fuel consumption, and truck traffic. Jewkes pf. at 8-9.

148. Vehicle emissions will primarily occur locally, intermittently and at low levels consistent with state rules (e.g., vehicular emissions control) and are not expected to result in appreciable degradation of air quality. During operation of the completed Project, vehicle usage and emissions from the facility will be minor. Nelson pf. at 6.

149. The bedrock present at the Wind Farm site does not contain asbestos, and thus, the site bedrock poses no special health or environmental hazards associated with project blasting and construction disturbance. Nelson pf. at 6; Exh. Pet.-JAN–3.

150. The sound levels from the Project will meet WHO noise guidelines and the Board 45 dBA (exterior) (Leq) (1hr) precedent standard, established in the Deerfield, Sheffield, and Georgia dockets, at all residences. Kaliski pf. at 4. *See* Georgia Order at 57; Deerfield Order at 67; Sheffield Order at 73.

151. The noise associated with the Project will not have an undue adverse impact on air quality. See findings __ through __ (aesthetics).

Discussion

Under Act 250 precedent, "noise is considered air pollution under Criterion 1 of Act 250 when it may cause adverse health effect[s], i.e., impacts rising above annoyance and aggravation to cause adverse health effects such as hearing damage."[24] As the findings in the aesthetics section below indicate, noise impacts from the Project will not to cause such health impacts and therefore the Project will not cause undue air pollution.

Water Pollution

152. The Project will not cause undue water pollution. This finding is supported by findings ___ through ___, below.

153. On September 20, 2010, GMP filed an individual stormwater discharge permit ("INDS") application with Vermont Department of Environmental Conservation ("DEC"). The INDS filing included a site description, and an explanation of how the proposed stormwater treatment and control system complies with applicable stormwater requirements. The application package demonstrated that the proposed operational phase stormwater management system will conform with Chapter 18 of the Vermont DEC Environmental Protection Rule, *Stormwater Management Rule*, as well as the Vermont DEC *Stormwater Management Manual*. The INDS filing is currently under review by DEC. Nelson reb. at 10-11.

154. Approximate calculations of Project disturbed area were based on the Project civil design progress set dated September 14, 2010 and reflect a total disturbed area of 123.6 acres, a total ECZ area of 20 acres and the area needed to install the overhead collector line of 3.5 acres.

[24] Sheffield Order at 44.

The ECZ constitutes a 10-foot wide buffer zone surrounding the "disturbed areas" to be used to install and maintain construction EPSC measures, where vegetation will be cleared but not stumped or grubbed. Jewkes reb. at 5.

155. GMP filed an application for an individual National Pollutant Discharge Elimination System ("NPDES") construction phase discharge permit ("INDC"), including a site-specific EPSC Plan with Vermont DEC on November 12, 2010. The INDC filing included a site description, an explanation of how the proposed stormwater treatment and control system complies with applicable stormwater requirements (including a description of the alternative STP design and permitting approach), Plan & Profile design plans, and other supporting materials. The INDC filing demonstrates that the proposed construction sequence and construction phase best management practices will ensure the protection of water quality and compliance with Vermont Water Quality Standards during construction of the Project. Nelson reb. at 11

156. A key objective of the Project was to maintain the natural drainage patterns and topography within the site, insofar as practicable by minimizing the amount of grading for road construction and turbine pad areas, maintaining natural surface water flows associated with streams and wetlands crossed by the Project access road and crane path, and providing buffers to water resource features wherever possible. Nelson pf. at 10-11.

157. The Project will implement a comprehensive EPSC Plan during the design and construction phase. Nelson pf. at 11.

158. To protect water quality and control runoff rates after construction, Petitioners will also implement a permanent stormwater management plan in accordance with DEC permit authorizations. Nelson pf. at 11.

159. In addition, the Project will be operated under the provisions and protocols of the existing GMP Spill Prevention, Control and Countermeasures ("SPCC") Plan, which has been modified to address specific elements of the Project. Consistent with the requirements of these stormwater permits and SPCC plans, water quality impacts will be minimized to the extent practicable and meet DEC regulations related to water quality protection. Nelson pf. at 12-13; Exh. Pet.-JAN-5.

160. The Petitioners will take appropriate precautions with regard to blasting to protect water supply. Petitioners have submitted a Preliminary Blasting Plan demonstrating that blasting will be conducted with an emphasis on safe and efficient removal of the rock without impact on surrounding structures. Exh. Pet.-IAJ-4.

161. The Preliminary Blasting Plan provides that all landowners within a 2,500 radius of the blast site will be offered pre-blast surveys by the blasting contractor. Exh. Pet.-IAJ-4.

162. The final Project blasting plan will be completed by the contractor after the appropriate geotechnical investigations and landowner notifications are complete. Jewkes pf. at 16.

163. The oil containment system at the Lowell #5 and Jay 17 substations will be large enough to contain all the oil in substation components in the event of a catastrophic failure in the equipment. Tr. 2-4-2011 at 242 (Estey).

164. The collector substation at the base of Lowell Mountain will be constructed with an impervious mat under the foundation with piping to drain oil to containment vessels. The capacity of this system will be adequate to contain the approximately 6,000 gallons of the oil that GMP contemplates using in that substation. Tr. 2-4-2011 at 243 (Estey).

165. Petitioners will commit to testing the soil for oil contamination at the substations to be constructed in connection with the Project prior to any decommissioning of the substations.

Headwaters
[10 V.S.A. § 6086(a)(1)(A)]

166. The Project will meet all applicable health and environmental conservation regulations regarding the reduction of the quality of ground or surface waters flowing through or upon headwaters areas. This finding is supported by the finding below, as well as findings ___ through ___ (Water Pollution), findings __ through __ (Wetlands), and findings __ through __ (Streams).

167. Portions of the Wind Farm include areas of steep slopes and the drainage areas of several of the delineated features are less than 20 square miles. In addition, portions of the

turbine access road and the turbine station locations themselves are located above 1,500 feet elevation. Nelson pf. at 10; Exh. Pet.-JAN-4.

Waste Disposal
[10 V.S.A. § 6086(a)(1)(B)]

168. The Project will meet applicable health and environmental DEC regulations for waste disposal and will not inject waste materials or any harmful toxic substances into groundwater or wells. This finding is supported by findings ___ through ___, below.

169. During construction of the Wind Farm Component, sanitary wastewater disposal will be addressed by the use of on-site portable toilets serviced by a licensed septic hauler. Once the Project is operational, the only sanitary wastewater to be generated will be associated with the maintenance building and will be disposed via leach field disposal system, designed, permitted, and constructed to meet the applicable criteria of the *2007 Vermont Wastewater System and Potable Water Supply Rules*. Nelson pf. at 13.

170. Solid waste disposal will be handled by local private haulers. Pughe pf. at 23.

Water Conservation
[10 V.S.A. § 6086(a)(1)(C)]

171. The Project incorporates water conservation principles that will ensure compliance with this criterion and not create an undue adverse impact on water resources. This finding is supported by findings __ through __ below.

172. Small amounts of water may be used during construction for dust suppression, in accordance with the EPSC Plan, as well as for pressure washing of towers. Nelson pf. at 16.

173. Once the Project is operational, a drilled well will provide potable water usage at the maintenance building, which will use water conserving fixtures. This will be the only ongoing water usage. Nelson pf. at 16-17.

Floodways
[10 V.S.A. § 6086(a)(1)(D)]

174. The Project will not have an undue adverse impact on lands defined as floodways. This finding is supported by findings ___ through ___, below.

175. Petitioners analyzed the available Federal Emergency Management Agency ("FEMA") Flood Insurance Rate Map and determined that there are no FEMA-mapped floodways within any region of the Wind Farm Component of the Project. Nelson pf. at 17-18. Exh. Pet.-JAN-2, Appendix 8.

176. The Transmission Component of the Project crosses near several zones identified by FEMA as Zone A, "Special Flood Hazard Areas." These zones include: floodways associated with the East Branch of the Missisquoi River, Ace Brook, Truland Branch Brook, an unnamed tributary to the East Branch of the Missisquoi River, and LeClair Brook in Lowell; the Missisquoi River, an unnamed tributary to the Missisquoi River, Taft Brook, an unnamed tributary to Taft Brook, and Mill Brook in Westfield; and floodways associated with Jay Branch and Crook Brook in Jay. Nelson pf. at 17.

177. Because the Transmission Component does not involve development activities, there should be minimal to no alterations to waterways, flood elevations, or the ability of the land to hold water as a result of existing overhead utility line upgrades or new installation along existing roadway ROWs. Nelson pf. at 17-18.

178. Substations associated with the transmission upgrade are located outside of FEMA Zone A designated areas and potential substation upgrades will not impact floodways. Nelson pf. at 18.

Streams
[10 V.S.A. § 6086(a)(1)(E)]

179. The Project will, whenever feasible, maintain stream channel condition and will not endanger the health, safety, or welfare of the public or adjoining landowners. This finding is supported by findings ___ through ___, below.

180. GMP has conducted stream delineations at the locations of all the Project components, including the Wind Farm, transmission connection, and substation sites. Nelson pf. at 18; Exh. Pet.-JAN-2, Section 5.

181. After the change in Vermont Wetlands Rules ("VWR") on September 15, 2010 and due to Project design changes, Petitioners updated and refined the calculated impacts on streams to .189 acres. Nelson reb. at 1-3 (Revised); Exh. Pet.-JAN-2, Appendix 1 (Second Supplemental), pages 1-9 and Appendix 5 (Second Revised); Exh. Pet.-IAJ-2 (Revised).

182. For the Wind Farm Component, in order to establish road infrastructure, the majority of the stream crossings will be permanent, culverted crossings. In order to mitigate against undue adverse impacts to streams during construction of the Wind Farm Component, the access road has been located and designed to minimize stream and riparian zone impact, by using perpendicular crossing orientation and bottomless culverts, by minimizing riparian zone vegetative clearing, by maximizing fill slopes where applicable, and by minimizing road/culvert footprints. Nelson pf. at 20.

183. For the Transmission Component, temporary stream crossings will be necessary for construction phase access to sites of pole placement. These access points will be designed in accordance with the *2006 Vermont Standards and Specifications for Erosion Prevention and Sediment Control*, which along with the comprehensive EPSC Plan for construction activities will protect against secondary stream channel impacts from erosion and sedimentation. Nelson pf. at 20.

184. Intervenor Dyer-Dunn, Inc. expressed concern about the potential impacts of the Project on the drinking water supply, a small tributary to Truland Brook, for its property. There would be no Project-related earth disturbance within the watershed of this tributary. Nelson reb. at 24; Exh. Pet.-JAN-15.

185. Intervenors Don and Shirley Nelson expressed concern about the construction of the Wind Farm impacting two streams located on their property. Based on site visits and mapping using GPS data, the springs are located at least 3,000 feet from the nearest proposed disturbance. Based on this distance, it is not expected that any impact to the quantity or quality of water at these sources would occur. Nelson reb. at 23; Exh. Pet.-JAN-14.

Shorelines
[10 V.S.A. § 6086(a)(1)(F)]

186. The Project will not create any undue adverse effect on shorelines. This finding is supported by findings ___ through ___ , below.

187. Shorelines are defined for purposes of Section 248 as the land adjacent to the waters of lakes, ponds, reservoirs, and rivers. Nelson pf. at 22.

188. Under the definition, there are no such bodies of water within the Wind Farm Component of the Project and therefore there will be no impact upon shorelines. Nelson pf. at 22.

189. The Transmission Component crosses areas that may be considered shorelines, including land adjacent to the East Branch of the Missisquoi River, LeClair Brook, Missisquoi River, Taft Branch, Mill Brook, Coburn Brook, Jay Branch, and Crook Brook. Nelson pf. at 22.

190. The Transmission Component of the Project will not result in any undue adverse permanent impacts, because it is largely located within an existing utility or roadway right-of-way ("ROW"). Nelson pf. at 22.

Wetlands
[10 V.S.A. § 6086(a)(1)(G)]

191. With the mitigation offered by GMP, the Project will not create any undue adverse effect on significant wetlands. This finding is supported by findings ___ through ___, below.

192. After the Petition was filed on May 21, 2010, new Vermont Wetlands Rules went into effect on September 15, 2010, and wetlands affected by the Project that were previously not considered significant wetlands were re-classified. Although not required to do so, Petitioner chose to evaluate Project wetlands impacts under the new rules. Direct wetlands impacts associated with the Wind Farm Component of the Project will be 0.267 acres and stream impact will be 0.189 acres, for a total of 0.456 acres. Nelson reb. at 2, 3 (revised).

193. Design changes during the regulatory process have reduced wetlands to about ¼ of what was originally calculated (1.07 acres in the original design). Nelson reb. at 3 (revised).

194. The Wind Farm area does not include any Class I wetlands. Exh. Pet.-JAN-2 Appendix 1 (Second Supplemental).

195. There are five Class II wetlands in the Wind Farm area that will face either permanent or temporary impacts as a result of the Project. Permanent buffer impacts include those areas to be filled, excavated, or cleared that are then regularly maintained. Temporary impacts are calculated based on the area needed between the area of permanent impact and limit of clearing disturbance primarily planned for EPSC features. Exh.Pet.-JAN-2 Appendix 1 (Second Supplemental), notes 6, 7.

196. The Project will cause a temporary impact to Wetland 2009-B3 and a permanent impact on its 50-foot Class II buffer zone. There will be both temporary and permanent impacts to the Wetland 2009-C23 buffer zone caused by grading a clearing for the crane path and EPSC. The Project will cause both temporary and permanent impacts to the Wetland 2009-C37/38 buffer zone related to grading a clearing for the EPSC and for a stormwater treatment practice. There will be both temporary and permanent impacts to the Wetland 2009-C44 buffer zone related to grading a clearing for the overhead collector line. Portions of Wetland 2009-C44 will also experience secondary Project impacts, which are impacts to forested wetland types that occur when a closed forested upland is permanently converted to emergent or scrub shrub wetland type through clearing and regular vegetation maintenance within the planned overhead collector line. There will be both temporary and permanent impacts to the buffer zone around Wetland 2009-C23 related to clearing for the collector line. Exh.Pet.-JAN-2 Appendix 1 (Second Supplemental).

197. The permanently cleared width of the transmission line ROW has been reduced from 100 feet to 50 feet based on design modifications and to avoid the need to expand the existing ROW. Nelson reb. at 8-9; Castonguay reb. at 2.

198. Total wetlands impacts associated with the Transmission Line Component will be 2.56 acres, of which 1.73 acres are temporary impacts (construction only), and 0.83 acres are secondary impacts (tree cutting along the ROW). Permanent wetland impacts will be only 0.002 acres from new pole placement. Nelson reb. at 9 (revised).

199. GMP has designed the Project to avoid impacts to Class III wetlands and buffers wherever feasible. For those impacts that are unavoidable, all feasible efforts to minimize wetland and buffer impacts have been incorporated into the design. Nelson pf. at 8.

200. Because of unavoidable encroachments and impacts on Class II wetlands in the Transmission Component during construction, the Project will require an application for a Conditional Use Determination from the DEC. The Project will also be required to obtain a Department of the Army Section 404 Permit and Vermont Section 401 Water Quality Certification prior to undertaking activities with permanent or temporary Class II or Class III wetland impacts. Nelson pf. at 23-24.

201. Mitigation measures associated with minimizing impacts and as part of the permit review process will include erosion control measures as well as, for example, conducting work during the winter under frozen ground conditions, or using a dry soil evaluation procedure with swamp mats deployed as necessary during construction. Nelson pf. at 23.

202. As an additional mitigation measure, Petitioners plan to permanently conserve an area of land comprising approximately 178 acres within the Moose Mountain Forestry ("MMF") landholdings to compensate for unavoidable impacts on water resources, as described below. This area includes a large Vermont Significant Wetland Inventory-mapped beaver-influenced Class II wetland and numerous smaller wetlands and streams for a total wetland mitigation area of approximately 17 acres. Nelson reb. pf. at 9-10; Exh. Pet.-JAN-12. Dostis reb. pf. at 2; Wallin reb. at 8; Pughe reb. at 9. Exh. GMP-ANR-1.

203. GMP has entered into a stipulation with ANR ("ANR MOU"), which requires GMP to obtain a conservation easement prohibiting development and logging on this approximately 178 acre parcel. Although the existing logging road may be maintained by the landowner and access rights will be preserved for an abutting landowner, no new infrastructure will be installed. Further, the approximately 178 parcel will be shall be managed in accordance Army Corps of Engineers and ANR recommendations. There are also permanently conserved high elevation wetlands contained in the 110.3 acre parcel. Exh. GMP-ANR-1.

Sufficiency Of Water And Burden On Water Supply
[10 V.S.A. § 6086(a)(2) & (a)(3)]

204. The Project will not burden existing water supplies. *See* findings ___ through___ (Water Pollution), ___through ___ (Water Conservation), and ___ through ___ (Streams).

Soil Erosion
[10 V.S.A. § 6086(a)(4)]

205. The Project will not cause unreasonable soil erosion or reduction of the land to hold water. This finding is supported by finding __, below, as well as findings ___ through ____ (Headwaters) and ___ through ___ (Water Pollution).

206. During the construction phase, to control construction dust and erosion, EPSC activities will include mulching, temporary and permanent plantings, application of erosion control blankets, and limiting the amount of land area disturbed at one time. Nelson pf. at 6, 26.

Transportation Systems
[10 V.S.A. § 6086(a)(5)]

207. The Project will not cause unreasonable congestion or unsafe conditions with respect to transportation systems. This finding is supported by findings ___ through ___, below.

208. Petitioners plan to transport major Wind Farm Components, including the wind turbines, installation cranes and other oversize equipment, to the Project site from Interstate I-91, along Vermont Routes 58 and 100 in accordance with a Transportation Plan that will be filed after a CPG has been granted. Pughe pf. at 14.

209. All public roads will be able to accommodate the expected volume of construction and operational traffic without creating unsafe operating conditions or excessive congestion. Pughe pf. at 21; Exh. Pet.-CP-7.

210. A survey to document existing road conditions will be conducted with the VAOT and officials of each affected town prior to transport of the components. Any damage caused by the transport activities will be measured against the pre-transport survey, and GMP will be responsible for any damage identified. Pughe pf. at 14.

Educational Services
[10 V.S.A. § 6086(a)(6)]

211. The Project will not cause an unreasonable burden upon the Town of Lowell to provide educational services. This finding is supported by findings ___ through ___, below.

212. It is not expected that the temporary construction workers for the Project would relocate to Lowell during construction, and, once operational, the Project will have up to three full-time workers on the site. Pughe pf. at 21-22; Exh. Pet.-CP-7.

213. Both the Lowell Graded School and the North Country Supervisory Union have confirmed that the Project will not place an unreasonable burden on their ability to provide educational services. Exh. Pet.-CP-7.

Municipal Services
[10 V.S.A. § 6086(a)(7)]

214. The Project will not cause an unreasonable burden upon the Town of Lowell to provide municipal services. This finding is supported by findings ___ through ___, below.

215. The on-site private roads of the facility will be maintained by GMP. Any modifications to the existing town roads required by the Project will be made at GMP's expense. Pughe pf. at 23.

216. Additional traffic during the Project's operational phase will not cause an unreasonable increase in the traffic or excessive wear and tear on the existing state or town roads. Pughe pf. at 23; Exh. Pet.-CP-7.

217. Waste disposal will be handled by local private haulers and will not cause any additional burden on the Town of Lowell. Pughe pf. at 23.

218. In the Lowell Agreement, GMP has agreed to offer free fire and rescue training to Lowell and surrounding towns to assist in the safe and effective evacuation of personnel from the site in case of a medical or other emergency. GMP will also provide all specialized equipment required for this training and work at the site, such as specialized harnesses for ascending the wind towers and appropriate vehicles to access the Project site during winter months. Pughe pf. at 23.

219. The Vermont State Police and Orleans County Sherriff's Department have confirmed that the Project will not pose an undue burden on emergency first responders. Exh. Pet.-CP-7.

220. The Lowell Volunteer Fire Department and the Missisquoi Valley Ambulance Service have both confirmed that the Project will not pose an unreasonable burden on their abilities to provide emergency fire and rescue services. Exh. Pet.-CP-7.

Aesthetics
[10 V.S.A. § 6086(a)(8)]

221. The Project will not have an undue adverse effect on aesthetics or on the scenic or natural beauty of the area. This finding is supported by findings ___ through ___ below.

Visual Aesthetics

222. The Vermont Center for Geographic Information indicates no named summits for the Lowell Mountains, although there are 38 named summits within a 10-mile radius of the Project site. Exh. Pet.-DR-2 at 8.

223. Petitioners' aesthetic assessment included a 378 square mile study area which is consistent with a 10 mile radius review. Of that study area, only 166 square miles are within the potential viewshed of the Project. Exh. Pet.-DR-2 at 24.

224. There are 531 miles of public roads within the study area and only 15% of those roads, or 29 miles, have potential ridgeline visibility. Exh. Pet.-DR-2 at 24.

225. The overall visibility of the Wind Farm will be very limited. The potential viewshed represents only 20 square miles or 5% of the total study area, due to topography and extensive vegetative cover in the Lowell region. Exh. Pet.-DR-2 at 24.

226. Although the Wind Farm will be visible from the historic Bayley Hazen Road, this road is not well-travelled since it is not readily passable for passenger cars in the summer or plowed in the winter. In fact, the website for the Bayley Hazen Road sends travelers on an alternative route. Exh. Pet.-DR-2 at 30; Exh.-DPS-MK-2 at 16; Tr. 2-9-2011 at 31 (Kane).

227. There are limited private residences proximate to the Project that will have potential views of portions of the Project. The closest year round residential structure is located

approximately .67 miles to the east of the Wind Farm in a wooded area. The area around the Wind Farm is also populated with seasonal camps. Only one home within one mile of the Wind Farm, the Nelson Farm, is in an open field. Exh. Pet.-DR-2 at 10, 44.

228. Although the Wind Farm will be visible from the Nelson Farm, the primary view and orientation of their home is to the east and away from the Wind Farm. The Project will not affect their ability to use the property. Exh. Pet.-DR-2 at 44.

229. No part of the Project will reduce or impact the amount of open space. The Wind Farm is being constructed entirely on private land and using existing roads and clearings where possible. There is no appreciable impact on or loss of open space due to this component of the Project. The Transmission Component is being constructed within an already existing utility corridor for the most part and the new substations are collocated within existing substation yards. Where transmission lines are being relocated, they will improve open space conditions because they will be moved closer to the road. Exh. Pet.-DR-2 at 23.

230. The access road and collector lines have been sited and designed in a way to minimize both their environmental and visual impact. Routing and alignment have limited overall length and where possible the collector line corridor and road have been collocated to minimize visual intrusion and provide a better fit with existing landscape. Exh. Pet.-DR-2 at 10.

231. The turbines will be of a light grey or white color allowing them to blend readily into the background of the sky color, which for 278 out of 365 days, or over 75% of the time, is either overcast or partly cloudy – typically resulting in a white, light or grey colored sky. Exh. Pet.-DR-2 at 22.

232. Turbines will be lit in accordance with Federal Aviation Administration ("FAA") lighting guidelines. Exh. Pet.-DR-2 at 44; Pughe reb. at 5-6. Vissering pf. at 14-15.

233. The visual impacts of the Wind Farm will be adverse due to the level of its visibility. Vantage points from which the Wind Farm will be visible include Belvidere Mountain, Little Hosmer Pond, and portions of the Bayley Hazen Road (including at the Nelson Farm) and other nearby areas. The Wind Farm will also be visible from some points along the Long Trail within the ten-mile radius, including Belvidere Mountain fire tower, and Tillotson Camp. Vissering pf. at 4; Exh. Pet.-DR-2 at 49.

234. The Project will not violate any clear, written community standards intended to preserve the aesthetics or scenic beauty of the area. Neither the Lowell Town Plan nor the NVDA Regional Plan contain any provisions specific enough to constitute clear, written community standards. Exh. Pet.-DR-2 at 52; Tr. 2-9-2011 at 117 (Vissering); Kane surreb. at 10.

235. The Lowell Zoning Bylaws lists "windmills" as a conditional use in the district in which the Wind Farm is located. Exh. Pet.-DR-2 at 52.

236. GMP has taken all generally available mitigating steps which a reasonable person would take to improve the harmony of the proposed project with its surroundings. Kane surreb. at 11.

237. These mitigation steps include the siting of the Project components, efforts to avoid unnecessary cutting of vegetation, co-location of the collector line and access road, and feathering of vegetation on the edge of the power line corridors. Exh. Pet.-DR-2 at 57-58, 61.

238. Removal of one project turbine would result in a forecasted levelized cost of the Project to increase from $0.103/kwh to $0.1046/kwh, removal of 2 turbines would increase the cost to $0.1066/kwh, and removal of 3 turbines would increase the cost to $0.1089/kwh. Pughe reb. at 4.

239. Removal of three turbines would not substantially change or mitigate the Project's visual presence. It will still be observed as a linear array of turbines along the Lowell Mountain Range. Raphael reb. at 13:9-11; *compare* Exh. Pet.-DR-2, Appendix 9G (Revised) (Alternative Visual Simulation from Tillotson Camp, Lowell) *with* Exh. Pet.-DR-2. Appendix 9G (Revised) (Visual Simulation from Tillotson Camp, Lowell).

240. The Project site has significant environmental and engineering constraints that preclude movement of turbines to the west. The combination of bear-scarred beech trees (indicative of bear habitat), wetlands, and steep grades seem to limit the flexibility of the site to adapt to design modifications intended to reduce visual impacts. It clearly is not reasonable to shift impacts from one environmental resource to another, particularly when other environmental resources are regulated (i.e. wetlands and habitats) by other state and federal agencies. Kane surreb. at 12.

241. If possible, GMP intends to install a lighting system commercially known as the Obstacle Collision Avoidance System ("OCAS"), a radar system that detects in-bound aircrafts that will pass within a specified distance of the Project and then turns on the FAA lights (at night only) and broadcasts a radio warning to pilots. Although the FAA has approved use of the OCAS system for other applications, it has not yet approved its use for wind turbines, although it is scheduled to address this issue in the next several months. Vissering pf. at 14-16; Pughe reb. at 5; Tr. 2-3-2011 at 43-44, 51 (Pughe).

242. It is likely that OCAS will require an 18 meter radar tower located off the Wind Farm site to the south, requiring a 75-foot by 100-foot cleared area. GMP is actively pursuing this location and will file a request for Board approval once the required analyses have been completed. Tr. 2-3-2011 at 45-46 (Pughe).

243. Installation of OCAS is not essential to avoid undue adverse impact on aesthetics, due to limited nighttime viewing, the distance of the turbines from Tillotson Camp and the fact that other nighttime views, without the lights prominently in view, are possible from the vicinity of the Camp. Raphael reb. at 9-10, 11-12; Pughe reb. at 6.

244. Even if OCAS cannot be implemented, the impacts of the turbine lighting will be adequately offset by the decommissioning and revegetation requirements described below. Tr. 2-9-2011 at 120-21 (Vissering); findings __ through __ (Wildlife).

245. Interpretative information about the view contained online and on-site signage would be an appropriate mitigation measure. It could highlight and address the connection with forest health and recreation, global warming, and wind power, in terms of the overall efficacy of this form of power production in relation to its environmental footprint. Raphael reb. at 13; Exh. Pet.-LP-1 at 24.

246. The average person viewing the Wind Farm would not be shocked or offended because there are limited designated public vantage points from which to clearly see the Project, and the majority of the public viewing areas are at a sufficient distance from the proposed turbines that the turbines would not dominate the view. Views are generally two or more miles away, with most visibility beyond five miles. In fact, the average distance of the nearest turbine

to a public vantage point or area is approximately six miles. Exh. Pet.-DR-2 at 2-28, 57, App. 3; Vissering pf. at 20-21.

247. The impact of the views are lessened by the relative distance of most views, the limited duration and context of most of the nearby views, the fact that the area landscape is not pristine and the long tradition of resource use. Exh. Pet.-DR-2 at 60-61.

248. According to Mr. Kane, views of a project are shocking and offensive if they involve a scale (ratio of project height to height of land mass plus project) of greater than 25% and a Vertical Visual Angle ("VVA") (degree to which the object is above the horizontal plane) on the order of 14.8. The only area identified by Mr. Kane meeting these criteria is the area around New Road, Old Road, and the Bayley Hazen Road, west of Route 14 and within 2.25 miles of the Wind Farm. Beyond this distance, the scale is less than 25% and the VVA is less than eight degrees. Exh.-DPS-MK-2 at 16; Tr. 2-9-2011 at 31-34, 37-38, 40-41 (Kane).

249. The VVA analysis was developed in connection with evaluating annoyance-related impacts associated with noise and is not an accepted evaluation tool for assessing visual impacts. Raphael reb. at 4, 5-6.

250. Although Mr. Kane testified that there are approximately 120 residences in this area, his Exh. MK-SUR-1 reflects on the order of 20 "key viewpoints" within this area, mostly located off the road and therefore associated with private homes. Exh. DPS-MK-SUR-1; Tr. 2-9-2011 at 40 (Kane).

251. The only public sections of this area are the roads themselves, for which the use is rarely stationary. Farther east of this area, the scale of the Project is sufficiently diminished so as to be below the threshold associated with shocking and offensive. The use of the Bayley Hazen Road within this area is limited and to a large extent involves activities (i.e. snowmobiling) that are less susceptible or sensitive to adverse visual impacts, and the views are of short duration and the primary focus is away from Lowell Mountain to the east and northeast. The Bayley Hazen Road is not well-travelled, moreover, as it is not readily passable for passenger cars in the summer or maintained in the winter. This level of visibility, and the lack of significant numbers of viewers reduces the impact and keeps it from rising to an undue level. Raphael reb. at 5-6; Exh.-DPS-MK-2 at 16; Tr. 2-9-2011 at 31, 40-41 (Kane).

252. The area of increased impacts to the area around the southern end of the Bayley Hazen road area are relatively small when compared to the overall 10-mile Project area. *See* finding directly above.

253. Based on the number of individuals who would experience an adverse aesthetic impact, even if considered to be undue, this impact is outweighed by the overall Project benefits. Lamont surreb. at 6-7.

254. GMP will use low-growth vegetation and serpentine edge trimming to minimize the visual impact of the cleared corridor. Pughe pf. at 8.

255. Public support for Wind Farms in growing in Vermont. The results of the recent statewide Deliberative Poll on "Vermont's Energy Future" indicate strong support for the installation of wind towers. Participants strongly favored energy obtained from renewable sources to meet Vermont's future electricity needs. Only about 10% were extremely concerned about the visual impact of Wind Farms on Vermont's scenery and 90% supported (74% strongly) a Wind Farm's being built if it were visible from where they live. Exh. Pet.-DR-2 at 54.

256. In a study conducted for the Redington Wind Farm in Maine, results from responses of hikers who used the trails surrounding the proposed project revealed that the Wind Farm would have neither a negative nor positive impact on hikers' views from area mountaintops, with the average person still placing a positive scenic value on the view. Exh. Pet.-DR-2 at 55.

257. The results of the study also showed that respondents believed that views of a Wind Farm had a less negative effect on the hiking experience than views of other forms of human activity, like ski trails and facilities, roads, power lines, developed areas, clear cuts, and other industrial facilities. Exh. Pet.-DR-2 at 55.

258. There is substantial community support for the Project. See findings __ through ___, (Orderly Development).

259. The Transmission Component would not shock or offend the average person because such transmission corridors are present throughout the state. The proposed upgrades to the transmission system are consistent with what people already see in the landscape and are not so extensive that they will result in any additional impacts that could be considered undue. Exh. Pet.-DR-2 at 59.

Discussion

The Board has consistently applied the Quechee analysis in determining whether a proposed project has an undue adverse effect on aesthetics.

> Pursuant to this procedure, first a determination must be made as to whether a project will have an adverse impact on aesthetics and the scenic and natural beauty. In order to find that it will have an adverse impact, a project must be out of character with its surroundings. Specific factors used in making this evaluation include the nature of the project's surroundings, the compatibility of the project's design with those surroundings, the suitability of the project's colors and materials with the immediate environment, the visibility of the project, and the impact of the project on open space. The next step in the two-part test, once a conclusion as to the adverse effect of the project has been reached, is to determine whether the adverse effect of the project is "undue." The adverse effect is considered undue when a positive finding is reached regarding anyone of the following factors:
>
> 1. Does the project violate a clear, written community standard intended to preserve the aesthetics or scenic beauty of the area?
> 2. Have the applicants failed to take generally available mitigating steps which a reasonable person would take to improve the harmony of the project with its surroundings?
> 3. Does the project offend the sensibilities of the average person? Is it offensive or shocking because it is out of character with its surroundings or significantly diminishes the scenic qualities of the area?[25]

There is no disagreement that the Project will have an adverse impact. The only issue is whether the adverse impact is undue. Based on the findings and the discussion below, the Project will not have an undue adverse effect on aesthetics.

The Project does not violate a clear written community standard intended to preserve the aesthetics of the area. Such a standard must be "'intended to preserve the aesthetics or scenic beauty of the area' where the proposed project is located and must apply to specific resources in the proposed project area."[26] Nothing in the Lowell or NVDA plans specifically address specific resources on Lowell Mountain. It is not appropriate to rely on the Lowell Zoning Bylaws as a

[25] Deerfield Order at 61.
[26] Sheffield Order at 66.

community standard for purposes of the Quechee analysis, because towns often grant exceptions and they could have the effect of mandating a Section 248 outcome, even though municipal enactments are not controlling.[27] In addition, the Project is permitted under the bylaws as a conditional use.

The Petitioners have also taken generally available mitigating steps that a reasonable person would take, as a result of the revegetation obligations contained in the ANR MOU, their efforts to implement the OCAS system, and the fact that a reduction in turbine height or size, or turbine relocation would have an adverse economic impact.

The DPS claims that the Project is shocking and offensive to the average person, in an area adjacent to the Bayley Hazen Road, almost entirely due to the scale of the Project relative to the ridgeline and its height above the viewer from this location. The DPS's conclusion was based on the so-called VVA analysis, which the Board has not previously employed and which has been used only for evaluating noise-related impacts. Even if the Project were considered to be shocking and offensive in this area, the affected area is a very small portion of the Project area, consisting on the order of 20 homes. This is too small an area to form the basis for rejecting the Project.[28] Finally, any claim that the Project is shocking and offensive in the limited area at issue is outweighed by the significant societal benefits provided by the Project, reviewed above.[29]

Noise

260. The Project will not produce undue noise levels with respect to health or aesthetics. This finding is supported by findings ___ through ___ below.

Turbine Ratings, Modeling Results

261. Although turbines for the Project have not yet been determined, Petitioners conducted sound modeling on the four models of wind turbines being considered. The guaranteed

[27] Georgia Order at 53-54.
[28] *See* Sheffield Order at 69 ("majority of the views of the Project are from a distance such that the size would not be overwhelming"); Deerfield Order at 62.
[29] *See* East Haven Order at 102.

maximum sound power from the V90 is 107 dBA and for GE 2.5 xl is 106 dBA which translates into an approximate sound pressure level of 56 and 55 dBA at 200 meters from the turbine base. The guaranteed maximum sound power for the Siemens SWT 3.0 101 is 107 ±1.5 dBA and for the Vestas V112 is 106.5 ±2.0 dBA. Exh. Pet.-KHK-2 at 23; Exh. Pet.-KHK-2 (Supp.) (Revised) at 2.

262. Petitioners' consultant, Resource Systems Group ("RSG") conducted sound modeling for the Project using Cadna A, an internationally accepted acoustical modeling used by many other noise control professionals in the United States and abroad. The software has a high level of reliability and follows methods specified by the International Standards Organization ("ISO") in their ISO 9613-2 standard, "Acoustics – Attenuation of sound during propagation outdoors, Part 2: General Method of Calculation." Exh. Pet.-KHK-2 at 25.

263. RSG utilized two different sound modeling methodologies using as its basis the ISO 9613-2 standard, which has been found to yield the most accurate yet conservative results using modeling parameters developed specifically for wind turbines. Their first methodology assumed hard ground over the entire modeling area, similar to a paved surface with no vegetation. As an additional measure, 1 to 2 dB was added to the manufacturer's nominal sound power. These modeling parameters applied by RSG will tend to over-estimate the resulting sound levels from wind turbines. The second methodology took into account the frequency of the varying meteorological conditions over the year. This method resulted in even more conservative results. Exh. Pet-KHK-2 at 24-30.

264. Sound modeling for 21 Vestas V90 and for 20 GE 2.5xl revealed dBA levels below the Board standard of 45 dBA (exterior) (Leq) (1hr). Exh. Pet-KHK-2 at 26.

265. Although the sound modeling for the worst-case levels for the Siemens SWT 3.0 101 and Vestas V112 exceeds the Board standard, both models can be operated in an NRO mode that reduces sound levels to below the Board standard. Kaliski reb. at 27.

266. No witness other than Mr. Kaliski presented sound modeling results for the Project. Instead, they merely used Mr. Kaliski's results. Blomberg surreb. at 3.

Sound Monitoring

267. Mr. Kaliski presented sound measurements for six sites adjacent to the Project measured over seven to eight day periods. The resulting sound levels ranged from 25 to 43dBA (L50)(night). Exh. Pet.-KHK-2 at 22.

268. The only other monitoring results, presented on behalf of LMG, reflected very limited measurements taken within a two-day period. Tr. 2-22-2011 at 223 (Blomberg).

269. For instance, the measurements at the McGrath property aggregated 31 minutes in a single hour. Tr. 2-22-2011 at 224 (Blomberg).

270. LMG's measurements were designed to eliminate common rural noises, such as wind, rain, dogs barking, and cars. James pf. at 6-7; Tr. 2-22-2011 at 226-28 (Blomberg); Exh. LMG-LB-11 at 3 (sampled dBA of 22.5-27.8 dBA excluded dog barking (31 dBA) and car passing (45.3 dBA)).

Existing Noise Standards

271. The Board's approved sound standard of 45 dBA (exterior) (Leq) (1hr) and 30 dBA (interior bedrooms) (Leq) (1hr) is sufficient to protect human health and avoid sleep disturbance. McCunney reb. at 4.

272. It is equivalent to, if not more stringent than, the 2009 World Health Organization ("WHO") Europe Noise Guidelines (40 dBA (exterior) (night) (annual)) that Dr. Irwin found sufficiently protective of public health. Irwin pf. at 2; Kaliski reb. at 3.

273. For wind turbines, a guideline based on an annual average is equivalent to a standard based on a one hour maximum of at least 5 dBA higher because wind turbines do not continuously operate. Even during operation sound levels vary due to range in output, wind direction, and meteorological conditions. As a result, the Board standard of 45 dBA (exterior) (Leq) (1 hr) is equivalent to, if not more conservative than, the WHO Europe guideline and is the appropriate standard to use. Kaliski reb. at 3.

274. The Board standard is also more stringent than the 1999 WHO standard of 45 dBA (exterior) (night) because it does not allow the average in any hour to exceed the 45 dBA limit,

whereas the 1999 WHO Guideline allows 45 dBA to be exceeded on average in any given hour so long as the nighttime average does not exceed 45 dBA. Exh. Pet.-KHK-2 at 11.

275. The Board's standard is also supported by studies undertaken in the states of Wisconsin and Maine, and the province of Ontario. The Wisconsin and Maine studies support a standard of 45 dBA(night), and the Ontario study refers approvingly to the WHO standard which is more lenient than the Board's standard. McCunney reb. at 12; Exhs. Pet.-RJM-2, 3, 4.

276. The Environmental Protection Agency ("EPA") Sounds Levels Document identifies a level of 55 dBA(exterior)(Ldn) as the level that is protective of human health and welfare. Blomberg surreb. at 21.

277. This is the equivalent of the 45 dBA during the night and 55dBA during the day, averaged over the year. Exh. Pet.-KHK-2 at 7.

278. All residences are greater than 3,200 feet from the nearest turbine. This exceeds the Congressional Research Service, National Academy of Sciences, and BLM guidelines for a setback outside of which noise is generally not an issue. Kaliski pf. at 4.

Health Impacts

279. The WHO guidelines on noise represent a consensus view of international expert opinion on the lowest noise levels below which the occurrence rates of particular effects can be assumed to be negligible. Exceedences of the WHO guideline values do not necessarily imply significant noise impact and indeed, it may be that significant impacts do not occur until much higher degrees of noise exposure are reached. McCunney reb. at 4.

280. The 2009 WHO Guidelines indicate that the Lowest Observed Adverse Effect Level ("LOAEL") is 40 dBA (exterior)(night)(annual). The "LOAEL of night noise, 40 dB Lnight outside can be considered a health-based limit value of the night noise guidelines necessary to protect the public, including the most vulnerable groups such as children, the chronically ill and the elderly, from the adverse health effects of noise." Exh. ALB-RJ-5 at XVII, 109.

281. A sound level of 30 dBA at the building façade causes no measureable harm. James reb. at 2.

282. The risk of any direct adverse health effect at levels below 45 dBA is virtually non-existent. McCunney reb. at 3.

283. The amount of noise-induced sleep awakenings per year associated with 45 dBA(exterior) is essentially zero. Noise levels associated with sleep disturbances tend to be higher than 45 dBA. Exh. ALB-RJ-5 at 51; Tr. 2-23-2011 at 75 (James); McCunney reb. at 3; Kaliski reb. at 6-7.

Amplitude Modulation, Annoyance

284. All modern large wind turbines use an upwind design that has eliminated low-frequency thump with very high infrasound and low frequency harmonics caused by blade tower interaction. Kaliski reb. at 19-20.

285. There is still a modulation (swishing) of broadband sound created by the movement of the blade into and out of higher wind regimes, but it is not a pure tone low-frequency noise. Although there are rare reports of high amplitude modulation and thumping, it is not characteristic of a properly operating Wind Farm. Wind farm operators are generally motivated to fix these problems because they can also impact energy production. Kaliski reb. at 20.

286. Although LMG and Albany claim that wind turbine noise is more annoying than transportation noise, according to a report cited by Mr. James, "[i]t is not clear whether the constant and relatively rapid repetition of wind turbine sound beats will have more or less effect on sleep quality, compared to vehicle or airplane passages." James reb. at 3; Exh. ALB-RJ-6 at 83.

287. Some people may be annoyed at the presence of sound from wind turbines, or its fluctuating nature, depending primarily on personal characteristics as opposed to the intensity of the sound level. Annoyance, however, is not a pathological condition, per se; the so-called "Wind Turbine Syndrome" is not a recognized medical disorder. McCunney reb. at 3.

288. Annoyance does not rise to the level of direct health impacts. Annoyance is not a recognized clinical diagnosis and its manifestations and definition vary considerably. McCunney reb. at 11.

289. At 45 dBA(exterior)(night), only .5% of the population complains at least annually. Exh. ALB-RJ-5 at 59.

290. Annoyance is an inaccurate measurement, of noise-related impacts, because it is self-reported, there is no objective unit of measurement and noise related annoyance is caused by a number of factors. For instance, the EPA Sound Levels Document uses terms such as "complaints" and "vigorous community reaction" without defining them. Similarly, the Pederson studies use the terms "slightly annoyed," "rather annoyed," and "very annoyed" without defining them. Mr. James created a definition of "likelihood" of complaints, without any measure of the percent likely or the type of complaint. Exh. LMG-LB-10 at 17, 20; Exh. Pet. Cross-3 at 3465; Tr. 2-23-2011 at 26-27 (James).

291. As an example of the lack of precision of the term "annoyed," the Pederson studies claimed that 28% were annoyed at the 37.5-40 dBA level in one study, yet only 6% annoyed in another study, without an explanation for the 360% difference in results. Exh. Pet. Cross-3 at 3465; Exh. Pet. Cross-4 at 483; Tr. 2-23-2011 at 65-66 (Lovko).

292. Noise-related annoyance relating to wind turbines is far more influenced by the visibility of the turbines and the existence of economic benefit than it is by noise. At 35 dBA, noise-related annoyance is somewhat lower than 20% where the turbines are visible and 0% where they are not and under both the "visible" and "non-visible" scenarios, there is essentially no increase in annoyance levels between <30 dBA and 40-45dBA. At 35 dBA, noise-related annoyance is 20% where there is no economic benefit and 0% where there is. Exh. Pet. Cross-5 at 638; Tr. 2-23-2011 at 32-33 (James); Tr. 2-23-2011 at 67 (Lovko).

Low Frequency, Infrasound

293. Infrasound occurs at frequencies less than 20 Hz. Essentially, the lower the frequency of a sound, the higher the sound pressure needed for the sound to be heard by the average person. There are, however, different levels of hearing sensitivity that may allow some people to hear high levels of infrasound. McCunney reb. at 5.

294. The results of studies on low frequency sound and infrasound from wind turbines indicated that infrasound is inaudible to even the most sensitive people 305 meters (1,000 feet)

from the wind turbines with the windows open or closed: low frequency sound above 40 Hz may be audible depending on background sound levels. McCunney reb. at 8.

295. The ground-borne vibrations from wind turbines are too weak to be detected by, or to affect, humans. McCunney reb. at 3.

296. While low frequency sound may be audible when not masked by man-made and natural background sounds, the level of low frequency sound from wind turbines usually contributes less to annoyance than a higher frequency sound. Kaliski reb. at 21.

Alternative Standards

297. LMG's witness recommended a standard of 35 dBA (exterior)(night)(1 hour) at the property line. Blomberg pf. at 15.

298. This standard is based on the 55 dBA level identified in the EPA Guideline Levels Document, adjusted downward by EPA adjustments of 20 dBA to reflect a rural community, no community experience with intrusive noise and impulsive noise characteristics. The adjustments were based on Figure D-7 of the EPA Guideline Levels Document, even though the document states that, for various reasons, it may be more appropriate not to incorporate these adjustments. Blomberg pf. at 15; Exh. LMG-LB-10 at D-21.

299. The EPA's definition of impulsive noise includes as examples sonic booms, gun fire, and explosions. Tr. 2-22-2011 at 232-33 (Blomberg).

300. The basis for a property line standard is unrelated to sleep disturbance, since it is unrelated to the location of the residence. Instead, it is based on the claim that there must be compensation for the inability to conduct undefined activities at the property line, a concept that is unsupported by reference to any legal principle or Board precedent. Such a standard would preclude any activity, such as increases in traffic, if it violated the property line standard. Kaliski reb. at 6; Tr. 2-22-2011 at 254 (Blomberg).

301. Mr. James recommended a second standard of 30 dBA (exterior)(night)(1hr). James reb. at 5-6.

302. This is the level associated with a soft whisper or below the levels at a library. It is minimally above the average level measured by Mr. Blomberg in a field near the Nelson

residence of 29.25 dBA. Exh. DPS Cross-3 at 3-2; Exh. LMG-LB-2011 at 2; Tr. 2-22-2011 at 265 (Blomberg).

303. There is no federal or state standard at the level of 30 dBA(exterior)(night) or lower. Tr. 2-23-2011 at 13 (James).

304. Dr. Lovko proposed a third standard of 35 dBA(exterior)(night)(Lmax). Lovko reb. at 11; Tr. 2-23-2011 at 62 (Lovko).

305. Although the EPA Levels Document makes clear that any sound standard should take into consideration issues relating to the cost and technical feasibility of a standard and the beneficial impacts of the activity subject to the standard, LMG's and Albany's witnesses chose not to do so. Tr. 2-22-2011 at 236 (Blomberg); Tr. 2-23-2011 at 36 (James); Tr. 2-23-2011 at 77 (Lovko).

Quechee Analysis

306. There is no quantitative noise standard in the Town of Lowell Zoning Bylaws or Lowell Town Plan. As a result, there is no clear written community standard in Lowell relating to noise. Exh. Pet.-KHK-2 at 7.

307. The Petitioners have taken generally available mitigating steps that a reasonable person would take. As with prior wind projects, the Petitioners will take all steps necessary to comply with the Board's noise standard, including use of NRO technology. Exh. Pet.-KHK-2 at 40; Exh. Pet.-KHL-2 (supp.) at 3.

308. Noise meeting the Board's standard is not shocking or offensive, because the standard is more stringent than generally-recognized standards (such as the 2009 WHO Guidelines) and because there is no basis for the claim that noise meeting the Board's standard would be annoying to any meaningful degree. Findings __ through __, above.

Sound Monitoring Plan

309. Petitioners have proposed to undertake a Board-approved post-construction sound monitoring plan that would include a complaint resolution procedure. Kaliski reb. at 24-26.

310. The monitoring plan would include the following provisions:

a. Duration: The monitoring plan would be implemented during the first 2 years after construction. Monitoring would not likely start until about three months after commissioning, to allow the operator to resolve any startup issues that may have arisen. One to two weeks of monitoring will be conducted to establish sound levels during various meteorological conditions.

b. Frequency: Monitoring would be conducted once during late fall, so as to capture a leaf-off condition, and once during late spring to early fall to capture a period when windows are more likely to be open.

c. Monitoring Locations: Preference will be given to monitor at Sites 1 through 5 from Figure 3 of Exh. Pet.-KHK-2. If complaints are filed within the first 1.5 years of operation, these sites may be replaced or supplemented to include at the complainant location.

d. Data to be collected: Data will be collected with averaging times between 1-second and no more than 10 minutes, to correspond with turbine SCADA data. Levels will include dBA, dBC, and 1/3 octave band spectra from 20 Hz to 10,000 Hz. Filters for high frequency insect noise may be implemented as needed. Other parameters may also be collected short-term on a case-by-case basis, such as 0.1 second data and frequencies down to 12.5 Hz. If noise reduced operational (NRO) modes are implemented, then monitoring may include short periods that have NRO turned off as a comparison.

e. Outside to Inside Level Reduction: Because measuring outside to inside reduction is intrusive, it will only be done at a complainant location and only with the permission of the homeowner. A standard such as ASTM E966-04 will be used. Absent that, a 15 dB reduction will be assumed.

f. Background Stations: Background will either be determined through comparison with pre-construction measurements, turbine shut-downs/outages, or some other methodology acceptable to the Department of Public Service and Public Service Board.

g. Reporting: The results will be compiled into a report for each monitoring season, which will include methodology, results, and conclusions. Background-adjusted values of L10, L50, L90, and Leq will be reported for each hour. Comparisons to modeled levels will be made. All raw data, meteorological conditions, turbine operating characteristics (to the extent this data is not confidential), and results will be made available to the Department of Public Service at its request.

h. Complaint Resolution: A process for complaint resolution will be established. At a minimum, it will include making available a 24-hour phone number to file complaints, information to be collected by the operator, a method for measuring or extrapolating sound levels during periods of high noise levels, and other administrative procedures. Beyond five years after construction, if no exceedences are found in that time, complaints will only

be addressed if they relate to malfunctions or maintenance issues at the wind farm.

Kaliski reb. at 24-26.

Discussion

The Project noise will not have an undue adverse effect on aesthetics. Although the Board has not applied the Quechee criteria to noise in its recent wind decisions (despite analyzing the issue under the aesthetics criterion) application of Quechee demonstrates that the Project noise will not have an undue adverse effect on aesthetics, based on the Board's noise standard of 45 dBA(exterior)(Leq)(1hr), 30 dBA(interior)(Leq)(1hr). [30]

Petitioners' aesthetics and sound experts concluded that the Project is adverse under the first part of the Quechee test because any noise that the turbines do emit will be out of character for its rural surroundings. However, the noise impacts are not unduly adverse. There are no clear written community standards either in the Town of Lowell or from state or federal government that apply to sound. The Board has its own noise standard applied to wind cases and the testimony and exhibits support that the standard as articulated in past Board precedent will be met.

In addition, Petitioners have taken the generally available mitigating steps in relation to noise that a reasonable person would take to improve the harmony of the Project with its surroundings. For example, the turbines are sited such that all residences are greater than 3,200 feet from the nearest turbine, and there are only seven to eight full time residences within a mile of the Project. Where there is a question as to whether a turbine being considered can consistently meet the Board noise standard, even in a worst- case scenario, those turbines can be equipped with a NRO mode. Finally, Petitioners will institute a post-construction sound monitoring plan that will include a complaint resolution procedure.[31] Petitioners have agreed that, prior to commencement of operations, they will submit to the Board for review and

[30] Georgia Order at 55-58; Deerfield Order at 64-67.
[31] Tr. 2-22-11 at 141 (Kaliski).

approval a post-construction noise monitoring plan to be implemented during the first two years after construction, consistent with the description contained in the findings.

While the noise impacts from the Project will be different than the current soundscape, the question goes beyond whether the sound levels are unusual or out of character. As the Environmental Board said in *Pike Industries*, "[t]he question, however, is not merely whether the noise from the Project is out of character with the surrounding area but whether it is so out of character as to be aesthetically shocking or offensive to the ordinary person."[32] The Environmental Board went on to find that the noise level, while possibly annoying, did not rise to the level of shocking and offensive.[33] The evidence in this case demonstrates that while it is possible that some people may find the noise from the Project annoying, the average person would not find that the level of intrusion by Project noise reaches the level of shocking and offensive. Given these conclusions, the noise generated by the Project does not present an undue adverse impact upon aesthetics.

Historic Sites
[10 V.S.A. § 6086(a)(8)]

311. The proposed Project will not have an undue adverse effect on historic sites. This finding is supported by findings ___ through ____, below.

Archeological Resources

312. The Project will not have an undue adverse impact upon archeological resources. Knight pf. at 1.

313. The Vermont Archaeological Inventory ("VAI") indicates no known precontact Native American archaeological sites exist within the proposed project area or within 5 km of the Lowell Mountains. Exh. Pet.-CK-2 at 3.

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[32] *Re Pike Industries, Inc. and Inez M. Lemieux*, #5R1415-EB, Findings of Fact, Conclusions of Law and Order, (Vt. Env. Bd., June 7, 2005) at 44.
[33] *Id.* at 45.

314. The closest known historic period archaeological site is VT-OL-58, located 4 km east of the Lowell Mountains along the banks of the Black River. This site represents the remains of a farmstead in the area. Exh. Pet.-CK-2 at 3.

315. During field investigations, no areas suitable for habitation were identified along the ridgeline of Lowell Mountain or on its slopes. The proposed maintenance shed is in a location that has been extensively disturbed by historic activities. Therefore the proposed turbine, upper portion of the access road and maintenance shed locations, as currently designed, will not affect sensitive archaeological areas. Exh. Pet.-CK-2 at 5.

316. The UVM Consulting Archeology Program ("UVM CAP") conducted a Phase I study of archaeologically sensitive areas previously identified along Route 100 and adjacent areas. Knight reb. at 1.

317. A study of the Transmission Line Component of the Project indicated six Archeologically Sensitive Areas. Although no archaeological sites have been found where studies have been completed, some areas have not yet been studied due to the lack of land owner permission. These sites are primarily along the Route 100 area. Knight reb. at 1.

318. Once Petitioners complete the remaining Phase 1 studies, if archaeological sites are found, Phase 2 studies will be required to evaluate the significance of the identified site. If the Phase 2 studies uncover culturally significant sites that cannot be avoided, Petitioners will undertake Phase III data recovery to recover samples. Knight reb. at 1; Exh. Pet.-CK-2 at 6.

319. The Project will not have an undue adverse effect on underground historic resources assuming the appropriate remaining archeological studies are completed in accordance with applicable requirements. Knight reb. at 2.

Above Ground Historic Resources

320. To conduct the analysis of the impacts on above ground historic resources, Petitioners' consultant conducted site visits to the surrounding area to identify districts or sites with significant historic buildings over fifty years of age, which were determined to either be within the Project's footprint or potentially have views of the Project. The Area of Potential Effect ("APE") comprises a 10-mile radius from the center of the proposed wind turbine

locations on the Lowell Mountains in the southeastern portion of the Town of Lowell. Exh. Pet.-LP-1 at 2.

321. Sixteen sites within the APE were identified as both important architectural resources, either listed on, or eligible for listing in the State or National Registers, and having the potential to be affected by the proposed wind turbine Project. Exh. Pet.-LP-1 at 9.

322. At a distance of 5 to 10 miles from the Project, the turbines would not dominate the viewshed due to their diminished size when observed from such a distance. If the turbines become visible as part of a broad viewshed, the turbines would only comprise a small portion of the viewshed and would not substantially alter the viewer's ability to appreciate the qualities of the overall landscape. No historic resources were found in the 5 to 10 mile radius that appear to have the potential for an adverse effect from the Project. The Tillotson Camp, located on the Long Trail, approximately 7 miles from the Project has been determined eligible for the National Register. The Project will be visible to the east from vantage points near the camp structure. Exh. Pet.-LP-1 at 10, 16.

323. From a distance of 3 to 5 miles, the visual impact of the turbines would not be remarkable as the turbines would appear as only a component of a broader landscape comprised of many other elements in the foreground, middle ground, and distance. The turbines will be evident in the viewshed, but they will not appear large or dominant in the landscape to the viewers' eye from that distance. No historic resources were found in the 3 to 5 mile radius that appear to have the potential for an adverse effect from the Project. Exh. Pet.-LP-1 at 17.

324. The only property with the potential for an adverse impact within the 0-3 mile radius is the Nelson Farm, located .83 miles from the Project. The Nelson Farm was placed on the State Register ("SR") in 2003. This property has the potential for impacts from the Project. Exh. Pet.-LP-1 at 7, 17.

325. The Nelson Farm retains a historic landscape with a high degree of integrity; however, the buildings have undergone some modern changes to design and materials primarily due to the addition of the attached garage and connector, and new windows on the farmhouse; modern metal siding on the barn; and the smaller, new barn. Exh. Pet.-LP-1 at 15.

326. It appears that the Project would have an adverse effect on the viewshed of the Nelson Farm when approaching it from the south on the Bayley Hazen Road when the turbines would be presented as clearly visible above the hillside backdrop. Although the turbines could appear as a focal point from this distance when approaching the site, the site would still be clearly read as a historic landscape, and the public would be able to appreciate the landscape even with the turbines in the background. Exh. Pet.-LP-1 at 20.

327. The Project will not result in any physical destruction, damage, or alteration of the qualities which make important resources historic, such as an existing structure, landscape or setting. Exh. Pet.-LP-1 at 19.

328. Overall, the Project will not have other effects on the historic structures, landscape, or setting which are incongruous or incompatible with the sites' historic qualities, including, but not limited to such effects as isolation of an historic structure from its setting, new property uses, or new visual, audible, or atmospheric elements. The one exception is at the Nelson Farm where the Project will have a new visual effect on the backdrop of the farm from some views; however the physical historic qualities of the farm will not be affected by the Project. Exh. Pet.-LP-1 at 19.

329. Petitioners have taken reasonable mitigating steps to preserve the character of the historic sites in the APE by selecting the location for the Project in a forested area that is undeveloped in terms of housing and other historic resources. Exh. Pet.-LP-1 at 19.

330. The Project will not interfere with the ability of the public to interpret or appreciate the historic qualities of the significant historic resources in the APE primarily because the Project is sufficiently distant from these resources, and the context of the areas surrounding some resources such as in the villages of Lowell and Eden have already undergone alteration and change due to modern encroachment or alterations to historic buildings. Even with the turbines as a backdrop, the Project will not interfere with the public's ability to interpret the historic qualities of the Nelson Farm, because the public will still be able to read the distinctive character of the farmstead, including the broad open fields to the east. Exh. Pet.-LP-1 at 19-20.

331. Throughout the entire length of the proposed transmission line, no significant historic resources or landscape features were determined to have the potential for adverse impacts.

Visual effects from the transmission line will not be substantially different than the existing impacts from the current transmission lines along Route 100 and 105. Exh. Pet.-LP-1 at 23.

Discussion

The above findings demonstrate that the Project will not have an undue adverse effect on historic sites. To determine whether a project has an undue adverse impact on historic sites, the Board relies on a three part test articulated by the Environmental Board in its *Middlebury College* decision.[34] The test first requires an analysis of whether the proposed site is historic, relying on the three ways under Act 250 that a site can be considered historic: (1) placement on the National Register of Historic Places; (2) placement on the Vermont register of historic places; and (3) persuasive evidence of historic significance brought before the Board or District Commission by the testimony of the Vermont Advisory Council on Historic Preservation.

If a site is considered historic, then the second part of the test requires an analysis of whether the proposed project will have an adverse effect on the historic site. Central to the determination of adverse effect is whether a proposed project is in harmony or fits with the historic context of the site. In evaluating "fit" the Board asks: "(1) whether there will be physical destruction, damage, or alteration of those qualities which make the site historic, such as an existing structure, landscape, or setting; and (2) whether the proposed project will have other effects on the historic structure, landscape, or setting which are incongruous or incompatible with the site's historic qualities, including, but not limited to, such effects as isolation of an historic structure from its setting, new property uses, or new visual, audible or atmospheric elements."[35]

If the project is considered adverse to a historic site, then the final step in the test is to determine whether the adverse impact is undue. "A positive conclusion on any one of the following guidelines can lead to a determination that an adverse effect is undue:

a. The failure of an applicant to take generally available mitigating steps which a reasonable person would take to preserve the character of the historic site.

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[34] *Re: Middlebury College,* No. 9A0177-EB, Findings of Fact, Conclusions of Law, and Order (Vt. Env. Bd. Jan. 26, 1990) at 9-10 ("Middlebury College").
[35] Sheffield Order at 78.

b. Interference on the part of the proposed project with the ability of the public to interpret or appreciate the historic qualities of the site.
c. Cumulative effects on the historic qualities of the site by the various components of a proposed project which, when taken together, are so significant that they create an unacceptable impact.
d. Violation of a clear, written community standard which is intended to preserve the historic qualities of the site."[36]

There was no evidence that any below-ground site is registered on the federal or state registries nor any evidence of historic significance sponsored by the Vermont Advisory Council on Historic Preservation. As a result, there are no below-ground sites that can be considered historic. The Petitioners have undertaken appropriate archeological studies to determine whether there are any archeologically significant areas, and will complete those studies once access to the remaining areas has been obtained.

Although sixteen above-ground sites within a ten mile radius of the Wind Farm meet the definition of historic and the potential for being impacted by the Wind Farm, from a distance greater than three miles from the Wind Farm, the turbines will not dominate the viewshed and will not substantially alter the viewer's ability to appreciate the qualities of the overall landscape. Although the effects of the Wind Farm on the Nelson Farm are substantial and will clearly impact the public viewshed of the property when approaching it from the south or north along the Bayley Hazen Road, the impact does not rise to the level of an undue adverse effect. Even with the turbines in the background of the Nelson Farm, the public will still be able to appreciate and interpret the site's historic qualities because the orientation of the property are to the east, away from the turbines.

The Board has traditionally focused its historic sites analysis almost exclusively on the visual and not auditory impact of a project upon a person's ability to appreciate an historic resource.[37] When the Board has considered noise impacts, mitigation measures designed to address other criteria have been determined to sufficiently mitigate against any noise impacts on historic sites.[38]

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[36] Middlebury College at 9–10.
[37] *See* Deerfield Order at 67-68; Sheffield Order at 78-81.
[38] Georgia Order at 64.

Rare And Irreplaceable Natural Areas
[10 V.S.A. § 6086(a)(8)]

332. The proposed Project will not have an undue adverse impact on rare and irreplaceable natural areas ("RINA"). This finding is supported by findings ___ through ____, below.

333. There are two uncommon natural communities (S3) found within the Wind Farm component of the Project: Montane Spruce-fir Forest Community and Montane Yellow Birch-Red Spruce Forest Community. Nelson pf. at 30; Exh. Pet-JAN-10, p. 13. The planned ridgeline conservation easement described below will aid in the re-establishment of natural communities at the Wind Farm site following decommissioning. Tr. 2-24-2011 at 228 (Sorenson).

334. The Transmission Component of the Project contains four additional uncommon (S3) natural communities: Silver Maple-Ostrich Fern Riverine Floodplain Forest, Northern White Cedar Swamp, Red Spruce-Balsam Fir Swamp, and 10 Vernal Pools (of which 4 are not considered viable). These communities are located either adjacent to or within the already existing ROW and will experience minimal to no impact due to their locations. Exh. Pet.-JAN-8, p. 5-6.

335. Petitioners and ANR agree that the Serpentine Outcrop site at West Farman Hill in the Town of Lowell is an "S1" or very rare natural community, and therefore could appropriately be determined by the Board to be a RINA. Nelson reb. at 8, 16; Exh. Pet.-JAN-8.

336. The current VEC ROW bisects this natural community. Exh. Pet.-JAN-8, p. 5.

337. Petitioners developed a vegetation management plan to ensure no adverse impact to the RINA and provide for the protection and sustained viability of the Serpentine Rock Outcrop habitat and associated rare vegetation during the Transmission Component construction and subsequent post-construction periodic maintenance. Nelson reb. at 17; Exh. Pet-JAN-13, at 1

338. GMP will prepare a revised vegetation management plan for ANR's review and approval. Exh. GMP-ANR-1 ¶ 7.

339. In the ANR MOU, GMP has committed to protect the Serpentine Outcrop with several measures. GMP will follow the November 18, 2010 Serpentine Outcrop management plan contained in Exh. Pet.-JAN-13, in order to minimize impact on the Serpentine Outcrop as

part of the transmission EPSC plan. In addition, GMP will provide for on-site review and oversight by an ANR-approved botanist during the construction of the transmission line upgrades at this location. Any seeding or planting in the area of the Serpentine Outcrop should be done in consultation with ANR. If acceptable to applicable federal and state agencies and not in violation of any federal or state regulations, the existing poles to be removed in this location will be cut flush with the ground and the pole butts will be left in place. The Serpentine Outcrop will be monitored for ten years from the date of first commercial operation for invasive species. Any species on the state Quarantine or Watch Lists will be removed by hand or per conditions below. Sorenson surreb. at 5 ; Exh. GMP-ANR-1 ¶ 6.

340. With the fulfillment of the commitments in the ANR MOU, the Project will have no undue adverse effect on any rare, threatened or endangered species or on any RINAs. Exh. GMP-ANR-1 at 2; Tr. 2-24-2011 at 195 (Sorenson).

Wildlife, Including Necessary Wildlife Habitat And Endangered Species
[10 V.S.A. § 6086(a)(8)(A)]

341. The Project will not destroy or significantly imperil necessary wildlife habitat or endangered species. This finding is supported by findings ___ through ____, below.

342. Necessary wildlife habitats as defined under Section 248(b)(5) have been identified for both white-tailed deer and black bear. Exh. Pet.-JAW-2, at 1.

343. The design of the Project has avoided much of the identified necessary wildlife habitat for bears. Where avoidance is not feasible, impacts on bear habitat, particularly Bear Scarred Beech trees can be sufficiently mitigated by the plans proposed by Petitioners resulting in no undue adverse impact on black bears. Wallin pf. at 3.

344. Under the ANR MOU, GMP will cause the following parcels, consisting of approximately 580 acres, to be conserved:

a. A 292 acre parcel to be conserved until 25 years after the completion of decommissioning, and will be subject to an ANR-approved forestry and wildlife habitat management plan that will preclude logging during April-May and September-November;

b. A 110.3 acre parcel to be permanently conserved, and will be subject to an ANR-approved forestry and wildlife habitat management plan that will preclude logging during April-May and September-November and preclude new roads other than for logging; and
c. A 178 acre parcel to be permanently conserved and that will preclude logging and new roads entirely.

Exh. GMP-ANR-1 ¶¶ 2.1-2.3.

345. Fragmentation impacts associated with the Project can be similar to those associated with timbering operations. Timber harvest creates clear cuts in a forest block, with associated canopy gaps. These cuts result in habitat loss, creation of forest edge, and reduction in size of contiguous forest patches. Gravel reb. at 7.

346. Under the ANR MOU, GMP will cause a portion the ridgeline to be subject to a permanent conservation easement following the decommissioning of the Project or another renewable energy project that receives a CPG from the Board or a telecommunications tower permitted by the appropriate permitting authority. The ridgeline easement will extend 500 feet on either side of the center line of the Project crane path, up to the primary landowner's property line, with the exception of all or a portion of the areas adjacent to turbines 1-5, 18-21. Exh. GMP-ANR-1 ¶ 3.1, Exh. A.

347. GMP has also agreed that prior to commercial operation of the Project, it will procure a prudent and timely conservation easement for wildlife connectivity to address fragmentation. ANR has committed to work collaboratively with GMP to achieve these outcomes. If GMP cannot procure such a conservation easement in proximity to the Project area, GMP and ANR will work in good faith to acquire connectivity easements of similar scale and ecological value. Exh. GMP-ANR-1 ¶ 3.2.

348. The Project will not commence commercial operation unless an acceptable easement is procured. Exh. GMP-ANR-1; Tr. 2-24-2011 at 200 (Sorenson).

349. Under the ANR MOU, GMP's decommissioning plan will be amended to include the following provisions:

a. Deep-ripping/scarification of the crane path and portion of the access road within the ridgeline easement area, contouring the surfaces to establish a substrate with micro-topography that will be more conducive to colonization by vegetation and establishment of organic material within the recontoured substrate;

b. Work in good faith with ANR to develop a five-year ridgeline monitoring and management plan and a ten-year non-native species monitoring and management plan;
c. Decommission all areas not involved in a future Board-approved renewable energy or telecommunications project ("Future CPG Project") upon cessation of Wind Farm operations and decommission areas involved in a Future CPG Project after cession of operations of the project; and
d. Develop a plan for removal of or revegetation over the crane path STPs.

Exh. GMP-ANR-1 ¶ 4.

Under the ANR MOU, GMP will stockpile cleared soils during construction and following final grading will spread organic material over rock fill, and revegetate the slopes with an appropriate mix. Exh. GMP-ANR-1 ¶ 5.

350. After the commencement of Project's commercial operations, scheduled Wind Farm capital maintenance will be planned to avoid fall (September through and including November) and Spring (April through and including May) feeding seasons for bears, but there will be no timing restrictions on emergency or ordinary Wind Farm maintenance activities. Exh. GMP-ANR-1 ¶ 2.5. Prior to commercial operation of the Project, GMP will develop a site access plan for the Wind Farm based on the Searsburg plan and to be approved by ANR prior to submission to the Board. Exh. GMP-ANR-1 ¶ 9.

351. Any undue adverse impacts of Project fragmentation have been adequately mitigated by the ANR MOU and GMP's commitment to seek a conservation easement to promote connectivity between and among relatively unfragmented wildlife habitats. Exh. GMP-ANR-1 at 2.

352. With the conservation of these parcels, and the fulfillment of the commitments that GMP has made in the ANR MOU, the permanent Project impacts on the natural environment will be adequately mitigated and the Project will have no undue adverse effect on the natural environment as set forth in 30 V.S. A. § 248(b)(5) (with due consideration having been given to the criteria specified in 10 V.S.A. §§ 1424a(d) and 6086(a)(1) through (8) and (9)(K)).

Black Bears

353. The Project will not have an undue adverse impact on bears, with the conditions imposed in this Order. This finding is supported by findings __ through __ below.

354. The Project will not adversely impact necessary black bear habitat. Wallin pf. at 3.

355. The final indirect and direct acreage is 146 acres of bear-scarred beech ("BSB") habitat within the defined investigation area. 20.7 acres will be directly impacted by the Project. Wallin reb. at 1; Exh. Pet.-JAW-4.

356. Petitioners intend to limit access to the Project site to only service vehicles once the Wind Farm is operational. Capital maintenance will be scheduled to avoid spring and fall bear feeding seasons. Wallin reb. at 5-6; Exh. GMP-ANR-1 at 7.

357. The three conserved parcels totaling approximately 580 acres contain valuable bear habitat, including BSB and wetlands, which are important bear habitat. Exh. GMP-ANR-1; Tr. 2-7-2011 at 39 (Wallin).

Deer and Moose Habitat

358. The Project will not have an undue adverse impact on deer and moose habitat. This finding is supported by findings ___ through ___ below.

359. The Project will not adversely impact necessary deer wintering habitat. Wallin pf. at 3.

360. The deer winter shelter ("DWS") habitat on the Wind Farm Component site has undergone various timber harvesting over the years. As such, the softwood canopy is not dense, and offers little shelter value. The cover that exists at the project site is of marginal value at best, consequently, there will be no significant impact. Exh. Pet.-JAW-2 at 2.

361. The transmission corridor runs largely adjacent to state and town roads and existing development meaning that wildlife habitat is already disturbed. Wallin pf. at 3.

362. Of the four DWS sites identified, two have topographic constraints that will minimize clearing (Sites 1 and 2) and two have opportunity for realignment to limit expansion to only one side of the existing corridor, avoiding more valuable habitat (Sites 3 and 4). Wallin pf. at 5; Exh. Pet.-JAW-3.

363. Moose winter concentration areas found within the Project boundaries are not classified as necessary wildlife habitat as defined in the regulatory process. Exh. Pet.-JAW-2 at 5.

Birds and Bats

364. The Project will not have an undue adverse impact on bats, with the conditions imposed in this Order. This finding is supported by findings ___ through ___ below.

365. GMP conducted on-site acoustic surveys to document bat activity between April 15 and October 15, 2009. GMP's risk assessment indicated that there is a potential risk of direct impacts to bats, and the magnitude of impact is expected to be moderate. On-site acoustic surveys documented typical species composition of bats, with silver-haired bats, a long-distance migrant, well-represented by acoustic detectors recording at or above tree canopy height. Overall acoustic activity rates above tree canopy were low compared to other Vermont studies. Gravel pf. at 7-8.

366. Results from post-construction surveys at regional facilities indicate that collision mortality occurs at wind facilities in the Northeast; bats are most vulnerable to collision mortality during the fall migration period; and long-distance migratory bat species (silver-haired bat, red bat, hoary bat) have comprised the majority of fatalities, although there is variability in rates of mortality and species composition at different sites. Therefore, Petitioners expect patterns of collision mortality at the Project to be most similar to patterns at operational projects in New England, where topography and habitat are most similar to the Project, and where low levels of bat mortality have been documented. Gravel pf. at 8.

367. Petitioners' bat risk assessment also indicated that there is a potential for indirect impacts to bats, since removal of tree roosting habitat during construction is likely not outweighed by the creation of additional foraging habitat associated with turbine pad clearings and increased forest edge. However, the magnitude of indirect impacts is expected to be low, given the large forest blocks surrounding the Project area and the disturbed nature of some habitats within the Project area as a result of current timber harvest. Further, no potential day-roosts for small-footed bats were identified during a habitat assessment for this state-threatened

species. Since small-footed bat mortality has not been documented at existing wind facilities to-date, and no potential day-roost habitat near the Project area was identified, it is expected that there will be no undue adverse impact to the species. Gravel pf. at 8.

368. Most studies of wind facility development and displacement of songbirds are inconclusive, due to study designs that do not utilize "BACI," or before-after-control-impact, assessments. Natural fluctuations in population size cannot be separated by changes to a forest as the result of a Wind Farm. Information is especially limited for existing wind facilities in the East on forested mountain ridges. Gravel reb. at 5.

369. Risk assessment studies concluded that the magnitude of impacts on breeding birds is expected to be low, since (1) research indicates that birds are less prone to collision mortality during the breeding season than during migration, (2) there is a history of forest disturbance in the area due to timber harvest, and (3) many of the common species in the Project area are edge-associated species which are expected to become habituated to the presence of turbines. Based on comparison to regional surveys conducted at lower elevations in adjacent valleys with more diverse habitats, breeding bird diversity is relatively low within the Project area. Gravel pf. at 7. Exh. Pet.-AJG-2 at E.1, E.2.

370. Potential impacts to nocturnally migrating passerines are expected to be minor. Although onsite field surveys documented nocturnally migrating passerines moving through the Project area in relatively low to moderate numbers compared to regional survey results, the vast majority of individuals were flying at consistently high altitudes above the height of the proposed turbines. Exh. Pet.-AJG-2 at 40.

371. Potential impacts on raptors are expected to be minor. Relatively low numbers of raptors appear to pass over the Project during the spring breeding season and no breeding raptors were detected. Exh. Pet.-AJG-2 at E.1.

372. No Bicknell's thrush were observed in the Project area during breeding bird surveys. Gravel pf. at 7.

373. Both migratory and resident bat species were detected at the Project. Acoustic radar calls were most often identified as belonging to the BBSH (big brown bat/silver-haired bat)

guild, and the majority of these were further identified as silver-haired bats. Exh. Pet.-AJG-1 at 56.

374. Low passage rates for on-site radar were observed for both raptors and nocturnally migrating songbirds compared to regional surveys, supporting the conclusion that Project impacts on these populations will be low. Gravel pf. at 5-6.

375. There is no reliable way to distinguish birds from bats during radar data analysis, so results refer only to "targets." However, given that the number of potential bird species migrating across the Project area far outweighs the nine species of bats known to occur in Vermont, it is likely that the pool of observed targets is composed of a higher percentage of birds than bats. Gravel pf. at 5.

376. The vast majority of targets observed during on-site radar surveys were flying at consistently high altitudes above the proposed turbine height. Gravel pf. at 6.

377. Impacts on birds and bats are expected to be similar to those at other projects located in areas of similar habitat and topography. Existing facilities in New England, where topography and habitat are most similar to the Project area, have documented low levels of nocturnally migrating songbird and bat mortality relative to facilities outside of New England. Patterns of mortality are expected to be similar to those expected at Sheffield and Deerfield, since results of on-site surveys at the Project area are similar to results from surveys conducted at these wind facilities. Based on Petitioners' analysis, the Project will not have an undue adverse impact on raptors, nocturnally migrating songbirds, breeding birds or bats. Gravel pf. at 9. Exh. Pet.-AJG-2 at E.4.

378. A Memorandum of Understanding between GMP and ANR addressing birds and bats ("Bird and Bat MOU") addresses survey methods for monitoring direct impacts to birds and bats, and provides a framework for evaluating the survey results in order to develop an operational strategy that is acceptable to all parties. The Bird and Bat MOU requires Petitioners to conduct three years of post-construction monitoring to be performed at the Wind Farm site for bird fatalities, and one year of post-construction monitoring for bat fatalities. At the end of the survey period, results will be jointly reviewed and evaluated by ANR and Petitioners to determine the most effective means of limiting bat mortality to the bat fatality thresholds set out by ANR.

Once mortality monitoring is complete, an operational strategy will be developed and implemented at the Wind Farm. It is expected that implementation of the Bird and Bat MOU will mitigate any adverse impacts resulting from bird and bat collisions so that they are not unduly adverse. Gravel reb. at 4; Exh. ANR-SD-2.

379. With respect to birds and bats, GMP and ANR agreed that there are to be no restrictions regarding the construction, operation or maintenance of the Project, except that turbine operating parameters shall be curtailed as specified in the bat section of the post-construction bird and bat study to be conducted at the project site, in accordance with the terms of the Bird and Bat MOU. Exh. ANR-SD-2.

Rare, Threatened or Endangered Species

380. The Project will not have an undue adverse impact on rare, threatened or endangered species. This finding is supported by findings ___ through ___ below.

381. No federally or state listed threatened or endangered species were observed in the Project area during breeding bird surveys. Gravel pf. at 7. Exh. Pet.-AJG-2 at E.3.

382. Of the nine species of bats occur in Vermont, the eastern small-footed bat is state-listed as threatened, with a rank of SI ("Critically Imperiled"), and the Indiana bat is listed as endangered, under the Vermont Endangered Species Law. Because the proposed Project is outside the known range of the Indiana bat, but within the range of the eastern small-footed bat, it was necessary to conduct additional habitat investigation for the eastern small-footed bat. Results show there was no potential eastern small-footed bat habitat detected within the 3-mile Project area buffer during the remote assessment or site visits. Exh. Pet.-AJG-1 at 57, 59.

383. Within the Wind Farm Component, field surveys revealed one occurrence of a state protected plant Male Fern (*Dryopteris filix-mas*). The Project has been designed to avoid impacts on the Male Fern. Nelson pf. at 29.

384. In order to ensure no undue adverse impact on rare, threatened or endangered species ("RTE"), the Petitioners also proposed an invasive species monitoring plan consistent with the one adopted in Docket 7500. Nelson reb. at 18-20.

385. Based on VHB's mapping, GMP will take the following actions to protect rare plants. There will be a 100-foot flagged protective buffer around the male fern, at the locations identified in Exh. Pet-JAN-10, which includes GPS locations of all identified examples of male fern. If greater than 25% of the population of boreal bedstraw (*Gallium kamtschaticum*), or three-leaved rattlesnake root (*Nabalus trifoliolatus*) is to be adversely affected by construction, the plants shall be transplanted and/or seeds collected for propagation adjacent to the disturbed areas. Exh. GMP-ANR-1 ¶ 6; Sorenson surreb. at 5; Exh. Pet. JAN-13.

386. Under GMP's agreement with ANR, prior to any routine vegetation management occurring in the area of the Serpentine Rock Outcropping, a qualified botanist will flag and delineate the Green Mountain maidenhair fern and large-leaved sandwort or alternatively the area containing them. Mechanical clearing will be done during the dormant season. There will be no foliar herbicide application within this area. Cut stump application of herbicide may occur if farther than one meter from any individual of the Green Mountain maidenhair fern or large-leaved sandwort. Exh. GMP-ANR-1 ¶ 7; Sorenson reb. at 5; Exh. Pet. JAN-13.

387. Prior to the commercial operations date, GMP will develop with ANR and file with the Board for approval the invasive species management plan as described above. Exh. GMP-ANR-1 ¶ 6.

Discussion

In its direct testimony, ANR raised concerns relating to the Project, primarily relating to bear habitat, certain natural communities, and potential fragmentation. As a result of the ANR MOU, and the earlier Bird and Bat MOU, and the Petitioners' obligation (enforceable by the Board) to comply with their terms, ANR's concerns have been addressed.

Development Affecting Public Investments
[10 V.S.A. § 6086(9)(K)]

388. The Project will not unnecessarily or unreasonably endanger the public or quasi-public investment in public facilities, services, or lands, or materially jeopardize or interfere with the function efficiency, or safety of, or the public's use of enjoyment of or access to public facilities, services, or lands. This finding is supported by findings __ through___, below.

389. The Kingdom Community Wind Project does not directly abut any public investments, other than Route 100, which lies at the base of the Project site. Exh. Pet.-DR-2 at 69.

390. While there will be an adverse impact to a few locations on the Long Trail within the 10 mile viewshed radius, those impacts will not endanger the public in any fashion, rise to the level of undue, adverse impact, or unduly interfere with the public use and enjoyment of the trail, because of the limited exposure of the Project to hikers using the Long Trail, the distance of the Project from the Long Trail, and the fact that a large portion of the users of this resource will find the limited visibility of the Project acceptable and understand its need and purpose within the larger context of environmental concerns. Exh. Pet.-DR-2 at 70.

391. The Catamount Trail, located along the eastern base of Lowell Mountain and then climbing over the ridge at a location north of the Project, will be within view of the Project for a distance of approximately 0.7 of a mile. This stretch of the trail is co-located with a snowmobile route, and travels through an active snowmobiling area, already altering the experience of the user in this area. Therefore, it cannot be concluded that the short distance within which one will have a view of the Project, although in relatively close proximity, will have an unduly adverse impact on the user's enjoyment or unduly interfere with their use of the resource. Exh. Pet.-DR-2 at 70.

392. There are a number of public investments within the viewshed of the Project, including public properties, schools, historic, and recreational resources. ANR has particularly identified the Wild Branch Wildlife Management Area ("WMA") as being within one mile of the Project. Exh. Pet.-DR-2 at 69; Buck pf. at 6.

Least-Cost Integrated Resource Plan

[30 V.S.A. § 248(b)(6)]

393. The proposed Project is consistent with the principles for resource selection expressed in the Petitioners' approved least cost integrated plans. This finding is supported by findings ___ through ____, below.

394. The most recently approved GMP Integrated Resource Plan indicated that robust GMP resource portfolios would likely include significant amounts of renewable generation, to the extent that they could be developed or purchased cost-effectively. Smith pf. at 15.

395. Section 11.3 of the VEC Integrated Resource Plan (T&D Action Plan) describes major capital projects required based on the corrective action plans developed as part of the following three efforts: (1) the Richford Accident Investigation performed by MPR Associates, (2) the System Condition Assessment performed by MPR Associates, and (3) VELCO's Analysis of VEC's 46 kV Transmission System. Specifically, the following projects are to be rebuilt or upgraded in the near future, all of which will be supported in part or fully funded as part of the Transmission Components of the Project: (1) the Jay Peak Tap Substation, (2) the Newport Center Substation Rebuild/Relocate, (3) the Lowell 5 / Irasburg 21 Consolidation & Refurbishment; and (4) the Jay / Troy Consolidations. Wright pf. at 6-7.

Compliance With Electric Energy Plan
[30 V.S.A. § 248(b)(7)]

396. The Project is consistent with the Vermont Twenty-Year Electric Plan. This finding is supported by findings ___ through ____, below.

397. The Project is consistent with the 2005 Vermont Electric Plan because it increases resource diversity, promotes clean and stable power sources and lowers the cost for electric service for customers. Smith pf. at 5.

398. On November 1, 2010, the DPS, in response to a request from Petitioners' under 30 V.S.A. § 202(f) determined that the Project was consistent with the *Vermont Electric Plan 2005*. Exh. DPS-DL-1; Tr. 2-24-2011 88-89 (Lamont).

Waste-To-Energy Facility
[30 V.S.A. § 248(b)(9)]

399. The Project does not involve construction of a waste-to-energy facility, therefore the criterion is inapplicable.

Existing Or Planned Transmission Facilities
[30 V.S.A. § 248(B)(10)]

400. The Project can be served economically by existing or planned transmission facilities without undue adverse impact on Vermont utilities or customers. This finding is supported by findings ___ through ___, above [System Stability and Reliability findings] and findings ___ through ___, below.

401. CVPS is the owner and operator of an adjacent electric distribution and transmission system.

402. The CVPS MOU addresses the joint development of mitigation strategies to address any impact by the Project's interconnection with the electric system so that it will not adversely affect the stability and reliability of CVPS's electric system. Exh. CVPS-1.

403. The proposed transmission route is the least cost transmission alternative. GMP-DPS-1 at 2 ¶ 4.

V. DECOMMISSIONING PLAN

Findings

404. The Project is expected to operate for 25 years, based on routine maintenance and component refurbishment, and for a longer period if the Wind Farm is repowered by refurbishing the turbines. Pughe pf. at 19.

405. At the end of the life of the Project, it will be decommissioned in a manner consistent with the Decommissioning Plan, as modified by the ANR MOU. See findings __ through __ above (Wildlife).

406. Under the Decommissioning Plan, decommissioning would consist of the following: (1) disassembling all turbines, including the rotors, nacelles, and tower sections and transporting off-site for reconditioning, salvage, recycling, or disposal; (2) turbine, maintenance building, and substation foundations to a depth sufficient to remove all anchor bolts, rebar, conduits, cable, and concrete to a depth of not less than two feet below grade; (3) removing the overhead power collection conductors and the power poles; (4) removing all underground infrastructure at depths less than two feet below grade; (5) abandoning all underground infrastructure at depths greater than two feet below finished grade; and (6) disassembling the

substation and interconnection facilities within those areas used solely for the transmission of electrical energy generated by the Project and removing, reconditioning, salvaging, recycling, or appropriately disposing of all components (including steel, conductors, switches, transformers, fencing, and control houses). The areas excavated during the decommissioning process will be graded to provide for permanent soil stabilization and to promote establishment of appropriate vegetation. Pughe pf. at 19; Exh. Pet.-CP-6.

407. The ANR MOU requires that the Decommissioning Plan be amended to include a site restoration plan approved by ANR, including deep-ripping/scarification of the crane path, turbine pads, and a portion of the access road, contouring of the surfaces to establish a substrate with micro-topography that will be more conducive to colonization by vegetation, establishment of organic material on this recontoured substrate, and a plan for removal of or revegetation over the stormwater management features for the crane path. Petitioners have agreed to develop a plan with ANR for the planting of vegetation in the prepared substrate as part of the decommissioning process. Determination of the appropriate vegetation shall be made at the time of decommissioning. A monitoring and management plan shall be agreed to between ANR and Petitioners, which shall provide for five years of monitoring of the decommissioned Wind Farm site. Exh. GMP-ANR-1 ¶ 4.

408. GMP shall provide for a Project decommissioning fund through accumulated depreciation. The estimated annual depreciation expense is $157,250/year, and the 25-year value of this fund is estimated to be approximately $3,931,250, before reflecting the slight increase due to the ANR MOU. Exh. Pet.-CP-6.

409. As a utility subject to the jurisdiction of the Board and the DPS, GMP is not required to post a letter of credit or similar security to the back decommissioning fund, nor to make the decommissioning fund bankruptcy remote to protect against creditor claims. Tr. 2-3-2011 at 104 (Pughe).

VI. Required Vote And Assessment Of Risks And Benefits

Section 248(c) requires VEC to conduct a vote on any proposed investment, construction or contract subject to this section.[39] Because VEC will co-own certain transmission facilities under the JOA that are subject to this CPG, VEC must obtain member approval for these transmission upgrades, and provide its members with a written assessment of associated risks and benefits identified by the Board and an assessment of any other risks and benefits determined by VEC. As VEC will neither be an owner of the Wind Farm Component nor constructing the Wind Farm Component and the REPA is not subject to Section 248, VEC only needs to conduct a vote for the transmission facilities it will co-own with GMP that are subject to this CPG (referred to as the "VEC Transmission Components").

The benefits associated with the VEC Transmission Components include increased reliability and cost savings. With respect to the increased reliability, the VEC Transmission Components will replace aged VEC facilities. With respect to cost savings, VEC stands to reduce its costs associated with owning and operating the VEC Transmission Components because GMP will share in the costs of constructing and operating these facilities. The risks associated with the VEC Transmission Components involve the limited environmental impacts associated with constructing the facilities and the financial costs of the upgrades.

VII. Post-Certification Review

The Board typically requires that design detail level plans be filed for Board approval prior to construction. Petitioners do not object to this practice in this case. Accordingly, GMP proposes that it shall file design detail plans with the parties and the Board for major project components, including access roads, collector lines, turbines, and the step-up station. GMP further proposes that the parties will have two weeks, from the date each set of plans are filed with the Board, to comment on the plans.

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[39] This statement reflects the law as it currently stands. However, VEC anticipates that a bill will be introduced that eliminates the member vote requirement for Section 248 projects.

VIII. CONCLUSION

For the reasons described above and subject to the conditions listed below, the Project will promote the general good, and a Certificate of Public Good shall be issued allowing its construction and operation.

IX. ORDER

IT IS HEREBY ORDERED, ADJUDGED AND DECREED by the Public Service Board of the State of Vermont that a 20-21 turbine 50-63 MW wind generation facility and the associated transmission and substation facilities located in Lowell, Westfield and Jay, Vermont will promote the public good of the State of Vermont subject to the following conditions:

1. Construction, operation, and maintenance of the Project shall be in accordance with the findings and requirements set forth in this Order.

2. The Petitioners shall file, for Board approval, final construction plans for the turbines, access roads, collector lines, transmission lines and substations. The Petitioners shall note any changes in the final plans from the plans approved by this Order. The Petitioners shall not commence construction on a project component until the associated plan is approved.

3. As part of its final design filing, the Petitioners shall identify the turbine model it will use.

4. The Petitioners shall obtain all necessary permits and approvals for the Project. Construction, operation, and maintenance of the Project shall be in accordance with such permits and approvals.

5. The Petitioners shall not commence construction of the Project until the VELCO Jay Tap Substation has received all necessary permits, except for AOT permits, the proposed amendment to the VEC Jay Tap Switching Station Section 248 approval has been received, and the VEC members have voted to approve the Transmission Component of the Project and the changes to the VEC Jay Tap Switching Station.

6. The Petitioners shall submit the final System Impact Study ("SIS"), and interconnection and substation plans to the Board, parties, and owners of the facilities to which the Project will interconnect, prior to commencement of construction of the Project. Prior to the Commercial Operations, the Petitioners shall implement any changes determined necessary by

the Board or ISO-New England to ensure system stability and reliability, and shall pay for any costs associated with such measures.

7. The parties shall have two weeks to comment on any filing requiring Board approval.

8. To the extent necessary, before operation GMP shall file an amended Lowell Agreement for Board approval to address ambiguities identified during the technical hearings. The Petitioners shall comply with the terms and conditions of the Lowell Agreement, including the requirement that Petitioners provide periodic training to local and regional first responders dealing with Project-related emergencies.

9. The Petitioners shall implement the Good Neighbor Fund.

10. The CVPS MOU is approved, and the Petitioners shall comply with all provisions of the CVPS MOU.

11. The DPS MOU is approved, and the Petitioners shall comply with all provisions of the DPS MOU.

12. The ANR MOU is approved, and the Petitioners shall comply with all provisions of the ANR MOU.

13. The Bird and Bat MOU is approved, and the Petitioners shall comply with all provisions of the Bird and Bat MOU.

14. Prior to construction, the Petitioners shall file for Board approval the Decommissioning Plan submitted as Exh. Pet.-CP-6, as amended by the ANR MOU.

15. Prior to construction, the Petitioners shall file a final blasting plan for Board approval. The blasting plan shall include the following conditions: (a) pre-blast surveys of wells and structures in the surrounding 2,500 foot radius area and a public information session with surrounding landowners to address concerns related to blasting; (b) blasting associated with construction of the Project shall be minimized to the extent practicable and performed only during the hours of 7:00 AM to 6:00 PM Monday through Friday; (c) all blasting shall be carried out by licensed and certified blasting technicians, carrying adequate insurance, and will be performed in accordance with any and all applicable laws and regulations, including, but not

limited to, U.S. Department of Interior Rules 816.61-68 and 817.61-68 and the Blasting Guidance Manual, Office of Surface Mining, Reclamation and Enforcement, U.S. Department of Interior to limit peak particle velocity and ground vibration to safe level, as well as those regulations and requirements established by the Vermont Department of Public Safety; (d) blasting mats will be used where needed to limit the occurrence of flyrock and dust migration; and (e) in the event surrounding landowners express concern regarding the impacts of blasting on wells or other structures on their property, the Petitioners shall perform evaluations to determine if any damage has occurred as a result of blasting activities and, if so, remediate any such damage. The Petitioners shall not commence construction until the plan is approved.

16. Prior to the scheduled delivery of any Wind Farm Component requiring oversize vehicles, the Petitioners shall file with the Board and obtain its approval of a Transportation Plan. The Transportation Plan shall incorporate the AOT overweight permit including: (a) provisions for emergency vehicle passage; (b) specific transportation plans with the Town of Lowell officials, including scheduling for oversized loads; and (c) plans for employing sheriffs or other trained traffic-control personnel to manage traffic flow, as necessary, during the delivery of oversized loads.

17. Contingent on FAA approval, the Petitioners will submit to the Board for review and approval a plan for the construction of the 18 meter OCAS radar tower located off the Wind Farm site.

18. The Petitioners shall construct and operate the Project so that it emits no prominent discrete tones pursuant to American National Standards Institute (ANSI) standards at the receptor locations and Project-related sound levels at any existing surrounding residences do not exceed 45 dBA(exterior)(Leq)(1 hr) or 30 dBA (interior bedrooms)(Leq)(1 hr).

19. Prior to commencement of operations, the Petitioners shall submit to the Board for review and approval a post-construction noise monitoring plan to be implemented during the first two years after construction, consistent with the description contained in the findings. Following the commencement of Project operations, the Petitioners shall complete the sound monitoring plan approved by the Board.

20. The Petitioners shall maintain a set-back distance of at least 60 meters between the bottom of each turbine tower and each nonparticipating property line.

21. The Petitioners shall file, for Board approval, an operating protocol, as described in the findings of fact, which will assure shut down of the turbines during icing conditions. The Petitioners shall not commence operations until the protocol is approved.

22. The turbine selected by the Petitioners shall meet the IEC 61400-1 or IEC WT01:2001 certifications, and the Wind Farm shall have heated wind sensors, and ice detectors and vibration monitors.

23. The Petitioners will evaluate each access road after construction to determine whether there are any specific bear crossings, and if identified, will take actions to preserve those crossing areas.

24. Prior to wind turbine installation, the Petitioners shall assess whether the Project will cause interference with off-air, i.e., broadcast, television reception at residences in the vicinity of the Project. The Petitioners shall perform such remediation as is necessary to mitigate any interference to residential reception occasioned by the Project following construction.

25. Prior to decommissioning of any Project substation, the Petitioners shall file, for Board approval, a plan for testing for contaminants and/or pollutants in the substation soil within the footprint of each Project substation.

26. The Petitioners shall conduct a post-construction survey to evaluate whether additional screening is needed at the Lowell 5 and Jay 17 Substations.

27. Once landowner access has been obtained, the Petitioners shall complete the remaining required archeological studies, including a Phase II site evaluation and Phase III data recovery if needed.

Dated at Montpelier, Vermont this ___ day of _____, 2011.

_____)
) PUBLIC SERVICE
)
_____) BOARD
)
) OF VERMONT
_____)

OFFICE OF THE CLERK

FILED: _____

ATTEST: _____

Clerk of the Board

NOTICE TO READERS: This decision is subject to revision of technical errors. Readers are requested to notify the Clerk of the Board (by e-mail, telephone, or in writing) of any apparent errors, in order that any necessary corrections may be made. (E-mail address:psb.clerk@State.vt.us)
Appeal of this decision to the Supreme Court of Vermont must be filed with. the Clerk at the Board within thirty-days. Appeal will not stay the effect of this Order, absent further Order by this Board or appropriate action by the Supreme Court of Vermont. Motions for reconsideration or stay, if any, must be filed with the Clerk of the Board within ten days of the date of this decision and order.

Attachment A – Appearances

Peter H. Zamore, Esq.
Benjamin Marks, Esq.
Charlotte B. Ancel, Esq.
Sheehey Furlong & Behm, P.C.
For Green Mountain Power Corporation

Joslyn Wilschek, Esq.
Primmer Piper Eggleston & Cramer PC
For Vermont Electric Cooperative, Inc.

S. Mark Sciarrotta, Esq.
For Vermont Electric Power Company, Inc.

Geoffrey Commons, Esq.
John Beling, Esq.
For Vermont Department of Public Service

Judith Dillon, Esq.
Donald Einhorn, Esq.
For Vermont Agency of Natural Resources

Sandra Levine, Esq.
For Conservation Law Foundation

Morris L. Silver, Esq.
For Central Vermont Public Service Corporation

Julie Kelliher, Esq.
For Vermont Agency of Commerce & Community Development

Gerald R. Tarrant, Esq.
Tarrant, Gillies, Merriman & Richardson
For Green Mountain Club

Brice C. Simon, Esq.
Aliena J. Gerhard, Esq.
Breton & Simon, LLC
For Lowell Mountain Group

David Stackpole, Esq.
Stackpole & French Law Offices
For Dyer-Dunn, Inc.

Jared Margolis, Esq.
For the Towns of Albany and Craftsbury

Mike Nelson
For the Town of Albany

Bonnie Day, *pro se*

Donald and Shirley Nelson, *pro se*

Jack Brooks, *pro se*

STATE OF VERMONT
PUBLIC SERVICE BOARD

Docket No. 7628

Petition of Green Mountain Power Corporation, Vermont Electric Cooperative, Inc., and Vermont Electric Power Company, Inc., for a certificate of public good, pursuant to 30 V.S.A. Section 248, to construct up to a 63 MW wind electric generation facility and associated facilities on Lowell Mountain in Lowell, Vermont, and the installation or upgrade of Approximately 16.9 miles of transmission line and Associated substations in Lowell, Westfield and Jay, Vermont	)	Technical Hearings held at Montpelier, Vermont February 3-4, 7-10, 22-25, 2011

Order Entered: _____

CERTIFICATE OF PUBLIC GOOD
ISSUED PURSUANT TO 30 V.S.A § 248

IT IS HEREBY CERTIFIED that the Public Service Board of the State of Vermont ("Board") this day found and adjudged that the construction of the proposed Lowell Mountain Wind Project, described in the Board's [date] Order in this Docket (the "Order"), will promote the general good of the State of Vermont, and a Certificate of Public Good is hereby issued to Petitioners, subject to the following conditions:

1. Construction, operation, and maintenance of the Project shall be in accordance with the findings and requirements set forth in this Order.

2. The Petitioners shall file, for Board approval, final construction plans for the turbines, access roads, collector lines, transmission lines and substations. The Petitioners shall note any changes in the final plans from the plans approved by this Order. The Petitioners shall not commence construction on a project component until the associated plan is approved.

3. As part of its final design filing, the Petitioners shall identify the turbine model it will use.

4. The Petitioners shall obtain all necessary permits and approvals for the Project. Construction, operation, and maintenance of the Project shall be in accordance with such permits and approvals.

5. The Petitioners shall not commence construction of the Project until the VELCO Jay Tap Substation has received all necessary permits, except for AOT permits, the proposed amendment to the VEC Jay Tap Switching Station Section 248 approval has been received, and the VEC members have voted to approve the Transmission Component of the Project and the changes to the VEC Jay Tap Switching Station.

6. The Petitioners shall submit the final System Impact Study ("SIS"), and interconnection and substation plans to the Board, parties, and owners of the facilities to which the Project will interconnect, prior to commencement of construction of the Project. Prior to the Commercial Operations, the Petitioners shall implement any changes determined necessary by the Board or ISO-New England to ensure system stability and reliability, and shall pay for any costs associated with such measures.

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9. The Petitioners shall implement the Good Neighbor Fund.

10. The CVPS MOU is approved, and the Petitioners shall comply with all provisions of the CVPS MOU.

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12. The ANR MOU is approved, and the Petitioners shall comply with all provisions of the ANR MOU.

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and structures in the surrounding 2,500 foot radius area and a public information session with surrounding landowners to address concerns related to blasting; (b) blasting associated with construction of the Project shall be minimized to the extent practicable and performed only during the hours of 7:00 AM to 6:00 PM Monday through Friday; (c) all blasting shall be carried out by licensed and certified blasting technicians, carrying adequate insurance, and will be performed in accordance with any and all applicable laws and regulations, including, but not limited to, U.S. Department of Interior Rules 816.61-68 and 817.61-68 and the Blasting Guidance Manual, Office of Surface Mining, Reclamation and Enforcement, U.S. Department of Interior to limit peak particle velocity and ground vibration to safe level, as well as those regulations and requirements established by the Vermont Department of Public Safety; (d) blasting mats will be used where needed to limit the occurrence of flyrock and dust migration; and (e) in the event surrounding landowners express concern regarding the impacts of blasting on wells or other structures on their property, the Petitioners shall perform evaluations to determine if any damage has occurred as a result of blasting activities and, if so, remediate any such damage. The Petitioners shall not commence construction until the plan is approved.

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first two years after construction, consistent with the description contained in the findings. Following the commencement of Project operations, the Petitioners shall complete the sound monitoring plan approved by the Board.

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27. Once landowner access has been obtained, the Petitioners shall complete the remaining required archeological studies, including a Phase II site evaluation and Phase III data recovery if needed.

Dated at Montpelier, Vermont this ___ day of _____, 2011.

_____)	
)	PUBLIC SERVICE
)	
_____)	BOARD
)	
)	OF VERMONT
_____)	

OFFICE OF THE CLERK

FILED: _____

ATTEST: _____

Clerk of the Board