State Policies Supporting Renewable Energy -- Documents

NH DES testimony on HB 1146 (Renewable Portfolio Standards), March 7, 2006
https://www.des.state.nh.us/testimony/archive/2006/HB1146.3706.pdf

NH DES testimony on HB 1568 (Wind Siting Study Committee Legislation), January 17, 2006
https://www.des.state.nh.us/testimony/archive/2006/HB1568.pdf

NH OEP Renewable Energy Page
http://www.state.nh.us/oep/programs/energy/renewableenergy.htm

NH OEP Renewable Energy Incentives Page
http://www.state.nh.us/oep/programs/energy/RenewableEnergyIncentives.htm

NH State Energy Plan – Fuel Diversity Section, Wind Power
http://www.state.nh.us/oep/programs/energy/documents/Ch208.pdf

HB 1758 – Payment in Lieu of Taxes for Renewable Energy Projects (Signed into law)
http://www.gencourt.state.nh.us/legislation/2006/HB1758.html

New Hampshire Clean Power Strategy (Overview p. 5-8)
http://www.des.state.nh.us/ard/pdf/NHCPS.pdf

NH DES Summary of Clean Power Act
http://www.des.state.nh.us/ard/CleanPowerAct.htm

NH DES Air Resources Fact Sheet ARD-23 – *Global Climate Change and its Impact on New Hampshire*
http://www.des.state.nh.us/factsheets/ard/ard-23.htm

NHDES *The Climate Change Challenge* – 2001 (p 32-34)
http://www.des.state.nh.us/ard/climatechange/challenge.pdf

NHDES Regional Greenhouse Gas Initiative Page
http://www.des.state.nh.us/ard/climatechange/rggi.htm

Upper Valley Lake Sunapee Regional Planning Commission, Regional Plan, December 21, 2005 – Energy Goals, Policies & Recommendations
http://www.uvlsrpc.org/files/pdf/Ch1.pdf

The State of New Hampshire
Department of Environmental Services

NHDES

Michael P. Nolin
Commissioner

March 7, 2006

The Honorable Bob Odell
Chairman, Senate Energy and Economic Development Committee
Room 102
Legislative Office Building
Concord, NH 03301

RE: HB 1146 An act establishing a committee to study renewable portfolio standards.

Dear Chairman Odell and Members of the Committee:

The New Hampshire Department of Environmental Services (NHDES) appreciates the opportunity to testify regarding HB1146 that would establish a committee to study renewable portfolio standards. DES supports development of a renewable portfolio standard for New Hampshire, as it would encourage the use of less polluting renewable fuels and the development of associated technologies.

The NHDES supports the continued use of renewable energy systems to help reduce reliance on fossil fuels for power generation. The impacts to human health and the environment from fossil-fuel combustion emissions are also a major concern. These impacts include increased incidence of respiratory illness (asthma) and other health related problems, ground level ozone, acid rain, regional haze, and climate change. In addition to environmental and public health benefits, generation of electricity from renewable energy resources also improves energy security by increasing fuel diversity and encouraging alternatives to fossil fuels for distributed energy generation. The continued operation of less polluting energy generation technologies that diversify the state's energy generation portfolio reduces electricity supply shortages, price spikes, and harmful air pollutant emissions.

There are a number of states in New England that have established renewable portfolio standards. These programs require suppliers of electricity to obtain renewable energy certificates for a portion of their total energy portfolio. Currently, the Whitefield Power and Light facility receives certificates from Connecticut. The Public Service Company of New Hampshire's Northern Wood Project, which will replace a coal boiler with a state-of-the-art wood burning plant, is slated to receive certificates from the Massachusetts market.

As you know, NHDES has also supported Senate Bill 314, an act establishing minimum renewable standers for energy portfolios, which passed out of the Energy and

Economic Development Committee with a recommendation of "ought to pass". NHDES still supports passage of SB314 but would support a committee to further study renewable portfolio standards if SB 314 fails to pass.

Developing a renewable portfolio standard is consistent with the public policy goals regarding environmental improvement established in **RSA Title 34 Public Utilities Chapter 374-F: 3, VIII** *(Electric Utility Restructuring)*, which calls for a meaningful increase in the number of renewable energy resources and increased investment in improving renewable energy technologies. Establishing a renewable portfolio standard is also called for in the New Hampshire Energy Plan (November 2002) prepared by the Governor's Office of Energy and Community Services.

Supporting development of renewable energy resources further supports the principles of continued environmental protection and long-term environmental sustainability by moving toward lower emission energy sources.

Thank you for the opportunity to offer our comments regarding HB1146. If you have any questions regarding these comments, please feel free to contact Air Resources Division Director Robert Scott (271- 1088) or Joanne Morin (271-5552).

Sincerely,

Michael P. Nolin
Commissioner

cc: Members of the Energy and Economic Development Committee
Representative Harvey
Representative Ryan
Senator Hassan
Senator Green

The State of New Hampshire
Department of Environmental Services

Michael P. Nolin
Commissioner

January 17, 2006

The Honorable Lawrence C. Ross, Chairman
New Hampshire House of Representatives
Science, Technology and Energy Committee
Legislative Office Building, Room 304
Concord, NH 03301

RE: HB 1568 An Act establishing a committee to study the siting and construction of industrial wind energy facilities

Dear Chairman Ross and Members of the Committee:

The New Hampshire Department of Environmental Services (DES) appreciates the opportunity to testify regarding House Bill 1568 that would establish a committee to study the siting and construction of industrial wind energy facilities. DES supports the siting and construction of industrial wind energy facilities in New Hampshire, because of the significant environmental benefits that would be achieved by meeting future electricity demand growth with non-emitting wind energy rather than with energy from higher emitting fossil fuel-fired power plants. DES welcomes the opportunity to work with the members of the study committee to address any concerns regarding the siting and construction of industrial wind energy facilities consistent with New Hampshire's Energy Plan.

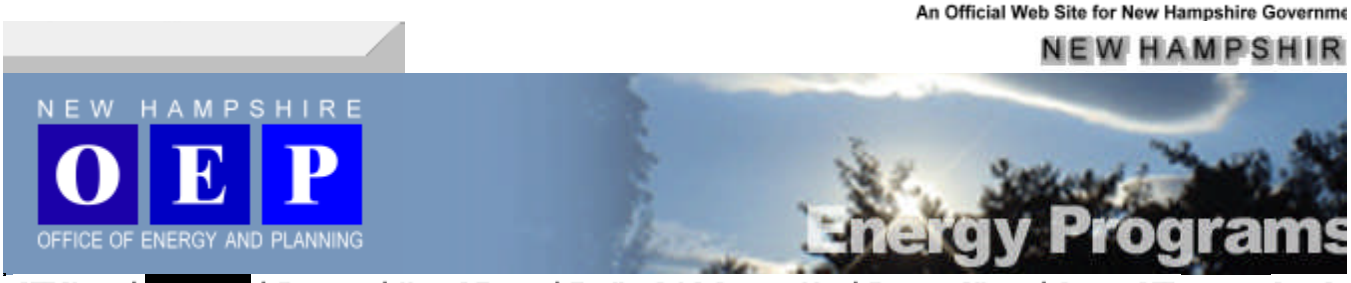
Thank you for the opportunity to offer our comments regarding HB1568. If you have any questions regarding these comments, please feel free to contact Air Resources Division Director Robert Scott (271- 1088) or Joanne Morin (271-5552).

Sincerely,

Michael P. Nolin
Commissioner

cc: Members of the Science, Technology & Energy Committee
Rep. Ward
Rep. Phmizy
Rep. Remick
Rep. Powers

P.O. Box 95, 29 Hazen Drive, Concord, New Hampshire 03302-0095
Telephone: (603) 271-1370 • Fax: (603) 271-1381 • TDD Access: Relay NH 1-800-735-2964
DES Web site: www.des.nh.gov



- OEP Homepage
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  - Industrial Energy Efficiency Program
  - Renewable Energy
  - State Heating Oil & Propane Program
- News & Events
- Funding/Job Opportunities
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ENERGY PROGRAMS

Renewable Energy

Renewable Energy

Energy efficiency and energy conservation can be the most cost-effective and least-polluting means of reducing our demand for energy. However, energy demand cannot be eliminated completely. Thus, renewable energy can be a valuable complement to energy efficiency and conservation. Among the potential benefits of renewable energy are:

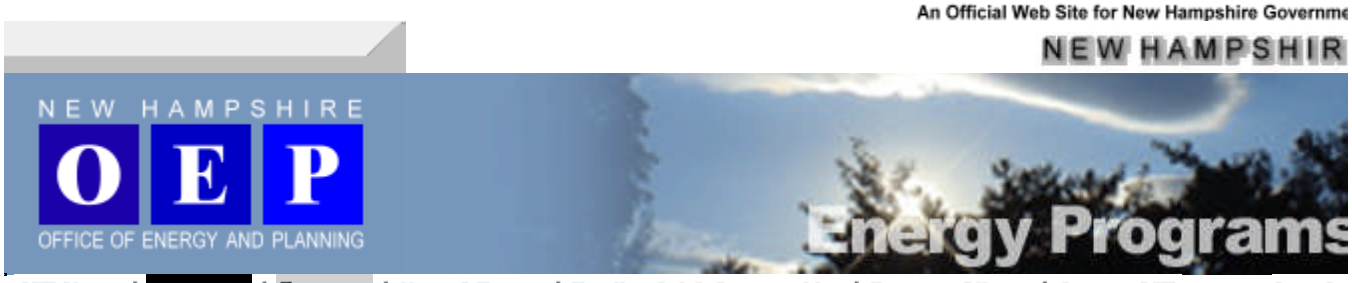
- More secure availability because:
  - it can be produced close to point of use;
  - it has multiple sources, such as hydro, solar, wind, biomass, geothermal.
- Efficiency gains due to less energy consumed in transmission or transport.
- More energy dollars are retained in local or regional economy, not exported.
- Renewable energy installations can create additional local jobs
- Reduced pollution compared with fossil fuel sources.
- Can be greenhouse gas-neutral.
- Lifetime cost can be lower than for non-renewable energy sources.
- "Wastes" such as manure, sewer gas, landfill gas, landscape trimmings, can become energy resources.

Additional Information

- Renewable Energy Incentives - Local, State, Federal
- Alliance to Save Energy
- The Energy Policy Act of 2005
- Renewable Energy Information Resources

For information on renewable energy, contact:

Joseph C. Broyles
Energy Program Manager
Office of Energy and Planning
57 Regional Drive, Suite 3
Concord, NH 03301-8519
VOICE (603) 271-2155
FAX (603) 271-2615
e-mail joseph.broyles@nh.gov



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  - State Heating Oil & Propane Program
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ENERGY PROGRAMS

Renewable Energy

Land Use Regulation Database Survey

Renewable Energy Incentives: Local, State, Federal

"Renewable" here means biomass (including wood), geoexchange ("geothermal"), hydropower, solar, and wind. NH incentives do not apply to all of these energy sources, because some of the technologies were not practical or available when the legislation was enacted in the 1970s.

New Hampshire Incentives

- **State incentives:** *The State of New Hampshire does not offe grants, loans or rebates for the purchase or installation of renewable energy systems. However other incentives exist:*
  - **Net metering:** NH Public Utilities Commission Code 90(provides for net metering, which permits homeowners t receive credit for on-site electricity generation, such as from a solar photovoltaic (PV) or wind turbine installation when the generation exceeds household consumption. This is accomplished by use of an electric meter that can run both forward and backward, so that the homeowner is billed only for the net reading on the meter.
  - **Solar skyspace easements:** NH RSA 477:49-51 perm landowners to guarantee access to sunlight for an abutter's solar installation by restricting building height or vegetation that would cast a shadow on that solar installation.
  - **Streamlined facility siting approval process** for commercial-scale electricity generating projects and other large energy-related installations such as refineries. Required for all generation projects of 30 MW or greater, and optional for smaller projects. This "one-stop" process, detailed in Chapter 4 of the New Hampshire Energy Plan, may reduce project costs by shortening project timeline; and by simplifying the process of identifying and complying with all relevant permitting and regulatory requirements. For more information the New Hampshire Site Evaluation Committee, its history and operations, see http://nhsec.state.nh.us/.
- **Local incentives:**

- **Renewable energy property tax exemption.** NH RSAs 72:61-72 permit cities and towns to offer exemptions from local property taxes for certain renewable energy installations. These include solar thermal (for example, to heat water), solar photovoltaic (to generate electricity), wind (to generate electricity) and **central** wood-fired heating systems (not stoves or fireplaces).
  Fifty-six cities and towns have adopted one or more renewable energy property tax exemptions as of 2003. Newer statewide data are not available; please consult local officials for current renewable energy tax exemption status.

  If your city or town does not currently offer such exemptions, see procedures for adopting local property tax exemptions. Note: Local officials may be unaware of exemptions, as the exemptions may have been adopted as long as 30 years ago.

  If you live in a city or town that offers exemptions and you have an installation that qualifies, you may apply for an exemption by completing the NH Department of Revenue Administration Form PA-29.

  OEP recommends that homeowners and municipal officials consult the NH Department of Revenue Administration with any questions regarding the renewable property tax exemption laws and their application.

Federal incentives

Generally, the federal government does not provide grants, loans o rebates for the purchase or installation of renewable energy equipment. However, other significant incentives are available in th form of income tax credits:

- The Energy Policy Act of 2005 (EPACT 05) offers several renewable energy and energy efficiency tax credits for items put into use on or after January 1, 2006. A tax *credit* is a dollar-for-dollar reduction of income *tax due*, not a reduction in taxable *income*; thus the money spent for qualifying measures is 100% recoverable up to the dollar amount or percentage of actual cost allowed under the law. End dates fo qualifying items and measures vary. US Internal Revenue Service (IRS) will post appropriate credit application forms as they are developed. A simplified summary of the incentives is also available.

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The annual revenue gap drops to its most negative value of $7.7M in 2008, and becomes positive in 2014. The cumulative revenue shortfall dips to its lowest value just shy of $50M in 2013, and thereafter rises back towards parity. The implication is that if the biomass plants were guaranteed a price of 5.8 cents per KWh until approximately 2023, then the net price support over the 2003- 2023 time period could be zero. Of course, it must be remembered that this estimate and analysis is based on forecasts of wholesale electricity prices, and it is faulty forecasts of energy prices that led to the original rate order contracts in the first place.

In conclusion, we have analyzed and described the costs and benefits of retaining the biomass plants in operation past the scheduled expiration of their rate orders. One of the major benefits of plant operation – increased forest management activity and its impacts on long-term value of standing timber in the state – has been mentioned but not quantified. Retaining the plants would provide for retaining 700-950 jobs, and help the state's growing sawmill industry. It would require some type of supplement starting in 2003, when wholesale electricity prices are below the estimated 5.8 cents per KWh break-even price for profitable operation of the plants. Any policy that makes a commitment to provide a supplement to fill the gap between wholesale prices and a break-even price would be a commitment to an uncertain amount, since it relies on a forecast of wholesale electricity prices.

It must be noted that while this analysis considers the energy, economic and environmental benefits associated with continued operation of the wood-fired power plants, the costs are not fully considered. This is because a funding source for continued operation of the facilities (e.g., a Renewable Portfolio Standard, a tax on electricity, or revenue from the state's general fund) was not identified, and was not used in the model. Prior to creation of any policy to support continued operation of the wood-fired power plants, the costs would need to be weighed against the benefits.

8.3.2 Establishing Wind Farms in New Hampshire

The State's Wind Resource

Northern New England, including New Hampshire, has a considerable wind resource. The technology for wind turbines has developed rapidly in recent years, so that utility-scale sites of wind turbines (so-called "wind farms") are now competitive with conventional (e.g., fossil fuel based) generation.

Around the world, over 50,000 wind turbines are currently in operation.[1] In the last six years, 1,100 MW of new wind generation has been established in Texas alone. Wind turbines have been generating electricity in the US for decades, but they have remained at least until now, a niche technology, accounting for less than 1% of US electricity. With recent advances in technology that improve wind power's economics, the role of wind energy is advancing rapidly. Last year alone, 1,700 MW of new wind capacity was installed in the US, doubling total US wind power capacity.[2] This is an amount equal to 60% of New Hampshire's total capacity in 2000, or roughly the capacity of Seabrook plus the state's coal power plants combined. And in 2002 alone, approximately $3 billion in wind power projects were proposed or planned for the next several years at sites in the Midwest, New Jersey, New York, and New England.

The following paragraph, excerpted from the National Renewable Energy Laboratory's Wind Energy Atlas, describes the wind power resource in New England:

> *An extensive area, including most of Vermont and New Hampshire, as well as much of Maine, Massachusetts, and Connecticut, has annual average wind power of class 3 or higher on exposed locations. Highest powers (class 5 and 6) occur on the best-exposed mountain and ridge tops in Vermont's Green Mountains, New Hampshire's White Mountains, and Maine's Longfellow Mountains. The remainder of the hilltops and mountain tops in this area that are outside of these major ranges have class 3 or 4 wind power. At the highest elevations this wind power increases to class 6 and 7 in the winter. Average wind speeds may vary significantly from one ridge crest to another and are primarily influenced by the height and slope of the ridge, orientation to the prevailing winds, and the proximity of other mountains and ridges. For example, the White Mountains are indicated to have class 6 wind power, but Mount Washington, at 1,917 m (6,288 ft) elevation, is known to have considerably greater wind power as a result of terrain-induced acceleration as the air passes over the mountain.*

[1] *Washington Post*, August 20, 2002: "Windmills on the Water Create Storm on Cape Cod," page A3.
[2] *Technology Review*, July/August 2002, pp. 42-45.

Also from the Wind Energy Atlas is a map of the wind energy resource in New Hampshire and Vermont.

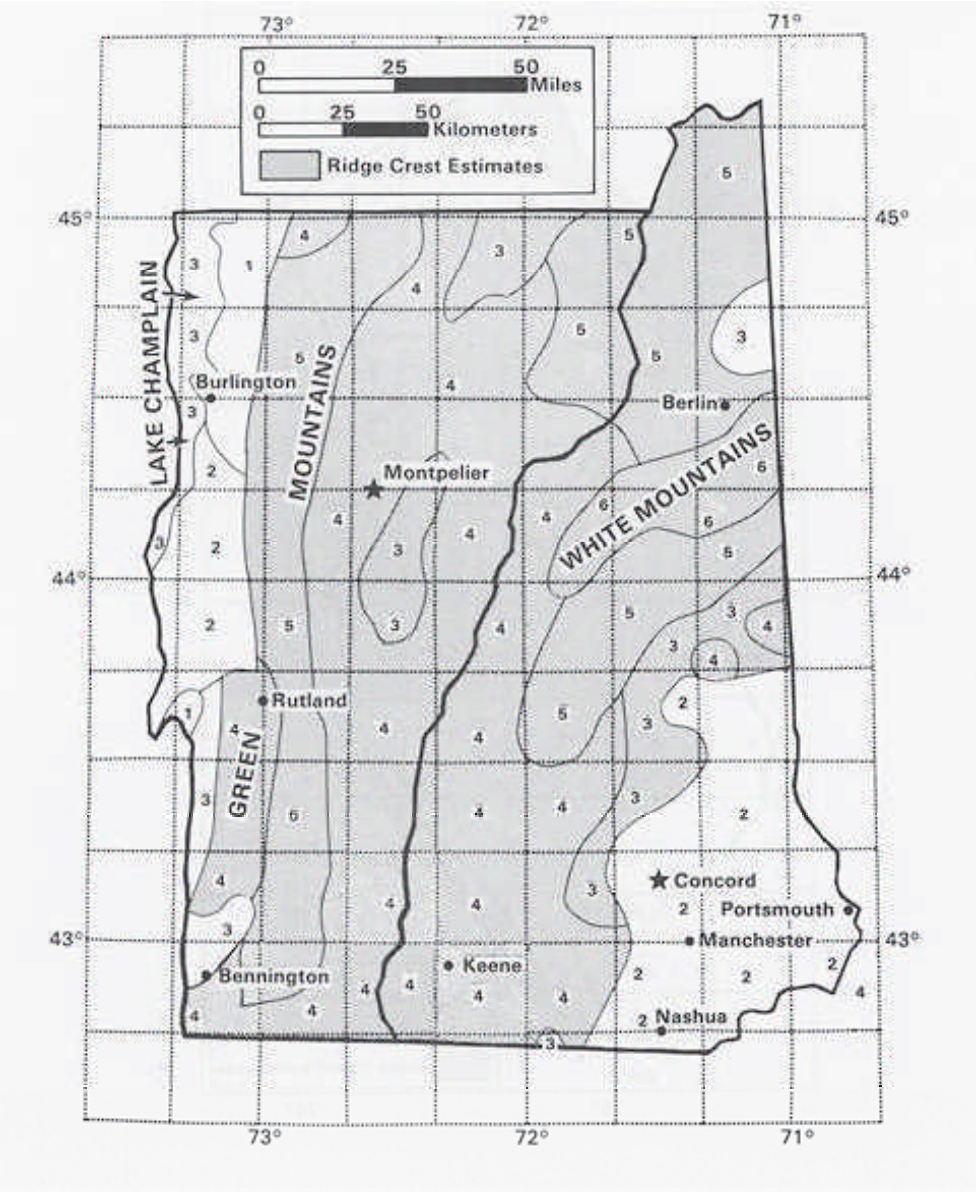

Figure 8.10. Wind Energy Resource Map for New Hampshire and Vermont

While there is strong potential for siting wind farms in the state, they also raise numerous concerns. It is likely that areas that could support wind power may face the following obstacles:

• Distance to the electricity grid:

Many of the sites potentially available for wind generation are remote, and would require investments in new infrastructure to make certain that power produced could reach the electricity power grid in an efficient manner.

• Ownership:

Many of the ridgelines with the altitude and aspect necessary to generate reliable wind power are on public land, most notably the White Mountain National Forest. Current forest policies do not allow siting of wind farms in the National Forest, and any effort to change this may encounter significant resistance.

• Aesthetics:

New Hampshire is known for its open space and views. While many find wind farms visually attractive, many others do not. Recent opposition from citizen groups to the siting of cell towers suggest that a company wishing to establish a wind farm in New Hampshire would need to work closely with the State, local communitites and other interested parties to address these concerns.

• Habitat concerns:

Many of the areas in New Hampshire most likely to have suitable wind are high-elevation ridge lines. High elevation sites often have the least human impact, are distant from roads and buildings, and have relatively undisturbed ecosystems. These issues would clearly need to be considered prior to establishment of a wind farm.

However, it is important to note that many projects have addressed all of these issues. One example is the wind farm in near by Searsburg, Vermont, owned by Green Mountain Power and managed by Vermont Environmental Research Associates.[3] The project includes 11 turbines that produce 6 mega-watts of power for the New England grid.

In this section we describe a basic simulation that has been performed to characterize the energy, environmental, and economic impacts of wind energy development in New Hampshire. We test the impacts of the construction of three moderate-scale wind farms in New Hampshire at 5-year intervals, so that in 2005, 2010, and 2015, wind farms of 25 MW capacity each are constructed. We model the timing of generation from these wind farms to be random and evenly distributed within days and seasons, with an availability factor of 29.05 percent based upon wind resource feasibility studies completed for Massachu-setts.[4] As a result, total annual generation from a 25 MW wind farm is calculated as availability **x** capacity **x** time = annual generation, or:

*0.2905(availability)*25(MW)*365(days/yr)*24(hrs/day) = 63,619 MWh/yr or 63.6 GWh/yr*

3 See www.northeastwind.com/Searsburg_Project for more information on the Searsburg wind farm.

4 "Massachusetts Renewable Portfolio Standard, Cost Analysis Report," Prepared for Massachusetts Division of Energy Resources, December 2000.

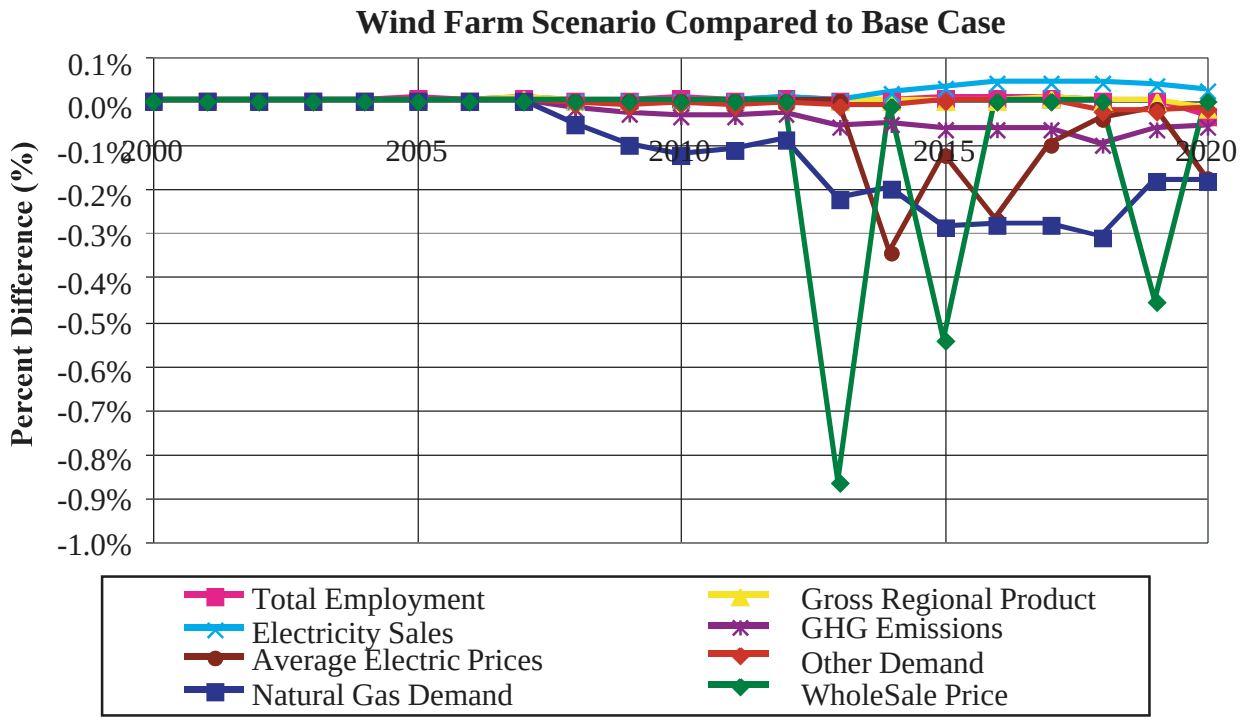

Figure 8.11 Impacts of WindFarm Relative to Base Case

For purposes of thisanalysis,we assumethat the windenergy unitssell all powerthat they generate, at the averagewholesaleprice for a givenyear.

The resultsof the wind farm scenario, relative to the Base Case,are shownin Figure8.12. Overall, the presence of windpower lowersthe wholesale electricityprice by an average of 2-3 tenthsof a percentbetween 2012 and 2020. This also has the effectof loweringthe retail priceof electricity by a lesseramount. Theslight retail pricereductionleads to a veryslight increase in electricitydemand in the out-years, as residences and businesses tend to investless in efficiency at the timeof new purchase, and possibly to do a bitof fuelswitchingto electricity.

Table8.8 Greenhouse Gas Impacts ofWind Farms

Greenhouse Gas Emissions (Million Tons CO2e/Year)						
	2000	2005	2010	2015	2020	20-Year Average
Base Case Comparison						
Base Case	36.37	40.48	46.16	51.63	56.07	**46.94**
Wind Farm	36.37	40.48	46.14	51.60	56.04	**46.93**
Difference	0.00	0.00	-0.02	-0.03	-0.03	**-0.02**
Percent Change	0.00%	0.00%	-0.03%	-0.07%	-0.06%	**-0.03%**
High Price Scenario Comparison						
High Price	36.37	40.48	45.12	48.03	52.73	**45.17**
Wind Farm HP	36.37	40.48	45.10	47.99	52.65	**45.15**
Difference	0.00	0.00	-0.02	-0.04	-0.07	**-0.02**
Percent Change	0.00%	0.00%	-0.04%	-0.09%	-0.14%	**-0.04%**

The hypothetical wind power additions would reduce total annual greenhouse gas emissions in 2020 by 30 thousand tons of CO_2. As a share of the total emissions from the state, this reflects approximately 0.06%. Note that if the high price fuel scenario came to pass, the emissions gains would be considerably higher, because wind would likely displace fossil fuels such as coal which have significant air emissions.

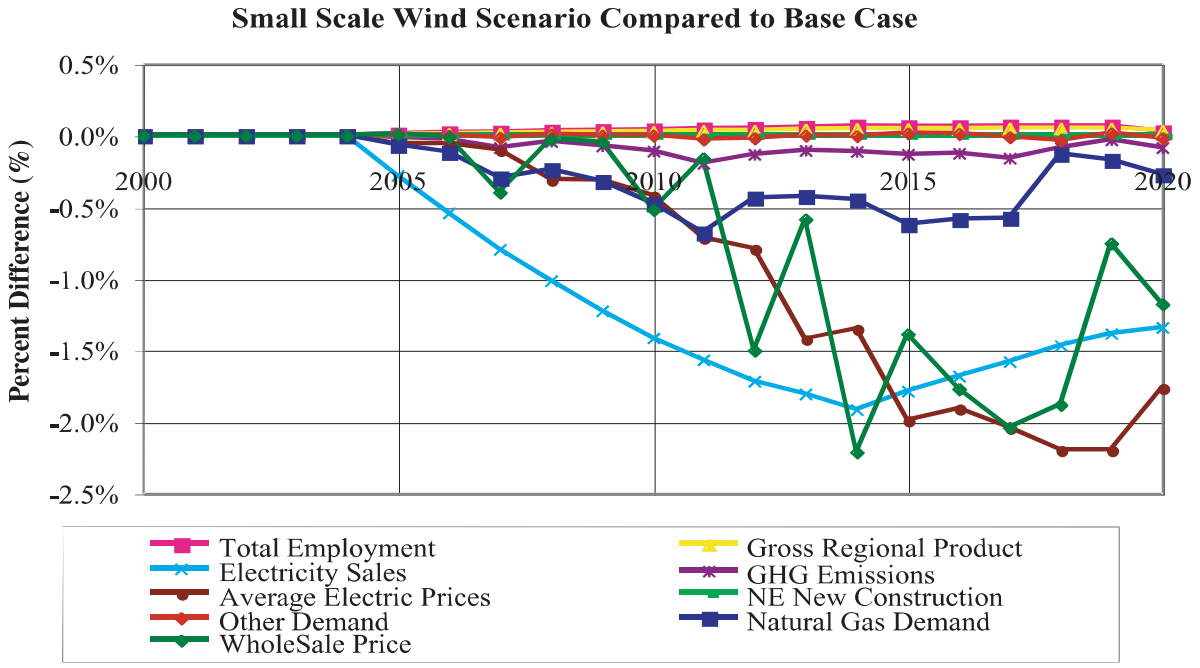

Figure 8.12. Impacts of Wind Farms on Selected Variables, Relative to Base Case

The employment impacts of wind power capacity additions are quite mixed in our modeling results. Construction of the plants generates a modest level of employment (roughly 30 full-time equivalents per year). However, because wind power additions lower the wholesale price of electricity slightly, this has the effect of delaying major plant construction that in the Base Case occurs in 2019; this delay of major new plant construction causes a very slight reduction in employment in 2020 relative to the Base Case.

Table 8.9 Employment Impacts of Wind Farms

Total Employment (Thousands)						
	2000	2005	2010	2015	2020	20-Year Average
Base Case Comparison						
Base Case	699.797	741.202	777.134	813.023	842.421	**779.501**
Wind Farm	699.797	741.228	777.166	813.058	842.111	**779.501**
Difference	0.000	0.026	0.032	0.035	-0.310	**0.000**
Percent Change	0.00%	0.00%	0.00%	0.00%	-0.04%	**0.00%**
High Price Scenario Comparison						
High Price	699.797	741.202	773.287	806.896	846.290	**776.937**
Wind Farm HP	699.797	741.228	773.319	806.931	845.841	**776.928**
Difference	0.000	0.026	0.032	0.035	-0.449	**-0.008**
Percent Change	0.00%	0.00%	0.00%	0.00%	-0.05%	**0.00%**

While the establishment of wind farms in New Hampshire offers potential economic and environmental benefits for the state, there are a number of issues that will need to be addressed. A starting point is to continue to refine our understanding of what parts of the state – based upon prevailing winds, elevation, aspect, ownership, distance to transmission lines, and other relevant factors included in a recent Northeast Utilities/ECS study – offer the greatest promise for wind power. With this information, the State, wind investors, environmental organizations, landowners and municipalities can engage in constructive dialogue about what sites are most appropriate for potential wind farms. By engaging in this discussion, all parties would have an opportunity to address issues of concern, and potential wind projects could be focused on the most appropriate sites.

8.4 Distributed Generation

Distributed generation refers to the production of electricity by numerous small units located at or near the sources of demand. This stands in contrast to traditional electricity generation systems, where electricity production is centralized at large installations some distance from demand, and the power must be transmitted significant distances through distributions systems such as pipelines and electric transmission wires.

There are a number of benefits associated with distributed generation, including:

- Reduced energy costs for the generator and user of electricity;
- Fewer, or even zero, transmission losses as a result of generation being sited closer to demand;
- Reduced costs associated with upgrades to transmissions and distribution systems otherwise required to handle increased load;
- Protection from major disruptions from weather or other events (ice storms, terrorism, etc.); and

CHAPTER 294

HB 1758 – FINAL VERSION

07Mar2006... 1009h

05/04/06 1892s

05/04/06 2196s

24May2006... 2267cofc

2006 SESSION

06-3024

03/09

HOUSE BILL ***1758***

AN ACT classifying bio-oil, bio synthetic gas, and biodiesel as renewable energy sources and relative to taxation of renewable generation facilities.

SPONSORS: Rep. Cataldo, Straf 3; Rep. Essex, Hills 1; Rep. Ober, Hills 27; Sen. Flanders, Dist 7; Sen. Estabrook, Dist 21; Sen. Letourneau, Dist 19

COMMITTEE: Science, Technology and Energy

AMENDED ANALYSIS

This bill specifies that bio-oil, bio synthetic gas, and biodiesel are renewable energy sources for certain purposes.

This bill also authorizes the governing body of a municipality to enter into a payment in lieu of taxes agreement with the owner or lessee of a renewable generation facility.

- -

Explanation: Matter added to current law appears in ***bold italics.***

Matter removed from current law appears [~~in brackets and struckthrough.~~]

Matter which is either (a) all new or (b) repealed and reenacted appears in regular type.

07Mar2006... 1009h

05/04/06 1892s

05/04/06 2196s

24May2006... 2267cofc

06-3024

03/09

STATE OF NEW HAMPSHIRE

In the Year of Our Lord Two Thousand Six

AN ACT classifying bio-oil, bio synthetic gas, and biodiesel as renewable energy sources and relative to taxation of renewable generation facilities.

Be it Enacted by the Senate and House of Representatives in General Court convened:

294:1 Limited Electrical Energy Producers; Definitions; Bio-Oil, Bio Synthetic Gas, and Biodiesel Added. Amend RSA 362-A:1-a, I to read as follows:

I. "Bio-oil" means a liquid renewable fuel derived from vegetable oils, animal fats, wood, straw, forestry byproducts, or agricultural byproducts using noncombustion thermal, chemical, or biological processes, including, but not limited to, distillation, gasification, hydrolysis, or pyrolysis, but not including anaerobic digestion, composting, or incineration.

I-a. "Bio synthetic gas" means a gaseous renewable fuel derived from vegetable oils, animal fats, wood, straw, forestry byproducts, or agricultural byproducts using noncombustion thermal, chemical, or biological processes, including, but not limited to, distillation, gasification, hydrolysis, or pyrolysis, but not including anaerobic digestion, composting, or incineration.

I-b. "Biodiesel" means a renewable diesel fuel substitute that is composed of mono-alkyl esters of long chain fatty acids, is derived from vegetable oils or animal fats, and meets the requirements of the American Society for Testing and Materials (ASTM) specification D6751.

I-c. "Cogeneration facility" means a facility which produces electric energy and other forms of useful energy, such as steam or heat, which are used for industrial, commercial, heating, or cooling purposes.

294:2 Limited Electrical Energy Producers; Definitions; Small Power Production Facility; Bio-Oil, Bio Synthetic Gas, and Biodiesel Added. Amend RSA 362-A:1-a, X to read as follows:

X. "Small power production facility" means a facility which produces electric energy solely by the use, as a primary energy source, of biomass, waste, renewable resources, ***bio-oil, bio synthetic gas, biodiesel,*** or any combination thereof and which has a power production capacity which, together with any other facility located at the same site, as determined by the commission, is not greater than 30 megawatts.

294:3 Renewable Energy; Bio-Oil, Bio Synthetic Gas, and Biodiesel Added. Amend RSA 374-F:3, V(f)((3) to read as follows:

(3) For purposes of subparagraph (f), "renewable energy" means geothermal energy, tidal or wave energy, wind energy, solar thermal energy, photovoltaic energy, landfill gas energy, hydro energy, biomass energy, ***energy generated from bio-oil, bio synthetic gas, and biodiesel as defined in RSA 362-A:1-a, I, I-a, and I-b,*** or combusted municipal waste energy where mercury emissions are reduced to an emission rate of 0.028 milligrams per dry standard cubic meter or less corrected to 7 percent oxygen by volume on a dry basis, or at least 85 percent control efficiency.

294:4 Land Use Planning; Utility Structures; Reference Changed. Amend RSA 674:30, IV to read as follows:

IV. Except for small power production facilities, as defined in RSA 362-A:1-a, X, and cogeneration facilities, as defined in RSA 362-A:1-a, [~~I~~] ***I-c***, owned and operated by a New Hampshire franchised utility, small power production facilities and cogeneration facilities shall not be considered to be public utilities under this section and may not petition the public utilities commission for an exemption from the operation of any regulation under this subdivision.

294:5 Purpose. High energy demand and tight supply are pushing energy prices, including the prices of oil, natural gas, coal, and electricity, to new records and increasing price volatility. The 2002 New Hampshire Energy Plan recognizes "energy's central role in fulfilling our priorities of economic growth, environmental quality, and a diverse energy supply" and recommends consideration of energy policies and programs that include encouraging the development of cleaner, affordable alternative energy sources; utilizing our plentiful renewable natural resources; and reducing our dependence on foreign oil. (New Hampshire Energy Plan at 1-1.) Such policies are supported by HJR 2 (1981), a resolution to establish a state policy on energy, and by the state's Energy Policy set forth in RSA 378:37 "to meet the energy needs of the citizens and businesses of the state at the lowest reasonable cost while providing for the reliability and diversity of energy sources; the protection of the safety and health of the citizens, the physical environment of the state, and the future supplies of nonrenewable resources; and consideration of the financial stability of the state's utilities." [n order to promote the state's energy policies as well as the public interest, the general court believes that impediments to preserving, expanding, and improving existing renewable generation facilities in the state, and to developing new renewable generation facilities in the state, should be reduced. Furthermore, the general court believes that practices, procedures, and methodologies related to property assessment for the purposes of taxation can be such an impediment. Therefore, the general court finds that it is desirable to reauthorize each municipality to enter into voluntary agreements with the owners of renewable generation facilities located in the municipality to make payments in lieu of taxes. Such tax policy is appropriate because renewable generation facilities differ from other utility property and traditional generation facilities, such as fossil fuel and nuclear plants. Specifically, many renewable generation facilities are very small and some renewable technologies like wind and hydroelectric facilities are weather-dependent and not able to operate at full output throughout the year. Furthermore, unlike other manufacturing operations, renewable generation facilities are considered utility property and are required to include all generation production equipment as taxable property. Unlike regulated utilities, renewable generation facilities are unable to recover their tax-related expenses through regulated rates.

294:6 New Subdivision; Exemption for Renewable Generation Facilities. Amend RSA 72 by inserting after section 72 the following new subdivision:

Payment in Lieu of Taxes for Renewable Generation Facilities

72:73 Definition of Renewable Generation Facility. In this subdivision, "renewable generation facility" means a facility which produces electric energy for resale solely by the use, as a primary energy source, of renewable energy as defined in RSA 374-F:3, V(f)(3), including the land, all rights, easements, and other interests thereto, and all dams, buildings, structures, and other improvements situated thereon which are necessary or incidental to the production of power at the facility.

72:74 Payment in Lieu of Taxes.

I. The owner of a renewable generation facility and the governing body of the municipality in which the facility is located may, after a duly noticed public hearing, enter into a voluntary agreement to make a payment in lieu of taxes. A lessee of a renewable generation facility which is responsible for the payment of taxes on the facility may also enter into a voluntary agreement with the municipality in which the facility is located to make a payment in lieu of taxes, provided the lessee shall send by certified mail to the lessor written notice which shall state that the property of the lessor may be subject to RSA 80 should the lessee fail to make the payments required by the agreement. A copy of such notice shall be provided to the municipality in which the facility is located.

II. A renewable generation facility subject to a voluntary agreement to make a payment in lieu of taxes

under this section shall be subject to the laws governing the utility property tax under RSA 83-F. Payments made pursuant to such agreement shall satisfy any tax liability relative to the renewable generation facility that otherwise exists under RSA 72. In the absence of a payment in lieu of taxes agreement, the renewable generation facility shall be subject to taxation under RSA 72.

III. If a municipality that contains more than one school district receives a payment in lieu of taxes under this section, the proceeds shall be prorated to the districts in the same manner as local taxes are prorated to the districts, or in the case of a cooperative school district between the city or town and pre-existing school district.

IV. The collection procedures in RSA 80 shall be used to enforce a voluntary agreement to make a payment in lieu of taxes authorized by this section.

V. If a municipality enters into a voluntary payment in lieu of taxes agreement with an owner, or a lessee responsible for payment of taxes, of a renewable generation facility, the municipality, upon the request of the owner, or a lessee responsible for payment of taxes, of any other renewable generation facility located within the municipality, shall offer a comparable agreement to the owner or lessee of such facility.

VI. No voluntary agreement entered into under this section shall be valid for more than 5 years; however, any such agreement may be renewed or amended and restated for any number of consecutive periods of 5 years or less.

294:7 New Section; Limited Electrical Energy Producers; Payment in Lieu of Tax Agreements for Renewable Generation Facilities. Amend RSA 362-A by inserting after section 6 the following new section:

362-A:6-a Payment in Lieu of Tax Agreements for Renewable Generation Facilities. The owner, or a lessee responsible for payment of taxes, of a renewable generation facility and the municipality in which the facility is located may enter into a voluntary agreement to make a payment in lieu of taxes, pursuant to RSA 72:74.

294:8 Revenue Administration; Duties of Commissioner; Reference Added. Amend RSA 21-J:3, XIII to read as follows:

XIII. Equalize annually by May 1 the valuation of the property as assessed in the several towns, cities, and unincorporated places in the state including the value of property exempt pursuant to RSA 72:37, 72:37-b, 72:39-a, 72:62, 72:66, and 72:70***, and property which is the subject of a payment in lieu of taxes under RSA 72:74*** by adding to or deducting from the aggregate valuation of the property in towns, cities, and unincorporated places such sums as will bring such valuations to the true and market value of the property, and by making such adjustments in the value of other property from which the towns, cities, and unincorporated places receive taxes or payments in lieu of taxes as may be equitable and just, so that any public taxes that may be apportioned among them shall be equal and just. In carrying out the duty to equalize the valuation of property, the commissioner shall follow the procedures set forth in RSA 21-J:9-a.

294:9 Applicability. Nothing in sections 5-9 of this act shall affect any existing agreement entered into under the prior RSA 362-A:6 between a qualifying facility and a city, town, or village district for payment in lieu of taxes. Sections 5-9 of this act shall apply to tax years commencing on or after April 1, 2006.

294:10 Effective Date.

I. Sections 5-9 of this act shall take effect April 1, 2006.

II. The remainder of this act shall take effect 60 days after its passage.

Approved: June 15, 2006

Effective: I. Sections 5-9 shall take effect April 1, 2006

II. Remainder shall take effect August 14, 2006

Monday, Aug. 14, 2006

New Hampshire Department of Environmental Services

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Air Resources

Overview of HB 284
The New Hampshire Clean Power Act
Ground-Breaking Legislation to Reduce Multiple Harmful Pollutant From New Hampshire's Electric Power Plants

Background

When the federal Clean Air Act was passed, air pollutant emissions from powe plants built before 1977 were "grandfathered." While new power plants had tc comply with tight emission limits, these old plants, by and large, were allowec to continue to pollute at higher levels. New Hampshire has three such plants: Merrimack Station in Bow, Schiller Station in Portsmouth, and Newington Station in Newington. All three belong to Public Service of New Hampshire (PSNH).

In order to reduce emissions of several unhealthy pollutants, negotiations wer conducted between PSNH, several New Hampshire environmental organizatior key state legislators, state environmental and energy officials, and the Governor's Office. A collaborative agreement on a comprehensive emissions reduction program was reached on November 2, 2001. This agreement was introduced as an amendment to HB 284, the New Hampshire Clean Power Act and subsequently passed by the New Hampshire House of Representatives in January 2002.

When implemented, HB 284 will help enhance public health and the quality of New Hampshire's natural environment. These are two necessary ingredients f a high quality of life. Since New Hampshire's high quality of life is responsible for much of the extraordinary economic growth that the state experienced in the last decade, HB 284 will also help protect New Hampshire's economic advantage. Importantly, HB 284 can be expected to help build momentum for similar reductions across the nation.

Pollutants Addressed

HB 284 addresses emissions of four important air pollutants:

Sulfur dioxide (SO2) is the principal cause of the acid rain which harms our forests (and forest productivity) and reduces the ability of our lakes to sustair fish and other aquatic life. It's also the primary cause of fine airborne soot, which is inhaled deeply into the lungs and can trigger cardiac problems as wel as respiratory effects. Nationally, fine particulate soot has been estimated to cause 64,000 premature deaths.

Nitrogen oxides (NOx) are the principal cause of ozone smog. Ozone is a pote lung irritant with serious human health consequences. It also impairs plant growth, producing negative agricultural and forestry impacts. NOx is also a secondary contributor to acid rain and fine particulate matter.

Mercury is a persistent neurotoxic heavy metal that accumulates in the food chain, mainly through fish, and is dangerous enough to have led to fish consumption advisory warnings throughout most states in the country. Simila to lead, its principal health impacts are impairing the neurological developmer of fetuses. It has similarly negative impacts on wildlife, including the common loon

Carbon dioxide (CO2) is the principal gas responsible for the climate altering affects (aka "global warming") that are already being seen in New Hampshire. New Hampshire's north country is already warming at a rate almost three tim the regional average, which threatens skiing, foliage, sugar maples, and trout fishing – all key components of our recreational industry. The best available science suggests that New Hampshire's climate will resemble that of Virginia c North Carolina by the turn of this century.

What Does HB 284 Do?

HB 284 "caps" emissions from PSNH's power plants. These caps are *annual* (i. they apply all year round, not just in the summer ozone season), and they are "*output-based*," which encourages more efficient generation than traditional "input-based" regulation. In addition, emissions trading (i.e., the ability to comply with reduction requirements by purchasing reductions made elsewhere doing so is more cost-effective) is allowed for SO2, NOx, and CO2.

HB 284 requires:

- **Sulfur dioxide** emissions to be reduced 87% from 1999 levels by the e of 2006. This is the same cap as the original bill, but achieved a full yea earlier.

- **Nitrogen oxides** emissions to be reduced 70% from 1999 levels by the end of 2006. This too is the same cap as the original bill, and it will also be achieved a full year sooner.

- **Carbon dioxide** emissions to be reduced to 1990 levels by the end of 2006. This change aligns the target for carbon reductions with those of the New England Governors and Eastern Canadian Premiers *Climate Change Action Plan*, adopted in August 2001.

-
- That a cap for **mercury** emissions be recommended to the Legislature b the Department of Environmental Services by early 2004. This schedule allows the cap to be set taking into account a specific assessment of mercury emissions from PSNH's facilities and the results of federal mercury limits that will be proposed by the US EPA in late 2003.

HB 284 also includes innovative new incentives to encourage PSNH to comply with the above caps in ways that will most benefit the state. Specifically:

- Voluntary expenditures by PSNH for energy efficiency, renewable energy and conservation programs can be converted into allowances to help comply with the caps.

- If PSNH reduces its direct emissions below a three-year moving average it can get credit for those reductions the following year.

- If PSNH acquires allowances from other states directly upwind from New Hampshire, it will get a premium over allowances acquired from more remote states.

• **Bottom Line:** When passed, the HB 284 will be the best multi-pollutant emissions control program to be approved by any legislature in the country.

Conclusion

HB 284 reflects the best traditions of New Hampshire environmental leadershi It represents a consensus approach – among leading environmentalists, PSNH and the State – regarding the need for additional emission reductions and the manner in which they can be most cost-effectively and expeditiously achieved It creates significant new, market-based incentives rather than relying on traditional, site-specific command and control regulation. Further, since emissions in upwind states contribute significantly to air quality problems in New Hampshire, this plan shows that the State of New Hampshire points upw with "clean hands," making the same reductions ourselves that we ask of upwind states. Finally, this action by New Hampshire should advance and expedite the debate in Congressional about multi-pollutant emission reductior by demonstrating that reasonable, effective consensus approaches are achievable.

Update

HB 284 passed and became effective on July 1, 2002. The law can be found a **http://www.gencourt.state.nh.us/rsa/html/indexes/125-O.html**.

Updated: November

The NEW HAMPSHIRE CLEAN POWER STRATEGY: An Integrated Strategy to Reduce Emissions of Multiple Pollutants from New Hampshire's Electric Power Plants

Executive Summary

Despite significant air quality improvements over the last two decades, recent scientific analyses have demonstrated that adequate protection of New Hampshire's public health, environmental quality, and economic well-being requires additional, concerted reductions in air pollutant emissions. The quality of life enjoyed by New Hampshire's citizens – as well as the State's economic success in the "new economy" – hinges on this protection. Moreover, aggressive additional reductions in air pollutant emissions will further enhance the state's tradition of environmental leadership, a tradition that has been remarkably successful in motivating similar environmental measures at the regional and national level.

Of particular concern is the fact that fossil fuel-burning electric power plants continue to emit substantial quantities of several harmful air pollutants despite a solid history of emission reduction efforts. In part, this is because power plants that were constructed prior to the Clean Air Act Amendments of 1977 were "grandfathered" (i.e., not required to meet the same stringent emission limits as newer power plants). Recognizing these facts, several Northeastern states have begun to address "grandfathered" power plant emissions much more aggressively through various legislative and regulatory solutions.

Acting at the direction of Governor Jeanne Shaheen, the New Hampshire Department of Environmental Services (DES) has developed a plan to constructively and cost-effectively achieve significant additional reductions in emissions of four important air pollutants from New Hampshire's electric power plants. By implementing one integrated strategy that comprehensively addresses sulfur dioxide (SO_2), oxides of nitrogen (NO_x), mercury, and carbon dioxide (CO_2), policy makers can provide New Hampshire's electric generators with the certainty and flexibility they need to meet clean air goals in the most cost-effective way. In addition, a comprehensive, integrated approach involving multiple pollutants allows generators to take advantage of the collateral benefits ("co-benefits") created when measures to reduce one pollutant assist in reducing emissions of other pollutants. Finally, a crucial aspect of this comprehensive strategy is the use of flexible, cost-effective, market-based measures, such as trading and banking of emission reductions under a strictly controlled and monitored overall emissions cap. Such "cap and trade" approaches have proven to be extraordinarily effective in curbing air pollution – reducing some emissions 30 percent more than required by regulations.

This document represents DES's recommended approach. DES's strategy – the **New Hampshire Clean Power Strategy (NHCPS)** – will substantially reduce emissions of these four harmful pollutants from all existing large, fossil fuel-burning electric power plants in New

Hampshire, namely Merrimack Station in Bow, Newington Station in Newington, and Schiller Station in Portsmouth.[1] The NHCPS is based on the following principles:

- ***Environmental effectiveness –***
  The NHCPS recommends emission caps based on electricity generated, rather than fuel used, in order to encourage greater efficiency and more pollution prevention;
- ***Cost-effectiveness and flexibility –***
  The NHCPS includes compliance flexibility provisions (e.g., banking and trading) to maximize environmental benefits with the least possible compliance cost and impact on electric rates;
- ***Integration and comprehensiveness –***
  The NHCPS recommends new, substantially lower emission caps for four key power plant pollutants: oxides of nitrogen (NO_x), sulfur dioxide (SO_2), mercury, and carbon dioxide (CO_2) to improve both air and water quality;
- ***Multiple benefits (or "co-benefits") –***
  The NHCPS provide multiple benefits in two ways; first, by addressing many air pollution-related public health and environmental problems simultaneously; and second, by encouraging facilities to utilize progressive control measures and technologies that reduce emissions of several air pollutants at the same time;
- ***Annual application –***
  The NHCPS applies all of these new limits on a year-round basis rather than only during certain seasons;
- ***Substantial lead time –***
  The NHCPS recommends timeframes which will provide owners of the affected power plants with substantial lead time in which to develop and implement control strategies before the new requirements take effect;
- ***Sound science –***
  The NHCPS is based on the latest available science regarding impacts to public health and environmental quality;
- ***Proven, effective, reliable technology or control measures –***
  The emissions caps recommended in the NHCPS are reasonably achievable with a combination of existing control technologies, market-based measures, operational changes, and developing technologies;
- "***Clean hands" –***
  Consistent with New Hampshire's past environmental leadership, the NHCPS sets an example for other jurisdictions to follow; and
- ***Consistency with Legislative policy –***
  The NHCPS is consistent with the New Hampshire Legislature's expectations for environmental improvement under electric deregulation, as embodied in RSA 374-F:3,VIII.

[1] NHCPS does not apply to the two new combined cycle natural gas burning power plants under construction in New Hampshire (i.e., Newington Energy in Newington and AES Granite Ridge in Londonderry). As new facilities, these plants are already subject to more stringent federal and state environmental regulations, including requirements to install state-of-the-art technology to provide the "Lowest Achievable Emission Rate (LAER)" for NO_x emissions, and "Best Available Control Technology (BACT)" for all other criteria pollutants. In addition, natural gas is inherently a much cleaner fuel.

Consistent with these principles, the NHCPS sets aggressive emission reduction targets for all four pollutants at New Hampshire's existing large, fossil fuel-burning electric power plants, including:

- A **75 percent** reduction in annual SO_2 emissions, above and beyond the Phase II requirements of Title IV of the federal Clean Air Act (i.e., the Acid Rain Program) that just took effect in 2000, reducing total New Hampshire SO_2 emissions from these sources by 89 percent since 1990;
- A **70 percent** further reduction in annual NO_x emissions, above and beyond the 68 percent annual (76 percent seasonal) NO_x reduction that New Hampshire has already achieved, reducing total New Hampshire NO_x emissions from these sources by 90 percent since 1990;
- A **75 percent** reduction in annual mercury emissions from coal-burning power plants compared to recent (1996/1997) emissions; and
- A **7 percent** reduction below 1990 CO_2 emission levels, reducing annual CO_2 emissions from these sources to approximately 10 percent below current annual New Hampshire CO_2 emissions.

NHCPS recommends the following timeframes for implementing these reductions:

- In 2006, an annual SO_2 emissions cap of 7,289 tons (derived by multiplying 1999 total MWh by 3.0 lb/MWh) would take effect;
- In 2006, an annual NO_x emissions cap of 3,644 tons (derived by multiplying 1999 total MWh by 1.5 lb/MWh) would take effect;
- In 2006 or as soon as appropriate control technology is commercially available, an annual mercury emissions cap of 82 pounds (derived by multiplying recent mercury emissions by 25 percent) would take effect for coal-burning facilities; and
- In 2006, an annual CO_2 emissions cap of 5,046,055 tons (derived by multiplying estimated 1990 total CO_2 emissions by 93 percent) would take effect.

The adoption and implementation of the NHCPS will enhance quality of life for all New Hampshire citizens. Nevertheless, due to transported air pollution, a complete solution to air quality problems in New Hampshire depends on the implementation of a similarly comprehensive multi-pollutant emission reduction strategy on a much broader regional or national basis. New Hampshire's environmental leadership – in adopting the NHCPS – will contribute materially to achieving this outcome. However, a regional or national solution, when developed, is likely to differ somewhat from any individual state's approach. As a result, New Hampshire may need to modify some of the NHCPS's provisions to comport with a regional or national solution, provided that such a solution achieves similar or greater emission reductions within an aggressive timeframe.

Since federal regulations for some or all of these four pollutants may change in the future, the NHCPS should be updated as necessary in order to ensure that its public health, environmental, and economic benefits to New Hampshire citizens are retained to the greatest degree possible. Moreover, the emission reductions recommended by the NHCPS are designed to address numerous environmental and public health problems. For several of these problems, including fine particulate matter and regional haze, direct regulation has not been recommended in the

NHCPS because these concerns arise indirectly, largely through atmospheric transformations involving SO_2 and NO_x, pollutants which the NHCPS does recommend limiting. If, after implementation, the NHCPS's anticipated benefits regarding regional haze or fine particulate matter do not materialize, it may be necessary to develop programs to regulate these pollution problems directly.

By definition, the NHCPS focuses on emissions reductions from existing power plants in New Hampshire. This is due to the relative volume of emissions from these sources and the relative cost-effectiveness of controlling them through market-based measures. However, DES has supported or developed other national, regional, and local strategies to achieve similar reductions from other emission source categories, and it will continue to do so. The NHCPS is not a "silver bullet" that will eliminate the need for all other emission reduction efforts. Rather, it is intended to implement one key component of DES's overall *Clean Air Strategy*. DES will continue to pursue implementation of this and other *Clean Air Strategy* components on a local, regional and national basis, as appropriate, in order to broaden the public health, environmental, and economic benefits that sustain New Hampshire's quality of life.

Air Resources

Environmental
Fact Sheet

New Hampshire Department of Environmental Services
29 Hazen Drive Concord NH 03301

Print Version

ARD-23 2005

Global Climate Change and Its Impact on New Hampshire

The Science Is Compelling

In the Northeast, the 1990s were the warmest decade in recorded history. The Northeast's average annual temperature has increased by about 1.8°F since 1899. In the White Mountains, spruce forest abundance has been declining since 1800. Climate records from Hanover show a 3°F increase in yearly temperatures and a 4°F increase in summer temperatures over the past 150 years. Glaciers at mid-latitudes are receding. Average global surface temperatures are approximately 1°F higher than average temperatures in the 19th century. Once just climate anomalies, intense rain and snow events and fewer extremely low minimum temperature events are now becoming more the norm. Undeniably, global climate is changing and potential impacts may be serious.

What is Global Climate Change?

Life on Earth is possible because the sun's energy warms the Earth and its atmosphere. As this warmth radiates back into space, a portion is absorbed by a delicate balance of heat-trapping gases in the atmosphere, creating an insulating layer. The insulating layer, functioning much as a conventional greenhouse, acts to elevate temperatures on Earth. This "greenhouse effect" is a necessary natural global mechanism. Without it, the Earth's climate would be hostile to human life. Human contributions to greenhouse gases have led to an "enhanced greenhouse effect," often referred to as climate change or global warming. Today's atmospheric concentrations of carbon dioxide (CO_2), the primary greenhouse gas, are 30 percent above the pre-industrial levels of 200 years ago. At present rates, they may double as early as 2050.

Potential Climate Change Impacts On New Hampshire

New Hampshire's social and economic health is predicated in part upon the health of its lakes and rivers, oceans and beaches, mountains, scenic towns, and natural areas. Natural features and aesthetic beauty contribute significantly to New Hampshire's fiber. Global climate change will affect the climate of New Hampshire. Doubling CO_2 from pre-industrial levels is predicted to raise global average temperatures between 1.8°F and 6.3°F. Parts of New Hampshire could experience even slightly warmer trends. Higher temperatures may increase extreme events, and we may experience periods of winter thaw followed by intense cold;

spring and summer drought; and summer heat stress. Serious impacts to New Hampshire may include:

Impacts on New Hampshire Ski Industry

- Loss of 10 - 20 percent of ski season days, representing a loss of $42 million to $84 million in direct and indirect spending in New Hampshire.

Impacts on New Hampshire Forests

- Ecological collapse for several tree species, including beech, maple, and hemlock (an important species for deer during the winter).
- Widespread tree mortality, including spruce and others; decreases in vegetation density of 25 - 75 percent; extensive wildfires; large increases in pest and pathogen outbreaks; and a lag in the establishment of new forests for several decades.
- Northern movement of other local tree species from 100 - 300 miles.
- Potential large-scale die-offs of sugar maple, on average a $3 - $3.5 million dollar industry.

Impacts on New Hampshire Coasts

- Sea level rise of 12 - 20 inches, causing large scale alteration of Great Bay, reduction of coastal estuaries and flooding of rivers, as well as potentially large revenue losses from coastal tourism, a $484 million generator for New Hampshire.
- Huge infrastructure investments to erect dikes and dredge channels to "stem the tide."

Impacts on New Hampshire Foliage

- Dulling and browning of foliage season due to tree die-offs, species substitution, and "climate stressed" unhealthy trees. New Hampshire foliage travelers on average spend a total of $292 million annually.

Impacts on New Hampshire Fishing

- Loss of cold water fishing: 50 - 100 percent eradication of rainbow, brook, and brown trout fishing, a $150 million New Hampshire industry.

What We All Can Do

Many different strategies can be used in combination to mitigate human-caused emissions of carbon dioxide and other greenhouse gases caused primarily by the burning of fossil fuels. The following are often mentioned at the international and national level. Several of these we can adopt at the local level:

- *Use less fossil fuels by:*
  - Driving less and putting high efficiency vehicles into use.
  - Where possible, using renewable energy sources such as solar, wind, and biomass.
  - Buying and using energy efficient products.
  - Switching from coal and oil to natural gas.
- Plant trees, which absorb CO_2, the major greenhouse gas.

- Encourage elected officials to encourage developing countries to control greenhouse gases.

For More Information

For more information on climate change and what is being done at the international and national levels, or to find out what you can do to reduce greenhouse gas emissions, visit www.des.state.nh.us/ard/climatechange/ or contact the DES Air Resources Division at 1-800-498-6868.

- Smaller geographic plant footprint.
- Lower air pollution emissions.
- Absence of large coal piles on-site.
- Most GFCC system equipment is prefabricated allowing modular expansion.

Natural gas emits approximately one-third less CO_2 per Btu than coal. In the U.S., 75 percent of planned new capacity at utilities will be fueled by natural gas.[57] Two gas-fired combined cycle electrical generating plants are now under construction in New Hampshire.[58] New Hampshire should continue to promote natural gas electric generating plans in-state and throughout the region and nation.

4.5 Renewable Energy Resources

4.5.1 Overview

Hydropower generation is responsible for 82 percent of current renewable electricity generation (1997 figures) in the U.S. It is not included in this discussion however, because its growth is severely limited by the availability of suitable sites and the difficulty in obtaining permits for new dams. Maintenance and improvements of existing hydropower sites should continue wherever economically and environmentally appropriate.

Geothermal, wind, and solar are more viable options for significantly increasing renewable electricity generation. Geothermal generation is theoretically limited by the regeneration rate of this resource compared to solar and wind generation where limits on regeneration are much less significant. New Hampshire has two pieces of legislation currently being considered, House Joint Resolution 5 (HJR 5) and House Bill 701 (HB 701), which direct that new and renovated state-owned buildings integrate renewable energy concepts into the design and construction. New Hampshire should continue to promote the use of renewable energy in state-owned buildings.

Biomass generation facilities emit little, if any, net carbon over time when they utilize waste wood or wood that is sustainably harvested (i.e., when harvested land is replanted).[59] In New Hampshire, wood waste from wood-based industries is burned in biomass electric generation facilities which also diverts these materials from landfill disposal.
One step that is critical to further development of renewable energy is an impartial analysis and identification of the technical capability of each generator to use intermittent systems and technologies available to achieve necessary power quality. There should be continued monitoring of energy storage technology to identify a cost-effective non-fossil fuel back up to allow greater deployment of intermittent systems.

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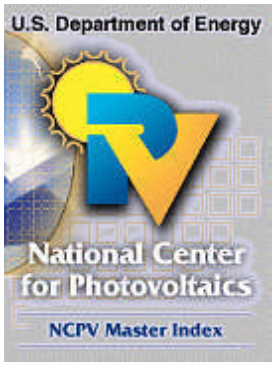
[57] For further information, see http://www.resourcesolutions.org/.
[58] For additional information, see http://www.aesgraniteridge.com/ and http://www.resourcesolutions.org/.
[59] Michael C. Brower et al., Union of Concerned Scientists, Powering the Midwest: Renewable Electricity for the Economy and the Environment, Cambridge, MA, 1993.

The U.S. Department of Energy's Energy Efficiency and Renewable Energy Network (EREN) provides a comprehensive resource for energy efficiency and renewable energy including available technologies, financial incentives, and technical information.[60] EREN also provides access to over 600 links and 80,000 documents.

4.5.2 Promote Photovoltaic (PV) Systems



Solar photovoltaic (PV) systems offer considerable benefits relative to fossil-fueled and nuclear generation.[61] PV systems are modular and silent, create no pollution in operation, can be operated unattended, and require little maintenance. They are usually small-scaled and used at the location that the power is consumed avoiding the need for investments in transmission infrastructure and loss of electricity across the hundreds of miles of transmission lines. PV systems are dependent on the sun and therefore cannot just be turned on when there is demand. However, peak PV generation generally coincides with afternoon peaks in electricity demand, when electricity is most valuable. Some regions in the country are implementing time-of-day pricing, charging customers more when demand is high. PV systems would be particularly advantageous under a time-of-day pricing regime. This coincidence also means that PV generation will usually displace the higher-emitting fossil-fueled plants that operate during peak periods thus improving air quality on a regional basis.[62] Finally, New Hampshire has implemented a "net-metering" rule, which allows unused generation from small solar (and wind) units to be credited to the customer against future power consumption. In other words, an individual's meter will "run backwards" if they are producing excess power and it will be credited against their future bill. Total PV energy production for the State is 86,000 kWh/year, which eliminates more than 642 tons of CO_2 per year and saves an estimated $8000 in electrical costs.[63]

In the last two years the Energy Office has developed 16 PV projects in the State through its annual Competitive Renewable Energy Technology Grants Program. New Hampshire should continue to fund and promote this program. In addition, the Solar-on-Schools Program has sponsored the installation of 1 kW PV systems on 13 New Hampshire high school rooftops, representing more than 12 percent of school districts in the state. Curriculum materials are also distributed in the schools through the program, which last year provided training for more than 70 educators. These public-private partnerships, part of New Hampshire's inclusion in the federal Department of Energy's Million Solar Roofs Initiative (MSRI) (also see Section 5.3.7) should continue. New Hampshire currently ranks 7th in the nation for number of PV systems installed under MSRI.

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[60] Energy Efficiency and Renewable Energy Network (EREN), US Department of Energy, see http://www.eren.doe.gov.
[61] For additional information on photovoltaics, see http://www.nrel.gov/ncpv/.
[62] STAPPA & ALAPCO, Reducing Greenhouse Gases & Air Pollution, A Menu of Harmonized Options, Final Report, Washington, D.C., October 1999, see http://www.cleanairworld.org/scripts/us_temp.asp?id=307.
[63] Governor's Office of Energy and Community Services, Concord, NH, 2001.

4.5.3 Landfill Gas to Energy Project

Landfill gas to energy facilities represent a very small percentage of total renewable energy generation in the State. Two sites, Manchester Landfill and Pelham Landfill, are actively capturing and converting the gas to energy. Gas produced by landfills usually includes methane, sulfur and chlorine compounds and numerous other organic compounds. Landfill gas to energy plant development should be encouraged. Most of the State's landfills have been covered and capped. Current gas capture technology can make it economically feasible to produce energy from landfill gas at small to mid-sized landfills.[64]

4.5.4 New Hampshire Wind Study Project

Electricity generated by wind turbines is currently the lowest cost of any renewable technology. For optimally sited wind turbines, costs have dropped from $0.30/kWh in 1981 to under $0.04/kWh.[65] Wind turbines emit no GHG emissions during operation.

The New Hampshire Wind Study Project was created in 1997 by a joint effort between the Energy Office (through Federal Department of Energy funding) and Northeast Utilities (NU). Currently, NU is providing full funding for the project. Four towers were erected to determine the feasibility of generating electricity from wind in the state; currently, towers on Mt. Sunapee and in Dixville Notch are involved in the project, which may be continued for another year. Data collected to date, and data from previous studies (in New Hampshire and New England), show that wind energy is possible in New Hampshire. Several private windmills are operating in New Hampshire. The recent passage of the net-metering law allows for individual wind turbines to sell electricity back to the area electrical generator when supply exceeds demand, helping to offset the up-front installation capital costs and ongoing generation values.

Despite the favorable wind-producing topography and conditions, several obstacles need to be overcome. Most of the favorable wind sites, for example, are located on federal lands, and the federal government has banned the erection of towers on federally owned land. Additionally, since the State places a high value on its natural environment and vistas, the siting of a windmill may provoke strong local resistance. Overall, New Hampshire has the potential for wind produced power and more study is warranted. Further information on wind energy can be found at the American Wind Energy Association website.[66]

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[64] For more information on using landfill gas for electric energy generation, see http://www.eren.doe.gov/cities_counties/landfil.html.

[65] STAPPA & ALAPCO, Reducing Greenhouse Gases & Air Pollution, A Menu of Harmonized Options, Final Report, Washington, D.C., October 1999, see http://www.cleanairworld.org/scripts/us_temp.asp?id=307.

[66] American Wind Energy Association, see http://www.awea.org/default.htm.

Monday, Aug. 14, 2006

New Hampshire Department of Environmental Services

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Regional Greenhouse Gas Initiative (RGGI)

DES is participating in the Regional Greenhouse Gas Initiative (RGGI) with other Northeast and Mid-Atlantic States. A major goal of RGGI is to develop a model regional cap-and-trade program (rule) to reduce emissions of CO2 from power plants across the region.

How can stakeholders participate in RGGI?

- 5th NH Stakeholder Meeting, March 29, 2006 – Presentation on Regional Greenhouse Gas Initiative, Draft Model Rule Overview
- 4th Stakeholder Meeting – September 12, 2005
- Elements of Staff Working Group Revised Proposal – Aug. 24, 2005
- Flow Chart with Revised Recommendations
- Mayors Letter of Support for RGGI

Stakeholder involvement in the development of the program, both at the regional and state levels, is crucial to its success. Regional stakeholder involvement is comprehensive and includes the posting of draft documents on the RGGI website (www.rggi.org) for comment, and stakeholder notification of important events through the Listserv located on that website. The regional stakeholder group serves as an important sounding board for the RGGI staff representatives as the program is designed. In addition to this regional stakeholder process, each state plans to implement its own state-specific stakeholder process as appropriate. States are supplementing the regional stakeholder group process by bringing back information and disseminating it to state stakeholder groups at the local level through meetings and other communication opportunities.

DES is planning to propose a program to achieve legislatively required CO2 reductions from power plants in New Hampshire through a market-based cap-and-trade program. New Hampshire's proposed program may be based on the RGGI model rule. Prior to proposing a program, DES wants to obtain feedback from New Hampshire stakeholders. DES held its first stakeholder meeting in October, 2004, to provide background information on requirements relative to CO2

Read more...

Introduction

What Individuals Can Do To Save Energy

What Businesses an Industry Can Do To Save Energy

What Local Government and Schools Can Do To Save Energy

NH Joins Energy Sta Challenge

The Climate Change Challenge (Action Plan)

Climate Change Science

Impacts of Climate Change

New Hampshire's Greenhouse Gas Emissions

Calculating Greenhouse Gas Emissions

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emissions reductions from power plants, the RGGI model rule, and related legislative and rulemaking processes and to receive input from New Hampshire stakeholders. DES held a second stakeholder meeting in January, 2005, to initiate discussion on key model rule design issues and to provide more information on the model rule. Two presentations were made during the meeting by groups that have been actively involved in the regional stakeholder process:

Presentation by Environment Northeast (a regional environmental organization)

Environment Northeast Draft Model Rule Memo (includes a model rule outline, key issues and next steps for modeling)

Presentation by the Northeast Regional Greenhouse Gas Coalition (a coalition of companies, including utilities that may be regulated by the program and sources that may voluntarily generate offsets that could be used by utilities for compliance flexibility)

As of January, 2005, DES has no final formal position on these issues, and DES plans to consider these presentations along with comments from New Hampshire stakeholders as it develops its position. DES held a third meeting in March, 2005, to review preliminary electricity sector modeling results. The presentation made at that meeting is linked below:

Presentation for Regional Greenhouse Gas Initiative (RGGI) 3rd NH Stakeholders Meeting: Preliminary Electricity Sector Modeling Results - Carbon Policy Scenarios and Sensitivities

The Regional Greenhouse Gas Initiative (RGGI) Staff Working Group (SWG) Package Proposal
RGGI 4th Stakeholder Meeting - Presentation from meeting held on September 12, 2005

Future meetings will be scheduled on an as-needed basis. For information on RGGI, contact Joe Fontaine, Air Resources Division, (603) 271-6794 or jfontaine@des.state.nh.us.

Updated: April 2

5. Abandoned railroad rights-of-way should be developed for snowmobiling, cross-country skiing and other compatible recreation uses. In some high-density areas, these should be for four-season use.

6. Rail-to-trail conversions of the Concord to Claremont line and the Springfield Terminal Railway Company Line should be considered recreation priorities in the Region.

7. The Commission should participate in and promote scenic byways and highways programs.

8. Communities and individuals should support efforts to protect important natural, scenic, historic and cultural resources adjacent to the Appalachian Trail corridor. Towns should consider designation of special protective zoning for districts adjacent to the AT. Individuals should consider the granting of conservation easements and participation in voluntary stewardship of the trail corridor.

9. Communities should work closely with the Dartmouth Outing Club and the Appalachian Trail Conference on trail management, stewardship, law enforcement and emergency response on AT lands.

10. Snowmobile clubs should attempt to formalize agreements with landowners to ensure continued use of the winter trail system.

11. Vermont and New Hampshire should continue to assist with the development of a winter trail system.

12. Public and private groups should continue efforts to link existing trails to develop an interconnected system of recreation corridors built on the foundation provided by the AT and Sunapee-Monadnock Greenway.

13. Communities should retain ownership of unmaintained road rights-of-way for recreation corridor purposes.

VI. ENERGY GOALS, POLICIES & RECOMMENDATIONS

Goals:

1. Achieve a sustainable energy supply.

2. Reduce energy demands for all uses.

3. Heighten public awareness of energy issues and energy conservation practices.

Policies of the UVLSRPC & Recommendations to the Communities:

1. Reduce the consumption of non-renewable energy resources, thereby decreasing dependence on imported energy supplies.

2. Encourage use of local, rather than imported, fuels.

3. Promote least-cost planning, or life cycle costing, which considers all costs of energy production and use, including environmental and social costs.

4. Encourage conservation and efficient use of energy in all economic sectors, thereby saving the Region's financial resources and the world's energy resources.

5. In the evaluation of all energy projects, those with the least adverse environmental, aesthetic, economic and social impacts are preferred.

6. Generation, transmission and distribution lines or corridors should not have undue adverse impacts on significant wetlands, plant and animal habitat, scenic resources, or recognized historic or cultural resources.

7. Plans for generation, transmission and distribution lines or corridors should incorporate the following design principles:

    a) Rights-of-way should not divide land uses, but should be located along the edges of land units (e.g. at the wooded edge of a field).

    b) Topographic features should be used to minimize, rather than accentuate, the visual impact of corridors and lines. Corridors and lines should not be placed on prominent geographic features such as ridge lines or at the focal points of scenic areas.

    c) Placement and maintenance of utility lines should minimize the removal of vegetation and the disruption of views from public highways, trails and waters.

    d) The view of corridors and lines should be screened from public roads, trails and waters.

8. Encourage on-site generation to avoid adverse effects of long-distance transmission.

9. Encourage research into non-petroleum based fuels.

10. Encourage and promote wise management of locally-developed renewable energy sources which create local jobs, stimulate investment in the Region and have minimal environmental impact.

11. Encourage the use of passive solar energy and renewable energy sources such as solar, wind, wood and hydropower whenever possible.

12. Communities should decide whether the areas with renewable resources (forested areas, dam sites or areas with favorable wind exposure) should be protected in order to preserve the usefulness for providing energy in the future. This could entail limiting the fragmentation of large forested tracts or limiting residential development in possible energy-producing areas.

13. Hydropower projects using run-of-the-river technology are preferable to impoundments which lower water flows.

14. Water quality should not be significantly degraded by a proposed hydropower project.

15. High priority should be given to minimizing the impact on aquatic life and recreational use of a site, when a hydropower project is proposed. Each project should be designed to provide energy, wildlife and recreational benefits.

16. Properly planned and constructed expansions and efficiency improvements to existing hydropower stations are encouraged if clearly beneficial to residents of the Region and do not harm life downstream.

17. Wind and solar-powered generation facilities should be designed to minimize adverse visual impacts.

18. No major improvements to existing or future dams on the White River or Connecticut River should be permitted unless the social, recreational, economic and environmental impacts on the visual, recreational and fishery resources are negligible.

19. Establish growth centers, including dense and/or clustered housing and commercial services, along existing transportation routes.

20. Construct pedestrian paths and bike paths near and within employment centers, population centers, and designated growth centers to encourage use of non-motorized modes of transportation.

21. Concentrate housing, employment and social services, and support the expansion of telecommunication systems, to reduce the demand for energy-consumptive transportation.

22. Locate generation, transmission and distribution lines or corridors to serve areas adjacent to existing settlements or areas designated for growth, rather than inaccessible areas remote from existing concentration of development.

23. Maximize solar gain by southern orientation of new buildings and protect existing structures from being shaded by new structures resulting in the loss of solar gain.

24. Increase opportunities for, and use of, regional public transportation services.

25. Advocate residential energy programs for conducting energy audits of and providing weatherization services for existing homes, especially those housing the elderly and low income households.

26. Encourage energy efficient patterns of land use and development.

27. The Commission should promote energy efficient land planning and construction in all of its review and advisory work.

28. Permit and develop rideshare parking lots at appropriate locations in the Region.

29. Encourage towns to adopt and integrate energy planning into master plans and town plans.

30. UVLSRPC should work with communities to develop an energy element for the municipal plan which, if implemented, will result in energy savings to the community.

31. At the request of the community, UVLSRPC should help identify areas with energy resource potential and assist in the evaluation of its development.

32. If requested by member communities, UVLSRPC should prepare an in-depth Regional analysis of energy resources, needs, scarcities, costs and problems.

33. UVLSRPC should assist in the review of proposals for new energy sources or facilities to evaluate economic, social, scenic and environmental impacts.

34. Utilities should demonstrate having used all reasonable measures to improve the efficiency of their operations and to assist their customers in energy conservation before constructing additional generation or transmission facilities.

35. Alternatives to the private combustion-driven automobile should be considered in every proposed plan for a development remote from employment or residential centers.

36. In the review of landfills, UVLSRPC should encourage the capture of gas generated during decomposition and the conversion of methane to useful energy either by burning or by converting it to electricity.

37. In the review of utility, industrial and commercial projects, UVLSRPC should promote the incorporation of co-generation as an energy source, wherever possible.

38. UVLSRPC should work with communities to establish incentives for developers to accommodate public transit in their plans, and with employers to encourage their employees to use public transit.

39. Landscaping and topography should be used to minimize building heating and cooling needs.

40. All wood-burning installations should meet all applicable National Fire Protection Association safety requirements and Federal EPA emission standards.

VII. FACILITIES, SERVICES & UTILITIES GOALS, POLICIES & RECOMMENDATIONS

A. General Community Services

Goals:

1. Provide community facilities and services in the most efficient manner to meet the existing and future needs of residents of the Region.

2. Make public investments, including the construction or expansion of infrastructure, that reinforce the general character and planned growth policies and patterns of the area.

Policies of the UVLSRPC & Recommendations to the Communities:

1. Plan to provide public facilities and services so that the rate of growth does not exceed the ability of the community and the area to provide facilities and services.

2. With assistance from the Commission, communities should make appropriate use of