

# ENERGY CHAPTER OF THE LACONIA MASTER PLAN

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[www.eere.energy.gov/wip/eecbg.html](http://www.eere.energy.gov/wip/eecbg.html).

# ENERGY

## Purpose

The purpose of this chapter is to promote energy efficiency and conservation in the City of Laconia with the expectation that through the implementation of the action steps in this chapter, Laconia can increase energy efficiency, reduce operating costs and cut carbon emissions.

The planning community recognizes that energy matters impact the health, safety, quality of life and economic vitality of any region or municipality and should be addressed at the state and local levels. The Energy Chapter herein is part of the City of Laconia's Master Plan which was previously revised in 2007 and follows NH RSA 674:2 Master Plan: Purpose and Description. When addressing energy issues, the City must consider land use, transportation, natural resources, utilities, hazard mitigation and other interrelated topics. The 2007 Master Plan embraces concepts such as mixed use development, walkability and bike paths.



Photo courtesy of Lakes Region Community College. Pictured is the ground mounted Photovoltaic Array at Lakes Region Community College (LRCC) which is used for training as well as powering 1/3 of the electrical needs for LRCC's Center for the Arts and Technologies (CAT) building at the campus. LRCC offers degree and certificate programs in Energy Services and Technologies as well as Electrical Technologies which both include Photovoltaic training.

In 2008, the New Hampshire Legislature added “energy” as an allowed Master Plan section. NH RSA 674:2 III (n) states: “An energy section, which 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.” In particular, the Energy Chapter will focus on energy efficiency, energy conservation and sustainable energy.

Energy planning has become an important issue for local governments as energy costs continue to increase and concern grows over the environmental impact and health costs of major forms of energy production. Reducing dependence on existing energy supplies and exploring alternative energy sources serves many purposes such as a reduction in operating costs for buildings and vehicles, an increasing in building comfort and user productivity, retention of more money in the local and regional economy by using more local sources of energy, services, and food supply, more options for multi-modal mobility (walking, bicycling, private vehicles, public vehicles, etc.), a diversification of energy supplies to include more local supplies such as wood and renewables for more energy security and an increase in U.S. national security by reducing dependence on foreign oil.

The Energy Chapter recognizes and addresses the interrelationship between land use, transportation, economic development, hazard mitigation and energy. This Chapter outlines a framework for understanding energy issues facing the City and provides related information so that local officials and residents can move forward in this energy environment.

### **Energy Approach for Laconia**

Laconia is reliant on a mix of fossil fuels to meet current energy demands. These fuel sources are not renewable and the global supply of fossil fuels is dwindling. Oil, gas, and coal need to be imported and their continued use can adversely affect the environment. Laconia residents and businesses should have access to diverse, reliable, affordable, local and environmentally responsible energy supplies. This may require residents, businesses and the local government to adopt more aggressive energy policies, embrace longer-term capital investment strategies and promote the development of sustainable energy alternatives.

The effects of global climate change are observed locally. The University of New Hampshire’s Complex Systems Research Center, Institute for the Study of Earth, Oceans & Space has determined that weather in New Hampshire has generally become hotter, wetter, and more extreme, (Dr. Cameron Wake 2005). This issue presents another critical reason for exploring ways to reduce the amount of energy used locally and to explore a transition to sources that produce fewer greenhouse gas emissions. These weather changes have been observed in Laconia and New Hampshire in the past six

years with extreme events occurring almost every year and with power outages from these extreme weather events ranging from 125,000 to 322,000 power outages. This compares to the 1990s when there were only four major storms resulting in 55,000 – 93,000 power outages.

<b>Event #</b>	<b>Year</b>	<b>Month</b>	<b>Description</b>
1	2006	May	Mother's Day Flood #1;
2	2007	April	Patriot's Day Flood #2;
3	2008	July	Tornado - 50 mile touchdown, starting in Deerfield to Ossipee with 1 fatality;
4	2008	Fall	Flood #3;
5	2008	Dec	Ice Storm: PSNH new record with 322,000 outages;
6	2010	Feb	Wind storm: PSNH 2nd most outages with 269,000;
7	2010	March	Flood #4;
8	2011	Aug	Tropical Storm Irene: PSNH 125,000+ highest non-winter outage;
9	2011	Oct	Halloween Snow Storm: PSNH 3rd most outages with 237,000; largest Northeast Utilities outage on record with 1,248,000 customers affected;
10	2011-12	Dec-Jan	Second warmest winter on record; and
11	2012	March	Warmest on record, 9 degrees F higher than average.

*Source: Bureau of Homeland security, NH DOS, NH utilities*

By exploring creative planning and development principles, Laconia can remain a vibrant community that is less dependent on fossil fuels and fluctuating energy costs. Planning concepts such as mixed use development, promotion of the City and neighborhood center, construction of energy efficient buildings, use of alternative energy sources for City buildings, use of alternative transportation and land use regulations and incentives for renewable energy will move the City forward to a more energy independent community. These policies and practices will help reduce energy use and environmental impacts associated with fossil fuel dependency and save the City and its residents and businesses resources.

### **State Statutes and Plans related to Energy**

New Hampshire State planning statutes articulate the purpose and scope of local land use regulations and the authority of the local jurisdiction and Planning Boards. Pertinent sections that relate to environment and energy include the following.

#### **NH RSA 672:1. Declaration of Purpose for Planning & Zoning**

**III.** Proper regulations enhance the public health, safety and general welfare and encourage the appropriate and wise use of land.

**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, zoning ordinances should not unreasonably limit installation of solar, wind, or other renewable energy systems or the building of structures that facilitate the collection of renewable energy, except necessary to protect the public health, safety, and welfare.

#### **RSA 674:2. Master Plan: Purpose and Description**

The master plan may also include the following sections:

**(n)** An energy section, which 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.

State law allows municipalities to establish a local energy commission.

#### **NH RSA 38-D: 4 Duties for Local Energy Commissions**

I. The (energy) commission shall:

(a) Research municipal energy use and cost and make such information available to the town on at least an annual basis; and

(b) Make recommendations to local boards and committees pertaining to municipal energy plans and sustainable practices such as energy conservation, energy efficiency, energy generation, and zoning practices.

II. The commission may appoint subcommittees as it may from time to time require.

#### **NH RSA 155-A:2 (VI) State Building Code**

Permits municipalities to adopt stricter measures than those of the NH State Building Code.

#### **NH RSA 72:61 through 72 Definition of Solar, Wind and Wood Energy**

Allows municipalities to offer a property tax exemption on solar, wind and certain wood heating systems. These systems include solar hot water, solar photovoltaic, wind turbine and central wood heating systems (and not stovetop and woodstoves).

A plan for energy efficiency and compliance with relevant state statutes allow Laconia to be eligible for grants and funding mechanisms which help the town to conserve energy and reduce operating costs. The following organizations play important roles in the energy field.

## **Existing Conditions**

### **City of Laconia**

With assistance from the NH Energy Technical Assistance Program (ETAP), funded by ARRA and administered by the NH Office of Energy and Planning, the City of Laconia's staffed Energy Committee completed the following energy reports.

1. Energy Efficiency Opportunities for Town (City) Buildings, Laconia, Dec 2010;
2. Municipal Greenhouse Gas and Energy Use Baseline Report for Laconia, NH, 2009;
3. Decision Grade Audit, Laconia Central Fire Station, April 2011;
4. Laconia Memo To J. Gardner From Peregrine Energy Group, Feb 2, 2011; and
5. Action Items, City staffed Energy Committee, multiple, April 4, 2012.

The above are valuable reports, which contain information on City energy usage, potential energy savings and specific action steps to reduce energy consumption. The City has completed energy audits for the City Hall, Police Station, Fire Station and Library and has worked to implement the recommendations. The 2009 Baseline report contained the following recommendations, with the City's efforts are noted in italics:

- Review existing Master Plan, Zoning Ordinances, and other town policies for inconsistencies with the goal to reduce energy usage. *In process*
- Implement a behavioral change program in municipal buildings with municipal employees. *Space heaters have been reduced and thermostats turned down.*
- Work with Local Energy Commission (LEC) Working Group for guidance to implement this initiative. *The City's in-house Committee has implemented several cost saving measures.*

- Implement buying strategy of Energy Star equipment and Products and environmentally sensitive office products, and implement awareness campaigns to encourage “thoughtful” consumption of equipment and products. *Implemented.*
- Evaluate ways to reduce fuel usage with vehicle fleet. This can be done by analyzing routes, usage, and a strict anti-idling policy. *In process.*
- Explore alternative energy sources to reduce escalating fossil fuel prices and emissions. *In process.*
- Investigate payback for possibly installing: a small CHP unit, biomass heating system or geothermal heat pump. *Alternatives such as these are considered during public bid and design process.*
- Encourage recycling and composting to the highest extent possible, in order to divert the amount of municipal solid waste going to landfill. *Implemented.*

Since 2009, through the City-staffed Energy Committee and with leadership from the Purchasing Department, the City has worked to implement energy efficiency cost saving steps. Some of these efforts include changing light bulbs and fixtures, adjusting thermostats, upgrading office spaces, increasing insulation, improving HVAC, purchasing smaller cylinder vehicles and other related activities. At this point, the City now desires to have the community at large (homeowners, businesses, non-profit organizations and others) more involved in the energy planning effort.

### **The Energy, Land Use and Planning Connection**

#### **Energy and Land Use:**

Energy efficiency and energy conservation are important components of a City’s land use policy and approach to land use planning. Energy issues and associated topics should now be considered as factors limiting development, in a manner similar to natural resource constraints, such as wetlands, floodplains, poor soils and steep slopes. A municipality should strive for consistency regarding land use and energy policies in its planning documents, e.g. Master Plan, Zoning Ordinance and Site Plan and Subdivision Regulations.

The concept of “smart growth” has many components, which address energy conservation measures. Planning concepts such as mixed use development and compact village centers help to reduce energy by reducing the number of vehicle trips between shopping areas and the distance between these shopping areas and where residents live. Similarly, alternative transportation reduces vehicular traffic and subsequently carbon dioxide emissions. Many local governments embrace the concept of a walkable community whereby residents can walk to shopping, employment and other needs. In Laconia, opportunities for a walkable community are abundant.

Site design techniques that take advantage of sun exposure, differences in microclimate and landscaping reduce a development’s demand for fossil fuel derived energy sources and lower energy consumption. These planning techniques can be used in designing housing and non-residential developments, deciding on density levels, integrating different land uses, and designing transportation and circulation systems. The Laconia Planning Board can implement energy efficient planning principles subdivision and site plan review regulations, zoning ordinance, and building codes. The Planning Board can apply these common sense approaches to energy planning when reviewing residential and non-residential developments for approval. As the City completes the Master Plan, it should highlight energy considerations and its relationship to land use, transportation, economic development and natural resource policies.

### **Current Trends and Initiatives in New Hampshire**

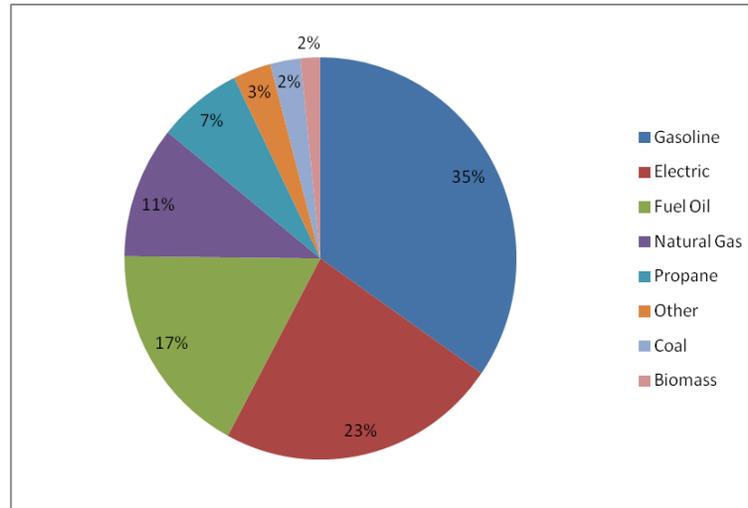
New Hampshire citizens, businesses, and industries spent almost \$5 billion on energy in 2009<sup>1</sup>. Of this expenditure, more than 67% leaves the state’s economy immediately with the majority paying for fossil fuels and nuclear fuels imported from overseas.<sup>2</sup> This outflow of dollars represents nearly 7% of New Hampshire’s GDP and has been identified as a major drain on the economy. Investments in more efficient energy use could cost up to \$2 billion. However, savings would offset the investments in less than four years.

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<sup>1</sup> Energy Information Administration, State Energy Data System 2009, “Table S1b Energy Expenditure Estimates by Source, 2009,” [http://www.eia.gov/emeu/states/hf.jsp?incfile=sep\\_sum/plain\\_html/sum\\_ex\\_tot.html](http://www.eia.gov/emeu/states/hf.jsp?incfile=sep_sum/plain_html/sum_ex_tot.html).

<sup>2</sup> New Hampshire Office of Energy and Planning, “2007 New Hampshire Energy Facts,” <http://www.nh.gov/oep/programs/energy/nhenergyfacts/2007/introduction.htm>.

### 2009 New Hampshire Energy Expenditure Estimates by Source



Source: Energy Information Administration, State Energy Data system 2009

According to a 2009 study, if all state households achieved the highest level of energy efficiency, residents would save \$309 million per year.<sup>3</sup> Commercial and industrial buildings would save \$220 million per year.<sup>4</sup> In May 2007, New Hampshire adopted a renewable portfolio standard that requires 25% of the State’s electricity to be generated from renewable sources by 2025. According to the 2012 Renewable Portfolio Standard white paper in New Hampshire, 84% of the electricity produced (2008 data) comes from non-renewable fuels: coal, natural gas, oil, and nuclear. The remaining 16% of the electricity produced comes from the following renewable fuels: biomass, hydropower, landfill gas. The State has a goal of having 25% of its electricity come from renewables by the year 2025.

<sup>3</sup> This represents energy savings of around 20%, as defined as cost-effective in the study *Additional Opportunities for Energy Efficiency in New Hampshire*, Final Report to the New Hampshire Public Utilities Commission, GDS Associates, Inc., 2009

<sup>4</sup> Independent Study of Energy Policy Issues. Vermont Energy Investment Corporation, Jeffrey Taylor and Associates, Optimal Energy Inc. June 30, 2011

Renewable Portfolio Standard (RPS) - In May 2007, New Hampshire's RPS policy became law as the Renewable Energy Act. It requires each supplier of electricity in New Hampshire (PSNH, Unitil, National Grid, NH Electric Coop) to demonstrate that they are obtaining about 25% of their electricity from renewable energy resources by the year 2025.

Regional Greenhouse Gas Initiative (RGGI) - RGGI is a cooperative effort among nine states – Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island and Vermont – to reduce greenhouse gas emissions. RGGI reduces CO<sub>2</sub> emissions by establishing a regional cap on the amount of CO<sub>2</sub> that power plants can emit through the issuance of a limited number of tradable CO<sub>2</sub> allowances. This approach allows market forces to determine the most economic means of reducing emissions and creates market certainty needed to drive long-term investments in clean energy. Together these states have capped and will reduce power sector CO<sub>2</sub> emissions 10 percent by 2018.

Performance Contracting - In 1993, the New Hampshire legislature created RSA 21-I: 19-d, which allows a municipality to sign a performance contract with an energy service company (ESCO). A performance contract allows costs of energy efficient upgrades to be financed through the ESCO and paid off over time through energy savings. There are no upfront capital costs associated to a municipality for such programs. Performance contracts protect municipalities by requiring the ESCO to meet a certain reduction of energy use. If this level is not reached, the ESCO is required to pay the difference in the energy bill. Both the municipality and energy provider value this program because it allows municipalities to become more energy efficient, reduces their energy costs, and protects them from increased costs, while the utility can control the increase in overall demand.

Competitive Electricity Supply Aggregation - Aggregation is the combination of individual electricity buyers (and their loads) into a large pool. Other factors being equal, suppliers prefer dealing with larger groups, which have more purchasing leverage with suppliers competing for their business. This purchasing power can be used to obtain cost savings, a different combination of services, or more favorable service terms. Aggregation also reduces transaction costs for the members of the buyers group and for the suppliers.<sup>5</sup> The Nashua Regional Planning Commission assisted nine municipalities and six school districts form an aggregation to purchase electricity from a competitive supplier.

Combined Heat and Power (CHP) - Also known as cogeneration, CHP is the concurrent production of electricity or mechanical power and useful thermal energy (heating and/or cooling) from a single source of energy. CHP is a type of

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<sup>5</sup> NREL. *Customer Aggregation: An Opportunity for Green Power?* February 2001.

distributed generation, which, unlike central station generation, is located at or near the point of consumption. Instead of purchasing electricity from a local utility and then burning fuel in a furnace or boiler to produce thermal energy, consumers use CHP to provide these energy services in one energy-efficient step. As a result, CHP improves efficiency and reduces greenhouse gas (GHG) emissions. CHP can use a variety of fuels, both fossil- and renewable-based.<sup>6</sup>

Net Metering or Net Energy Metering - This refers to an electricity policy, which allows utility customers to offset some or all of their energy use with self-produced renewable energy. Net metering works by utilizing a meter that is able to spin and record energy flow in both directions. The meter spins forward when a customer is drawing power from the utility grid (i.e., using more energy than they are producing) and spins backward when energy is being sent back to the grid. At the end of a given month, the customer is billed only for the net energy used.<sup>7</sup> At present, a few homeowners are benefiting net metering in Effingham.

Grants, Rebate Programs and Low-Interest Loans - This information is contained throughout the Chapter especially in Section 4. Tools for Energy efficiency, c. Tools for Energy Efficiency.

## **Laconia's Energy Goals, Values and Vision**

With a population of 15,900 and equalized value of \$2.0 Billion, the City of Laconia, NH in Belknap County is in the heart of the Lakes Region. The City is 30 miles from Concord and 90 miles from Boston and a heavily dependent on tourism and recreation for its economic base. In late June 2012, the Laconia Planning Department in partnership with the Lakes Region Planning Commission and other local officials sponsored an Energy Forum at the Laconia City Hall. The forum provided an opportunity for local interested persons to share their thoughts regarding energy issues affecting the City. The purpose of the forum was twofold: 1) provide information to attendees on basic energy efficiency, energy conservation and sustainable energy activities and programs; and 2) solicit thoughts and ideas from the participants relative to the future energy vision for the City of Laconia.

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<sup>6</sup> ["Combined Heat and Power – Effective Energy Solutions for a Sustainable Future"](#). Oak Ridge National Laboratory. 1 December 2008. Retrieved 11 April 2012.

<sup>7</sup> Calfinder Residential Solar Power. <http://solar.calfinder.com/blog/solar-information/what-is-net-metering/>

## ***Energy future***

The participants identified the following topical areas of energy interest: Energy Efficiency, Energy Sources, Community Planning and Other.

- Energy Efficiency: Appoint a Facilities Manager for Energy to seek energy efficiency in all governmental buildings and facilities and be the municipal energy resource specialist; engage in energy efficiency activities; promote light-emitting diode (LED) for City street lighting; conduct energy audits and require life cycle analysis for municipal buildings.
- Energy Sources: Encourage a mix of energy sources including expansion of the existing natural gas line, hydro, wind power and the landfill as a source of methane gas. Participants at the Forum recognize that future energy sources may likely be local and decentralized.
- Community Planning: Local building codes must allow for energy efficiency and sustainable energy projects. Explore a multi municipal Energy Cooperative similar to the one established in the Nashua Region. Communicate with other local governments as to the types of energy activities in which they are interested. The Lakes Region Energy Alliance could be revived and play an important role in the future.
- Other: Best Management Practices (BMPs) for energy type operations and educational / outreach efforts, including but not limited to the Laconia City schools.

## ***Energy challenges***

The following are potential obstacles to reaching the energy vision.

- Economic: Financing availability with easier and better access; a number of lower income persons in the city; transition to an energy future requires educational and funding resources.
- Situational: Old buildings; location may not be suitable for solar or wind.
- Social: Attitude and apathy to change; need more people to participate; and need younger persons to be involved.

### ***Laconia's Energy Vision***

The past work of the City's Local Energy Committee, the April 17, 2012 meeting of local officials regarding energy issues and information gathered from the June 2012 Local Energy Committee were helpful in designing the following Energy Vision:

***Laconia will promote an efficient and sustainable energy future consistent with the City's built urban environment and character and existing land use pattern. Working with energy partners, the City of Laconia will lead in this area and strive to be a source of information and resources for homeowners and businesses so that residents can enjoy an energy efficient and cost effective future***

Based on the Forum, the following five energy goals are proposed:

1. Encourage energy independence and energy self-reliance with the outcome of reduced operating costs and increased economic benefit.
2. Explore additional energy sources.
3. Reduce energy costs by basing decisions on initial investment and operating costs.
4. Promote energy-conscious management of Laconia's municipal buildings.
5. Provide residents with more information regarding their investments in energy efficiency and energy conservation.

## **Recommendations and Action Plan**

The following are nine recommendations and 27 action steps for the city's consideration.

1. Reduce energy use.
2. Maximize energy efficiency in buildings.
3. Continue the City's efforts to find energy efficient cost savings.
4. Increase renewable and low CO2 emitting sources of energy.
5. Support regional and national actions to reduce Greenhouse Gases
6. Encourage land use patterns that reduce vehicle miles traveled.
7. Lead by example.
8. Develop an integrated education, outreach, and workforce-training program.
9. Promote local food supply and marketing.
10. Investigate incentivize and use alternative and local energy sources.

**Laconia Master Plan – Energy Chapter: Recommendations and Action Steps**

	<b>Recommendations/Action Steps</b>	<b>Responsible for Action</b>	<b>Projected Implementation Timeframe</b>	<b>Implementation Status</b>	<b>Plan Reference</b>
<i>1. Reduce energy use</i>					
1a.	Provide information to homeowners on techniques to reduce energy consumption.	Planning Board (PB)	2013		
1b.	Encourage all new residential buildings to be energy efficient.	Planning Board (PB)	2013		
1c.	Appoint a Facilities Manager (FM) for energy management in City facilities	City Manager (CM) / City Council (CC)	2012		
1d.	Recommend energy policies for municipal buildings	Local Energy Commission (LEC)	2013		
1e.	Encourage department heads to consider energy efficiency projects and in coordination with other departments	Administrative Assistant and Dept Heads	2013		
<i>2. Maximize energy efficiency in buildings</i>					
2a.	Review the energy audits for opportunities to realize energy savings	Department Heads	2012		
2b.	Prioritize energy efficiency recommendations	Facilities Manager	2013		

2c.	Track energy use and cost in municipal buildings and provide quarterly reporting	Facilities Manager	2013		
2d.	Consider establishing an energy efficient building ordinance for municipal buildings. This would require new construction or major renovations for City buildings to meet US Green Building Council LEED standards.	CM, PB and CC	2014		
2e.	Consider adopting more stringent building codes than State codes to increase energy efficiency and decrease energy costs.	CM, PB and CC	2014		
<i>3. Continue the City's efforts to find energy efficient cost savings.</i>					
3a.	Determine energy costs regarding municipal energy investments.	Facilities Manager	2013		
3b.	Establish a fund for future municipal energy efficiency projects	CM and CC	2014		
<i>4. Increase renewable and low CO2 emitting sources of energy</i>					
4a.	Purchase up to 20% of municipal energy from renewable sources by 2030.	Facilities Manager	2015		
4b.	Investigate on-site renewable energy sources for municipal buildings such as a small CHP unit, biomass heat, wind and solar.	Facilities Manager	2014		

<i>5. Support regional actions to reduce Greenhouse Gases</i>					
5a.	Support New Hampshire's Renewable Portfolio Standard of 25% renewable energy by 2025	CM, CC and LEC	2014		
5b.	Support the Regional Greenhouse Gas Initiative (RGGI)	CM, CC and LEC	2014		
5c.	Request biennial updates from the LEC to the CC on City actions to reduce Greenhouse Gases	CM and CC	2014		
<i>6. Encourage land use patterns that reduce vehicle miles traveled</i>					
6a.	Conduct an audit of the City's land use regulations and other town policies for consistency with energy efficient development	Planning Board (PB)	2013		
6b.	Consider innovative land use planning techniques for energy efficient development	Planning Board (PB)	2014		
6c.	Be receptive to proposed creative energy efficient developments.	Planning Board (PB)	2013		
6d.	Allow innovative design and new technology for more efficient buildings.	Code Department	2014		
<i>7. Lead by example</i>					
7a.	Publish municipal energy use and costs on the City's website	FM and LEC	2014		
7b.	Review and revise municipal	PB and LEC	2014		

	energy goals and strategy on a biennial basis				
7c.	Establish the Local Energy Commission (LEC) and work with City departments to identify energy saving projects.	CM and CC	2012		
7d.	Consider energy issues when preparing updates to the City Master Plan.	PB and LEC	2012 and ongoing		
7e.	Purchase fuel efficient vehicles.	Purchasing Agent	Ongoing		
7f.	Evaluate plans for construction to ensure energy efficiency measures are met	CC, LEC and PB	Ongoing		
<i>8. Develop an integrated education, outreach, and workforce training program</i>					
8a.	Charge LEC with education and outreach effort	CM and CC	2013		
8b.	Appoint a CC and PB representative to the LEC to work with and coordinate on energy efficiency projects in Laconia	CC, PB	2013		
8c.	Publicize energy savings measures the City accomplishes regarding municipal buildings and progress on reducing municipal energy and costs	CM, FM and LEC	2013		
8d.	Create a page for the LEC and "Energy Matters" on the City website	FM and LEC	2013		
8e.	Publish energy efficiency tips,	FM and LEC	2013		

	incentives and rebates in the local newspaper and on the town website through the LEC				
8f.	Hold free events with an energy conservation focus and incorporate energy conservation measures into community events	LEC	2013		
<i>9. Promote local food supply and marketing</i>					
9a.	Prepare an electronic brochure for the website identifying small farms and growers of local produce	LEC	2013		
9b.	Support the concept of a Farmers' Market	CM, CC, PB, LEC and Department Heads	2012		
<i>10. Investigate, incentivize and use alternative and local energy sources</i>					
10a.	Request energy efficient alternatives in RFPs, designs et cetera.	LEC and Purchasing	2013		
10b.	Provides incentives such as a streamlined review process and reduced fees for energy efficient projects and developments.	CM, PB and CC	2014		

## Appendices

### A. Definitions

**ARRA** – American Reinvestment and Recovery Act

**Carbon sequestration** - Carbon that is removed from the atmosphere and retained in a carbon sink (such as a growing tree or in soil).<sup>8</sup>

**Climate Change** – Burning fossil fuels, increased agriculture, and deforestation all emit natural greenhouse gases and are of concern due to their contribution to increased concentrations of these greenhouse gases. Human activities also increase GHG emissions that are not naturally and include semiconductor manufacturing, refrigerant leaks, and other industrial sources. The high level of greenhouse gases trap heat close to the surface of the earth, contributing to major shifts in the global climate.<sup>9</sup>

**DHW** – Domestic Hot Water

**Energy Conservation** – the efficient use of energy or the reduction of energy use by implementing energy efficient practices, policies, technologies, construction, development or any other action aimed at reducing energy use.

**Energy Efficiency – Efficient energy use**, sometimes simply called energy efficiency, is the goal of efforts to reduce the amount of energy required to provide products and services or creating the same benefit or output, but with less energy as an input. For example, insulating a home allows a building to use less heating and cooling energy to achieve and maintain a comfortable temperature. Installing fluorescent lights or natural skylights reduces the amount of energy required to attain the same level of illumination compared to using traditional incandescent light bulbs. Compact fluorescent lights use two-thirds less energy and may last 6 to 10 times longer than incandescent lights. Improvements in energy efficiency are most often achieved by adopting a more efficient technology or production process.<sup>10</sup>

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<sup>8</sup> [Energy Terms Glossary](http://www.neo.ne.gov/statshtml/glossarys.htm). Nebraska Energy Office. <http://www.neo.ne.gov/statshtml/glossarys.htm>. Retrieved 2011-11-15.

<sup>9</sup> US Dept. of Energy. Federal Energy Management Program

<sup>10</sup> Diesendorf, Mark (2007). Greenhouse Solutions with Sustainable Energy, UNSW Press, p. 86.

**Energy conservation** - refers to the efficient use of energy or the reduction of energy use by implementing practices, policies, technologies, construction, development or any other action aimed at reducing energy use. Energy conservation reduces energy usage. Using energy and not gaining any benefit from it is wasting energy.

**Energy, Sustainable** - is used to describe energy generation systems that do not use nonrenewable fuel sources (e.g., fossil fuels) and that “meet the needs of current generations without diminishing the needs of future generations.” The World Commission on Environment and Development provided this information. Examples include solar hot water and photovoltaic systems, wind energy systems, biomass heating, co-generation systems and hydroelectric systems. When such systems are located in relative proximity to the point of consumption (for example a residence or business), the system is considered to be “distributed” energy generation systems vs. centrally operated systems. As a distributed system, the energy source does not require an electric distribution utility to transmit the power from its centrally located power plant to the point of consumption.

**Greenhouse Gas Emissions** – Greenhouse gases are trace gases in the lower atmosphere that trap heat through a natural process called the "greenhouse effect." This process keeps the planet habitable. International research has linked human activities to a rapid increase in GHG concentrations in the atmosphere, contributing to major shifts in the global climate.<sup>11</sup>

**GDP** – Gross Domestic Product

**IR** – Infrared

**kWh/yr** – Kilowatt hours per year

**LEED** - Leadership in Energy and Environmental Design. Developed by the U.S. Green Building Council (USGBC) in 2000, the LEED certification provides independent, third-party verification that a building, home or community was designed and built using strategies aimed at achieving high performance in key areas of human and environmental health: sustainable site development, water savings, energy efficiency, materials selection and indoor environmental quality.

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<sup>11</sup> US Dept. of Energy. Federal Energy Management Program.

**Life-cycle emissions** – The term 'lifecycle greenhouse gas emissions' means the aggregate quantity of greenhouse gas emissions (including direct emissions and significant indirect emissions such as significant emissions from land use changes related to the full fuel lifecycle, including all stages of fuel and feedstock production and distribution, from feedstock generation or extraction through the distribution and delivery and use of the finished fuel to the ultimate consumer, where the mass values for all greenhouse gases are adjusted to account for their relative global warming potential.<sup>12</sup>

**Light Emitting Diodes (LED)** - A light-emitting diode (LED) is a semiconductor light source.<sup>13</sup> LEDs are used as indicator lamps in many devices and are increasingly used for other lighting. Introduced as a practical electronic component in 1962,<sup>14</sup> early LEDs emitted low-intensity red light, but modern versions are available across the visible, ultraviolet and infrared wavelengths, with very high brightness.

**Point of Use DHW heaters** – Point of Use Domestic Hot Water heaters. They are typically dedicated use heaters meaning the unit serves one sink / faucet or one shower, etc.

**Renewable Energy** – Renewable energy is derived from natural processes that are replenished constantly. In its various forms, it derives directly from the sun, or from heat generated deep within the earth. Included in the definition are electricity and heat generated from solar, wind, ocean, hydropower, biomass, geothermal resources, biofuels and hydrogen derived from renewable resources.<sup>15</sup>

**Simple payback** – Payback period in capital budgeting refers to the period of time required for the return on an investment to "repay" the sum of the original investment.

**Small wind energy systems** – A wind energy conversion system consisting of a wind generator, a tower, and associated control or conversion electronics, which has a rated capacity of 100 kilowatts or less and will be used primarily for onsite consumption.

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<sup>12</sup> US EPA. Clean Air Act Section 211(o)(1)

<sup>13</sup> "LED". The American heritage science dictionary. Houghton Mifflin Company. 2005. Via <http://dictionary.reference.com/browse/led> and <http://www.thefreedictionary.com/LED>, Retrieved 2011-11-15

<sup>14</sup> "Nick Holonyak, Jr. 2004 Lemelson-MIT Prize Winner". Lemelson-MIT Program. <http://web.mit.edu/invent/a-winners/a-holonyak.html>. Retrieved 2007-08-13.

<sup>15</sup> International Energy Agency

**Traditional Neighborhood Developments** – Traditional Neighborhood Development (TND) is a compact land development pattern that includes a variety of housing types and land uses in a defined area. Public spaces, civic buildings and commercial establishments are located within walking distance of homes. Community identity, civic spaces and walkability are emphasized.<sup>16</sup>

**Vehicle miles traveled** – Vehicle Miles Traveled (VMT) is the total number of miles driven by all vehicles within a given time period and geographic area.

**Village Plan Alternative** – The Village Plan Alternative (VPA) is a planning tool that promotes compact development with a mix of land uses, including residential, small-scale commercial, recreation and conservation in close proximity to one another within a neighborhood. It is designed to implement the specific provisions of RSA 674:21.VI(a) to allow for the creation of new villages with mixed-used development that is scaled to the smaller populations and lower density of New Hampshire towns.<sup>17</sup>

**Wind turbines** – A wind turbine is a device that converts kinetic energy from the wind into mechanical energy.

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<sup>16</sup>Natural Lands Trust. Conservation Tools. <http://conservationtools.org/guides/show/46> Retrieved 2011-11-15

<sup>17</sup>NHDES. Innovative Land Use Planning Techniques Handbook. October 2008.

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3. Decision Grade Audit, Laconia Central Fire Station, April 2011;
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5. Action Items, Energy Committee, multiple, 04/12/12.