

**APPENDIX 17D:
SOUTHWEST REGION PLANNING COMMISSION, SOUTHWEST NEW HAMPSHIRE
NATURAL RESOURCES PLAN, CHAPTER 3: ENERGY RESOURCES
(2014)**



Southwest New Hampshire NATURAL RESOURCES PLAN

2014

Prepared by the Southwest Region Planning Commission



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CHAPTER 3. ENERGY RESOURCES

Energy plays a significant role in many aspects of our lives. It shapes how we transport and store food, heat our homes and buildings, power our vehicles, and many other important applications. Needless to say, access to affordable and reliable energy is essential to our economic stability and growth, both globally and at the community level. However, this heavy reliance, specifically on non-renewable and imported energy sources, has made our Region vulnerable to changes in its supply and price. It can also have substantial impacts on the quality and stability of the environment as a result of emissions, land use impacts, and waste from the production and use of certain energy sources.

Although energy is a global commodity and the issues described above are broad in scope, there are opportunities to address these challenges within the Southwest Region. Communities have much to gain by taking charge of their energy future and making sustained investments in the built environment and energy infrastructure. By using energy more efficiently and producing more energy locally, communities can help lower energy costs, increase energy security and reduce environmental impacts.

This chapter is intended to highlight some of the pressing energy challenges facing the Region and to identify opportunities for communities, organizations, businesses, and residents to address these issues.

Energy Consumption

Although the Southwest Region relies on many different types of energy sources, petroleum products dominate our energy consumption. New Hampshire households are among the most dependent on petroleum in the nation, with more than half of homes using fuel oil as their primary source for home heating. This is especially true in the Southwest Region, where 65.8% of residents rely on petroleum products to heat their homes.¹³⁰ However, it is the transportation sector that consumes more petroleum-based products than any other sector in the state. In 2012, this sector accounted for 35.5% of the state's total energy consumption.

New Hampshire receives natural gas by interstate pipelines from Maine and Canada, yet more than 50% of the natural gas in these pipelines travels through the state to reach consumers in Massachusetts. Approximately two-



thirds of this natural gas is used to generate electricity in the state, and the remainder is distributed to commercial, residential and industrial sectors.

New Hampshire is among the lowest states in per capita natural gas consumption, in part because large areas of the state do not have natural gas distribution infrastructure. As a predominantly rural area, there is less use of utility supplied gas for home heating use in the Southwest Region than in New Hampshire as a whole (3% compared to 20% statewide). However, 6% of renter occupied housing units in the Region, compared to 1.7% of homeowners, identified utility gas as the primary source of heating fuel.

As a densely forested Region and state, it is not surprising that nearly 1 in 12 homes depend on wood products as a primary heat source. Use of biomass for heating fuel is higher in the Southwest Region (14%) than in the state (6%) or nation (2%).

Energy Supply

Having no fossil fuel reserves, the Region imports the majority of its energy from other states or abroad. In 2011, New Hampshire ranked 44th in the United States for total energy production. The highest energy producer in the Northeast is Pennsylvania, who ranks 4th in the nation to 1st ranked Texas.¹³¹ This dependence on foreign fuels makes the Region vulnerable to fuel oil shortages and price spikes, especially during winter months. In 2000, the U.S. Department of Energy created the Northeast Heating Oil Reserve to give consumers adequate supplies for about ten days (the time required for ships to carry heating oil from the Gulf of Mexico to New York Harbor) in the event of a supply shortage. The Reserve's storage terminals are located in New Jersey and Connecticut.

New Hampshire produces electricity using a mix of energy sources, the most predominant being nuclear energy (42%) and natural gas (33%). The state also uses renewable sources to produce electricity such as hydroelectric power, biomass, wind power, and to a small extent, solar power. As of 2013, 16% of the state's net electricity generation came from renewable energy, up from 10% in 2011.¹³²

Figure 6. NH Energy Consumption by End Use Sector, 2012

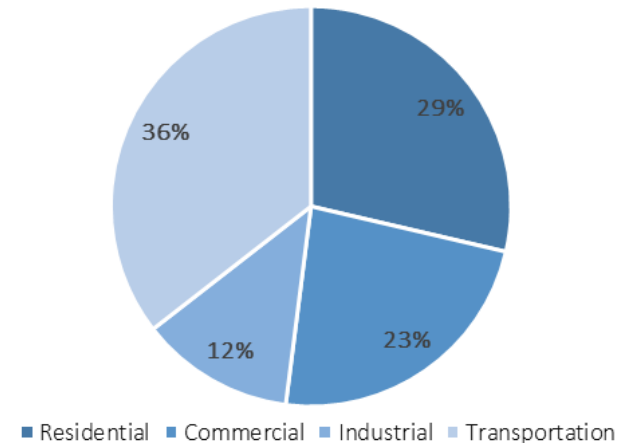
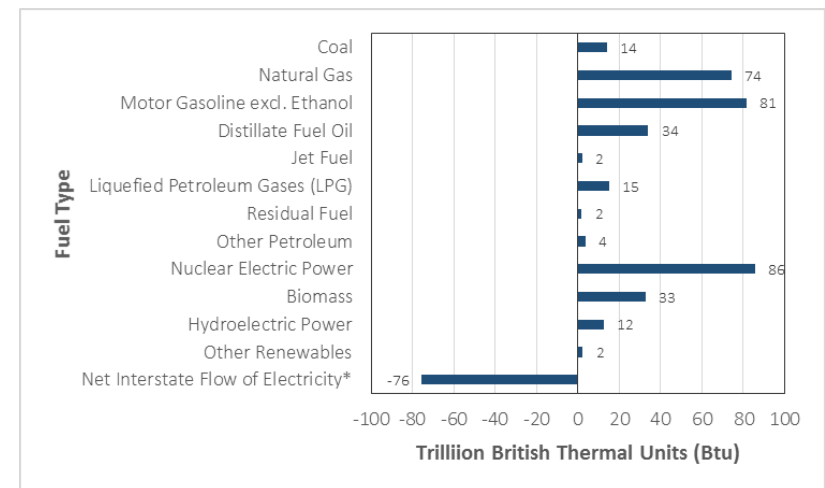


Figure 7. NH Energy Consumption by Source, 2012



*Represents the difference between the amount of energy in the electricity sold within a state (including associated losses) and the energy input at the electric utilities within the state. A negative number indicates that more electricity (including associated losses) went out of the state than came into the state.

Source for above figures: U.S. Energy Information Administration, State Energy Data Estimates, 2012

Energy Expenditures

Even though the state's per capita energy use is relatively low (NH ranked 42nd in the nation in 2012), it ranks 23rd nationally for per capita energy expenditures, indicating a disproportionately high cost per unit of energy. In 2013, New Hampshire citizens, businesses, and industries spent nearly \$6 billion on energy, which is approximately 9% of the state's Gross Domestic Product (GDP).

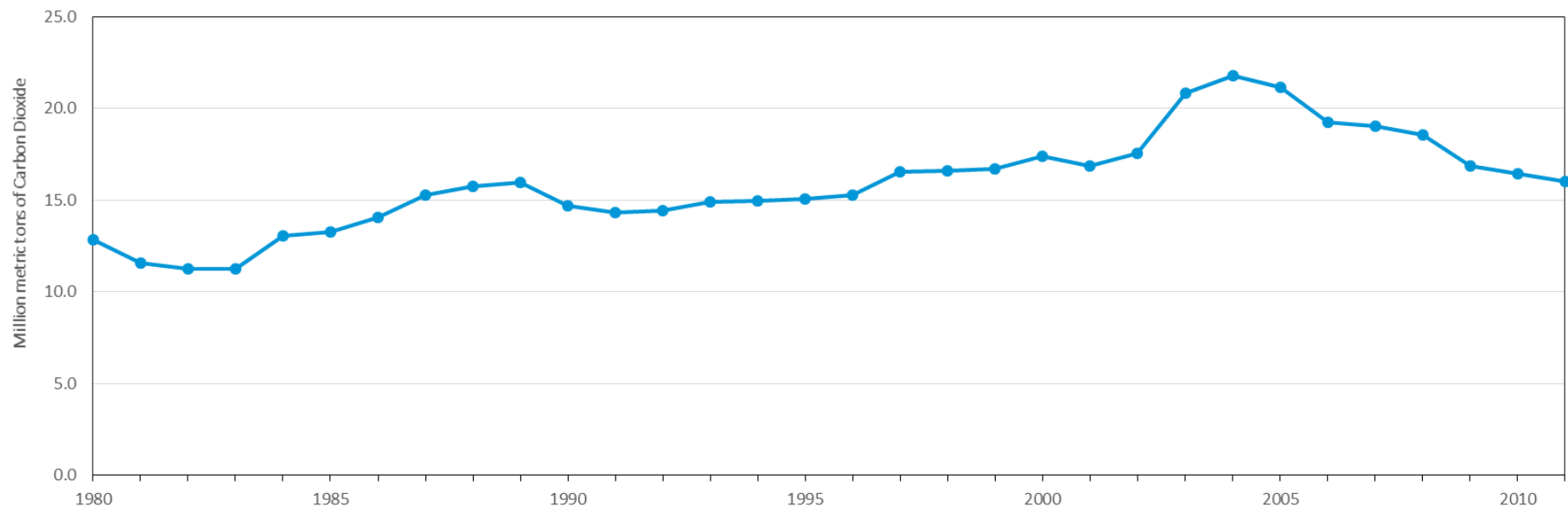
The majority (50%) of the state's estimated energy expenditures in 2012 were on transportation, followed by residential (26%), commercial (17%), and industrial (7%) uses. In the same year, New Hampshire ranked 4th in the nation for highest motor gasoline annual expenditures per person (\$1,893 per person).

Environmental Impacts

Much of the energy produced and consumed in Southwest Region is through the use of nonrenewable fossil fuels (e.g. coal, natural gas, and oil), which can have significant health and environmental impacts. According to EPA, the burning of fossil fuels was responsible for 79% of greenhouse gas (GHG) emissions in the United States in 2010.¹³³ GHGs, which include carbon dioxide and methane, exist naturally in the atmosphere and contribute to the warming of the Earth's surface by trapping heat from the sun, in what is known as the greenhouse effect.

They become problematic when the concentration of GHGs in the atmosphere exceeds stable levels. This concentration causes average temperatures to rise, resulting in numerous climatic shifts and impacts around the world. In 2011, carbon dioxide emissions from fossil fuel consumption was 16 million metric tons, compared to 19 million metric tons in 2007.

Figure 8. NH Carbon Dioxide Emissions from Fossil Fuel Consumption, 1980-2011



Source: U.S. Energy Information Administration, State Energy Data Estimates, 2012

ENERGY EFFICIENCY

Energy efficiency is one of the most cost-effective ways to address the challenges of high energy consumption and expenditures. Investing in efficiency reduces the Region's reliance on imported and nonrenewable fuel supplies, which can lead to cost savings for consumers and increased energy independence. It can also be an opportunity to increase local economic development since energy improvements typically involve the purchase of local goods and services. A 2013 independent study¹³⁴ conducted for the NH Office of Energy and Planning (OEP) found that if all buildings in the state were improved to the highest level of cost-effective energy efficiency, this investment would create 2,300 jobs and add \$160 million each year to the state's GDP. In addition to providing economic benefits, efficiency also reduces harmful emissions produced by burning fossil fuels, can decrease stress on the electric grid, and can increase comfort and safety in buildings.

THREATS & CHALLENGES

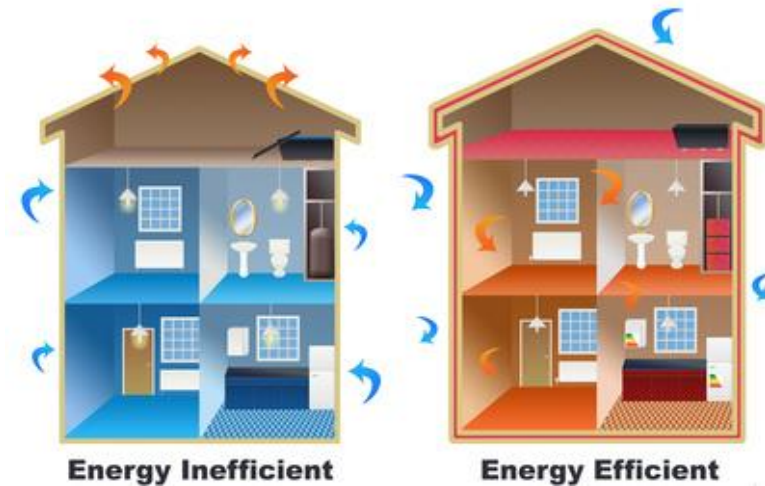
The section below explores some of the greatest challenges to energy efficiency in the Region.

Older Building Stock

As of 2011, 80.5% of the housing stock in Southwest New Hampshire was built in 1989 or earlier. Of this total, 31% was built in 1939 or earlier.¹³⁵ While many of these older structures are important to the Region's heritage and character, they consume a great deal of energy.

Older buildings tend to have inferior building envelopes and less efficient heating equipment than newer construction. According to the U.S. Energy Information Administration (EIA), the typical home built after 1999 consumes 21% less energy for space heating than those built in previous decades. As a whole, commercial and residential buildings in the United States accounted for 41% of primary energy consumption, 74% of all electricity consumed domestically, and 40% of carbon dioxide emissions in 2010.¹³⁶

Given the significant energy demands of the building sector and the Region's aging housing stock, there is a need to improve the energy efficiency of existing and new buildings in the Region. Buildings often represent the single largest financial investment for families or business owners, and the lifespan of new buildings can be 30 to 50 years or more. Incorporating energy



Above photo: Thermal image of a residential structure. The warmer colors represent areas of heat loss; Below photo: Heat loss comparison between an energy inefficient and efficient structure.

efficient design in new and promoting energy retrofits in existing buildings can lead to lasting energy benefits through reduced energy bills, reduced air pollution, improved health and comfort and increased building durability.

Limited Incentives

There are few incentives or policies in place to encourage energy efficiency improvements in the state and Region. Those that do exist are either underutilized or underfunded.

In the past, many incentive programs were funded by the New Hampshire Greenhouse Gas Emissions Reduction Fund (GHGERF), which received revenue from carbon dioxide auctions held under the Regional Greenhouse Gas Initiative (RGGI). This fund directed a minimum of 10% of program allocations to low income energy efficiency programs. The remainder went to support energy efficiency programs such as energy audits, weatherization of buildings, building code compliance, education and outreach, energy efficiency related workforce development, revolving loan funds for energy efficient investment, etc.

In 2012, a bill¹³⁷ was passed that replaced the GHGERF with the Energy Efficiency fund, lowering the rebate threshold for auction proceeds to \$1, and allocating the remaining proceeds received by the state to core energy efficiency programs, which are administered by the state's utilities. These changes, which were made effective at the start of 2013, reduced the funds available for energy efficiency investments.

Some of the efficiency programs that are currently offered by the state and utility companies are limited and not all residents or businesses are eligible to receive assistance. For instance some programs only offer incentives to customers who meet a minimum energy demand. Other programs impose income limitations on who is eligible to receive services.

Although these program have had some success, they are currently insufficient to help the state realize its full efficiency potential. A 2013 study found that New Hampshire's current levels of investment in energy efficiency amount to roughly one-third of those necessary to put the state on track to achieve all cost effective gains in efficiency.¹³⁸

Lack of Enforcement

According to the U.S. Department of Energy (DOE), the single most important step to reducing energy use in buildings is to implement and enforce compliance with building energy codes.¹³⁹ A building code is a set of rules that specify the minimum acceptable level of safety for constructed objects such as building and non-building structures. Energy codes, which are a subset of building codes, set minimum efficiency requirements for new and renovated buildings.

However, for many communities, especially those with limited resources, routine enforcement of codes and regulations can be a significant challenge. In New Hampshire, it is the local building official that enforces energy requirements of the State Building Code. Municipalities with code officials conduct plan reviews and on-site inspection, as well as issue building and occupancy permits. These communities may consult with the Public Utilities Commission (PUC) and the Department of Safety (DOS) on enforcement issues as necessary.

However, it is not uncommon for smaller or more rural municipalities to have a part-time or no code official on staff. In 2010, only 13 municipalities in the Region had either a part time or full time code official.¹⁴⁰ In jurisdictions without a code official the PUC is responsible for conducting plan reviews for the State Building Code for any municipality that requests it, and the DOS is responsible for inspections. In practice, neither entity has sufficient resources to conduct adequate plan reviews and on-site inspections for all construction projects that fall under their jurisdiction.¹⁴¹

As part of the New Hampshire Building Energy Code Compliance (NHbcc) program,¹⁴² it was estimated that the baseline level of compliance with building energy code in NH in 2012 was approximately 45%.¹⁴³ This initiative found that some of the common issues impeding compliance or enforcement of codes include: limited knowledge or awareness of the codes or their benefits; lack of resources and training; insufficient funding to support code officials; competing priorities, constrained or limited resources; and, the general sentiment of 'this is the way we have always done it.'

OPPORTUNITIES

Adopt and Enforce Improved Building Energy Codes

- It is important for communities and the state to adopt building codes that promote energy efficiency and conservation. Including energy as a central part of the construction process and making early investments in efficiency can yield significant, long term benefits for building owners and occupants.¹⁴⁴ Especially since it can be significantly more expensive to achieve high efficiency levels in buildings post-construction.
- Since 2010, New Hampshire has referenced the 2009 International Energy Conservation Code (IECC), which applies to both residential and commercial buildings. The most current version of this code is the 2012 IECC, which has proven to be more cost effective than the 2009 IECC. Energy costs, on average, are 27% lower with the 2012 IECC, and homeowners could save an estimated \$10,635 over a thirty year period.¹⁴⁵ Local governments have the ability to adopt the 2012 IECC or another code, as long as the requirements are more energy efficient than the state's.
- To encourage compliance and enforcement of codes, is important to have trainings, resources and tools available to building trade professionals and enforcement officials that explain the code's requirements and benefits. In recent years, the NHBCC has developed hands-on training curriculum for NH code officials and building professionals. Also, the PUC offers online training on a variety of code, beyond code and related building science issues.¹⁴⁶

Table 9. Comparison of 2009 and 2012 IECC Requirements

Example Requirement	2009 IECC	2012 IECC
Building envelope sealing	Caulked and sealed, verified by a visual inspection against a more detailed checklist	Caulked and sealed, verified by a visual inspection and a pressure test against leakage requirement
Ducts and air handlers	Sealed, verified by visual inspection, and pressure tested, or all ducts must be inside building envelope	Sealed, verified by visual inspection, and pressure tested against a leakage requirement, or all ducts must be inside building envelope
Insulation on hot water pipes for water heating systems	None	R-3 except where pipe run length is below a diameter-dependent threshold
% of High-efficacy lamps in the home	50% of lamps	75% of lamps or 75% of fixtures

Source: U.S. Department of Energy, 2012

Increase Efficiency of Existing Buildings

- Although the adoption and enforcement of improved building energy codes can lead to significant energy reductions, this measure is largely focused on new construction. Promoting increased energy efficiency in existing buildings through weatherization and retrofits is essential to reducing the Region's overall demand for energy and to realizing energy cost savings for home and business owners.
- As noted earlier, much of the Region's building stock was built prior to 1940, predating the adoption of the state's first energy code in 1979. Although the Region experienced an influx of construction between 1970 and 1990, when its population grew by 39.4%, new construction has steadily slowed since this time along with population growth. As of 2011, only 3.4% of houses in the Region were built in 2005 or later, compared to 5.1% at the national level.¹⁴⁷
- Currently, the community action agencies serving the Region, Southwestern Community Services and Southern NH Services, administer programs to help reduce energy usage and costs through free weatherization services. Eligibility for these programs is based on income with priority given to the elderly, disabled, and families with young children.
- Some utility companies offer assistance for implementing energy efficiency improvements; however, these programs are not widely advertised and typically involve some investment from the building owner or occupant.
- Button Up NH is a program that holds home weatherization workshops conducted by energy professionals in communities across the state. These free workshops are open to the public and teach basic building science concepts and information about air sealing, insulating, and conservation measures that reduce fuel and electricity use.

Implement Energy Financing Programs

- An important step for encouraging building owners to invest in energy improvement and retrofits is to identify and implement strategies to help minimize upfront project costs. Over the past decades, a number of innovative energy efficiency financing programs have emerged to help individuals achieve this goal. These strategies include on-bill financing,

property tax financing (also known as Property Assessed Clean Energy financing), and energy efficiency mortgages. Although these programs are not without limitations, they offer opportunities to overcome some of the challenges to investing in energy improvements.

- **On-bill financing** - In many instances, this option allows customers to pay back part or all of the cost of their energy efficiency improvements with the money saved on their monthly utility bills. In New Hampshire, the NH Electric Co-op offers SmartSTART, an on-bill financing alternative to pay for energy-efficient lighting and other approved energy-saving measures such as air sealing and insulation improvements. Rather than paying up front, the costs of these projects are distributed on monthly electricity bills equal to 75% of the monthly savings realized by the customer. If the customer moves and the installed products stay, the obligation to pay for them ends. The next occupant will “pay as they save.”
- **Property Assessed Clean Energy (PACE)** - In 2010, New Hampshire adopted legislation (NH RSA 53-F) that enables municipalities to create districts to finance energy conservation and efficiency improvements in residential, commercial, and industrial structures. Residential and commercial property owners living in these districts, which may be all or part of a municipality, can finance their project and pay it back over time as a voluntary property tax assessment through their existing property tax bill. While paying the assessment included in the property bill, the current building owner and any future owner profit from lower utility bills made possible by the energy efficiency improvements.

- **Energy efficient mortgage (EEM)** - An EEM is a mortgage that credits a home’s energy efficiency in the mortgage itself. Conventional EEMs increase the purchasing power of buying an energy efficient home by allowing the lender to increase the borrower’s income by a dollar amount equal to the estimated energy savings. EEMs can also be used to finance energy improvements as part of a mortgage. To acquire an EEM, a borrower typically has to have a home energy rating system (HERS) evaluation before financing is approved.

Community Energy Planning & Action

- Many communities and organizations within the Southwest Region are working to address energy efficiency and conservation at the local and Regional level. In 2007, residents in 27 of the Region’s 35 communities voted to adopt the NH Climate Change Resolution. This Resolution encourages the people of New Hampshire “to work for emission reductions within their communities,” and it calls on selectmen in each town to “consider the appointment of a voluntary energy committee to recommend local steps to save money and reduce emissions.”
- Noting the high concentration of municipalities in the Region that adopted this Resolution, Clean Air-Cool Planet (CA-CP) and the Antioch New England Institute (ANEI) partnered to form Cool Monadnock, a three year initiative to help communities manage energy issues at the local level. With the assistance of Cool Monadnock, many of the Region’s municipalities established energy committees, began to track

Below photo: Button Up NH Workshop in Milford, NH



energy use and costs, and started planning for energy efficiency and conservation improvements.

- Cool Monadnock culminated in 2011, with the development of a regional climate and energy plan. This Plan, called the Monadnock Sustainability Action Plan, is designed to serve as a practical guide for local energy committees, residential groups, businesses, organizations, educational institutions and other sectors to easily identify and implement actions to reduce energy demand.
- Although funding for energy projects has been limited in recent years, communities and energy committees continue to work on energy improvements and raise awareness for energy efficiency and conservation at the local level. Some communities have been successful at procuring funding for energy initiatives at their annual town meeting. In 2011, voters in the Town of Richmond approved the establishment of an expendable trust fund for energy retrofits of town buildings. In the following year, voters appropriated \$15,000 into this fund for energy improvements to the Town's Veterans Hall.

In 2010, the City of Keene adopted a Sustainable Energy Efficient District, which gives developers incentives for constructing green or energy-efficient buildings. Other local actions include but are not limited to the development of energy chapters to Master Plans, participation in the New England Carbon Challenge, and hosting local workshops on energy efficiency and weatherization.

While the focus of these committees has traditionally been on municipal energy savings and improvements, there may be opportunities for Regional collaboration and coordination with other energy use sectors including the commercial, residential, and education sectors. Committees can partner with neighboring municipalities and other organizations and institutions to host events and workshops like Button Up NH, plan for projects like community shared solar, and realize cost savings through joint purchasing practices or demand aggregation.



Above photo: Town of Jaffrey Energy Committee

ENERGY DIVERSITY

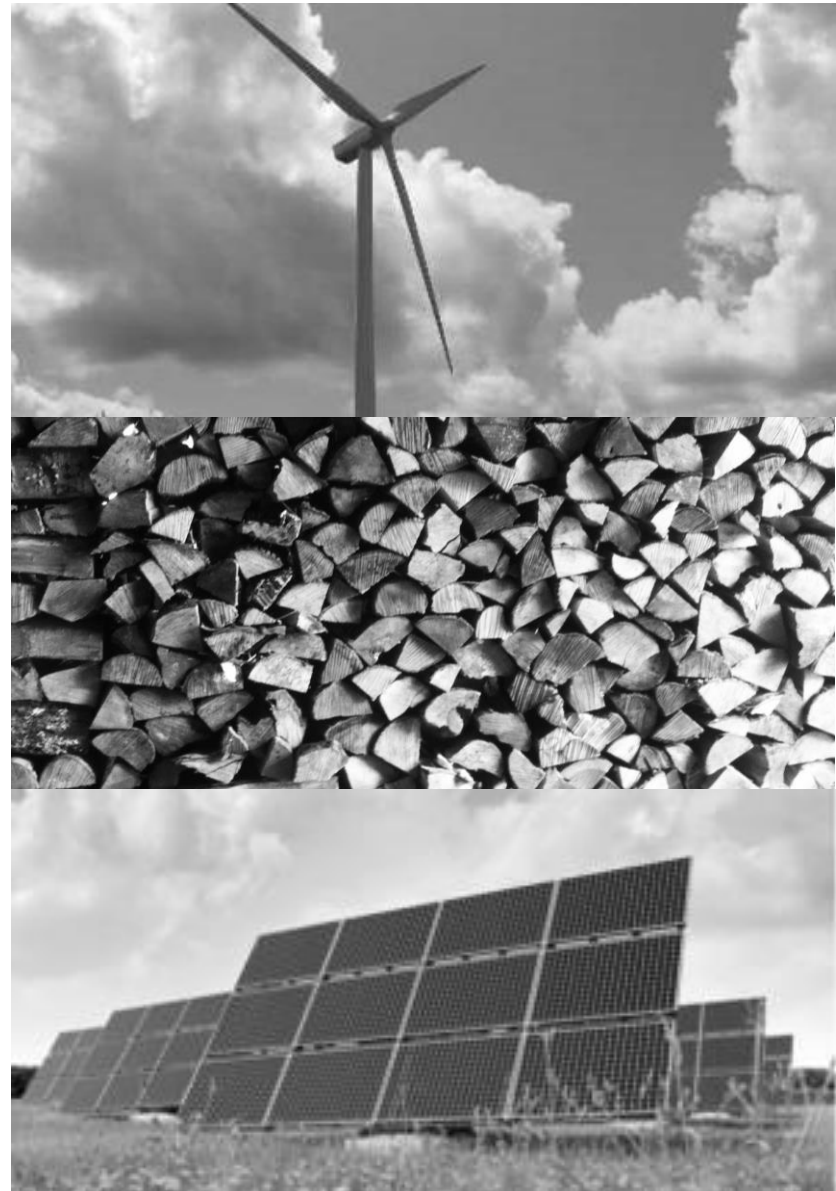
The Southwest Region like the rest of the state and nation has developed a strong reliance on foreign, non-renewable fossil fuels to meet its energy needs. Traditionally, fossil fuels have been relatively easy to obtain. However, resource depletion combined with political and market volatility could lead to dramatic price increases and reduced availability of these energy sources in the future. To stabilize the price and supply of energy, and to reduce the environmental impacts of fossil fuels, it is important for the Region to encourage the development and expansion of renewable energy resources such as hydropower, wind, solar, biomass, geothermal and methane generation.

As of 2013, nearly one-seventh of New Hampshire's net electricity generation comes from renewable resources, with hydroelectric facilities providing slightly more than half, and biomass facilities supplying most of the rest. Renewable energy can produce viable energy at a small scale (individual commercial building or house) or at a large scale (producing energy for multiple buildings or to sell to other energy consumers). Within the Region, there are currently few large scale renewable energy facilities in operation. However, recent projects and proposed developments might increase the Region's renewable energy capacity.

Some of the Region's existing renewable energy resources as well as challenges and opportunities to expanded renewable energy production are described below.

Hydropower

- Hydropower offers an emissions-free, reliable and locally distributed source of electricity. In the mid-1700s, early settlers of the Region built saw-mills and grist-mills and used the power of rivers to operate these facilities. However, advancements in technology, increased regulations and environmental challenges led to the decline of hydropower generation and consumption in the Region.
- According to the EIA, 35 of the New Hampshire's 60 power plants are small hydropower plants, and hydropower accounts for 7.1% of total electricity generation in the state. PSNH currently owns and operates nine hydroelectric power plants throughout the state, several of which are over a century old. The PSNH facility closest to the Region is the



Jackman Hydroplant, located on the North Branch of the Contoocook River in Hillsborough. This plant is capable of generating 3.6 MW. A smaller hydropower producer in the Region is Monadnock Paper Mills. The Bennington-based company generates up to 49% of its own power through low-impact hydroelectric generation using the Contoocook River.

- In addition to providing a clean source of energy, hydropower has provided noteworthy economic benefits to the state. According to the Granite State Hydropower Association, in 2010, hydropower operators paid \$750,000 in local and utility property taxes, employed over 50 state residents, and spent over \$1,000,000 on NH products and services.¹⁴⁸
- Although well maintained dams can provide many benefits, they can also cause a number of environmental problems, including blockages of fish passage, interruption of sediment and nutrient transport, interference with the reproduction of aquatic life and fragmentation of natural habitats. The effects can be felt significantly downstream, where flows can be reduced, stranding aquatic life and cutting off usable upstream habitat.¹⁴⁹

Wind Power

- Currently, there are three large-scale wind farms operating in the state. In 2008, Iberdrola, a large renewable energy company based in Spain, established the first New Hampshire-based wind farm on the hill-top ridges in Lempster, which borders the Southwest Region town of Marlow to the north. Since then, two other wind farms have been established near Groton and Dixville Notch and more operations are seeking permitting or are in development.
- Within the Region, a 15 MW wind project is proposed for the top of Kidder Mountain in New Ipswich and Temple. The project is currently under the review of the Towns. A commercial wind farm in Antrim was proposed for construction in 2014; however, the NH Site Evaluation Committee (SEC) rejected the proposal for reasons related to the visual and aesthetic impact of the proposed turbines. This marked the first time the SEC has turned down a wind project.
- Regional challenges associated with wind energy are largely related to the impact of wind development on scenic views and wildlife resources. The hill-tops and mountain ridges that are most suitable for generating

larger scale wind power are also valued for their scenic beauty, recreational value, and natural resources. Some of the proposed sites for wind energy in the Region are also areas that support important wildlife habitat and critical flyways for migratory birds.

- In 2008, the New Hampshire legislature created a framework for municipalities to regulate the construction of small-scale wind turbines that have a generating capacity of up to 100 kW. The law (NH RSA 674:63) identifies several possible restrictions to small wind facilities that would be considered unreasonable, and required OEP to develop a model Small Wind Energy System Ordinance. Municipalities can tailor this model ordinance to meet local goals and priorities.
- In the wake of increased development pressure from commercial wind companies, communities across the state have been developing and adopting large scale wind ordinances. Both New Ipswich and Temple adopted large scale wind ordinances in 2010. Large scale wind systems have a generating capacity of greater than 100 kW up to 30 MW. Any utility scale electric generation facility of 30 MW or more is regulated under the Energy Facility Siting Process before the SEC.



Above photo: Wind farm on Crotched Mountain in Greenfield, NH. In December of 1980, US Windpower installed the world's first wind farm, consisting of 20 wind turbines rated at 30 kW each. For a variety of reasons, including unreliable equipment and poorly understood wind resources, the project was not a commercial success and dismantled after a year.

Biomass

- With its strong biomass resources, particularly in the forestry sector, the Region has the opportunity to increase its role in the production of bioenergy. Although wood has historically been the largest biomass energy resource, other sources can be used including food crops, grasses, residues from agriculture, and algae. Biomass can be used for fuels, power production and products that would otherwise be made from fossil fuels.
- The primary biomass feedstocks for power are paper mill residue, lumber mill scrap and municipal waste. Biomass energy plants often burn wood chips made from tree tops and other low value wood scraps from harvesting projects. Currently, there are 7 existing and 2 proposed biomass energy plants in the state, none of which is located in the Region. On average, NH's existing biomass facilities are about 25 years old and produce more than 39% of the state's renewable power.¹⁵⁰
- Although the Region is not home to a biomass energy plant, it is the location of one of the Northeast's largest wood pellet manufacturer, New England Wood Pellet, which is headquartered in Jaffrey.¹⁵¹ Use of biomass for home heating is higher in the Southwest Region (14%) than in the state (6%) or nation (2%).
- While cord wood for heating fuel is relatively inexpensive and is a renewable source of energy, improper burning practices can pose environmental challenges. Older woodstoves are a significant source of wood smoke and emissions of harmful fine particle pollution.

Solar Energy

- In recent years, the adoption of solar energy has become more apparent in the Region, with the installation of solar arrays at municipal buildings, local elementary schools, colleges, and organizations and businesses. In 2013, Keene State College became the third largest producer of solar power under PSNH in the state. The College's Technology, Design and Safety Center is home to a solar array that produces 15% of the building's power needs.¹⁵² A project is being proposed in Peterborough to develop a 1 MW solar farm for distributed generation at the site of the Town's waste water treatment facility (WWTF).

- In 2012, a group of individuals interested in energy efficiency and renewable energy formed the Monadnock Area Resource Initiative (MERI). MERI is a grassroots, non-profit organization that offers affordable opportunities for communities and residents of the Region to improve the energy efficiency of their homes, schools, and non-profit centers through solar hot water installations and neighbors-helping-neighbors weatherization trainings.

This organization was modeled after the successful Plymouth Area Renewable Energy Initiative (PAREI), which has popularized the concept of 'energy-raisers' in the state. An energy raiser is a neighbor-helping-neighbor effort, similar to a barn-raising, where trained individuals, tradespeople and community members volunteer their time and expertise to install a solar energy system on a home or building.

MERI has expanded this concept to include deep energy retrofits and weatherization of homes and buildings. Through education, community building, increasing accessibility to professional energy related services and cost savings, the approach employed by MERI has encouraged residents and others in the Region to support energy conservation and energy efficiency practices.



Above photo: Solar Array on top of Keene State College's Technology, Design and Safety Center.

OPPORTUNITIES

Renewable Energy Rebate Program

- The PUC administers rebate programs for a variety of renewable energy systems. These programs offer rebates to qualifying homeowners for residential small renewable systems, wood pellet central boilers, and solar hot water heating and space heating systems. There are also rebate programs available for commercial and industrial solar electric and thermal systems and bulk fuel-fed wood pellet central heating systems. However, the eligibility requirements and amounts available for rebates vary by program and fiscal year.

Renewable Energy Tax Exemption

- An incentive currently available at the local level is the renewable energy property tax exemption (NH RSA 72:61-72), which permits cities and towns to offer exemptions from local property taxes for certain renewable energy installations. These include solar systems (thermal and photovoltaic), wind turbines, and central wood-fired heating systems, excluding woodstoves and fireplaces. The goal of this exemption is to create a tax neutral policy that neither increases an individual's property tax nor decreases the municipality's property tax revenues. This policy serves to eliminate the potential disincentive of higher property taxes for installing a renewable energy system.
- To date, only 16 of the Region's 35 municipalities have adopted this property tax exemption for one or more renewable energy sources. Among these communities, all have adopted a solar energy property tax exemption, 10 have adopted a wind energy exemption, and 7 have adopted a wood energy exemption. OEP has developed guidance for municipalities seeking to adopt these tax exemptions including a sample warrant article.

Group Net Metering

- An opportunity for encouraging increased renewable energy in the state is the passage of legislation (NH RSA 362-A:9, XIV) in 2013 that enables group net metering. Net metering allows the owners of certain small electric generating systems to receive credit for the electricity produced

by those systems, above what is consumed on the premise. Group net metering allows for certain small renewable energy generating systems to form a group with multiple customers (or multiple electric meters) within the same utility service territory, in order to offset the electric bills of the group members against the production of the system. In other words, the output of a renewable energy system at a particular location can be shared among multiple accounts, not necessarily located at the same location. This tool is seen as an innovative way to encourage investment in renewable energy.

Community Solar

- An opportunity to expand access to the benefits of solar power is community shared solar. This is an option for individuals who are unable to pursue a solar energy system because they lack a favorable site, do not own property, lack sufficient funds, etc. to access and share in the costs and benefits of solar power. There are numerous models for designing and financing community solar projects.
- The National Renewable Energy Laboratory developed a guide¹⁵³ for groups or individuals interested in developing community shared solar power, which focuses on three different project models. The utility sponsored model is where a utility owns or operates a project that is open to voluntary ratepayer participation. In the special purpose entity model, individuals join in a business enterprise to develop a community shared solar project. The nonprofit model is based on a charitable nonprofit corporation administering a community shared solar project on behalf of donors or members.
- Although community solar projects are developing across the country, there are still many considerations and challenges to ensuring the success of these initiatives. Some of the primary issues to this concept are financial and institutional barriers including raising necessary capital, limited access to federal and state tax incentives, and the need for policies and regulations at the state level for community solar.

RESOURCES FOR COMMUNITIES

- **NH Office of Energy and Planning (OEP)** provides information, data and guidance to assist decision-makers on issues pertaining to development, land protection, energy use and community planning. OEP operates several energy programs in partnership with private and public entities that promote energy efficiency and reduced energy costs as well as the expanded use of renewable, domestic energy resources.
www.nh.gov/oep/energy
- **NH Department of Environmental Services (DES) Energy Program** is a resource for municipalities and the general public to receive information on energy related topics and programs in New Hampshire. This program is housed within the Air Resources Division of DES.
des.nh.gov/organization/divisions/air/tsb/tps/energy/
- **NH Public Utilities Commission (PUC) Sustainable Energy Division** assists the PUC in implementing specific state legislative initiatives focused on promoting renewable energy and energy efficiency and to advance the goals of energy sustainability, affordability, and security. The Division helps the Commission in administering the Renewable Energy Fund and the Greenhouse Gas Emissions Reduction Fund. These funds finance energy efficiency and renewable energy initiatives across the state.
<http://www.puc.state.nh.us>
- **NH Sustainable Energy Association (NHSEA)** is a nonprofit organization focused on educating citizens, businesses and organizations in New Hampshire about sustainable energy and on advocating for favorable sustainable energy projects in the state. www.nhsea.org
- **NH Local Energy Working Group (LEWG)** is an ad hoc group focused on supporting the work of local energy committees and commissions, municipalities and schools in New Hampshire. It manages a web-based clearinghouse of information on resources and tools available in New Hampshire to address energy issues and challenges. They also host the annual Local Energy Solutions Conference. www.nhenergy.org
- **Button Up NH** is a home weatherization workshop designed to provide citizens with information and techniques to help save money on home energy use. Communities host these workshops, which are conducted by an independent certified energy professional and are free and open to the public. www.myenergyplan.net/buttonup
- **NH Saves** is a collaboration of New Hampshire's electric and natural gas utilities working with the PUC and other interested parties to provide customers, including businesses and municipalities, with information, incentives, and support designed to save energy, reduce costs, and protect our environment statewide. www.nhsaves.com
- **Jordan Institute** is a nonprofit organization focused on advanced environmental and economic health by improving energy performance and resiliency in how buildings are designed, built, renovated, operated and financed. <http://www.jordaninstitute.org>
- **US Energy Information Administration (EIA)** collects, analyzes, and disseminates independent and impartial energy information. EIA maintains the State Energy Data System, which is source of historical information on energy production, consumption, prices, and expenditures by state. www.eia.gov
- **U.S. Department of Energy's (DOE) Office of Energy Efficiency and Renewable Energy (EERE)** plays a key role in advancing the nation's energy strategy by leading a large network of researchers and other partners to deliver innovative technologies and market-based solutions.
energy.gov/eere/office-energy-efficiency-renewable-energy