ENE Comments to the New Hampshire State Energy Advisory Council on Policy Prioritization

March 28, 2014

ENE is a non-profit organization that researches and advocates innovative policies that tackle our environmental challenges while promoting sustainable economies. ENE is at the forefront of efforts to combat global warming with solutions that promote clean energy, clean air and healthy forests.

ENE thanks the Energy Advisory Council for the opportunity to present our recommendations for policies that will help New Hampshire achieve its energy vision for 2025. The policy prioritization process is an important step in developing a coherent, deliberate, and comprehensive energy policy for New Hampshire. We present key policies for each of the three sectors: electric, thermal and transportation.

I. ENE's Electricity Sector Strategy Recommendations

Energy Efficiency

Expanding energy efficiency for all fuels – electric, gas, and oil customers – will deliver multiple benefits to New Hampshire. Strategic investments in energy efficiency help reduce consumer and business energy costs while avoiding greenhouse gas emissions. In addition to lower energy bills, reduced energy demand means less money leaving the state to import carbon-intensive fossil fuels. Energy efficiency investments generate significant local economic benefits, including increased Gross State Product and thousands of new jobs.[1]

New Hampshire should adopt multi-year energy savings targets for the utilities' customer energy efficiency programs. Electric and natural gas savings targets should be established on a statewide basis, and be subject to approval by the Public Utilities Commission (PUC). Utility program administrators would be required to meet the targets. Multi-year targets provide greater market certainty for sustained energy efficiency investments. The charts in Figure 1 and Figure 2 depict the multi-year energy savings goals in place in Massachusetts and Rhode Island.

Multi-year targets should be complemented by a requirement for utilities to procure all cost-effective energy efficiency that is less expensive than supply. Energy efficiency investments deliver real energy savings that can displace generation from supply-side resources. An all cost-effective efficiency requirement would require the utility to consider all available energy resources, including energy efficiency, and to invest in efficiency whenever it is cheaper than traditional supply. Energy efficiency can also play an important role in addressing grid reliability and high fuel prices. Regional electricity prices closely track natural gas prices, thus escalating natural gas prices and pipeline constraints affect both electric and natural gas customers. Energy efficiency is a resource that can be quickly deployed to reduce system price and reliability challenges, and can be targeted to specific geographic areas to defer expensive system upgrades and lessen seasonal peaks.

[1] http://www.env-ne.org/resources/open/p/id/964

Figure 1. Massachusetts Electric Energy Savings Targets[2]

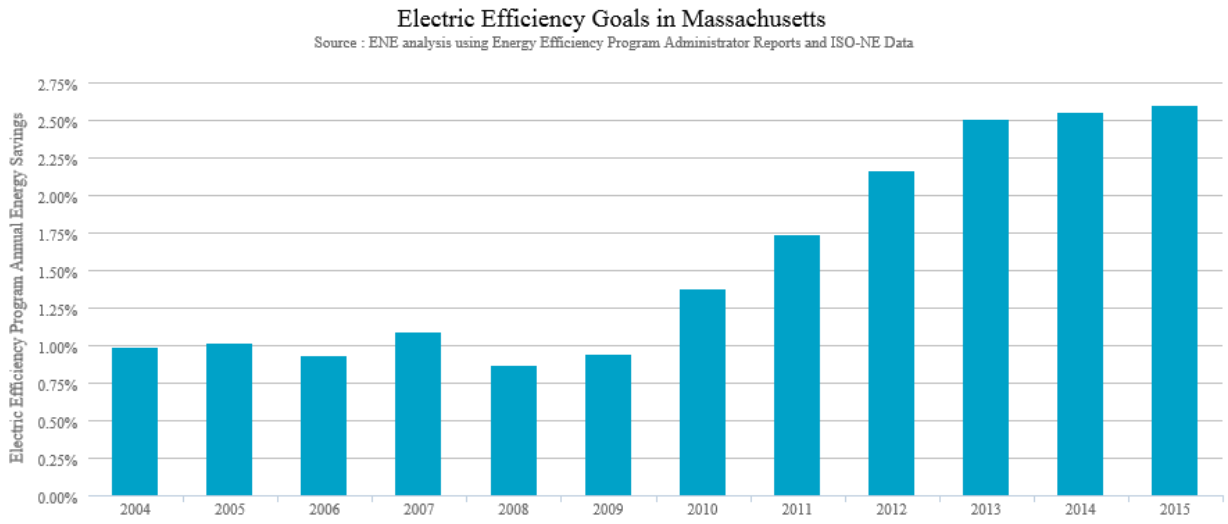
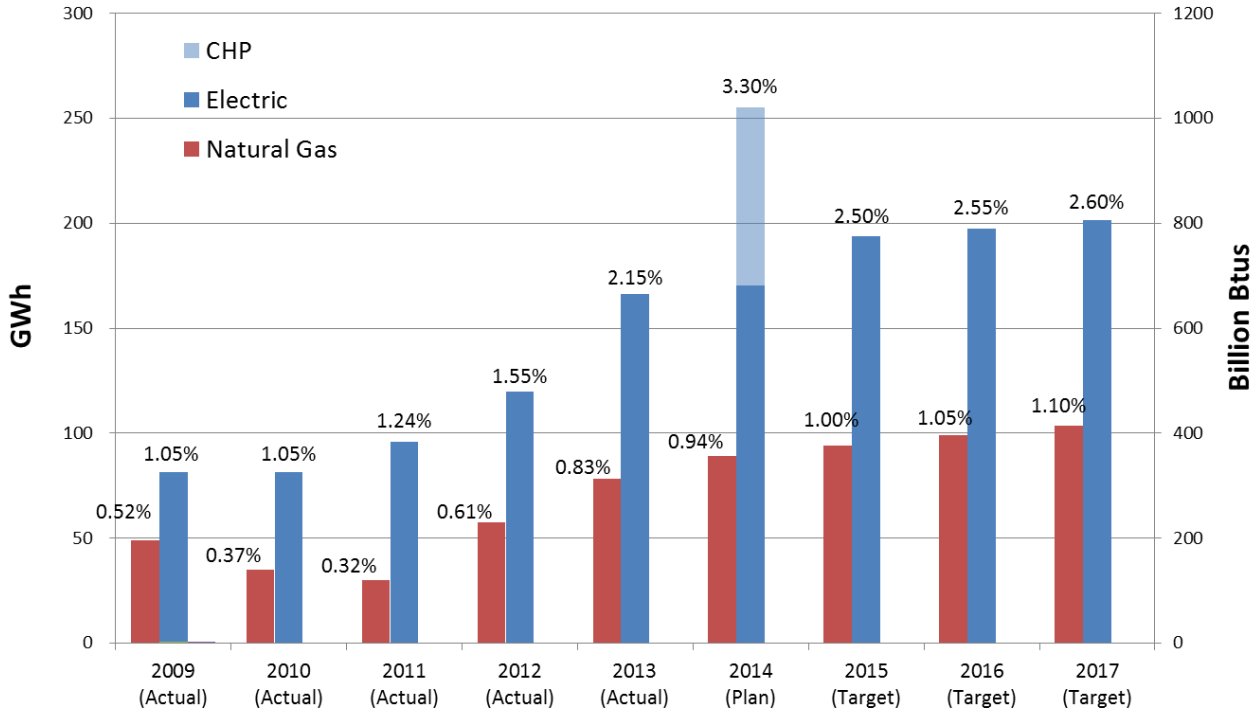


Figure 2. Rhode Island Electric, Natural Gas, and CHP Energy Savings Targets[3]



[2] http://eneclimatevision.org/policy-successes/energy-efficiency-investments

[3] "2015-2017 Savings Targets Recommendations" presentation by the Rhode Island Energy Efficiency & Resource Management Council, Rhode Island Public Utilities Commission Technical Session, February 25, 2014.

Financing mechanisms should not be considered standalone alternatives to comprehensive energy efficiency programming. Property Assessed Clean Energy (PACE) funding, revolving loan programs, and other financing vehicles are a complementary element of comprehensive energy efficiency programs. Financing alone will not capture all cost-effective energy efficiency, and will not deliver the same results as well-designed energy efficiency programs.

ENE recommends establishing a stakeholder council to oversee and guide the development of statewide energy savings targets, and ensure the program administrators are pursuing all cost-effective energy efficiency that is cheaper than supply. The stakeholder council would not diminish the authority of the PUC, but would rather serve as an advisory body throughout the planning and implementation phases. The stakeholder council would include key parties who are engaged in energy policy in the state. Ideally, council decisions would be consensus-based and informed by objective analysis. Three states at the top of the American Council for an Energy-Efficient Economy's *2013 State Energy Efficiency Scorecard* – Massachusetts (#1), Connecticut (#5), and Rhode Island (#6) – have efficiency stakeholder councils in place.

New Hampshire should explore revenue decoupling mechanisms that eliminate the utilities' financial incentive to promote electric and gas sales, to make them stronger allies in promoting efficiency.

New Hampshire should adopt the most recent edition of the International Energy Conservation Code (IECC) for residential and commercial buildings. In addition, ENE recommends a legislative requirement to adopt each new IECC edition within one year of its publication. Updated on a three-year cycle, each new edition of the IECC builds upon the efficiency requirements of the prior version. The 2012 IECC is approximately 30% more efficient than the 2006 IECC edition. The 2015 IECC raises efficiency requirements by 45-50% over the 2006 IECC.[4]

Extending and Expanding Support for Renewable Energy

Cleaning up New Hampshire's energy supply will reduce greenhouse gas emissions, improve the stability and sustainability of the current energy system, and promote jobs and economic development in the state and region. Supporting both grid scale and distributed renewable energy through incentives and policies will reduce air and water pollution and enhance price stability by reducing exposure to volatile fossil fuel prices.

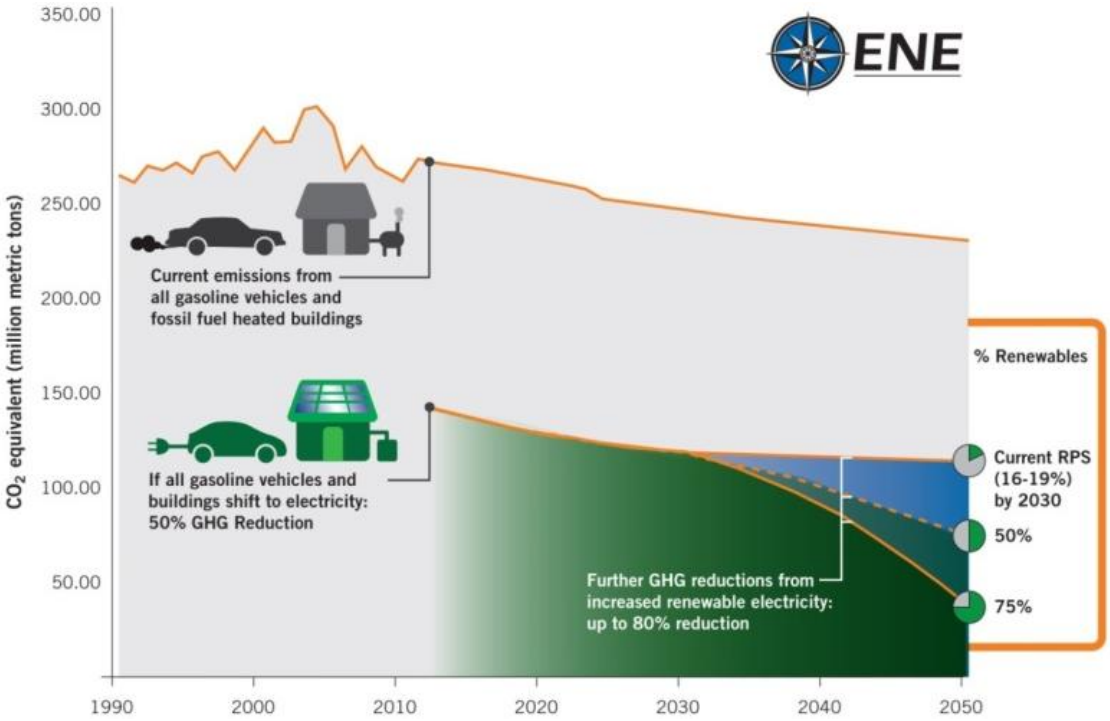
New Hampshire's existing renewable portfolio standard (RPS) should be extended and expanded from current requirements in order to provide financial support for sustainable, low-carbon power sources that can help the state meet climate targets while promoting economic growth. In order to provide clarity to investors, RPS targets should be increased to at least 75% renewable energy by 2050, with potential revisions to 2025 and other interim targets to support the 2050 goal.

Advanced consumer technologies that are increasingly available to provide heat and transport to New Hampshire citizens will increase the state's reliance on electricity to meet a growing share of its energy needs. Electric vehicles operate at greater efficiency and lower cost than gasoline-powered vehicles, and produce fewer GHG emissions. Air sourced heat pumps are capable of heating and cooling buildings at lower cost to consumers and the climate. While electrification in and of itself will help reduce GHG emissions from the heat and transport sector, supplying a greater percent of New Hampshire's electricity from clean generation sources will be needed to meet greenhouse gas (GHG) reduction goals. If

[4] U.S. Department of Energy, Energy Efficiency & Renewable Energy, Building Technologies Program. "Building Energy Codes – IECC 2012 and Beyond." http://apps1.eere.energy.gov/buildings/publications/pdfs/corporate/ns/webinar_residential_energycodes_20110222.pdf

renewable thermal technologies are supported through the RPS, heat pumps should also be allowed to generate credits. Realizing the full GHG reduction benefit of electric vehicles and heat pumps will require that electricity supply come from clean power sources. If 75% of electricity supply is provided by renewables, GHG emissions from cars and buildings in the region would drop by 80% (see Figure 3) and help the state meet its GHG reduction goals.

Figure 3: GHG Emissions Benefit Achieved by Supplying Renewable Power to Electric Vehicles and Heat Pumps



Economy-wide Carbon Pricing

A market-based mechanism that puts a price on carbon will spur innovation and drive a cost-effective transition to a more sustainable, low-emissions future. New Hampshire should build on the successful Regional Greenhouse Gas Initiative (RGGI) to extend carbon pricing across the state economy in order to capture least-cost emissions reductions and support the transition to a sustainable energy system.

Market-based environmental programs achieve outcomes at lowest cost by leading businesses and consumers to account for the societal cost impacts and adjust behavior accordingly. Under RGGI, emissions across the region have dropped significantly since the program was launched, even as electricity prices dropped (coming down by 8% from before the program launched in 2008 to 2012[5]). Extending RGGI beyond the power sector or establishing a carbon tax in other sectors of the economy would create incentives to reduce emissions, while at the same time raising revenue for the state to cut taxes or invest in additional emissions reductions.

Markets are able to react quickly and can deliver reductions in pollution cost-effectively. If revenue from carbon pricing is returned to consumers or invested in energy efficiency, carbon pricing can also

[5] See ENE Emissions Trends Report at:
http://www.env-ne.org/public/resources/ENE_RGGI_Past__Future_121210.pdf

promote economic growth – particularly in states like New Hampshire that do not produce fossil fuels. For example, since establishing a revenue-neutral carbon tax in 2008 British Columbia's consumption of fossil fuels has dropped faster than the rest of Canada, without damaging the Provincial economy. British Columbia was also able to reduce income taxes to the lowest level in Canada,[6] though revenue could also be used to lower sales taxes or other taxes. Investing carbon revenue in energy efficiency could create even greater benefits, as consumer savings on energy bills are reinvested in the local economy. Independent analysis found that New Hampshire's investment of RGGI revenue in energy efficiency over the program's first 2.5 years of operations will generate $17 million in net benefits over ten years.[7]

Reforming the Electric Grid

The transmission and distribution (T&D) planning and investment policies that exist today in New England were developed in a different era, when large fossil-fueled power plants were constructed to energize the region's population centers. Electric T&D planning and cost allocation has not kept pace with changes in energy technologies and environmental and consumer goals. While the New England states have set aggressive targets for meeting our energy needs with demand-side resources- including energy efficiency, demand response, distributed generation, and combined heat and power- the outdated processes used to determine new grid investments are barriers to pursuing and integrating clean energy resources. Realizing the potential of new technologies, strategies and tools that help consumers control energy use, such as time-varying rates and advanced meters, and technologies that help the utility manage the grid system, such as energy storage and clean distributed generation, will require a new way of thinking about the grid. The goal is to transform the grid from a centralized network run by the electricity producers, distributors, and system operators to a more decentralized consumer interactive network. A smarter system would be better able to take advantage of energy efficiency, clean distributed resources, and energy storage (including electric vehicles) to meet our energy needs. The challenge is to construct a system that facilitates development of new clean heat and power sources, energy efficiency, and electric vehicles through policy and planning reform at the state and regional levels to maximize consumer value and environmental benefit.

In ENE's vision of the modern grid system, the home and business are the centerpieces of the energy system. Consumers will have greater control over energy use within and around buildings through technologies such as rooftop solar water heating and photovoltaic systems, advanced meters that help consumers control and monitor power usage, and technologies such as smart appliances, heat pumps, and electric vehicles that can help power the home or office when not being driven. Community energy systems will also play an important role in a decentralized power grid. Energy efficiency is a "first resource" through targeted deployment that offers a cost-effective alternative to building more poles and wires to supply additional power.

The modern grid should have the following characteristics:

- Fully integrated, flexible, low carbon energy network
- Smart and dynamic electric system
- Widespread clean energy supply, distributed generation, deep energy efficiency
- Increasingly electrified buildings and vehicles
- Incorporation of new, customer-side energy resources

---

[6] Based on analysis of data from Statistics Canada by Professor Steward Elgie, see: http://www.sustainableprosperity.ca/article3685

[7] Analysis Group, 2011, *The Economic Impact of the Regional Greenhouse Gas Initiative on Ten Northeast and Mid-Atlantic States,* available at: http://www.analysisgroup.com/rggi.aspx

- Consumer-centered system
- Connecting to local, distributed generation
- Incentives for off-peak consumption
- Homes and businesses as micro-utilities
- Efficient, clean technologies
- Two-way power flow for distributed generation and electric vehicles
- Rates that incentivize energy efficiency, conservation, load shifting
- Infrastructure that supports energy efficiency, DG, storage, vehicles
- Energy efficiency, DG, EVs, etc. utilized as grid resources

Existing regulatory policies for grid planning and financing risk perpetuating the status quo. To achieve this future, existing policies and rules at the state and regional levels need significant reform in the following areas:

Planning barriers- *current planning processes fail to include non-transmission alternatives*

- Existing T&D planning processes largely ignore the proven ability of non-transmission alternatives (i.e., energy efficiency, demand response, distributed generation, storage) that would help forestall and/or avoid construction of new transmission and distribution lines
- The existing planning process also does not account for the likely impact of new advanced electric technologies on the grid, and strategies for grid modernization that would minimize any adverse impacts.
- Planning process is reactive and primarily focused on traditional utility solutions.
- Incongruity of a regulatory model for traditional "poles & wires" solutions and market model for non-wires solutions has resulted in an un-level playing field for new technologies and resources.
- Planning mindset is focused on long-lived, predictable assets that are part of a centrally-controlled network.
- Current planning schedule is often too late for the incorporation of non-traditional solutions; however some states, such as Maine and Vermont, have taken steps to ensure that non-transmission alternatives are examined in a timely fashion.

Cost allocation barriers- *current regulatory framework creates an un-level playing field*

- Utilities and transmission companies are able to earn a higher return on equity for traditional poles & wires solutions, but non-transmission alternatives are not eligible for the same return.
- Regional rules on the cost allocation of new transmission infrastructure significantly disadvantages non-transmission alternatives because the costs of new wires are divided among the ratepayers of all of the states based on the state's contribution to the ISO-NE load, while the cost of non-transmission alternatives are spread over the ratepayers of the individual state in which the project is located.
- State regulators determine whether distribution utilities receive cost recovery and a return on equity for distribution-level system investments. The utility has the burden of proving that investments are prudent, valuable, used, and useful.
- Utilities, seeking to retain a familiar level of financial risk, will not adopt new technologies or strategies for modernizing the grid until state regulators clarify and

establish clear guidelines for determining whether utilities can recover investments in new technologies/strategies.

- Regulators point to uncertainty about costs, benefits, and risks.

ENE recommends that New Hampshire enact policies to modernize the grid that achieve the following:

1. Utilities should be provided clear incentives (e.g., revenue decoupling mechanism) to promote and prioritize energy efficiency, renewable energy, combined heat and power, and demand response strategies over traditional transmission and generation.
2. Reward utilities for taking a coordinated approach to improving the efficient use of the distribution system, including providing capacity for strategic electrification of buildings and transportation.
3. Ensure that investments in advanced metering infrastructure maximize consumer benefits from energy efficiency, distributed generation, demand response, load management and automation, and electric vehicles.
4. Reward utilities for deploying high-value, targeted non-transmission alternatives to provide capacity on the transmission and distribution network, potentially deferring or avoiding costly infrastructure upgrades.
5. Ensure that utilities support and are equipped to receive and deliver net-metered energy on a large scale, including stored power from electric vehicles. Utility planning processes must anticipate the impacts to the grid of consumer engagement with energy efficiency and distributed generation resources.

II. ENE's Thermal Sector Strategy Recommendations

Natural Gas

ENE recommends that before any natural gas expansion is considered in New Hampshire, all alternatives are explored, including installation of air source heat pumps and/or solar PV combined with efficiency. Any expansion of natural gas infrastructure should be incremental and cost-effective. Expansion of distribution should take a 'near main' approach as it reflects an efficient strategy of expanding with only low capital investment. Consideration should also be given to requiring coordination of any natural gas conversions with NH's greenhouse gas emission reduction goals and ongoing energy efficiency efforts. ENE believes that increasing natural gas usage will conflict with state goals to reduce carbon pollution.

Thermal Efficiency

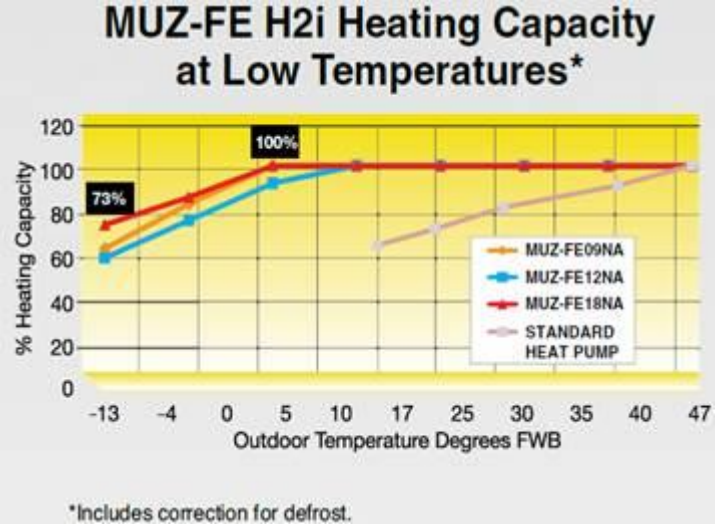
ENE supports analyzing an expanded energy efficiency future that includes heating oil and other delivered fuels, including propane and kerosene. Energy efficiency, especially improving the efficiency of the building envelope through weatherization, should be the first choice of every home owner and business since it is the least expensive option to reduce home heating bills, and avoids the need to purchase imported, carbon-emitting fuels. Considerable environmental and macroeconomic benefits will accrue to New Hampshire and its residents and businesses by giving comprehensive, all-fuels energy efficiency top policy priority.

ENE recommends designing incentives and rebates to support adoption of energy efficiency improvements to both heating equipment, the building envelope and clean heating technologies such as air source heat pumps to overcome the barrier of upfront cost of weatherization, equipment upgrades, and replacing existing heating systems.

Renewable Thermal

New Hampshire's support for renewable thermal technologies through the RPS creates an important incentive for the adoption of technologies that can reduce energy costs and greenhouse gas emissions, and air source heat pumps designed for cold climates should be included with other technologies eligible to generate credit under the RPS. Heat pumps are advancing rapidly and are increasingly able to operate at extremely low temperatures in the northeast. Whereas natural gas and oil systems have a maximum potential efficiency of 100%, heat pumps are already 200% to 400% more efficient than combustion technologies – even in Northeast winters – and the efficiencies are likely to continue improving (see Figure 4 below)[8]. HPs are able to achieve this efficiency because they move heat from outside a building to inside rather than directly create it from another energy source.

Figure 4. Heating capacity for advanced heat pumps



Cold climate air source heat pumps (ccASHPs) are furthermore capable of being installed in buildings at fairly low costs, and are more widely applicable than some other renewable thermal technologies. Specifically, ccASHPs do not require the land or vertical drilling of ground source heat pumps, and can thus be installed at lower cost. Additionally, ccASHPs are ductless and require no modifications to existing oil, gas, or propone heating systems, but can significantly offset use of these more expensive heating fuels.

III. ENE's Transportation Sector Strategy Recommendations

The current transportation system is unsustainable. The transportation sector is the second largest source of U.S. GHG emissions, responsible for 28% of emissions nationally, and nearly 40% in Northeast and Mid-Atlantic states. In New Hampshire, transportation is responsible for 41% of emissions. Additionally, the current transportation system is almost entirely dependent on gasoline and diesel,

[8] Available at: http://www.mitsubishipro.com/media/382145/m-series_revised_july13.pdf

resulting in a transfer of wealth from New Hampshire to other regions and countries. Electrifying the transport sector will also save drivers money. At recent electricity and gasoline prices, the fuel costs of a battery-electric vehicle like the Nissan Leaf are approximately 65 percent lower than the fuel costs of a conventional medium sedan.[9] Shifting a greater portion of driving to electric vehicles will reduce our total expenditure on transportation fuels and slow the flow of wealth out of the state.

The suite of policies and actions outlined below can begin the process of bringing additional choice to consumers and speeding the transition off of petroleum-based fuels.

Establish 2025 Target for Electric Vehicles

Electric vehicles (EVs) provide significant reductions in greenhouse gas emissions compared to existing vehicles on the road. Replacing only ten percent of the 600,000 conventional automobiles in New Hampshire with electric vehicles could reduce New Hampshire's greenhouse gas emissions by nearly a quarter of a million tons with the current electricity mix.[10] As we continue to clean our electric sector over the coming decades, the greenhouse gas benefits of electric vehicles will increase and can represent a substantial percentage of the proportional reductions from the transportation sector.

Provide Consumer Incentives to Accelerate EV Adoption

Electric vehicles purchased in or after 2010 may be eligible for a federal income tax credit of up to $7,500.[11] New Hampshire should capitalize on this by further reducing costs to encourage electric vehicle adoption. Other states, such as Massachusetts and California, have enacted financial incentives for EV buyers that could serve as models. New Hampshire should:

1. Establish a long-term rebate program for qualified electric vehicles, with a framework for determining rebate levels as battery costs change over time.
2. Exempt charging equipment and relevant electric vehicle parts from the state excise tax.

Regulatory Framework to Maximize Benefits of EV Adoption

Public utilities commissions need to make structural reforms to ensure that electric vehicles are integrated into the electric system in a manner that enhances system reliability, minimizes costs, and protects consumers.

1. Establish and publicize mechanisms to incentivize EV owners to charge vehicles during low-cost off-peak periods. These mechanisms may include, but not be limited to, time-varying electricity rates.
2. Adopt rules that encourage utilities to support the integration of electric vehicles into the electric grid to increase asset utilization, load management, and energy storage.
3. Integrate electric vehicles into short and long term distribution-level system planning and load forecasting. Provide for reporting of EV charging station location and capacity and direct the registry of motor vehicles to share EV registrations with the electric distribution utilities.

---

[9] ENE analysis assumes gasoline price of $3.63 per gallon of gasoline and $0.15 per kWh of electricity. The conventional vehicle fuel efficiency (miles per gallon) and electric efficiency (kWh/100 miles) from U.S. DOE. Fuel efficiency of the "medium sedan" category is the average of MY 2012 Chevrolet Impala, Ford Fusion, Honda Accord, Nissan Altima, and Toyota Camry. Available from: http://www.fueleconomy.gov/.

[10] Based upon reductions per vehicle shown in Chart 2.

[11] The Internal Revenue Service maintains an index of qualified electric drive motor vehicles eligible for the federal tax credit. Available from: http://www.irs.gov/Businesses/Qualified-Vehicles-Acquired-after-12-31-2009

4. Require electric utilities to provide consumer education on electric vehicle charging rates and costs of residential charging infrastructure installation.

Facilitate Build-out of EV Charging Infrastructure

A significant build-out of electric charging infrastructure is needed to support widespread electric vehicle adoption. New Hampshire can facilitate deployment by providing guidance and standards for infrastructure site selection and integration of charging infrastructure into the built environment:

1. Establish targets for charging infrastructure to accommodate the electric vehicle target.
2. Develop statewide guidelines for public electric vehicle charging stations that inform technical design and optimal site selection to serve diverse consumer groups.
3. Clarify that 1) non-utilities are allowed to own and operate EV charging stations, and 2) all owners of EV charging stations will be able to purchase electricity on fair terms.[12]
4. Make charging costs easily visible in a format understandable to consumers and prohibit member-only public charging stations.
5. Require state and local building code officials to implement standards related to electric vehicle charging and provide expedited inspection of home charging infrastructure.
6. Recommend standardized signage for use by cities and towns to identify EV parking and charging locations.

Lead by Example

New Hampshire can accelerate transportation electrification and prime the market for vehicles and infrastructure by committing to electric vehicle usage and providing guidance and incentives for municipalities.

1. Establish a yearly minimum percentage of electric vehicles for state fleet purchases and increase the percent of vehicles that must be zero emissions over time.
2. Develop model RFPs or procurement standards for vehicle and charging equipment by state agencies and municipalities.[13]

---

[12] Retail rate structures should be designed to avoid discriminating against electric vehicle charging stations. Charging station owners should be able to act as a supplier of generation services but must be subject to the same requirements, such as renewable portfolio standards, as other entities providing electric energy from the wholesale markets.

[13] Rhode Island recently added the all-electric Ford Focus, Nissan Leaf, and Honda Fit to its list of eligible alternative fuel vehicles. Plug-in gas-electric models include the Chevrolet Volt, Ford C-Max, Toyota Prius Hatchback, and Ford Fusion. For additional information, see: https://www.purchasing.ri.gov/RIVIP/StateAgencyBids/7458316.pdf.

ENE appreciates the opportunity to provide comments on policy recommendations and looks forward to continuing discussions on these and other matters at the Energy Advisory Council.

Thank you.

Respectfully submitted,

Ellen Hawes, Forest Policy Analyst

For Further Information:
Ellen Hawes, Forest Policy Analyst, (802) 649-7161, ehawes@env-ne.org
Dan Sosland, President and CEO, (207) 236-6470, dsosland@env-ne.org