

## **CHAPTER V ENERGY**

### **INTRODUCTION**

Reliable, affordable, properly sited, clean and sustainable sources of energy are vital to Windham's economy, social well-being and future development.

Under the Planning and Development Act ("the Act"; 24 V.S.A. Chapter 117) Vermont municipalities are authorized, but not required, to develop and adopt comprehensive municipal plans including an Energy Plan. Accordingly, Windham Vermont's 2014 Energy Plan includes an analysis of energy resources, needs, scarcities, costs and problems within the municipality, and statements of policy and standards for:

- the conservation of energy, including programs, such as integrity standards for buildings, to implement that policy,
- the minimum siting requirements for energy projects to protect our environment, the character of our community, and the health and safety of our residents.
- promoting patterns and densities of land use likely to result in conservation of energy and promoting energy efficiency.
- the development of appropriately scaled and sited renewable energy resources.

The State of Vermont created a Comprehensive Energy Plan (CEP) in 2011 which purports to examine all forms of energy usage and sets ambitious goals for the adoption of renewable sources for 90 per cent of the State's energy usage in all categories by 2050.

The core of the CEP is the belief that it is only by replacing our existing energy sources with energy from renewable sources that the State can make a contribution to the problem of GHG emissions and their effect on the global climate. Available information regarding the economic and environmental aspects of the plan makes it far from clear that these goals are either attainable or advisable, but for the State's CEP to be effective it is clear that the State and local communities must work together. Communities should appreciate that they play a major role in conserving energy, becoming more efficient, and providing the State with information and guidance on how to develop appropriately scaled and sited renewable energy resources within their community. It is with this vision that this Chapter is written – as a partner, and advisor to the State and an active player in reducing Green House Gases through a series of meaningful steps consistent with CEP with awareness and compliance with 24 V.S.A. § 4302.

In order for a community to plan usefully to make a positive contribution to this effort it is important to understand the components of the problem and the ways in which individuals, communities and states can make a difference.

The previous state energy plan was released in 1998 and focused exclusively on the sources and uses of electrical energy. The current plan purports to analyze all forms of energy including that used in transportation, home heating and agriculture and industry in addition to electricity. Often the lay reader will assume that "energy" refers to electricity, especially when the term appears in

connection with “renewable.” In fact this conflation is understandable since it is in the area of electric generation that the most renewable technologies are widely available.

Windham’s topography and settlement patterns are unique and different. As the highest incorporated village in Vermont, our highest points of land not only lie in close proximity to our residential communities, but they contain many important headwater environments critical to the water quality of the Town and the region and help to protect the area from flash floods and tropical storms. It is a requirement under this Plan that siting electric and energy facilities must consider the unique topography, character, natural resources and settlement patterns of the Town.

## **Transportation**

Renewable fuels for transportation are limited to bio-fuels. At present, for example, ethanol can only represent 10% of automotive fuel; and even then there is controversy as to whether the environmental benefits of ethanol production are meeting expectations. Bio diesel can be used to replace diesel petroleum, but availability is an issue in many places and some of the same efficacy questions apply to it as to ethanol. The extent to which electric vehicles will replace petroleum fueled vehicles in Vermont is not yet clear. As of 2012 there were fewer than 200 plug-in electric cars registered in Vermont. According to the Center for Transportation Studies at the University of Vermont with proper grid management, the plug-in fleet could grow to 200,000 vehicles without requiring the construction of additional electric generation or transmission capacity. ([www.uvm.edu/~transctr/pdf/EffectsofPHEVsontheVTElectric.pdf](http://www.uvm.edu/~transctr/pdf/EffectsofPHEVsontheVTElectric.pdf).)

## **Home Heating**

In Vermont, 60% of homes are heated wholly or in significant part by petroleum fuel oil or propane. The balance of home heating energy is produced from burning wood. There is no generally available natural gas in the southern part of the state. The availability of natural gas will presumably change now that the Public Service Board has approved Vermont Gas Company’s proposed gas pipeline expansion to Addison County. This will have some immediate impact on both replacing fuel oil for heating, and perhaps to a lesser extent, in replacing electricity for some home heating, refrigeration and cooking. It is unclear at this point how much, if any, new electric generation in New England will be supported by this influx of lower cost natural gas supply.

## **Electricity**

Although electricity is consumed in home heating, it is largely for air handling rather than thermal warming. The greatest amount of electricity used by Vermonters is in lighting, refrigeration, laundry appliances, entertainment, air conditioning and in what are called phantom loads produced by the proliferation of led lights on appliances of all kinds.

## **Energy Definitions:**

***Energy Conservation:*** Reducing energy use. This applies to measures, including changes in personal habits (eg. turning off lights, driving less, improve insulation of homes and other buildings) that reduce the amount of energy consumed.

***Energy Efficiency:*** Using less energy to perform the same functions and tasks. This applies to measures such as the use of new technologies (eg: LED lights, energy efficient appliances and more efficient vehicles) that use energy more efficiently and reduce waste.

***Net-Metered System:*** An onsite generating system for local use that is connected to the power grid. The state defines this more specifically as a facility for the generation of electricity that is of no more than 500 kW capacity, operates in parallel with facilities of the electric distribution system, is intended primarily to offset the customer's own electricity requirements, is located on the customer's premises, or for group net-metered systems, on the premises of a member of the group, employs a renewable energy source or is a qualified micro-combined heat and power system of 20 kW or less, that meets state definitions and may use any fuel source that meets air quality standards (30 V.S.A. 219a). Net metered systems are considered residential or small business applications and represent an example of community scale, decentralized or distributed energy generation.

***Renewable Energy:*** (1) Energy available for collection or conversion from direct sun light, wind, running water, organically derived fuels and agricultural resources, waste heat, and geothermal sources. (2) Under the state's renewable energy programs, "renewable energy" means energy produced using a technology that relies on a resource that is being consumed at a harvest rate at or below its natural regeneration rate (30 V.S.A. 8002).

***Residential:*** Small-scale renewable energy facilities most often consist of systems such as those listed in the paragraph above and can range up to 15 kW in power.

***Commercial/Industrial:*** These are energy systems that are greater than 500 kW. These are generally large scale projects designed to generate profit for owner, lessee or licensee by sale of the output to or through public utilities.

### **Energy Goal**

The overall goal of Windham's Energy Plan is to encourage the efficient use and conservation of energy in all categories (including transportation, heating and electricity) and the appropriate siting and development of appropriate renewable energy resources.

Windham believes it can best achieve these goals by:

- Promoting and facilitating the use of state, utility and municipally-supported energy efficiency and conservation programs re: home heating, transportation and electrical usage, as a means of increasing the effectively available energy resources without constructing new capacity.
- Encouraging individual and group net-metered and off-grid renewal energy projects, community-based projects and small-scale systems serving individual users, in appropriate, context-sensitive locations.
- Supporting and promote those facilities that are suitable for the topography and character of the areas within the Town and will avoid, reduce or defer transmission or distribution system investments.
- Supporting in-place upgrades, as opposed to new construction, of existing facilities, including transmission lines, distribution lines and substations as needed to serve the town and region.
- Exploration of safe and convenient alternatives to individual automobile travel.
- Education and promotion regarding ways in which homes and other buildings can be heated and insulated more efficiently.

## Plan Policies

Windham believes local energy planning is both relevant and important. While many energy issues are national or global in reach, local government has some control over its own energy consumption, and can lead by example to influence residents to be more aware of the ways to reduce energy use and costs, and to help develop local energy options, to the benefit of the entire community. The town is also in a unique position to understand, identify and protect our natural resources and land conservation opportunities (see Natural Resources Chapter IV) in the process.

Windham municipal plan policies and land conservation measures – as adopted Community Standards – provide the basis for local participation in state regulatory proceedings including Act 250 for energy facility development and Public Service Board (Section 248) hearings. Before the Public Service Board can issue a Certificate of Public Good (CPG), for most projects it must find that "the purchase, investment, or construction, with respect to an in-state facility, will not unduly interfere with the orderly development of the region, with due consideration having been given to the recommendations of the municipal and regional planning commissions, the recommendations of the municipal legislative bodies, and the land conservation measures contained in the plan of any affected municipality." 30 V.S.A. §248(b)(1)

\* (<http://info.libraries.vermont.gov/supct/current/op2007-456.html>)

The municipal plan also considers community participation in long-range state and utility energy planning, including the update of the following plans, as required under state law:

- **Vermont Comprehensive Energy Plan**, updated every five years by the Department of Public Service.
- **Vermont Long Range Transmission Plan**, updated every three years by the Vermont Electric Company.
- **Utility Integrated Resource Plans** prepared by utilities for review by Vermont PSB.
- **Vermont 20 Year Electric/Energy Plan**

## Energy Coordinator / Energy Committee

Title 24 V.S.A. provides towns with the ability to appoint an Energy Committee or Coordinator. Consistent with this Title, Windham has appointed a Town Energy Coordinator responsible for developing and contributing to energy policy for the town and is considering expanding this function and developing a Town Energy Committee to work in conjunction with its Planning Commission & Zoning Administrator. The Energy Coordinator is responsible for quantifying and tracking municipal energy consumption and recommending actions that the town and community should take to conserve energy (transportation, home heating and electrical usage), increase energy efficiency, promote local energy production from community-scale renewable resources, and to reduce energy costs and greenhouse gas emissions. The Energy Coordinator, in conjunction with the Town Treasurer or Assistant shall separately quantify and track energy consumption and recommend action for improved efficiency and conservation for town owned buildings, vehicles and equipment.

## **Energy Objectives**

- To ensure the long-term availability of reliable, affordable, clean and safe energy supplies from a combination of utility-distributed sources and appropriately scaled community and residential systems
- To increase energy conservation and efficiency in home heating, transportation and electrical usage
- To promote the development of appropriate renewable energy resources in the Town of Windham to contribute to the energy needs of the community and region.
- To reduce energy usage and expenditures by residents through improved conservation and efficiency
- To reduce reliance on fossil and other polluting fuels, such as biomass for electric generation, and thereby reduce greenhouse gas emissions that contribute to climate change.
- To identify and limit the adverse impacts of energy development and use on public health, safety and welfare.
- To preserve the Town's historic districts and planned pattern of development, environmentally sensitive areas, and our most highly valued natural, cultural and scenic resources, consistent with related development, resource protection and land conservation policies.
- To identify, study and understand steps necessary to preserve and protect the Town and regional headwaters and water quality from negative consequences of new energy project siting such as pipelines, transmission lines, extraction processes and electric generation.

## **Energy Planning**

Windham actively supports partnerships, strategies, and state and federal legislation that will ensure the affordable and reliable production and delivery of electrical power to the community, in conformance with community goals, objectives and standards. It is our intent to work with utility providers, the Regional Planning Commission, the Department of Public Service and neighboring communities to plan for needed system upgrades and expansions to meet projected demand while protecting and preserving the natural environmental characteristics of the town. The Town will participate in long-range energy planning and development, in cooperation with the Regional Planning Commission, the Public Service Dept and neighboring communities, to ensure that local energy, resource conservation and development objectives are identified and considered in future energy initiatives including public utility or merchant power development.

Windham's Planning Commission believes that without widespread understanding of the issues, all renewable energy projects may be viewed uncritically as making positive contributions to society. However, not all energy projects, including Renewable projects, provide the same benefit(s) or present the same obstacles or impacts. With this understanding, we begin our planning by considering all renewables for the benefit(s) they potentially offer and the tradeoffs they may require.

Our plan requires us to apply our knowledge and understanding of the Town of Windham, its unique geographic features, critical natural resources and attributes to allow us to understand what may be best for Windham and its Region. The Planning Commission, in consultation with the Energy Coordinator, is responsible for preparing Community Standards for the siting and

development of generation, transmission and substation facilities, for reference by facility developers and local property owners, and for consideration in Section 248 proceedings.

### **Energy Facility Development**

The Planning Commission, in consultation with the Selectboard, is responsible for the development of guidelines and standards to direct local participation in Section 248 proceedings for the review of public utility or utility scale merchant generation projects located in Windham or in neighboring communities which may affect the Town. The guidelines and standards reflect levels of participation or formal intervention in relation to the type, location, scale, and magnitude of a proposed project, and its potential benefits and impacts to the health and welfare of the community and its residents and property owners.

The municipality will participate in the Public Service Board's review of new and expanded generation and transmission facilities as necessary to ensure that local energy, resource conservation and development objectives are identified and considered in proposed utility development. This may include collaboration with other affected municipalities and the Regional Planning Commission for projects that may have significant regional impact.

### **Energy Conservation & Efficiency**

Windham's local government will lead by example to increase energy efficiency and reduce overall energy consumption and costs to local taxpayers. Energy efficiency and conservation will be a primary consideration in all municipal construction projects, vehicles, equipment purchases and facility operations. Accordingly the Selectboard, with the assistance of the Energy Coordinator and municipal employees will:

- Conduct baseline energy studies and periodic energy audits or assessments of all municipal buildings, vehicles, equipment and facilities to identify improvements that will reduce energy consumption and costs. This may include, but is not limited to: an analysis of electricity, space heating, lighting and hot water usage for town halls, libraries, town garages, schools, etc.

Profile municipal vehicle inventories and their associated fuel type and efficiency.

- Prioritize municipal energy efficiency projects and incorporate them into the municipal Capital Budget & Program.
- Apply for grants to pay for energy audits for the town and its residents and work in collaboration with Efficiency Vermont. [www.encyvermont.com](http://www.encyvermont.com)
- Develop facility maintenance and operation policies that maximize energy efficiency while maintaining comfort levels for employees and visitors, to include building temperature, heating and air conditioning guidelines, electrical equipment use guidelines, interior and exterior lighting guidelines, and the use of energy management devices (e.g., sensors, timers). Examples include installation of day-lighting tubes, programmable thermostats, occupancy light sensors, smart strips and energy star appliances.
- Prioritize weatherizing municipal buildings before conducting any space heating energy efficiency improvements.
- Replace facility lighting with energy efficient compact fluorescent or LED bulbs and fixtures with the assistance of Efficiency Vermont and local utilities. Some of these options include the elimination of certain fixtures, the replacement of inefficient bulbs with more efficient ones, such as LEDs, and the utilization of lighting controls such as timers or light sensors.

- Develop municipal vehicle purchase, maintenance and use policies, including minimum fuel efficiency standards for new vehicles. Consider alternative-fuel vehicles as available and appropriate. One example of such a policy would be to ensure all municipal vehicles are up to date with tune ups and tire pressure checks in order to maximize fuel economy.

The Town of Windham supports energy literacy, and voluntary energy conservation and efficiency programs for residential, commercial buildings, including home energy audits, retrofit and weatherization programs. The Town will:

- Develop community education, outreach and informational programs, in cooperation with Efficiency Vermont and other groups and organizations, to illustrate and promote the benefits of energy conservation and energy efficiency.
- Work with local school teachers and administrators to promote energy literacy in the classroom, for example, in association with the Vermont Energy Education Program (VEEP).
- Provide information on energy conservation techniques, energy-efficient products and efficiency and weatherization programs available to local residents and businesses.
- Develop community-based lighting design guidelines that promote energy efficiency, and reduce glare, light trespass, and light pollution or "sky glow."
- Consider establishing, by town vote, a municipal Property Assessed Clean Energy (PACE) program that provides loans to local residents, paid back through an assessment on their property, to help finance eligible energy efficiency projects.

New development and renovation projects should include measures to reduce energy consumption through site and building design, material selection and the use of energy-efficient lighting, heating, venting and air conditioning systems. The Town will:

- Provide available information on energy efficient development to individuals and developers seeking municipal land use [zoning, building] permits.
  - Encourage new development and renovations to meet at least minimum state commercial and residential energy building codes. This may include a provision that state-required certificates of code compliance be filed with the town prior to the issuance of a municipal certificate of occupancy.
1. Amend local regulations to provide incentives (e.g., waivers, density bonuses) for development that exceeds minimum state efficiency standards (e.g., Energy Star or Vermont Builds Greener program).
  - Amend site plan, subdivision and planned unit development regulations to incorporate more energy-efficient siting, building orientation and landscaping standards.
  1. Develop municipal outdoor lighting standards to require lighting plans for larger development projects, and the use of energy-efficient lamps and fixtures, timers and sensors.
  1. Support local and regional programs for energy audits and cost-effective weatherization services on all existing homes, with a priority on affordable housing.

## **Renewable Energy Resources**

Renewable energy facilities have the potential to raise complex and controversial issues regarding the potential health, visual, ecological, environmental, social and economic impacts of

large scale renewable (wind, biomass and solar, for instance) development initiatives. Even the siting of small scale installations in certain locations has raised community concerns about the impacts such facilities may have on the health and welfare of town residents. Each proposed project must be reviewed based upon location and impacts to the Town, our natural resources and our residents. Every attempt will be made to balance town policies to maximize the positive benefit(s) of appropriately scaled renewable energy with community attributes, values and natural resources consistent with 24 V.S.A. Section 4302 and the CEP.

The Town of Windham continues to support the development and use of residential and community-scale renewable energy resources including off-grid and net-metered wind and solar, biomass, micro hydro, geothermal at a scale that is sustainable. Any and all of these approaches will enhance energy system capacity and security and promote cleaner, more resilient energy production.

The Windham Planning Commission has developed Community Standards for renewable energy projects (pages 62-67) that are intended to avoid and mitigate potential negative impacts of renewable energy. These standards are for municipal and Public Service Board (“PSB”) consideration and permitted residential and community-scale renewal energy projects and prohibit commercial/industrial-scale wind/solar development initiatives. The town has (or will):

1. Mapped, in association with the Regional Planning Commission, those areas of Town with the highest potential for siting small scale net-metered and off grid renewable energy systems, based on resource availability, technical siting requirements, and the community's resource conservation, land use and development objectives.
1. Prepared local guidelines for the development of renewable energy resources (including related access and transmission line extensions) for reference by utilities, developers and local property owners, and for consideration in state and local permit proceedings.
2. Amended local regulations to allow off-grid solar and net-metered wind systems as accessory uses in all districts in which structures are allowed, subject to specific use standards, and to incorporate district height and setback waiver provisions for such facilities where appropriate. Development standards must be designed and enforced to address public health and safety, and potential adverse impacts to significant natural, environmental, historic and scenic features, public facilities, and neighboring properties and uses.

## Energy Usage and Sources

The EPA measures energy usage in four primary categories for purposes of calculating GHGs emitted by each. Vermont’s carbon footprint from all energy sources compared to New England and the Nation as a whole in 2010 was reported by the EPA as follows:

	<u>Vermont</u>		<u>New England</u>		<u>US</u>	
	<u>%CO2</u>	<u>%Energy</u>	<u>%CO2</u>	<u>%Energy</u>	<u>%CO2</u>	<u>%Energy</u>
Electricity	4%	20	33%	N/A	35%	38
Home Heating	33%	29	12%	N/A	10%	14
Transportation	59%	35	39%	N/A	30%	27
Agriculture / Industry	11%	16	10%	N/A	20%	21



## **A. ENERGY APPLICATIONS**

Energy resources are necessary for transportation, home heating and electricity usage. Sufficient clean energy supplies at an affordable cost are essential to a town's growth and economic health and development. Improved energy efficiency and conservation in all energy usage are key components of the town's energy plan.

### **Transportation**

Transportation accounts for the largest category of energy usage in Vermont and accounted for an estimated 35% of the total energy used in 2010 and 59% of GHG emissions. (The National equivalents are 27% of total energy and 30% of GHGs). Motor vehicles are the state's largest source of toxic and carcinogenic air pollutants, and greenhouse gases (GHGs).

Approximately 28% of Windham Town residents currently work at home, and we expect this figure to continue to grow as Windham is ideally suited for small scale home based businesses and telecommuting. Over time we expect this development will have a net positive effect on the town's energy and conservation as it relates to transportation.

In a rural community with no significant industry or commerce and no access to public transportation, the opportunities for reduced energy use in Transportation are somewhat restricted. The Windham Planning Commission and Energy Coordinator will attempt to raise community awareness of the environmental costs of unnecessary transportation and will try to inform residents of the advantages of sharing rides for shopping and other errands in addition to carpooling.

As noted in Figure 1 (page 17) of the Windham Community Profile, 73% of residents who work travel out of town for work. Table 11 (pg 55) indicates most residents (62%) drive alone to work and a minority (3%) carpool. These data underscore the geographical dispersion of employment opportunities for residents of rural communities like Windham and the absence of large employers in any of the immediate nearby towns.

One of Windham's important economic assets is the quiet, unspoiled natural setting which serves to keep disruptions to home and work environments to a minimum.

Windham supports ongoing and collective efforts to reduce transportation energy demand, vehicle miles traveled, fossil fuel consumption and greenhouse gas emissions. Windham will:

1. Partner with local and regional service agencies to explore establishing a volunteer driver program that offers rides for local residents and opportunities to coordinate group travel.
  - Work with local businesses and farmers to develop programs that support the local economy – for example a "buy local" campaign, a local business directory, a farmers market, or a vendors ordinance – to increase the availability of locally produced energy, food, goods and services.
  - Adopt a no-idling policy or ordinance that limits vehicle idling on town and school property. For more information see [www.idlefreevt.org](http://www.idlefreevt.org).
  - Investigate plug-in charging stations as appropriate vehicles become more available.

- Promote telecommuting to capitalize on expanded internet connectivity for at-home workers and to reduce unnecessary automobile travel.

### **Home Heating**

Residential Home Heating represents the state's second largest use of energy and accounted for an estimated 29% of the total energy used in Vermont in 2010. Home Heating is reported by the EPA to contribute 33% of Vermont's GHG emissions, and we assume Windham falls within that pattern. Home Heating offers both Windham and the state the most accessible opportunities to combat climate change through the reduction of GHGs.

The residents of Windham use a variety of energy sources for home heating. According to the 2000 Census, residents heat their home primarily with fuel oil (64.8%) and secondarily with wood (29.3%). The remaining heating fuel sources include propane (14%), electricity (2.7%) and solar energy (1.3%). Heating provides Windham its most significant opportunity to reduce energy use, GHG emissions and shift to cleaner fuels and technology. Energy efficiency and conservation are key component of the Town's Energy Plan.

The most practical means to reduce home heating emissions are in improved home insulation, modernizing HVAC systems, and/or converting to solar, geothermal, heat pumps or wood-fired heating sources. There is also the prospect of increased availability of natural gas supplies in the foreseeable future. Such a development would offer the combined advantage of much lower GHG emissions and lower heating costs (as compared to fuel oil) for households and businesses.

Wood is currently the most commonly used biomass fuel for residential home heating, and the town of Windham supports the continued use of wood as a fuel source. The Town encourages residents to use low-emission wood burning appliances and to install any wood burning appliances according to state standards and guidelines.

### **Electricity**

Electricity sold to residential, commercial and industrial customers in Vermont represents about 20% of the State's total energy usage and generates less than 4% of its Greenhouse Gas Emissions.

Windham's electrical supply is delivered by Green Mountain Power (GMP). Vermont Electric Power Company (VELCO) maintains two 345 KV transmission lines that run north to south near the Grafton-Windham boundary.

According to the Environmental Protection Agency (EPA), and other sources, Vermont uses less electric power than any state, and according to the Energy Information Agency (EIA), the electric power it both uses and generates is the cleanest in the US when measured in terms of GHG emissions per Megawatt hour and in millions of metric tons total GHGs. In 2010 Vermont's electrical energy produced 3 pounds of CO<sub>2</sub> per Mwh as compared to a national average of 1300 pounds per Mwh. (State CO<sub>2</sub> Emissions of Fossil Fuel Combustion –MMTons 1990-2011

[http://www.epa.gov/statelocalclimate/resources/state\\_energyco2inv.html](http://www.epa.gov/statelocalclimate/resources/state_energyco2inv.html)).

### **Residential Electric Energy Usage**

In per capita terms, Vermont ranks among the ten states with the lowest electric usage (EIA). Vermonters annually use 9000 kwh per capita. The New England average is 8500; and the average of the other 45 states is 12,700 kwh per capita.

A review of 6 years' aggregate electrical usage by residential accounts in the town of Windham shows an 8% decline from 5687 kwh per residence to 5241 kwh. (Note that this figure is 58% of the Vermont state average.)

<u>Year</u>	<u>Total Annual kWh</u>	<u>#Premises</u>	<u>Annual kWh per Premise</u>	<u>% Change</u>
2007	2,144,005	377	5,687	
2008	2,101,924	382	5,502	-3%
2009	2,063,785	383	5,388	-2%
2010	2,107,861	387	5,447	+1%
2011	2,142,570	389	5,508	+1%
2012	2,033,659	388	5,241	-5%

### **Commercial Electric Energy Usage**

According to data supplied by Green Mountain Power of a total of 412 location accounts in Windham, 24 were listed as commercial in 2013, or 5.8% of the total. Electric usage by these accounts represented 9.4% of the total electricity usage in the town. Commercial accounts include the Fire Departments, 1 School, 2 Churches, 1 Telephone facility, 1 Golf Course, 3 Town accounts, a small engine service and sales business, three B&Bs, a handful of home-based businesses and 3 working farms.

<u>Commercial</u>	<u>Year</u>	<u>Total Annual kWh</u>	<u>#Premises</u>	<u>Annual kWh per Premise</u>	<u>% Change</u>
	2007	156,226	20	7,811	
	2008	155,558	20	7,778	---
	2009	174,432	21	8,306	+7%
	2010	202,112	21	9,624	+15%
	2011	171,524	21	8,168	-15%
	2012	210,297	24	8,762	+7%

(See Section C Renewable Energy for a more complete review of Renewable Energy Sources).

### **Facility Development**

The following forms of energy development are supported by the Town of Windham in order of priority:

1. Increased system capacity derived through appropriate energy efficiency and conservation programs.
2. Small, onsite distributed energy projects, including individual and group net-metered renewable energy projects and community-based projects that conform to municipal policies and standards.
3. Give preference to in-place upgrades of existing facilities, over new construction including existing transmission lines, distribution lines and substations as needed to reliably serve the town and region.
4. New community-scale energy facilities (including transmission and distribution lines, substations, hydro dams, solar farms and small wind generation) as may be necessary to meet increased demand for power or to improve grid stability and community resiliency.
5. Public education on the subject of conservation and efficiency as real sources of more energy and a better alternative than new construction of generation or transmission facilities.

### **B. ENERGY CONSERVATION AND EFFICIENCY**

Energy resource availability and costs are generally not within the control of Windham residents; however, consumption can be influenced through education, technology, and the alteration of use patterns. Effective land use planning can promote energy conservation. Targeting new development towards areas located close to the community's major roads and existing settlements will minimize the energy consumed by residents commuting and will reduce the energy required to deliver essential services to residents and businesses. Decisions concerning capital expenditures on roads and other municipal infrastructure should be mindful of energy conservation.

As noted in Figure 1 (page 17) of the Community Profile, 72% of Windham's residents who work travel out of town for work. Table 11 indicates most Windham residents continue to drive alone to work and reflects a sharp decrease in those that carpooled. Car-pooling is beneficial for residents not only because it conserves fuel, but also because it reduces wear and tear and maintenance costs on individual vehicles. The Planning Commission will continue to promote carpooling for both work and pleasure activities as a means of enhancing energy conservation.

**Table 11: Commuting to Work: aged 16 and older**

<i><b>Method</b></i>	<i><b>1990</b></i>	<i><b>2000</b></i>	<i><b>2010</b></i>
Drive Alone	65%	74%	62%
Carpool	19%	11%	3%
Public Transportation	0%	0%	0%
Bicycle	-	-	0%
Work at Home or Walk	13%	14%	28%

Other Means	3%	1%	7%
Average travel time (minutes)	22.5	24.2	30.4

(Source: 2010 US Census, 2006-2010 American Community Survey 5-Year Estimates)

Energy savings can be realized by retrofitting existing buildings with insulation, more efficient doors and windows, weather-stripping, compact fluorescent lights, and energy efficient appliances. The following programs are available to residents of Windham:

- Southeastern Vermont Community Action (SEVCA): SEVCA is the service provider in Windham County that runs the Weatherization Assistance Program. Weatherization services, which include an energy audit, diagnostic tests, analysis, and installation measures, are available at no cost to income-eligible homeowners and renters. SEVCA is also available to help in the event of a heating emergency. They can help purchase oil, kerosene, propane, or wood. In addition, they also work with electric companies in order to prevent disconnection and help negotiate payment plans.
- Efficiency Vermont: Efficiency Vermont is the State's provider of energy efficiency services. They provide technical and financial assistance to electrical consumers for the purpose of improving the efficiency of existing and new facilities. (Efficiency Vermont.com)
- ENERGY STAR Home Rebates: Energy Star Homes meet strict energy efficiency guidelines set by the U.S. Environmental Protection Agency and U.S. Department of Energy. Efficiency Vermont provides free financial, design, and technical help to build an ENERGY STAR qualified home. Benefits of being an ENERGY STAR home include financial incentives such as product rebates; utility savings; higher resale value; increased comfort and air quality; and other environmental benefits.
- Windham's Energy Coordinator to help with specific energy saving programs.
- Call 211( the Vermont State information call line) for information on a variety of services available to Vermonters.
- Vermont Public Service Department has a line for energy efficiency advice at the Vt. State Efficiency Office.

### **Policy 1: Reduce energy consumption and increase energy efficiency at both Town and Homeowner levels.**

#### *Actions*

1. Have the Town of Windham lead by example by seeking ways to increase energy efficiency and reduce energy consumption in all town offices, vehicles and buildings.
2. Support carpooling and promote increased use of the improving telecommunications infrastructure that can support telecommuting.
3. Provide information in the Town Office about energy assistance programs such as SEVCA and Efficiency Vermont.
4. When new residential construction is undertaken, provide informational materials to owners or builders at the time the Zoning Permit is issued to inform property owners.
5. Evaluate, and as appropriate, propose amendments to the zoning bylaws to regulate the siting of systems that make use of renewable energy, such as appropriately scaled solar panels and residential wind energy systems. Such regulations shall allow for flexibility in the application of setback, height, and other requirements,

and they should also allow for building design and placement that maximize passive solar energy use.

6. Support appointment of the Windham Town Energy Committee to help educate residents on conservation practices and potential cost savings benefits.

**Policy 2: The placement of utility line extensions above ground and roadside must be sited to provide maximum protection of Windham’s scenic resources.**

*Actions*

- 1 Require that electric poles that have been abandoned due to relocation or consolidation are removed from the landscape.
- 2 When relocating, upgrading, or establishing electric distribution lines, a review of operational maintenance, engineering design, direct cost, and visual impact should be undertaken to determine the appropriateness of the existing or proposed utility line location.

**Policy 3: Support the use of individual on-site energy sources.**

*Actions*

- 1 Cordwood for domestic use is an important by-product of better forest management. Encourage landowners with woodlots to participate in sustainable management programs that emphasize full utilization of wood fuel resources, as well as the production of high grade saw timber.
- 2 Refer to Community Standards and up-dated Zoning Bylaws for specific standards for residential wind energy systems that address limitations on height, separation of structures, minimum lot size, setbacks, aesthetics, operational noise, environmental impacts and other items as deemed necessary.
- 3 Residential connection of individual wind energy and photovoltaic systems to the electric power grid under “net-metering” shall not be considered commercial use for purposes of this plan.
- 4 Outdoor wood furnaces are regulated and shall comply with Vermont Air Pollution Regulation, Section 5-204, Outdoor Waterstoves (September 1997).

**Policy 4: With the exception of net-metered residential wind energy systems, prohibit Commercial/Industrial wind energy projects in the Town of Windham.**

*Actions*

- 1 Amend the zoning bylaw to add additional use classifications of commercial/ industrial wind systems and individual wind energy systems. Expressly prohibit commercial/industrial wind systems.
- 2 Participate in and/or designate an expert agent to represent the Town’s interests in any regulatory hearings for any potential commercial/industrial-scale wind energy development in and around Windham.

**C. RENEWABLE ENERGY**

**1. Hydroelectric**

Hydroelectric energy generation is one form of renewable energy. While Windham has abundant water resources, their potential to generate energy is limited because, as a headwater community,

most of the streams are small and have low seasonal flows. The possibility of developing small “micro-hydro” systems may exist. Micro-hydro systems usually do not dam rivers or streams. Their utility depends on the dynamic head, amount of water flow, and the efficiency of the turbine. In Windham, if this type of system is feasible, it would probably act to augment other power sources. However, in addition to stream flows, cost and the effect of cold weather climate on the equipment will likely be deterrents to wide spread usage of this type of renewable energy. (See Chapter IV Natural Resources for a more detailed discussion of Windham’s water resources and their protection.)

## **2. Solar Energy**

Passive solar designs can reduce heating and electricity bills. No mechanical means are employed in passive solar heating. Instead, siting and design measures, such as south facing windows, open floor plans, and ventilation are used. Photovoltaic systems can be used to convert sunlight to electricity. These systems require equipment such as solar panels, a charge controller, batteries, and an inverter, which convert DC current into AC current for use in outlets for regular household appliances. Photovoltaic systems of up to 15kW or less are eligible for net metered electric rates after receiving a Certificate of Public Good. By special arrangements with the power company which may involve additional fees, larger systems can be constructed. (30 VSA Section 219a(h)(1)(E).

The Town of Windham supports the use of solar energy and encourages research and education on its use at both residential and community scales.

## **3. Wind Energy Systems**

The Town of Windham is supportive of alternative and renewable energy sources, but as with other development, it must fit the scale, topography, settlement patterns and character of the Town. It must be sensitive to the impacts on neighbors and quality of life. It must not adversely impact the unique qualities of our ridgelines or of woodlands that accommodate healthy headwaters, a wide variety of wildlife and its habitat and other unique features. There are many ways, especially those involving energy conservation and efficiency, for the Town and its residents to make a positive impact on the larger environment without compromising the local environment and ecology or the health of our residents.

## **4. Individual Wind Energy Systems**

Wind energy systems are beginning to be used as an energy source on a residential scale. There have been two individual wind energy systems in Windham; both are now inoperative. Towns may only regulate wind facilities that do not connect in any way to the public power supply.

Rural areas with low density residential development or working agricultural landscapes are the most appropriate places to locate individual wind systems. Their height and visual prominence make them incompatible with densely settled areas. Individual wind energy systems must be designed so that they are not located as a focal point in one of the designated scenic areas of Windham as listed and described elsewhere in this plan. The permitting of these facilities should be reviewed under the conditional use review process with additional safeguards specified in the Zoning Regulations. In addition, adequate setbacks which accommodate a fall zone, ice throw, operational noise levels, and lighting shall be addressed by the following:



- Turbines shall not be allowed or permitted unless they are set back a minimum of 2 times the highest blade height measured in a straight line from the closest property line.
- Turbines shall not be allowed or permitted unless applicant clearly demonstrates noise will not exceed the lesser of 45 dBA Fast Lmax at the closest property line or 5dBA Lmax above the ambient sound level.
- Turbines shall not be allowed with lights.
- Turbines and associated development shall not be allowed on slopes of 20% or greater.

## **5. Commercial/Industrial Wind Energy Systems**

Wind energy systems (wind farms) that are greater than 500 kW are defined as commercial/industrial systems. These are large-scale projects with large or multiple turbines designed to generate electricity for sale to or through regulated public utilities in Vermont or elsewhere. Windham has been studying commercial/industrial wind generation since 2004. Our 2008 Town Plan, re-adopted in 2013, contains a prohibition against this form of development based on the unique topography and settlement patterns of our Town, our ten years of research and knowledge and the support of the majority of our residents and property owners. That Plan was closely reviewed by the Department of Public Service in 2012 relative to Docket 7905. (Application of Atlantic Wind, LLC, for authority, pursuant to 30 V.S.A. & 246 and 248, to install temporary meteorological stations in the Towns of Windham and Grafton, Vermont filed July 31, 2012.) In a letter dated October 9, 2012 the Department said: “The Public Service Board should defer to Windham’s Town Plan intent to prevent the temporary siting of MET Towers within the Town.” In closing that letter the Department said: “The Board is required to give due consideration to the Town Plan with regard to the orderly development of the region § 248 criterion. The Board should treat the provisions prohibiting the construction of MET towers within the Forest Resource Districts and within the Town generally as dispositive. ”

At the time of preparing the updated Town Plan, the State of Vermont has four operating utility-scale wind generation facilities: Searsburg, Lowell Mountain, Georgia Mountain and Sheffield. A large landowner in Windham is currently measuring wind resources (DOCKET 7905) with the stated intention of constructing another such facility. At this time, neither the landowner nor the developer has revealed any information to the Town about how the project might be laid out or how many turbines it might contain.

On October 2, 2012, the Governor’s Energy Generation Policy Siting Commission was created through Executive Order No. 10-12. The Commission was charged to recommend guidelines for permitting electric generation project of all kinds. The legislature is studying those recommendations, and may propose related legislation. The Agency of Natural Resources is studying new guidelines for wetlands management and for stormwater runoff, and the Public Service Board has recently opened its own investigation into the adequacy of the State’s noise pollution standards and their application. Public comment on the Total Energy Study and the Comprehensive Energy Plan is invited. While all these events are going on, the State is gaining valuable firsthand experience with the benefits costs and trade-offs of utility scale renewable energy.

As the Town of Windham approached the mandatory updating of the Town Plan, we are cognizant of these unfolding events. It is not our intention to address any particular landowner or project, but rather to extend and strengthen our published policy, which declares commercial/industrial scale wind development inappropriate for Windham for a variety of



reasons. In addition to our unique relationship of settlement and topography those include but are not limited to the Town's statutory responsibilities under the law to protect and preserve the health and welfare of residents and property owners, the preservation of the unique aspects of our natural environment as well as the quality of life and the values, both material and social, that have characterized our Town for more than 215 years.

Industrial wind energy systems are inappropriate in Windham for a variety of reasons including the nearness of many probable turbine sites to historic settlement patterns; the presence of steep slopes (slopes of 20% or greater); the presence of wildlife and their critical habitat; the many fragile natural areas including wetlands and vernal pools; several listed high-elevation headwaters draining through rugged terrain; pristine views and natural quiet and darkness.

It is the policy of the Town of Windham that commercial / industrial wind energy systems as defined above and temporary meteorological towers proposed as precursors to such projects are prohibited throughout all of town as potentially hazardous to the health and welfare of its residents, incompatible with high elevation headwaters and not compatible with the town's vision of appropriate development, or its historic settlement patterns and for other reasons set forth in this section.

This policy is consistent with Windham's Zoning Bylaw as well as with the Town's written Community Standards. (See pages 62-67) Commercial/Industrial wind is neither a permitted nor conditional use in the Zoning Bylaw; as such it is specifically prohibited. In addition, Windham's high elevation lands - those most desirable for industrial wind energy development - are unique and contain many important natural resources and are among the most sensitive sites from a development perspective. For these reasons, these high elevation lands have been located in the Forest District where development is limited to agriculture; commercial forestry; forestry for research, education, and demonstration; and camps.

If permitted by the Public Service Board, Commercial/Industrial Wind Energy Systems are subject to some of the same requirements articulated above plus some further specifics:

- Turbines shall be set back according to the following required measurements:
  - 2,500 feet from property lines
  - 1,300 feet from transmission lines & poles, ski lift equipment & structures, camps, other turbines and public travel ways.

These setbacks are intended to accommodate the impact on the surrounding area of commercial/industrial wind turbines. Potential impacts include not just a falling tower, but ice throw, shadow flicker, noise, size of mounting pads, storm water runoff, access roads and lighting which are potentially harmful to the community and its residents. (Reference Natural Resources Chapter 4.)

- Turbine noise shall not exceed 45 dBA Fast Lmax at the property line. or 5dBA Lmax above the ambient sound level.
- Turbines shall not have lights.

If, however, application for a utility scale generation project should be filed with the PSB for any location in Windham, the Town will ask the Board to deny such requests and will in so doing

refer to 30 VSA Section 248. Section 248 was written to enable public utilities to site and build needed generation and transmission facilities without having to meet all criteria of Act 250 – most particularly the portions dealing with the role of town plans.

In Section 248 proceedings, the Town requests that the Public Service Board adopt Windham's Town goals and policies as criteria under which any such project should be judged. If we weigh and balance the goals of Title 24 of the Vermont Statutes Annotated, which have guided us in the writing of this plan, we must conclude that certain types of development cannot co-exist in a Town with Windham's goals, unique attributes and historic treasured patterns of settlement. Commercial/Industrial wind projects are among those types of development and must not be sited within the town.

24 VSA Section 4302 (c)(5) charges towns to create plans that are written:

- (5) To identify, protect and preserve important natural and historic features of the Vermont landscape, including:
  - (A) Significant natural and fragile areas;
  - (B) Outstanding water resources, including lakes, rivers, aquifers, shore lands and wetlands;
  - (C) Significant scenic roads, waterways and views;
  - (D) Important historic structures, sites, or districts, archaeological sites and archaeologically sensitive areas.
- (6) To maintain and improve the quality of air, water, wildlife and land resources.

Each of these sections represents important elements of Windham's vision of its future and this plan endeavors to set forth how they contribute to our vision for the Town and should be protected. It is the Town's position that Section 248 of Title 30 and Section 4302 of Title 24 – should be read together to give support and meaning to each in a reasonable and just manner so that statewide projects take into account town standards and prohibitions and consider the differences of each town when it comes to topography, settlement patterns, natural resources and other unique features of the town.

## **6. Wood:**

Wood is considered a biomass fuel and can be beneficial if used appropriately. The use of biomass fuel can replace or reduce the use of non-renewable fuels such as heating oil. When grown and harvested in conjunction with effective forest management plans, woodlots can provide an alternative fuel source for landowners, thereby decreasing dependence on non-renewable resources. While burning wood does create air pollution, wood-burning technology has improved and emission requirements have been implemented. Windham supports the continued use of wood as a local thermal fuel source and encourages residents to use low-emission wood burning appliances.

Outdoor wood furnaces or boilers are gaining popularity across the country as a home heating method. These are free-standing combustion units located outside the home or structure that is to be heated. When used properly these systems can be a clean and economical way to heat a house and water. Nonetheless, concerns over the safety and environmental impacts of these heating devices, particularly the production of offensive odors and potential health effects of uncontrolled emissions exist. The State of Vermont does have regulations pertaining to these systems. Amongst the provisions are the fact that they must be located at least 200 feet from

neighboring residences and that the stack on the furnace must be higher than the neighboring roof line if the furnace is between 200 and 500 feet from the nearest neighboring home. (Vermont Air Pollution Regulation, Section 5-204, Outdoor Waterstoves (September 1997). The State regulations also permit towns to have their own ordinances regulating outdoor wood furnaces. Any installation shall comply with all local and state regulations. A Zoning permit must be obtained.

#### **D. WINDHAM COMMUNITY STANDARDS AND CONDITIONS FOR ENERGY DEVELOPMENT**

**Purpose:** The purpose of these municipal energy policies and standards is to promote the development of appropriate small-scale renewable energy resources and energy facilities in the Town of Windham, while limiting the adverse impacts of such development on public health, safety and welfare, the town's historic and planned pattern of development, environmentally sensitive areas, and our most highly-valued natural, cultural and scenic resources – consistent with related development, resource protection and land conservation policies included elsewhere in this plan. These policies are to be considered in undertaking small-scale municipal energy projects and programs, in updating the Town's bylaws to address energy development, and in the review of new or upgraded energy facilities and systems by the Town and the Public Service Board under 30 V.S.A. § 248.

To the extent physically and functionally feasible, existing utility systems, including transmission lines, distribution lines and substations, shall be upgraded or expanded on site or within existing utility corridors before new facilities or corridors are considered.

The Town of Windham will endorse or permit the development and installation of small-scale energy facilities that conform to community energy facility development and siting standards through participation in Public Service Board (Section 248) proceedings or, where applicable, through local financing and incentive programs and regulations.

### **WINDHAM COMMUNITY STANDARDS FOR ENERGY DEVELOPMENT**

#### **Public Health and Safety Standards**

##### **Noise:**

Noise generated by any energy facility, including wind energy systems, or by any other industrial or commercial facility or operation shall not exceed the lesser of (a) 45 dBA Fast Lmax as measured at any property line, or (b) 5 dBA Lmax above the ambient sound level. (See Natural Resources Chapter 4.)

##### **Shadow Flicker:**

Wind energy facilities shall be sited or screened so that shadows cast by rotor blades will not result in shadow flicker on occupied buildings located within the viewshed of the project.

##### **Lighting:**

Energy facilities, including wind and transmission towers, are not to be artificially lighted.

- Substation lighting should be the minimum necessary for site monitoring and security, should be cast downward, and must not result in light trespass or glare on adjoining properties.

**Codes:**

Energy facilities shall comply with all manufacturer specifications, state or industry safety and electric codes, and utility connection requirements. Documentation of code compliance may be required for facilities subject to municipal review

**Height:**

The maximum tower height for energy facilities including net-metered, or similar off-grid wind energy facility shall not exceed the lesser of (a) 120 feet in total height, as measured vertically from the ground to the rotor blade tip at its highest point, or (b) the total height above the existing tree canopy.

**Setbacks:**

- All ground-mounted small-scale wind energy facilities must be setback at least 2 times the total facility height, as measured vertically from the ground to the rotor blade tip at its highest point, from all property lines, occupied buildings on adjoining properties, overhead utility lines, public and private rights-of-way and established trail corridors, unless easements are secured from adjoining property owners.
- Guy wires used to support wind towers are exempt from minimum district setback requirements, except they shall be set back at least 20 feet from all property lines.
- A building-mounted solar panel(s) must meet minimum setback requirements for the building on which it is mounted.
- Facility setback distances from property lines, or from occupied structures in existence at the time of application, shall be increased as necessary to mitigate identified public health and safety hazards or nuisances to adjoining property owners (e.g., noise, vibration, glare, shadowing and shadow flicker, ice throw).

**Ground Clearance:**

The blade tip of any wind turbine shall, at its lowest point, have a ground clearance of no less than 30 feet, as measured vertically from the ground to the tip of the rotor blade at its lowest point.

**Access:**

- Facility access shall be provided from existing access roads where physically feasible, and, where feasible and safe access roads and utility corridors shall be shared, to minimize site disturbance, resource fragmentation, the creation of additional edge habitat, and the introduction and spread of invasive exotic species.
- Public access to generation and transmission facilities, including substations, shall be restricted as necessary to protect public health and safety.

**Burial:**

Utility controls and onsite line connections shall be wireless or buried, except at the point of connection with distribution lines, transmission lines and substations.

**Signs:**

Energy facilities and structures shall not be used for display or advertising purposes. Signs, except for owner and manufacturer identifications and safety warnings, that exceed one square foot are prohibited on all facilities and structures.

**Interference:**

Facility operation shall not reduce or interfere with television, radio, telemetry, or other telecommunications signals, including public safety communications systems.

**Decommissioning and Abandonment:**

Generation facility permits or certificates must include provisions for system abandonment, decommissioning and site restoration.

**Facility Siting Standards**

**Hazard Areas:**

With the exception of transmission and distribution lines, new energy facilities that are not attached to existing or permitted structures shall not be located in:

- Special Flood Hazard Areas (SFHAs), including floodways and floodway fringes identified on Flood Insurance Rate Maps (FIRMs) for the town. Any allowed facility located within these areas must meet minimum National Flood Insurance Program (NFIP) requirements, as reviewed and permitted by the municipality or the state.
- Fluvial erosion hazard areas identified on Windham FEHA maps.
- Slopes, with natural (pre-development) grades of 20% or more.

**Conservation Areas:**

Energy facilities are to be sited to avoid where physically feasible, or to otherwise minimize encroachment and mitigate the adverse impacts of facility development on:

- Surface waters, wetlands, vernal pools and associated setback and buffer areas, as specified for all development under town bylaws.
- Primary agricultural soils as mapped by the USDA Natural Resource Conservation Service for the state.
- Significant wildlife habitat, including core habitat areas, and travel and migratory corridors, as identified from state inventories and data sets, local inventories, and site investigations associated with facility development.
- Onsite mitigation is required through a combination of facility clustering, relocation, buffering and permanent conservation easements. Mitigation to avoid flooding from storm water runoff will be limited to well proven, non-experimental technologies. Off-site mitigation measures should be required where on-site mitigation is not physically feasible.

(All of these topics are more fully developed in Chapter IV Natural Resources)

**Land Conservation Measures:**

**Headwaters, Wetlands, Slopes, Vernal Pools, Agricultural Land and Open Space:**

(See Chapter IV Natural Resources)

Energy facilities, including solar arrays and other generation facilities, transmission and distribution lines, accessory structures and access roads shall be located on non-agricultural land or along field edges to avoid fragmentation of, and to minimize and mitigate adverse impacts to agricultural land and open fields.

- Forestland Energy facilities, including wind towers and other generation facilities, transmission and distribution lines, accessory structures and access roads shall be located along existing tree lines, or on otherwise disturbed forestland, as necessary to avoid the fragmentation of, and to minimize and mitigate adverse impacts to productive timber stands and critical forest habitat.
- Forestland intended for commercial biomass production must be sustainably managed and harvested in a manner that preserves critical forest habitat and long-term forest health.

### **Visual Impacts:**

Applicants shall demonstrate through site planning, facility siting and proposed mitigation that the visual impacts of new and upgraded energy facilities will be minimized as outlined in the standards set forth below:

- All energy facilities and accessory structures are to be designed and constructed of materials, colors, and textures that blend into the surrounding natural or built environment to the extent feasible. Wind towers, turbines and blades shall be of a neutral, non-reflective and unobtrusive color (e.g., white, off-white or gray).
- Facilities are to be sited to outside of, or to the edge of scenic views or viewsheds so that they are not a prominent focal point.
- The facility should not extend above the background horizon line as seen from populated areas.
- The facility should be screened from view through the use of existing topography, structures, vegetation or strategically placed tree, shrub and ground cover plantings that do not block distant views.

### **Designated Scenic Areas:**

The documented historic, rural and scenic character of the following areas in the Town of Windham, its Hamlets and their environs shall be preserved under any form of new energy development. New energy facilities sited within or as viewed from these areas shall not create a significant physical, visual, audible, or historically incongruous or incompatible intrusion into these areas. New facilities, including generation facilities greater than 15 kW, substations and transmission lines, are specifically prohibited within or as viewed from these areas unless significant associated impacts can be avoided, for example through facility siting, screening or line burial.

- Designated historic districts, including the South Windham and Windham Central Historic Districts as described in the application filings for Historic Status.
- Windham has many significant and iconic views within the Town. (Please see Chapter VI Part C for an inclusive list.)
- Views from locally designated scenic roads, as listed under Chapter VI of the plan, or as subsequently designated by the Windham Selectboard.



**Historic Districts, Sites and Structures:**

Energy facilities, including wind systems and solar photovoltaic (PV) or thermal panels, that are located in the town's two designated historic districts, or on properties with federal or state-listed historic structures, are to be sited in accordance with current Secretary of the Interior's Standards for Rehabilitation, and the following:

- The historic character of listed properties and structures shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be prohibited unless they are required for health and safety reasons, as certified by a Vermont professional historic preservation expert and a Vermont health official.
- Ground installations are preferred to roof-mounted installations on historic structures. Ground installations, to the extent functionally-feasible, shall be installed in locations that minimize their visibility, such as a side or rear yard, and be screened from view of public rights-of-way and adjoining properties.
- Roof-mounted systems may be placed on new construction, non-historic buildings and additions.
- Solar panels and other roof- or wall-mounted structures shall not be placed on primary building facades, including street-facing walls or roofs, unless there is no other suitable location on the site or structure.
- Roof- or building-mounted systems on an historic structure shall not physically damage the structure, alter its character-defining features, including existing roof lines or dormers, nor obstruct significant architectural features such as overlaying windows or architectural detailing. Attachment points must be minimized and allow for future system removal.
- Roof-mounted Installations are to be placed below and behind parapet walls and dormers, on rear-facing roofs, where feasible. Panels should be mounted flush with and at the same angle as the existing roof surface and, on flat roofs, set back from the roof edge to minimize visibility. They should not be visible above the roofline of the primary facade. Panels and mounting systems must be compatible in color to established roofing materials to minimize their visibility.

**WINDHAM CONDITIONS FOR ENERGY DEVELOPMENT**

If allowed to proceed through a Section 248 application for any utility scale energy generation project, the developer, operator, landowner and their heirs and assigns shall provide a contingency plan to the Town that outlines mitigation action, in the event of unforeseen and unacceptable negative impacts from the project to the town, region and the residents. Such a plan shall be based on before and after assessments of impacts, including, but not limited to, the following issues:

- Resident Health and Safety including but not limited to air and water quality and noise that any commercial/industrial wind development project may have on Windham residents and/or property
- Air and water quality and noise impacts, pursuant to standards set forth under Chapter IV Air and Noise quality.
- Height restrictions set forth in Chapter IV.

- Fair and adequate financial compensation to Windham residents and/or property owners whose health and welfare are negatively affected by any commercial wind development project, e.g., sound-related or other health-related problems.
  - Cultural, historic, and aesthetic impacts
  - Impact assessment on the effect wind turbines would have on Windham's Historic Hamlets if they were visible to these Historic Hamlets.
  - Property rights and values impacts
- 
- Fair and adequate compensation to landowners and homeowners whose property values are negatively affected (decreased) by any Commercial/Industrial wind development project
  - Fair and adequate compensation to anyone in Windham or surrounding towns who depends on Windham's headwaters for their drinking water if they should become imperiled as a result of construction related to energy generation siting of any kind.
  - Hazardous materials contingency plan(s)
  - Supplemental fire and rescue resources in the event of catastrophe
  - A wildlife habitat assessment, including assessment of impact to migratory, resident and breeding avian and bat populations, and mitigation plans, if necessary.
  - A rare, threatened or endangered species assessment, and mitigation plans, if necessary.
    - Shadow flicker analysis (see Community Standards pages 62-67)
  - An impact assessment for wetlands, seeps, springs, streams, ponds, and vernal pools, and mitigation plans, as appropriate under local, state and federal rules and laws.
  - A visual impact assessment, including pre- and post-construction photo simulations of the project as seen under leaf-off conditions during the day and at night.
  - Alternative sites analysis of tower locations within the site considering all criteria in Chapter IV.
  - Adequate financial surety, either in cash or letter of credit, to repair damage to town and private roads and to stabilize the entire construction site during and after construction of the project, shall be provided. The financial surety must be provided to the municipality in the event that the municipality needs to conduct work to secure or remediate the stability of the soil and vegetation on the site, including any town and access roads, during or after construction. The Selectboard with the advice of the road foreman and planning commission will oversee this assessment.
  - Sufficient decommissioning funds, kept in an escrow account associated with the property that is separate from the developer's general accounts shall be provided, so that the site will be restored to natural conditions when the project ceases to operate for whatever reason.
  - Financial assistance to the town to pay for the hiring of qualified engineering, environmental, and legal consultants to assist the Town in reviewing state-level applications and permits, establishing local revenue agreements, and participating in permitting processes, and any other scientific experts and/or specialists, as needed.
    - Any other matter (s) that becomes apparent due to the location of such facilities.