9. ENERGY

In recent years, more and more communities are including energy in master plans as its positive influence on municipal expenditures and land use is increasingly of interest to residents, local officials and business owners. Reliable, affordable sources of energy are critically important to our overall quality of life and the stability of the economy.

This Energy Chapter presents a framework that can be used to support Town efforts in the areas of energy use, efficiency and planning. Opportunities to incorporate energy efficiency into land use planning as well as into other areas such as transportation are important to pursue. The use of energy for electricity, heating, and transportation has direct links to land use, individual lifestyles, natural resource conservation, and environmental quality. The purpose of this Chapter is to provide some background on energy usage and issues and to identify potential strategies and tools for energy conservation, energy efficiency, and efficient development. After a brief introduction to the topic of energy, there is a summary of New Hampshire's energy profile and sources as well as a series of recommendations for achieving the overall vision of a resilient, efficient community through programs, operational practices, ordinances and regulations. There is also some data on Dunbarton's energy profile, municipal energy consumption and an overview of potential opportunities for usage and cost savings, energy efficiency improvements and renewable energy options.

Many municipalities in New Hampshire, including Dunbarton, are looking at different options for reducing energy consumption, improving energy efficiency, and investigating renewable energy sources. One such options is incorporating energy into a master plan. New Hampshire **RSA 674:2,III(n)** was approved by the legislature in 2008, authorizing municipalities to incorporate an energy section into their master plan that "includes an analysis of energy and fuel resources, needs, scarcities, costs, and problems affecting the municipality and a statement of policy on the conservation of energy."

VISION STATEMENT

Protect and maintain Dunbarton's rural character while looking for opportunities to pursue energy efficiency that will generate reduction in municipal expenditures and promote efficient development that supports the concept of energy conservation, efficiency and renewable energy generation. The development of Dunbarton's energy policies as they relate to energy generation, building standards, transportation and land use development patterns can have a direct impact on the community's vitality and long term sustainability.

THE ENERGY LANDSCAPE

Energy efficiency and renewable sources of energy continue to emerge as topics in discussions of energy usage and costs. Many view them as solutions to high energy costs and supply concerns as well as a response to environmental sustainability.

An important concept to remember is that New Hampshire is part of a region and really a world market when it comes to energy. Since 1997, ISO-NE (Independent System Operator of New England) has been managing the regional electricity demand and supply in New England; what we can do as a state, region, municipality and individual is influence overall use and fuel choice.

Energy is a very broad topic and also has some specific terms that need to be understood, particularly in the area of renewable energy. Below is a list of definitions that clarify some of the terms used in this Chapter.

1. **Energy conservation** means reducing the overall use of energy, particularly wasted energy (such as installing programmable thermostats that turn on the heating or cooling only when a building is occupied).

2. **Energy efficiency** refers to the ability to produce the same output or benefit using less energy in the process (such as replacing an incandescent light bulb with a fluorescent one). Anywhere energy is used, there are opportunities to increase efficiency.

3. **Renewable energy** describes energy sources and systems that produce power from sources that are unlimited or can be cyclically renewed, such as solar, wind, geothermal, or biomass. Non-renewable energy sources are those with a finite supply, such as oil, natural gas, nuclear or coal.

4. **Renewable Portfolio Standard (RPS)** was established in May 2007 as RSA 362-F and requires the state's electricity providers -- with the exception of municipal utilities and electric cooperatives -- to acquire by 2025 renewable energy certificates (RECs) equivalent to 24.8% of retail electricity sold to end-use customers. The RPS includes four distinct standards for different types of energy resources; these are classified as Class I (largest class and includes new and existing renewable facilities), Class II (solar), Class III (existing biomass and landfill gas facilities) and Class IV (existing, small hydro with certain restrictions). See the Public Utilities Commission's website for a detailed explanation of the classes. What an RPS does is establish a base level of demand but allows the market to determine which renewable energy resources will meet that demand. Initially proposed as a mechanism to support renewable energy development in competitively restructured electricity markets, the RPS model today is now seen to serve other functions such as encouraging fuel diversity and economic development.

5. **Renewable Energy Credits or Certificates (RECs)** – are sold separately from the underlying physical electricity and are tracked, traded and sold in the market. As renewable generators produce electricity, one REC is created for every 1 megawatt-hour (MWh) of electricity placed on the grid. RECs represent the "attributes" (environmental, social, and other non-power qualities of renewable electricity generation) of renewable electricity generation from the physical electricity produced, serving as "currency" for renewable energy

markets. Since RECs only represent the non-power attributes, they are not subject to delivery constraints.

6. **Alternative Compliance Payments (ACPs)** are made to the state by utilities for every megawatt hour of energy for if their renewable energy quotas are not met. These alternative compliance payments are essentially an assessed fee to those utilities and competitive electricity providers that have not complied with the RPS. If RECs are not available or prices exceed the alternative compliance price, the electrical supplier will often elect to pay the fee, i.e., the alternative compliance payment.

Typically, it makes sense to strive for energy conservation first as using less energy has minimal costs and is fairly straightforward to implement. Improving energy efficiency can also reduce energy use, although it does not always result in lower consumption (for example, a person who buys a more fuel efficient car may drive the same number of miles, thereby saving energy and money or he or she may drive *more*, which costs the same but does not reduce the amount of fuel used). Finally, constructing renewable energy systems, particularly those where the energy is used on-site, is a valuable strategy for long term energy cost savings and reduction in pollutant emissions.

STATEWIDE ENERGY USE OVERVIEW

Some Quick Facts from the U.S. Energy Information Administration, June 2018:

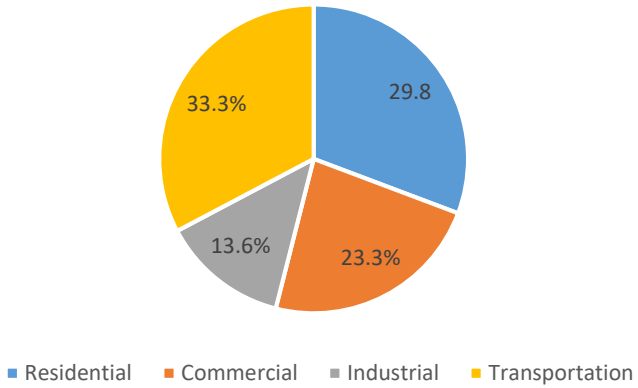
- New Hampshire was the tenth lowest per capita consumer of energy among the states in 2016.
- The Seabrook nuclear power reactor, the largest in New England, provided over half (57%) of New Hampshire's 2017 net electricity generation.
- Nearly half of all New Hampshire households relied on fuel oil for heat in 2017, and another 14% depended on propane.
- About one-fifth of New Hampshire's 2017 net electricity generation comes from renewable energy, with biomass facilities providing half of that renewable power and hydroelectric and wind facilities generating most of the rest.
- About one in five New Hampshire households in 2016 used natural gas as their primary energy source for home heating.
- New Hampshire's Renewable Portfolio Standard requires 25% of electricity sold to come from renewable energy resources by 2025; 20% of New Hampshire's 2017 net electricity generation came from renewable energy.

Energy use in the Central NH Region parallels patterns throughout the state and the northeast. New Hampshire relies on a number of different types of energy supplies – each with its own unique costs. Some important points to remember:

- New Hampshire traditionally relies on external sources of energy for nearly 90% of its total energy consumption.
- Population growth has slowed but is still increasing. Household changes are also leading to changes in how energy is used – computers, phones, TVs. Any gains in efficiency may be partially offset by the increasing electric demand associated with the number of devices and appliances per household.

- Energy costs and supply are dynamic; costs are not fixed.
- Demand patterns for energy may decrease, BUT expenditures can increase due to rising fuel prices.
- Decisions concerning energy supply and usage directly impact individual energy bills and the overall economy.

Figure 9.1: New Hampshire Energy Consumption by End-Use Sector, 2016



Source: Energy Information Administration, State Energy Data System

Figure 9.1, produced by the Energy Information Administration in 2018 shows New Hampshire's 2016 energy consumption by end-use sector. Residential, commercial and industrial sectors use energy for electricity as well as for heating, cooling, and mechanical operations. The residential and commercial sectors together use 53% of the total energy consumed in the state. The industrial sector uses approximately 14% of energy consumed, and the transportation sector accounts for 33% of energy use, the highest of all the sectors.

SOURCES

In this section, there is discussion of the major supply sources such as gas, petroleum, coal renewables and biomass/wood. Smaller sources such as kerosene and propane are not covered

NATURAL GAS

In New Hampshire, there are four natural gas pipelines. The significant line for state residents is the Tennessee Gas Pipeline (TGP) which is owned by Kinder Morgan and brings gas from Texas, Louisiana, and the Gulf of Mexico into New England. This pipeline crosses New York and Massachusetts and distributes gas across a large section of Massachusetts. There are several tributaries off of the main line, one of which branches off near Lowell and heads north through the communities along the Merrimack River and into the Lakes Region. Natural gas is not currently available in Dunbarton.

According to the U.S. Energy Information Administration (EIA), "about one in five New Hampshire households uses natural gas for primary home heating. Because of recent differences between natural gas and home heating oil prices, there has been an increase in the number of homeowners who have been switching to natural gas in New Hampshire and throughout New England. However, New Hampshire is still among the lowest states in per capita natural gas consumption, in part because large areas of the state do not have the natural gas distribution infrastructure."

Electricity generation from natural gas has increased since 2003 with the commissioning of two large generating stations. As increasing amounts of natural gas are used for electricity, in New Hampshire and in New England as a whole, assurance of natural gas supply is becoming a critical strategic energy issue for the region.

Petroleum

According to the US Census 2013-2017 data, nearly half (45%) of all New Hampshire households relied on petroleum as their primary heating fuel, making the state and the overall region particularly vulnerable to fuel oil shortages and price spikes during the winter months.

The transportation sector consumes more petroleum products than any other end use sector. State law requires the use of a biodiesel blend in state vehicles unless the blend costs more than all-petroleum fuel. The state also requires reformulated motor gasoline blended with ethanol in the populated areas of southeastern New Hampshire to limit ozone formation.

Coal (EIA Data)

New Hampshire currently has two coal-fired generating stations, Schiller at Portsmouth and one in the Central NH Region, Merrimack Station at Bow. Schiller station has generating units that can burn either coal or petroleum, and one unit that was converted to burn woody biomass in 2006. Coal's share of New Hampshire electricity generation has declined as the shares of natural gas and biomass have grown. In 2017, coal provided under 2% of the state's net electricity generation. Granite Shore Power purchased these plants and others from Eversource in January of 2018.

Renewable Energy

According to the EIA, about one-fifth of New Hampshire's net electricity generation comes from renewable resources, with biomass facilities providing more than half of that renewable power and hydro and wind facilities generating most of the rest.

Most New Hampshire biomass facilities use either methane gas that is generated in municipal landfills or wood and wood waste-derived fuels from the state's forest industry. Many of the state's nearly 100 hydroelectric facilities are small, often less than 1 megawatt. The two largest hydroelectric plants in New England, the 140-megawatt S.C. Moore and the 127-megawatt Comerford hydropower dams, are located on the Connecticut River along the New Hampshire and Vermont border. The state's biomass generators are, on average, 25 years old, and hydroelectric facilities average 60 years old. The state's wind facilities, in contrast, were built in the last decade. New Hampshire's first modern wind farm opened in 2008 and the state has about 200 megawatts of installed wind power capacity. In 2016, for the first time, the state obtained more net electricity generation from wind than from coal, and that trend has continued.

New Hampshire has no net electricity generation from utility-scale solar (1 megawatt or larger). However, the state's largest solar facility, the 944-kilowatt photovoltaic (PV) solar array at a wastewater treatment plant in the Town of Peterborough, comes close. Most of the state's solar power comes from distributed (customer-sited, small-scale) solar generation capacity, like rooftop solar PV panels, which totaled about 70 megawatts of installed capacity at the end of 2017.

The NH Office of Energy and Planning (OEP), now the Office of Strategic Initiatives (OSI), completed a project in 2015 through the New England Solar Cost Reduction Partnership (NESCRP) from the US Department of Energy's Rooftop Solar Challenge II Program. The intent of this grant was to increase implementation of solar photovoltaic (PV) by driving down its associated costs. Under this grant, NH focused on the "soft costs" associated with residential permitting, zoning and interconnection. Statewide model permitting and zoning, a guide to the utility interconnection process, and additional educational resources, including training, were

developed for use by municipalities and are available through OSI's website.

Solar Energy Use

Since 2008, U.S. installations have grown from 1.2 gigawatts (GW) to an estimated 64.2 GW of total installed capacity, enough to power 12.3 million American homes. According to the Solar Energy Industries Association (SEIA), solar accounted for 29% of all new electric generating capacity additions in 2018, second only to natural gas. Growth in this industry is driven by many factors and certainly varies by sector and state. The federal tax credit is still available, installed costs continue to decline and state and utility rebates all are contributing to the solar market growth. The federal Investment Tax Credit was extended through 2021 and a "commence construction rule" was added, effectively providing the market with policy visibility through 2023. By many standards, this is still an industry that is in its relative infancy when you consider that in 1985, annual solar installation was 21 MW.

According to the NH Public Utilities Commission's (PUC) RPS 2018 Report, 86 solar companies were operating in NH in 2017, employing just over 1,000 workers. Privately owned solar facilities generate tax revenues for municipalities. Some municipalities are purchasing some or all of their electricity from solar electric projects within their own boundaries. Nineteen schools have installed solar electric facilities, reducing operating expenses. Solar facilities that are interconnected with the New Hampshire grid and net metered from December 31, 2010 and December 31, 2017, increased from 546 facilities to 7,277 with capacity increasing from approximately 2 MW to almost 70 MW. The rebate programs for residential solar water heating issued over 485 rebates and 284 commercial and industrial rebates through June, 2016. The PUC Renewable Energy Programs include a solar rebate program and a low moderate income solar program; funding is sometimes limited but the Programs are currently accepting applications (see Residential Solar Rebate Program and the Commercial & Industrial Solar Rebate Program).

As solar systems become more mainstream, there is developing interest in looking at the role of zoning and land use regulations to ensure that solar renewable energy projects are compatible with existing land use regulations. Looking at ways to support renewable energy projects that are not overly restrictive or contradictory to the installation of the systems within the framework of "sound" community development is important. Some potential considerations by communities include whether the systems are considered an accessory use or a conditional use in certain areas, height and setback limitations, scale, and aesthetics (i.e. glare).

Biomass

According to the U.S. Energy Information Administration, nearly 1 in 12 homes in New Hampshire depend on wood products as a primary heat source. New Hampshire is around 84% percent forested and roughly 81% is considered viable timberland. Biomass products such as wood pellets and chips, logwood and briquettes, are an important part of the state's economy and can keep fuel dollars in the local economy.

Since biomass is part of the renewable energy market, there is the opportunity to sell the renewable energy attributes or RECS. As mentioned earlier in this Chapter, these renewable energy attributes or RECs are traded separately from the underlying electricity. New Hampshire was the first state in the nation to create RPS incentive provisions for thermal renewable systems that are equivalent in value to those for renewable electric technologies.

With the assistance of the PUC's Renewable Energy Fund, as of 2018, more than 450 residential and commercial biomass heating systems are currently operating in the state, including at least 38 publicly owned properties. Electricity in New Hampshire is generated from the combustion of wood by seven major power plants in New Hampshire. In the Central NH Region, Wheelabrator Concord Company operates a waste-to-energy plant that includes two furnace/boiler systems that processes up to 575 tons of solid waste per day. The plant produces high pressure steam capable of producing around 14 megawatts of electricity annually, close to supplying the electricity for 15,000 homes.

Interest in biomass as a source of heating has been increasing for residential, commercial, and municipal uses, thanks in part to rebate programs and other sources of funding the last few years. As of June, 2018, New Hampshire's commercial and industrial rebate program for wood pellet boilers has issued 59 rebates and the residential wood pellet/furnace program has issued 380. The residential wood pellet program is currently active and a link to the application is available through the Public Utilities Commission

Wind Power

While New Hampshire may not have the wind power capacity or potential of other states, there have been four major wind projects approved by the state's Site Evaluation Committee (SEC). There are smaller wind projects in the North Country that didn't require SEC approval. The SEC functions as the state's permitting authority for the review, approval, monitoring and enforcement of compliance in the planning siting, construction and operation of energy facilities. See SEC's website for more information on the Committee.

Most of the US wind power capacity is from Texas up to North Dakota and the west coast. While the "wind farm" development is an intensive undertaking, there have been advances in community scale wind turbine technology and the interest continues, albeit on a limited scale when compared to other renewables such as solar and biomass. It should be noted that Dunbarton currently does not have a wind ordinance.

Hydropower

Hydropower, or hydroelectric power, is considered to be the most common and least expensive source of renewable electricity in the United States today. According to the U.S. Energy Information Administration, historically, all renewable electricity generated in the United States came from hydropower resources. In NH, close to 30% of renewable electricity is provided by hydropower.

Hydropower technologies use flowing water to create energy that can be captured and turned into electricity. There is a long history of hydro not only in the state but in the Central NH Region.

Below is a list of the current facilities operating in the Central NH Region.

- **Penacook**: upper and lower falls located on the Contoocook River, operated by Briar Hydro Associates.
- **Rolfe Canal**: operated by Briar Hydro Associates.
- **Jackman Hydro**: operated by Hull Street Energy, LLC, the facility is located in Hillsborough on the north branch of Contoocook River. (3.6MW)
- **Garvin Falls**: operated by Hull Street Energy, LLC, the facility is located on the Merrimack River. (12.4MW)

GEOTHERMAL

The common type of geothermal energy uses the more readily accessible soils where the temperature of the ground is 50 to 55°F at 4 or more feet below the surface (below the frostline). This utilization of energy in the ground is more correctly termed geothermal heat pump system, ground source heating or "geoexchange." There are two main components, the heat pump and the circulation system that is drawing the heat from the ground. These systems are becoming more popular but they do have some limitations that can restrict their use. The units can be very expensive with upfront costs in the range of $20,000-$35,000 or more. The differences between a closed loop and open loop system for well systems tend to be specific to the site in question and requires careful study of the site characteristics.

There are other hybrid type systems that use several different geothermal resources that won't be discussed here but can be found at the Department of Energy's website:

In New Hampshire, geothermal systems are regulated by the Department of Environmental Services (DES). The Environmental Protection Agency (EPA) requires states to inventory several classes of injection wells. Open loop wells are considered Class V injection wells which needs to be registered with DES. Closed loop systems also are required to register with DES. For more information, see the fact sheet prepared by DES.

An example of a large and successful geoexchange project in the Central NH Region is the Merrimack County Nursing Home (MCNH) in Boscawen, NH. This is a nursing facility that, on average, has about 290 residents and a staff of 425, and is roughly 235,000 square feet.

DUNBARTON ENERGY PROFILE

Many of the Central NH Region's communities are served by a combination of different utility providers. Dunbarton residents receive service from a combination of Unitil (124 customers) and Eversource (1,167 customers).

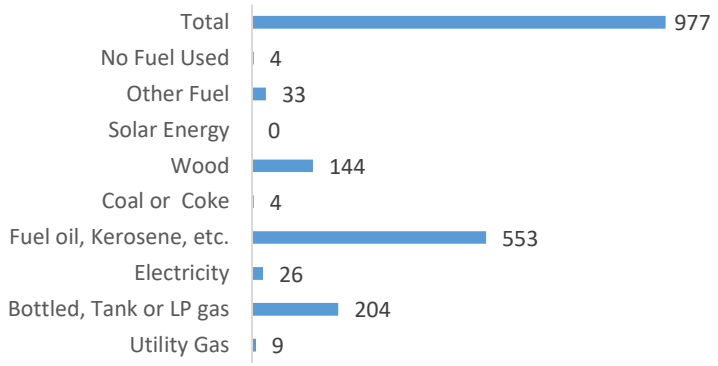
Data on Dunbarton's heating sources is provided in the following charts that show a typical Northeast profile of the heavy reliance on oil heat. Dunbarton has a higher percentage at 57% for fuel oil than the state (45%).

Table 9.1: House Heating Fuel, Occupied Housing Units

HOUSE HEATING FUEL, Occupied Housing Units, Percent Share	
Utility gas	1%
Bottled, tank, or LP gas	21%
Electricity	3%
Fuel oil, kerosene, etc.	57%
Wood	15%
Coal or coke	<1%
All other fuels	3%
No fuel used	<1%

Source: American Community Survey, 2013-2017

Figure 9.2: 2013 – 2017 House Heating Fuel, by Type, in Dunbarton



Source: American Community Survey, 2013-2017

ENERGY AND PLANNING

The first step for a community that is interested in reducing municipal energy use is to establish a baseline for comparison. Benchmarking energy use by completing an inventory of lighting, electrical, and heating fuel usage for several key municipal facilities is very important. Dunbarton was able to conduct several energy efficiency projects, including an inventory, with funding through the former Office of Energy and Planning in 2010 and 2011. With these data as a starting point, Dunbarton can now measure the effectiveness of future energy reduction efforts. Further discussion on Dunbarton's energy efficiency projects occurs later in this Chapter. The buildings used in any analysis could be selected by the Town due to their level of use and availability of data. A complete energy inventory of all facilities, including any vacant buildings can be helpful for future benchmarking. Municipal vehicle fuel usage (DPW trucks, police cruisers, fire vehicles, etc.) could also be monitored and analyzed as part of a town's total energy inventory.

PLANNING AND ENERGY POLICY

Energy planning continues to receive increasing attention at the policy level due to long term energy costs and the relationship between energy use, economic activity, and environmental impacts. The principles of "sustainability" support energy conservation and efficiency through thoughtful community design. Compact development patterns, open space preservation, and multi-modal transportation options are core elements which contribute to energy-conscious development while preserving traditional rural character. NH's communities are all experiencing the demographic trends of an aging population and being able to age in place is of great interest to residents. Energy conservation has the added benefit of supporting many of the accessibility needs of an aging population.

When communities are designed so that residential areas are convenient to businesses, services, and amenities, residents are able to complete daily tasks in fewer trips and use less fuel. While compact development is one technique that allows for greater density while reducing the miles of roadway and other infrastructure needed to serve homes and businesses, this is often a challenge for rural communities, given the land use patterns that have developed over time.

Efficient building construction can significantly reduce energy use and operating costs for the life of the building. Finally, local renewable energy production allows property owners to have control of their electricity, heating, and hot water generation without consuming additional non-renewable fuels. Local regulations can support and influence these elements as a way to encourage a more energy-conscious community.

While many energy issues are outside of local, regional and state jurisdiction, there are several key areas where there are opportunities to impact policy and weigh in on those policies that have a direct connection to municipal affairs. Awareness of state policies and how they can influence local energy planning and available program/project development is important as communities strive to achieve more energy efficiency.

STATE ENERGY STRATEGY (SB191)

In 2013, an Advisory Council was tasked with developing a revised 10-year statewide energy strategy, the aim of which is to provide forward-looking guidance on electric, gas, and thermal energy strategies and optimize the ready availability of energy supply, energy affordability, the state retention of energy expenditures, jobs, and the use of renewable energy sources and energy efficiency policies, including demand-side policies. Completed in 2014, there were four main categories that frame the energy strategy are:

1. Advance electric grid modernization;
2. Increase investments in cost effective energy efficiency;
3. Diversify fuel choice; and
4. Increase transportation options.

Required by RSA 4-E, the Office of Strategic Initiatives shall complete updates to the initial strategy at least every three years with opportunities for public comment and consultation with state legislative committees. The State Energy Strategy was updated in April of 2018 and continued an emphasis on energy efficiency.

ENERGY EFFICIENCY RESOURCE STANDARDS (EERS)

An EERS establishes specific targets for energy savings that utilities or non-utilities must meet through customer energy efficiency programs. As of January 2017, 26 states have fully funded policies in place that establish specific energy savings targets that utilities or non-utility administrators must meet through energy efficiency programs. All the New England states have an EERS with some of the strongest requirements in Massachusetts, Rhode Island and Vermont, which all require close to 2.5% savings annually. A long standing recommendation of earlier studies in New Hampshire, the PUC approved a new statewide utility-run EERS in 2016. This went into effect in January of 2018 and will require utilities to increase their annual energy savings. Starting in 2018, the electricity savings goal was set at .8% and natural gas consumption must be reduced by .7%. Higher savings are established starting in 2019. Parts of the plan include existing energy efficiency programs and new initiatives such as residential energy audits, financing options for moderate-income residents and multi-year energy planning to encourage long term energy savings for commercial customers. Funding for the EERS comes from increases to the system benefits charge (SBC) and the local distribution adjustment charge (LDAC), both current components of electric and gas bills, respectively.

CLIMATE CHANGE ACTION PLAN

The Climate Change Policy Task Force was convened in 2008 and developed a statewide Climate Action Plan in 2009.[1] According to the New Hampshire Climate Action Plan, the most significant reductions in both emissions and costs will come from substantially increasing energy efficiency in all sectors of our economy, continuing to increase sources of renewable energy, and designing our communities to reduce our reliance on automobiles for

[1] *The New Hampshire Climate Action Plan: A Plan for New Hampshire's Energy, Environmental and Economic Development Future*, March 2009, available at http://des.nh.gov/organization/divisions/air/tsb/tps/climate/action_plan/nh_climate_action_plan.htm.

transportation. As stated in the Plan, a response to climate change and our economic future is inextricably tied to how we produce our energy and how much energy we use. [2]

The Plan calls for long-term reductions in greenhouse gas emissions of 80% below 1990 levels by 2050, with an interim goal to reduce emissions by 20 % below 1990 levels by 2025. A total of 67 specific recommendations are made to achieve that goal. They include: direct energy savings in buildings, transportation, and electricity generation; natural resource protection; supporting regional initiatives; public education and workforce training; and adaptation to existing and potential climate impacts.

NET METERING

The Public Utilities Commission (PUC) allows net metering which permits homeowners to receive credit for on-site electricity generation such as from a solar photovoltaic (PV) or wind turbine installation when the generation exceeds household or business consumption. This is accomplished by use of an electric meter that can run both forward and backward so that the host is billed only for the net reading on the meter.

The PUC recently issued a long-awaited order that lifts all existing limits on net metering, settling an issue that has been in dispute for several years, as utility interests and solar industry advocates debated the proper way to compensate those who own solar panels without imposing unfair costs on those who don't.

Many of the states with net metering laws have no limit on how many megawatts can be accommodated, and the PUC order lifts the current 100-megawatt limit on solar power eligible for net metering, put into place in 2016.

BUILDING ENERGY CODE

The New Hampshire State Building Code for residential and commercial buildings is now the 2015 International Energy Conservation Code (IECC). A part of the overall building code, the energy code establishes minimum requirements for energy efficient design and construction for both new and renovated buildings. By establishing the minimum requirements, the codes set the baseline for energy efficiency in new construction and major renovations to which further design upgrades and strategies may be compared.

STATE LEGISLATION

In New Hampshire, municipalities possess legal powers as enabled by state legislation. A number of state statutes authorize municipalities to take action on energy matters:

- **RSA 672:1, III**: "Proper regulations enhance the public health, safety and general welfare and encourage the appropriate and wise use of land."
- **RSA 672:1, III-a**: "Proper regulations encourage energy efficient patterns of development, the use of solar energy, including adequate access to direct sunlight for solar energy uses, and the use of other renewable forms of energy, and energy conservation. Therefore, the installation of solar, wind, or other renewable energy systems or the building of structures that facilitate the collection of renewable energy shall not be unreasonably limited by use of municipal zoning powers or by the unreasonable interpretation of such powers

[2] Ibid., p. 1.

except where necessary to protect the public health, safety, and welfare."

- **RSA 674:17, I(j)** states that one of the primary purposes of zoning ordinances adopted by municipalities is "to encourage the installation and use of solar, wind, or other renewable energy systems and to protect access to energy sources."
- **RSA 155-A:2, V** permits communities to adopt stricter measures than the New Hampshire State Building Code, such as requiring new buildings to use highly efficient insulation or to take advantage of passive solar energy.
- **RSA 72:61-72** allows municipalities to offer property tax exemptions on solar, wind, and wood heating energy systems, including solar hot water, solar photovoltaic, wind turbine, or central wood heating systems (not individual woodstoves). Over 100 municipalities in NH have exemptions with 11 of the Central NH Region's communities adopting renewable energy exemptions (See Table 9.2).

It should be noted that Dunbarton does not have a formal policy or ordinance on exemptions for renewable energy but does have a practice of not assessing for alternative energy equipment.

- **RSA 674:62-66** gives authority to municipalities to regulate the construction of small wind energy systems up to 100 MW and prevents municipalities from enforcing unreasonable limitations on their construction and operation.
- **RSA 53F** was signed into law in 2010 and allowed municipalities to establish energy efficiency and clean energy districts. Once a district is adopted by a municipality, a financing tool called Property Assessed Clean Energy (PACE) comes into play. PACE allows municipalities to set up programs to fund energy improvements in commercial buildings and allows repayment of the investments through property "tax" assessments. It is important to note that the financing is tied to the property, not the building owner(s), and paying for the investment through property taxes can allow for more affordable and longer term paybacks.
- **SB129**, also known as the Clean Energy Jobs Act of 2017, became law on July 11th, 2017. This legislation will strengthen New Hampshire's Renewable Portfolio Standards (RPS), with the intent of future stabilization and growth opportunities for the state's biomass and solar industries. SB129 also removes the 10kw limit on the residential solar rebate program, allowing for greater beneficial electrification of the state's grid, while reducing peak demand and saving money for all. The law additionally makes the benefits of the Renewable Energy Fund (REF) available to more low-income customers, ensuring that everyone has the potential to benefit from renewable energy.

Table 9.2: Renewable Energy Exemptions

Municipality	Solar	Wind	Wood
Boscawen	√	√	√
Bow	√		√
Bradford	√	√	
Canterbury	√		
Chichester	√		√
Deering	√		
Henniker	√	√	√
Hillsborough	√	√	√
Hopkinton	√		
Warner	√	√	
Webster	√		

Source: NH Office of Strategic Initiatives, 2016

LOCAL ENERGY COMMITTEES

According to the NH Local Energy Workgroup, there are 71 Local Energy Committees statewide; eight are located in the Central NH region - Henniker, Dunbarton, Concord, Pembroke, Loudon, Canterbury, Warner and Webster. Some Committees are working on energy chapters in master plans, inventories or audits of municipal buildings and/or moving forward with special projects such as wood pellets for public facilities. Five communities moved forward with this earlier work and adopted energy chapters – Concord, Boscawen, Loudon, Salisbury and Warner.

LOCAL ENERGY PLANNING - **DUNBARTON**

The Innovative Land Use Planning Techniques Handbook, available on the NH Department of Environmental Services website, contains model ordinance and regulatory language for municipalities to implement a variety of measures addressing sprawl, environmental, and energy concerns. As noted below, many communities like Dunbarton have formed local energy committees (LECs) to advise municipal officials and educate the public about energy issues. Through the statewide Energy Technical Assistance and Planning (ETAP) program, administered by the former Office of Energy and Planning (OEP) in 2010-2011, as well as other funding sources, many communities, including Dunbarton, have undertaken municipal building energy assessments, master plan energy chapters, energy capital improvement planning, and other actions to achieve energy savings.

MUNICIPAL ENERGY ACTIONS

At the local policy and regulatory level, the Town of Dunbarton has an Open Space Development provision that is also part of the Town's Zoning Ordinance. This allows new subdivisions to be designed so that homes can be built closer together and blocks of open space are preserved. With smaller lot sizes and a more compact design, cluster developments can save energy on construction, infrastructure, and service provision. They also result, ideally, in a network of permanently conserved open space that is protected from future development and provides natural ecosystem services necessary for stormwater recharge, floodplain storage, and wildlife habitat.

In 2011, the former Office of Energy and Planning contracted with a consulting firm to complete an audit of Dunbarton's municipal and school facilities. The purpose of the study was to identify cost

effective energy efficiency and renewable energy investments that Dunbarton could consider as part of a long range energy management plan. The consultant identified several cost saving opportunities as a result of the study, ranging from specific improvements on lighting retrofits and insulation in Town Offices to conducting assessments on other buildings such as the Library and equipment for future energy efficient upgrades. Many of these recommendations have been completed by the Town.

All of the actions taken to date by the Town demonstrate Dunbarton's interest in reducing energy use and costs. It is clear that effective facility management and the responsible use of public funds are a priority shared by the municipal departments. With energy data benchmarking and continual monitoring, the results of such efforts could be measurable.

DUNBARTON ENERGY COMMITTEE

The mission of the Dunbarton Energy Committee is to encourage and support the practical application of energy efficiency and sustainable energy, in Town buildings, equipment and vehicles, and also in individual residences and vehicles, in order to lower energy costs and reduce carbon emissions.

The Committee's focus includes:

- Seeking opportunities for cost-effective energy efficiency and sustainable energy applications;
- Soliciting energy-related requests for advice and funding from the Town and residents; and
- Providing easily accessible, practical, and trustworthy conservation and sustainable energy information and guidance.

ACCOMPLISHMENTS OF ENERGY COMMITTEE

Established in 2007, the Energy Committee has continued to promote energy efficiency projects to benefit the residents of Dunbarton. Some of these accomplishments include the following.

- Established the Neighbors Warming Neighbors Program in 2013, providing energy audits for residents interested in developing their own energy efficiency program.
- Created a website in 2009 that provides information on energy efficiency for residents and the local officials.
- Sponsored the annual Dunbarton Energy Expo since 2015 that promotes energy efficiency through workshops, exhibits and vendor information.
- Assisted in numerous lighting retrofit projects for municipal buildings, including the Fire/Police facility, Town Garage, Transfer Station, Town Bandstand and Library.
- Training other municipalities on the Neighbors Warming Neighbors Program.

Recently, the Energy Committee investigated the installation of a municipal solar electric system to reduce electricity costs for town-owned buildings. After interviewing several town installations and financing methods, it was determined that the Transfer Station was the best location. Three installers were contacted for cost estimates, including payback calculations for the 30-year point.

ADDITIONAL ENERGY OPPORTUNITIES

There are a number of additional actions that Dunbarton can take to implement some of the recommendations identified above. A comprehensive strategy could include municipal policy and operational changes, land use regulation revisions, and targeted outreach efforts. If the Town wishes to consider certain revisions or additions to existing ordinances and regulations, the following could be pursued:

- → Consider formally adopting RSA 72:61-72 to offer tax exemptions for renewable energy installations.
- → Include energy improvements for municipal buildings and vehicle fleets in long-range capital improvements planning discussions, and prioritize such improvements during the annual budgeting process

This is not intended to be an exhaustive list. No single strategy or action will lead to Dunbarton achieving more energy efficiency. The pursuit of both small and large changes will be necessary to reach the desired level of efficiency. It is also important to note that policy shifts, planning considerations, and behavioral changes are just as important as making system or equipment improvements.

SUMMARY

The overall intent of this Chapter is to provide a general analysis of energy use and to identify strategies for the Town to pursue in the areas of energy conservation, efficiency, clean energy options, and energy-conscious development. The Town is being proactive by preparing this Energy Chapter. Additional opportunities exist for the Town to continue its efforts, including changes to land use policies, municipal operations, and public outreach. By implementing such changes, Dunbarton can save energy and taxpayer dollars, reduce pollutant emissions, and create a community with a strong quality of life. A community that supports energy efficiency efforts also supports sustaining settlement patterns that reduce transportation infrastructure, conserve natural resources and promote open space protection.

As stated earlier in this Chapter, transportation is the leading source of energy use in the state. While it is possible to accomplish both compact design and maintaining rural character, there can be challenges that arise and need to be addressed.

There is also the increasing concern for the aging population at both the local, regional and state levels and its impacts on our abilities to reach destinations - for recreation, health care and social services. This has a direct correlation to the land use patterns and infrastructure of our communities and how we need to get from point A to point B. The link between energy efficiency and transportation is a strong one.

As tax credits, rebates and other incentives continue to evolve and hopefully stabilize with a consistent funding stream, it is expected that renewable energy installations will become more prevalent. While there are certainly challenges that still need to be addressed, there are also opportunities to improve on the status quo. A wide range of financial and informational resources exist to help municipalities, business owners, and residents make positive changes in their energy consumption. Taken together, these actions will contribute to statewide energy reduction goals and increased energy independence, while creating economic and environmental benefits.

OBJECTIVES OF THE CHAPTER AND RECOMMENDATIONS

OBJECTIVE 1

To reduce municipal energy usage and costs and improve energy efficiency in municipal operations.

- → Continue to pursue active monitoring of municipal energy usage and costs to track progress resulting from any energy saving initiatives.
- → Look for opportunities to implement energy improvement plans that increase the efficiency of municipal buildings, and incorporate planned improvements into the municipal budgeting process.
- → Continue to work with local officials on funding options for renewable energy installations for municipal buildings.
- → Periodically review priorities identified through inventories and energy audit reports for energy improvements to municipal buildings.

OBJECTIVE 2

To encourage and support energy-conscious development throughout Dunbarton.

- → Evaluate existing land use regulations periodically to ensure energy efficient development is addressed.
- → Evaluate adequacy of existing regulations for renewable energy installations such as solar arrays.
- → Continue to keep apprised of revisions to the Energy Building Code and opportunities for education and training offered for code enforcement officials.
- → Consider formal adoption of RSA 72:61-72 to allow tax exemptions for renewable energy installations.

OBJECTIVE 3

To inform Dunbarton residents and business owners on energy conservation, efficiency, and renewable energy measures and where to find additional information and funding.

- → Maintain existing energy website supported by the Dunbarton Energy Committee to share information with residents and business owner on home energy saving strategies, renewable energy system installation, business energy programs, available financing, tax credits, green building design, etc. Find opportunities to place information and links on the overall Town of Dunbarton's website and at the Library.
- → Look for opportunities to sponsor and/or partner with others on workshops or events on energy conservation, efficiency, and renewable energy, and/or notify residents of regional events.
- → Continue to support the Energy Committee's programs and initiatives, such as the annual Energy Expo and the Neighbors Warming Neighbors.
- → Work with the Energy Committee on energy efficiency projects and seek guidance on ways to improve energy efficiency in the community.