

11 Energy

“We have to understand the ubiquity of energy in everything we do. Energy is core to our economy and it brings with it environmental challenges, and it’s core to our security challenges.”

-Ernest Moniz, Former Secretary of the U.S. Department of Energy

Introduction

This chapter provides information on Littleton’s current energy supply and consumption and provides a road map for future energy conservation and efficiency efforts.

Being both environmentally aware and fiscally conservative, the Town of Littleton is committed to maximizing energy conservation and efficiency, acknowledging its myriad of benefits (including significant savings on energy costs and reducing the town’s overall carbon footprint), and promoting stewardship of the Town’s shared natural resources.

While Littleton has undertaken steps to achieve this goal, much more remains to be done that

will challenge residents, nonprofits, businesses, and municipal organizations to work together in unprecedented ways. The Town is uniquely positioned to address energy efficiency issues because of its municipally owned and operated electric utility, Littleton Water and Light, which supplies electric power to residents and businesses. The Town should continue to find ways to work with Littleton Water and Light to promote energy efficiency and renewable energy sources while maintaining its low municipal utility rates. Additionally, there is significant economic development potential for local entrepreneurs who promote the use of renewable energy from local resources and provide energy efficient products and services. Thoughtful, incremental measures are needed through a combination of incentives, voluntary actions, and, where necessary, regulations.

BENEFITS OF ENERGY PLANNING

MUNICIPAL COST SAVINGS

Increasing energy efficiency and conservation in municipal facilities and operations (as well as supplementing with renewable sources) can reduce fuel and utility bills over the long term.

GREATER INDEPENDENCE AND SECURITY

Ensuring a diversity of energy sources safeguards residents and businesses from worldwide energy price shocks and supply shortages.

LOCAL INFLUENCE OVER ENERGY SITING

Developing land use regulations for energy systems provides more control to local authorities for siting new energy systems.

MORE EFFICIENT COMMUNITIES

Energy planning enables communities to integrate goals with transportation and land use planning strategies, resulting in a more compact and efficient use of land.

HEALTHIER COMMUNITIES

Reducing energy use improves local air quality and associated health benefits. Efficient land use and transportation planning can promote walking and cycling opportunities which promotes healthier behaviors.

A CLEAN ENVIRONMENT

Investing in energy efficiency and renewable energy can result in reduced greenhouse gas emissions, improved air quality, and healthier ecosystems.

NH CLIMATE ACTION PLAN

In 2009, New Hampshire created a Climate Action Plan. Acknowledging the changing climate and its associated impacts (including a higher frequency of extreme weather events like droughts and floods, shorter winters, and others), its overarching objective is to achieve the greatest feasible reductions in greenhouse gas emissions while also providing the greatest possible long-term economic benefits to the citizens of NH.

The plan identifies action items that aim to:

- reduce emissions from buildings, electric generation, and transportation
- protect the state's natural resources to maintain the amount of carbon sequestered
- support regional and national initiatives to reduce greenhouse gases
- develop an integrated education, outreach, and workforce training program; and
- adapt to existing and potential climate change impacts.

ENERGY CONSERVATION COMMITTEE

In 2007, Littleton adopted the New Hampshire Climate Change Resolution and established the Energy Conservation Committee (ECC). The purpose of the ECC is to promote energy conservation and efficiency practices, with a local and regional focus, by educating the private sector and advising the public sector in the areas of cost reductions and sustainable, renewable energy sources. The goals of the ECC are to re-

duce energy consumption town-wide, to conserve natural resources, and to save money. Currently, the Energy Conservation Commission is inactive in the community. However, the following priority projects have been accomplished in recent years:

- The Energy Management Plan has been institutionalized
- Lighting retrofits in municipal buildings have been completed
- Heating systems have been improved at the fire station, highway garage, and opera house
- Energy audits were performed on the old Highway Garage, Fire Station, Public Library, and Opera House
- The Energy Conservation Committee provided energy efficiency advice on the construction of the new highway garage and assistance to the Littleton Food Coop for the installation of an Electric Vehicle charging station

The following energy projects were initiated, but not completed:

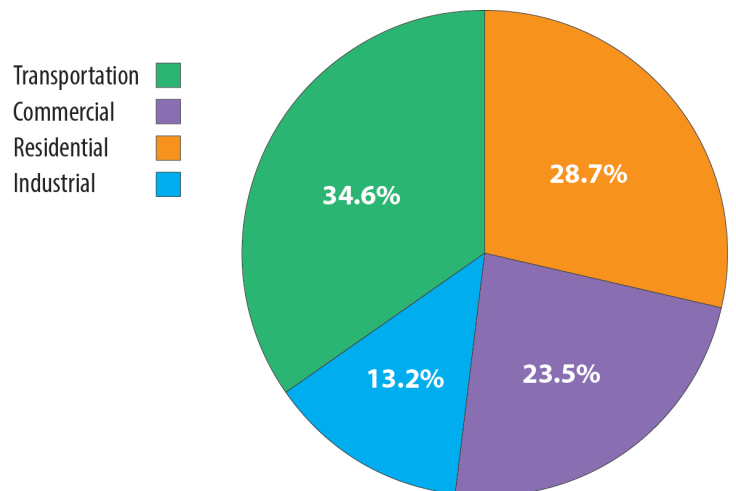
- A solar initiative for the retired landfill was supported by the Town, but not Littleton Water and Light and was abandoned
- Conversations with the school system related to energy efficient upgrades have been slow to get off the ground

New Hampshire’s Office of Strategic Initiatives (OSI) recently released its updated 10-year State Energy Strategy in 2018. The Plan notes that New Hampshire has the third highest electricity rates in the contiguous United States, impacting all NH residents, but especially low-income earners. The graph on the right shows electricity generated by a variety of sources in the state, the highest producer being nuclear energy. The purpose of the State Energy Strategy is to inform decisions about energy related challenges and the state’s energy future. Its primary goals are to enable business and consumer cost savings, create jobs, spur economic

growth, promote industry competitiveness, protect the natural environment, and support a reliable and resilient energy system.

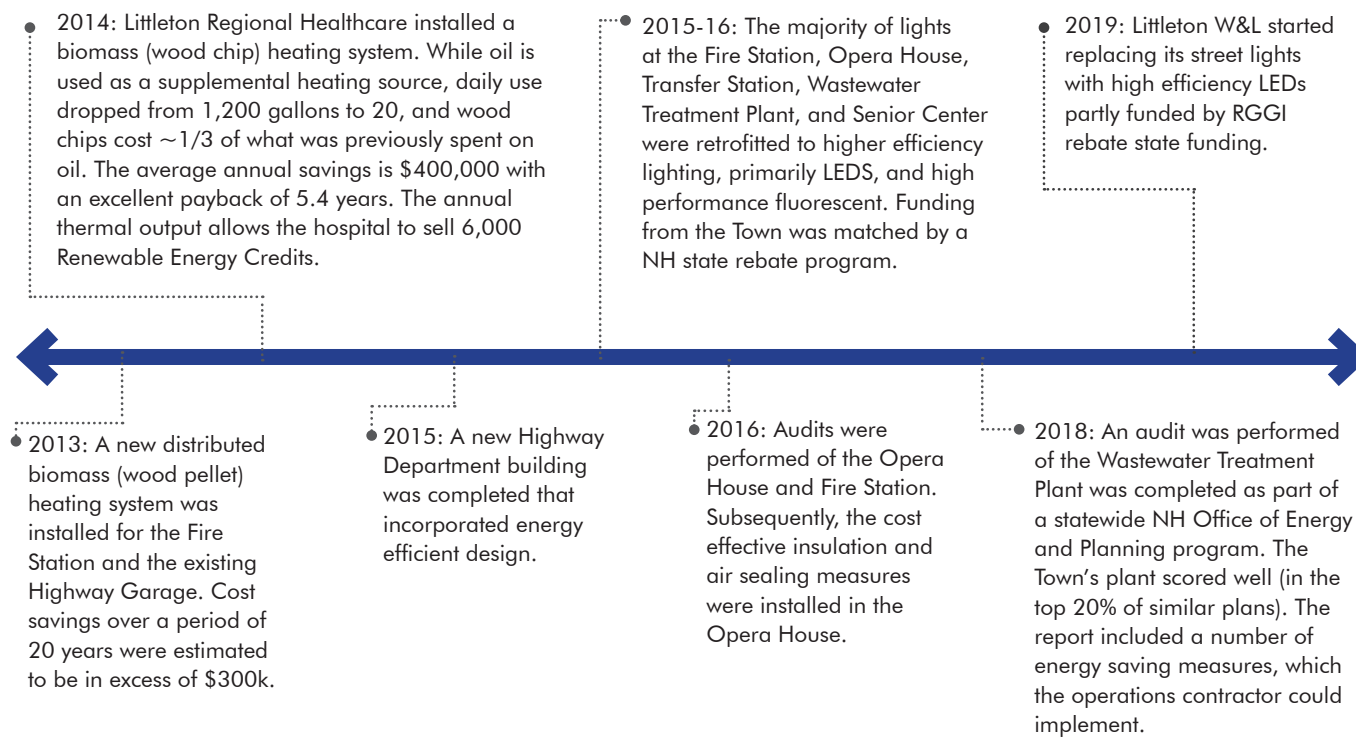
Additionally, national trends are showing an increase in renewable and clean energy development. Emerging renewable energy systems provide an opportunity to improve energy independence and local resiliency by increasing the diversity of energy production methods and infrastructure in communities. Additionally, New Hampshire has committed to a Renewable Portfolio Standard (RPS) that mandates that 24.8% of its energy in 2025 originates from nonnuclear renewable sources.

The State Energy Strategy and growing national trends provide Littleton with opportunities to invest in local renewable energy infrastructure and energy efficient practices and policies, while reducing the environmental, economic, and health costs of burning fossil fuel. Municipal policies and practices can support these initiatives while encouraging distributed energy initiatives, increased transportation options, and other efforts that will build resiliency over time.



Above: NH Energy Consumption by End-Use Sector, 2012
 Source: Energy Information Administration, State Energy Data System

A TIMELINE OF LITTLETON'S ENERGY CONSERVATION PROJECTS



ENERGY CONSERVATION

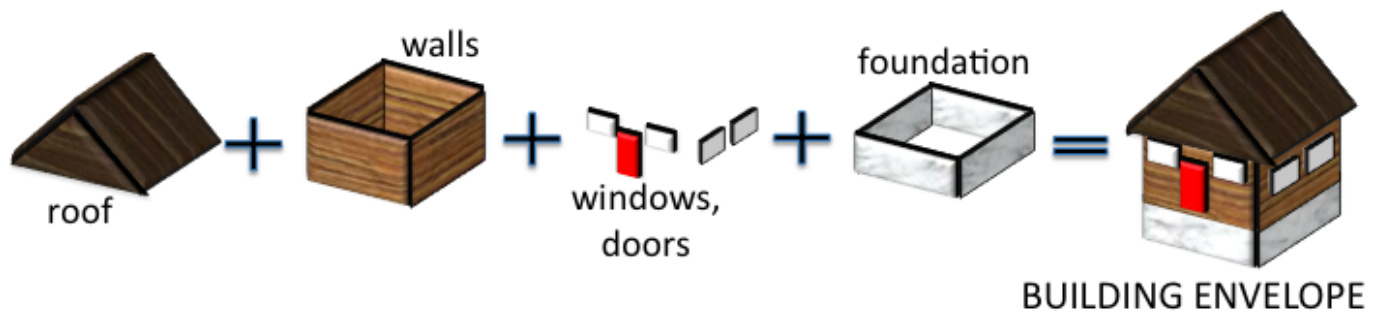
The objective of conservation is to reduce energy consumption and associated costs while ensuring that residents and businesses have access to the energy they need.

In 2014, the ECC established the Energy Management Plan (EMP) to systematically track energy consumption and efficiency in building and facilities, look for trends in use, and recommend remedial action when necessary. An associated data base records energy consumption of municipal buildings that includes electricity, water, and heating and cooling systems. Members of the ECC also periodically visited department heads to track progress.

Energy Efficiency

While conservation measures are a great first step, energy efficiency upgrades have even greater savings potential. Investment in efficiency reduces the reliance on imported fossil fuels, boosts the economy by creating in-state jobs, and lowers energy costs for residents and businesses. Upgrades can range from simple insulation of an attic or basement to comprehensive air-sealing measures. The type of upgrades that is right for a building depends on many factors, and the best way to make informed decisions about these upgrades is to conduct an energy audit on the building.

Energy efficient homes and non-residential spaces save money and help the environment. The Town of Littleton is strongly committed to good stewardship of its citizens' tax dollars, and



Above: The components that make up a building envelope.
Source: University of Calgary Energy Education

energy efficiency at the office is just good business. Accordingly, an energy policy was adopted in 2015 that applies to all departments. The Town also amended the Purchase Policy to require consultation with the ECC before purchasing or replacing equipment.

BUILDINGS

Typically, about **60% of all energy is consumed in buildings**, making reduction of this energy sector a common public and private goal.

Efficiencies can be realized through better building envelopes, operating systems, and appliances. Littleton should strive to improve efficiency in existing buildings and new buildings by conducting energy audits to identify and prioritize problem areas, and determine grants, incentives, or low interest loans to remediate inefficiencies. The Town should develop a process for enforcing the State Energy Code and consider adopting voluntary or mandatory local energy building codes. The Town might also consider contracting a building inspector, whose services could be shared with other towns, to ensure compliance with any state and local codes or ordinances.

BUILDING RETROFITS

According to the U.S. Green Building Council, green retrofits are any kind of upgrade to an existing building to improve energy and environmental performance, reduce water use, and improve the comfort and quality of the space in terms of natural light, air quality, and noise—

all accomplished in a way that it is financially beneficial to the owner. New England, in general, has a very old building stock, which often consumes and wastes high amounts of energy through poor insulation. Retrofitting the Town's municipal buildings to be more energy efficient will save taxpayer money over time. Wood, solar, wind, geo-thermal, and biomass energy systems should be considered for all types of existing structures (municipal, school, commercial, and residential).

NEW CONSTRUCTION AND LAND USE

New construction should incorporate state-of-the-art energy efficiency technology and renewable energy sources into the design of the building envelope and operating systems.

As a municipal government, Littleton is the primary authority having jurisdiction over construction in Town through building standards that regulate fire safety, plumbing, structural integrity, as well as land use regulations that provide oversight on location, use, and appearance of buildings. Today, many municipalities regulate construction to ensure energy efficiency and compliance with the State Energy Code. At a minimum, existing zoning ordinances and other policies should be reviewed to make sure they do not limit renewable energy systems. The Town should also consider site plan review regulations as a way to promote energy efficient design in new commercial buildings.

Denser development and conservation subdivisions

should be incentivized because they protect valuable land resources and save energy in transportation. Land use regulations should consider the energy implications of our land use pattern to properly manage growth and development.

TRANSPORTATION

The second biggest consumer of energy in the United States (and the first biggest consumer in NH) is the transportation sector. Littleton is committed to reducing reliance on automobiles by expanding alternative transportation infrastructure and promoting multiple modes of travel.

Alternative transportation options reduce fuel use, promote physical activity, protect air quality, reduce traffic congestion, and its infrastructure is now seen as a desirable community feature. Alternative transportation includes:

ACTIVE TRANSIT, which is any self-propelled, human-powered mode of transportation such as walking or bicycling. Sidewalks, bike lanes, and multi-use trails provide safe and convenient infrastructure for these travel modes and reduce fuel use. Littleton recently adopted a Bicycle and Pedestrian Plan which should help the Town continue to make improvements that facilitate active transportation more efficiently including improved or new sidewalks, crosswalks, and bicycle lanes. Eventually, the community should strive for a non-motorized “greenway” network that supports all transportation modes throughout the entire Town. In addition, the Zoning Ordinance should encourage mixed use development and dense residential development within walking distance to jobs, school, shopping, and services.

MASS TRANSIT is a form of travel offered locally that enables more people to travel together along designated routes, such as buses or rail. Currently, the Concord Coach stops in Littleton and offers

AHEAD TOWN AND COUNTRY APARTMENTS

Littleton Town and Country Family Housing provides affordable apartments for working families. The affordable housing development is owned and maintained by AHEAD, a local non-profit housing organization based in Littleton. The apartments were built using modern sustainable building design practices including increased insulation, energy start light fixtures and appliances, krypton gas-filled windows, and incorporated such programs as mandatory recycling. These apartments also showcase appropriate siting of housing, located within walking distance of downtown and other important amenities.



a way for residents to travel to southern parts of the state by bus. Tri-County Transit also provides public transportation services to the general public (but especially, seniors, low-income persons, and the disabled) in the North Country region around Littleton.

RIDESHARING is any means of transportation in which multiple people use the same car, truck, van, or vehicle to arrive at a similar destination. Though ridesharing companies Uber and Lyft don't have a huge presence in Littleton now, they may grow

in the future. Additionally, park and ride lots near interstate highways also provide opportunity for ridesharing to occur.

ENERGY EFFICIENT SINGLE OCCUPANCY VEHICLES, such as electric cars, are rising in popularity and are much more fuel efficient than non-electric vehicles. Littleton should be promoting the use of electric vehicles and establish charging stations at key locations in Town. Currently, electric vehicle charging stations exist at the Food Coop and at the Mill Street Studio School and the Town is pursuing an additional station as part of the Mill Street streetscape project.

According to the American Community Survey, Littleton has the highest rate (10.5%) of housing unit occupants with no vehicle in Grafton County. Living in a rural area requires individuals to have a vehicle to access a variety of services. Littleton also has the county's highest rate (11.4%) of individuals living below the poverty level. Littleton's workforce needs inexpensive and easily accessible means of getting to their place of employment. Littleton should consider this when planning for equitable, well-connected, and diverse transportation options.

ENERGY SOURCES

New Hampshire has no in-state sources of fossil fuels (e.g., coal, natural gas, oil) or nuclear material, relying on energy imports for these sources. Although New Hampshire burns virtually no oil for purposes of electricity generation, its per capita petroleum consumption is one of the highest in the United States. There's also been a shift in recent years to utilizing renewable sources of energy. New Hampshire's renewable portfolio standard requires 25% of electricity sold in the state to come from renewable energy resources by 2025. In 2017, 20% of electricity generation in the state came from renewables.

AN ENERGY EFFICIENT HIGHWAY DEPARTMENT BUILDING

Littleton's Highway Department was built with energy efficient design in mind:

- **Insulation:** The walls are rated at R24 and the ceiling at R33.
- **Doors:** Large, overhead, passive solar doors provide natural light and supplemental heat during the winter months. Using less artificial light will save on electricity.
- **Lighting:** Highly efficient LED lights, augmented by large solar doors, and occupancy sensors.
- **Heating:** The existing biomass (wood pellet) system continues to be the primary heating source, supplemented and backed up by a new propane system. Radiant floors work especially well in tandem with the wood-based heating system. Radiant heat also keeps the slab floor dry, a life-safety enhancement.
- **Gas Saving:** Less idling will be required to warm up vehicles in the winter.

Alternative Sources of Energy

Renewable energy is an important step toward addressing climate change and securing financial and environmentally sustainable energy systems into the future. The five most commonly used renewables are:

- Biomass: including wood and wood waste, municipal solid waste, landfill gas, and biogas, ethanol and biodiesel
- Water (hydropower)
- Geothermal
- Wind
- Solar: Direct solar systems can collect heat to

supplement building systems or can generate electricity.

The most practical alternate systems of harvesting energy available to the North Country are wood, hydroelectric, direct solar collection, and wind. Littleton has begun to make strides to convert from mostly oil to propane and wood in municipal buildings. There may also be local opportunities for small scale-hydro power and wind energy systems.

Energy Efficiency Resources

The following state programs provide incentives to property owners to plan for and implement energy efficient upgrades to their property.

- **ENERGY AUDIT FINANCING:** Small businesses in the Littleton Water and Light service area may be eligible for low cost energy audits. The NH Community Development Finance Authority will cover up to 75% of audit costs for eligible businesses.
- **NH RURAL RENEWABLES:** Lakes Region Community College, along with Plymouth Area Renewable Energy Initiative (PAREI) and New Hampshire Sustainable Energy Association (NHSEA) are teaming together to provide this free technical assistance. Rural small businesses interested in installing solar photovoltaic, solar thermal, wood heat, and other renewable energy technologies can receive helpful educational information and preliminary vendor-neutral site evaluations at no cost.
- **NEW ENGLAND GRASSROOTS ENVIRONMENT FUND (NEGEF):** Small grants for education, outreach, and community energy projects are available through revolving grants offered by NEGEF.

The following resources provide information on

In 2011, the Littleton Police Department enacted a gas-saving, anti-idling policy. As well as limiting idling to only those situations operationally necessary. The policy also encourages the use of walking and biking patrols. This policy is being used as a model in NH.

funding, programs, policies, and education related to energy in the state.

- **NHSAVES:** NHSaves provides tools, incentives, & tips for homes, businesses, and towns, to save energy.
- **LOCAL ENERGY SOLUTIONS:** Local Energy Solutions provides guidance and resources to help local energy groups to implement success energy efficiency and renewable energy projects to make their communities more sustainable.
- **OFFICE OF STRATEGIC INITIATIVES ENERGY DIVISION:** The Energy Division promotes energy efficiency and reducing energy costs by supporting programs for low-income households, municipalities, businesses, and schools; exploring opportunities to expand the use of renewable energy sources, and administer state and federal programs related to energy.



Above: A solar array helps to power Burndy Manufacturing in Littleton, NH. Installed by Revision