Joint Petition of Green Mountain Power Corporation, Vermont Electric Cooperative, Inc., Vermont Electric Power Company, Inc., and Vermont Transco LLC, for a Certificate of Public Good, pursuant to 30 V.S.A. Section 248, for authority 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.	)	Docket No. 7628

REPLY BRIEF OF
THE LOWELL MOUNTAINS GROUP, INC

The Lowell Mountains Group, Inc. ("LMG") hereby files this Reply Brief in opposition to the Project. Petitioners have failed to show that the Project would be in public good. The Project would have an undue adverse effect on aesthetics, including noise, natural resources, property values and tourism. Considering the relatively modest power production capacity of the Project, conservation and small-scale in-state electric generation provide more cost-effective alternatives. Petitioners application for a Certificate of Public Good seeks to unjustly shift costs to the people living within a few miles of the Lowell Mountain ridgeline, without sufficiently proven benefits, and should be denied.

When the Board evaluates a petition for a CPG under 30 V.S.A. § 248, it is engaging in a "legislative, policy-making process." The Board must exercise its discretion "to weigh alternatives presented to it, utilizing its particular expertise and informed judgment. *In re Amended Petition of UPC Vt. Wind, LLC*, 2009 VT 19, P2 (Vt. 2009) (internal citations and quotations omitted). In this case, Petitioners have not presented reasonable alternatives for the Board to weigh, and have failed to provide a coherent policy argument for allowing such significant environmental detriments while supplying at most 6% - 7% of GMP's electrical power needs. Proposed Findings and Brief of LMG, ¶ 21.

I. THE PROJECT WOULD HAVE AN UNDUE ADVERSE EFFECT ON AESTHETICS

Petitioners admit the Project will have an adverse impact on aesthetics, but deny the adverse impact is undue. *Initial Brief of Petitioners*, 1 – 11. Superficially employing the *Quechee* test, the Initial Brief of Petitioners selectively discusses facts and precedent without fully acknowledging the sheer magnitude of the Project. Petitioners brush over the importance of aesthetics in local and regional planning documents, ignore the obvious reductions in size and scope that would improve the harmony of the Project with its surroundings, and minimize the severely shocking and offensive impact of the Project on residents, visitors and other members of the public.

A. THE PROJECT IS SHOCKING AND OFFENSIVE TO THE AVERAGE PERSON

Petitioners have gone to great lengths to rationalize the Project's size and aesthetic impacts. The Initial Brief of Petitioners focuses on the limited section of the Bayley Hazen Road that would be unduly impacted, minimizes the view of the project from other public highways, and relies upon unproven and vague economic benefits to avoid the conclusion the Project would have an undue adverse impact on aesthetics. Initial Brief of Petitioners at 4 – 6. The intent of the *Quechee* analysis and 30 V.S.A. § 248 cannot be satisfied if a project that is shocking and offensive, thereby having an undue adverse effect on aesthetics, could be considered acceptable merely due to purported societal benefits. *See* Initial Brief of Petitioners at 6. The aesthetic impacts of the project must be realistically and accurately considered, and the *Quechee* test must be accurately applied, before the ultimate question of whether the project is in the public good can be reached. Petitioners have insinuated societal benefits of renewable power into the analysis too soon.

Petitioners intentionally obfuscate the aesthetics impacts analysis with an inappropriate reference to societal benefits in the aesthetics portion of their Initial Reply Brief. *Id.* The Board was apparently justified in its concern, expressed during Mr. Raphael's technical hearing testimony, that the aesthetics impacts analysis relied upon by Petitioners had been influenced by reference to the positive aspects of wind development. *See* Raphael THT, 2/8/11, pp. 192 – 204. Petitioners cannot have their proverbial cake and eat it too: if the aesthetics impacts analysis is correctly conducted without reference to societal benefits, as Mr. Raphael agreed during his Technical Hearing testimony, then GMP's criticism of Mr. Kane's testimony as lacking consideration of the societal benefits of the Project must be rejected. *See* Initial Brief of Petitioners at 6. Accordingly, Mr. Kane's testimony that the Project would be shocking and offensive to the average person should not be diluted by any reference to societal benefits, and the Project should be found to have an undue adverse impact on the aesthetics of the area. Only after the undue adverse aesthetic effects of the project are adequately recognized should the Board weigh against those impacts any proven societal benefits of the Project, to determine whether the Project is in the public good.

Petitioners' reliance on inapposite projects previously approved by the PSB is unavailing. *Id.* Petitioners have not acknowledged the significant differences between the Project in this docket and those approved in *UPC Vermont Wind*, the *Georgia Order*, *East Haven*, and other dockets. The Project would be shocking and offensive in large part because it is so much more prominent and larger in size than the wind projects previously approved by the Board. *See, e.g.*, *East Haven*, Docket 6911 (4 turbines); *Georgia Mountain,* Docket 7508 (5 turbines); *Deerfield Wind*, Docket 7250 (15 turbines), *UPC Vermont Wind*, 2009 VT 19, ¶ 3 (16 turbines); *In re*

Halnon, 174 Vt. 514, 516 (Vt. 2002) (single tower would offend the sensibilities of the average person).

Vermonters are not used to eyesores along the pristine ridges of the Green Mountains, such as 20-21 turbines over 400 feet tall along almost 4 miles of cleared and blasted ridgeline, and the average person would be shocked and offended to see a quintessential Vermont mountain range so severely altered. Those viewing the project from Route 14, traveling North, or from the Bayley Hazen Road and the surrounding vicinity, would see an industrial-scale wind production development rather than the wilderness and uninterrupted habitat to which they have become accustomed, and for which they may have even moved to the area. The change would be objectively likely to cause an emotional reaction of sorrow for that which was lost, and anger at the interloping towers. It is the reasonable likelihood of such a reaction from ordinary citizens that establishes the Project would be shocking and offensive, out of character with its surroundings, and threatens to significantly diminish the scenic qualities of the area.

B. REASONABLY AVAILABLE MITIGATION HAS NOT BEEN CONSIDERED

Petitioners have refused to consider reducing the size of the wind turbines, or meaningfully decreasing the number of towers. The reason the project could not be constructed to a scale more in keeping with other wind projects approved by the Board is a bit murky. Petitioners acknowledge that minimizing the number of turbines is an appropriate mitigation measure to pursue. Initial Brief of Petitioners at 3. Petitioners' entire argument against reducing the number of turbines, or the turbine height, is that such mitigation measures have been "rejected based on economic impact." Initial Brief of Petitioners at 4 (*citing* Pughe reb. at 4-5, 7-8).

Without an in-depth analysis of mitigation through reduction in the size and number of turbines, Petitioners cannot be said to have taken all reasonably available mitigating steps. Instead of such an analysis, Petitioners offer estimates of the increase in levelized cost associated with reducing the size or number of turbines, and claim that such reductions would contradict GMP's goal of, "maximizing project renewable energy output from the smallest footprint and developing new in-state renewable energy sources in the most economic manner with the fewest impacts." Pughe reb. at 7. The record further belies Petitioners' position that the Project's size cannot be reduced. *See* Town of Lowell's Brief, p.2; *and* Exh. GMP-RAD-1, p.3 (agreement with the town of Lowell contemplated a 36MW project would be feasible). Further, GMP's own information provides a range of between 50 and 63 MW that would be acceptable. Pughe Technical hearing Testimony ("THT") 2/4/11 pp.56-57, 62-69. Petitioners have additionally failed to provide a detailed decommissioning plan as should be required. *See* Kane THT, pp. 77 – 78; *and* Exh. GMP-ANR-1.

According to GMP, widespread devastation of an entire ridgeline reduces impacts. Initial Brief of Petitioners, pp. 4 – 5. The economies of scale that make it more economical to develop as many wind turbines as possible in one place do not translate, however, into environmental economies of scale. Considering more significant aesthetic impacts preferable, so long as more, less expensive power can be produced, is not consistent with the *Quechee* analysis or the public good. Such reasoning would not be countenanced in the case of an oil-fired electric generation facility, a gas pipeline, or a transmission line, and should not be accepted when it comes to industrial-scale wind development along Vermont's ridgelines. Rejecting GMP's position that the project should be as large as possible, so the company can get more bang for its buck, necessitates denial of a Certificate of Public Good. In the alternative, the Board should hold

additional hearings to determine what reductions in the size and number of turbines can actually be accommodated, and impose conditions requiring the Project to be consistent in scale with the vast majority of other wind power developments that have been approved by the Board.

C. THE PROJECT VIOLATES THE INTENT OF THE TOWN AND REGIONAL PLANS, AND THE LOWELL ZONING ORDINANCE

The Northeastern Vermont Development Association's ("NVDA") Regional Plan and the Lowell Town Plan reveal the intent of the town and region to retain their rural character, while encouraging development that fits with the rural surroundings. NVDA Regional Plan for the Northeast Kingdom, Volume II: Regional Analysis, 12. The Regional Plan divides the region into 5 broad categories related to future land use and development:

1. Regional Urban Centers
2. Service Centers
3. Rural Villages
4. Rural Areas
5. Industrial Parks

The community standard regarding rural areas is clearly written:

> Most of the region's land lies outside of the town and village centers. It consists mainly of the farms and forestlands of the traditional Vermont landscape. These land uses are supported by the regional urban centers, service centers, and rural villages, where most of the people and commerce are located. These rural areas receive very little commercial or industrial development unless it occurs in an established industrial park, in an area specifically designated in the local zoning bylaw, or occurs in an **appropriate scale** for its rural surroundings.
>
> NVDA Regional Plan, V. II at 14 – 15 (emphasis added).

Written regional policy regarding future development of the area is similarly unambiguous:

- Traditional development patterns should be maintained and new development should be encouraged to follow these patterns.
- New development should be compatible with existing land uses, and agree with local plans.

- Historic structures, community facilities, and other buildings should be preserved and adapted for re-use.
- Brownfield sites should be reclaimed.
- Significant development proposals should consider the impact on adjacent regions.

Id. at 17; and Exh. Pet.-DR-2 (Appx. 10 and 11) at 36.

Regional policy toward wind is included in the sections of the Regional Plan excerpted in Mr. Rapheal's exhibits:

> The siting of wind turbines has raised concerns about aesthetic impacts, erosion, noise, effects on wildlife, property values, public health, and economic impacts. Because of our region's mountainous terrain, the ideal location for commercial-scale wind turbines is on North-South oriented ridgelines with elevations between 2000 and 3500 feet above sea level. Each tower can range in height from 135 feet to over 400 feet tall, requiring specified FAA lighting for towers over 200 feet. Smaller individual owner-consumption towers are usually below 135 feet high and can generate on lower terrain. Larger ridgeline generation facilities may contain as few as 5 to as many as 40 turbines and are subjected to review and approval by the Public Service Board (30 VSA Section 248). As with the development of any energy generation facility, a Certificate of Public Good must first be issued by the Public Service Board. Prior to issuance, the Board takes into account the environmental, economic, and social impacts of a proposed facility.
>
> NVDA Regional Plan, V. II at 34; Exh. Pet.-DR-2 (Appx. 10 and 11) at 38.

Finally, the Regional Plan sets forth specific community standards regarding large-scale wind development that clearly and directly contradict Petitioners' positions:

> There are significant, legitimate issues surrounding commercial-scale wind generation. Many of these issues will be considered by the Public Service Board in its Section 248 review; however, other significant issues may not be considered under the present Section 248 criteria. Specifically, NVDA requests the Public Service Board, in its review, also consider the following criteria:
>
> > 1) The consistency of the proposal with not only the region's plan and the host town's plan and zoning bylaws, but also the plans and bylaws of other towns which may be impacted by the proposed project;
> >
> > 2) A weighing of the potential benefits as well as negative impacts on not only the host town but other impacted towns, including a possible outline of tax payment benefits to impacted towns.
> >
> > 3) Applicants must include a comprehensive de-commissioning plan when filing for

a Certificate of Public Good.

4) Appearance and operation of facilities should be weighed as an aspect to change the essential character of the area.

5) Proposed turbines should be sited to minimize the visual impacts.

NVDA Regional Plan, V. II at 39; Pet.-DR-2 (Appx. 10 and 11) at 39.

While the Regional Plan gives a resounding endorsement of Biomass, wind is treated as a controversial subject. *Id.* The Regional Plan's written policy regarding wind indicates that the appropriateness of a project is highly dependent upon visual aesthetic impacts, including the impacts on surrounding towns, and compliance with zoning bylaws. *Id.* When the Regional Plan's warnings about wind projects are coupled with the clear preference of the Lowell Town Plan and Zoning Ordinance for small-scale rather than industrial wind, a clear, written community standard intended to preserve the aesthetics of the area emerges. Proposed Findings of Fact and Brief of the Lowell Mountains Group, Inc., ¶¶ 22 – 30, *and* pp. 39-40 (Lowell Zoning Ordinance prohibits wind projects that would have an adverse impact on aesthetics). The Project would violate those clearly written community standards, and should therefore be denied a Certificate of Public Good.

II. THE PROJECT WOULD PRODUCE UNACCEPTABLE NOISE LEVELS

Petitioners essentially rely upon the Board's past decisions regarding noise, arguing that the standard used in other cases should be applied in this case. Initial Brief of Petitioners at 7. The Board's historic standard has been 45 dBA (exterior) (Leq) (1hr) and 30 dBA (interior bedrooms) (Leq) (1hr). This standard does not, however, adequately account for the impacts of noise on camps, property, and sleep where attenuation results in less than a 15 dBA reduction in sound pressure from outside to inside. Nor does the standard advanced by Petitioners adequately

address the problems associated with relying upon NRO mode, and the lack of adequate real-world monitoring proposed by Petitioners.

Petitioners have still failed to adequately address the fact that the Project is proposed for a pristine natural area, where people go to seek the solace of low background sound levels. The proposed turbines would be four times as loud as existing background levels over approximately 2,000 acres of land not controlled by the Project, and twice as loud on 5,759 acres of land not owned or leased by GMP.[1]

It was repeatedly stated during the Technical Hearings that GMP did not perform an audibility analysis, as has been done in other dockets, resulting in the Petitioners' failure to provide the Board with a realistic assessment of the sound impacts the Project would have on neighbors. GMP has submitted nothing to remedy this omission, and therefore there is an inadequate record from which to conclude the project would not have an undue adverse effect on aesthetics due to noise, cause undue noise pollution, or result in undue adverse health impacts from noise. NRO mode may be inadequate to protect the public, and noise levels may be higher than anticipated due to atmospheric conditions. The sound of the turbines may travel around the valleys more than anticipated, and the disruption of the peaceful sounds of nature may result in a relatively significant difference in residents' subjective experience of living in a rural area. Petitioners have done little, however, to anticipate, assess or ameliorate such consequences of the Project, and instead rely upon a wildly unorthodox sound study, assumptions about outdoor/indoor attenuation, and the unsupported assertion that relative changes in background

[1] Kaliski THT, 2/22/11, p.143 (some homes that are now relatively quiet would frequently hear noise from the turbines).

sound are less important to aesthetics and public health than absolute sound pressure levels measured outside the home and averaged over one hour.

In addition, the Petitioners' noise expert took readings outside the Dyer-Dunn camp, but never analyzed the impacts of noise on camps near the Project site generally, or the Dyer-Dunn camp specifically. It is essentially undisputed that low-frequency noise can cause vibrations that produce noise, and can be more annoying than higher frequency noise. Thus, without a more complete analysis of the impacts of noise on camps and properties in the area, the Board cannot find that the Project will not cause undue air pollution, an undue adverse effect on aesthetics, or undue adverse health effects due to noise.

There are additionally a number of specific deficiencies with the Initial Brief of Petitioners. The Petitioners noted that neither Mr. Blomberg nor Mr. James have any medical training, but failed to note that the two witnesses with medical training made roughly the same recommendations as the noise experts Messers. Blomberg and James: 35 dBA outside a home. Mr. McCunney made this recommendation with respect to the level he would want at his home and Dr. Lovko with respect to the level that would protect sleep.

These are not extreme positions, as the Petitioners claim. The 35 dBA level is supported by the Petitioners' own medical witness. ALB-Cross-7 at 38. Moreover, the situation is not comparable to a library. Given that the monitored existing noise level in the Lowell area is lower than 16 decibels, the average noise in a library would exceed this by at least 15 decibels, and the Board's prior noise standard would exceed this level by at least 30 decibels. Kaliski Rebuttal, p. 9 (correcting Exhibit-Pet-KHK-2, Table 2). A 15 decibel increase in a library would have an undue adverse impact, further suggesting that it is the increased noise levels caused by the Project that cause an undue adverse impact. It is thus the impact of the increased noise level that

should be assessed to determine whether the Project would have an undue adverse impact on aesthetics, air pollution or human health due to noise.

Considering the rural nature of the Project location, the Board should recognize the importance of limiting the impact of sound on area residents. Impacts may seem minimal when the average sound level over an hour increases, but when instantaneous levels exceed what is acceptable the effects may be unduly adverse. When using a one-hour averaged standard, the level must be low enough to exclude the possibility of significant impacts of shorter duration. It is exactly these impacts that can cause sleep interference, from which the neighbors of the Project are seeking protection.

Moreover, the Petitioners seek to make a 35 dBA standard appear technically implausible. The Petitioners provided no evidence that a limit of 35 dBA at the property line could not be implemented. If the Project will have the purportedly substantial economic benefits Petitioners suggest, there should have been adequate resources to pay area landowners to offset the impacts of sound on non-participating properties. Apparently, the feasibility of a 35 dBA standard for non-participating neighbors has little to do with the technicalities of turbine acoustics, and instead is due to GMP's desire to avoid protecting or compensating neighbors whose quality of life would be unduly impacted.

The Petitioners' reference to guinea pigs as the only support for opposing witnesses concern for low frequency noise is absurd. The concern for low frequency noise is cited by the World Health Organization as a reason to deviate from the general transportation noise standard. Blomberg Prefiled Direct, p. 5. Moreover, even the Petitioners' witnesses testified to one of the many concerns raised about low frequency noise: that it travels through walls better than higher

frequency noise, and is therefore less susceptible to standardized attenuation and more noticeable inside homes. Kaliski THT, 2/22/11, p. 156.

The Petitioners further seek to portray "annoyance" as an inappropriate consideration when setting a noise standard. The EPA's and WHO's recommendations substantiate, however, that annoyance is a valid concern, though it is only one of many concerns raised by Blomberg, James, and Lovko. There are numerous reasons to enforce a 35 dBA standard, such as community reaction, sleep interference, and even the honest opinion of GMP's medical expert. ALB-Cross-7 at 38. The Petitioners have ignored the likely negative "community reaction" that Mr. Blomberg addressed. Exh LMG-LB-7.; *and* Blomberg PDT, p. 14. Additionally, the Initial Brief of Petitioners offers a strong argument for a 35dBA noise standard: 35 dBA is the level at which the correlation between noise and annoyance diminishes and other factors become equally or more significant. That makes 35 dBA an appropriate, protective noise standard.

Finally the Petitioners' *Quechee* Analysis (Initial Brief of Petitioners, p. 11) is woefully inadequate with respect to noise. Mr. Kaliski has testified that he did not perform a *Quechee* analysis. The Petitioners' only *Quechee* analysis with respect to noise is on page 11 of the Initial Brief of Petitioners, and it lacks any analysis of Lowell's zoning by-laws, lacks a discussion of mitigation measures, and lacks reference to reactions of actual people exposed to wind turbine noise. Instead, Petitioners rely upon marginally relevant or wholly unrelated documents from the Congressional Research Service, National Academy of Sciences, and BLM. Petitioners' analysis amounts to a cursory overview, compared with the thorough analysis set forth in the testimony of LMG's expert Mr. Blomberg. *See* Blomberg Prefiled and Surrebuttal Testimony.

III. PETITIONERS HAVE FAILED TO PROVE THE PROJECT IS THE MOST COST EFFECTIVE RENEWABLE ALTERNATIVE OR THAT IT WILL RESULT IN AN ECONOMIC BENEFIT TO THE PEOPLE OF VERMONT

Petitioners acknowledge, "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." Proposed Decision Submitted on Behalf of Petitioners, dated March 21, 2011. While it is true that the Project's final output will not be known until it is operational, it is equally certain that the Project will not be as productive as Petitioners claim. This is so because there has been no analysis of actual project output that accounts for a realistic capacity factor or real-world factors impacting availability. *See* Alternative 1 Major Cost and Revenue Assumptions, filed March 24, 2011, ¶ 3 (maintaining 28.42% theoretical capacity factor, and unrealistic 100% availability factor). The assertion that the Project is, "one of the most cost-effective renewable options available," cannot be supported by objective analysis, and therefore should not be relied upon by the Board.

With Mr. Kvedar's theoretical 28.42% capacity factor (Exh. Pet.-AJK-1 (Revised)), Mr. Smith assumes that the grid will experience 27% capacity from the Project. Pre-filed Testimony of Douglas C. Smith, p. 3. Although the actual grid-experienced capacity factor and the total loss factor are the central parameters for the calculation of the cost-effectiveness of the Project, and are essential features necessary to compare this project to other renewable projects (particularly in the scientific literature), the record lacks proof that Petitioners' numbers are more than best guesses. The contrast between the Petitioners' certainty about the Project being the most cost-effective option available and their uncertainty about the actual capacity of the project, combined with their obscuration of critical parameters necessary to support or dispute their claims, suggests there has been an inadequate objective analysis of the project's cost-

effectiveness in the interest of the people of Vermont. The public's confidence in this project would be easily enhanced if its cost-effectiveness were supported by standard, analytic methods rather than undocumented allegations that raise suspicions of corporate interests overriding the public good.

The grid experienced capacity factor for the Project is the central parameter that drives both the costs to society and the benefits. With a favorable capacity factor, the capital and operating costs can be distributed over a larger power output, which can then be sold at a lower rate; the output theoretically displaces more fossil-fuel energy, the cost-effectiveness improves and the cost-effectiveness ratio is lower. In other words, the higher the Project's capacity, the more metric tons of CO2 emissions purportedly avoided. *See* Krupnick AJ et al, *Towards a New National Energy Policy*, Resources for the Future and National Energy Policy Institute, November 2010. As the capacity factor decreases from a desirable range, the cost-effectiveness ratio becomes less favorable because the total project costs have to be distributed over less output and fewer CO2 emissions are displaced. These relationships are easily discernable, and are amenable to mathematical analysis.

When evaluating the effects of renewable energy polices, widely respected, peer reviewed policy analysts have specified a minimum capacity factor for wind projects in order to be able to fairly characterize their costs and benefits to society. As of June 2010 this minimum was set at 30%. Palmer K *et al*, *Modeling Policies to Promote Renewable and Low-Carbon Sources of Electricity*, Resources for the Future and National Energy Policy Institute, June 2010. As of January 2011 the minimum capacity factor was further increased to 32%. Palmer K *et al, Federal Policies for Renewable Electricity: Impacts and Interactions, Resources for the Future*, January 2011. Accordingly, the Project has a lower capacity factor than the minimum

recommended. This means that when Petitioners claim the Project's significant environmental costs are outweighed by a greater good, they are lacking an effective measurement of whether the Project will even result in an economic benefit to society. Without a provable, particular economic benefit, the Project cannot be found to be in the public good.

In the past, the willingness of lenders to provide financing was the major obstacle to a low capacity project; however, in today's economic times and with the Public Service Board's involvement, policy decisions should be informed by detailed cost-effectiveness analyses. Additionally, earlier projects were built at sites with lower costs and higher capacity in order to maximize the return on investment and utility profits. Here, the Project's desirability is influenced by the policy preference for in-state renewable generation, but the costs of such power must still be accurately assessed. It is up to the Public Service Board to then determine whether the policy preference for "green" energy is adequately served, without undue adverse impacts on the environment, before finding the project is in the public good.

Petitioners are required to implement a least-cost integrated plan that is the most cost-effective alternative available for new energy projects. As with other major issues, Vermont has the opportunity to implement the worthy social policy of increasing reliance on renewable energy, while maintaining limits on the degree of environmental degradation that will be allowed. But, only by requiring Petitioners to prove tangible financial benefits can responsible cost-effectiveness criteria be met.

Industry standards for the calculation of the grid-experienced capacity factor for a wind project require that the ridgeline capacity factor of 28.42% (Exh. Pet.-AJK-1 (Revised)) be adjusted for turbine availability, icing, line losses, high wind hysteresis, blade soiling, sector curtailment, cold weather shut down, substation maintenance, and array efficiency losses. These

adjustments relate to issues that have been generally discussed throughout the record, but the associated impacts on cost effectiveness have never been adequately recognized. Using values for each such loss category, calibrated according to the availability of wind projects in climates similar to Vermont, results in a total loss factor of 15% as compared to the implied loss factor of 5% embedded in the Petitioners' calculations. Of particular concern is Petitioners' assumption that the Project will maintain 100% availability. Exh. Pet.-AJK-1 (Revised). It is unclear how the anticipated down-time due to icing is incorporated into Petitioners' analysis, if at all, and adding moderate down time requires adjusting the expected lost capacity increases from 15% to 17.4%. Hewson T, Energy Ventures Analysts, Arlington, Va.

Using typical values for all the loss factors from wind projects in climates similar to Vermont, the grid-experienced capacity factor for the Project is not 27% but is projected to be 23.3 to 24.2%, the lower factor associated with a maximum of 25 days lost capacity due to icing. *Id.* The Sheffield Wind Project, cited by Petitioners, has in fact experienced a significantly larger loss factor than anticipated when that project was presented to the Board. *Sheffield Wind*, Docket 7156, Exh. CRV-6, p. 3. Petitioner's position that the Project is the most cost-effective among available renewable alternatives must be assessed with reference to a realistic capacity factor. Without a real-world capacity factor, accounting for the anticipated losses discussed above, there is in inadequate record for the PSB to find the project would be in the public good.

It should be noted too that the Project's capacity factor, even at the arguably inflated level of 27%, is still below the minimum of 32% set by national policy analysts in peer-reviewed publications *See, e.g.,* Palmer K, Paul A, Woerman M. *Federal Policies for Renewable Electricity: Impacts and Interactions*, Resources for the Future (January 2011). Assuming a liberal capacity factor for the subject Project is 24% (only 5.5 days lost to icing), it is 25% below

the expressed 32% minimum. The negative consequences of a lower capacity factor would result in higher project and power costs, as well as reduced displacement of CO2 emissions.

The Project, with a capacity factor well below the advisable minimum, cannot be credibly characterized as cost-effective. Only by comparing the project to other wind projects in low-wind-resource areas, or projects with extremely high costs per kWh, can the Petitioners claim that the Project is comparatively cost-effective. When compared to national wind projects, as should have been done to present an accurate picture of the Project's cost-effectiveness, the Project can be demonstrated to be profoundly cost-***ineffective***.

Petitioners' repeated widespread assertions to the public that the Project is cost-effective is undocumented and based upon unfounded assumptions. Unlike the aesthetic issues, cost-effectiveness can be objectively determined. Rather than objectively demonstrate the Project's cost-effectiveness, Petitioners continue to rely upon self-serving statements based upon demonstrably inaccurate assumptions.

An adequate cost-effectiveness analysis for the Project would comply with the standards of the energy analysis community as represented in Krupnick AJ, Parry IWH, Walls M, Knowles T, Hayes K. "Toward a New National Energy Policy: Assessing the Options," National Energy Policy Institute and Resources for the Future (November 2010), as argued by Mr. Blomberg. *See* Blomberg Direct, *and* Blomberg Surrebuttal.

A cost-effectiveness analysis for this project that meets the standards of the energy analysis community must answer the following questions:

1) How many megawatt hours (MwH) of electricity will the Project produce per year?
2) What is the Project's cost to produce the electricity—considering all societal costs?
3) What is the cost for the same amount of power when purchased from the grid?

4) How many tons of CO2 would be emitted if the same amount of power were purchased from the grid?
5) How does the cost-effectiveness of the Project compare to other alternatives that reduce CO2 emissions?

Regarding the number of MwH the Project can produce per year, a standard grid-experienced capacity factor of 24% results in an expected output of 132,451 MwH annually (.24 x 24 hours/day x 365 days per year x 63 MW nameplate capacity). This represents an 11.1% reduction from the 149,000 MwH Petitioners' experts testified would be produced. Prefiled Testimony of Doulas C. Smith, May 21, 2010.

Evaluating the actual cost of the Project's power requires analysis of the levelized cost. The levelized cost of an energy project is the cost per unit of output that must be charged to the customer to break even; the levelized cost does not include profits and it explicitly excludes the production tax credit available for the first 10 years of a project's life from the federal government. Exh. Pet.-AJK-1 (Revised). The production tax credit is a cost to society that must be included in a cost-effectiveness analysis, as is the income from the renewable energy certificates. Blombert Direct; Blomberg Surrebuttal*; and* Krupnick AJ, Parry IWH, Walls M, Knowles T, Hayes K. "Toward a New National Energy Policy: Assessing the Options," National Energy Policy Institute and Resources for the Future (November 2010).

Green Mountain Power has presented two cost analyses for the Project. Alternative 1 does not consider the costs of substation upgrades, while Alternative 2 does. Alternative 2, with capital costs of $152,770,000, is the more appropriate alternative to consider as it incorporates more closely all the costs incurred by society to build the project. Under the Alternative 2 scenario, the levelized cost is $0.116 per kwh ($116 MwH). This alternative incorporates the

following assumptions: 1) the total loss factor from the ridgeline capacity is 5 %, 2) 100 % of the renewable energy certificates are sold over the lifetime of the project with an unstated revenue (for purposes of analysis assume $25/Mwh), and 3) there will be a production tax credit of $22.08 per MwH for the first 10 years of the project. Expected revenue from the renewable energy certificates though Green Mountain Power has apparently been included in Petitioners' analysis, although it should not. Adjusting for the renewable energy certificates increases the levelized cost to $0.141/kwh. Adjusting for the production tax credit for the first 10-years increases the cost to $0.149/kwh. Adjusting for the capacity factor of 24% (as opposed to the adjusted factor of 27% implied but not stated by Green Mountain Power) increases the levelized cost to $0.167 per kwh or $167/MwH.

Determining how much it would cost to purchase the same amount of electricity as that produced by the Project is impossible to state precisely, considering the market price for electricity will vary over the next 25 years. Market rate power costs can, however, be determined by checking the ISO-NE portal at http://www.iso-ne.com/portal/jsp/lmpmap/Index.jsp, which discloses a value of approximately $48.05 per MwH.

Petitioners have presented no evidence regarding the number of tons of CO2 that would be emitted if the same amount of electricity as will be produced by the Project were purchased from the grid. In an August 2010 publication, ISO New England reported the marginal CO2 emission rate for grid purchased electricity for the year 2008 at 890 pounds of CO2/MwH or equivalently .404 metric tons/MwH.

With the foregoing parameters better identified, a true cost-effectiveness calculation can be made. Purchasing 132,451 MwH of electricity from the market would presently cost $6,364,270 (132,451 x $48.05) and would result in the emission of approximately $53,510

metric tons of CO2 (404 x 132,451). The same amount of electricity from the Kingdom Community Wind Project (if it were up and running as anticipated) would cost society $22,119,312 (132,451 x $167) and there would be zero additional CO2 emissions. The difference in cost of $15,755,042 is the cost of avoiding 53,510 metric tons of CO2 emissions, or $295 per metric ton.

In the final analysis, the Project is less cost-effective than other alternatives that reduce CO2 emissions. According to Krupnick et al renewable energy projects are found to have average cost-effectiveness ratios of $13-$25 per metric ton. The Project exceeds the upper limit of this range by 12 fold. The highest cost-effectiveness ratio reported is $76 per metric ton for using liquefied natural gas for heavy-duty trucks. The Project is 3.8 times the highest cost alternative evaluated by these national policy analysts to reduce CO2 emissions.

This analysis supports 4 conclusions:

1) By using substandard methods by failing to accommodate reasonable energy losses from the project, and incorporating decreased costs due to sale of renewable energy certificates over 25 years, GMP attempts to make the Project appear more cost-effective than it really is.
2) Among those options that GMP has evaluated, this option is unlikely to be the most cost-effective as they have biased their conclusions by overstating the capacity factor and the expected output of this Project by 11%. Considering the numbers involved, an 11% reduction in output is likely to make an apparently desirable option undesirable.
3) Comparing this project to renewable energy projects across the country necessitates a finding that the Project would be 12 times more costly than average renewable energy

projects and 3.8 times the maximum considered by national analysts. Imposition of this excessive financial burden on Vermont's economy has large, incalculable opportunity costs. Rather than being an economic benefit to the State of Vermont, there is objective evidence that the Project would result in an economic detriment.

4) The Project's limited cost-effectiveness is due to the high capital cost that would be incurred, such as construction and operations, and likely decreasing capacity and availability. The costs are increased by building on a remote and inaccessible ridgeline. The low capacity is due to the poor wind resource in Vermont and the adverse weather conditions that foster icing. These factors are indigenous to Vermont.

GMP states, "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,…" Proposed Decision Submitted on Behalf of Petitioners, March 21, 2011. Under the Alternative 1 scenario, the levelized cost is $103/MwH. Under the Alternative 2 scenario, the levelized cost is $116/MwH. The Alternative 2 scenario levelized cost has been proven inaccurate, as it understates the likely costs of the Project, and the same arguments apply to the Alternative 1 scenario. the record contains no proof that the market price of electricity is likely to exceed or even approach $100/MwH at any time over the 25 year life-span of the project. The statement that the projected cost of the project is "consistent with the projected market price of power" is a misleading, unfounded allegation that is not supported by the record. Petitioners' position in that regard is contradicted by Exh. Pet.-DCS-5 (Revised), and the estimated market price of grid-purchased electricity over the life span of the Project.

Because the record does not support the Petitioners' assumptions or conclusions regarding the Project's cost-effectiveness, and the Project's actual cost effectiveness is likely to be less than claimed, the Board should find that Petitioners have failed to show the Project will constitute an economic benefit to the people of Vermont, and Petitioners' application for a Certificate of Public Good should be denied.

IV. THE PROJECT'S NATURAL RESOURCE IMPACTS ARE UNACCEPTABLE CONSIDERING THE LACK OF PROVABLE BENEFITS

Petitioners do not dispute that the Project will have a devastating impact on a state significant natural area, fragmentation, bats, birds and other natural resources. Instead, Petitioners seem to hold unyielding to the predetermined assumption that any such natural resource impacts will always be outweighed by the Project's significant societal benefits. As argued in LMG's Proposed Findings and Brief, the benefits of the project are too tenuous, to reliant upon the behavior of the regional power market and third parties, and ultimately are inadequate to justify the permanent environmental devastation that will occur even if the GMP-ANR-1 MOU is fully implemented.

V. THE PROJECT IS NOT CONSISTENT WITH VERMONT'S RENEWABLE ENERGY POLICIES

Vermont is in the process of evaluating its long-term energy plans. The Project seeks to move Vermont from a state supporting small-scale wind powered electricity production to a large-scale industrial producer of wind energy. There has been no change to Vermont's general development policies, including developing downtowns and identified growth centers while avoiding development in important natural areas. No political process in Vermont has directed the Public Service Board that all renewable energy projects should be approved, regardless of the environmental and scenic impacts. There has not been a significant increase in electricity prices

such that urgent action is necessary, and long-term price projections have actually declined. These factors suggest the cost-effectiveness of the Project has actually decreased during the CPG process, but there is no mechanism for handling further reductions after a CPG is issued. Vermont's preference for small-scale generation projects, such as the net metering projects that have been proliferating, has not changed. LMG submits the Project has been advanced not because it fits well with Vermont's long-term development goals, but because it meets Petitioners' short-term plan to utilize tax incentives to make a costly project financially palatable.

Considering the impacts the Project would have on an intact natural area, a pristine ridgeline, and hundreds of people who seek solace in the quiet nature offered by Lowell and surrounding towns, the development would have to be necessary in order to be justified. Supplying at most 7% - 8% of GMP's power needs, the Project cannot be said to be necessary. Because the Project would not substantially further Vermont's renewable energy goals, and would have disproportional environmental and human impacts in light of its limited best-case benefits, the Project is not consistent with Vermont's energy policies, is not in the public good, and should be denied a Certificate of Public Good.

WHEREFORE, for all of the foregoing reasons, Petitioners have failed to prove the Project would be in the Public Good, and the application for a Certificate of Public Good should be DENIED.

DATED at Stowe, Vermont this ____ day of April, 2011.

LOWELL MOUNTAINS GROUP, INC:

By: _____

Brice Simon, Esq.
Breton & Simon, LLC
PO Box 240
Stowe, VT 05672