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Via Hand Delivery and Electronic Mail

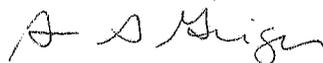
NH Site Evaluation Committee
c/o Jane Murray, Secretary
29 Hazen Drive, P.O. Box 95
Concord, NH 03302-0095

Re: Antrim Wind Energy, LLC-SEC Docket No. 2011-02

Dear Ms. Murray:

Enclosed for filing with the Site Evaluation Committee in the above-captioned docket please find an original and 3 copies of Prefiled Direct Testimony of Jack Kenworthy. Please contact me if there are any questions about this filing. Thank you for your assistance and cooperation.

Very truly yours,



Susan S. Geiger

cc:

Service List (via electronic mail)

Enclosures
760554_1

STATE OF NEW HAMPSHIRE
SITE EVALUATION COMMITTEE

Docket No. 2011-02

RE: PETITION FOR JURISDICTION OVER
RENEWABLE ENERGY FACILITY
PROPOSED BY ANTRIM WIND ENERGY LLC

PREFILED DIRECT TESTIMONY OF JACK KENWORTHY

MAY 6, 2011

1 **Qualifications**

2 **Q. Please state your name and business address**

3 A. My name is John (Jack) B. Kenworthy and my business address is 155 Fleet
4 Street, Portsmouth, NH 03801.

5 **Q. Who is your current employer and what are your qualifications?**

6 A. I am employed by Eolian Renewable Energy, LLC. I have been an executive
7 in the renewable energy industry for 8 years, with Project development experience in
8 wind, solar and biofuel technologies. I have been a founder of two clean energy firms in
9 the last decade. My resume is submitted as Attachment JBK-1.

10 **Q. What position do you hold?**

11 A. I am Chief Executive Officer.

12 **Q. Are you familiar with the proposed Antrim Wind Energy Project that is**
13 **the subject of this docket?**

14 A. Yes I am.

1 **Purpose of Testimony**

2 **Q. What is the purpose of this prefiled direct testimony?**

3 A. The purpose of this testimony is to provide the Site Evaluation Committee
4 (“the Committee” or “SEC”) with detailed information about the Antrim Wind Project,
5 describe why the processes within the Town of Antrim will not permit a timely and
6 impartial review of the Project, and explain why it is necessary and appropriate for the
7 SEC to assert jurisdiction over the Project.

8 **Summary of the Antrim Wind Project**

9 ***Project Background***

10 **Q. If the SEC asserts jurisdiction over the Antrim Wind Project, who would**
11 **be the eventual applicant?**

12 A. The applicant would be Antrim Wind Energy, LLC (“AWE”), a Delaware
13 limited liability company. Antrim Wind Energy LLC operates from the offices of Eolian
14 Renewable Energy, LLC at 155 Fleet Street, Portsmouth, NH 03801. Antrim Wind
15 Energy, LLC has two members who own and control 100% of the membership interests
16 in the company. Those members are Westerly Antrim, Inc. and Eolian Antrim, Inc. Both
17 members are registered Delaware corporations and are owned by Westerly Wind, LLC
18 and Eolian Renewable Energy, LLC, respectively. A list of the owners, officers and
19 directors of Antrim Wind Energy, LLC, Eolian Antrim, Inc., and Westerly Antrim, Inc.,
20 is included as Attachment JBK-2 to this testimony.

1 **Q. Please summarize Antrim Wind Energy’s financial, technical and**
2 **managerial capacity to construct and operate the proposed facility.**

3 A. AWE is a Delaware limited liability company that was formed to develop,
4 build, own and operate the Antrim Wind Energy Project (“the Project”) which is
5 described below.

6 One of AWE’s members, Eolian Renewable Energy, LLC (“Eolian”), is a
7 Delaware limited liability company formed in 2009 to manage the development,
8 construction and operation of distributed utility scale wind energy facilities in New
9 England. Eolian is headquartered in Portsmouth, New Hampshire and presently has a
10 development portfolio consisting of five wind energy projects with a total nameplate
11 capacity of approximately 80 MW in New Hampshire, Maine and Vermont. Eolian
12 focuses only on developing wind energy projects in the range of 10-25 MW and at sites
13 that have superior qualities in terms of their potential for performance and permitting, the
14 presence of existing impacts, and close proximity to existing infrastructure such as roads
15 and transmission resources. Eolian has focused on the niche of “distributed, utility scale
16 wind facilities”, which allows for electrical generation to be sited closer to the loads
17 being served, with project sizes that are large enough to make meaningful contributions
18 to New England electric supply and local economic development, but that can be brought
19 online without substantial need for new high voltage transmission resources. Eolian also
20 believes that projects at this scale are a better geographic and cultural fit in the unique
21 New England landscape. Brief biographies for Eolian’s four partners have been provided
22 as part of AWE’s Petition for SEC jurisdiction. These individuals bring diverse
23 experience to the utility wind energy development business including energy

1 development, real estate development, construction management, GIS, wind resource
2 analysis, and environmental compliance and permitting.

3 The other AWE member, Westerly Wind, LLC, is a Delaware limited liability
4 company that provides development capital and management expertise to facilitate the
5 deployment of wind energy generation in the United States and select international
6 markets. Westerly was founded in 2010 and is based in Braintree,
7 Massachusetts. Westerly is a portfolio company of US Renewables Group (“USRG”),
8 which is one of the largest private equity firms focused exclusively on investing in
9 renewable power, biofuels and clean technology infrastructure. USRG was founded in
10 2003 and has mobilized over \$750 million of capital commitments for renewable energy
11 projects. Westerly’s principals have over 34 years of collective experience in developing,
12 financing, constructing and operating energy facilities in the United States, including the
13 northeast, with over 700 MW of successful wind project development experience.

14 ***Site Information***

15 **Q. Please describe the site of the proposed Project.**

16 A. The Project is proposed to be located in the northwest portion of the Town of
17 Antrim and includes property from the east summit of Tuttle Hill to the flank of Willard
18 Mountain to the west. A map of the Project location is submitted as Attachment JBK-3.
19 The Project site is located on a mostly contiguous ridgeline running east northeast to west
20 southwest, and nearly parallel to NH Route 9, which is approximately ¾ of a mile to the
21 north. The entirety of the Project is located in the sparsely settled rural conservation
22 zoning district in Antrim on approximately 2,000 acres of private lands leased by AWE
23 from five landowners. Post-construction, the Project will occupy approximately 300

1 acres, including anticipated setbacks and buffers, with an expected 40 acres of
2 development (e.g. roads and other facilities.) To the north of the proposed turbine string
3 (which is depicted on the Project site map attached hereto) between the ridgeline and
4 Route 9 is a PSNH transmission corridor containing both a 115 kV transmission line and
5 a 34.5 kV distribution circuit, where AWE intends to interconnect the Project to the grid.
6 This transmission right of way is approximately ½ mile from the Tuttle Hill ridge and
7 runs through property currently leased by AWE. Proposed access to the Project site is
8 from Route 9 up the north slope of Tuttle Hill ridge.

9 **Q. Why was this site chosen for this Project?**

10 A. Locations suitable for utility-scale wind facilities require a host of very
11 specific conditions. Smaller utility scale projects, such as the Antrim Project, require
12 even more stringent siting criteria than larger projects, due to the economic
13 considerations associated with siting, developing, building, owning and operating these
14 facilities. Appropriate sites are very limited and the Antrim site is the only location in
15 southern New Hampshire that has met Antrim Wind Energy's siting criteria..

16 Antrim Wind Energy's site analysis takes into consideration factors such as:
17 projected wind speeds at anticipated turbine hub height; proximity to adequate
18 transportation; proximity to transmission or distribution infrastructure capable of
19 handling the new generation; adequate setbacks from residences or other inhabited
20 structures to ensure public safety; the absence of known sensitive ecological resources
21 that may be disturbed such as critical wildlife habitats, major wetlands, and other
22 sensitive areas within the proposed Project area; and previous environmental impact and
23 activities on site. The Antrim Wind site meets all of these criteria.

1 Several factors make the Project site a very attractive location for a small
2 commercial- scale wind energy facility. First, the modeled and verified wind speeds are
3 suitable for a utility-scale wind site. Importantly, the Project site is located
4 approximately ½ mile from a PSNH transmission corridor that includes both a 34.5 kV
5 distribution line and a 115 kV transmission line. The Project proposes to interconnect to
6 the 34.5 kV distribution line. The site is also located approximately ¾ mile from Route
7 9, a substantial state highway that can handle transportation of turbine components and
8 construction equipment. There are no current conservation restrictions on the site that
9 would limit the development of the Project. In addition, desktop GIS review of known
10 environmental factors has not indicated the presence of any known critical habitats or
11 endangered species. This has also been verified by site reconnaissance conducted thus
12 far. The elevation of the site, between 1650 and 1800 feet above mean sea level, is much
13 lower than many proposed wind facilities which reduces impacts to sensitive high
14 elevation alpine habitats. Much of the northern slope of Tuttle Hill has been heavily
15 logged in the past decade and, as recently as last year, logging operations (unrelated to
16 the wind Project) have impacted the site by clearing hundreds of acres. These site
17 characteristics, when combined with willing private host landowners and the support of
18 the vast majority of Antrim residents, support our conclusion that this is an appropriate
19 and well-sited wind energy facility.

1 **Q. Please state whether Antrim Wind Energy is the owner or lessee of the**
2 **proposed site or facility, and describe the legal rights that Antrim Wind Energy has**
3 **to the proposed site.**

4 A. Antrim Wind Energy, LLC has a leasehold interest in seven properties in the
5 Town of Antrim. These properties, owned by five distinct private landowners, comprise
6 the entire proposed Project area in Antrim. All lease rights have been recorded at the
7 Hillsborough County Registry of Deeds. The leases have an initial term of 25 years with
8 an option to extend the lease for an additional 25 years.

9 *State and Federal Permitting and Regulation*

10 **Q. What state or federal agencies have jurisdiction to regulate any aspect of**
11 **the construction or operation of the proposed facility?**

12 A. New Hampshire Department of Environmental Services (“NHDES”) would
13 have jurisdiction to regulate construction and operation of the project. Depending on the
14 findings of studies planned for the project New Hampshire Fish and Game (“NHFG”),
15 New Hampshire Natural Heritage Bureau (“NHNHB”) and New Hampshire Division of
16 Historical Resources (“NHDHR”) may also have jurisdiction. The New Hampshire
17 Department of Safety (“NHDOS”) has jurisdiction over blasting permits and New
18 Hampshire Department of Transportation (“NHDOT”) has jurisdiction over oversized
19 loads and driveway permits.

20 Federal agencies that would have jurisdiction to regulate construction or operation
21 of the Project include US Army Corps of Engineers (“ACOE”), US Environmental
22 Protection Agency (“EPA”), and the Federal Aviation Administration (“FAA”).

1 **Q. What state and federal permits are required for this Project?**

2 A. State and federal permits which may be required for the Project include:

3 Alteration of Terrain Permit; Wetlands Permit(s); Section 401 Water Quality
4 Certification; Federal Aviation Administration review and approval, including the hazard
5 assessment process; National Pollutant Discharge Elimination System ("NPDES")
6 permits for construction stormwater; oversized load permits; driveway permits; and
7 blasting permits.

8 *Technical Considerations*

9 **Q. Please describe the manner in which the Project will produce electricity**
10 **and a description of the Project's major components.**

11 A. The Project will produce electricity using wind turbine electrical generators
12 installed on tubular steel towers. The turbines will be horizontal axis upwind rotor
13 turbines typical of those currently in use in utility scale wind projects in New England.
14 The Project will consist of up to 10 turbines in the 2-3 MW size class with an expected
15 plant generating capacity of between 18.5-23 MW (rated). The Project will require
16 approximately 1.5 miles of new road to access the ridge from NH Route 9 and
17 approximately 2 miles of additional road along the ridge to access each turbine location.
18 It is expected that the total direct impact for new roads, work pads, staging areas and
19 turbine pads will be approximately 40 acres. The Project proposes to interconnect to the
20 PSNH 3140 X1 line (34.5 kV) via a direct tap on property that is currently leased by
21 Antrim Wind Energy. No new transmission lines, other than collector system lines, are
22 currently anticipated to be required. The Project will also require the construction of a
23 maintenance building expected to be approximately 3,000 square feet.

1 Antrim Wind is presently evaluating turbines manufactured by a number of
2 manufacturers, including Vestas, Siemens, Gamesa, and REpower. Final turbine
3 selection will be based on several factors, including availability, price and site suitability.

4 **Q. Please provide information about the line that will interconnect the**
5 **Project with the local and/or regional power grid.**

6 A. The Antrim Wind Energy Project plans to interconnect to the electrical grid
7 via a direct tap on the PSNH 34.5 kV 3140 X1 circuit, which is fed from Jackman
8 substation in Hillsborough, New Hampshire. Antrim Wind filed an initial
9 Interconnection Request with ISO-NE in July 2010, and ISO-NE referred the application
10 to PSNH after a determination that the interconnection to PSNH's 34.5 kV line was a
11 non-FERC jurisdictional interconnection. PSNH originally studied the potential impacts
12 and required upgrades to connect 18 MW of new wind generation to the 3140 X1 line and
13 provided Antrim Wind with a report of those findings. Antrim Wind has subsequently
14 requested that PSNH review the potential impacts of up to 23 MW of additional
15 generating capacity at that location and this study is currently underway.

16 ***Environmental Concerns***

17
18 **Q. Please describe the proposals for studying and solving any environmental**
19 **problems associated with this Project.**

20 A. Antrim Wind Energy (AWE) has already met with NHFG, NHDES, NHHNB,
21 NHDHR, ACOE, US Fish and Wildlife Service (USFWS) and EPA. These meetings
22 were focused on identifying the agencies' environmental concerns and on developing the
23 study protocols to address these concerns. AWE continues to work with these agencies
24 to finalize study protocols to fully address their areas of concern. Once the studies have

1 been completed, AWE intends to continue to meet with the involved agencies, discuss the
2 findings of each of the studies, and discuss potential mitigation measures to further
3 reduce the impact of the Project if it is determined that mitigation is necessary.

4 **Q. Please describe the proposals for studying the Project's anticipated**
5 **effects and mitigation of those effects on aesthetics, historic sites, air quality, water**
6 **quality, the natural environment and public health and safety.**

7 A. In addition to the environmental field studies that are being performed by
8 AWE, visual impact, noise and public health and safety analysis will be completed
9 consistent with previous projects in New Hampshire and industry standards. Plans to
10 mitigate the Project impacts will be developed if it is found necessary to do so.

11 AWE has begun discussions with NHDHR and is currently working to finalize the
12 scope to evaluate the potential impact of the Project on historical and archaeological sites.
13 Once these studies are completed, AWE will meet with NHDHR to determine if
14 mitigation for the Project is required.

15 AWE has discussed the plan for conducting wetlands and vernal pool surveys for
16 the Project with involved agencies and has commenced several components of this work
17 in the field. Significant work has already been done through preliminary screening to
18 avoid these resources to the extent possible. AWE will continue to work to minimize the
19 Project impacts on these resources. In addition, AWE will be proposing stormwater
20 control measures to mitigate for the construction and operational stormwater from the
21 site. These control measures will be discussed with NHDES and other involved agencies
22 during development of the construction plans.

1 AWE is currently working with NHHNB to conduct natural community mapping
2 of the Project area and will be conducting rare plants surveys based on the findings of the
3 natural community mapping for the Project. The field mapping of natural communities
4 has commenced and is ongoing. These studies will be utilized to facilitate modification
5 of the Project's layout and identify potential mitigation options for the Project if required.

6 Significant air quality studies are not anticipated for the Project given it will not
7 produce air emissions. However, a desktop study of the Project as it related to air quality
8 will be included.

9 **Q. Please describe the Project's anticipated effects on the orderly**
10 **development of the region, including estimates of the impacts of construction and**
11 **operation of the facility.**

12 A. The Project will not unduly interfere with the orderly development of the
13 region. As previously described, this site possesses many unique attributes suitable to
14 successful wind energy development including wind resource, proximity to transmission,
15 proximity to suitable highways, previous impacts to the site, the absence of development
16 restrictions, adequate distances from proposed turbine sites to residences and other
17 inhabited structures, and limited anticipated impacts to local ecology. The proposed use
18 of the site, on private property historically managed as timberlands, is compatible with
19 existing uses, which can continue largely unencumbered. The installation of a renewable
20 energy facility in a sparsely settled area of Town on large tracts of private property is in
21 concert with the orderly development of the region, especially considering the site's close
22 proximity to an existing transmission corridor and a state highway.

1 The Antrim Master Plan, updated as recently as 2010, speaks extensively and
2 supportively of the need for renewable energy development. The Master Plan contains a
3 15-page section addressing climate change, energy efficiency and renewable energy and
4 calls for the Planning Board and planning department to encourage renewable energy
5 uses.¹ The Project clearly falls well within these goals. In addition, the Project will
6 support many of the Southwest Regional Planning Commission's stated goals. The
7 Commission identifies "current lack of local, renewable energy alternatives" to
8 conventional energy sources a substantial risk to future growth in the region.² Finally,
9 New Hampshire state planning and zoning laws require support of renewable energy
10 projects. *See* RSA 672:1, III-a and RSA 674:17(j).³

11 Additionally, as Antrim Wind Energy has indicated to the Town and to interested
12 conservation groups, it seeks to establish substantial conservation benefits by adding
13 permanent conservation easements in areas adjacent to the wind facilities. The Project
14 would also provide the additional benefit of wind lease revenues to the private
15 landowners. This income mitigates the need for the landowners to develop the land for
16 other permitted purposes such as residential subdivisions.

17 The wind facility is expected to provide clean, domestically produced electricity
18 in an amount equivalent to the annual consumption of approximately 6,500 average New

¹ Antrim Master Plan (2010), Section IV, pages 1-15. Selections from the Antrim Master Plan are submitted at Attachment JBK-4.

² Southwest Regional Planning Commission, Comprehensive Economic Development Strategy for Southwest New Hampshire, at 79 (June 2007).

³ These statutes require that local ordinances should be designed "to encourage the installation and use of solar, wind, or other renewable energy systems" RSA 674:17(j). In addition, RSA 672:1, III-a, requires that a land use board may not unreasonably interpret its regulations to prohibit the installation of renewable energy systems or structures. "Unreasonable interpretation" is defined in RSA 672:1, as including "the failure of local land use authorities to recognize that renewable energy systems ... when practiced in accordance with applicable laws and regulations, are traditional, fundamental and accessory uses of land throughout New Hampshire, and that a prohibition upon (renewable energy systems) cannot necessarily be inferred from the failure of an ordinance or regulation to address them." RSA 672:1, III-d.

1 Hampshire homes, while also providing jobs, tax benefits, and conservation benefits to
2 the Town and the region. The facilities will not burden the Town with costs typical of
3 other forms of development, such as new or larger schools, busing, police and public
4 safety, snow removal or other similar municipal costs.

5 In addition to the direct benefits of the annual tax payments, property lease
6 revenues, clean energy benefits and land preservation opportunities, Antrim Wind Energy
7 will seek to use as much qualified local labor as possible throughout the permitting,
8 developing, construction and operation of the facility. This will include opportunities for
9 site clearing, construction, surveying, maintenance and other related jobs. Further, the
10 Antrim Wind Energy Project would become the largest taxpayer in the Town of Antrim
11 (negotiations on a PILOT Agreement are underway.)

12 Thus, this Project will not unduly interfere with the orderly development of the
13 region because it provides clean energy consistent with the stated goals of NH statutes,
14 the Antrim Master Plan and Antrim residents' desires (see footnote 7, below), along with
15 economic development and significant new permanent conservation opportunities.

16 **Request that Site Evaluation Committee Assert Jurisdiction & Statutory Standard**

17 **Q. Why has Antrim Wind Energy, LLC submitted its petition asking the**
18 **Site Evaluation Committee to assert jurisdiction over the Project?**

19 A. The Site Evaluation Committee can provide a fair process which permits
20 participation by proponents and opponents, as well as other interested parties to the
21 Project, with clear deadlines, explicit standards, and most importantly, a transparent and
22 fair process which considers state, regional, and local concerns and interests in the
23 permitting of a renewable energy project. The Antrim Board of Selectmen, the Town's

1 governing body, submitted a petition pursuant to its authority under RSA 162-H:2, XI (c)
2 requesting the Site Evaluation Committee to assert jurisdiction after a duly noticed public
3 meeting of the Board of Selectmen and a proper vote authorizing the petition. Antrim
4 Wind Energy supports the Antrim Board of Selectmen's position that the SEC is best
5 qualified to evaluate a project of this type, size, and scope. It also agrees with the
6 Selectmen that the Town does not have the capacity to evaluate an application for a
7 utility-scale wind facility in a fair, reasonable, and timely manner. The Project's
8 interactions with the Town of Antrim, as described below, provide ample support for this
9 position.

10 The Selectmen's petition to the SEC was submitted after nearly two years of
11 Project history in Antrim. This history involves at least three specific issues:
12 1) an initial height variance application to the Town of Antrim to erect a temporary
13 meteorological tower; 2) a subsequent request for a building permit for the same
14 temporary meteorological tower as an allowed use requiring minor site plan approval;⁴
15 and 3) a Town-led effort to amend the Antrim Zoning Ordinance to expressly permit
16 commercial wind energy facilities, and to require Planning Board review and regulation
17 of those facilities. The process and outcome of each of these distinct efforts has been
18 fraught with procedural errors, very lengthy application processes and appeals, and the
19 reversal of previous decisions by various Town land use boards. These circumstances
20 have led to litigation over the outcome of the first two requests to permit the met tower,
21 and two canceled ballot votes on the ordinance amendment after 6 months of effort.
22 Brief histories are provided below on each of the three issues:

⁴ This request was made after a rehearing request was made regarding the Zoning Board of Adjustment's decision approving the height variance and issuance of the building permit.

1 1. Met Tower Variance Application: After a conceptual meeting before the Antrim
2 Planning Board in April 2009, Antrim Wind Energy sought guidance from the
3 Town Planning department regarding an application to erect a temporary
4 meteorological tower. The Town Planner, Peter Moore, allegedly upon seeking
5 the advice of Town Counsel and the New Hampshire Local Government Center,
6 advised Antrim Wind Energy to apply for a building permit under Article XIV-D
7 of the Antrim Zoning Ordinance. That article pertains to small wind energy
8 systems and specifically includes requirements for meteorological towers.

9 Article XIV-D limits the height of a meteorological tower to 150 feet, so
10 Antrim Wind Energy sought a height variance to erect the tower at a height of
11 approximately 198 feet – the height required to properly evaluate wind resources.
12 After 5 public hearings before Antrim Zoning Board of Adjustment, including a
13 site visit, between June 2009 and September 2009, a variance was granted and a
14 building permit issued in October 2009. The tower was erected pursuant to that
15 permit in November 2009.

16 Although Town officials repeatedly insisted that the appropriate avenue
17 for relief was a variance under the Small Wind Energy Systems section of the
18 ordinance, a motion for rehearing, filed by Richard and Lorraine Block in
19 November 2009, claimed that the Zoning Board should re-hear the variance
20 because the Small Wind Energy System section of the Ordinance was
21 inapplicable. In December 2009, the Zoning Board granted the Blocks' rehearing
22 request. The rehearing was eventually held in July and August 2010. More than
23 a year after the initial application was submitted, the ZBA voted to uphold its

1 initial decision to grant the variance. Mr. and Mrs. Block have appealed this
2 decision to Hillsborough County Superior Court, where litigation is pending.

3 Of note, throughout this process there was confusion among both the ZBA
4 and the public regarding which issues were before the ZBA on Antrim Wind
5 Energy's variance request (which concerned only the meteorological tower.)

6 2. Site Plan Approval: Prior to the rehearing of the ZBA variance case, Antrim Wind
7 Energy, in an effort to obtain permitting for the same met tower under a different
8 route, sought a building permit for the tower in the hope of obviating the need to
9 litigate the variance approval. Antrim Wind Energy held extensive discussions
10 with the Planning Department, the Building Inspector and Town Officials to
11 clarify its intent and next steps. The Antrim Zoning Ordinance allows public
12 utilities by right in the Rural Conservation District and also allows "special
13 industrial structures" to be exempt from certain height requirements in the
14 Ordinance. Such uses require site plan approval from the Planning Board.

15 In December 2009, Antrim Wind Energy submitted an application for a
16 building permit, asserting that the met tower use and height were both permitted
17 under the above-mentioned Ordinance sections. The Building Inspector denied
18 the building permit, stating only that the tower required site plan review.⁵ Antrim
19 Wind Energy submitted its request for site plan approval and the Planning Board
20 held two public hearings in March 2010 review the site plan. The site plan was
21 ultimately approved by the Antrim Planning Board. Inherent in this approval (and
22 the stated reason for denying the initial building permit by the Building Inspector)

⁵ Under the Antrim Zoning Ordinance, the Building Inspector must state that if a request for a building permit "is not approved, the applicant shall be notified in writing *as to the reasons* for disapproval." The only reason provided by the Building Inspector was the lack of site plan approval.

1 was a determination by the Planning Board that under the Ordinance, the met
2 tower constituted a permitted use and was exempt from the height requirements
3 for structures under the ordinance.

4 In March 2010, Mr. and Mrs. Block, together with several others, filed an
5 appeal with the ZBA challenging the Planning Board's interpretation of the
6 Ordinance. The ZBA granted the Block's appeal, ruling that the Antrim Planning
7 Board erred in its determination that the use was allowed, and overturned the
8 Planning Board's decision. Antrim Wind Energy filed a rehearing request, which
9 was rejected by the Zoning Board. Correspondence from the Town's governing
10 board, the Board of Selectmen, to the ZBA pertaining to the Selectboard's
11 position on the met tower variance was never provided to ZBA members prior to
12 the ZBA's vote. Subsequently, Antrim Wind Energy appealed that decision to
13 the Hillsborough County Superior Court. This case has been consolidated with
14 the Block appeal, which is discussed earlier in my testimony.

15 3. Amendment of Zoning Ordinance: Largely as a result of the confusion around the
16 met tower cases and the amount of time and effort that had gone into reviewing
17 the initial applications and hearing subsequent appeals, the ZBA approached the
18 Antrim Planning Board requesting that they clarify the ordinance with respect to
19 wind energy facilities and meteorological towers to avoid such contentious, time
20 consuming hearings in the future. The Planning Board commenced an effort to
21 address the ZBA's request in October 2010. In a series of public meetings and
22 public hearings in December 2010, January 2011 and February 2011, the Planning
23 Board drafted language that would have allowed "renewable energy facility[ies]",

1 including wind energy, as well as accessory and appurtenant uses (including met
2 towers) in the Rural Conservation and Highway Business Districts.⁶ Under the
3 proposed amendments, these new uses would be allowed in the named districts
4 and would be reviewed and regulated by the Planning Board under Antrim's
5 Major Site Plan Review regulations in a public forum. After hearing public input
6 on the initial draft language, much of it related to concerns over a broad definition
7 of "renewable energy facilities" that initially included biomass, geothermal and
8 certain hydro electric technologies, the Planning Board reduced the definition to
9 include only "wind energy facilities." The Planning Board voted to adopt the
10 ordinance amendments and place them on the March Town Meeting ballot, but
11 after the warrant articles had been presented to the Town Clerk, several notice
12 errors resulted in the amendments failing to make it onto the Town Meeting
13 ballot. Thus, although approximately three quarters of the Town residents who
14 responded to a survey (469 out of 618 responses) regarding these amendments
15 supported them,⁷ those residents were denied the opportunity to vote in support of
16 them at a Town Meeting.

17 In March 2011, the Planning Board voted to approve a new set of
18 ordinance amendments for "wind energy facilities" and also to recommend that
19 the Board of Selectmen authorize a Special Town Meeting to vote on those
20 amendments. The approved amendments were delivered to the Town Clerk. At a

⁶ While the original text of the amendment concerned "renewable energy facilities," later iterations included only "wind energy facilities" as a new permitted use.

⁷ Antrim Wind Energy hired American Research Group of Manchester, NH to conduct a Town-wide survey, which was sent to 986 households in Antrim asking their position on the proposed facility, their position on the proposed warrant articles allowing wind energy facilities as a use in several zoning districts, and whether or not respondents intended to vote in the March 8 Elections. Over ¾ of respondents indicated support for the Project and the zoning amendments and indicated that they would be voting on March 8th.

1 public hearing on March 14, 2011 the Selectmen, after receiving a citizens petition
2 to advance the proposed zoning amendments to a ballot vote, voted to approve a
3 Special Town Meeting for April 26th to allow the Town to vote on the Ordinance
4 amendments. The very next week, after two new members of the Planning Board
5 were seated, that Board voted to reconsider its action on the amendments and then
6 voted to rescind its prior recommendation that the Board of Selectmen hold a
7 Special Town Meeting. There were several flaws inherent in the “new” Planning
8 Board’s actions: (1) reconsideration of the amendments was not included as an
9 agenda item; (2) there was no public notice that the Planning Board intended to
10 reconsider the “prior” Board’s action on the amendments was provided; (3) one
11 Board member (the current Chair) has publicly stated that he did not receive
12 notice that this issue would be raised at the meeting; and (4) the Board’s authority
13 to reconsider decisions finalized at prior meetings, and its jurisdiction over the
14 amendments once they were submitted to the Town Clerk are both in question.⁸
15 On March 21, 2011 amid the confusion regarding this process, the Selectmen
16 reversed their decision to hold a Special Town Meeting.

17 All three of the initiatives have been fraught with procedural errors, improper
18 omission from the record of written correspondence to the Land Use Boards, confusion
19 over procedural rules, the Land Use Boards’ failure to adhere to rules, and frequent
20 reversals of prior decisions. In addition to the above-described history, it is apparent
21 from letters, discussions at meetings of the Selectboard and Land Use Boards since

⁸ RSA 675:3, I states “any proposed zoning ordinance, as submitted by a planning board or any amendment to an existing zoning ordinance as proposed by a planning board ... *shall* be submitted to the voters of a town ... in the manner prescribed in this section.”

1 March, ongoing (and sometimes contentious) arguments among Planning Board
2 members, and the recent resignation of the Town Planner, that the ability of Antrim's
3 Land Use Boards to create and then adhere to both state and local procedures, to stand by
4 stated positions and decisions relied upon by Antrim Wind Energy, and to act upon the
5 stated wishes of Antrim residents, are highly questionable. In short, the Antrim Land Use
6 Boards have failed to demonstrate their ability to follow and implement existing laws,
7 procedures and ordinances relative to the Antrim Wind Project.

8 As a result of these experiences over the past two years, and the continuing
9 struggles between and among the Town's governing and land use bodies to agree on and
10 adhere to appropriate processes and decisions and the failure to act upon the stated wishes
11 of the Antrim residents, Antrim Wind Energy has no confidence that the Town would be
12 able to fairly review an application for a wind energy facility.

13 **Q. Please explain whether you believe that a Certificate of Site and Facility**
14 **is needed to maintain a balance between the environment and the need for new**
15 **energy facilities in New Hampshire.**

16 A: The proposed facility is a renewable energy project that furthers the goals of
17 the State's Renewable Portfolio Standard, RSA 362-F, and the Governor's "25 by 25"
18 plan to obtain at least 25% of the state's total energy needs from renewable sources by
19 the year 2025. *Executive Order No. 2007-003*. As recent global events have
20 demonstrated, no source of energy is perfect. But wind power generation, proven to be a
21 safe, domestic and emission-free source of power, can and should play an increasingly
22 prominent role in New Hampshire's resource supply mix. The conversations between the
23 Town and Antrim Wind to develop a wind energy facility did not commence in the past

1 several weeks, or months, or even last year. The Project has been the subject of public
2 conversations with the Town for over two years, during which time every effort has been
3 made to advance the Project in an open and transparent manner and to discuss various
4 ways that proper permitting and review could be conducted. Efforts described elsewhere
5 in this testimony, have been repeatedly thwarted by minority opposition. Instead of
6 developing and implementing a process to address the land use issues associated with the
7 Project, opponents have delayed and disrupted the processes undertaken by Antrim Wind
8 Energy and the Town's governing body. As a result, the SEC process is necessary to
9 assure that Antrim Wind Energy, Project supporters and opponents all receive fair
10 consideration, and that environmental and energy issues are reviewed in a holistic,
11 comprehensive, integrated and interdisciplinary manner.

12 As demonstrated by the history in Antrim, the SEC process is necessary to assure
13 that New Hampshire's goals of renewable energy development are not undermined by
14 failures in local processes and that new regulatory processes are not created in a
15 contentious atmosphere within and among governmental boards. Wind energy
16 developers are faced with a multitude of risks in an expensive and competitive market
17 place. Federal tax incentives, turbine supply, natural gas prices, and other complex
18 factors are constantly in flux and can render Projects unfeasible and uneconomic. Adding
19 great delay and uncertainty to the permitting process for wind facilities is unreasonable
20 and will negatively impact the ability to meet the stated, and much needed, goals of
21 increased domestic renewable energy production in New Hampshire and the region.

22 Antrim Wind Energy has drafted detailed study protocols and submitted them to
23 the relevant State and federal agencies for review and comment, some of which have

1 been received. The Project has commenced many seasonally-dependent studies, i.e.
2 those regarding vernal pools, migratory birds, breeding birds, raptors and acoustic bat
3 studies. Once the Project obtains certainty that it will be evaluated under a fair and
4 balanced permitting process, these studies will continue on schedule and allow for a
5 comprehensive SEC permit application to be submitted by the end of 2011. In the
6 absence of any certainty regarding the permitting process, these studies will stop
7 indefinitely because the Project cannot justify the risk associated with conducting
8 extensive permitting studies in the face of an unknown local process.

9 Waiting for the Town to create a local regulatory scheme --if one is even
10 developed- would unreasonably delay the Project beyond the timeframes contemplated
11 by RSA 162-H. Although several potential interveners in this docket have raised
12 environmental and regional planning issues, and apparently expect Antrim Wind to invest
13 large sums of money to answer detailed questions, they have not provided any assurance
14 of a correspondingly fair, certain and timely local process through which the results could
15 be interpreted and reviewed. This puts Antrim Wind in an entirely untenable position.

16 **Q. Please explain whether a Certificate of Site and Facility is needed to avoid**
17 **undue delay in the construction of needed energy facilities and provide full and**
18 **timely consideration of environmental consequences.**

19 A. The Project needs to come before the SEC in part because of the clearly
20 established time frames established in RSA 162-H, which allow for adequate planning
21 and investment risk management. Project developers need reasonable certainty with
22 regard to timeframes, standards and processes in order to manage risk and make informed
23 decisions.

1 Requiring Antrim Wind Energy to wait indefinitely to find out what standards and
2 processes the Town could or would apply to this Project, if any standards are ever
3 developed at all, is unfair and will cause undue delay, as studies will not go forward
4 without more certainty. Furthermore, waiting for the Town to enact ordinances is a
5 fruitless exercise because ordinances created in response to this specific, existing Project
6 are of questionable enforceability.

7 It is evident based on our experiences with permitting a single temporary
8 meteorological tower in Antrim, which is still under appeal after nearly two years, as well
9 as the failed ordinance amendment process, that no local process in Antrim will provide a
10 timely, final decision.

11 **Q. Please explain whether a Certificate of Site and Facility is needed to**
12 **ensure that Antrim Wind Energy, LLC is required to provide full and complete**
13 **disclosure to the public about such plans.**

14 A. There is a clear, documented history of the Town of Antrim's inability to
15 comply with notice and other basic procedural requirements. For example, the "new"
16 Antrim Planning Board has taken positions regarding the development of new Ordinance
17 standards without public notice or notice to its own members, raising questions regarding
18 whether the public will be adequately notified regarding the Planning Board process of
19 ordinance development and analysis of the Project. Given the local, regional and state-
20 wide implications of this Project, the clearly-established SEC process will provide a
21 much better venue for disclosure, issue vetting and opportunity to comment by all
22 interested parties than would a Town-sponsored process, even if such a process were to
23 be developed and properly followed.

1 **Q. Please explain whether a Certificate of Site and Facility is needed to**
2 **ensure that construction and operation of the Antrim Wind Project is treated as a**
3 **significant aspect of land-use planning in which all environmental, economic, and**
4 **technical issues are resolved in an integrated fashion.**

5 A. Because there is no current Ordinance or set of regulations in Antrim that
6 addresses a development of this type or magnitude, the Town's general Zoning
7 Ordinance and site plan review processes apply. These regulatory schemes are not well-
8 suited to evaluate all environmental issues, economic or technical issues at a local level
9 (let alone at a regional or statewide level) or in any sense of an integrated fashion.

10 Instead, an ordinance or a set of site plan regulations would need to be created in
11 response to the impending Project proposal outlined above. And the Town would need
12 legal and enforceable processes, decision-making authority, standards and methods of
13 evaluation to ensure that the State's goal of evaluating these facilities through "land-use
14 planning in which all environmental, economic, and technical issues are resolved in an
15 integrated fashion" is fulfilled. Based on past history explained above, the prospects for
16 the creation and implementation of such a process in Antrim are dim. Because this
17 renewable energy project has regional and state-wide benefits, it should be reviewed at
18 the state rather than local level. Thus, the SEC process is appropriate and should be
19 applied.

20 **Q. Does this conclude your pre-filed testimony?**

21 A. Yes.

22 760590_1.DOC

John Bausman Kenworthy (Jack)

155 Fleet Street
Portsmouth, NH 03801
603-570-4842 (w) 484-467-5315 (m)
jkenworthy@eolian-energy.com

GENERAL QUALIFICATIONS:

Renewable energy executive with extensive management time spent in start-up environments, emerging markets and over 8 years in the renewable energy sector. Expert in the financial, legal, technical and narrative elements involved in complex clean energy project deployment. Superior communications skills and ability to build and manage excellent teams and form lasting business relationships built on a foundation of trust and follow-through.

PROFESSIONAL EXPERIENCE:

Eolian Renewable Energy, LLC: Portsmouth, NH: *Co-Founder, CEO*

(January 2009-Present)

Renewable energy development and operations company focused on building distributed utility scale wind facilities in the New England region.

Kenworthy Partners, LLC: Portsmouth, NH: *Founder, Managing Partner*

(July 2008-2010)

Kenworthy Partners serves as consultants to industry, educational institutions and municipalities on strategies to maximize competitiveness by providing thought leadership in integrated sustainable systems and technical competence in energy systems design, financing, policy and performance.

Cape Systems, Limited: Eleuthera, Bahamas: *Co-Founder, President and CEO*

(July 2005 – June 2008)

Cape Systems is a full service renewable energy and biofuels engineering firm and project developer located in The Bahamas. Cape Systems is the nexus for renewable energy development and green development in The Bahamas and is responsible for many national “firsts” in clean energy systems, biofuels, carbon projects and public/private partnerships. Cape Systems recently launched a 20-year plan to make Eleuthera entirely independent of petroleum using onsite renewables – profitably.

Responsible for:

- strategic development
- contract development
- partnership development
- staff management
- financial management
- government relations
- operations oversight

Bahamas Biodiesel, Limited: Nassau, Bahamas; *Co-Founder, Chairman*

(May 2007-June 2008)

Bahamas Biodiesel is the first commercial scale biodiesel company in The Bahamas and the first in the region to be designed to operate on 100% waste cooking oils. Cape Systems was the founding partner of the company.

Cape Eleuthera Institute: Eleuthera, Bahamas: *Co-Founder and Director of Systems, Facility Manager*
(January 2002 – June 2006)

Cape Eleuthera Institute is a center of excellence in marine resource preservation and sustainable technologies in The Caribbean. The Cape Eleuthera Institute builds relationships, provides resources, conducts research, and develops sustainable industries in South Eleuthera, The Bahamas, and the Caribbean.

Cape Eleuthera Island School: Eleuthera, Bahamas: *Teacher, Facilities Manager, Research Advisor*
(January 2001-January 2004)

PROFESSIONAL ACCOMPLISHMENTS:

- Negotiated first successful public/private renewable energy partnership in The Bahamas using hybrid wind/solar technologies connected to utility grid in pilot partnership with utility.
- Brought first carbon finance deal to Bahamas for commercial scale biodiesel plant
- Launched “Freedom 2030” initiative to eliminate Eleuthera’s dependence on oil in 20 years. Involved managing relations with partners at RMI, NREL, Bahamas Electricity Corporation, Ministry of Works, Office of the Prime Minister, technology vendors, international development banks, private capital and consumers.
- Advisor to Renewable Energy Working Group at Bahamas Electricity Corporation.

EDUCATION:

University of Vermont, B.A. (Environmental Science and Law, Summa Cum Laude)

Academic Awards:

- George T. Kidder Medal for Leadership, Scholarship and Service, University of Vermont (May 2000)
- College Honors in Arts and Sciences, University of Vermont (May 2000)
- Program Honors, Environmental Studies at the University of Vermont (May 2000)
- Member of the John Dewey Honors Program at The University of Vermont
- Member of the Phi Eta Sigma Honors Society through The University of Vermont
- Member of the Vermont chapter of the Golden Key National Honors Society
- Crow Award for Excellence in Systems Thinking - Columbia University, Spring 1998

**List of Owners, Officers, Directors of Antrim Wind Energy LLC,
Eolian Renewable Energy LLC, Eolian Antrim, Inc., Westerly Wind LLC and
Westerly Antrim Inc.**

I. Antrim Wind Energy LLC

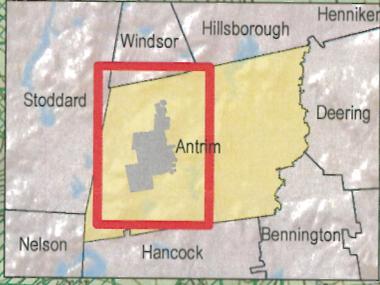
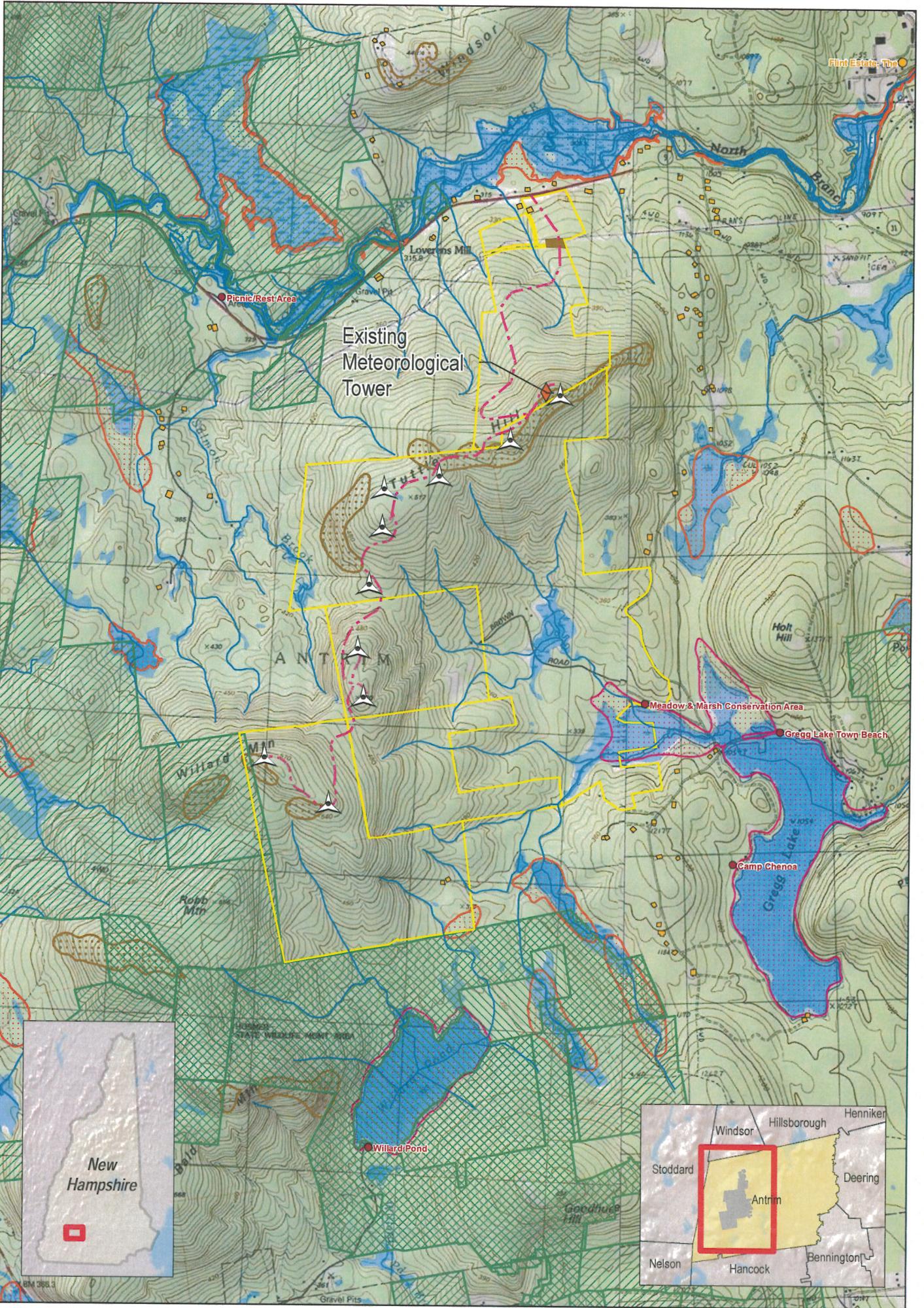
- a. Delaware limited liability company
- b. Members
 - i. Eolian Antrim Inc.
 - ii. Westerly Antrim Inc.
- c. Officers
 - i. John B. Kenworthy, Executive Officer
 - ii. John M. Soininen, Executive Officer
 - iii. Joseph Cofelice, Executive Officer
 - iv. Peter Mara, Executive Officer
- d. Directors
 - i. John B. Kenworthy
 - ii. John M. Soininen
 - iii. Joseph Cofelice
 - iv. Peter Mara

II. Eolian Antrim, Inc.

- a. Delaware Corporation
- b. Owner(s)
 - i. Eolian Renewable Energy, LLC
- c. Officers
 - i. John B. Kenworthy, President and CEO
 - ii. John M. Soininen, Vice President
 - iii. James A. Kenworthy, Vice President
- d. Directors
 - i. John B. Kenworthy
 - ii. John M. Soininen
 - iii. James A. Kenworthy

III. Westerly Antrim, Inc.

- a. Delaware Corporation
- b. Owner(s)
 - i. Westerly Wind LLC
- c. Officers
 - i. Joseph Cofelice, President and CEO
 - ii. Peter Mara, Vice President
 - iii. Sean McCabe, Vice President
- d. Directors
 - i. Joseph Cofelice
 - ii. Peter Mara
 - iii. Sean McCabe



- | | | | |
|---------------------------------|--------------------|--------------|--|
| Existing Meteorological Tower | Nearby Structures | Streams | FEMA Flood Zones |
| Proposed Turbine Locations | Recreation Feature | NWI Wetlands | 0.2% Annual Chance Flood Hazard |
| Proposed Access Road Centerline | Conservation Areas | Ridge Talus | A - An area inundated by 100-year flooding, for which no BFEs (Base Flood Elevations) have been determined |
| Project Parcels | Recreation Areas | | A - An area inundated by 100-year flooding, for which BFEs (Base Flood Elevations) have been determined |
| Proposed Substation Location | | | |



ANTRIM WIND ENERGY PROJECT
ANTRIM, NEW HAMPSHIRE



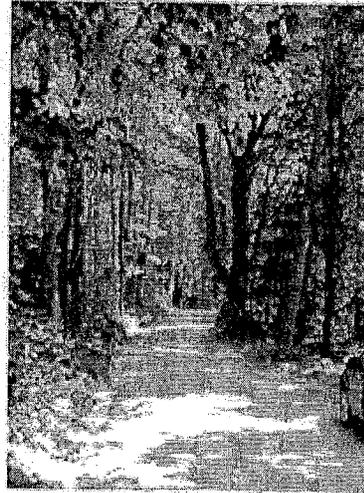
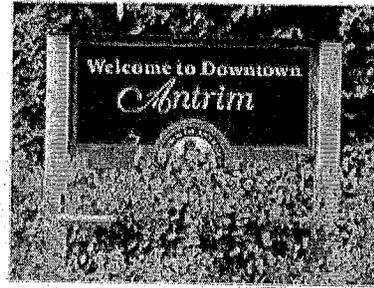
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S:\Projects\TRC\Augustal192878-Antrim WindPark\Antrim WindPark\Project_Location.mxd

Hillsboro and Stoddard 7.5-Minute USGS Topographic Quadrangles

Antrim Master Plan

Antrim, New Hampshire



2010

Energy Usage and Conservation

Antrim, like the rest of New Hampshire, is feeling the pinch when it comes to rising energy costs. Our appetite for more and more energy hits us in the pocketbook while damaging the environment.

There is no question that Antrim residents want to do something to reduce energy consumption not only to hold our costs down but to reduce the effects of global warming. Antrim was one of 164 towns in New Hampshire to adopt the New Hampshire Climate Change Resolution in 2007.

The resolution reads:

“Whereas, The protection of our forests, air and water quality, fisheries and other natural resources are important to the health and quality of life of our citizens; and

“Whereas, There is evidence that climate change is already impacting New Hampshire’s environment and natural resources, from increased intensity of storms, higher sea level, less snow cover, and more winter rain; and

“Whereas, New Hampshire state government has taken steps to lead by example by reducing energy use of state operations and committing to an overall state goal of using 25 percent renewable energy by 2025; and

“Whereas, The residents of many New Hampshire towns passed the New Hampshire Climate Change Resolution, calling for a national program to reduce U.S. greenhouse gas emissions while protecting the U.S. economy, to create a major national research initiative to foster rapid development of sustainable energy technologies, and encouraging towns to start local energy committees to seek ways to save energy, reduce emissions and save taxpayer dollars;

“Now, therefore, I John Lynch, Governor and the Executive Council of the State of New Hampshire, do hereby commend the New Hampshire Climate Change Resolution and local volunteers for bringing this issue to New Hampshire’s town meetings and community leaders.”

Credit for Information That Follows

Before proceeding further, it should be noted that much of the information and data that follows was gathered from the Regional Planning Commission’s master plan energy chapter for the Rockingham Planning Commission. It, in turn, relied heavily on the Intergovernmental Panel on Climate Change (IPCC) reports. The IPCC was formed in 1988 through the United Nations Environmental Programme and the World Meteorological Organization. The Regional Planning Commission says the IPCC’s latest report, released in 2007, “is well regarded as the single most comprehensive and unbiased report on climate change.” The Regional Planning Commission also said in its conclusion of the chapter, “...this chapter has been developed in a modular format to serve as a template for communities to amend and adopt into their master plan. It offered a background on the scientific data of global warming, depicted the baseline energy consumption trends of the region and summarized current programs. When this plan is combined with

community energy information and community goals it could serve as an action plan to guide communities towards reduction of energy use and greenhouse gas emissions.”

Impact of Global Warming on New Hampshire

Global warming is caused by the greenhouse effect. Just as a real greenhouse produces heat from the sun shining into it, the earth’s atmosphere allows solar radiation to be absorbed by the earth’s surface. When absorbed, the radiation is converted to heat and emitted as infrared radiation into the atmosphere. Some gases such as carbon dioxide, methane, chlorofluorocarbons, nitrous oxide, ozone, and water vapor absorb some of the infrared radiation which causes the earth’s atmosphere to heat up.

Scientists have taken ice cores in Antarctica which show the correlation between carbon dioxide and temperature changes for the past 400,000 years. As carbon dioxide levels increase, so do atmospheric temperatures; when they fall, temperatures also fall. Scientists have found that historically, carbon dioxide levels have varied between 180 parts per million by volume (ppmv) to 300 ppmv. According to the National Oceanic and Atmospheric Association (NOAA), estimates of atmospheric carbon dioxide reached 386 ppmv in 2007.

How has this affected New Hampshire? According to C.P. Wake at the University of New Hampshire’s Climate Change Research Center, in *Indicators of Climate Change in the Northeast*, 2005, there have been notable changes. The weather has become hotter, wetter, and more extreme.

- Average Northeast Temperature Change from 1899 to 2000: annual, up 1.8°; winter, up 2.8°; spring, up 1.9°; summer, up 1.7°; fall, up 0.7°.
- Total precipitation has increased 3.3 inches from 1899 to 2000 and the frequency of extreme precipitation events also has increased.
- Snowfall has decreased significantly in northern New England and northern New York from 1970 to 2000.
- Days with snow on the ground have decreased 16 days from 1970 to 2000.
- Ice-out of lakes occurs 9 days earlier in the northern/mountainous regions and 16 days earlier in the southern regions of New England from 1850 to 2000.
- Sea surface temperatures have increased 1.1° in the Gulf of Maine from 1880 to 2001.
- Relative sea level has increased 16 inches at New York City from 1856 to 2001.
- Growing season has increased by 8 days from 1899 to 2000.
- Lilac bloom dates are 4 days earlier and apple and grape bloom dates are 8 days earlier from 1965 to 2000.

How This Affects New Hampshire

Shorter, warmer winters mean fewer tourism dollars for skiing, snowmobiling, and ice fishing, according to Eric Steltzer, regional planner with the Rockingham Planning Commission. Its

master plan says, “agricultural industry will be affected by a longer growing season and habitat changes which will affect crop output. Specifically, maple syrup production is shown to begin 10 days earlier, end 10 days later and the syrup runs for approximately 3 days shorter compared to 40 years ago. The seacoast areas will be affected by sea level rises and the increase in storm intensity, causing insurance companies to pull their coverage for coastal areas... The health industry will be affected by increased respiratory and heat related illnesses.”

New Hampshire’s Power Usage

Global warming is not our only problem. Our energy usage has increased at an alarming rate. In 1990, the total energy consumption in New Hampshire was 264.6 trillion British Thermal Units (BTUs).¹ At that time the state population was 1,109,117, which means each resident consumed 239 million BTUs. By 2004, the state’s energy consumption had grown by 28.7% to 340.6 trillion BTUs, but the population grew by only 17.1%. The energy consumption per capita in 2004 rose to 262 million BTUs or a 9% increase from 1990 to 2004.

Breaking down energy usage by sectors, the commercial sector grew 73.8% from 1990 to 2004. Transportation grew 49.6% for the same period. The residential sector in 1994 consumed 29.8% of the state’s energy making it the state’s largest consumer sector. From 1994 to 2004, the residential consumer sector grew 26.4%. It was second only to the growth in transportation.

Petroleum products, including gasoline, propane, home heating oil, and diesel, are the primary fuel sources, providing 60% of the energy used between 1990 and 2004. The use of natural gas has increased dramatically over those 14 years. In 1990, the primary use for natural gas was for heating and accounted for only 5.5% of total energy consumption. By 2004 it had become the third largest fuel source, accounting for 18.9% of total energy consumed. In 1990 there were no natural gas power plants. By 2004 several natural gas plants came on line, producing 5.4 million megawatt hours, or 22.6% of all electricity generated in New Hampshire.

The Seabrook nuclear power plant is the largest in New England. It is the largest source of electricity in the state, producing 42.6% of the state’s needs. However, because Seabrook accounts for a lot of electrical output, 34.2% of its generation is exported out of New Hampshire. Renewable energy provided only 4% of the state’s energy needs in 2004. Coal usage in the U.S. as a whole accounts for 50% of the electricity generated. In New Hampshire, coal accounts for 17.1% of the generation.

Energy use patterns in New Hampshire are similar to the rest of New England. Per capita use for our state is 262 million BTUs, compared to 258 million BTUs for the rest of New England. However, New Hampshire fares better when compared to the rest of the U.S. which consumes 341 million BTUs per capita.

One of the key motivations in becoming more energy efficient is the rising price of fuel. Oil prices have risen drastically during the last quarter of 2007. The price of oil flirted with the \$100

¹ A BTU is defined as the amount of energy required to raise the temperature of one pound of water 1 degree Fahrenheit. To put it into perspective, burning a cord of wood produces roughly 20 million BTUs.

per barrel range in the last quarter of 2007. The table below provides a perspective on the growth of energy prices since 1990.

Fuel	Price in 1990	Price
No. 2 Oil (\$/gallon, excluding tax)	\$1.25	\$ 3.85, March 2008
Natural Gas (\$/1000 cubic feet)	\$7.80	\$ 19.01, July 2008
Propane (\$/gallon, excluding tax)	\$1.25	\$ 3.12, March 2008
Gasoline (\$/gallon, excluding tax)	\$0.95	\$ 3.59, Sept. 2008
Electricity (cents/kilowatt hour)	10.05¢	15.75¢, May 2008

Source: Energy Information Administration

New Hampshire's Carbon Dioxide Emissions

Global warming is tightly bound with carbon dioxide emissions (other gases, such as methane also play a role). However, carbon dioxide emissions are pervasive in our society. Between 1990 and 2004, carbon dioxide emissions in New Hampshire have increased by 33%. Historically, the transportation sector has been the number one emitter of carbon dioxide. However, between 2002 and 2004 emissions from the electric power sector increased sharply. The table below shows the trend for each sector.

Carbon Dioxide Emissions in Million Metric Tons²

Sector	1990	2004	Percent Increase
Residential	2.4	3.4	41%
Commercial	1.3	1.8	38%
Industrial	0.9	1.2	33%
Transportation	5.1	7.7	50%
Electric Power	4.8	7.8	63%
Total	14.6	21.8	49%

New Hampshire Regulations

The problems associated with the drastic increase in energy usage and the accompanying increase in greenhouse gas emissions have not gone unnoticed by the state. New Hampshire has a number of regulations that support and encourage energy conservation and use of renewable energy sources.

- RSA 672:1 III-a states: "Proper regulations encourage energy efficient patterns of development, the use of solar energy, including adequate access to direct sunlight for solar energy uses, and the use of other renewable forms of energy, and energy conservation. Therefore, zoning ordinances should not unreasonably limit installation of solar, wind, or other renewable energy systems or the building of

structures that facilitate the collection of renewable energy, except where necessary to protect the public health, safety, and welfare.”

- RSA 21-I:19-d allows a municipality to contract with a pre-qualified energy service company to make energy efficient upgrades to be financed through the energy service company and to be paid off over time through the energy savings. There are no upfront capital costs for the municipality. A performance contract also protects the municipality by requiring the company to meet a certain reduction in energy use. If the goal is not met, the company pays the difference in the energy bill.
- RSA 72:61-72 allows municipalities to offer a property tax exemption on solar, wind and woodheating energy systems. The systems include solar hot water, solar photovoltaic, wind turbine or central wood heating systems (not including stovetops or wood stoves). As of 2006, Antrim does not offer property tax exemptions for these renewable energy resources.
- RSA 53-E allows residents, businesses and municipalities to form a Community Choice Aggregate (CCA) to combine their electrical demand in order to receive a reduction in price.

Be Innovative in Our Thinking and Implementation

Antrim should look at the obvious forms of energy conservation, but it shouldn't be afraid to encourage innovative solutions for some of the larger projects. Below are three examples of how other municipalities solved energy problems while saving money and increasing energy efficiencies at the same time. It should be noted here that while the Town of Antrim believes that energy conservation should be everyone's concern and responsibility, the following section should not be viewed as suggesting a mandate to non-residential users or potential businesses. We believe that commercial and manufacturing concerns will know best how to mitigate their energy needs and will take responsible steps in that direction as needed, steps that may be encouraged through reasonable and flexible regulations of the town.

Epping Energy Efficiency Article 22

In early 2007, the voters in Epping, New Hampshire, approved Article 22 which requires new non-residential buildings to implement energy efficiency and production, energy conservation, and sustainable design principles. A point system was established and non-residential buildings must earn a certain number of points based on their square footage. For example, a building 5,000 square feet or less must earn 5 points. A building of 50,001 square feet or larger must earn 25 points. Use of wind, photovoltaic panels, fuel cell based co-generation, use of biomass and bio-synthetic oil co-generation are among the ways designers can earn points.

Clay Mitchell, town planner, said TD Banknorth originally came forward with a design for a bank that met the 5 points necessary for approval. However, later it returned with a new design which achieved 15 points – the highest yet proposed for a building. Among the design changes was a system for using gray water to flush toilets and a solar power array for generating electricity.

Another business which supplies bricks, stones and masonry supplies constructed a new 4,000 square foot showroom. It features windows sealed with foam insulation which is better than fiberglass; four furnaces that eliminate trying to heat the showroom from a distance with the attendant heat loss. The company also recycles the water used in cutting and finishing counter tops to help reduce water consumption and keep from polluting streams.

Some Epping residents felt the innovative energy provision might put a damper on development. However, Mitchell said that businesses are using it as a selling tool in promoting their businesses.

Waste Water Treatment Plant

Up until 2003, the wastewater treatment plant in Essex Junction, Vermont, used only half of its waste methane gas produced by its anaerobic digester to fire the boiler that heated the digester. The remaining methane was flared because methane is 20 times more effective at trapping heat than carbon dioxide.

The facility officials had been considering installing a combined heat and power (CHP) system and power it with methane from the digester. However, they weren't sure that sufficient digester temperatures could be maintained. Also, it was not clear that it would meet the governing board's 7-year payback period. The system also would be required to emit no more pollutants than flaring methane.

Funding was found through various organizations and governmental agencies. Northern Power designed micro-turbines that can run either on methane or natural gas. Before the co-generation was installed, the treatment plant paid out \$100,000 per year for electricity. After installation, electric costs dropped \$37,000. At first it was assumed the micro-turbines would operate a total for both of 40 hours per day. However, both have run for a total of 48 hours per day, saving 80,000 kwh of electricity per year.

Other benefits of the project include preventing carbon dioxide emissions of 600,000 pounds per year, using nearly 100% of its waste methane, compared to 50% before, and demonstrating the viability of methane-fired cogeneration at a small facility (Essex Junction has a daily average flow of 2 million gallons per day).

Gas-To-Energy Project

In Antioch Village, Illinois, a closed 51-acre landfill was authorized by the U.S. Environmental Protection Agency to be used as a source of methane gas. The gas will be used to heat and power the Antioch Community High School only half a mile away.

The landfill holds about 2 million tons of waste. With the help of grants and bonding, the \$1.9 million project will heat the 262,000 square foot school and generate 360 kw of power. The power and electricity will be generated by 12 Capstone MicroTurbines located on school property. Any additional electricity generated is to be sold back to the power company. Each microturbine produces 290,000 BTUs per hour at 550° F. The exhaust from the turbines is routed

through a waste heat recovery system. By varying flow and inlet fluid temperature a wide variety of needs can be met for hot water.

When waste heat recovery is not required, the exhaust can automatically be diverted around the exchanger, permitting electrical output only. Also, during months when the school is not in use, all of the heat from the waste heat recovery system is diverted to other area businesses or industries. Starting in 2003, the annual savings to the school in energy costs was estimated to be over \$100,000 annually.

Some of the other benefits of the project include:

- Low energy costs for the high school.
- Revenue from sale of electricity to the power company.
- Clean, complete combustion of waste methane gas.
- Waste heat for internal use in the high school.
- Reduced greenhouse gas emissions.

Biodiesel - An Alternative to Petroleum Diesel

Antrim should look into using biodiesel to power its diesel engines. Biodiesel is made from vegetable oils (commonly soy), animal fats or recycled waste grease. It can be used alone or it can be blended with petroleum diesel fuel. When used in its pure state it may cause damage to rubber parts. However when it is blended with petroleum fuel at a 20% rate of biodiesel to 80% regular diesel, no damage to engines will occur, according to the National Biodiesel Board.

The advantage of using a blend of biodiesel is that it will dramatically reduce emissions and lessen our dependency on foreign oil.

The table below shows the reduction of air pollution for pure biodiesel (B100) and a 20% blend of Biodiesel with 80% petroleum diesel (B20).

**Average Biodiesel Emissions Compared to Conventional Diesel,
According to EPA**

Emission Type	B100	B20
Regulated		
Total Unburned Hydrocarbons	-67%	-20%
Carbon Monoxide	-48%	-12%
Particulate Matter	-47%	-12%
Nox (various nitrous oxides)	+10%	+2% to -2%
Non-Regulated		
Sulfates	-100%	-20%
PAH (Polycyclic Aromatic Hydrocarbons)	-80%	-13%
nPAH (nitrated PAH's)	-90%	-50%
Ozone potential of speciated HC	-50%	-10%

According to the biodiesel website (www.biodiesel.org), "sulfur emissions are essentially eliminated with pure biodiesel." Sulfur emissions are major components of acid rain. Also, the smog forming potential of biodiesel is less than that for regular diesel fuel.

Antrim looked into using biodiesel previously, but there was concern over whether it would gel up during winter. According to the [biodiesel.org](http://www.biodiesel.org) website, "biodiesel will gel in very cold temperatures, just as the common #2 diesel does....typical blends of 20% biodiesel are managed with the same fuel management techniques as #2 diesel." Minnesota has been running a biodiesel program for several years, apparently with no problems due to cold temperatures.

Tests have also shown that B20 provides similar engine performance as regular diesel fuel. It was consumed at a similar rate as #2 diesel with horsepower, torque, and haulage rates equivalent to those engines using conventional diesel fuel.

Other municipalities, organizations and the state are using biodiesel including the City of Keene, Keene State College, the University of New Hampshire and the New Hampshire Department of Transportation. In addition, Rymes Heating Oils, Inc. provides biodiesel fuel.

Antrim should take another look at biodiesel fuel.

Perform Public and Private Energy Audits

In late 2007 Antrim formed an energy committee to look at energy usage and to find ways to eliminate wasted energy and improve efficiencies. The first task of the committee was to audit the energy usage in the town's public buildings and vehicles. The committee also sold energy saving compact fluorescent bulbs at little or no cost to residents. The program was well received and almost all the bulbs were sold. The committee likely will offer a similar program in the future.

For individuals there are many ways to cut energy usage. Public Service of New Hampshire (PSNH) points out that "if every American home replaced their five most frequently used lights or the bulbs in them with ones that have earned the ENERGY STAR, each home would save about \$60 a year in energy costs, and together we'd save about \$6.5 billion each year in energy costs and prevent greenhouse gases equivalent to the emissions from more than eight million cars."

Also consider having a professional energy audit performed on your house. Go to www.psnh.com for more information about what is involved in an energy audit of your home.

PSNH offers a free lighting catalog which lists many energy efficient products that customers can use to cut their electricity bill and save power at the same time. PSNH's website offers ideas and products under its efficiency programs including:

- Energy Star Homes
- Home Energy Solutions
- Home Energy Assistance
- Energy Star Lighting
- Energy Star Appliances

- HEATSMART
- Renewable Rate
- Tax Incentives
- Tools and Calculators

Antrim's Recent Conservation Measures

In 2003 and 2004, Antrim began looking seriously at ways to use electricity more efficiently. Working with Public Service of New Hampshire (PSNH), the town embarked on a street light replacement program to replace older inefficient lighting systems with newer more energy efficient systems. It also entered into another agreement with PSNH to determine what changes in power use could be made to make town buildings more efficient.

PSNH did a study of Antrim's street lighting. It suggested the town convert from the Municipal Outdoor Lighting *Rate OL* to the Energy Efficient Outdoor Lighting *Rate EOL*. To make the conversion Antrim would change over existing street lights to either high efficiency high pressure sodium or all-metal halide. The study indicated the following:

	<u>Conversion Cost</u>	<u>Annual Savings</u>	<u>Simple Payback Period</u>
High Pressure Sodium	\$33,863	\$5,168	6.6 Years
Metal Halide	\$41,291	\$3,581	11.5 Years

In the second program called Pay-As-You-Save (PAYS), PSNH pays all of the costs associated with the purchase and installation of approved measures such as lighting, including LED exit signs, occupancy sensors, programmable thermostats and hot water insulation wraps. A PAYS Purchase and Installation Charge, calculated to be less than the monthly savings, is added to the town's monthly electric bill until all costs are repaid.

The following chart shows how meaningful these savings are.

Facility	Project Cost	Antrim Cost-Share	Annual Savings (Conservative)	Payback (Years)
Sewer and Water Department	\$3,064.94	\$1,532.46	\$449.98	3.41
James Tuttle Library	\$2,005.20	\$1,002.59	\$349.15	2.87
Antrim Town Barn	\$1,314.10	\$657.04	\$423.44	1.55
Antrim Grapevine	\$702.21	\$351.08	\$265.14	1.32
North Branch Fire Station	\$934.84	\$467.42	\$402.24	1.16
Antrim Fire Station	\$3,277.20	\$1,638.57	\$649.40	2.52
Antrim Transfer Station	\$875.63	\$437.79	\$195.94	2.23

TOTAL	\$12,174.12	\$6,086.95	\$2,735.29	2.23
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It is interesting to note that the town's electric costs have not increased since 2004 and that includes our share of the cost for the new lights, so the savings have been greater than originally anticipated above.

Cool Monadnock

Cool Monadnock is a three-year collaborative project for 36 southwest New Hampshire regional communities, including Antrim. Antioch New England Institute and Clean Air-Cool Planet will provide training, coordination and technical assistance to the region's towns and cities. Cool Monadnock's first goal is to "quickly accomplish a 10% reduction in GHG (greenhouse gases)."

Other goals are:

- "To achieve personal commitment and actions from a significant number of residents and businesses to reduce GHG emissions."
- "To stimulate 300 communities throughout New Hampshire and New England in implementing significant community engagement approaches to reducing GHG."
- "To create a model of regional collaboration that can be implemented in other regions in the northeast."

Businesses, local governments, residents and students will partner together to develop effective strategies and actions to reduce greenhouse gases, save on energy costs and support public health. Cool Monadnock also works with Southwest Regional Planning Commission and other agencies to deal with climate change.

Cool Monadnock says that community-level action is very important because there is virtually no federal leadership for this issue. Towns throughout the U.S., it says, can play a major role in reducing green house gas emissions.

Areas that can be targeted to reduce emissions include land-use planning, transportation planning and mass transit, reducing local government energy use, local forestry, power generation, residential energy and solid waste. Communities working collaboratively can institute multi-town efforts to reduce greenhouse gases.

The organization's task force "will prepare a regional climate action plan that identifies a range of actions to reduce GHG emissions that can be undertaken on both the regional and community levels." One reason a regional approach is a sound idea is that some green house gas emissions activities such as transportation are regional in scope. Also, the organization points out that a collaborative effort can help towns achieve economies of scale such as in fluorescent light bulb change-out programs.

The lead partners include Antioch New England Institute (ANEI), a consulting and community outreach department of Antioch University New England. Cool Monadnock says "ANEI promotes a vibrant and sustainable environment, economy, and society by encouraging informed civic engagement. It provides training, programs and resources (U.S. and international) in leadership

development, place-based education, nonprofit management, environmental education and policy, smart growth and public administration.” Clean Air-Cool Planet is another lead partner. It is dedicated to finding and promoting solutions to global warming. It partners with campuses, companies, communities and science centers in the Northeast to help reduce their carbon output. It helps partners, constituents and other regional leaders to understand global warming and find ways of dealing with the problem. Christa Koehler, a former city planner for Keene, is a project co-director along with James Gruber, the Antioch New England Institute co-founder.

Cool Monadnock’s website has a wealth of information on its three-year project, including a calendar of events, using compact fluorescent bulbs, reaching out to students and social organizations to spread the word and get help with projects, etc. The website also has a page where everyone can see what the individual towns and cities in Cool Monadnock have done to date. See www.coolmonadnock.org.

Encourage Renewable Energy Resources

According to RSA 674:17(j), planning boards should “...encourage the installation and use of solar, wind, or other renewable energy systems.” RSA 674:36(k) also encourages “the installation and use of solar, wind, or other renewable energy systems and protect access to energy sources by the regulation of orientation of streets, lots, and buildings...and encouragement of the use of solar skyspace easements under RSA 477.”

Further information on ways to improve Antrim’s energy efficiency and conservation can be found in *New Hampshire Handbook on Energy Efficiency and Climate Change* by Clay Mitchell, Julia Dundorf and Wes Golomb. See Appendix 5. Also see www.carboncoalition.org.

Antrim should also consider offering property tax exemptions to encourage the use of solar, wind and wood heating energy systems. These systems include solar hot water, solar photovoltaic, wind turbine or central wood heating systems (not stovetops or woodstoves). Presently 62 towns and cities in New Hampshire offer tax exemptions on one or more of these systems.

Constructing Green Buildings

The U.S. Green Building Council addresses what can be done to reduce energy use during construction and post construction. It has developed the Leadership in Environment and Energy Design (LEED) criteria which is the benchmark for design, construction, and operation of environmentally friendly buildings. Its criteria apply to new construction, existing buildings, homes and schools.

Its rating system considers sustainable site, water efficiency, energy and atmosphere, materials and resources, indoor environmental quality, and innovation and design process. The number of points a project receives determines the level of certification it receives. The ratings are: Certified (26-32 points); Silver (33-38 points); Gold (39-51 points); and Platinum (52-69 points).

Communities can adapt the system to encourage good practices and use of construction materials that are environmentally friendly. Note that this is similar to the Energy Efficiency program,

Article 22, adopted by Epping. (See section above about being innovative). Tied to this point system, communities use incentives such as tax breaks, reduced fees, expedited reviews, density increases, etc. The system can be tied to municipal, residential, and non-residential construction from new buildings and houses to additions and home improvements.

New Hampshire State Energy Plan

In 2002, the state drafted a 10-year state energy plan. The plan says the single most cost effective means to address energy concerns is to improve energy efficiency. It also is a guide for municipalities to use in addressing energy concerns. For more information, see www.nh.gov/oepp/programs/energy/StateEnergyPlan.htm.

Other Resources for Planning and Implementation

There is a great deal of information, grants, software, organizations and tools available from the state and non-profit groups that can be tapped by Antrim for assistance.

- ICLEI – Local Governments for Sustainability offers software that can be used to inventory current energy use, set reduction targets, and provide plans for evaluating a community's progress. It is called Clean Air and Climate Protection (CACP). It covers transportation, residential, commercial, and industrial energy use. The software can be downloaded from www.iclei.org.
- EPA Energy Star Program. The EPA provides Portfolio Manager software to perform energy audits. Communities are invited to join the campaign to reduce energy consumption by 10%. To date, the state, Dover, Rochester, Somersworth, and Nashua have signed on. See www.energystar.gov.
- RETSCREEN. It is similar to EPA's software but offers cost analysis for system improvements. RETSCREEN is produced in Canada. It is used to determine the viability of clean energy products. It is in use by 129,000 people across the world. It is downloadable from www.retscreen.net
- Sierra Club Cool Cities. The project provides guidance on what can be done to reduce greenhouse emissions. Municipalities which adopt the U.S. Mayors Climate Protection Agreement can become members of cool cities. See www.coolcities.us.
- U.S. Mayors Climate Protection Agreement. Since being created in 2005, over 680 mayors from three Canadian provinces and municipalities in all 50 states have joined to reduce global warming. In New Hampshire, Dover, Hanover, Keene, Manchester, Nashua, Portsmouth and Rochester have adopted the resolution. See www.usmayors.org/climateprotection.
- Clean Air-Cool Planet helps communities institute programs to reduce greenhouse gas emissions. Some programs include community-owned wind turbines, performance contracting experiences, LED streetlights, etc. Located in Portsmouth, the non-profit organization provides a wide range of projects

and assistance, including help in starting up an energy committee. See www.cleanair-coolplanet.org.

- Performance Contracting. RSA 21-I:19-d allows a municipality to contract with an energy service company (ESCO) to make energy efficient upgrades to be financed through the ESCO and paid off over time through the energy savings. There are no up-front capital costs to the town. If the agreed-upon level of savings is not achieved, the ESCO must pay the difference in the energy bill.
- Community Choice Aggregation. Under RSA 53-E, residents, businesses and municipalities “aggregate” their electric load together to form a Community Choice Aggregate (CCA). The CCA is formed by the community or region’s legislative body or bodies to competitively bid for electricity, among other benefits.
- NH Carbon Challenge provides information about how individuals can cut greenhouse gas emissions. Communities can use their materials to create a residential campaign. Go to <http://carbonchallenge.sr.unh.edu/>.
- Systems Benefit Charge (SBC) was begun in 2002 by the Public Utility Commission. It is a charge on electric bills which fund two energy efficiency programs run by the utilities. One program is the Low Income Assistance Program which subsidizes costs for eligible households. The second program is the Energy Efficiency Program for residential and commercial customers. Another program for municipalities is the Smart Start program. It allows municipalities to upgrade lighting to more efficient lighting and pay for the upgrades through the energy savings. See www.nhsaves.com.
- Database of State Incentives for Renewable Energy (DSIRE). This is a collection of financial incentives and rules applicable to renewable energy projects for all the states and the federal government. It lists many different programs available to New Hampshire through the state, utilities and the federal government. It also covers NH Renewable Portfolio Standard and the U.S. Department of Energy’s Alternative Fuels. Go to www.dsireusa.org.
- The U.S. Department of Agriculture offers grants between \$75,000 and \$5 million through its High Energy Cost Grant Program. It is open to individuals and municipalities. Go to www.usda.gov/rus/electric/hecgp/overview.htm.
- New England Grassroots Environmental Fund is a nonprofit organization which offers small grants to fund grassroots environmental projects. Past projects include maps for conservation lands, creation of urban gardens and municipal energy efficiency programs. The fund is encouraging energy committees to seek funding. Its website is: www.grassrootsfund.org.

Conclusion

There are a wide variety of programs, potential funding and assistance available to New Hampshire municipalities to help them reduce greenhouse gas emissions, conserve energy and make the towns

as a whole more energy conscious. There is no question that the United States has, up to now, done very little to reduce our dependence on foreign oil, cut back harmful energy emissions, and make our society more aware of what the consequences are if we don't mend our ways.

Global warming is a real threat not only to the United States but to the world. Glaciers are melting away; the Arctic ice cap is shrinking which is threatening the polar bears' survival; oceans are rising; storms are becoming more intense. Scientists around the world are detecting a wide variety of changes. They are concerned that it could lead to large scale extinctions and changes to regions of the earth which can or cannot grow food. Coastlines will change as the ice caps melt and the oceans rise. There is even concern that continued warming ultimately could put an end to the Gulf Stream current which would have dire consequences for the world.

Antrim has created an energy committee – a positive first step in making our town more energy conscious and efficient. The committee alone is not enough. All Antrim residents, households, and businesses have to do their part. We should be driving more fuel efficient cars, replacing incandescent bulbs with energy-efficient bulbs and paying attention to Energy Star ratings when purchasing appliances and other products. All are important steps that residents can take to make Antrim more energy efficient while saving money in the process.

Recommendations

The Energy Committee has begun an energy audit for the public buildings in town to see where energy waste may be occurring and how to make them more efficient. Other steps the town can take include:

- Offer incentives in the form of property tax exemptions for residents or businesses who install renewable energy systems such as wind turbines and photovoltaic panels.
- Install the EPA Portfolio Manager software or the RETSCREEN software to manage the data from energy audits and to set goals for energy reduction over time.
- Thoroughly explore all the various programs listed in this document and any others that come to light so that the town can make intelligent choices about energy conservation and planning and take advantage of any grants or financial help that may be available.
- Conduct a feasibility study for creating a Community Choice Aggregate (CCA) to improve energy efficiency services, expand renewable energy and stabilize energy costs.
- Consider entering into a Performance Contract with an energy service company (ESCO).
- Establish point standards similar to those set up by the U.S. Green Building Council LEED certification to promote energy efficiency in future construction. Also, see the discussion above about Epping's modification of the point system to fit its own needs.

- Encourage smart growth principles such as mixed use, centralized development, higher density, and alternative transportation to reduce energy use.
- Reevaluate using biodiesel fuel for Antrim's diesel engines.