New Hampshire Climate Change Policy Task Force

EXCERPTS from the New Hampshire Climate Action Plan

A Plan for New Hampshire's Energy, Environmental and Economic Development Future

Prepared by NHDES

February 17, 2009

New Hampshire Climate Action Plan

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January 2009

The Honorable John Lynch
Governor

New Hampshire Climate Change Policy Task Force

Chair
Thomas S. Burack
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CHAPTER 2: TASK FORCE RECOMMENDATIONS

1. Maximize energy efficiency in buildings.

   The operation of buildings accounts for 48% of greenhouse gas emissions in the United States according to the Pew Center on Climate Change. In New Hampshire, 32.3% of the net energy consumed in 2005 was used to heat buildings and structures, and another 36.6% was used to generate electricity, much of which is used in buildings[1]. The construction and operation of buildings, therefore, represents a major contributor to greenhouse gas emissions. The state can realize substantial reductions in its energy consumption for heat and power by maximizing the thermal and electrical efficiency of all future buildings and extensively retrofitting existing residential, commercial, industrial and municipal buildings. This will lead to significant and direct reductions in energy costs and greenhouse gas emissions. Such actions can begin immediately by implementing the most cost-effective investments in energy efficiency immediately and incorporating more advanced technologies when they become economically viable.

   Actions recommended by the Task Force:

   - Maximize Efficiency in New Construction (RCI 1.1)
   - Maximize Energy Efficiency in Existing Residential Buildings (RCI 1.2)
   - Maximize Energy Efficiency in Existing Commercial, Industrial, and Municipal Buildings (RCI 1.3)
   - Install Higher-Efficiency Equipment, Processes, and Systems (RCI 2.1)
   - Increase the Use of Combined Heat and Power (EGU 1.3)
   - Consider Alternative Rate Design (EGU 1.1)
   - Upgrade Building Energy Codes (RCI 1.4a)
   - Increase Building Energy Code Compliance (RCI 1.4b)
   - Establish an Energy Properties Section in Real Estate Property Listings (RCI 1.5)
   - Conserve Embodied Energy in Existing Building Stock (RCI 1.8)

2. Increase renewable and low-CO_2-emitting sources of energy in a long-term sustainable manner.

   While expanded energy efficiency will reduce the total demand for energy at the individual site level, there will still be a need for heat and power. Further emission reductions can be achieved as New Hampshire meets an increasing portion of its total energy demand by developing renewable and low-CO_2-emitting energy resources. This expanded capacity will reduce overall greenhouse gas emissions. In addition, to the extent that in-state energy resources can reduce the dependence on imported fossil fuel, such resources will result in more dollars staying in New Hampshire, thus having a positive impact on non-energy sectors of the state economy.

   Actions recommended by the Task Force:

   - Promote Renewable Energy through the Electric Portfolio Standard (RPS) (EGU 2.1)
   - Increase Renewable and Low-CO_2 Thermal Energy Systems (RCI 3.1)
   - Promote Low- and Non-CO_2-Emitting Electric Generation (EGU 2.4)

- Identify and Deploy the Next Generation of Electric Grid Technologies (EGU 2.8)
- Promote Low- and Non-CO_2-Emitting Distributed Generation (EGU 2.9)
- Encourage the Use of Biogenic Waste Sources for Energy Generation (AFW 2.4)

Actions recommended by the Task Force with majority support:

- Implement Regional Greenhouse Gas Initiative (RGGI) (EGU 2.2)[*]
- Enable Importation of Canadian Hydro and Wind Generation (EGU 2.6)[†]
- Allow Regulated Utilities to Build Renewable Generation (EGU 2.7)[‡]
- Support Strong Climate Action at the Federal Level (GLA 1.6)

8. <u>Lead by example in government operations.</u>

The State of New Hampshire has a critical role to play as a supporter and leader of climate change action in New Hampshire. The State's agencies and activities can adopt strategies that reduce the greenhouse gas emissions associated with heating and cooling buildings, the power used by equipment and the fuel consumed by its fleet of vehicles. The State can track the dollar savings associated with these efforts, and share this information. These actions will provide an economic development model for municipalities and businesses to adopt while also developing some of the infrastructure, such as alternative fueling stations, that are necessary for certain technologies to become viable. All levels and categories of government in New Hampshire, including counties, municipalities, village precincts and school districts, can adopt the same measures as are recommended for the state government and by doing so they can also be supporters and leaders of climate change action in their regions or communities.

Actions recommended by the Task Force:

- Establish an Energy Management Unit to Address State Energy Use and Greenhouse Gas Emissions (GLA 1.1)
- Establish an Energy Consumption and Greenhouse Gas Emissions Baseline Inventory for State Government (GLA 1.2)
- Establish a Self-Sustaining Fund for Energy Efficiency Projects in State Government (GLA 1.3)
- Provide for the Establishment of Local Energy Commissions (GLA 1.4)
- Include Climate Change Adaptation and Mitigation in Programs and Planning (GLA 1.5)
- Promote Public School Siting and Building Aid to Reduce Energy Use (GLA 2.6)

[*] This action received one "no" vote.
[†] This action received a number of "no" votes due to concerns over the potential environmental impacts of the imported power and the effect imported power might have on development of in-state renewable resources.
[‡] This action received one "no" vote.

10. Develop an integrated education, outreach, and workforce training program.

Critical to achieving the overarching strategies and implementing the recommended actions will be a comprehensive education program for the state that ranges from grade schools to universities and colleges, households to communities, and small businesses to large corporations, and also includes churches and not-for-profit organizations. This program would focus on raising the awareness of climate change causes and impacts, the wide variety of solutions to reduce greenhouse gas emissions, and the potential economic and environmental benefits of energy efficiency and the development of renewable and low-CO_2-emitting energy resources. It should also focus on the development of a workforce trained in the installation, operation, and maintenance of advanced technologies and proficient in the design and construction of residential, commercial, and industrial buildings incorporating advances in energy efficiency and renewable energy. The education program would further integrate climate change science and solutions into all academic levels and disciplines toward the goals of empowering future generations to take action in their own lives and developing future leaders in policy, government, engineering, science, and communications.

Actions recommended by the Task Force:

- Develop an Overarching Outreach and Education Plan (RCI 4.6)
- Include Energy Efficiency and Conservation in School Curriculum (RCI 4.1)
- Increase Energy Efficiency through Building Management Education Programs (RCI 4.2)
- Reduce Residential Energy Demand through Education and Outreach (RCI 4.3)
- Establish a Comprehensive Energy Efficiency and Renewable Energy Education Program (RCI 4.4)
- Create an Energy Efficiency and Sustainable Energy Systems Web Portal (RCI 4.5)

CHAPTER 5: SUMMARY OF ACTIONS AND IMPLEMENTATION

Each action recommended by the Task Force to support the 10 overarching strategies is summarized below including an overview of short-term and mid-term implementation steps. It is clear from these summaries that a significant amount of resources will be required to develop these recommended actions and to coordinate the various parties involved in implementation. The first steps in this development process will be to determine those parties responsible for coordinating the implementation of the entire plan and its individual recommendations and to obtain the resources necessary to support this process. This broader implementation process is detailed in more detail in Chapter 6, and as can be observed from the recommended actions below, will require the collaborative effort of government, business, non-profit and educational entities.

Overarching Strategy 1: Maximize Energy Efficiency in Buildings

Actions recommended by the Task Force:

► *Maximize Efficiency in New Construction (RCI Action 1.1)*

Develop a program to maximize energy efficiency and minimize net CO_2 output in new residential, commercial, institutional, and industrial building construction with a phased-in goal for new buildings to use produce as much energy as they consume. New construction should incorporate state-of-the art energy efficiency and renewable energy systems into the design of the building envelope, operating systems (e.g., heating, ventilating, and air conditioning (HVAC)), and energy consuming appliances and devices. This action could be developed in conjunction with national level Architecture 2030 initiative, which targets similar energy use goals for new buildings.

Overall Implementation:
- Develop probable legislation for building codes, zoning regulations, and possible tax code incentives.
- Develop program details, create financial incentives, and begin state outreach and education.
- Develop sustainable funding mechanisms.

Timeframe:
- Implementation can begin immediately.
- Scaling up will continue into the future.

► *Maximize Energy Efficiency in Existing Residential Buildings (RCI Action 1.2)*

Develop a program to retrofit existing New Hampshire housing stock to minimize or eliminate net CO_2 output, and further, to ensure that current and future investments minimize embedded CO_2 output with a phased-in goal to retrofit 30,000 homes annually in order to reduce their net energy consumption by 60%. Program elements should include: 1) building shell and window upgrades, including instrumented air sealing and thermographic inspections; 2) space conditioning equipment upgrades/replacements, including ductwork and duct sealing; 3) domestic hot water system upgrades; 4) ENERGY STAR lighting upgrades/replacements; 5) water saving measures; 6) ENERGY STAR appliances upgrades/replacements; and 7) use of renewable energy systems.

Overall Implementation:
- Develop program details, create financial incentives, and begin state outreach and education.
- Develop sustainable funding mechanisms.

- Legislation likely needed to enact these measures.

Timeframe:
- Implementation can begin immediately.
- Scaling up will continue into the future.

► *Maximize Energy Efficiency in Existing Commercial, Industrial, and Municipal Buildings (RCI Action 1.3)*

Develop a program to retrofit existing commercial, industrial, and municipal buildings in New Hampshire to minimize or eliminate net-CO_2 emissions, and further, to ensure that current and future retrofit projects maximize the use of the "embodied energy" in buildings with a phased-in goal to reduce existing buildings net energy consumption by 50% by 2030. Program elements should cover the following: 1) lighting; 2) heating, ventilating and air conditioning (HVAC) systems; 3) processes (e.g., air compressor equipment and variable frequency drives); 4) control equipment and technologies; 5) refrigeration equipment; 6) building shell and windows; 7) hot water systems; 8) water usage; and 9) renewable energy systems.

Overall Implementation:
- Develop program details, create financial incentives, and begin state outreach and education.
- Develop sustainable funding mechanisms.
- Legislation likely needed to enact these measures.

Timeframe:
- Implementation can begin immediately.
- Scaling up will continue into the future.

► *Install Higher-Efficiency Equipment, Processes, and Systems (RCI Action 2.1)*

Create incentives to increase the installation of higher-efficiency equipment and the adoption of higher-efficiency processes. Commercial, industrial, and municipal processes can reduce net-CO_2 output by properly designing process lines and using high-efficiency lighting and equipment. Currently, the CORE Programs offered by the electric utilities provide these services for electricity-saving measures, and the gas utilities have comparable services for reducing natural gas consumption. Programming should be expanded to cover all cost-effective measures that reduce CO_2 emissions regardless of fuel type, including the use of renewable generation and use of combined heat and power (aka cogeneration). A combination of targeted and comprehensive energy audits could be used to identify efficiency improvements and opportunities to reduce CO_2 emissions from manufacturing processes. Incentives could be offered to retrofit inefficient processes and equipment and to help offset the additional costs of premium efficiency equipment in new construction.

Overall Implementation:
- Develop program details, create financial incentives, and begin state outreach and education.
- Develop sustainable funding mechanisms.
- Legislation likely needed to enact these measures.

Timeframe:
- Implementation can begin immediately.
- Scaling up will continue into the future.

▶ *Increase the Use of Combined Heat and Power (EGU Action 1.3)*

Develop mechanisms to promote the use of combined heat and power (also known as CHP and cogeneration) systems for use as an on-site power plant or boiler to generate both electricity and useful heat simultaneously. This technology may be applicable where a thermal load (i.e., for space heating or industrial process heat) already exists or is planned. Combined heat and power would be appropriate for new boilers and for retrofits of existing boilers using cleaner-burning fuels that are not already co-generating electricity. For consistency with the goal of reducing overall emissions, any program designed around combined heat and power would need to define the allowable emission limits and might also specify allowable fuels for program eligibility. Mechanisms could include regulatory changes, incentives and portfolio standards.

Overall Implementation:

- Consider incentives to promote voluntary development of combined heat and power installations.
- Consider implementing a renewable portfolio for combined heat and power (separate from the existing RPS – see EGU Action 2.1) requiring utilities to obtain a fraction of their energy supply from this technology, with flexibility to meet requirements through a market-based trading program.
- Determine eligibility requirements and necessary emission limits to ensure that the desired emission reductions would be achieved.
- Provide funding to establish and administer the program.
- Develop outreach, education and training programs required to support the integration of combined heat and power into siting and planning, building designs and operation.

Timeframe:

- Enactment could be as early as 2009 with implementation in 2010.

▶ *Consider Alternative Rate Design (EGU Action 1.1)*

To the extent that it reduces or does not raise electricity costs and manages the risk to the utilities, consider identifying and implementing appropriate alternative rate designs (e.g., decoupling) for utilities in order to remove obstacles to increasing energy efficiency. Existing rate structures may conflict with the State's energy efficiency and alternative energy goals, in that traditional rate design is based upon "throughput" incentives for utilities to sell more energy (e.g., kWh, therms) in order to increase their annual profits. Advocates of alternative rate structures believe that these mechanisms are a necessary ingredient to obtain strong utility support for energy efficiency and would complement other demand side management programs. Consumer advocates have raised issues regarding rate impacts and the potential for customers unfairly bearing all risks related to providing electricity. New Hampshire should explore these issues and develop a fair approach to new rate mechanisms that protect consumers and provide appropriate incentives to utilities to promote energy efficiency.

Overall Implementation:

- Evaluate and establish an alternate rate design as part of the existing PUC open docket investigating decoupling and other rate mechanisms (DE 07-064).
- Alternative rate designs either as general policies, or on a utility-specific basis.

Timeframe:

- Consideration of possible mechanisms could be developed in the current PUC docket.
- Full implementation of a changed rate structure would likely take several years due to the complexity.

▶ *Upgrade Building Energy Codes (RCI Action 1.4a)*

Update New Hampshire's building energy code to require improved energy efficiency in new construction and building renovations. Building energy codes represent one of the more cost-effective ways to reduce energy use and related carbon emissions. The state should participate in the International Energy Conservation Code™ (IECC) update process, either on its own or by providing input through other regional partners that do participate, such as Northeast Energy Efficiency Partnerships (NEEP). There is considerable evidence that if New Hampshire is to achieve deeper greenhouse gas emission reductions, the state's building energy code should be more stringent than the current IECC. In addition to updating its mandatory building energy code, the state could define a preferred "stretch code" that sets even higher, but voluntary, "green" building energy performance standards to advance the state's policy objectives.

Overall Implementation:
- Adopt latest revision to IECC.
- Begin consideration of higher performance standards in the near term for either mandatory or "stretch" codes to support RCI Actions 1.1 – 1.3.
- Legislation likely needed to enact these measures.

Timeframe:
- The latest revision to the IECC may be available for adoption in January 2009.
- The code development community appears to have adopted a three-year cycle as reasonable for code updates.

► *Increase Building Energy Code Compliance (RCI Action 1.4b)*

Consider mechanisms that would result in stricter enforcement of energy codes. Building energy codes – either mandatory or voluntary – are among the more cost-effective ways to reduce energy use and related carbon emissions. Mandatory energy codes can be used to set minimum requirements for energy use in both new construction and major building renovations. However, any effort to capture savings from mandatory energy codes is only as good as compliance with the codes. Consideration should be given to creating a system to promote stricter enforcement of the state's building energy code to ensure compliance in all affected structures, including those in rural communities where resources are often lacking. Such programming could include required third party certification, the fee for which could be included as a cost of construction. The state should consider a formal certification process for inspectors beyond the current voluntary process offered through the International Code Council (ICC).

Overall Implementation:
- Evaluate current barriers to effective enforcement of building energy code; begin state outreach to municipalities to improve code compliance rates.
- Legislation likely needed to require mandatory training and certification of all municipal building inspectors on the state building energy code.
- Consider revenue sources to support the inspector certification program and local enforcement of the state's energy code.

Timeframe:
- Initiatives to enhance energy code compliance can begin immediately.

► *Establish an Energy Properties Section in Real Estate Property Listings (RCI Action 1.5)*

Establish an energy section in the Multiple Listing Service (MLS) real estate listings. This measure would create a specific, defined set of energy-related criteria/ratings for properties presented in the MLS listings. The concept behind an MLS energy section is to reinforce the fact that energy is a major factor in home buying and to provide the consumer with a means for comparing energy usage between homes. Presumably, properties that are energy-efficient would be favored, and market pricing would reflect this advantage.

Overall Implementation:
- Adopt a building energy rating standards.
- Design and implement an energy section for MLS listings of New Hampshire properties.
- Perform outreach to build awareness of this new feature available to buyers and sellers.

Timeframe:
- Design and implementation of an energy section for MLS listings can begin immediately.

► *Conserve Embodied Energy in Existing Building Stock (RCI Action 1.8)*

Develop state-wide policies and programs that recognize, quantify, and encourage the conservation of the energy embodied in the New Hampshire's older building stock. "Embodied energy is the total expenditure of energy involved in the creation of the building and its constituent materials[2]," and the energy invested in it throughout its use. Embodied energy is a key component of life-cycle analysis, which examines the environmental impact of building materials and systems from raw materials, through use within a building, to demolition and disposal. A typical house in New Hampshire contains about 1.5 billion Btus of embodied energy, enough to power the family vehicle for about 25 years. When older buildings are preserved or reused their embodied energy is conserved, new material needs are minimized, and massive carbon emissions from new construction are avoided (in addition to the unspecified historical value that is retained). The concept of embodied energy is not widely recognized, even among professionals in the building and construction industries. If the potential energy savings and reductions in carbon emissions are to be realized, the proposed action will require education, research, and incentive programs.

Overall Implementation:
- Establish a technical committee to conduct research and quantify potential energy savings and emission reductions associated with the conservation of embodied energy in New Hampshire's building stock.
- Develop outreach and education to promote the concept of embodied energy conservation and to dispel myths about the use and reuse of materials.
- Prepare a list of best practices and implement demonstration projects.
- Consider creation of incentives at the state and local levels to preserve/reuse existing building stock.
- Provide funding to establish and administer the program.

Timeframe:
- A study commission could be created in the current legislative session.
- Research and education programs could be initiated at the same time.

Overarching Strategy 2: Increase Renewable and Low-CO_2-Emitting Resources in a Long-Term Sustainable Manner

Actions recommended by the Task Force:

► *Promote Renewable Energy through the Electric Portfolio Standard (RPS) (EGU Action 2.1)*

Implement New Hampshire's Renewable Portfolio Standard, enacted in 2007, which mandates that 23.8 percent of retail electricity sales to in-state customers be provided by renewable energy sources by 2025. The potential renewable generation capacity in New Hampshire alone is 4,447 megawatts (MW) with a generation potential of 12,819,000 megawatt-hours (MWh) by that date. The Renewable Portfolio Standard would capture nearly 3.5 million MWh of this potential with the following mix of renewable sources of in-state retail electricity sales: existing small hydro, 1%; existing biomass and landfill methane, 6.5%; new solar, 0.3%; and new other (wind, geothermal, tidal, etc.), 16%.

Overall Implementation:
- Program development complete and ongoing.

Timeframe:
- Program has commenced and will run through 2025.

▶ *Increase Renewable Energy and Low-CO_2-Emitting Thermal Energy Systems (RCI Action 3.1)*

Create an incentive program to promote the expanded use of renewable and low-CO_2-emitting thermal energy systems to reduce fossil fuel use and greenhouse gas emissions. In New Hampshire, the energy used for space heating, hot water, and process conditioning makes up about one-third of total energy consumption. This proposal would provide incentives and attractive financing for the use of cost-effective, renewable energy resources and high-efficiency/low-CO_2-emitting thermal systems. The incentive levels and financing would be directly tied to the magnitude of the efficiency improvements and energy savings. Other considerations would include the potential of particular new systems for market transformation and peak demand reduction.

Overall Implementation:
- Identify new thermal energy systems worthy of special consideration in this program.
- Evaluate potential current and new funding sources to support incentives and project financing.
- Develop incentive program details and create sustainable funding mechanisms.
- Legislation likely needed to establish stable funding streams.

Timeframe:
- Program could start ramping up in 2009.
- Incentives and financing could continue until maximum penetration of thermal renewable systems is achieved.

▶ *Address Barriers to Low- and Non-CO_2-Emitting Electric Generation (EGU Action 2.4)*

Identify and remove obstacles to siting and constructing low- and non-CO_2-emitting energy facilities and transmission infrastructure in the state. These actions would better facilitate the development of new low- and non-CO_2-emitting facilities in the state, to enable the state to move away from carbon-based supply-side resources (i.e., fossil-fuel-fired power plants) while offsetting the impact of any potential load growth. The development of the new low-and non-CO_2-emitting facilities could enable older high-CO_2-emitting facilities to be gradually retired and facilitate the achievement of New Hampshire's Renewable Portfolio Standard targets and the goal to meet 25% of the state's energy from renewable power by 2025. However, to do so it is imperative that electrical transmission capability within the state also be enhanced to enable power to be exported from those areas where hydro, solar photovoltaic, wind, geothermal, tidal and biomass technologies could best be deployed in order to serve the New England load. These two goals could be accomplished by seeking methods to expedite the ISO-NE interconnection application review and approval for these types of

facilities, and by establishing appropriately streamlined state and local permitting processes. In addition, New Hampshire's planning efforts cannot stand in isolation and should be coordinated with other states and Canada.

Overall Implementation:
- Influence ISO-NE to expedite interconnection application review and approval for these types of facilities.
- Establish streamlined state and local permitting processes.
- Include siting standards to protect environmental quality and siting procedures that provide for appropriate public participation in state process.

Timeframe:
- Policy development could begin in 2009

► *Identify and Deploy the Next Generation of Electric Grid Technologies (EGU Action 2.8)*

Work at the state and Regional level to facilitate the adoption of the next generation of electric grid standards, technologies, and practices through a *phased-in approach* in order to increase the efficiency of the grid and expand the integration of renewable distributed power generation to reduce total greenhouse gas emissions from the electric generation. This transition will include the modernization of the electricity transmission and distribution system to incorporate digital information and controls technology, deployment of energy storage devices, and sharing of real-time pricing information with electricity customers and "smart" technologies in homes and businesses. Deployment of the technology and adoption of standards would occur in a step-wise fashion in which initial investments would first exploit the current most cost-effective technologies while more advanced technologies would be employed as they become more cost-effective. This transition would occur across New Hampshire and the entire ISO-NE grid to the point of general adoption and ongoing market support in the electric generation sector. Such action would lead to the creation of a self-monitoring, adaptive system capable of semi-automated restoration and higher energy efficiency through reduced line losses and better integration of renewable resources through energy storage capacity and the deployment of end use technologies that are able to shift electric use to times when renewable generation is greatest.

Overall Implementation:
- Coordinate efforts at the state and regional levels to facilitate the adoption of smart grid standards, technologies, and practices.
- Assess the current state of smart grid technology market penetration and any obstacles to smart grid development.
- Identify needed legislation, NH Public Utilities Commission orders, and incentives to initiate smart grid development.
- Identify sustainable funding mechanisms.
- Require that electric utility rates be aligned with incentives for the delivery of cost-effective energy efficiency (i.e., consider rate decoupling to promote energy efficiency)
- Require electric utilities, before investing in conventional grid technologies, to demonstrate that investments in advanced grid technologies have been considered.
- Require electric utilities to provide customers with direct access to daily information regarding prices, usage, intervals and projections, and sources.
- Perform demonstration projects using advanced technologies for the power grid, including integration of demand-side resources into grid management.
- Address transmission infrastructure limitations.

Timeframe:
- The required technology already exists and could be deployed within a year.

▶ *Promote Low- and Non-CO_2-Emitting Distributed Generation (EGU Action 2.9)*

Encourage the development of customer-sited low- and non-CO_2-emitting distributed generation (DG) through a combination of regulatory changes and incentives as begun with the passage of Senate Bill 451 (SB 451) in the 2008 Session. These distributed generation resources can include renewable power sources such as solar photovoltaic systems, wind power systems, biogas and landfill gas-fired systems, geothermal generation systems, and systems fueled with biomass, as well as extremely efficient fossil fuel fired cogeneration or combined heat and power. The distributed electricity generating systems provide electricity system benefits such as avoided capital investment and avoided transmission and distribution losses, while also displacing fossil-fueled generation and thus reducing greenhouse gas emissions. SB 451 authorizes rate recovery for electric public utilities investments in distributed energy resources located on the premises of a retail customer of the electric public utility. Additional policies designed to encourage and accelerate the implementation of customer-sited renewable distributed generation could include direct incentives for system purchase, market incentives, including "net metering", education and training, state goals or directives, and favorable rules for interconnecting renewable generation systems with the electricity grid.

Overall Implementation:
- Assess the current state of renewable distributed generation in New Hampshire.
- Identify regulatory and institutional opportunities and obstacles affecting expansion of this network.
- Develop appropriate legislation and rules to expand the use of renewable distributed generation.
- Develop an outreach and education program with provisions for technical assistance.
- Develop a financial incentive program.
- Provide sustainable funding mechanisms.

Timeframe:
- The required technology already exists and is currently being implemented. More widespread implementation would occur once the necessary regulations, programs, and incentives have been put into place.

▶ *Encourage the Use of Biogenic Waste Sources for Energy Generation (AFW Action 2.4)*

Create incentives for the development of facilities and processes that utilize biogenic waste streams as energy sources to reduce New Hampshire's reliance on fossil fuels. These wastes, which may be generated in municipal, residential, agricultural, institutional, or industrial settings, can provide heat, power, and fuel through any number of applications. Examples include anaerobic digesters, microbial fuel cells, and direct conversion of organic wastes to fuel. Among the possible energy sources are sludge, septage, municipal and industrial wastewater, brown grease, residential and institutional food waste, leaf and yard waste, and manure. Development incentives could be provided by means of 1) a loan program to assist livestock and industrial operations, and 2) modification of existing municipal funding mechanisms to cover the higher initial costs of these projects, to be offset by long-term reductions in operating costs and fossil fuel consumption.

Overall Implementation:
- Assess the viability of a regional approach to biogenic waste-to-energy projects and the attendant economies of scale.

- Develop incentive program details and create sustainable funding mechanisms.
- Legislation likely needed to enact these measures.

Timeframe:
- Program development can begin immediately.
- Implementation could begin as early as 2010.

Actions recommended by the Task Force with majority support:

▶ *Implement Regional Greenhouse Gas Initiative (RGGI) (EGU Action 2.2)*

Implement the Regional Greenhouse Gas Initiative, beginning in 2009, to stabilize CO_2 emissions from power plants at 188,076,976 tons (regional 3-year average) through 2014. Reduce CO_2 emissions by an additional 2.5 percent per year for 4 years (10 percent total) through 2018. In 2012, evaluate the feasibility of further reductions after 2018.

Overall Implementation:
- Complete RGGI rulemaking process.
- Continue to participate on regional implementation workgroup with other states.
- Continue to implement program

Timeframe:
- Implementation is on-going.

▶ *Enable Importation of Canadian Hydro and Wind Generation (EGU Action 2.6)*

To the extent that it reduces or does not raise electricity rates to the consumer, high voltage transmission lines should be built to import clean power generated from Canadian hydro and wind sources as a complementary policy to developing non-CO_2-emitting generation in New Hampshire. Canada is developing vast new hydro and wind generation resources, which are greater than their local needs. This creates an opportunity for New Hampshire and the entire Northeast to obtain clean power. This could provide new power sources to offset future local and regional growth and facilitate retiring or curtailing the operation of fossil fuel-fired plants in New England. Contracts made for this renewable energy should be developed with consideration for the broader environmental impacts of the power sources as well as the impacts that this imported power would have on the development of in-state renewable resources.

Overall Implementation:
- Begin administrative and legislative procedures to clarify issues and enable construction of a new transmission system.
- Identify program developers to find and align potential sellers and buyers for clean Canadian power. A positive regulatory or legislative signal would be essential.

Timeframe:
- This action could be implemented soon after 2012, following necessary review and approval.

▶ *Allow Regulated Utilities to Build Renewable Generation (EGU Action 2.7)*

To the extent that it increases New Hampshire's overall renewable energy capacity and the rate at which those resources are brought online and helps to reduce CO_2 emissions, regulated utilities should be provided

with limited authority to construct and/or acquire renewable generating assets. The only regulated electric utility that currently owns generation is Public Service of New Hampshire (PSNH), and under existing law PSNH and other utilities[§] are only specifically authorized to invest in or own new small-scale distributed generation under a new 2008 law. As noted in the summary below, this issue has been an area of intense debate within the Legislature and a wide range of opinions exist among the various stakeholder groups across the state. However, in the interest of reducing greenhouse gas emissions and reducing vulnerability to global energy price volatility, New Hampshire's energy planning efforts should consider the significant resources and experiences that utilities can provide in the development of new renewable generation, in conjunction with a strategy of aggressively encouraging new low-CO_2 generation sources so that ultimately less fossil fuel generation plants are needed in New England. The key element to achieve the greenhouse gas reductions is to draft legislation that gives regulated utilities the authority to construct and/or acquire renewable generating assets. This authority should be provided with consideration to the impact that it will have on the benefits of market competition provided by non-utility owned merchant generating plants.

Overall Implementation:

- Establish clear legislation authorizing regulated utilities to construct or acquire generation facilities that are based exclusively on renewable energy resources.
- Address obstacles to speedy and efficient project review at the state and local levels by:
  - Considering an expedited permit process for smaller generation facilities using renewable resources; and
  - Providing for an expedited PUC proceeding schedule so that project review may begin prior to project commencement.
- Address transmission infrastructure limitations, including the Coos County loop in northern New Hampshire.

Timeframe:

- This action can be implemented during the 2008-2009 legislative session.

Overarching Strategy 8: Lead by Example in Government Operations

Actions recommended by the Task Force:

▶ *Establish an Energy Management Unit to Address State Energy Consumption and Greenhouse Gas Emissions (GLA Action 1.1)*

Form an Energy Management Unit within state government to implement and oversee the recommended actions of the Climate Change Policy Task Force as well as the Governor's Energy Efficiency Initiative. This entity would be responsible for tracking state government efforts to reduce energy use and costs, reduce greenhouse gas emissions, achieve state energy reduction/climate change goals, and provide assistance on energy efficiency matters to local and regional government entities. In addition to the existing State Energy Manager, the proposed Energy Management Unit would consist of a project manager, a data manager, a fleet manager, and an energy education and outreach specialist. This action would also require that the state adopt and implement consistent document and reporting procedures for energy purchases, equipment purchases, and energy usage.

[§] This excludes the New Hampshire Electric Cooperative and municipal electric utilities, which are not subject to the restrictions placed on other utilities in the state.

Overall Implementation:

- Establish a project manager position as the highest priority; phase in other positions as resources allow.
- Develop consistent procedures for documentation and reporting of energy purchases, equipment purchases, and energy usage.
- Work plan to include remainder of GLA Actions that were retained for further consideration (Appendix 4.8).
- Legislation likely needed to enact these measures.

Timeframe:

- This establishment of this unit can be taken up in the next Legislative Session.

▶ *Establish an Energy Consumption and Greenhouse Gas Emissions Baseline Inventory for State Government (GLA Action 1.2)*

Establish a baseline inventory of energy consumption and greenhouse gas emissions for state government for the year 2005 or other year if more appropriate. The inventory would profile the specific types and sources of energy used and would quantify the amounts of energy consumed and emissions released on a quarterly and annual basis. This baseline inventory would assist in identifying opportunities having the greatest potential to reduce state government's energy consumption and greenhouse gas emissions and would serve as a benchmark by which to track progress in specific energy efficiency and renewable energy projects. The baseline inventory and subsequent updates would be the responsibility of the new Energy Management Unit.

Overall Implementation:

- Design a uniform data collection and reporting protocol for all state agencies to use in tracking energy consumption.
- Provide staffing and financial resources to collect the data, perform quality assurance, undertake the necessary analyses, and generate regular reports.

Timeframe:

- This action can be implemented immediately.

▶ *Establish a Self-Sustaining Fund for Energy Efficiency Projects in State Government (GLA Action 1.3)*

Create a non-lapsing Energy Efficiency Fund, overseen by the Director of Plant & Property Management and the State Energy Manager (unless or until an Energy Management Unit is formed and becomes operational). State agencies could request monies from this fund to cover the costs of their energy efficiency projects. The fund would be financed and replenished with monies equal to 2 percent of each agency's utility budget from the previous year. Monies would be distributed to subsidize requested energy efficiency projects using technologies shown to reduce energy consumption. The Energy Efficiency Fund would boost the efforts of state agencies to find ways to conserve energy and lower their utility bills. By charging a single entity to administer the distribution of these funds, consistent procedures could be maintained for the benefit of small and large agencies alike.

Overall Implementation:

- Prepare and adopt legislation for the Energy Efficiency Fund.
- Develop criteria for allocation and application of funds.
- Prepare administrative and technical guidelines (e.g., calculation of emission reductions and project payback) for fund applications.
- Provide staffing and financial resources to develop and administer the funding program.

Timeframe:
- This action can be implemented during the 2008-2009 Legislative Session.

▶ *Support the Establishment of Local Energy Commissions (GLA Action 1.4)*

Support the newly forming Local Energy Committees by providing the statutory and programmatic resources needed to make these committees a working part of municipal governance. In March 2007, 164 New Hampshire municipalities passed a historic Climate Resolution that called on state and federal elected officials to address climate change. The resolution also called for the establishment of Local Energy Committees to address greenhouse gas emissions associated with municipalities' activities. Since then, nearly 100 cities and towns have established Local Energy Committees. New Hampshire can support this groundswell of civic action by 1) passing legislation that authorizes municipalities to establish Local Energy Commissions with specific powers, thus formalizing their role and mission; and 2) providing resources to regional planning commissions and state agencies to assist municipalities in setting up Local Energy Commissions.

Overall Implementation:
- Pass legislation to amend RSA 674 to grant New Hampshire towns the authority to establish formal energy committees with specific authority.
- Provide staffing and financial resources to regional planning commissions and designated state agency(ies) to assist municipalities in forming Local Energy Commissions.

Timeframe:
- This action can be implemented during the 2008-2009 Legislative Session.

▶ *Include Climate Change Adaptation and Mitigation in Programs and Planning (GLA Action 1.5)*

Establish a policy requiring that climate change adaptation and mitigation be considered in all planning and programmatic activities of state government agencies. Climate change has impacts that could affect the entire spectrum of activities (e.g., economic, recreational, agricultural) within the state. Likewise, the vast majority of activities are contributing to climate change in large and small ways. Because New Hampshire state government has the capacity to influence these activities regardless of origin – governmental, residential, commercial, or industrial – all state agencies should take the initiative in seeking solutions to climate change. A logical starting point is to incorporate consideration of climate change into all state planning and programming functions. The state's proactive response to climate change will help to engender climate change action as a necessary and normal part of life in New Hampshire.

Overall Implementation:
- Issue an executive order to require consideration of climate change in all government planning and programs.
- Begin outreach/education activities to build greater understanding of the science of climate change within the ranks of state government and to assist state employees in shaping an effective response to climate change.
- Provide resources to support internal outreach/education efforts.
- Publicize the state initiative to the population at large.

Timeframe:
- This action can be implemented immediately.

▶ *Promote Public School Siting and Building Aid to Reduce Energy Use (GLA Action 2.6)*

Revise state public school siting and building aid policies to more effectively and cogently encourage the renovation of existing schools and the creation of high performance schools (through renovation or new construction) that both meet current educational standards and further the goals of RSA 9B and similar local and regional smart growth objectives. New emphasis on renovation through comprehensive feasibility studies, meaningful coordination between affected municipal bodies, adequate maintenance, and effective disposition processes can reinforce existing trends, take advantage of new opportunities for energy efficiency upgrades, and help alleviate conflicts in local school construction decision-making. For high performance schools, an additional funding bonus of up to 2 percent (resulting in a total bonus of up to 5 percent) may also entice more school districts into pursuing energy efficiency improvements that are part of major renovation projects or new construction.

Overall Implementation:
- Review existing school siting policies to identify opportunities to strengthen emphasis on renovation.
- Develop resources and support for coordinated planning and feasibility studies to support school construction decision making.
- Pass legislation necessary to expand the CHPS funding bonus.
- Develop the education and outreach necessary to increase awareness of the CHPS program and the expanded funding benefit in order to increase participation.

Timeframe:
- This action can be implemented immediately.

Overarching Strategy 10: Develop an Integrated Education, Outreach, and Workforce Training Program

Actions recommended by the Task Force:

▶ *Develop an Overarching Outreach and Education Plan (RCI Action 4.6)*

Implement a comprehensive climate change outreach and education program that elevates the awareness, knowledge and skill in the state in order to support action at all levels and in all sectors. This program would coordinate and develop educational programs in New Hampshire in order to engage residents, students, businesses and industry to take action now, while simultaneously expanding the capacity of the state to develop and implement advanced mitigation and adaptation solutions in a phased-in approach in the future. This broad education program must rely upon, and build partnerships with, existing educational and outreach organizations including (but not necessarily limited to) K-12 schools, colleges and universities, museums and science centers, environmental and climate change focused not-for-profits, state programs, and professional associations and groups (e.g., architects, planners, builders). Critical to this effort would be marketing the existing Climate Action Plan in order to foster the support necessary for wide-spread implementation.

Overall Implementation:
- Inventory existing climate and energy related educational/outreach/training programs and success of those programs.
- Identify working group to consult with responsible parties and develop plan for overall program and integration.

- Invest and enhance existing educational programs that are working (e.g., NH Carbon Challenge, Clean Air-Cool Planet, Local Energy Committees, UNH Cooperative Extension Energy Answers program).
- Collaborate with professional associations to enhance/grow existing professional training programs.
- Identify and pursue resources to support broader, integrated program.

Timeframe:
- Identification of working group should begin immediately.
- Plan framework and development over the next year and initiate implementation in 2010.

▶ *Include Energy Efficiency and Conservation in School Curricula (RCI Action 4.1)*

Revise New Hampshire's K-12 school curriculum standards to promote development of a citizenry that has a comprehensive understanding of climate change and the opportunities to engage in energy efficiency and conservation measures. Goals would be developed from a multi-disciplinary perspective, including topics in science, mathematics, and social studies. As a short-term goal, partnerships between educators and experts on energy and the environment would be created to develop educator workshops to train New Hampshire teachers in the nuances of climate change and energy efficiency. The long-term goal would be to amend the New Hampshire Curriculum Frameworks at all grade levels with particular emphasis on curricula for grades 9 through 12, including both open enrollment and advanced studies. Greenhouse gas emission reductions would be achieved as students carry their growing knowledge of climate change and sustainable behaviors back to their families and communities. Sustainable behaviors can happen as part of daily habits, life-long decisions, individual advocacy, and community involvement.

Overall Implementation:
- Provide resources to support outreach/education efforts.
- Establish partnerships, assemble resource materials, and develop educator training program. Look to existing programs in other states for guidance in the design of multi-disciplinary teaching modules/workshops on climate change and energy efficiency.
- Begin educator workshops in targeted communities/school districts and extend these workshops to different communities each year. Provide continuing professional development credits to teachers who complete the workshops.
- Create a diverse committee of educators to begin the task of revising the K-12 curricula.
- Provide resources to support program development and curriculum revision.

Timeframe:
- Teaching modules/workshops for educators could be developed by a suggested target date of June 2010. Training in targeted communities/school districts would begin thereafter.
- Amendment of the New Hampshire Curriculum Frameworks and new teacher certification requirements would be longer-term, with a suggested target date of 2015.

▶ *Increase Energy Efficiency through Building Management Education Programs (RCI Action 4.2)*

Continue and expand energy efficiency education for building maintenance and energy management staff. The industrial, commercial, and government sectors should make use of the many training opportunities provided by utilities, energy companies (e.g., oil and propane distributors), and private consulting firms. Training should focus on energy audits as a proven method for identifying energy efficiency opportunities to minimize or eliminate net CO_2 output in existing buildings. For new construction, "beyond code" certification would assure that buildings produce the lowest possible environmental impacts.

In addition, encourage the creation of building energy manager positions within organizations that are still without these positions. The concept of placing one person in charge of energy efficiency within an organization should be promoted even for small businesses. This action would result in regular reviews of energy use and identification of energy saving opportunities. Building energy managers should be given the responsibility and budgetary tools to implement energy saving measures as they are identified.

Overall Implementation:

- Direct the NH Office of Energy and Planning (or other state agency) to create, perhaps in conjunction with the energy utilities, an initiative to 1) promote energy efficiency education to facilities management staff and 2) encourage the establishment of building energy managers in government and business.
- Coordinate efforts with the NH Public Utilities Commission and the NH Energy Efficiency and Sustainable Energy Board to investigate funding opportunities to support the program.

Timeframe:

- Action to create initiative can occur immediately.
- Implementation of the initiative would be ongoing.

▶ *Reduce Residential Energy Demand through Education and Outreach (RCI Action 4.3)*

Develop a community-based outreach and education program aimed at reducing greenhouse gas emissions in the residential sector. Because residential greenhouse gas emissions account for roughly half of all such emissions (when personal vehicles are included), an organized effort to engage residents in voluntary reductions of their household energy use would be effective. This program would provide the needed information, tools, and support to help residents understand how they use energy and how to map out strategies that would reduce their household energy consumption and energy costs. The program should make use of existing networks and communities (e.g., towns, neighborhoods, civic groups, faith-based organizations, businesses, environmental organizations) to maximize participation. Research-based behavioral change strategies targeting the root causes of climate change inaction should be employed through outreach activities that strengthen communities and do not rely solely on information-based campaigns.

Overall Implementation:

- Develop program details; consider adopting the New Hampshire Carbon Challenge™ (http://nhcarbonchallenge.org) as a platform to reduce residential energy consumption.
- Consider an executive order to encourage all state employees and all New Hampshire citizens to take the challenge.
- Create a database to quantify emission reductions and chart participation rates and progress toward emission reduction goals.
- Publicize progress at the community and state levels.
- Provide resources to support the program.

Timeframe:

- This action can be implemented immediately and would be ongoing.

▶ *Establish a Comprehensive Energy Efficiency and Renewable Energy Education Program (RCI Action 4.4)*

Establish a comprehensive education program on energy efficiency and renewable energy to help close the tremendous gap that exists between knowledge and practice. It is estimated that just by using current technology correctly and efficiently we could cut building energy consumption and associated greenhouse

gas emissions by 30 percent. In the proposed action, state government, utility companies, colleges, professional and building trade organizations, would sponsor ongoing training and offer demonstration sites for energy-efficient and renewable energy practices. The program would provide accessible resources and educational opportunities to any individuals and organizations that design, build, evaluate/rate, maintain, sell, own, and occupy buildings. It would be of particular value to contractors, code officials, and energy raters, and would establish working groups for building managers and real estate agents. The program would be established and administered at various settings throughout the state, including demonstration centers, community colleges, training seminars.

Overall Implementation:

- Create partnership agreements to develop and administer the education program.
- Evaluate existing resources and possible training locations.
- Design the program by building upon existing training programs and/or using successful programs as models. (Experience with the CORE Efficiency Programs could prove useful.)
- Publicize and roll out the program at a limited number of settings; expand and adjust the program as resources become available and experience is gained.
- Develop a sustainable funding mechanism.

Timeframe:

- This action can be implemented immediately and would be ongoing.

▶ *Create an Energy Efficiency and Sustainable Energy Systems Web Portal (RCI Action 4.5)*

Develop a searchable, web-based clearinghouse to hasten the adoption of energy efficiency and sustainable energy products and technologies. The portal would serve a range of specific New Hampshire audiences, including local energy committees, city and town managers, business owners, industrial and commercial facility managers, and residents. The portal would provide each specific target audience with the resources needed to make informed decisions concerning the available options to reduce their greenhouse gas emissions (e.g., currently available products/services/technologies, costs, projected savings, installers or contractors, online calculators, and tax and/or rebate incentives). Although numerous websites give information of this sort, there is currently no web-based clearinghouse for those who are evaluating purchasing sustainable energy products and technologies or have decided to buy products or services and need additional information.

Overall Implementation:

- Designate a state agency and a program coordinator within the agency to lead this action. The program coordinator would be responsible for development and maintenance of the portal with assistance from internal and external experts in energy efficiency and sustainable energy systems.
- Issue a request for proposals to create a searchable, web-based clearinghouse for energy-efficient and renewable products and services.
- Publicize the existence of the web portal when ready.
- Provide resources to support development and maintenance of the web portal.

Timeframe:

- This action can be implemented immediately

[1] NH Office of Energy and Planning, (2008). New Hampshire Energy Facts website, http://www.nh.gov/oep/programs/energy/nhenergyfacts/index.htm. (Last accessed June 6, 2008).

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[2] Rypkema, D. (2005). "Economics, Sustainability, and Historic Preservation," keynote address at the National Trust Conference, Portland, Oregon, 1 October 2005.