TOWN/VILLAGE OF WOODSTOCK
COMPREHENSIVE PLAN
ENERGY CHAPTER
July 3, 2019 PH Draft

Woodstock has a history and culture of environmental conservation and sustainability that goes back to George Perkins Marsh and the Billings and Rockefeller families. Their legacy continues today with the Marsh-Billings-Rockefeller National Historical Park which is the only National Park in the country conducting ongoing research on the impacts of climate change. The majority of Park's energy use is from renewable sources, with an aim of becoming 100% renewable; they also maintain the longest managed forest in the United States. Woodstock is working to match the Park's successes by meeting the goals of the Mayor's Ready for 100% Clean Energy pledge which was signed in September 2017. All forms of renewable energy are necessary to meet our renewable energy goals and will be an integral part of our community.

Purpose

Energy is a vital factor in the economic, environmental, and social well-being of our community. Energy from various sources, including petroleum-based "fossil" fuels (oils, gas, coal, etc.), biomass (wood, pellets, etc.), renewable (solar, wind, hydro, etc.), and electricity generated from these sources is required to heat buildings, run transportation, power industry, light the dark, and perform most of the functions of daily life.

Energy is a major component of the costs of living, and costs are increasing. The sources of most of our energy are imported either domestically or from foreign countries. Our current generation and use of energy have significant negative impacts on the environment, including air quality, natural habitat and land use. The use of fossil fuels in particular, in adding carbon to the atmosphere, is contributing to accelerated global climate change and poses a serious threat to our environment. Our current pattern of energy use is not sustainable in the long term.

The production of energy is global in scope and, therefore, out of the direct control of residents of Woodstock. This Plan, however, calls for action where it can be achieved, in belief that local actions can precipitate global change. This Plan also supports the goals that the State of Vermont has set out in its Comprehensive Energy Plan.
(Http://publicservicedept.vermont.gov/publications/energy_plan/2011_plan)

Vermont strongly supports reducing its reliance on fossil fuels and securing energy independence for the state by improving the energy efficiency of residential, business, and government buildings, and utilizing in-state renewable energy resources. The Vermont Comprehensive Energy Plan (CEP) addresses the major factors to our energy use by addressing the state's energy future for electricity, thermal energy, transportation and land use. The CEP set a long term statewide goal of obtaining 90% of Vermont's Energy needs from renewable sources while eliminating our reliance on fossil fuel. Expanding upon the statutory goal of 25% renewable by 2025 (10 V.S.A. §580 (a)), the CEP established the following set of goals:

- Reduce total energy consumption per capita by 15% by 2025, and by more than one third by 2050.

- Meet 25% of the remaining energy need from renewable sources by 2025, 40% by 2035, and 90% by 2050.

- Three end-use sector goals by 2025: 10% renewable transportation, 30% renewable buildings, and 67% renewable electric power.

"Energy" as used in this Plan and the state's Comprehensive Energy Plan (CEP) is not the same as electricity. It is all forms of energy used by people. This is commonly broken down into four sectors: commercial (this involves running machinery, heating and lighting), residential (mainly heating and lighting), industrial (process energy such as smelting or concrete production), and transportation (mainly gasoline and diesel).

It is in the best interest of all residents of the Town, for economic, health and environmental reasons, that we reduce the amount of energy per capita that we use, and that we limit and work toward the reduction of the use of fossil fuels and energy generated from these sources. The overall purpose of this section of the Town Plan is to promote energy efficiency and energy conservation, limit the use of carbon-based fossil fuels, and encourage the development and use of renewable energy sources among the Town's residents, businesses, educational and municipal affairs.

Current Conditions

Woodstock, like the region and the state, relies on a variety of sources for energy, the vast majority of which are imported, either domestically or from other countries. According to 2009 statistics for the State of Vermont, approximately 47% of primary energy usage is generated from petroleum, 32% from nuclear electric, 8% from natural gas, 8% from hydroelectric, and the remaining 5% from other sources, including all other renewables.

Recent trends include an increase use of natural gas, and a slower rate of increase in renewable sources such as solar, wind, and biofuels. Usage of energy is dominated in our region by the demands for transportation fuel and heating for buildings.

Current energy use is important to evaluate where Woodstock needs to go with our energy future. This section will provide the background data on existing renewable energy generation in town, estimated transportation, home heating, commercial, and electricity use.

Renewable energy generation sources include wind, solar, and hydroelectric. In 2015 renewable energy was about 7% of the annual energy consumption according to the Vermont Department of Public Service (DPS). Through information from the Energy Action network as of August 2018, there are an estimated 80 sites in Woodstock, which increased from 51 in 2016, that are producing about 2,350,133 kWh of renewable energy generation. By the Fall of 2018 the majority of Woodstock's municipal electricity demands will be met by an out of town solar installation.

Existing Renewable Energy Generation	2016 (MW)	2016 (MWh)	2018 (MW)	2018 (MWh)
Solar	0.41	503	76.332	88,560.9
Wind	.03	92	1.48	3,552.4
Hydro	.50	1752	50	142,900
Other	0	0	0	0
Total Existing	.88	2,273	12,781.2	235,013.3

The table above shows existing renewable generation in the municipality as of September 2016 and August 2018, in MW and MWh, based on information available from the Vermont Department of Public Service and the Energy Network.

Current Municipal Transportation Energy Use (2016)

Transportation Data	Municipal Data
Total # of Vehicles (ACS 2011-2015)	2,290
Average Annual Miles per Vehicle (VTrans)	11,356
Total Annual Miles Traveled	26,005,240
Realized MPG (2013 - VTrans) 2015 Energy Profile	18.6
Total Gallons Use per Year	1,398,131
Transportation BTUs (Billion)	168
Average Cost per Gallon of Gasoline (RPC)	$2
Gasoline Cost per Year	$3,229,683

This table uses data from the American Community Survey (ACS) and Vermont Agency of Transportation (AOT) to calculate current transportation energy use and energy costs

Current Municipal Residential Heating Energy Use (2016)

Fuel Source	Municipal Households (ACS 2011-2015)	Municipal % of Households	Municipal Sq. Ft. Heated	Municipal BTU (in Billions)
Natural Gas	36	2.5%	2,019,600,000	2
Propane	246	17.1%	20,939,040,000	21
Electricity	36	2.5%	2,426,220,000	2

Fuel Oil	850	59.1%	77,910,420,000	78
Coal	14	1.0%	1,417,920,000	1
Wood	232	16.1%	23,090,340,000	23
Solar	3	0.2%	303,840,000	0
Other	5	0.3%	506,400,000	1
No Fuel	17	1.2%	953,700,000	1
Total	1439	100.0%	129,567,480,000	130

Current Municipal Commercial Energy Use (2016)

Commercial Establishments in Municipality (VT DOL)	Estimated Thermal Energy BTUs per Commercial Establishment (in Billions) (Vt Dept. Of Public Service)	Estimated Thermal Energy BTUs by Commercial Establishments in Municipality (in Billions)
246	0.725	178

The table uses data available from the Vermont Department of Labor (VT DOL) and the Vermont Department of Public Service (DPS) to estimate current municipal commercial establishment energy use in the municipality.

Current Electricity Use (KWH)

Sector	2014	2015	2016
Commercial & Industrial	15,434,300	15,167,746	15,269,300
Residential	13,378,843	13,067,416	12,926,927
Total	28,813,143	28,235,161	28,196,927
Count of Residential Premises	1,896	1,924	1,927
Ave. Residential Usage	7,056	6,792	6,708

This table displays current electricity use within the municipality with data provided by Efficiency Vermont.

Targets

With the baseline information set, targets need to be set for the municipality to provide milestones along the way toward a path of meeting 90% of our total energy needs with renewable energy. The target years of 2025, 2035, and 2050 were in conjunction with the 2016 Vermont Comprehensive Energy Plan benchmarks. Most of the information in this section was developed using the Long-Range Energy Alternatives Planning (LEAP) model from the Vermont Energy Investment Corporation (VEIC).

The following two tables display the percentage of households and commercial buildings in Woodstock that would need to be weatherized in each of the target years to meet the goals. They are also a measure of the electric efficiency needed for each target year to meet the goal.

Residential Thermal Efficiency Targets	**2025**	**2035**	**2050**
Residential - increased efficiency & conservation	33%	67%	125%
Commercial - increased efficiency & conservation	6%	9%	18%

Renewable Energy Use	**2025**	**2035**	**2050**
Transportation Renewables	9.6%	23.1%	90.3%
Heating Renewables	53.3%	65.0%	91.5%

In order to meet the various overall targets above, residents will have make their homes more energy efficient, to convert to more efficient technologies such as cold climate heat pumps and/or switch to electric vehicles. While the targets below only set targets for two systems types, there are many ways in which a homeowner or business could convert to more efficient technologies. These targets provide a way for the town to track progress toward meeting the goals and setting a system in place to do that will help adjust targets and goals in the future.

Thermal Fuel Switching Targets (Residential & Commercial)

	2025	**2035**	**2050**
New Efficient Wood Heat Systems (in units)	218	268	375
New Heat Pumps (in units)	147	393	815

The rural nature of our region leads to longer commutes for work, shopping and services. This impacts the number of vehicle miles traveled which directly relates to how much fossil fuel is being burned to power all the cars in the region. The transportation sector is responsible for 37% of the total energy consumed in Vermont, powered mostly from gasoline (75%) and diesel (20%). To reach local, regional and statewide renewable energy goals, residents will need to shift away from petroleum powered vehicles to electricity and biofuels. The table below identifies the number of electric and biodiesel vehicles are needed in town to meet the overall renewable energy goals

Transportation Fuel Switching Target (Number of Vehicles)

	2025	2035	2050
Electric Vehicles	212	1503	3126
Biodiesel Vehicles	373	702	1185

The town would like to encourage the creation of public transportation and development projects that would have the effect of lowering the energy needs for Woodstock and make it easier to meet our energy goals. More densely populated village areas make it easier to develop public transportation options and walkable/ bikeable communities.

Electricity Efficiency Targets

New technology, demand-side management and renewable generation alone will not be sufficient to achieve the state's energy goals. Gains in efficiency can be made through appliance standards, building energy codes, customer economic decisions, and publicly funded programs. In order to achieve the state's energy goals, people will have to alter their behavior patterns, to use electric appliances, lighting, and heat with greater thought given to conservation. Large-scale energy savings can be achieved by effectively encouraging many people to make small individual changes such as turning down thermostats, weatherizing their homes, air drying clothes and turning off lights and electronic devices when not in use. The table below identifies the electric efficiency improvement targets for the town by 2050.

Electricity Efficiency Targets

	2025	2035	2050
Increase efficiency & conservation	-0.6%	5.7%	9.9%

Note the decrease in the first target year. This plan encourages residents to conserve energy and switch to more efficient systems. This is due to LEAP modeling showing that efficiency trends are outpacing the electrification certain inputs.

Using the data from the renewable resources maps, Woodstock has significantly more land than is required to meet the town's renewable generation target (17,112 - 20,915 Mwh). The table below identifies the potential generation for solar and wind in town.

Local Renewable Energy Resources

Renewable Generation Potential	MW	MWh
Rooftop Solar	3	3,273
Ground-mounted Solar	398	487,954
Wind	975	2,988,584
Hydro	0	515

Biomass & Methane	0	0
Other	0	0
Total renewable generation potential	1,375	3,480,326

There are no numbers in Hydro as there are no potential Hydro sites according to the Community Hydro study done in 2008. Biomass sites are not restricted by resource location

Solar Generation

Most locations in Vermont are capable of generating solar energy through photovoltaic panels or solar thermal systems. At present according to Energy Action Network's reports, Woodstock has at least 76 net-metered photovoltaic (used to generate electricity) sites. Additionally, it is estimated that the Town of Woodstock has 359 residences and 61 commercial locations with the potential for rooftop solar capacity of 3,273 Mwh. It is important to note that the renewable generation targets cannot be attained from just rooftop solar but installing ground mounted solar can help reach that target.

Some ways that solar can help reduce the use of energy is through good building and site design are essential to taking advantage of the sun's energy through passive methods. Woodstock could increase the use of solar in this fashion by drafting language for zoning bylaws and subdivision regulations that encourage the appropriate placement of buildings, landscaping and building design, while working within historic and scenic constraints.

Electricity Generation - Decreasing costs of equipment have made solar electric generation systems more prevalent. Solar systems are no longer utilized exclusively by "off-grid" buildings. The advent of net-metering allows buildings to be connected to the grid while utilizing renewable energy. Systems that are net-metered are overseen by the Public Service Board and are exempt from local permitting. The use of batteries in conjunction with solar panels can counteract the intermittent nature of solar photovoltaic systems. New cold-climate heat pump and water heaters are available and use the ambient area to heat hot water. These units are now widely promoted through electric utility energy efficiency programs across the U.S.

Because of the nature of solar arrays, they are in some ways more desirable than wind towers. This is primarily due to the fact that they do not need to be located on high ground and are, therefore, less visually prominent. In addition, these facilities can be located in areas that are less rural in nature, requiring fewer access roads and reducing adverse impacts on wild lands. It takes roughly 6-8 acres of solar collectors to produce one megawatt of electricity.

Wind Generation - Similar to solar, wind energy is an intermittent resource and its generation fluctuates in response to environmental conditions. From a supply perspective it can often generate when solar is not generating which evens out the supply available to the grid. The amount of energy produced by a specific wind tower can depend greatly on location, height of the tower and proximity to other obstructions, but they are generally in the 2-5 megawatt maximum capacity range. Most modern wind turbines (when properly sited) are able to generate electricity

much more of the time than solar arrays, and hence have a higher "capacity factor" (the ratio of actual production to maximum possible production).

Biomass - The term "biomass" refers to biologically-based feedstocks (that is, algae, food or vegetable wastes, grass, wood, methane, and much more). Biomass can be converted into an energy source to fuel vehicles (e.g., biodiesel), heat homes, or even generate electricity.

Many homes use biomass for heating individual buildings in the winter, and sometimes to provide electricity. According to the 2016 Vermont Comprehensive Energy Plan, those using wood for primary heating consumed about 4.8 cords in 2014-2015, while those using wood as a supplementary source used 2.1 cords. In that same year, Vermont households burned about 126,000 tones of wood pellets, with primary-heat-source consumers burning 4.4 tons and supplementary-heat-source consumers burning 3.3 tons for the season. A slight reduction in the number of cords of wood burned from 2007-2008 data could be a reflection of Vermonters installing more efficient wood heating systems. The large increase in use of wood pellets also shows that there is great potential and demand for the utilization of wood resources as heating fuel.

Commercial biomass energy generation facilities should be located close to available biofuels to reduce transportation impacts and costs. A biomass power plant would require a great deal of space to accommodate the various stages of collection and conversion of the mass into fuel before burning it to produce electricity. Water can also pose a problem as biomass facilities require large quantities to handle the recycling process of waste materials. Materials would have to be transported to and from the facility, so truck traffic should be a consideration in selecting a site. Additionally, before a biomass energy generation facility is located in Woodstock, developers should prove that their proposed project will not negatively impact the rural character of the community or the local road system, that there be no additional air pollution, that their operation is being done sustainably and that their product is carbon neutral.

Biofuels - In addition to using biomass for heating, the use of biofuels, particularly biodiesel, is becoming an increasingly popular option for municipalities attempting to cut costs and reduce the environmental impacts associated with vehicle emissions. The negative impact of biofuels is that if they are generated from a food source, then we are adversely impacting our landscape and food security by using farm fields for energy production.

According to the Vermont Biofuels Association, biodiesel is a clean burning alternative fuel, produced from domestic, renewable resources such as soybeans, sunflowers, canola, waste cooking oil, or animal fats. Biodiesel contains no petroleum, but it can be blended at any level with petroleum diesel to create a biodiesel blend which can be used in colder weather. It can be used in compression-ignition (diesel) engines or oil-fired boilers or furnaces with little or no modifications. The CEP relies upon a massive increase in the production of biodiesel to meet expected energy demands for heavy vehicle transport.

Hydro power - There is one Hydro power facility located in Woodstock. While large hydro facilities are more commonplace in Vermont, advances in technology are making it increasingly viable for small-scale residential use. Micro Hydro power has the potential to generate enough electricity to power a home, provided that the essential ingredients - water and vertical drop - are available. Hydro can be an excellent complement to a solar system, because water flow is often greater during the winter season when solar is less effective. At all times, the health and stability of the river ecosystem needs to be prioritized above the generation of energy.

Meeting the Local Energy Demand - Increasing Awareness and Efficiency

There are a number of ways that Woodstock can meet its local energy demand, first by lowering that demand, and then by working to meet the remaining need with local, untapped energy resources.

Decreasing Energy Use by Changing Behavior

Raising awareness about wasteful energy behaviors and energy saving behaviors reduces the strain on existing energy resources, and helps residents and businesses save money, making the town a more affordable place to live with a higher quality of life. Examples include:

- Turning off lights when you leave a room.
- Using a programmable thermostat.
- Use a laundry line.
- Use a cold-water laundry wash.
- Don't make multiple car trips for errands.
- Close doors between higher and lower heated rooms.

Decreasing Energy Use by Implementing Energy Efficiency

For those necessary or desired services that require energy, we can apply the principles of energy efficiency to ensure that we use less energy to provide the same level and quality of service. Examples include:

- Insulating with high R-value (or heat flow resistance) materials.
- Using high efficiency windows.
- Installing energy efficient appliances like refrigerators, freezers, front loading washing machines, gas heated clothes driers and heating systems without blowers.
- Using high efficiency lighting and having efficient lighting design.
- Using biomass, heatpump, and/or solar hot water heaters.
- Siting buildings to make use of existing wind blocks and natural cooling patterns driven from the landscape's topography.

New residential development in the State of Vermont is required to comply with Vermont Residential Building Energy Code (RBES). Commercial development is subject to similar code regulations. Some examples of the types of development the RBES applies to include:

- Detached one- and two-family dwellings.
- Multi-family and other residential buildings three stories or fewer in height.
- Additions, alterations, renovations and repairs.
- Factory-built modular homes (not including mobile homes)

In order to comply with the RBES, a home, as built, must meet all the Basic Requirements and the Performance Requirements for one of several possible compliance methods. If the home meets the technical requirement of the Residential Energy Code, a Vermont Residential Building Energy Standards Certificate must be completed, filed with the Town Clerk of the community and posted in the home. Because there is no enforcement of the filing requirement at the state level, the community may want to consider innovative ways to encourage filing, such as requiring an additional fee with a building permit that would be reimbursed if an RBES certificate is filed. If a home required by law to meet the Residential Energy Code does not comply, a homeowner may seek damages in court from the builder. The RBES includes heating and cooling systems as well.

Making Changes and Implementing Solutions at the Municipal Level

Although communities are unlikely to have an impact on energy consumption at the global level, they do have an impact at the local level given their demand for and use of energy. The relationship between a municipality and its energy use creates opportunities to have an impact on local energy use reduction.

Working with the Sustainable Woodstock Energy Group

Woodstock has an energy group that is in partnership with Sustainable Woodstock. The group conducts energy audits on municipal buildings, tracks energy use for these buildings, works with the Planning Commission on the Energy Plan, develops energy efficiency and renewable energy projects. Most importantly the Energy Group helps the town save money while saving energy

Auditing Municipally Owned Buildings

Many towns in Vermont own buildings that are old and inefficient in many respects. For instance, older buildings often have insufficient insulation, wasteful heating and cooling systems, and out-of-date lighting. These kinds of infrastructure problems result in higher energy use with the resulting cost passed onto taxpayers.

Municipal officials should consider conducting audits on all town buildings in order to determine what improvements are necessary, and which projects would have the highest cost-benefit ratio in terms of energy and financial savings. Woodstock has conducted energy audits of all its municipal buildings and is working out steps to implement the suggested weatherization work.

Capital Budget Planning

Given the potential expense of energy efficiency improvements, it is essential to wisely budget town funding to cover these costs in the Capital Improvement Plan.

When planning for routine major facilities investments, such as roof replacements, foundation repairs, etc., it is important to also consider making energy efficiency improvements at the same time. The cost to replace or renovate a community facility will only be slightly higher if energy efficiency improvements are done at the same time.

In addition to reducing the energy use related to facilities, municipalities can implement policies that lower energy use by town staff or encourage greater energy efficiency. Examples include:

Energy Efficient Purchasing policy - A policy of this nature would require energy efficiency to be considered when purchasing or planning for other town investments. For example, purchasing Energy Star rated equipment is a well-documented way to increase energy efficiency. Devices carrying the Energy Star logo, such as computer products and peripherals, kitchen appliances, buildings and other products, generally use 20%-30% less energy than required by federal standards. When replacing municipal vehicles the town should replace them with more energy efficient or electric vehicles whenever possible.

Staff Policies - Towns can also implement policies that are designed to reduce wasteful energy practices. For example, Woodstock should enforce the policy requiring that town vehicles (such as dump trucks and other road maintenance equipment) not idle for more than a set period of time. Idling is an expensive waste of fuel, and a policy such as this could lead to substantial savings in money spent on fuel by the town.

Through policy making, local government can set a clear example for townspeople and encourage sustainable behavior that will ultimately result in both energy and financial savings.

Outreach - Schools are a great opportunity to educate kids about renewable energy as well as get them interested in the science behind it. One organization that can help bring education to the classroom is The Vermont Energy Education Program which provides in-class workshops to classrooms around Vermont.

Permitting - Energy generation in Vermont is subject to a number of different permitting requirements, most of which are limited to state level permitting. Towns are prohibited from regulating energy generation facilities, from house-scale to commercial projects, if they connect to the grid. But there are two ways that the town can make its voice heard in the state review process. These facilities require a Certificate of Public Good as part of their Section 248 permitting, and this Plan is considered during the state review. Towns are also empowered under (statute) to craft a local bylaw with siting standards, though the siting standards cannot have the effect of prohibiting energy generation facilities under the bylaw they may not issue a permit, only a recommendation to the PSB.

Section 248

Distributed power generation facilities, such as Hydro power dams, fossil fuel plants as well as wind power or solar systems owned by utilities, are subject to review and approval by the Vermont Public Service Board (30 V.S.A. §248). Under this law, prior to the construction of a generation facility, the Board must issue a Certificate of Public Good. A Section 248 review

addresses environmental, economic, and social impacts associated with a particular project, similar to Act 250. In making its determination, the Board must give due consideration to the recommendations of municipal and regional planning commissions and their respective plans, unless these plans have been written to a higher standard, in which case they are afforded "substantial deference." This Plan has been updated so that now the Public Service Board gives any clearly stated policies herein "substantial deference" in their proceedings. For policies to have that effect, they cannot be ambiguous or optional, and they can't be written in such a way that treats energy facilities differently that other types of development or that has the effect of prohibiting them. Accordingly, it is appropriate that this Plan address these land uses and provide guidance to town officials, regulators, and utilities.

For all commercial energy generation facilities, the following policies shall be considered:

Preferred Locations: The Town supports the placement of new generation and transmission facilities on (structure) parking lot canopies, brownfields, landfills, gravel pits. Additionally, the town by joint letter of the Planning Commission and Select Board may designate a site as preferred.

Prohibited Locations: Because of their distinctive natural or scenic value, energy facility development shall be excluded from the following areas: wetlands including Class III, vernal pools, flood hazard areas, and riparian buffer zones.

Constraint Areas: All new generation, transmission, and distribution facilities shall be sited and designed to reasonably avoid or, if no other reasonable alternative exists, to otherwise minimize and mitigate adverse impacts to the following: Scenic Ridgeline District, Design Review District, and designated view shed areas. All development shall be designed and sited in a manner that does not cause undue adverse impact to the scenic landscape of the town. All associated development, including roadways and parking areas, shall be designed to blend in with the surrounding landscape and to avoid visibility in winter months.

For a more detailed description of energy generation, usage and trends, refer to documents published by the Two Rivers Regional Planning Commission (http://trorc.org/pubs.html), the State of Vermont and other sources (http://www.eia.gov/beta/state/?sid=VT).

ACTION PLAN

Goal 1 - Reduce energy consumption for residents, businesses, schools and the municipality through energy efficiency and conservation.

Objective 1.1. *Increase conservation and energy efficiency for existing buildings, alterations to existing buildings, and new construction.*

Action 1.1.1. Require confirmation of compliance with all applicable State Energy code for Town/Village building permits.

Action 1.1.2. Periodically review Town and Village regulations for conflicts with building energy goals.

Action 1.1.3. Increase the energy efficiency of existing Town and Village owned buildings and implement energy conservation methods in municipal facilities.

Action 1.1.4. Encourage all existing and new construction projects to be designed to maximize energy efficiency.

Action 1.1.5. Create an energy efficient purchasing policy for Town and Village.

Action 1.1.6. Create staff policies to reduce wasteful energy practices for the Town and Village e.g., vehicle idling time.

Objective 1.2. *Reduce the use of non-renewable energy for transportation.*

Action 1.2.1. Reduce the mileage driven by Town and Village vehicles.

Action 1.2.2. Implement a program of vehicle maintenance and purchasing to maximize fuel efficiency of municipal vehicles

Action 1.2.3. Enforce regulations to limit engine idling for all vehicles.

Action 1.2.4. Improve the safety and convenience of sidewalks and other facilities to facilitate pedestrian traffic.

Action 1.2.5. Develop infrastructure to facilitate bicycle traffic including bicycle racks in public locations.

Action 1.2.6. Actively encourage and support efforts to develop a network of bike/walking path (trail) throughout the Town of Woodstock.

Action 1.2.7. Encourage the development of town-wide broadband internet connection to provide an alternative to energy-consumption physical travel.

***Action 1.2.8.** Add additional Park and Ride opportunities.

Action 1.2.9. Pursue alternate solutions for village parking.

***Action 1.2.10.** Engage regional transportation authorities and transportation providers to bring reliable bus service to Woodstock with connections to the Upper Valley and points beyond.

Objective 1.3. *Establish land use policies that will result in reduced energy demand.*

Action 1.3.1. Encourage development at higher densities in established village and town centers and other established growth centers.

Action 1.3.2. Encourage development of housing, businesses and institutions within walking distance to each other.

Action 1.3.3. Encourage development of outdoor recreation within the Village.

Action 1.3.4. Actively work to ban the use of single use plastic and paper bags, plastic straws, and no-recyclable or compostable waste.

Goal 2 - Transition from existing use of fossil fuel to renewable sources

Objective 2.1. *Transition from fossil fuel used in buildings to renewable energy sources.*

Action 2.1.1. Promote installation of heating, cooling and other building systems that use renewable and carbon neutral energy in all Town and Village buildings.

Objective 2.2. *Transition to the use of renewable energy for transportation.*

Action 2.2.1. Develop and enhance infrastructure for plug-in electric vehicles.

Goal 3 - Develop new local sources of renewable energy

Objective 3.1. *Establish regulations that encourage the development of local sources of renewable energy in a responsible way.*

Action 3.1.1. Evaluate the Village Design Review guidelines for flexibility in the use of solar panels on buildings in the district.

Objective 3.2. *Develop and build new local renewable energy facilities to serve the energy needs of the Town properties and the local community.*

Action 3.2.1. Encourage the use of municipal property, capital, and credit in the development of new local renewable energy sources.

Goal 4 - Support non municipal programs and private initiatives to encourage businesses, institutions and residents to conserve energy, increase energy efficiency, transition away from the use of carbon-based "fossil" fuels, and develop renewable sources of energy.

Objective 4.1. *Maintain a Town Energy Committee*

***Action 4.1.1.** Support the Sustainable Woodstock ad-hoc energy group.

***Action 4.1.2.** Maintain and encourage municipal participation in the Energy Group.

Action 4.1.3. Support and promote initiatives and recommendations from the Sustainable Woodstock energy group.

Action 4.1.4. Encourage local gas station to offer bio diesel fuels.

Objective 4.2. *Encourage District schools to adopt energy goals similar to those in this Town Plan.*

Action 4.2.1. Promote energy conservation and energy efficiency for District school buildings, transportation policy and land use. Encourage electric school buses.

Action 4.2.2. Encourage the transition away from carbon-based fossil fuels and the development of new local sources of renewable energy for district schools.

Action 4.2.3. Support K-12 schools to bring energy ideas and solutions into the classroom by working with organizations such as Vermont Energy Program (http://veep.org)

Goal 5 - Monitor energy usage and production on a continuing basis to assess progress in reaching the above goals.

Objective 5.1. *Perform a comprehensive audit of energy usage and production throughout the Town to be used as a baseline for future analysis.*

Action 5.1.1. Collect available data from all sectors of the Town, including municipal, commercial, institutional, industrial and residential on annual energy usage.

Action 5.1.2. Collect data from all sectors of the Town on local sources of energy supply and generation.

Action 5.1.3. Continue to refine the baseline energy audit by seeking more accurate data and more localized sources of data.

Action 5.1.4. Continue to use the Energy Star Portfolio Manager to summarize the data and project the future effects of proposed actions. Energy usage should be described in consistent energy units, in current dollars, and in the amounts of atmospheric carbon emissions.

Objective 5.2. *Perform periodic updates of the data in the energy usage and production models to track progress toward the above goals.*

Action 5.2.1. Work toward an efficient system to gather accurate and comprehensive data on an annual basis.