



Energy

Energy

Introduction

T

he purpose of this chapter is to discuss energy efficiency, conservation and sustainability and to encourage the reduction of energy consumption and cost. This chapter also encourages the establishment of best management practices and technologies in future construction, renovation, and maintenance of buildings and facilities. In the 2014 Visioning Workshop and Master Plan Survey, Windham residents and businesses wanted more information and education about energy conservation and sustainability principles.

The connection between land use planning and energy conservation has been of increasing interest to the Town in recent years. The volatility of energy supply and demand impacts decisions made by the public and private sector in terms of development patterns, transportation, and municipal services. Land use policy can address issues regarding how a community meets its energy needs, reduces greenhouse gas emissions, and faces the impacts that climate change may bring. This can be achieved through land use regulation (zoning), transportation policies (mass transit, pedestrian and bicycling safety, and traffic flow), building design standards, and the efficient provision of public services.

This chapter of the Master Plan will focus on energy use in Windham, and efforts that are underway to reduce current levels of consumption, address rising and volatile energy costs and the changing landscape of falling prices for renewable energy technology. The town of Windham shall be a regional leader in energy efficiency, innovation, and fiscal responsibility.

The Vision and Purpose therefore is:

- To achieve a more educated community across all sectors, wherein there is resource awareness on energy related issues.
- To assist municipal entities in implementing changes to improve the energy efficiency of municipal, residential, school and commercial buildings.
- To recommend approaches to improve transportation efficiency for both municipal and private vehicles.

Goals

For achieving the overall vision of a resilient, efficient, and environmentally responsible municipality, Windham shall:

- Support the Town Government and School District in achieving measureable and significant energy cost reductions totaling 10% each by 2025.
- Implement energy audit recommended weatherization improvements and substantiate energy savings.
- Support the extension of natural gas service throughout Windham by 2025.
- Explore several promising on-site renewable energy options for the Town (Wind, Solar, Geothermal, Biomass).
- Establish recommendations for best energy management practices to be applied to building design, future construction, renovation and maintenance of both public and private buildings and facilities.
- Encourage changes in the transportation sector to contribute to energy cost reductions and to foster alternative transportation approaches such as carpooling, regional bus ridership and bicycling.
- Increase outreach to the community, and involve them as a whole, to inform residents and businesses regarding energy conservation and sustainability principles.

Background: Regional, State, and Local Perspectives

Regional and State

In the past, energy consumption and efficiency matters received limited attention among multiple Town bodies. As a result of increased energy awareness nation-wide; federal, state and municipal agencies have made energy conservation a priority and have established specific bodies to address this issue.

In 2006 Governor John Lynch announced the 25 x '25 Renewable Energy Initiative. The goal of 25 x '25 is for New Hampshire to obtain 25% of its energy from clean, renewable sources by the year 2025. This initiative is part of a national effort aimed at producing 25% of the energy consumed in the United States from clean, renewable power by year 2025.

Achieving 25% renewable energy for New Hampshire will be more easily accomplished as an overall goal, rather than working toward 25% renewable energy in each of the end use categories and economic sectors. It will also be easier to meet the overall goal for renewable energy if demand for electricity is reduced by increasing energy efficiency and conservation.

Currently a plan is being developed by the Office of Energy and Planning (OEP) and the Department of Environmental Services (DES), in coordination with a New Hampshire based consulting firm to clearly identify the State's energy efficiency goals based on the 2009 New Hampshire Climate Action Plan (available through the New Hampshire DES). This effort is significant for the State and the Nation. Windham should monitor the plan as it is developed to identify opportunities for the community to be part of the solution.

Local

In 2009, the NH State Legislature authorized the establishment of local energy committees, with the specific mandate to promote renewable energy programs in local communities. The Windham Board of Selectmen (BOS) appointed the Windham Local Energy Committee in 2010. This committee continued and furthered the efforts and programs initiated by Go Green Windham – a grassroots community advocacy group founded in 2007.

Go Green Windham completed financial energy audits of all Windham Town buildings and 19 electric meters and compiled baseline data for 4 years starting in 2005, which is widely considered the most weather anomaly-free year in the past decade. In 2010, using data from the audit, Go Green Windham applied for Energy Efficiency Conservation Block Grant (EECBG) program administered by the New Hampshire Office of Energy and Planning (OEP) and funded by the American Recovery and Reinvestment Act (ARRA). Three grant applications were submitted and funds were awarded for 2 projects - \$14,000 for ASHRAE Level 2 audits of all the municipal town buildings and \$20,743 for LED retrofits of parking lot lights at the Windham Fire and Police Departments and Nesmith Library.

The BOS accepted the grants on behalf of the town and, at the same time, approved the Bylaws for a Windham Local Energy Committee. The BOS appointed a 7 member team to oversee the grants. The EECBG project went out for bid, the LEC evaluated the bids, selected vendors and supervised the audits and the LED retrofits in 2011.

The audits were divided into 2 sets of recommendations – Weatherization and Capital Improvements. A majority of the weatherization recommendations were completed in 2012 and 2013. In 2013, Nesmith Library applied for Capital Improvement Program (CIP) funding to replace and upgrade their HVAC systems based on those audits. The CIP warrant article was approved at 2014 Town meeting and the library will begin the upgrade process in the summer of 2015. The Fire and Police are also applying for their HVAC upgrades through CIP and anticipate Town meeting approval in March 2016.

In 2010, the Windham Small Wind Energy Systems ordinance was enacted at Town Meeting in accordance with RSA 674:62-66, and RSA 672:1-III-a. The purpose of this ordinance is to accommodate small wind energy systems in appropriate locations while protecting the public's health, safety and welfare. In addition, this ordinance provides a permitting process

for small wind energy systems to ensure compliance with the provisions of the requirements and standards established by the statutes referenced above.

In 2011, the LEC placed a warrant article on the ballot – receiving Town approval - of a Renewable Energy Property Tax Exemption as per RSA 72:61-72 which permits cities and towns to offer exemptions from local property taxes for certain renewable energy installations. These include solar systems (thermal and photovoltaic), wind turbines, and central wood-fired heating systems. The goal of the exemption is to create a tax neutral policy within a municipality that neither increases an individual's property tax, nor decreases the municipality's property tax revenues. By implementing it as a tax neutral policy, homeowners do not have the disincentive of higher property taxes for installing a renewable energy system, and since there is no net reduction in municipal tax revenues, other taxpayers in a municipality are not affected.

In 2011, the LEC introduced a Solar Hot Air vendor, Shift Energy, to the Windham School Board to install a solar hot air system at Windham High School. A similar project was implemented at Sanborn High School in Sanborn, NH. A power purchasing agreement between the SAU 17, the Town of Sanborn, Shift Energy and Revision Energy allowed the school to save almost \$17,000 a year in heating and cooling costs. The Windham School Board passed on the project at the time, but the opportunity for the future remains.

In 2012, Windham LEC researched the possibility of investing in clean energy and purchasing Renewable Energy Credits (REC) for Windham's electricity needs. The BOS approved and allowed the Town to meet the NH State Portfolio Standard of 12%.

In 2013, the REC amount was increased to 50% Wind Energy - making Windham the only community in Southern NH to meet its energy goal.

In 2014, the LEC researched and prepared a proposal to increase Windham's investment in clean energy by purchasing 100% Renewable Energy Credits (REC) for our municipal power needs beginning in March 2015. The BOS approved the proposal, recognizing the opportunity to be a leader in clean energy adoption. In 2015, with the blessing of the BOS, the LEC applied for and achieved recognition in the United States Environmental Protection Agency's (EPA) Green Power Partnership as a 100% Green Power User and will pursue other awards as appropriate such as a Top 30 Local Government ranking.

In 2014, the LEC began researching the possibility of bringing natural gas to Windham, since it is the only community in the Southern Tier with no commercial or residential access to natural gas.

87.5% of the master plan respondents rank promoting renewable energy as a priority.

Energy Usage

Windham, New Hampshire, with a land area of 27.2 square miles, utilizes a number of energy sources and suppliers to meet its residential, commercial and light industry needs.

The principal energy usages are for transportation, space and water heating and non-space heating (electricity for lighting, air conditioning, cooking and electronics and machinery operation). Transportation is the largest energy consumer followed by space and water heating and non-space heating functions.



Transportation

In 2014, Windham residents and businesses operated 10,778 passenger vehicles, 2,709 trucks and 612 motorcycles¹; The Windham LEC estimated, on the basis of US Department of Energy data², that the passenger vehicles and trucks – the principal energy users - travel approximately 162,000 million miles annually and consume 6.5 million gallons of fuel (principally gasoline).

The summary of approximate annual, motor vehicle fuel consumption appears in Table 1.

Table 1 Annual Windham Motor Vehicle Energy Usage

	# Registered	Miles Traveled (millions)	Miles/Gallon	Gallons (million)	BTU (millions)
Passenger Vehicles	10,778	129	20	6.5	
Trucks	2,709	33	15	2.2	
Transportation	13,487	161.8		35	8.6 1,209,000

¹ NH Department of Safety; buses were assumed to be included in the trucks category

² US Department of Energy, Alternate Fuels Data Center, <http://www.afdc.energy.gov/data/>

Space and Water Heating

The principal space and water heating fuels are fuel oil, propane, electricity and wood/coal. Windham is unique among the surrounding communities in having no natural gas service. Fuel oil and propane are provided by a number of independent businesses located within and surrounding Windham. As part of a 2014 study on the feasibility of bringing natural gas service to Windham, the Windham Local Energy Committee (LEC) identified the fuels, quantities and their costs to provide space heating to the Town. The LEC conducted this assessment with the assistance of the Town and School District staff. The estimates below - for space heating fuel quantity and cost - utilized building square footage, DOE published correlations between building area and annual energy consumption and fuel costs; these estimates were current as of early 2014.

Table 2 Annual Windham Space Heating Energy Usage

Total Energy	# of Buildings	Fuel Oil (gal.)	Propane(gal.)	Electricity (KWH)	Wood (cords)	Total Energy (million BTU)
Residential	4529	2,179,000	1,589,000	336,000	144	450,000
Commercial	104	449,000	183,900	-	-	79,000
Municipal	12	1,800	29,100	-	-	3,000
School District	8	79,000	31,500	-	-	14,000
SPACE HEATING (Multiple Fuels)	4,653	2,708,800	1,833,500	336,000	144	546,000

Electricity

The third major energy usage component is electrical energy for non-space heating functions, e.g. lighting, air conditioning; cooking and equipment and machinery operation. Public Service of New Hampshire (PSNH) and Granite State Electric (GSE) operated as a subsidiary of Liberty Energy Utilities Company provide Windham's electrical supply. A handful of residents and commercial operations have installed photovoltaic solar systems to supplement electric service from the electric grid. No large-scale wind turbines are operating in the Town currently. Estimated 2014 electricity usage (as provided by PSNH and Granite State Electric) appears below in Table 3.

Table 3 Annual Windham Estimated 2014 Electricity Usage

	# Customers	Electricity (KWH)	Total Energy (million BTU)
Entire Town (Residential, Commercial,Municipal and School District)			
NON-SPACE HEATING (Electricity)	6,075	80,600,000	280,000

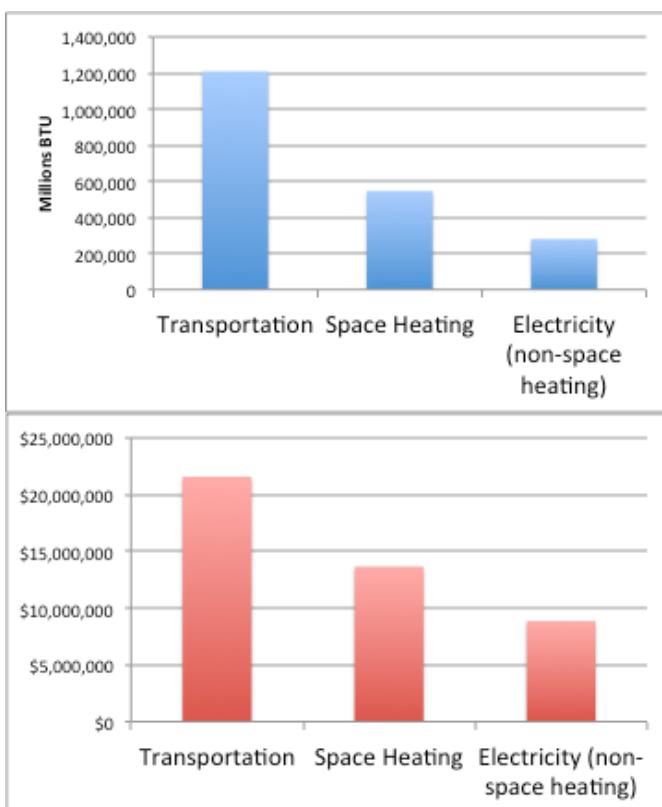
Windham Energy Costs

Windham's energy usage for transportation, space heating and non-space heating has significant impact on the local economy and the environment. Figure 1 summarizes Windham's estimated annual energy consumption and cost by sector and a total consumption of 2,035 billion BTU and a total cost of approximately \$44.1 million dollars.

To put these numbers into perspective, the \$44.1 million dollar annual energy cost distributed over approximately 5,500 Windham households yields an annual household

energy cost of \$8020 which represents 6.6% of the median Windham household income. The 2,035 billion BTUs consumed by Windham residents and businesses generate approximately 305 million pounds of CO₂ annually or 24,100 pounds per Windham resident. This compares favorably with per person production rates in the US, China, Russia and Canada, i.e. 38,200, 13,600, 26,800 and 32,300, respectively.

The long-term upward energy cost trend makes this sector of the Windham economy an appropriate target for implementing cost reduction and efficiency measures.



Windham's total energy bill exceeds \$40 million dollars annually

Moving Ahead: Recommended Actions & Objectives

The following sections describe and detail improvements and goals that Windham is seeking in efficient energy utilization, renewable energy implementation, energy usage monitoring, improvement in transportation efficiency and development of an “energy-savvy” population who can demand and drive future energy efficiency measures. Although these sections will emphasize the roles that the Town and School District administrations play in advancing this energy agenda, we will discuss how the residents and municipal officials can work cooperatively to make the goals realizable Town-wide.

Both present and future technologies will play an important role in our ability to minimize our energy usage. It will be important not to specify technologies but rather to specify performance levels and allow the designer to experiment and develop new approaches to achieving what is desired.

Energy Usage and Cost Reduction

Municipal Actions

Implement Audit-identified energy reduction measures

As discussed above, Windham conducted energy audits of its municipal buildings in 2011 which identified immediate and longer-term improvements in building weatherization and heating system efficiency. The Town, between 2011 through 2014, implemented a number of the lower cost, non-capital expenditure recommendations to reduce heat loss (insulation and weather-stripping repairs/additions) and some improvements to heating system efficiency. In 2015, the Town upgraded the HVAC system for Nesmith Library and will be seeking voter approval for similar HVAC improvements for the Police and Fire Station in 2016. The Local Energy Committee is supporting the Town’s implementation of the balance of the 2011 recommendations including:

- HVAC upgrades;
- replacement of oil-fired heating systems with propane to adopt a single fuel for municipal buildings and
- installation of renewable energy-based water heating.

These improvements should yield reductions in electrical, fuel oil and propane usage by 10%, 100% and 33%, respectively. In addition, the Town buildings will reduce CO₂ production by 30%.

Lower energy costs by negotiating supplier contracts

The Windham Local Energy Committee has supported the Town administration in purchasing lower cost “greener” energy by recommending the selection of a competitive, reliable broker or conducting a bid process to identify an energy supplier to the Board of Selectmen. This support has continued from 2012 until the present.

Renewable Energy Purchasing Consortium (REPC):

In 2015, the Windham Local Energy Committee (LEC) began working closely with the Southern New Hampshire Regional Planning Commission (SNHRPC) to establish the Renewable Energy Purchasing Consortium (REPC).

The goal of the REPC is to purchase electricity as a group from a competitive supplier at a lower rate than each member could receive on its own. By purchasing as an aggregation, municipalities and school districts can offer energy suppliers a larger demand than if they each tried to purchase energy individually, and receive a better rate. These significant cost savings allow for the opportunity to purchase electricity produced on their behalf using cleaner, renewable sources of generation. This will be accomplished through buying local Renewable Energy Credits (RECs) that meet accepted standards for quality. RECs are the currency for the renewable energy market, representing the attributes and benefits of renewable generation sources.

The REPC serves as an aggregator to facilitate a bid process among competitive electricity suppliers licensed with the NH Public Utilities Commission. Each aggregation member signs its own contract with the supplier for a fixed electricity supply rate. Rates and contracts are identical for each member within a given electric distribution territory.

Membership in the REPC is voluntary, and encourages Towns and Schools to take advantage of new energy technologies to better manage energy price volatility and dependence on inefficient and unreliable supply. The consortium is comprised of municipalities and school districts that are collectively purchasing renewable energy for their facilities, paving the way for renewable energy use in the broader educational community.

Piggy-backing on the larger users like Derry, Londonderry and Windham will allow all participating members of the Consortium to benefit from the inherent discounts given to large volume users. This especially benefits smaller Towns. In addition, the larger towns have attractive usage profiles because of water treatment plants and pumping stations as well as the schools districts which have high usage and attractive usage profiles (low peak summer usage and low usage at peak time-of-day in late afternoon). Smaller communities like Weare, Auburn, Chester and New Boston will benefit from lower prices and make the switch to renewables less challenging.

The goals of the consortium are to:

- Enable participating Towns and Schools to purchase renewable energy simply and efficiently.
- Ensure that participating entity receive competitively priced Renewable Energy Certificates (RECs) through demand aggregation and administrative efficiencies.
- Provide participating communities with the resources and communications support they need to educate their stakeholders and community on renewable energy.
- Demonstrate leadership within community and establish a standard that will influence and guide the use of renewable energy across the members of the SNHPC.

Implement best practices and technology requirements for future construction, renovation and maintenance of municipal and School District buildings

Strategies for establishing best management practices in future construction, renovation, and maintenance of public buildings and facilities is in many ways a more difficult challenge. While vehicles may last on the order of 10 years, buildings can be in use for 10 times that long. It is clear that energy efficiency must be paramount in the specification, design, and review process, if Windham is to minimize its energy requirements.

Since the new and old buildings and facilities will be utilized for such a long time, energy costs should be a key evaluator in the design and specification process. This should be true for new construction as well as for the modernization and upgrading of existing facilities. For example, insulations requirements should be near the maximum recommended by the U.S. energy department. US Department of Energy (USDE) recommends that insulation levels for the roofs in this area should be between R30 and R60. While it is true that an R60 requirement is more difficult to achieve since it requires 2x the thickness of a given material with a specific R-value in 10 to 20 to 50 years, the extra insulation will more than pay for itself. The use of multiple paned windows including triple paned windows should be encouraged. High performance window coatings should also be used. The real management practice here is not necessarily to require a specific level of insulation, it should be the requirement to evaluate the cost of heating and cooling the facility over an extended time period, e.g. 20 -30 years, rather than the shorter times that are normally used.

In addition to minimizing heat loss or gain, serious consideration should be given to both passive and active energy control measures. For example, the proper design of glass[note that the use of glass in a building can be more than just windows and doors] in a building combined with energy storage systems can greatly reduce the need for active heating. Similarly the use of newer and more innovative energy sources, such as roof top solar panels and geothermal heat pumps, can greatly reduce the need for the consumption of fossil fuels

to heat and to cool buildings and facilities.³ As more and more of these and other innovative technologies become available, the town's design review process should encourage their use. It will be important for the town to avoid limiting the use of new and innovative technologies while maintaining the proper safeguards for building and facility design. Allowing designs that fit harmoniously with the surrounding edifices will also be important.

Overall, the process going forward should be to:

- Carefully set design requirement for new building and to improve existing buildings through judicious modifications.
- Recommend the maximum passive insulation requirements that meet US Energy Department guidelines and modify building energy codes to reflect the most recent efficiency standards.
- Evaluate the long-term energy requirements of proposed new designs and modifications.
- Encourage the use of new approaches to meet requirements.
- Specify performance requirements and not specific designs or approaches. Develop a plan and then implement procedures to measure and track energy usage in municipal buildings and facilities as well as in vehicles.

Adopt Efficient Street and Municipal Facility Lighting

An additional area for potential energy savings is the area of street and facility exterior lighting. While safety is the first and most important concern for street and facility lighting, it is important to ensure that each light is actually needed to ensure safety. The town should also plan to replace those lights which are truly needed with the most energy efficient available. For example, LED lights offer considerable savings over most other alternatives. These savings and the longer life and reduced maintenance associated with LED lights will pay the town back in a few years for their installation. This conversion process can be completed as funding is available and does not need to be done all at once.

Town-wide Actions

Implement best practices and technology for future construction, renovation and maintenance of residential, commercial and industrial buildings

Many of the “best practices” discussed above for the municipality should also apply to Windham residential and commercial buildings. The Town, perhaps through the Local Energy Committee, can work to achieve these goals via a community-wide education and awareness program.

Investigate possibility of negotiating reduced electricity rates for consumers within Windham

Investigate feasibility of an aggregation program for residential and commercial electricity purchases, as available to Massachusetts communities. This would likely be in partnership with the Southern New Hampshire Planning Commission (SNHPC).

New Fuels and Renewable Energy implementation

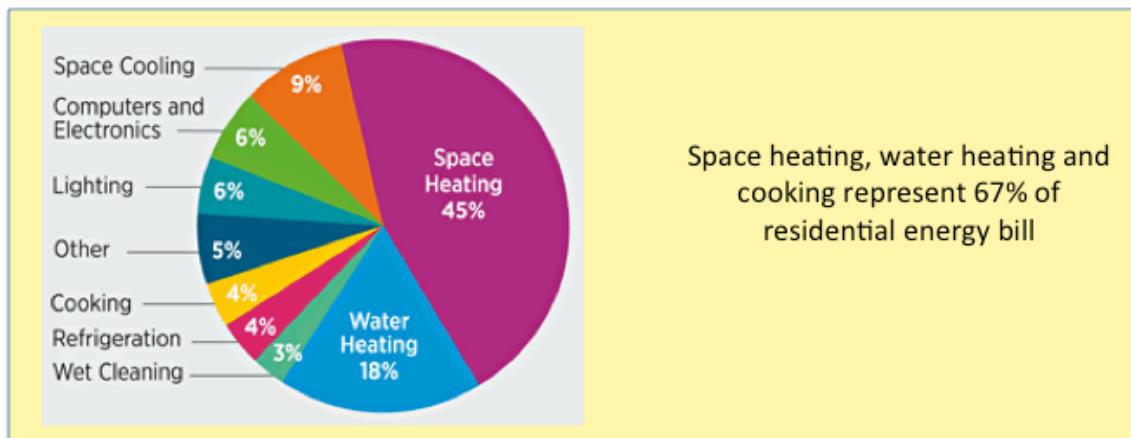
Support utility initiatives to bring natural gas service to Windham residents and commercial users

Natural gas – a low cost fuel for residential, commercial and industrial heating – is not currently available in Windham although many surrounding communities receive natural gas service from two utilities: Utilit and Liberty Utilities. The recent US development of natural gas via “fracking” has significantly increased the natural gas supply and, correspondingly, lowered the price of natural gas (per BTU of energy delivered) relative to fuel oil and propane.

The Windham Local Energy Committee (LEC), motivated by the recent comparatively lower cost of natural gas as a space-heating fuel, conducted an exploratory assessment of benefits, risks, conversion, operating costs and approaches for bringing natural gas service to Windham in early 2014. Simultaneously, Liberty Utilities has embarked on a natural gas service expansion program for its New Hampshire customers and currently (early 2015) is evaluating the economic feasibility of bringing natural gas service to Windham and Pelham, New Hampshire beginning as early as summer, 2016. With the approval of the Windham Board of Selectman, the Windham LEC has met with Liberty Utilities management to share its findings with Liberty Utilities and to encourage their moving forward with natural gas service expansion into Windham. The Windham LEC’s assessment of the benefits accruing to Windham and its residents appear in the figure below. The

key point is that Windham government agencies, residents and businesses can realize significant cost savings via the adoption of natural gas-based space heating and, as such, should work to bring natural gas service to the community.

Natural Gas Offers Significant Cost Reductions for Windham



GROUP	Natural Gas			Fuel Oil + Propane Costs - 2013	NG Cost @ \$1.65/therm	Cost Reduction	% Cost Reduction
	Fuel Oil (gal.)	Propane (gal.)	(Therms)	\$10,696,750	\$6,843,200	\$3,853,550	36%
Residents	2,029,450	1,480,000	4,147,400				
Town	1,750	29,100	31,350	\$63,200	\$42,950	\$20,250	32%
School District	79,000	31,500	137,700	\$304,300	\$188,750	\$115,550	38%
Commercial	448,700	183,900	786,550	\$1,729,700	\$1,077,550	\$652,150	38%

Data courtesy of Dana Call, Adam Steel, Rex Norman

Fuel Propane (gal)	Residential	Mun./Comm./Ind.
	\$2.25	\$1.72
Fuel Oil (gal)	\$3.50	\$3.15
Natural Gas (Therm)	\$1.65	\$1.37

Liberty Utilities would make the initial capital investment for the installation of the necessary gas lines and, under NH Public Utilities Commission (PUC)-approved rates, re-coup its investment over a 10 to 20 year interval by a delivery charge rate borne by the users. There would be no direct costs to the Windham municipality for gas line installation.

Recent news related to energy availability has highlighted the discovery of vast amounts of natural gas at various locations within the U.S. There have also been significant discoveries of oil due to new technologies that allow the capture of oil from Tar Sands and other geological structures. As a result of those discoveries the U.S. has or will become the #1 supplier of natural gas and will also be self-sufficient in the production of oil. These facts have been heavily advertised by the oil and natural gas industries.

As a goal, Windham should work to encourage Liberty Utilities to move forward with gas service expansion into Windham beginning in 2016 while simultaneously participating in the NH PUC

regulatory process to ensure that Windham's community, residential and commercial interests are protected in the rate setting for the gas service expansion.

Investigate renewable energy sources for Town buildings

There have also been significant improvements in the ability of renewable energy sources to provide alternatives to various fossil fuels. These renewable resources include hydroelectric, solar, geothermal, biomass and other renewable energy sources.

Eversource currently provides approximately 16% of its energy from hydroelectric sources. These sources are located within New Hampshire and Canada.

Solar energy, both thermal and photovoltaic, has seen a dramatic reduction in cost over the last few years and these cost reductions should continue. Solar energy could provide the energy to heat and run our municipal buildings and, if sufficient capacity is provided, to run a fleet of town electric vehicles. This could contribute significant savings for the town in the future. To make the cost benefits of renewable energy available to a larger number of New Hampshire residents, the Legislature has authorized an organizational structures, e.g. group net metering, which "...permits net-metered renewable energy facilities, known as hosts, to share the proceeds from surplus electricity generation with other electric utility account holders, known as group members."⁴ Group members do not have net-metered renewable energy facilities and do not have to make any changes to their existing electric service.

Geothermal energy, utilizing heat pumps and underground extensions, could provide cost savings to the town in the future. This option could provide savings in both air conditioning and heating for the town. When it becomes time to replace existing air conditioners in town buildings, this option should be explored.

Biofuels offer the unique option of switching fuels without changing equipment. Certainly, as the costs come down, this should be considered for those town buildings that currently use fuel oil as heating sources.

In summary, we are at the beginning of an era where new and potentially significantly less expensive fuel sources are becoming available. It will be important to monitor and evaluate each of these renewable fuel sources as they become available in order to minimize Windham's carbon footprint, its consumption of resources, and the cost of heating and cooling its buildings. In particular, Windham should plan ahead to utilize these new energy sources as part of its operational plan.

⁴ <http://www.puc.state.nh.us/Sustainable%20Energy/GroupNetMetering.html>

Energy Monitoring Initiatives

Adopt energy monitoring to substantiate energy use/cost reductions

While planning to go forward with the best intentions is a good thing, Windham needs to plan and implement a program to measure its progress toward the goal of greater energy efficiency. The 2010 inventory (Energy Audits) of energy usage of all municipal building and facilities should be updated regularly. This inventory should also be used as the baseline against which future energy efficiency improvements should be planned. Buildings and facilities should be evaluated based on this inventory and improvements that will result in the maximum return should be planned. This plan needs to account for both short term and longer term use requirements in addition to energy efficiency requirements. As this plan is implemented, the building survey should be updated on a yearly basis in order to track energy usage improvements and measure Windham's progress toward maximum energy efficiency.

Transportation Efficiency

Assess and implement, where feasible, transformation of Town vehicle fleet for higher efficiency, alternate fuels

Town vehicles are another area of vehicle related energy usage within the town. This is an area which the town can and should control. On a national level there is a concerted effort to increase vehicle fuel efficiency. The EPA has put forth a plan to increase the average vehicle mileage requirement to approximately 54 mpg by 2025. The town can take advantage of these fuel efficiency improvements by requiring that replacement vehicles be the most fuel efficient vehicles that meet the requirements for which they are intended. The town might also consider the purchase of specific vehicles for special purposes. This is in contrast to the current practice of purchasing new vehicles for the Police and Fire Departments and transferring them later to other departments. For example, vehicles for use by town employees should be the smallest and most fuel-efficient vehicles that would meet transportation requirements. Although this is not current Town policy, future considerations could demonstrate the value of a vehicle fleet aimed at specific Town needs.



There is considerable activity at the national level in the area of vehicle fuel efficiency improvements. Windham needs to be aware of this activity and plan accordingly. For example, electric vehicles appear to be on the verge of significantly affecting overall fuel requirement and

efficiency standards. The state of battery technology is currently the limiting factor in their implementation. However, many vehicle manufacturers (e.g., Tesla, Nissan, Toyota, etc.) are continuing to accelerate investment in research (R&D), design and manufacture of electric vehicles that might be considered as potential purchases by both the town and its citizens. Since most trips taken by town employees, other than the town police, are relatively short, it might make sense to consider the purchase of electric vehicles as replacement vehicles in the future. In addition, if electric vehicles are to become more prevalent, they will need the infrastructure to support them. In particular, it will be necessary to install charging stations in key locations in the commercial areas of town. As an aside, with proper planning it is possible to add sufficient solar electric capacity to town building and facilities to provide the charge necessary to run a fleet of electric vehicles. This is an area where planning will be key to future success.

Foster reduced transportation energy usage by encouraging carpooling, public transportation

Mass transit would offer the potential for significant overall reductions in Windham's transportation related energy usage. Windham should take steps to encourage mass transit usage by making this transportation mode more available, lower cost, more attractive and more convenient. The Town can support achieving these benefits by working with the NH Department of Transportation and commercial transportation companies.

Transportation accounts for largest portion of Windham's annual energy consumption and cost

Short car trips are costly in terms of fuel, carbon emissions, and vehicular congestion downtown. The cumulative impact of replacing short-distance car trips with bicycling or walking has the potential to reduce in-town collective driving. Bicycle and pedestrian transportation are healthy, low cost modes of travel that are available to almost everyone in Windham. Unfortunately, with an increasing number of motor vehicles over the years and little attention paid to bicycle and pedestrian infrastructure, bicycling and walking have become more challenging.

Much remains to be done to make Windham the bicycle – and pedestrian – friendly community overwhelmingly supported by previous Master Plans and the Master Plan Survey conducted in 2014. When planning new developments within the town, careful consideration and encouragement should be given to the implementation of bicycle and walking friendly trails.

Taking into consideration Town improvements, potential positive impacts, and the expressed desires of the community, Windham should continue to upgrade its transportation

infrastructure to improve bicycling and walking opportunities. Since Town property taxes fund a good portion of Windham's roadway maintenance and improvements, roads should accommodate all the different ways that Windham residents choose to travel.

Energy Education

Town residents, at the 2014 Visioning Workshop and in the Master Plan Survey, expressed willingness to encourage the use of clean energy and the Town is hopeful this sentiment continues.



It is the vision of the Windham Local Energy Committee to act as the energy related information gatherer and conduit to Windham residents and businesses.

This may be accomplished by further developing and highlighting the usefulness of the Town Energy Website and conducting regular informational events (e.g., 4th of July, Town elections, etc.). Also worthy of strong consideration is to produce a series of energy-related programs for distribution on our local television station, WCTV, and on the Town Energy Website. A series of energy tips may also be included in local newspapers to reach the greatest audience.

The Windham LEC recommends that the Town adopt the following actions to advance Windham's energy awareness.

- Reach out to the community as a whole to inform and educate residents and businesses regarding energy conservation and sustainability principles.
- Conduct and publish studies and analyses of energy sources, costs and renewable energy benefits/trade-offs to foster increased efficiency, reduced cost and "greener" energy usage.
- Maintain contact with NH PUC to gain information on regulations, rulings and state-sponsored programs to benefit Windham consumers.
- Participate in information exchanges with other community energy committees and regional, energy-oriented organizations.
- Interact with utilities to expand services within Windham and to provide Windham consumers with information regarding utility-sponsored, energy efficiency and cost-reducing programs.

- Provide Windham residential and commercial consumers with optional strategies – including trade-offs - for reducing energy costs.
- Establish and publish monitoring of municipal energy usage and cost data to keep Town residents informed of effectiveness of Town energy conservation measures.
- Provide residents with regular updates of mass transportation availability, schedules and rates for nearby Park and Ride facilities.

Summary

This chapter serves to emphasize the need for the Town and Local Energy Committee to:

- a. Identify and implement energy reduction measures in Municipal and School District buildings and facilities with a goal of reducing energy consumption by at least 10%.
- b. Encourage adoption of energy-conserving, “best practices” and technologies for building and facility design, construction and operation by its residents and businesses.
- c. Recommend adoption of new fuels for transportation, space heating and non-space heating functions for municipal, School District, residential and business facilities.
- d. Implement a Municipal and School District energy monitoring program to support the achievement of energy reduction goals.
- e. Carry out a Town-wide energy education effort to create an informed and active community eager to adopt energy saving measures. Employ regular surveys.
- f. Track the use of commuter and ride share parking lots and services, and bicycle use on a regular basis to gauge ridership levels and evaluate effectiveness over time.

Energy concerns cut across all aspects of the Town's plans for the future. Thus, they help to shape other chapters of the Master Plan. The considerations raised in this Chapter echo through this document, but especially the following chapters for linkages and discussion:

Land Use:

- Need for alternative transportation mobility and choices - pedestrian, bicycle and transit.
- Need for sustainability - creating energy efficient community facilities, residences and businesses, and pursuing development of mixed-use zoning, compact and walk-able neighborhoods and places in close proximity to work, play and home.

Demographics:

- Residents commuting to work would benefit from mass transit choices.

Economic Development:

- Encourage alternate fuel choices such as natural gas for commercial uses.

