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Please respond to the Portsmouth office

May 13, 2013

Via Electronic and Overnight Mail

Jane Murray, Secretary
NH Site Evaluation Committee
New Hampshire Department of Environmental Services
29 Hazen Drive
Concord, NH 03301

Re: Timbertop Wind, I, LLC Petition for Jurisdiction;
Docket No. 2012-04

Dear Ms. Murray:

Enclosed please find 18 copies of written testimony on behalf of the Towns of New Ipswich and Temple, New Hampshire for the Site Evaluation Committee's consideration in this matter. Electronic copies have been sent to each person on the Committee's official service list in this proceeding with links to download all of the enclosed information. Any person who has problems downloading this information is requested to contact my assistant Sharon Mallon in our Portsmouth Office who can send a copy on compact disc. I have also enclosed a copy on disc for the Committee's use.

In addition, a complete hard copy has been sent by overnight mail to Thomas Getz, counsel for Timbertop Wind 1, LLC and to Peter Roth, counsel for the public in this proceeding.

If you have any questions, please contact me.

Very truly yours,

Justin C. Richardson
jrichardson@uptonhatfield.com

JCR/sem
Enclosure(s)
cc: Docket No. 2012-04 Service List

BEFORE THE STATE OF NEW HAMPSHIRE

ENERGY FACILITY SITE EVALUATION COMMITTEE

Timbertop Wind 1, LLC

Petition for Jurisdiction

Docket No. 2012-04

TESTIMONY OF EDWARD DEKKER AND ELIZABETH FREEMAN

ON BEHALF OF THE TOWN OF NEW IPSWICH

I. BACKGROUND

Q. What is your name and address?

A. DEKKER: Edward N. Dekker, 36 Blueberry Lane, New Ipswich, NH 03071

A. FREEMAN: Elizabeth C. Freeman, 410 Ashby Road, New Ipswich, NH, 03071

Q. What is your official capacity in the Town of New Ipswich?

A. DEKKER: I am the Chair of the New Ipswich Planning Board. I have served as a member of the New Ipswich Planning Board since 2004.

A. FREEMAN: I am Vice Chair of the New Ipswich Planning Board and have served on the Board for fourteen years, at various times as Chairman or Vice Chairman. As a member of the Board, I led the effort to update the Vision Chapter of the New Ipswich Master Plan, which was adopted in 2004.

Q. What is your professional background and experience?

A. DEKKER: I am a software engineer and the sole proprietor of a computer software consulting firm that provides software development and technical training on Windows Device Drivers, Systems Programming and Real-Time Programming. Additionally I am the co-author of a book on Windows System Programming (Developing Windows NT Device Drivers). I have more than 35 years of engineering experience.

My educational background includes graduation from Western Reserve Academy and a Bachelor of Science in Electric Engineering from Northwestern University. I have also taken post-graduate courses at the Massachusetts Institute of Technology as a Special Graduate Student. I have prepared several technical publications in the areas of software development and programming.

A. **FREEMAN**: I have a Bachelor of Science from the Massachusetts Institute of Technology, a Master of Education from Boston University, and I have taken postgraduate courses at the Sloan School of Management. I was co-owner of a small management consulting company for 18 years prior to my retirement in 2000. We provided consultation to various industries on how to improve work processes and the quality of products and services. Our clients included a chemical manufacturing company, a business forms company, the forestry group of a paper company, and the R&D division of a pharmaceutical company.

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

A. Our testimony is offered for the following purposes:

(1) **First**, our testimony provides an overview of the experience and qualifications of the New Ipswich Planning Board. It is our opinion that the New Ipswich's Planning Board and its Zoning Board of Adjustment[1] are well qualified to review Timbertop Wind 1, LLC's proposal and have the authority to retain qualified technical experts as appropriate to review a proposed LWES.

(2) **Second**, our testimony explains the basis for the Town's Zoning Ordinance, which permits Large Wind Energy Systems (LWES) as an allowed use, provided that the LWES adequately protects the public and the environment from unreasonable adverse impacts.

(3) **Third**, our testimony explains how a review by the New Ipswich Planning Board under the New Ipswich Zoning Ordinance allows for certain standards, such as the 33 dBA standard, to be exceeded by either land owner consent or by variance,

[1] We have not included a separate statement of the Zoning Board of Adjustment's qualifications and experience because of the Board's quasi-judicial role.

provided that the LWES would not have an unreasonable adverse impact on the use and enjoyment of adjacent properties.

(4) **Finally**, our testimony explains that the New Ipswich and Temple Planning Boards and Zoning Boards of Adjustment are willing and able to conduct joint hearings that would coordinate review of a proposed LWES located in both Towns.

II. QUALIFICATIONS AND EXPERIENCE OF THE NEW IPSWICH PLANNING BOARD

Q. What are the qualifications and experience of the New Ipswich Planning Board?

A. The New Ipswich Planning Board is comprised of highly experienced and qualified professionals who are fully capable of performing their duties as Planning Board members appropriately, fairly and efficiently.

Q. Please provide a summary of the experience and qualifications of the individual members?

A. Our experience and qualifications are described above. We are truly honored to serve on a Planning Board that includes a number of accomplished professionals, including the following current members:

- **Ned Nichols** is a member of the New Ipswich Planning Board with over 25 years of experience in site project management of multimillion dollar power generation projects for Westinghouse Electric Corp and Siemens. In addition, his experience includes development and construction of an 80 home condominium project; development and construction a 15 megawatt wood fired power plant in

Bethlehem NH; and 10 years managing a multi-million dollar per year power generation service business for Westinghouse Electric Corp with responsibility for all of New England. His management experience includes projects involving both turnkey installation of power plants in the US and 4 foreign countries and major maintenance of steam and combustion turbines.

- **Dr. Paul Termin**, is a Member of the Planning Board who was active in the development of the LWES. Dr. Termin is a Pathologist and has a Doctor of Veterinary Medicine (DVM) from Cornell University and a PhD in Micro Anatomy from the University of Minnesota. Dr. Termin is a senior level science and technology professional with 40 years of experience in research and development management, and pre-clinical studies management and analysis.
- **Carolyn Dick Mayes, Esq**. is an Alternate Member of the Planning Board and is an attorney with 20 years of experience in environmental law. She serves as senior counsel for United States Environmental Protection Agency, Criminal Enforcement office, and has previously served as its Acting Deputy Director. She has also practiced law for the firm of Whiteman, Osterman & Hanna and the United States Department of Housing & Urban Development.
- **Michael Conlin** has served as the Selectmen's Representative on the Planning Board and the Conservation Commission for the past two years. He has also served as a member of the town recreation committee for seven years. He has been doing environmental work for the last 13 years and is currently employed as the Sampling Technician in the Operations Department of Field and Technical Services out of Pittsburg, PA.

- **Bernard Hamill** is a member of the New Ipswich Planning Board with more than 35 years of experience in land development, site planning, structural engineering, and multi-million dollar project management. Mr. Hamill is a registered professional civil engineer and a professional land surveyor with a BS in Civil Engineering from Lowell University and an MBA from Troy State University. He has prepared more than 400 site plans including plans for 3 electrical substations.
- **Oliver Niemi** has served on the Planning Board for 10 years. He has worked at Western Electric in Equipment Systems Test Engineering and in Product Planning and Engineering, and at Lucent as a Manufacturing Process Engineer and as Manager of Manufacturing Quality Control. Mr. Niemi holds a BS in Electrical Engineering from Lowell Technical Institute and an MS in Engineering Science from Clarkson College.
- **Timothy Jones** serves as an alternate member of the New Ipswich Planning Board. Mr. Jones brings his expertise as a senior manager of various high technology firms having served in management positions including Group General Manager, President and Chief Operating Officer. Mr. Jones has an MBA in Finance and Marketing from Columbia University and a BA in Economics from Dartmouth College.

Q. RSA 162-H:10, V authorizes the Site Evaluation Committee and Counsel for the Public to "jointly conduct such reasonable studies and investigations as they deem necessary or appropriate to carry out the purposes of this chapter … the cost of which shall be borne by the applicant in such amount as may

be approved by the committee." What experience and authority does the New Ipswich Planning Board have to conduct similar studies?

A. The Planning Board's legal authority to require studies is contained in RSA 674:44 and RSA 676:4, I (g) which authorize the Board to require special studies "which may be required by particular applications". See also, RSA 676:5.[2] The Board's Site Plan Regulations provide for "an applicant to pay all … costs of special investigation and review of documents and other matters which may be required by particular applications."[3] In the case of an LWES application, the Board's regulations require that the applicant complete studies, including but not limited to following:

- Visual impact assessment,
- Wind resource study,
- Catastrophic failure report,
- Noise compliance report
- Critical communications study
- Environmental impact study; and
- Life cycle and decommissioning plan

We are confident that the Board members have the necessary experience to review studies and investigations that will be required when deciding on the merits of this application, and Commission any additional studies or independent consultants that may be required by particular applications.

[2] The New Ipswich Zoning Board of Adjustment has the same authority under RSA 676:5.
[3] New Ipswich Site Plan Regulations, Section III, Paragraph 5

III. HISTORY OF NEW IPSWICH ZONING ORDINANCE FOR LWES

Q. Why did the New Ipswich Planning Board decide to propose an Ordinance for Large Wind Energy Systems (LWES) in 2010?

A. Sometime after the New Ipswich Planning Board, in March of 2009, approved the first Met Tower in town, the Board realized the Town's Zoning Ordinance had no provisions for industrial scale wind turbines. Although somewhat skeptical that there would be sufficient wind in New Ipswich to support a LWES, the Board believed that wind farms are an important land use, and decided to write a zoning amendment making Large Wind Energy Systems (LWES) an allowed use in town.

Q. How did the Planning Board go about developing the original LWES Ordinance ?

A. The Board found several model ordinances and ordinances adopted by numerous other towns on the Internet. After review and comparison of these ordinances, the Board selected what it felt were the most appropriate sections from different ordinances. This process took place over a couple of months in the Fall of 2009 and the Town adopted the LWES Ordinance in 2010.

Q. Why, did the Planning Board decide to propose amendments to the LWES ordinance?

A. Almost two years later, the Board had come to appreciate that wind energy could be viable in our region. Recognizing that the existing ordinance had been developed in some haste without a full understanding of the issues, the Board felt it would be advisable to review the previously approved LWES ordinance to

determine if it was sufficiently protective of the health, safety, and welfare of the community. The Board believed that with two additional years of experience with wind farms in the US, there would be more information available about the impacts on the communities in which they were located. In doing some initial research, the Board discovered a document from Lincoln Township, Wisconsin. See Exhibit 5, Pages 15-26. This document reported on the findings of a survey of the Lincoln Township community regarding the impacts from a local wind farm. Based on these findings, the Board became concerned that the current LWES Ordinance was not sufficiently protective of the town's residents.

Q. How did the Board go about developing proposed amendments to the existing LWES Ordinance?

A. The Planning Board embarked on what became a 7-month intensive effort to study potential impacts of an LWES, draft revisions to our existing ordinance, and educate the community on its findings, its recommendations, and the process it had used to arrive at these recommendations. The Board had two objectives: to ensure the ordinance would protect the health, safety, and welfare of all the residents of the town and to ensure that the ordinance reflected the wishes of the citizens as expressed in the Master Plan. We understood that the primary method for achieving these objectives was to establish appropriate siting standards. We conducted extensive research on numerous issues.

We also consulted with two sound engineers, Stephen Ambrose and Robert Rand, who have a strong background evaluating the impact of noise on communities, having worked for many years at Stone & Webster in community noise control.

Their reports and recommendations to the Board are set forth in Exhibits 6, 7 & 8.[4] This process required many, many extra board meetings and work sessions, as well as several public information sessions and presentations to the Board of Selectmen (in addition to the required public hearings). Some of the more useful documents and studies that the Board reviewed fills a file drawer in the town office, and this does not include everything the Board reviewed.

Q. Did the Board act to prohibit the Timbertop Wind Project?

A. No. The Board has always worked with Timbertop to review and approved its project as required by law. In fact, the Planning Board approved Timbertop's two separate applications for two Met towers related to the project. Subsequently, at the request of Timbertop Wind, the Board conducted a Design Review in accordance with RSA 676:4, II(b). This Design Review, in accordance with RSA 676:12 VI, grandfathered Timbertop's application under the former 2010 LWES Ordinance for a period of one year. However, Timbertop did not submit an application within the one year period which expired in November 2012. It has provided only limited information and changed location and design of its project several times. The Board continues to support the development of renewable energy, but it also must protect the health, safety and welfare of New Ipswich residents.

IV. NEW IPSWICH MASTER PLAN

Q. What did the Planning Board use for guidance in reaching the decisions it made regarding the proposed amendments?

[4] Exhibit 7 is a presentation to Riga Township, Michigan. We have included this presentation because it provides an excellent summary of the impact of wind turbine noise on the community.

A. The Planning Board relied on the Town's Master Plan, first adopted in 1983, and amended in 1995, 2004, 2005, 2011 and 2012. The purpose of the Master Plan is "to aid the board in designing ordinances that result in preserving and enhancing the unique quality of life and culture of New Hampshire."[5] The Master Plan must include a vision section that "shall contain a set of statements which articulate the desires of the citizens affected by the master plan"[6] as well as a "set of guiding principles and priorities to implement that vision."[7]

Q. How does the New Ipswich Master Plan "articulate the desires of the citizens" of the Town of New Ipswich?

A. The Vision Section of the New Ipswich Master Plan includes the following statements:

- The Town will remain a small New England rural town, which for the people of New Ipswich means:
  - A country environment which is free from water, air, noise and light pollution,
  - Traditional New England scenes characterized by farmlands and woodlands; hills and mountain ridges; rivers, ponds and streams; and traditional New England buildings,
  - Shaded, curving roads, lined with mature trees and with low traffic volume, affording views of the natural beauty of the town,
  - Active farming and forestry enterprises,

[5] RSA 674:2 I
[6] RSA 674:2 II (a)
[7] RSA 674:2 II (a)

- Habitat that can sustain a wide variety of native animals, plants and aquatic species,
- Access to land providing opportunity for a wide variety of outdoor recreation,
- A development pattern showing variety in the density of housing and providing opportunities to live in densely settled villages (such as the town's three historic villages) or more sparsely settled areas.
- Historic buildings, fields, stone walls, and cellar holes serving as a reminder of the town's long history and traditions,
- A low density population creating a sense of safety and security, and providing opportunity for meaningful participation in community life.

Q. How can you be certain that the values articulated in the Town's Master Plan and in its LWES Ordinance reflect the values of the community?

A. The Master Plan was developed after substantial consultation and involvement of town residents. That process is described in Chapter I of the Master Plan. The first phase was initiated in August 2002 with the formation of ten affinity groups involving over 70 townspeople. This phase culminated in a town forum where 154 participants identified priorities and, based on these priorities, formed into eight topic groups, which commenced work in January of 2003. The work of these groups was synthesized into a questionnaire, which was delivered to all 1,500 households in town. Over 1,000 questionnaires were returned and formed the basis of the Vision Section. The percentage of returns far exceeded the more

typical 9-11% rate of questionnaire returns usually expected. The Planning Board officially adopted the updated Vision Chapter in March of 2004.

V. STANDARDS GOVERNING CONSTRUCTION OF LWES

Q. Please provide an overview of the New Ipswich Zoning Ordinance regulating LWES?

A. The New Ipswich Zoning Ordinance is intended to provide for all aspects of construction and operation of an LWES in an integrated manner. By making a LWES an allowed use in all districts of the Town, the LWES Ordinance allows an LWES to be constructed provided that there are no unreasonable adverse impacts to the community.

Q. Why did the New Ipswich Planning Board decide to change the standards for regulating sound pressure levels?

A. After reading the Lincoln Township report the Board became very concerned about sound standards. Our concern was confirmed after listening to a slide presentation from our sound consultants, in which they talked about several communities in Maine with wind farms. In these communities there were many appeals to stop the noise, organized community legal action against the wind farms, and stories of home abandonment due to the noise. New Ipswich is an exceptionally quiet rural community and the Board worried that similar events could occur in New Ipswich if we did not revise our standards.

Q. What additional evidence did the Board find concerning adverse community impact?

A. The Board discovered abundant anecdotal evidence of complaints regarding wind farm noise. These complaints included not only annoyance, but far more serious complaints of negative health impacts, and in some cases the Board found stories of home abandonment due to wind farm noise. Complaints about adverse noise effects appeared to be a particularly common occurrence when a LWES is sited in quiet rural communities. Although the issues related to adverse effects from wind farms are far from settled, the Board found 27 news accounts of complaints about wind farm noise in communities in the US, Canada, England, Scotland, Australia, and New Zealand. The Board was impressed by the sheer number of complaints and wished to avoid similar complaints in New Ipswich. The following are examples of some of the news articles reviewed by the Board.

- Boardman, Oregon - "Wind Farms Whip up Noise, Health Concerns"[8].
- Maine - "Wind Turbine Noise Recommendation Unlikely to End Debate"[9]
- Vinalhaven, ME - "For Those Near, the Miserable Hum of Clean Energy"[10]
- Freedom, ME - "Living Next to a Wind Turbine"[11]
- Falmouth, MA - "Residents Complain About Wind Turbines"[12]
- Fairfield, NY - Residents in Wind-Turbine Shadows Seek Noise, Other Relief"[13]
- Naples, NY - Naples Hears From Windmill Supporter-Turned-

[8] Exhibit 15, Page 166.
[9] Exhibit 16, Page 172.
[10] Exhibit 17, Page 174.
[11] Exhibit 18, Page 177.
[12] Exhibit 19, Page 179.
[13] Exhibit 20, Page 181.

Opponent"[14]

- St. Cloud, WI - "Neighbors Say Wind Energy Has Its Price"[15]
- Valley City, ND - "Wind Turbine Noise Concerns Prompt Investigation"[16]

Q. What else influenced the Board to change the sound standards?

A. The Board researched numerous scientific studies and reports: These included:

- An article by Stephen Ambrose, "Wind Turbine Noise Complaint Predictions Made Easy"[17], which includes a map of the households in Falmouth, MA of households complaining about wind turbine noise and shows their distance from the turbines.[18]
- Pedersen and Waye, "Annoyance Due to Wind Turbine Noise"[19], a 2004 paper, cited in numerous other studies, showing that wind turbine noise results in a "higher proportion of people reporting … annoyance than expected from the present dose–response relationships for transportation noise". This paper confirmed the adjustments recommended by our consultants and those recommended in Table D-7 of the EPA Levels Document.[20]
- The Acoustic Ecology Institute's "Fact Sheet: Wind Energy Noise Impacts"[21] and its "Wind Farm Noise 2011, Science and Policy Overview"[22], two articles which explain wind farm noise issues in "lay language" and which were extremely helpful to the Planning Board.

[14] Exhibit 21, Page 183.
[15] Exhibit 22, Page 185.
[16] Exhibit 23, Page 188.
[17] Exhibit 8, Page 65.
[18] Exhibit 8, Page 67.
[19] Exhibit 9, Page 69.
[20] See Exhibit 10, Page 80.
[21] Exhibit 11, Page 90.
[22] Exhibit 12, Page 98.

- Soysal, "Wind Farm Noise and Regulations in the Eastern United States".[23]
- An additional report, "Findings and Rational - The Montville (Maine) Wind Turbine Generator Ordinance"[24] was also considered.

Q. What did the Board's sound consultants recommend concerning appropriate sound level standards?

A. Our consultants recommended that the town use the most straightforward approach possible when determining appropriate sound standards. They explained this approach in a slide presentation to the Board in Exhibit 6. They recommended that New Ipswich base its sound standards on the predicted community noise response (CNR) developed by the EPA in a document entitled, "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare With an Adequate Margin of Safety" ("Levels Document"), using the adjustments in Section 3 of Appendix D.[25] The Levels Document is a compilation of fifty-five noise studies published by the EPA in 1974, at the time when communities started complaining about the new noises introduced by jet airplanes and super highways, and before the introduction of industrial scale wind turbines. Its findings and methodology for prediction of community noise impacts remains a standard in the industry today.[26]

Q. How did the New Ipswich Planning Board determine that a 33 dBA sound standard was necessary to avoid adverse impacts?

[23] Exhibit 13, Page 153.
[24] http://penbay.org/energy/raggedmtn/ordinances/montville_findings_and_rationale.pdf
[25] Exhibit 10, Pages 80-89 contains Section 3 of Exhibit D of the EPA's Levels Document. Due to length (284 pages), the entire Levels Document is not included as an exhibit.
[26] See e.g. Soysal (Exhibit 13).

A. Table D-7 and Figure D-7 in Appendix D of the EPA "Levels Document" formed the basis for the final recommendation of 33 dBA. Figure D-7 is a graph showing the predicted response of communities to an intruding noise source. When the intruding noise source is over 59 dBA, the graph shows a prediction of widespread complaints, or worse. However, the 59 dBA is based on community response to noise levels in urban environments. Table D-7 shows corrections that should be made to predict the impact of noise as follows: 10 dBA for a quiet rural community; 5 dBA for no prior experience with the noise; and 5 dBA for impulsive character of the noise or the presence of a pure tone. Our consultants informed us that New Ipswich should be considered an extremely quiet rural community, with probable background noise levels not much over 20 dBA on a still winter night. In addition, the sound emitted by industrial scale wind turbines has an impulsive character. Finally, a correction of 6 dBA was necessary to convert from measuring sound as a normalized day-night level (Ldn), which is a 24-hour average, to measuring sound as Leq, which is how sound meters measure sound over shorter time periods. The resulting 26 dBA correction to the graph in Figure D-7 would mean it is predictable that any noise emitted by a LWES exceeding 33 dBA will lead to widespread complaints from a quiet rural community community.

Q. Why is an adjustment required because of the nature of wind turbine noise?

A. Noise emitted by wind turbines has unique characteristics. The Board learned from its sound consultants that noise from a LWES could be very different than noise from other sources. The noise from wind turbines is often louder at night

than during the day. This occurs because sound travels more easily in cold air, and cold air is held aloft during the day by the sun warming the earth. However, at night the cold air descends and the sound follows it. Wind speeds at turbine height can be much higher than wind speed at ground level. At night there may be little or no wind at ground level to mask the noise generated by the high winds at turbine height. The noise generated by a wind turbine may actually be louder some distance away from the turbine than it is at the base of the turbine. In addition, noise from wind farms may contain thumping, low frequencies, pure tones, and infrasound. The modulation of the noise from wind turbines is similar to that of the modulation of the human voice, thus making it difficult to ignore. Because of the unique characteristics of LWES noise, it is not comparable to a more familiar noise source, such as a passing truck.

Q. Why are noise levels from a LWES not comparable to noise from Small Wind Energy Systems (SWES)?

A. The characteristics of the sound from each are entirely different. “The sounds produced by blades, gearing, and generator are significantly louder and more noticeable as wind turbine size increases. Long blades create a distinctive aerodynamic sound as air shears off the trailing edge and tip. The sound character varies from a ‘whoosh’ at low wind speeds to ‘a jet plane that never lands’ at moderate and higher wind speeds. Blade-induced air vortices spinning off the tip may produce an audible ‘thump’ as each blade sweeps past the mast. Thumping can become more pronounced at distance, described as ‘sneakers in a dryer’, when sounds from multiple turbines arrive at a listener’s position simultaneously.

Wind turbines are not synchronized and so thumps may arrive together or separately, creating an unpredictable or chaotic acoustic pattern. The sounds of large industrial wind turbines have been documented as clearly audible for miles. They are intrusive sounds that are uncharacteristic of a natural soundscape."[27]

Q. Why did New Ipswich's consultants recommend use of Leq sound measurements rather than Ldn (Day-Night averages)?

A. The Board learned from its sound consultants that, because of its unique characteristics, wind farm noise might be difficult to measure. Typical measurement issues include separating turbine noise from background noise, the period of time over which measurements are taken, and how those measurements are averaged. Our consultants also pointed out that the human ear does not average noise level over a period of hours or even minutes. Humans can detect sound level changes that occur over microseconds. In addition, wind turbine noise can be greatest during quiet night time periods, making the use of average background noise levels inappropriate.

Q. What other standards in the existing LWES ordinance did the Board find to be in need of revision, and why?

A. The Board revised other sections of the LWES Ordinance in order to make it consistent with the New Ipswich Master Plan and to strengthen protections for the healthy, safety, and welfare of the community. This included standards for Visual Impacts, Aviation Lighting Systems, Environmental Impacts (including avian and bat species), and Setbacks, discussed below. Our goal was to adopt an ordinance

[27] R.W. Rand and S.E. Ambrose, "Wind Turbine Noise, An Independent Assessment"

that regulated all aspects of construction and operation of an LWES in an integrated manner.

Q. Visual Impacts. How does the New Ipswich Zoning Ordinance regulate Visual Impacts?

A. The LWES Ordinance was amended to include criteria for determining whether or not the turbines would dominate significant views. The criteria included in the amendment were taken from the document *A Visual Impact Assessment Process for Wind Energy Projects,* Vissering, Sinclair, and Margolis, May 2011. Visual impacts are particularly important because:

- A significant portion of the Wapack Trail is located in New Ipswich, with a spur ascending Kidder Mountain. The Wapack Trail was created 90 years ago and is a significant historical and recreational resource in the town and the entire region. It fits the description of land designated in the guiding principals of the Master Plan as having high priority for protection.[28]
- There is a cross-country ski center located in New Ipswich near the base of Kidder Mountain. One of the guiding principals in the Master Plan is to encourage this kind of enterprise.[29]
- The New Ipswich Master Plan listed two of the characteristics of a Small New England Rural Town as "Access to land providing opportunity for a wide variety of outdoor recreation" and "Traditional New England scenes characterized by

[28] "Conserve lands providing opportunities for outdoor recreation, Preserve scenic views, historic features of the land, and other areas of natural beauty, Establish a comprehensive trail system

[29] "The kinds of business and industry which is encouraged should be consistent with townspeople's desire to maintain a country environment which is free from water, air, noise, and light pollution. These could include … businesses related to tourism and outdoor recreation…."

farmlands and woodlands; hills and mountain ridges; rivers, ponds and streams; and traditional New England buildings."

Q. Lighting Systems. What standards does New Ipswich's LWES Ordinance use to regulate lighting systems?

A. The Board learned that new lighting technology was available that would protect New Ipswich's dark night time skies. New Ipswich does not have significant industrial or commercial sources of light pollution and the Town's Master Plan recognizes that protection of dark night time skies is important.[30] The LWES Ordinance requires that: "The use of Automatic Obstruction Lighting Systems, such as those manufactured by DeTect and OCAS, is mandatory for Wind Turbines with FAA lighting." The Board understands that these systems have been installed and currently operate in a limited mode and expects that the Federal Aviation Administration (FAA) will publish an advisory circular allowing full radar controlled operation this summer (2013).[31] We understand that these or similar Audio Visual Warning Systems (AVWS) are recommended or required at a number of locations, including:

- Coconino County, AZ
- Ellis County, KS
- Albany County, WY
- Recommended by the Town of Hammond, NY
- Bureau of Land Management Districts (several)

[30] One of the characteristics of a Small New England Rural Town, as defined by New Ipswich Residents in the New Ipswich Master Plan, is "A country environment which is free from water, air, noise and **light** pollution."

[31] Data sheets for the DeTect Visual Warning System and the OCAS Radar system

- Vermont, Lowell Community Wind Project (under construction).[32]

Q. Timbertop Wind has indicated that these systems may not be commercially available for its project. How did New Ipswich select the AVWS systems specified in the ordinance?

A. We contacted the manufacturers of these systems and were provided with the following statement:

> "The first HARRIER VWS in the US (also the first obstruction lighting radar system in the US) was installed at NExtEra's Perrin Ranch wind farm in Arizona in early 2012. We have orders pending for several more systems as well as will be installing a system for a power line in the northeast in March.
>
> "As I noted, the FAA will not approve or certify any system (the FAA only certifies systems that go into aircraft or are used for active air traffic control). All other systems, included VWS, fall under the Advisory Circular (AC) process which sets design and performance standards that the system must meet in the form of an Advisory Circular (AC). It is incumbent on the manufacturer and owner to ensure that the system meets the AC requirements. The FAA may conduct on-site tests of a system however, again, will not issue a certification or approval (the FAA has indicted that it intends to do this at Perrin Ranch on DeTect's HARRIER VWS).
>
> "The FAA is currently in the process of amending the current obstruction lighting AC. The manufacturers we[re] allowed to review the pre-draft in late 2012 and we expect the final draft to be available for public comment within the next 90 days with the final AC released mid-year or early Q3. DeTect is selling VWS systems to its customers in the interim with a guarantee that our system will meet the AC when released." [33].

Q. What would happen if these systems do not become commercially available as anticipated by the LWES Ordinance?

[32] Email to Edward Dekker dated 10/27/2011 from Gregory S Erdmann Sales and Marketing Director, North America for OCAS Inc.
[33] Email to Edward Dekker dated 2/21/2013 from Gary W. Andrews General Manager DeTect Inc.

A. In the event that these systems do not become commercially available, we expect that the project would seek a variance to install a similar system consistent with the spirit of the LWES Ordinance.

Q. Environmental Impacts. How does the New Ipswich LWES Ordinance address Environmental Impacts such as migratory birds and bat species?

A. The Wapack Range, a large portion of which is located in New Ipswich, is an extremely important migration route for raptors. It is a rare geographical formation known as a Leading Line. Migrating birds, particularly raptors, travel far distances to reach this location. Besides the seacoast, which is another form of Leading Line, there is not another route like this for hundreds of miles. This location is widely known among birders with a famous "Hawk Watch" every fall. The Hawk Watch (which includes Audubon and Antioch University participation) counts thousands of raptors, with as many as 6,000 counted in one day.

Q. Setbacks. How does the New Ipswich LWES Ordinance evaluate whether setbacks are adequate?

A. The Board proposed removing specific distances for setbacks. The purpose of setbacks is to protect people, animals, property, and utilities from debris and ice falling from the wind turbine**.** The Board did research on the issue of potential harm caused by debris and ice and determined that while it is theoretically possible to calculate the distance that debris can be thrown, in reality, there are many complicating factors. Instead of designating exact distances for setbacks, the Board believed it was more practical to allow the applicant to propose the setback distance required for each LWES project and demonstrate to the Planning

Board that the proposed setback is sufficient to prevent debris and ice from falling outside the project boundary**.** The Board also believed that the setback required to meet the sound standards would most likely result in adequate setback from a public safety standpoint.

Q. Other Standards. Are there other important standards in New Ipswich's Ordinance?

A. Yes. The standards listed above are only examples intended to illustrate how the New Ipswich LWES Ordinance is intended to regulate all aspects of construction and operation of an LWES in an integrated manner.

VI. THE NEW IPSWICH ZONING ORDINANCE ALLOWS FLEXIBILITY TO EXCEED CERTAIN STANDARDS

Q. What if the standards required by the LWES Ordinance have the practical effect of prohibiting the construction of a Large Wind Energy System?

A. We do not believe that the Town's Ordinance prohibits the construction of a Large Wind Energy System. The Board supports the development of sources of renewable energy. It approved the construction of two Met Towers in town and initiated the passage of an ordinance to allow wind farms in New Ipswich as a permitted use, thus relieving potential applicants from the burden of having to go to the ZBA for a variance in order to allow development of a LWES. The LWES Ordinance was written in order to provide a framework to allow an appropriate facility to be constructed in accordance with the wishes of the citizens of New Ipswich, as expressed in the Vision Chapter of the Master Plan.

Q. On what basis did the Planning Board believe that an LWES could be constructed that would comply with the Town's 33 dBA noise standard?

A. When the Planning Board was considering amendments to the LWES Ordinance, Pioneer Green Energy submitted the Sound Level Model for the Groton Wind facility to the Board, which is included as Exhibit 14, Page 165 to our testimony. The Groton Wind model showed that a substantially larger 48-megawatt facility could be constructed with a 4,000-5,000 foot setback and meet a 33 dBA sound level. The members of the Planning Board reviewed this information and believe that a smaller facility could be sited in New Ipswich and meet our 33 dBA sound standard, especially if adjacent land owners consented to the project as allowed by the LWES Ordinance.

Q. What recourse does an applicant have if they are unable to meet the standards in the LWES Ordinance?

A. There are two avenues of recourse. First, the LWES Ordinance itself allows for an applicant to obtain an easement from abutting landowners. This easement would allow for certain standards to be exceeded on the property of the owner granting the easement. Second, New Hampshire land use law provides for a variance from zoning ordinance standards through application to the zoning board of adjustment (ZBA).

Q. Under what circumstances may the ZBA grant a variance?

A. The criteria governing issuance of a variance from the New Ipswich Zoning Ordinance are set forth in RSA 674:33, II. The five criteria are:

(1) The variance will not be contrary to the public interest;

(2) The spirit of the ordinance is observed;

(3) Substantial justice is done;

(4) The values of surrounding properties are not diminished; and

(5) Literal enforcement of the provisions of the ordinance would result in an unnecessary hardship.

Q. From a practical standpoint how would the 'five criteria' for a variance be satisfied?

A. The New Ipswich LWES Ordinance was adopted with the understanding that an applicant could request a variance to exceed the standards in the ordinance, provided that the variance criteria were met. By making an LWES an allowed use in all districts, the New Ipswich Zoning Ordinance is meant to support a finding as to the public interest, spirit of the ordinance, and substantial justice criteria. The key question to be answered by the Zoning Board of Adjustment is not whether or not an LWES should be built, but whether an LWES would have an adverse impact on the values of the community that are protected by the Ordinance. For example, while New Ipswich has adopted a 33 dBA standard for noise, if Timbertop Wind or another applicant is able to demonstrate to the Zoning Board of Adjustment that a greater noise level would not have an adverse impact on (non-participating) residential properties, it seems likely that the Zoning Board of Adjustment would be required to grant a variance. In effect, the New Ipswich Zoning Ordinance provides a goal to be met by the project, but the variance criteria allow the Zoning Board of Adjustment to consider whether exceeding the standards set by the Ordinance would have an adverse effect on

nearby residences. This is very similar to the findings that are made by the Committee when it considers whether or not a proposed energy facility would have an "unreasonable adverse effect" on noise.

VII. JOINT REVIEW BY NEW IPSWICH AND TEMPLE

Q. Under what circumstances could the Planning Boards of New Ipswich and Temple conduct a joint review of an application?

A. New Hampshire land use law **requires** joint reviews by two different municipalities upon request of an applicant. See RSA 674:53. The planning boards of both New Ipswich and Temple have agreed to conduct a joint review, and while there are minor differences, our Ordinances are consistent or even identical in nearly all areas of importance.

Q. How would New Ipswich and Temple conduct a joint review?

A. The joint review would be conducted with a single record, joint hearings, the same timeframes for decision under RSA 676:4. We expect that both towns could use the same experts to advise both boards. The ordinances of the two towns are essentially identical. We expect that the Boards would reach the same results applying the same standards in each Town. The planning boards of the two towns have already demonstrated extraordinary cooperation in the preparation for this case before the SEC.

Q. How do the ordinances of the two towns compare?

A. The two ordinances are essentially identical.

- Both towns use the same Definitions.

- The Design, Manufacture, Construction, and Maintenance Standards are the same for both towns.
- Temple specifies that the Total Height of the Wind Turbines shall not exceed 450 feet. The New Ipswich standard is that due consideration shall be given to the scale of the turbines in relation to the surrounding landscape.
- The Temple ordinance requires a setback from adjacent property lines of non-participating owners of at least 2,000 feet. The New Ipswich ordinance requires that the applicant demonstrate that turbine setbacks are sufficient to protect people, domestic and farm animals, public and private property, and utilities from Debris Hazard and requires that ice throw or ice shedding from the LWES shall not cross the Project Boundary. We expect that New Ipswich and Temple's 33 dBA noise standard will be sufficient to meet the goals of either Town's setback requirements from non-participating land owners.
- Both towns require that sound levels produced by the LWES shall not exceed 33 dBA (Leq 10 minute) anywhere at any time on a Non-Participating Landowner's property.
- The parameters that must be used in developing a noise prediction model are the same for both towns.
- The standard for protection of birds, raptors, and bats are nearly identical. Both ordinances require compliance with the Avian Power Line Interaction standards, avoiding the creation of artificial habitats for raptors

or raptor prey, prohibiting the operation of turbines in winds under 10 mph to protect bats, and requiring periods of curtailed operation to protect raptors and migratory birds.

- Temple requires a Historical, Cultural, Archeological protection plan, and the Temple Planning Board may require specific setbacks of LWES structures or roadways from significant sites and/or other actions, which protect or restore items of historic significance. New Ipswich does not require a protection plan, but does require the applicant to include a Historical, Cultural, Archeological, Resource Map as part of the site plan submission. The map must show the locations of recognized historical, cultural, or archeological resources within the project boundary and a two-mile radius beyond the project.
- Both towns use the same factors to assess visual impact, including: appearance of proximity; duration of view; expectation for natural or intact landscape setting; uniqueness of a scenic resource; whether the view is directly ahead over extended distances; and whether large numbers of turbines are visible in many views.

The only significant differences between the two ordinances are: 1) the Temple Ordinance designates a maximum height, and 2) the Temple Ordinance designates a specific setback distance. The other differences are not significant factors.

Q. Could the differences in the two ordinances cause any difficulty if the two towns were to conduct a joint review of an application for a LWES by Timbertop Wind?

A. The differences in the two ordinances would be highly unlikely to cause any problems. The information presented by an applicant to demonstrate to the New Ipswich Planning Board that the proposed setback was safe and that the tower height conformed to the visual impact standards would be the same information required by Temple should the applicant need to apply for a variance as previously explained. The same information, on the same record, should produce the same results in both towns.

V. CONCLUSIONS

Q. RSA 162-H:1 states that it is intended to ensure that "construction and operation of energy facilities is treated as a significant aspect of land-use planning in which all environmental, economic, and technical issues are resolved in an integrated fashion". How does the New Ipswich LWES Ordinance meet this goal?

A. The New Ipswich zoning ordinance regulating a LWES is a comprehensive ordinance that includes standards governing:

- the design, manufacture, construction, and maintenance of the facility,
- height, setbacks, sound and sound measurement, shadow flicker and visual impact,
- erosion and storm water control, mitigation for impacts to public infrastructure, and communication interference,
- safety, and provision for firefighting and rescue services, including training programs, and

- protection for environmentally sensitive areas, wildlife, birds, bats, and ground and surface water.

- The ordinance provides for post construction monitoring of environmental impact, compliance with noise standards, and power production by the facility.
- The ordinance has provisions for various financial issues, including: financial assurance from the applicant for construction, decommissioning and administrative costs to the town.
- The ordinance addresses various legal issues, including: complaint resolution, enforcement and penalties, and granting of leases and easements.

Q. RSA 162-H:1 is also intended to "assure that the state has an adequate and reliable supply of energy in conformance with sound environmental principles"? How does the New Ipswich LWES Ordinance meet this goal?

A. The New Ipswich LWES Ordinance allows a LWES as a permitted use and contains provisions for protection of the environment. We believe that the ordinance promotes the State's and the Town's renewable energy goals while ensuring that an LWES does not have an unreasonable adverse impact on the community or the environment.

Q. What would be the consequences if the SEC accepts jurisdiction of this project?

A. The local Planning Board is already very familiar with some of the unique impacts this project may have on the Town. We have confidence that the SEC would inform itself about these impacts, but it would take significant time and effort that has already been invested by the Planning Board. However, the time

and resources of the Committee and its members would be taken away from reviewing larger projects or the performance of other important duties of their office. Timbertop's gain could be a loss for the rest of the state if other important goals and objectives were delayed or not met in order to review a project that is well below the threshold for jurisdiction and provides little or no benefit to the State's energy goals or economy.

A determination of jurisdiction could also set a dangerous precedent because New Ipswich and Temple have invested a considerable time and resources to research and prepare a comprehensive LWES Ordinance that is consistent with the vision for each community. New Ipswich and Temple could have prohibited LWES entirely but did not do so. If Timbertop's petition is granted, it will send a clear message to communities in New Hampshire that efforts to develop standards appropriate to their community will be undermined if they depart from those applied by the Committee to projects that may have no application to the unique circumstances present in each Town. If Timbertop's Petition is granted, it may send a message that it would be 'safer' to prohibit renewable energy facilities entirely, rather than risk developing standards to promote renewable energy that may later be challenged before the Committee.

Q. Does this conclude your testimony?

A. Yes.

BEFORE THE STATE OF NEW HAMPSHIRE

ENERGY FACILITY SITE EVALUATION COMMITTEE

Timbertop Wind 1, LLC

Petition for Jurisdiction

Docket No. 2012-04

TESTIMONY OF JOHN KIELEY AND ROSE LOWRY

ON BEHALF OF THE TOWN OF TEMPLE

I. BACKGROUND

Q. What is your name and address?

A. John Kieley, 37 Holt Lane, Temple NH

A. Rose Lowry, Cutter Road, Temple NH

Q. What is your official capacity in the Town of Temple?

A. **Kieley**: I am the Chairman of the Temple Board of Selectmen and the ex-officio member of the Planning Board. I have served on both Boards for seven years.

A. **Lowry**: I am the Chair of the Temple Planning Board. I have served on the Planning Board for six years; this is my second year as Chairman.

Q. What is your professional background and experience?

A. **Kieley:** I have a Bachelors degree in mathematics from Norwich University and a Masters degree from the University of Michigan's Graduate School of Business Administration. I am a Fellow of the Society of Actuaries and a retired owner of Hewitt Associates which became a New York Stock Exchange company. I currently serve on the Board of Directors of the Lukas Foundation and The Nature Conservancy's New Hampshire Chapter.

A. **Lowry:** I have a BFA degree from the University of Michigan and have been a small business owner (graphic design and illustration) for 14 years. My professional experience covers contract development, marketing, web design, and graphic design. I am an active volunteer, including committee and marketing work with arts, human services, conservation and farming organizations, plus the Temple Historical Society. My board experience includes the NH Creative Club,

Andy's Summer Playhouse, and The Graphic Artists Guild (regional and national).

Q. What is the purpose of your testimony?

A. Our testimony is offered for the following purposes:

(1) **First**, our testimony provides an overview of the experience and qualifications of the Temple Planning Board. It is our opinion that the Planning Board is well qualified to review Timbertop Wind 1, LLC's proposal and has the authority to retain qualified technical experts as appropriate to review a proposed LWES.

(2) **Second**, our testimony provides an overview of the Town of Temple and its important historical, natural and recreational resources. We explain that the Town's Zoning Ordinance is intended to permit Large Wind Energy Systems (LWES) as an allowed use, provided that the proposed LWES does not adversely impact the public, wildlife and natural resources that are critical to the Town of Temple.

(3) **Third**, our testimony explains how review of a proposed LWES under the Temple Zoning Ordinance can be completed provided that adverse impacts on the community and values protected by the Zoning Ordinance are avoided. For example, we explain that the Temple Zoning Board of Adjustment has the authority to permit variances in cases where a literal enforcement of the Zoning Ordinance would result in unnecessary hardship, provided that the proposed LWES demonstrates that it would not have an adverse impacts on residential properties and the values that the Zoning Ordinance is intended to protect. The Temple Zoning Ordinance also allows for relief from the noise and setback limits

when the LWES obtains written permission from affected landowners. We also explain that the New Ipswich and Temple Planning Boards remain willing to conduct joint hearings and coordinate review of a proposed LWES located in both Towns in order to avoid undue delay.

II. QUALIFICATIONS AND EXPERIENCE OF THE TEMPLE PLANNING BOARD

Q. What are the qualifications and experience of the Temple Planning Board?

A. The Temple Planning Board is made up of highly experienced and qualified professionals who are fully capable of performing their duties as Planning Board members appropriately, fairly and efficiently. At the time the Planning Board prepared the Large Wind Energy System (LWES) amendment to the Town's Zoning Ordinance, the Planning Board had combined planning board experience of approximately 100 years.

Q. Please provide a summary of the experience and qualifications of the individual members?

A. Our experience and qualifications are described above. Following is a summary of the qualifications of our other current Board members:

Allan Pickman. Mr. Pickman is resident and homeowner in Temple since 1981. He is a graduate of New York University and a member of Temple Planning Board since 1986, either as an elected member or ex-officio member. He is a former member of Temple Board of Selectmen and the Conval School Board.

Mr. Pickman has more than 35 years of experience as architectural designer, estimator and project manager in general construction.

Randall Martin. Mr. Martin is a graduate of the University of New Hampshire and Harvard University's School of Design. He was a Corporate Property Manager of 1,000,000 square feet of prime office space in Washington, DC and Boston for firms including Hagner and Co., Hamlen and Collier, and Leggat/ McCall and Co. He has served on the Temple Planning Board since 1995; the Temple Conservation Commission from 1994 to 2001; and as a board member of the Southwest Regional Planning Commission from 1997 to 2005. He owns the Timberdoodle Club which has been in Temple for 45 years.

Mary Beth Ayvazian, is a Temple resident since 1999 and has a J.D. degree from the Massachusetts School of Law. She practices law at Group W Legal Partners. She has experience in land use and real estate law and has served on Temple's Zoning Board and the Temple Energy Committee. Ms. Ayvazian joined the Planning Board in 2009.

Ken Sullivan has a Bachelor of Science in Mechanical Engineering degree (cum laude) from University of Detroit and did graduate work in Mechanical Engineering at Northwestern University. His professional experience includes manufacturing engineering at Ford Motor Company, research and development at Borg Warner Corp., Vice President of Product Planning at Victor Business

Products (div.of Kidde Inc.) and 30 years of experience in information technology in sales, marketing and product management positions ranging from Account Management to CEO, with companies such as Devcom Mid-America, Sun Microsystems and Cisco Systems.

Camilla C. Lockwood has a JD degree from the New England School of Law and has owned and managed property in Temple since 1985 (in family since 1929). She served as an Assistant District Attorney, Essex Co. Massachusetts from 1979 to 1994. A founding member of both the New Hampshire Rivers Campaign/Council (President mid 90's; Honorary Director today) and the Exeter River Watershed Association. She previously served on the Chester Conservation Commission and Planning Board. The Town of Chester recognized her as Volunteer of the Year in 2002.

III. THE TOWN OF TEMPLE, NEW HAMPSHIRE

Q. How would you describe the Town of Temple?

A. The Town of Temple was incorporated in 1768 and has a current population of 1,366 with 995 registered voters. The Town covers 15,168 acres with elevation ranging from 800 to almost 2200 feet. Like Sharon, Temple was originally known as Peterborough Slip when first granted in 1750. Temple was incorporated in 1768 in honor of John Temple, lieutenant governor under John Wentworth. Temple was son-in-law to James Bowdoin, for whom Bowdoin College is named. Temple was home to the Temple Glass Works, founded in 1780. The short life of the business makes Temple glass rare and sought after today. The Temple Town

Band is the oldest organized town band in the United States. Its first recorded performance was in 1800 for George Washington.

Today Temple could be described as a rural residential community where many families go back several generations. Townspeople are very environmentally conscious and we were one of the first communities in the State to adopt an energy committee; that Committee is very active throughout the State in energy conservation and alternative energy sources. We still have a number of local farms, which sell their products both locally and as far away as Boston.

Q. How would you describe Temple's rural character?

Temple is one of the oldest and prettiest villages in Hillsborough County, a town of rustic charm, among hills and woods. Temple owes much of its charm to its agricultural roots. Temple is predominantly a rural, residential, and agricultural community. Preserving critical open space areas is vital to maintaining not only the environmental health of Temple, but also the natural identity, rural character, and recreational opportunities that are so closely connected to the Town.

We have included photographs of the Town of Temple to give the Site Evaluation Committee a "view" of the exceptional rural character that Temple has maintained by preserving its rural character and historical resources. These photographs are included in Exhibit 4, which also includes view of the Town of New Ipswich from the Wapack Trail.

Q. How important is Temple's rural character to its residents?

A. We believe it is extremely important. Temple has a rich history of asking citizens what they think about a wide variety of subjects including changes that they would like to see. Opportunities for input include town wide forums where citizens get together in the evening to learn about a topic, discuss it and then participate in a straw vote. Town wide surveys have also been used to solicit citizen involvement. Planning Board members annually have a table at the Town's Harvest Festival to share information and seek input from residents. Temple has consistently had very high citizen involvement and voter turn out; we had 88% voter turnout in last November's election.

Consistently citizens have asked the Town government to maintain our rural character.

Q. How is Temple different from other scenic New England communities?

A. The Town of Temple stands out because of its extraordinary combination of historical, natural, ecological and recreational resources. Protection of these resources is critical to its residents and is reflected in its LWES. The following is brief summary of the resources protected by Temple's Zoning Ordinance:

1. Historical Resources

Unlike many New England communities, Temple did not experience the industrial and commercial development that replaced farming. Much of the land that was devoted to farming reverted to forest. As a result, Temple contains a number of significant historical sites that remain in a scenic, rural setting.

There are far too many historical buildings, sites, structure, roads and schools to list. The following is only a partial list of the historical resources identified in the Town's Master Plan:

Historic Village District

Public Buildings:

- Town Hall built in 1842 and now on the National Register of Historic Places.
- Church built in 1841–1842; Goodyear Chapel built in 1887. Friendship Hall was built in 1951/52 with an addition in 1998.
- Willard's Store and Post Office (formerly a stable) built in 1805, rebuilt after a fire in 1882.
- Mansfield Public Library built in 1890, with an addition in 1951 and 2002.

Town Common:

The Temple Town Common is a triangular area located at the historic center of the Town . It was officially dedicated on July 4, 1873, but contains a flagpole in front of the Town Hall set in a millstone base from Joseph Putnam in 1770 and dedicated to the town by the Barry family in 1895. Today, the Common is used for a variety of cultural events and is maintained by the Village Green Committee, and the Highway Department.

National Historic Sites:

The Temple or New England Glass Works was established in Temple by Robert Hewes of Boston in 1780-1782 and is believed to be one of the first glass

manufacturing sites in the United States. Temple glass is highly valued today due to its rarity.

National Register of Historic Places:

The Birchwood Inn built in 1775 contains murals by Rufus Porter.

The Temple Town Hall built in 1842.

Historic Homes:

The Temple Master Plan identifies 48 "Historic Homes" that were built in the 1700s and 19 Historic Homes that were built in the 1800s at different locations in the Town of Temple. These Historic Homes include the following:

Built in 1700s*:

1. Ball-Pratt house on Stone Lane;
2. Barnes-LaPree house on Hill Road;
3. Cobb-Sylvian house on Rte 45;
4. Colburn-Weston house on Colburn Road;
5. Cummings-Lee house on East Road;
6. Cutter-Hollister house on Vinton Lane;
7. Cutter-McAdoo house on Cutter Road;
8. Dinsmore-Sargent house on Fish Road;
9. Drury-Mirabella house on West Road;
10. Edwards-Lukas Foundation house on Memorial Drive;
11. Emery-Phillips house on Moran Road;
12. Felt-Byram house on Route 45;
13. Felt-Tobey-Scott house on East Road;
14. Fiske-Lukas Foundation house (Maynard house/Echo Farm) on Memorial Drive;
15. Foster-Karl house on Foster Road;
16. Foster-Fiske house on General Miller Hwy;
17. Gardner-Carpenter house on Hadley Hwy;
18. General Miller House (Marshall/Edwards-Miller- Friede/Beaudoin) on General Miller Hwy;
19. Goodale-Blood/Caney house on Blood Road;
20. Griffin-Lewis house on Old Revolutionary Road;
21. Heald-Bay house on Webster Hwy;
22. Heald-Copertino house on Webster Hwy;
23. Heald-Fox house on Old Revolutionary Road;
24. Heald-Hawkins house on Old Revolutionary Road;

25. Heald-Whiting house on Old Revolutionary Road;
26. Holt-Moore house on Colburn Road;
27. Howard-Davis house on Kendall Road;
28. Jewett-Munk house on Kendall Road;
29. Johnson-Whitcomb house on Colburn Road;
30. Killam-Kantner house on Derbyshire Lane;
31. Killam-Kantner house on Converse Road;
32. Lowell-Treadwell house on Old Revolutionary Road;
33. Mansur, Sr.-Bradler and Mansur, Sr.-Bradler houses on East Road;
34. Marshall-Mazza house Thomas Maynard Drivel
35. Miles-Guy house/Noah Miles parsonage on Leighton Lane;
36. Parlin-Pierce house on Mansfield Road;
37. Perkins-Wegmueller house on Tainter Lane;
38. Putnam-Barry house on Putnam Road;
39. Putnam-McDaniel house on Webster Hwy;
40. Searle-Monzies house on Mansfield Road;
41. Severance-Quinn on Cutter Road;
42. Shattuck-Henderson house on Rte 45;
43. Spafford (Spofford)-King house on Webster Hwy;
44. Spofford-Klinck house on West Road;
45. Stickney-Bigelow/Mansfield house on East Road;
46. Tenney-Wolbers house on Hill Road;
47. Tenney-Ulch house on General Miller Hwy; and
48. Wheeler-Banks house on Main St.

Built in 1800s*:

1. Barry House on Putnam Road.
2. Child/Heald-Odell house on Old Peterborough Road
3. Clement-Burnham house on West Road
4. Drury-Doyle house on Rte 45
5. Fiske house on General Miller Hwy.
6. Hadley-Willard on Hadley Hwy
7. Hawkins-Clements house on Hadley Hwy.
8. Hawkins-Forrest house on Hadley Hwy.
9. Howard-Davis house on Kendall Road.
10. Killam-Head/Miller Head house on Rte 45
11. Laws-Wright/Culliton house on Hadley Hwy.
12. Lucy Heald House/Congregational Parsonage and barn on Rte 45
13. Parkhurst-Sartell house on East Road
14. Searle-LeBel house on General Miller Hwy.
15. Searle-Pickman/Downs house on Colburn Road
16. Shaw-Schubert house (Blacksmith Shop)
17. Sheldon-Ricci/Lycyniak house on Hadley Hwy.
18. Spofford-Felt house on Rte. 45
19. Spofford-Areias house on West Road

Historic Schoolhouses:

1. District No. 1 schoolhouse built in 1805 on Hadley Hwy (Davidson-Benotti).
2. District No. 2 schoolhouse built in 1805 on Fish Road (Sanford-Barnhisel/Bauchat house).
3. District No. 3 schoolhouse built on East Road in 1799 by Ebenezer Edwards and moved across the road in 1919 to its present site (Leighton-Marchuk house).
4. District No. 4 schoolhouse built in 1855 moved to Hwy. 101 as a dwelling (Messing house) in 1931, near Temple Cabins.
5. District No. 5 schoolhouse built in 1900 on Webster Hwy near Heald-Cupertino residence, moved in the 1930s, and remodeled into Wildes residence on Hill Road.
6. District No. 6 schoolhouse built around 1820 on Converse Road and moved across road in 1800s. Building was moved to the Village Center in 2001.
7. Central Schoolhouse built in 1918 on Hadley Hwy (Moses house).

Cemeteries:

1. Village Cemetery/Old Burying Ground with gate dedicated to "The Wives and Mothers of 1776." Many of the first settlers were buried here from 1772 until 1891. Located in the Historic Village District across from the Town Common.
2. North Cemetery with burials from 1794 to 1822 located on Converse Road.
3. East Cemetery with earliest burial in 1800. Town tomb is visible at SW corner. Located on Gen. Miller Road.
4. Miller Cemetery across from East Cemetery obtained in 1898.

Archaeological District:

Earliest settlement in Spofford Gap area of the Wapack Range (to become Temple and Sharon) on Old Todd Road (the Ashburnham-Peterborough Trail) with numerous cellar holes and mill sites. First deed issued to Joshua Todd in 1758 (first cider-maker in town). School was first kept at the Walton place, now a cellar

hole. Area includes Maynard Inn cellar hole and Glassworks site dating to 1780s.

Historic Roads:

1. Old Todd Road was the first road cut through Temple from Groton through Townsend, MA, to New Ipswich and Sliptown (Temple/Sharon) to Peterborough. Originally the Ashburnham-Peterborough Trail). Currently called Old Street Road in Peterborough. Predates the survey of the area Peterboro Slip in 1750 and dates 1738-1739. No longer appears on maps of 1858 and 1892 and so assumed to be abandoned by the early 1800s.

   This road runs through the proposed LWES property.

2. Old Revolutionary Road was cut in 1760 by English Royal Militia headed by Ephraim Heald. Road becomes Bennington Battle Trail in Wilton. Used as a military highway to convey munitions and troops.

Historic Stone Structures:

1. Stone arch bridge on old 101 Hwy across Blood Brook.
2. Stone arch bridge on Memorial Drive off Rte. 45.
3. Cut-stone culvert/bridge/canal on Old Peterborough Road.
4. Cut-stone culvert on Webster Hwy/Revolutionary Road.
5. Cut-stone canal on Hadley Hwy across Kids/Temple Brook from the Balch, Bacon, and Walton grist,saw, and cider mill site.

Historic Mill Sites (as of 1975):

1. Skowhegan River Tributaries
2. Whiting Brook:
3. Whiting mill
4. Butterfield grist and saw mill
5. Joseph Putnam grist mill
6. Jacob Putnam cider and woodworking mill
7. Farrar grist mill
8. Elias Boynton grain and saw mill
9. Blood Brook:
10. Killam woodworking mill
11. Boynton mill
12. Saunders mill
13. Barnes Brook:
14. Ball grist and cider mill
15. Balch, Bacon, and Walton grist, saw, and cider mill

16. Barnes mill
17. Gulf Brook:
18. Snow-Dutton grist mill
19. Contoocook River Tributaries
20. Bacon grist mill
21. William's mill
22. Non-Water sites
23. Searle first combination grist and saw mill
24. Colburn cider mill
25. Crain woodworking mill
26. Howard mill

Q. How are these historical resources relevant to Timbertop Wind's Petition for Jurisdiction?

A. We expect that review of Timbertop Wind's proposal to construct its LWES, access roads, power lines, and related facilities will prove to be particularly challenging due to the abundance of historical resources in the Towns of Temple and New Ipswich which are in close proximity to their proposed site. For example, the currently proposed configuration of Timbertop Wind's wind turbines places one of the towers directly adjacent to the Temple or New England Glassworks which is a National Historic Site. See www.nhglassmakers.com for more information on the historic significance of this site.

In addition, we have learned Timbertop has indicated that access roads for its project and its transmission lines will require widening or construction on roads in Temple. These roads are likely to be in close proximity or high visibility to significant historical resources. Local knowledge of these resources will be important in the review of the project. In our opinion, it would be very difficult for the Site Evaluation Committee or any other agency to resolve siting, design

and alternatives to an LWES without local knowledge and consideration of these and other historical resources located in the Town of Temple as well as those in New Ipswich which could be adversely impacted. Because of their local knowledge and the ability to conduct site views during its review, the Temple and New Ipswich Planning Boards are well suited to review impacts to historical resources in consultation with an applicant's or their own qualified consultants.

2. **Natural and Ecological Resources**

Q. How important are Temple's natural or ecological resources?

A. Temple's natural resources are exceptionally important. Temple has many significant conservation areas and open spaces. In addition, the Miller State Park in the Town of Temple provides access to a critical research center, the Pack Monadnock Raptor Migration Observatory (located on the Peterborough Town Line), operated by the New Hampshire Audubon Society (Audubon).

Q. Why is the Raptor Observatory important?

A. The Wapack Range passes through Temple and New Ipswich and is part of a unique geological formation known as a "leading line" which creates a long, reliable updraft which birds intentionally travel to, to assist in their migration. The Observatory is sited strategically along the Wapack Range, which is situated along the western edge of Temple, and is the centerpiece of a crucial migration route which is recognized by the Federal government. There is not another "leading line" formation for hundreds of miles. Effectively, there is not another one in New England. Raptor migrations funnel into the narrow Wapack ridge line and NH Audubon describes it as "the most important migration route in the state".

Q. What research is conducted by Audubon at the Observatory?

A. Audubon's "long-term scientific goal of the project is to collect ten years' worth of standardized data, which would allow for the undertaking of statistical analysis of raptor population trends. The site is one of approximately 169 consistently reporting North American watch sites, all of which enter their daily observations into a database administered by the Hawk Migration Association of North America (HMANA)."[1] Audubon employs a full time naturalist to record raptor migrations in Temple during the period from August to November each year, supported by volunteers who, in 2012 "logged 600.75 observation hours over 85 days".[2] During the 2012 migration, Audubon maintained an "average number of experienced observers on the platform at any one time was between four and six".[3]

Q. What do the Observatory's results show?

A. The most recent results of Audubon's research are included in Audubon's 2012 Annual Report included in Exhibit 24 to our Testimony. By way of brief summary, the data from Audubon's Observatory in Temple show that the Wapack Range is the epicenter of North American east coast raptor migration routes. The numbers are truly staggering. In 2011, "an unprecedented wave of Broad-winged Hawks broke over Pack Monadnock—over 8,700 in just two days in mid-September"![4]

The following table shows the total raptor migration for all species in 2012:

[1] Exhibit 24, Page 3 (192).
[2] Exhibit 24, Page 3 (192).
[3] Exhibit 24, Page 5 (194).
[4] See Audubon's 2011 Report Page 15 (not included).

Season	Obs Hrs	TOTAL
F 2012	600.75	12,324
F 2011	368	14,256
F 2010	627.75	10,786
F 2009	420.75	6,963
F 2008	435.75	9,274
F 2007	430	10,624
F 2006	408.25	10,435

Q. Where is Timbertop Wind 1, LLC's project located in relation to the Observatory and the Wapack Range?

A. Exhibits 1-3 show that Timbertop Wind 1, LLC's project appears to be located directly in the path of the raptor migrations reported from the Observatory.

Q. What do the records from the Observatory show about how raptor migrations interact with the Wapack Range?

A. The daily observation reports on the Pack Monadnock Hawkwatch show that migrating birds, including Golden Eagles, do not just soar in straight lines along the Wapack Range in Temple and New Ipswich, but interact and maneuver extensively along the range. The observation reports indicate that migrating birds use the Wapack Range to land in the trees to rest, to sleep, to eat, and to await better weather, especially thermals.

Q. How is this information relevant to Timbertop Wind's proposal?

A. The Temple LWES ordinance recognizes the unique migratory conditions that are present in the Wapack Range that have been documented by the New Hampshire Aududon Society, and requires avian studies to determine how a potential project can be developed with minimum impact on migration. As an example, Timbertop

Wind submitted an Avian and Bat Survey Report which demonstrated that an average of approximately 38% of all observed raptors migrating within the proposed project area, fly below the turbine blade height.[5] This kind of data is corroborated by Audubon observations, and extremely important in refining project specifications.

The Temple and New Ipswich LWES ordinances recognize the importance of avian issues and require that the operations be curtailed during periods of significant migration. It is also important to note that there is considerable variation in the migration patterns. The Temple and New Ipswich Planning Boards are well aware of these issues and their ordinances are designed to address them.

Q. In what ways are the Towns of Temple and New Ipswich well suited to address the issues associated with raptor migrations?

A. Audubon's annual data from the Observatory show that there is considerable variability from year to year, both in terms of the dates of raptor migration and its intensity. This will have to be recognized in the review of the project and conditions will need to be developed to address this from year to year. The Towns are well suited to address the year-to-year variation in migration for a number of reasons including: (1) proximity to the Observatory; (2) the ability of local officials to respond to reports from the Observatory and approve modifications or curtailment of operations of the LWES due to raptor migrations. We expect that the flexibility offered by the local permit process could be

[5] See pages 29 and 37 of TTW Avian report which are pages 61 and 69 of TTW Feb 14, 2013 submission to the SEC.

incorporated into conditions to protect raptors. By contrast, if review is conducted only at the state level, it would be very challenging to develop conditions by the Committee that could be administered at the state level.

3. **Recreational Resources.**

Q. Please explain how Temple's Recreation Resources are important to the review of Timbertop's proposal?

A. The Town of Temple contains a number of significant recreational resources that contribute to the Monadnock region's tourism economy. Protection of these resources is a high priority not only to maintain the Town's rural character, but to maintain its economic value for tourism. Significant recreational resources include:

The Wapack Trail is a 21-mile (8 miles of which are in Temple) skyline footpath along the scenic north-south ridge of the Wapack Range which is referenced several times as an important resource in the Temple Master Plan.. It begins at the base of Mt. Watatic in Ashburnham, MA and reaches altitudes of 2,200 feet before it ends at the foot of North Pack Monadnock Mt. in Greenfield, NH. The Wapack Trail is managed and maintained by the volunteer organization Friends of the Wapack. The Wapack Trail is one of the oldest interstate trails in the Northeast, having been a popular hiking destination for 90 years. The trail includes stunning skyline routes along the summits of Watatic, Pratt, New Ipswich, Barrett, Kidder and Temple mountains, plus the Pack Monadnocks. Portions of the trail in the Towns of Temple and New Ipswich are shown in Exhibits 1-3.

The Wapack National Wildlife Refuge. Established in 1972 by the U.S. Department of Interior, Fish and Wildlife Service and managed as a wilderness area, this 1,672-acre refuge is located in Temple (475 acres), Lyndeborough, and Greenfield. The refuge is suitable for hiking, snowshoeing, cross-country skiing, and wildlife observation. Hunting, trapping, camping, and motor vehicles are prohibited. This is a popular bird-watching area with cliff and bare ledge habitats.

Miller State Park is located on the summit of Pack Monadnock and is the oldest state park in New Hampshire. 344 acres of this 544-acre park are located in Temple. The park contains three main hiking trails and a seasonal auto road to the summit. Picnic tables and an old fire tower (now used for viewing) can be found at the summit. The summit offers a panoramic view of the surrounding countryside. Mount Monadnock, 3,165 feet high can be seen twelve miles to the west. The park is named for General James Miller, long-time resident of Temple who fought in the War of 1812. Miller State Park is used extensively for research, recreational and educational birding activities. According to Pack Monadnock Raptor Migration Observatory Final Report Fall, 2012:

> The Pack Monadnock Observatory, located near the summit at the juncture of three hiking trails, and just a few hundred yards from the parking lot, averages a few thousand visitors each year—not only dyed-in-the-wool hawk-watchers, but hikers, tourists, day-trippers, trail-runners, leaf-peepers, motorcycle gangs looking to stretch their legs…all sorts of people, many of whom have never heard of hawk-watching. This year over 3,100 people stopped to learn something about hawks at Pack Monadnock.

Temple Mountain State Reservation is located just south of Miller State Park and provides miles of hiking and cross country skiing trails on its 352 acres most of which are in Temple.

Pack Monadnock Raptor Migration Observatory. The Observatory, located near the summit at the juncture of three hiking trails, and just a few hundred yards from the parking lot, averages a few thousand visitors each year. The following is from the Pack Monadnock Raptor Migration Observatory Final Report fall 2012:

> "—not only dyed-in-the-wool hawk-watchers, but hikers, tourists, day-trippers, trail-runners, leaf-peepers, motorcycle gangs looking to stretch their legs…all sorts of people, many of whom have never heard of hawk-watching. This year over 3,100 people stopped to learn something about hawks at Pack Monadnock."

Other Trails: Temple is fortunate to have three other trail networks that offer more moderate hikes. The White Ledges, Town Forest and Chris Weston Conservation Area trails are all on land owned by the Town and managed by the Conservation Commission.

Q. How frequently are these resources used?

A. The use of recreational resources in the Town and the overall Monadnock region is significant. The following data, obtained from the New Hampshire Department of Resources and Economic Development, show that the use of State Parks in the area is significant, led by the Mount Monadnock Park Headquarters. Mount Monadnock is one of the most frequently climbed mountains in the world.

N.H. State Park Attendance, Monadnock Region
3/30/12 - 11/1/12

State Park	Total Use	% of Grand Total
Monadnock Gildon Pond	7,321	7.3%
Monadnock HQ	71,487	71.1%
Monadnock OldToll Rd.	14,128	14.0%
Miller State Park	7,644	7.6%
Monadnock Region GT	100,580	100%

Q. How are Temple's recreational resources relevant to the review of Timbertop Wind 1, LLC's proposal?

A. The data show that local parks and trails are important to the regional economy. We believe that the Temple and New Ipswich LWES Ordinances provide a framework to resolve potential impacts to these resources during the site plan review process. For example, Section 12 of the Temple ordinance provides that the project be designed to avoid adverse visual impacts from "public recreational and scenic areas, trails used by the public including the Wapack Trail". We expect that the Planning Board would evaluate potential impacts using the reference document *A Visual Impact Assessment Process for Wind Energy Projects*, Vissering, Sinclair, and Margolis, May 2011, as specified in its ordinance.

IV. HISTORY OF TEMPLE ORDINANCE FOR LWES

Q. What led the Temple Planning Board decide to propose an Ordinance for Large Wind Energy Systems (LWES) in 2012?

A. In 2009, the Temple Planning Board developed a Small Wind Energy System (SWES) ordinance that was approved by voters in March 2010. The provisions of this ordinance were based on RSA 674:63-66. In 2010, the Planning Board realized that larger scale wind projects might be developed in Temple had preliminary discussions about development of an LWES ordinance. On April 6, 2011, the Temple Planning Board received information about the proposed Antrim LWES and decided to begin further research. (See minutes 04-06-11)

Q. When did Pioneer Green first approach the Town?

A. In the summer of 2011, the Temple Planning Board was approached by Pioneer Green Energy (PGE) regarding the construction of a multi-tower large wind energy system in Temple and New Ipswich. The specifications of the project were not made available to the Town. Given the size of the potential development, the Planning Board determined that it was their fiduciary obligation to both become knowledgeable on the potential impacts of these developments and develop an ordinance that would balance the need for renewable energy with protections for our environment, wildlife and our residents.

Q. How did the Planning Board go about developing the LWES Ordinance?

A. The Board first read available literature on the design, construction and operation of LWES. Wind energy projects from across the US and several international projects were researched. Several members visited the LWES in Lempster and spoke with local residents on the impact of that development. We also spoke with residents and officials in both Antrim and New Ipswich regarding what they were learning about these developments. We discussed these developments with

Southwest Regional Planning Commission and our town counsel. An internet search was conducted to locate existing zoning ordinances dealing with these developments.

With this background we set about over the course of several months to develop specifications for and develop an ordinance that would protect the health, safety and welfare of residents while also protecting our environment and wildlife.

Given the fact that the PGE project spanned two towns, we recognized that it would be advantageous for both the developer and the two towns to have the two ordinances as similar as possible.

From the early stages of our studies we understood that noise was going to be a major issue in permitting LWES. While New Ipswich had used qualified sound engineers in the development of their standards we felt that it was appropriate to retain an independent consultant to advise Temple. Temple retained Sound Control Engineering from Billerica Ma. to advise the Planning Board.

In March 2012, Temple's voters approved the ordinance by an overwhelming margin of 349 to 78!

V. STANDARDS GOVERNING CONSTRUCTION OF LWES

Q. How did the Temple Planning Board determine that 33 dBA was the appropriate standard for regulating sound pressure levels?

A. The Board relied on a number of sources. We understand that Mr. Decker and Ms. Freeman have described the process and the evidence that led the Town of New Ipswich to adopt the 33 dBA noise standard in its Zoning Ordinance. Many of the same concerns and evidence presented in New Ipswich were presented in the

Town of Temple. The Temple Planning Board conducted its own independent review of the community noise impacts of wind turbines and ultimately agreed with the approach adopted by the Town of New Ipswich.

Q. RSA 162-H:1 states a purpose of "that undue delay in the construction of needed facilities be avoided". Do you believe that Temple Zoning Ordinance would result in "undue delay in the construction of needed facilities"?

A. No. We understand that RSA 162-H was adopted at a time when delays in the review of projects before Planning Boards were not uncommon. Today, Planning Boards are required to review projects within the time periods established by RSA 676:4, I (c), which requires a determination as to whether a project is complete within 30 days of submission of an application. Once an application is accepted as complete, the Planning Board has 65 days to approve or disapprove of an application, subject to an extension not to exceed 90 days as specified in RSA 676:4, I (f). The Temple and New Ipswich Zoning Ordinances specify the information to be submitted in detail so that once an application is submitted, these deadline can be met.

Q. RSA 162-H:1, also establishes a purposes providing for "full and timely consideration of environmental consequences" and "construction and operation of energy facilities is treated as a significant aspect of land-use planning in which all environmental, economic, and technical issues are resolved in an integrated fashion." How does the Temple Zoning Ordinance meet these goals?

A. The Temple Zoning Ordinance spells out in detail the information to be provided in order to evaluate potential adverse impacts to Temple's exceptional Historical, Natural and Recreational Resources. This is admittedly a difficult challenge due to the close proximity of potential wind resources to residential areas. However, the Town supports the development of wind energy resources provided that potential adverse impacts can be avoided as set forth in the Town's Zoning Ordinance, which received overwhelming approval of the Town residents.

Q. What recourse does an applicant have if they are unable to meet the standards in the LWES Ordinance?

A. There are two avenues of recourse. First, the LWES Ordinance itself allows for an applicant to obtain an easement from abutting landowners that allow for relief on both noise and certain setback requirements. Second, New Hampshire land use law provides for a variance from zoning ordinance standards such as structure height through application to the Zoning Board of Adjustment (ZBA).

Q. Under what circumstances may the ZBA grant a variance?

A. A variance may be granted under the following conditions:

- The proposed use would not be contrary to the public interest
- The use is not contrary to the spirit of the ordinance
- Granting the variance would do substantial justice
- The proposed use would not diminish property values
- Literal enforcement of the ordinance would result in unnecessary hardship because 1) no fair and substantial relationship exists between the general

public purposes of the ordinance provision and the specific application of that provision to the property and 2) the proposed use is a reasonable one.

Q. Do the standards required by the LWES Ordinance have the practical effect of prohibiting the construction of a Large Wind Energy System?

A. We believe that the Town's Ordinance provides ample opportunity for the construction of a Large Wind Energy System. The Town and the Board support the development of renewable energy. Temple's Energy Committee has been called a model for the State. Our ordinance specifically allows wind farms in Temple as a permitted commercial use in residentially zoned areas, thus relieving potential applicants from the burden of having to go to the ZBA for a variance in order to allow such use. As members of the Board attend more seminars and read more literature on LWES we continue to both believe and be encouraged that LWES can be built in Temple under our ordinance.

Having said that, it was extremely important to ensure that any LWES would not have an unreasonable impact on noise, aesthetics, or the Town's desire to maintain its rural character.

Q. Under what circumstances could the Planning Boards of New Ipswich and Temple conduct a joint review of an application?

A. New Hampshire land use law requires joint reviews by two different municipalities upon the request of an applicant. RSA 674:53. The planning boards of both New Ipswich and Temple have agreed to conduct a joint review.

Q. How would Temple and New Ipswich conduct a joint review?

A. The ordinances of the two towns are identical in many important areas; in others such as setbacks it is simply a matter of the developer siting the towers appropriately on the approximately 900 +/- acres they have under agreement. The planning boards of the two towns have already demonstrated extraordinary cooperation in the preparation for this case before the SEC. A joint review would be based on the same record and governed by the same timeframes for review.

Q. How do the ordinances of the two towns compare?

A. The two ordinances are essentially identical. The only significant differences are that the Temple Ordinance designates a maximum height and specific setback distance.

Q. Could the differences in the two ordinances cause any difficulty if the two towns were to conduct a joint review of an application for a LWES by Timbertop Wind?

A. The differences in the two ordinances would be highly unlikely to cause any problems. In New Ipswich the developer would have to demonstrate that the proposed setback was safe while in Temple it's simply a question of whether the minimums have been met.

VI. CONCLUSION

Q. In conclusion, what is your opinion of Temple and New Ipswich's ability to fairly and appropriately review Timbertop Wind 1, LLC's project under their LWES ordinances if and when Timbertop files as application?

A. In our opinion, the Towns of Temple and New Ipswich are extremely well suited to manage an application for a LWES. We have very experienced and dedicated

planning and zoning boards as well as highly researched and balanced ordinances. Our ordinances are by intent extremely similar to virtually eliminate any hardship to a developer proposing a project in the two towns. Our ordinances provide for relaxed standards when adjoining landowners provide easements. We know our communities and their particular issues; we can identify potential problems upfront and work with he developer to mitigate them. We believe in green energy; we are a model for the State for energy conservation and were early adopters of an ordinance permitting small wind energy systems. There are many technical challenges that a project would need to overcome, but a properly designed and sited LWES project would be an asset to our community.

Q. Does this conclude your testimony?

A. Yes.

BEFORE THE STATE OF NEW HAMPSHIRE

ENERGY FACILITY SITE EVALUATION COMMITTEE

Timbertop Wind 1, LLC

Petition for Jurisdiction

Docket No. DW 12-04

TESTIMONY OF LISA LINOWES

ON BEHALF OF THE TOWNS OF

NEW IPSWICH AND TEMPLE, NEW HAMPSHIRE

Q. Please state your name and address.

A. My name is Lisa Linowes. My address is 286 Parker Hill Rd, Lyman, NH 03585.

Q. What are your professional qualifications and experience related to the siting of Wind Turbines?

A. I serve as Executive Director for the Industrial Wind Action (IWA) Group, a national advocacy group focused on policy issues associated with industrial-scale wind energy development. In this capacity, I have participated in four separate dockets before the Site Evaluation Committee (SEC) related to the siting of wind energy facilities including Lempster Wind, LLC (SEC Docket No. 2006-01), Granite Reliable Power, LLC (SEC Docket No. 2008-04), Brookfield Renewable Power Inc. (SEC Docket No. 2010-03) and Antrim Wind, LLC (SEC Docket No. 2012-01). I also served on the Ad Hoc committee to develop wind siting guidelines for the state of New Hampshire. Since 2006, I have written and spoken extensively on the topic of renewable energy policy and wind energy economics. Invited speaking engagements include: The Midwest and Northeast Chapters of the Energy Bar Association annual meetings (2009, 2010), the ISO-NE Regional System Plan meeting (2011), and the New England Wind Energy Education Project Conference (2011). In April 2012, I testified before Congress on federal subsidies impacting wind project costs. I hold an Masters in Business Administration.

Q. What is the purpose of your testimony today?

A. I offer this testimony to explain why Timbertop Wind 1, LLC's proposed 15 MW wind energy facility is not needed "to assure that the state has an adequate and reliable supply of energy in conformance with sound environmental principles" within the meaning of RSA 162-H:1.

Q. Please explain.

A. Before explaining why Timbertop Wind 1, LLC's project is not needed to assure an adequate and reliable supply of energy, I note that RSA 162-H:1 refers to the need for a "reliable supply of energy" but makes no reference to a need for Renewable Energy Certificates (RECs) under RSA 362-F. The omission of any reference to the RPS in RSA 162-H:1 is noteworthy. The Legislature could have added the need for additional "renewable energy" to the purposes enumerated in RSA 162-H:1 but clearly did not do so.

Q. Do you believe that the Legislature intended that the Committee consider the need (or lack of need) for additional renewable energy facilities in determining whether a project below the 30 MW threshold requires a certificate "consistent with the findings and purposes set forth in RSA 162-H:1"?

A. This is a legal question that may need to be decided by the Courts. However, I do not believe that the Legislature intended that the need or lack of need for additional RECs be considered for the following reasons:

- The Legislature clearly could have included this requirement but did not do so. New Hampshire adopted its RPS program on May 11, 2007.[1] On July 17, 2007, the Legislature added a definition for renewable energy facility and time frames to RSA 162-H.[2]
- Class I and other RECs are an abstract creation under State laws in New Hampshire, Massachusetts, Maine, Rhode Island and Connecticut to provide incentives for renewable generation. However, RECs are not 'needed' in the sense used in RSA 162-H:1.
- New Hampshire provides for an Alternative Compliance Payment (ACP) under RSA 362-F:10, II. Even if a shortfall existed due to market conditions in other states, an ACP can be made to New Hampshire's renewable energy fund to meet the requirements under RSA 362-F.
- Demand for RPS can also be reduced by the New Hampshire Public Utilities Commission which has the authority to delay implementation of RPS requirements under RSA 362-H:4, V. In fact, the Commission recently delayed implementation of the thermal Class I requirement in Order No. 25,484.
- RPS markets are typically "lumpy" or "binary".[3] Events such as the changes to the definitions of eligible Class I facilities in other states, changes to the ACP, and availability of renewable resources in New York

[1] See Laws of 2007, Chapter 364, adopted May 11, 2007.
[2] See Laws of 2007, Chapter 26, adopted on July 17, 2007.
[3] NHPUC: 2011 Renewable Energy Portfolio Standard Review.

or other markets that can bid into the New England can quickly change the market conditions in New Hampshire.

As a result, it appears that the need for additional Class I facilities to serve markets outside of New Hampshire is not a factor that should be considered when determining whether a project is "consistent with the findings and purposes set forth in RSA 162-H:1".

Q. How then have you evaluated whether Timbertop Wind 1, LLC's project requires a certificate in order to "to assure that the state has an adequate and reliable supply of energy"?

A. In evaluating whether the Timbertop proposal should be certificated by the state, I first looked at whether the facility was necessary to assure an adequate and reliable supply of energy and second I looked at whether it was needed to assure an adequate and reliable supply of Class I RECs.

To the first point, New Hampshire represents approximately 9% of the total energy demand in New England but has 13% of its generation capacity. New Hampshire has long been an exporter of electricity. This coupled with reduced demand growth since 2008 for the entire region has clearly lowered the need to build new capacity. Energy generated by the Timbertop project is not necessary to ensure an adequate supply of generation for the state.

The question of whether the Timbertop project is needed to assure an adequate and reliable supply of Class I RECs requires an examination of the New Hampshire's REC market.

New Hampshire's energy policy requires that 24.8% of our energy load be met with renewable energy resources by the year 2025. Of this percentage, 12.4%[4] represents the Class I REC requirement which includes wind energy. Assuming a total RPS obligation of nearly 3-million megawatt hours by 2025[5], the state of New Hampshire already has sufficient existing in-state resources to meet the state's 2025 compliance for Class I RECs (see TABLE 1). While many of these RECs are sold out of state, the New England REC market is rapidly changing as policies are amended and as new, existing, and imported resources are approved under the various state RPS policies.

TABLE 1 - New Hampshire Class I Resources

Unit	Project	MWh per year
1	Lempster Wind (24 MW)	63,072
2	Granite Reliable Wind (99 MW)	260,172
3	Groton Wind (48 MW)	126,144
4	Shiller Station #5 (50 MW)	320,000
5	Alexandria Indeck (16.4 MW)	105,120
6	Berlin BioPower (68 MW)	542,070
Total (305.4 MW)		**1,416,578**
Notes: Production numbers are estimates and assume projects are in service and operate without curtailment.		

Q. Please explain your assertion that *'many of these RECs are sold out of state'*.

A. Total quantities and percentages of NH Class I RECs must be understood in the context of a regional market. NH Class I RECs can be used for RPS compliance

[4] Class I thermal is a subset of Class I. The thermal requirements are subsumed in the Class I requirement but can only be satisfied using thermal renewable energy.
[5] NH Public Utilities Commission, *2011 Renewable Energy Portfolio Standard Review,* http://www.puc.nh.gov/Sustainable%20Energy/RPS/RPS%20Review%202011.pdf (page 7).

in several New England states. Thus, many more RECs are actually created in NH than are reflected in the state's RPS compliance figures. Of the six projects listed above, Lempster, Alexandria Indeck and Berlin BioPower[6] are likely the only facilities selling their RECS to in-state service and energy providers. In contrast, Granite Reliable Wind has two long-term power purchase agreements (15-20 years) with Vermont utilities[7] to sell up to 82% of its energy, capacity and RECs. Groton Wind has a signed agreement with Massachusetts utility, NSTAR, to sell all of its energy, capacity and RECs for a term of 15 years. When New Hampshire elected to lower its Class I alternative compliance payment (ACP) to $55 beginning in 2013, Class I qualified projects not under contract were incentivized to sell their RECs in states offering higher ACPs.

The ACP for Class I RECs in Rhode Island and Massachusetts is currently $65.27. As long as these states have a deficit of Class I REC's , their REC markets will prove more attractive for NH project owners. According to the *Massachusetts RPS & APS Annual Compliance Report for 2011* (published April 9, 2013), 89.2% of Massachusetts' 2011 RPS Class I compliance was satisfied by out-of-state resources. Of that, 12.6% or 331,996 MWh were produced by New Hampshire projects[8].

Looking further out, there are currently several substantial requirements for New England distribution utilities in MA, RI, and CT to add significant amounts of

[6] Berlin BioPower is expected to be in service by October 2013. A long-term (20 year) power purchase agreement signed with Public Service of New Hampshire was approved by the NH PUC in April 2011.
[7] Amended PPAs were approved by the Vermont Public Service Board with Central Vermont Public Service (http://psb.vermont.gov/sites/psb/files/orders/2010/7589AmendedOrder.pdf) and Green Mountain Power. (http://psb.vermont.gov/sites/psb/files/orders/2011/7590AmendedOrder.pdf)
[8] http://www.mass.gov/eea/docs/doer/rps-aps/rps-aps-2011-annual-compliance-report.pdf at 32.

new generation in the next few years using long-term contracts. The Massachusetts Green Communities Act currently requires 7% of RPS compliance using contracts. Recent proposed changes in the Connecticut RPS, if signed into law, will require 4% of the state's RPS load to be satisfied with contacts. Rhode Island mandates 90 megawatts be under contract representing a significant portion of the state's RPS requirement. Both Antrim Wind, LLC and Timbertop Wind, LLC reported they were shortlisted for RFPs issued by Rhode Island utilities. Such legislative mandates in other New England states would continue to pull Class I RECs away from New Hampshire, particularly wind energy RECs. Other changes in the RPS laws in Massachusetts and Connecticut seek to lower or phase-out wood biomass in the next few years. If fully realized, Class I biomass RECs will likely return to New Hampshire (and/or migrate to Rhode Island), however, wind energy projects proposed to be built in New Hampshire are expected to satisfy RPS laws out-of-state.

TABLE 2 - RPS Class I REC Production and Requirement by Project/Year

Project	2013 Production	2014 Production	2015 Production	2016 Production	2017 Production	2018 Production
Lempster Wind (24 MW)	63,072	63,072	63,072	63,072	63,072	63,072
Alexandria Indeck (16.4 MW)	105,120	105,120	105,120	105,120	105,120	105,120
Berlin BioPower (68 MW)	0	542,070	542,070	542,070	542,070	542,070
Shiller Station #5 (50 MW)	0	0	0	320,000	320,000	320,000
Total Production	**168,192**	**710,262**	**710,262**	**1,030,262**	**1,030,262**	**1,030,262**
RPS Class I Requirement	**399,000**	**489,038**	**581,264**	**664,820**	**750,375**	**837,965**

Table 2 estimates the number of RECs produced by New Hampshire facilities and matches the production to the RPS Class I requirement for the period from 2013-2018. By 2014, Berlin BioPower alone, will supply New Hampshire's Class I

REC requirement. Barring mitigating changes to the Massachusetts RPS policies for biomass, Shiller will return to New Hampshire beginning in 2016 and further add to the state's supply[9].

Q. If proposed renewable energy projects including Timbertop are not permitted in New Hampshire, how will the state achieve its RPS obligations?

As mentioned, it is important to evaluate the NH RPS in the context of the larger regional market. The policies in other New England states and adjacent control areas, as well as New Hampshire's own policies, directly impact the question of need. Two examples, already cited, resulted in NH Class I RECs leaving the state:

- Massachusetts and other New England states mandating that a percentage of their Class I obligation be secured using long-term contracts;
- New Hampshire's decision to lower its Class I ACP.

However, with REC's trading at, or near the ACP, there is significant incentive for existing renewable resources within the ISO-NE control area to qualify under one or more of the states' RPS programs. In addition, large numbers of behind-the-meter generators have also become qualified as renewable resources. These include biomass boilers at paper and pulp mills. In 2011, behind-the-meter resources produced nearly 750 thousand MWh. Finally, New York and Canada continue to build renewable resources which qualify under New England RPS policies. In 2011, 40% of the supply[10] of Massachusetts Class I RECs came from imported resources located in New York and Canada. Beginning in 2015-16, New

[9] Berlin BioPower will create a surplus of NH Class I RECs driving prices below the ACP. If this happens, the economics of other Class I facilities without long-term contracts could be impacted.
[10] See Supra 8

York wind will likely enter New England as NYSERDA contracts expire. New York renewable resources include over 1,600 MW[11] of installed wind which could substantially increase the supply of Class I RECs throughout New England.

Q. Is there anything else you would like to say?

Yes. Given the fact that New Hampshire already has sufficient renewable resources in-state to meet its 2025 RPS Class I obligation and given the anticipated market activity regarding existing, behind-the-meter and imported resources, it appears New Hampshire has ample opportunity to meet and exceed it Class I mandate through to 2025. Simply recognizing how regional RPS policies impact New Hampshire's ability to achieve compliance will go a long way toward resolving the state's REC deficits. Unlike energy markets, the need for RECs is a regulatory fiction that cannot be compared to a need for energy. It is evident that a shortage of RECS could be satisfied without setting aside community land use codes that apply to projects below 30 MW.

Q. Does this conclude your testimony?

A. Yes.

[11] NYSERDA has 2.8 million MWhs of wind energy currently under contract. http://www.nyserda.ny.gov/Publications/Program-Planning-Status-and-Evaluation-Reports/Renewable-Portfolio-Standard-Reports.aspx

STATE OF NEW HAMPSHIRE

SITE EVALUATION COMMITTEE

Timbertop Wind I, LLC Petition for Jurisdiction

Docket No. 2012-04

EVIDENCE OFFERED ON BEHALF OF THE TOWNS OF

NEW IPSWICH AND TEMPLE, NEW HAMPSHIRE

Exhibit 9. Pederson and Waye, *Perception and Annoyance Due to Wind Turbine Noise – a Dose-response Relationship*, Journal of the Acoustical Society of America, December 2004.

Exhibit 10. United States Environmental Protection Agency, *Community Reaction to Environmental Noise*, Excerpt from EPA "Levels" Document, Appendix D, Section 3, 1974.

Exhibit 11. The Acoustic Ecology Institute, *Fact Sheet: Wind Energy Noise Impacts*.

Exhibit 12. The Acoustic Ecology Institute, *Wind Farm Noise 2011, Science and Policy Overview*, August 4, 2011.

Exhibit 13. Soysal, *Wind Farm Noise and Regulations in the Eastern United States*, Frostburg State University, Department of Physics and Engineering, September, 2007.

Exhibit 14. Epsilon, *Groton Wind Project Noise Model*, presented by Pioneer Green Energy to New Ipswich Planning Board in 2011.

TAB 6. NOISE IMPACTS: COMMUNITY RESPONSES TO WIND TURBINES

Exhibit 15. *Oregon Wind Farms Whip up Noise, Health Concerns*, September 30, 2009

Exhibit 16. *Wind Turbine Noise Recommendation Unlikely to End Debate*, August 8, 2011 (Maine).

Exhibit 17. *For Those Near, the Miserable Hum of Clean Energy*, The New York Times; October 5, 2010 (Vinalhaven, ME).

Exhibit 18. *Living Next to a Wind Turbine*, July 1, 2009 (Freedom, ME).

Exhibit 19. *Residents Complain About Wind Turbines*; September 2, 2011 (Falmouth, MA).

Exhibit 20. *Residents in Wind-turbine Shadows Seek Noise, Other Relief*, September 6, 2011 (Fairfield, NY).

Exhibit 21. *Naples Hears from Windmill Supporter-turned-opponent*, May 9, 2009 (Naples, NY).

Exhibit 22. *Neighbors Say Wind Energy has its Price*, August 15, 2010 (St. Cloud, WI).

Exhibit 23. *Wind Turbine Noise Concerns Prompt Investigation*, August 4, 2009 (Valley City, ND)