

STATE OF VERMONT
PUBLIC SERVICE BOARD

Joint Petition of Green Mountain Power)
Corporation, Vermont Electric Cooperative, Inc.)
and Vermont Electric Power Company, Inc. for a) Docket No. _____
Certificate of Public Good pursuant to 30 V.S.A. §)
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)

PREFILED TESTIMONY OF
KENNETH H. KALISKI, P.E.
ON BEHALF OF GREEN MOUNTAIN POWER CORPORATION

May 21, 2010

Summary of Testimony

Mr. Kaliski's testimony addresses the expected noise impacts of the proposed Kingdom Community Wind Project. The analysis is based on monitoring existing sound levels adjacent to the Project, and modeling of expected sound propagation from the wind turbines and substations. Mr. Kaliski concludes that the Project will meet the Public Service Board's precedent noise limits.

**PREFILED TESTIMONY OF KENNETH H. KALISKI, P.E.
ON BEHALF OF
GREEN MOUNTAIN POWER CORPORATION**

1 **1. Q. Please state your name, current position, employer and business address.**

2 **A.** My name is Kenneth Kaliski. I am the managing director of the Energy,
3 Environment, and Acoustics Division at Resource Systems Group, Inc. at the company's
4 headquarters in White River Junction. My business address is Resource Systems Group, Inc., 55
5 Railroad Row, White River Junction, VT 05001.

6

7 **2. Q. Please state briefly your educational background and business experience.**

8 **A.** I have a BA in Biology and Environmental Studies from Dartmouth College and a
9 BE in Engineering from the Thayer School of Engineering at Dartmouth College. My educational
10 experience includes coursework in sound level monitoring, noise control engineering, active noise
11 control, indoor and outdoor acoustical modeling, vibration control, sound level meter design, and
12 the physics and mathematics involving sound and its propagation. I am the co-holder of a patent
13 for an environmental noise monitoring system.

14

15 I have worked at Resource Systems Group since 1986, and serve on its Board of Directors. In my
16 twenty-four years with Resource Systems Group, I have given testimony before all of Vermont's
17 nine District Commissions and the Environmental Board regarding noise, traffic, air, and related
18 impacts. Some of the more relevant Environmental Board cases where I have evaluated potential

1 impacts from noise include John and Joyce Belter, Bane Granite Quarries, Black River Rod and
2 Gun Club, Hannaford, John Russell Corp., and Alpine Stone.

3
4 I am a licensed professional engineer and am Board Certified through the Institute of Noise Control
5 Engineering (INCE). Within INCE, I serve as Vice President for Board Certification. I am also a
6 member of the Acoustical Society of America and have a Qualified Environmental Professional
7 certification through the Institute of Environmental Practice.

8

9 **3. Q. Have you ever testified before the Public Service Board (“Board”)?**

10 **A.** I provided testimony in the Section 248 proceedings in several dockets, including
11 the Green Mountain Power Searsburg wind project, and the Sheffield, Deerfield, and Georgia
12 wind projects. I also provided testimony in several electric power cases, including Vermont
13 Electric Power Company’s (“VELCO”) Northwest Reliability, Southern Loop, East Avenue, and
14 Lamoille projects.

15

16 **4. Q. What is your experience with wind projects?**

17 **A.** I have been involved with wind projects since 1993, when we were asked by the
18 Maine Land Use Regulatory Commission to review a large wind farm in the western part of that
19 state. Subsequently, we have done analyses and reviews of many projects throughout the U.S.,
20 including those in Kansas, Michigan, Arizona, Massachusetts, Pennsylvania, and Vermont. I am
21 the author or co-author of eight publications and presentations, and have been invited to speak on
22 wind turbine noise issues to the American Wind Energy Association and National Wind

1 Coordinating Collaborative. I have chaired conference sessions on wind turbine noise, including
2 those at InterNoise 2009 in Ottawa and the Acoustical Society of America/NoiseCon 2010
3 conference in Baltimore. A copy of my resume is attached as **Exh. Pet.-KHK-1**.

4

5 **5. Q. Please describe the analysis and conclusions of the study you conducted in**
6 **this case.**

7 **A.** I conducted an analysis of the noise impacts from the proposed Kingdom
8 Community Wind project proposed in Lowell, Vermont. A copy of this report is attached as
9 **Exh. Pet.-KHK-2**. The analysis took into account the addition of 20 to 21 wind turbines and
10 associated substation additions and modifications in Lowell and Jay, VT. Our analysis included:

11

- 12 • Sound monitoring at various locations around the project over a 7 to 8 day period
- 13 • Descriptions of the sound emissions from two turbines that may be used on the project
- 14 • Computer propagation modeling of the wind turbines under full load for a 20-turbine array
15 and a 21-turbine array.
- 16 • Computer propagation modeling of the wind turbines using 1-year of meteorological data
- 17 • An analysis of low-frequency noise
- 18 • Sound monitoring at three existing substations in Lowell and Jay
- 19 • Computer propagation modeling of the new project substation, and changes proposed to be
20 made at existing substations in Lowell and Jay.
- 21 • Recommendations for mitigation

22

1 **6. Q. What are your conclusions?**

2 **A.** My conclusions are as follows:

- 3 • This project is designed to meet the Board 45 dBA (exterior) (Leq) (1hr) precedent
4 standard, established in the Deerfield and Sheffield dockets, at all residences. This standard
5 is more conservative than the World Health Organization (“WHO”), U.S. EPA, and other
6 cited noise guidelines.
- 7 • All residences are greater than 3,200 feet from the nearest turbine. This exceeds the
8 Congressional Research Service, National Academy of Sciences, and BLM guidelines for a
9 setback outside of which noise is generally not an issue.
- 10 • Two types of modeling were conducted: one using worst-case meteorology and one using
11 one year of hourly meteorology. Both types of modeling showed that the Board precedent
12 of 45 dBA, the WHO eight-hour sleep disturbance guideline of 45 dBA averaged over the
13 night, the 40 dBA annual nighttime average WHO Europe sleep disturbance guideline, and
14 U.S. EPA 45 dB Ldn guideline will be met at all residences.
- 15 • To meet a 45 dBA standard outside of each residence, the guaranteed sound power level
16 from each wind turbine (assuming 21 turbines) should be at or below 107 dBA at the
17 maximum rated capacity. However, other combinations of sound power levels, wind
18 turbine siting and the number of wind turbines can also achieve the same result. If the final
19 choice of wind turbine has a higher sound power level, then modeling should be redone to
20 assure conformance with applicable standards.
- 21 • The levels of low frequency sound will not create perceptible building vibration.

- 1 • The sound levels from the turbines will not rise to a level that can create hearing damage or
2 pose quality of life concerns with respect to sleep disturbance or speech interference.
- 3 • Other than extended concrete pours, wind turbine erection and similar events, major
4 construction is expected to take place during normal business hours. Aside from road
5 construction, these activities will take place well away from the nearest residence and thus
6 will have a minimal impact on noise levels.
- 7 • One substation will be built, and three will be modified. The resulting substations all have
8 modeled sound levels that are well below Board precedent levels. However, the modified
9 substations are close to either an elementary school or lodging. For these, the applicant
10 should install transformers with a manufacturer guarantee of 5 dB below NEMA TR-1
11 standards, if found to be cost-effective.
- 12 • Other sound sources include routine maintenance and transformers at the base of the
13 turbines. The routine maintenance and transformers will not create significant noise.

14

15 **7. Q. Does this conclude your testimony?**

16 **A. Yes.**