

## Chapter 6 Energy

### 1 Purpose

It is the overall intent of this chapter to encourage the efficient use of energy and the development of renewable energy resources in accordance with 24 V.S.A. §4302(c)(7). It is also the intent of this energy chapter to address the requirements of Act 174 of 2016 and to meet the enhanced energy planning standards developed by the Vermont Department of Public Service (DPS). This was prepared based upon the *Guidance for Municipal Enhanced Energy Planning Standards* (DPS; March 2, 2017) in order for the Chester Town Plan to be given greater weight in the Section 248 process. This chapter describes existing conditions in Chester and conveys community policies on energy conservation, renewable energy production, and how land uses can contribute toward energy conservation.

The Southern Windsor County Regional Planning Commission (SWCRPC) has developed a 2018 *Regional Energy Plan* to meet these standards in order to receive Section 248 “substantial deference”. Chester is coordinating the development of this municipal energy plan with the SWCRPC so that:

1. The municipal plan is informed by the ongoing regional energy planning process; and,
2. The municipal plan is compatible with the regional plan.

This energy chapter was developed with assistance from the SWCRPC through funding provided by the Vermont Department of Public Service.

#### 1.1 Community Energy Survey

A survey was conducted in January 2018 to get input from residents to assist in this enhanced energy planning process.

Key findings from this survey are summarized below.

1. The vast majority of respondents indicate that energy issues are very important (57%) or important (29%) to them. A majority (about three-quarters of the respondents) support the goal of 90% of energy coming from renewable sources by 2050.
2. There is very strong support for roof-mounted solar arrays.
3. Strong support was expressed for non-residential solar power.
4. Support was expressed for non-residential wind power; however, 23% are not in favor and another 21% are neutral.

For more detail about the survey see Appendix \_.

#### 1.2 Energy Goals

Through the 2016 Vermont Comprehensive Energy Plan (CEP) and Statute, the State of Vermont has identified a number of goals and strategies to achieve energy conservation throughout the state. The

**Due Consideration:** To give such weight or significance to a particular factor as under the circumstances it seems to merit, and this involves discretion. [*Black’s Law Dictionary, 6th ed. 1990*]

**Substantial Deference:** Means that a land conservation measure or specific policy shall be applied in accordance with its terms unless there is a clear and convincing demonstration that other factors affecting the general good of the State outweigh the application of the measure or policy. [*30 V.S.A. §248*]

Town of Chester embraces the State Energy Goals<sup>1</sup> including but not limited to the following. Through the detailed policies and actions contained in this plan, Chester will strive to achieve these goals.



Reduce total energy consumption per capita by

**15% by 2025**

**More than one third by 2050**



Reduce greenhouse gas (GHG) emissions from 1990 levels

**40% reduction by 2030**

**80% to 95% reduction by 2050**



Meet remaining energy need from renewable sources

**25% by 2025**

**40% by 2035**

**90% by 2050**

## 2 Analysis of Energy Use

### 2.1 Power Generation and Transmission Facilities

Green Mountain Power (GMP) is the electric utility provider in Chester and surrounding towns. There are no utility-scale power generation facilities located in Chester. There are 38 known renewable energy generation sites in town presently. Two commercial-scale ground-mounted solar facilities were constructed in Chester within the last few years, both in close proximity to the Chester Substation.

---

<sup>1</sup> Energy goals as referenced in 24 V.S.A. §4302(7), 10 V.S.A. §578(a), 10 V.S.A. §580, 10 V.S.A. §581, and in the Vermont Comprehensive Energy Plan

There is one known residential-scale wind turbine located in Chester at this time, which does not appear to be net-metered. See Appendix A for more detail about existing energy generation.

Electric transmission is provided by the Vermont Electric Power Company (VELCO). Transmission facilities located in Chester include the following, which are shown on the maps in Appendix \_:

- Chester Substation, located along VT Route 103 south of the intersection with Trebo Road;
- A 46 KV line that parallels Trebo Road;
- A 46 KV line that cuts through the northeast corner of Chester; and,
- A 345KV line along the western town boundary with Andover.

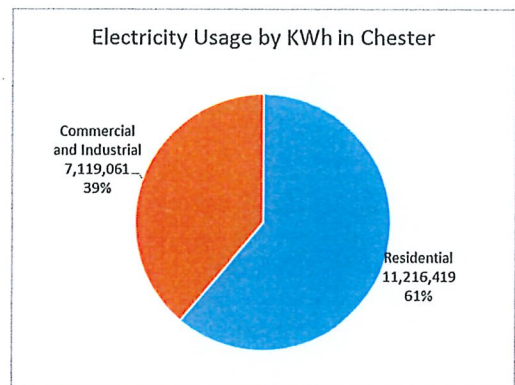
## 2.2 Energy Usage

As discussed in the *2016 Vermont Comprehensive Energy Plan (CEP)*, “fossil fuels currently play a dominant role in meeting Vermonters’ demand for energy services, with gasoline and distillates (namely diesel and heating oil) alone supplying around half of all of Vermont’s primary energy consumption”. The CEP states that less than 20% of the statewide consumption of primary energy is from renewable energy sources. More than two thirds of that renewable energy comes from the electric power supply, which includes power generated by hydro, biomass, wind, solar and other facilities. The remaining renewable energy consumption in Vermont is largely comprised of wood for home heating and ethanol blended into gasolines<sup>2</sup>.

## 2.3 Electricity

In 2015, residences accounted for 61% of the current total annual electricity usage, and commercial and industrial uses accounted for 39% of the total 18,335,480 kWh used in Chester. The figure opposite summarizes electricity use data provided by Efficiency Vermont. Average residential usage is 6,689 kWh (2015).

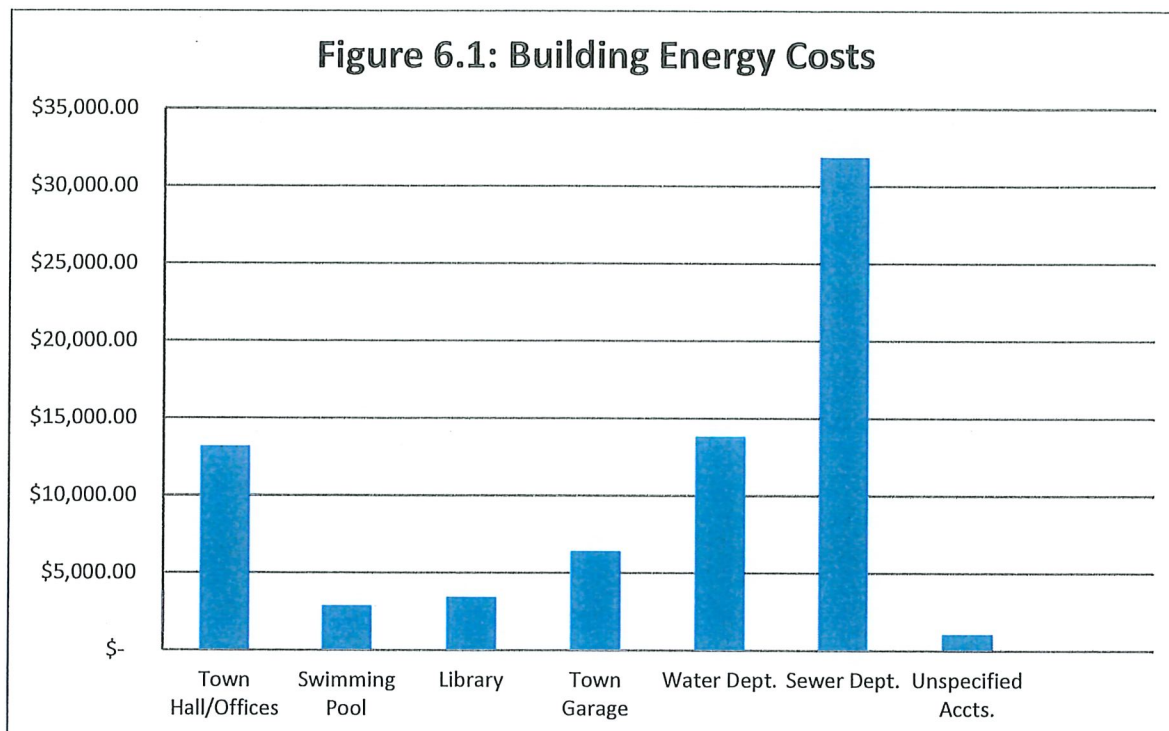
According to Department of Labor Statistics, there were 129 commercial establishments in Chester during 2015.



Total electricity consumption have essentially leveled off in recent years. (There was a slight increase in total electricity usage in Chester between 2014 and 2016.) See Appendix A for more detail.

An older energy analysis found that the Town of Chester spent \$192,795 on fuel (2010), of which 38% was for municipal buildings and 62% for the municipal vehicle fleet. When comparing costs for municipal facilities, the Sewer Department had the highest fuel costs, followed by the Water Department, and then the Town Hall (see figure on page 4). An energy audit was performed for the Town Hall and a number of recommendations have been implemented to date, including air sealing and basement insulation. The Town is exploring opportunities to make additional energy efficiency improvements to the Town Hall. Audits of other municipal facilities would be helpful to identify cost-effective energy upgrades for other municipal facilities.

<sup>2</sup> Vermont Comprehensive Energy Plan (Department of Public Service, 2016)



## 2.4 Heating

Of the 1,793 total household units in Chester, 18% are seasonal and 20% are renter-occupied. See Figure \_\_ which summarizes total housing units in Chester by type from the 2010 Census Bureau.

Fossil fuels are currently the primary fuel type used for heating structures in Vermont<sup>3</sup>. According to American Community Survey (ACS) data (2011-2015), the predominant ways to heat homes in Chester include fuel oil (62%), wood (25%) and propane/LP gas (13%). In 2015, the estimated average annual cost to heat a home was \$1,452 and about \$6,248 to heat a business. See Appendix A for more detail about heating existing buildings.

Wood is the only form of these heating fuels that is renewable and locally produced. Sustainable forestry operations are important not only to supply fuel wood for residents, but also to maintain an active working landscape in rural Chester and support a local forestry economy.

## 2.5 Transportation

As a rural area, transportation options for Chester residents is dominated by the personal automobile (see the Transportation Chapter for more information about other modes of travel). The negative environmental impacts of single-occupant vehicle driving is well documented. Costs associated with using an automobile for most of your travel needs can be significant (see the Housing Chapter for more information on household transportation costs). About 88% of the local work force travel to jobs located in another town. Common work destinations are Chester, Springfield, Ludlow, Bellows Falls, and Rutland. Approximately 71% of employed Chester residents drive alone to work. The average commute time is 21 minutes.

<sup>3</sup> Vermont Comprehensive Energy Plan (Department of Public Service, 2016)

According to ACS data, there were about 1.9 vehicles per occupied household in 2015. The average vehicle miles traveled in a year is estimated at nearly 13,200, which accounts for approximately 1.9 million gallons of total fuel used and an estimated total fuel cost of more than \$4.4 million.

Fuel costs are volatile. Gasoline costs of around \$4 a gallon in 2008 and \$3.70 in 2014 were challenging for many household budgets. During June 2018, average motor vehicle fuel costs in Vermont are about \$2.96.

Chester's *Village Center Master Plan* includes recommendations to improve the walking and bicycling facilities in the villages, some of which the Town is actively implementing.

### 3 Energy Targets

The standards that the Department of Public Service has established for energy targets must be met if this Plan is to receive substantial deference in Section 248 energy siting proceedings. Chester is utilizing targets (or scenarios) developed using the Long-Range Energy Alternatives Planning (LEAP) Model and provided to Chester by the SWCRPC. The background for the targets are described in more detail in the *2018 Southern Windsor County Regional Energy Plan*. The purpose of the targets, when combined with the analysis presented in the previous section, are intended to provide an overview of existing energy use and projections for the pace of change that is needed over the next three-plus decades. **The targets simply demonstrate that, in order to meet 90% of Vermont's energy need from renewable sources by 2050, a significant amount of change will be needed in the forms of energy conservation, behavior modification, and development of new local renewable energy generation.**

Energy targets for Chester are presented in Appendix \_.

### 4 Implementation Actions (Pathways)

In order to meet our stated energy goals and targets, the Town of Chester identifies the following implementation actions, also referred to as "Pathways". These implementation action categories are intended to be consistent with those used in the *Guidance for Municipal Enhanced Energy Planning Standards* (DPS; March 2, 2017).

#### 4.1 Conservation and Efficient Use of Energy

- a) The Town of Chester encourages the conservation and efficient use of energy.

Efforts to improve energy efficiency and conservation are Chester's initial focus. Chester has identified the following implementation actions to achieve this policy.

In order to assist in implementing these actions, the Town will consider establishing an Energy Committee under 24 V.S.A. §§4433, 4464. The Town will also consider including priority municipal energy efficiency projects into the Capital Budget and Program. The Town may also consider establishing a fund to support appropriate municipal energy projects (e.g. capital projects, outreach efforts, incentives).

##### 4.1.1 Encourage Conservation by Individuals and Organizations

Chester cannot control the use of energy by individuals and organizations. However, the Town can lead by example, serve as a resource, and encourage individuals and organizations to conserve and use energy efficiently. To do so, Chester identifies and promotes the following resources to provide guidance to individuals and organizations:

- a) Inform residents about energy efficiency programs through [Efficiency Vermont](#) and the Weatherization Assistance Program for low-income households through Southeastern Vermont Community Action ([SEVCA](#)) and encourage residents to participate.
- b) Work with partner organizations and Efficiency Vermont to offer workshops and educational opportunities to businesses on efficiency in new construction, retrofits, and conservation practices.
- c) Publicize local energy conservation projects to encourage future private and public activities.
- d) Utilize various methods to disseminate educational information, such as through Springfield Area Public Access (SAPA) TV, brochures, website materials, public events and digital media.
- e) Conduct outreach to service clubs.
- f) Identify large energy usage customers (including large businesses, manufacturing facilities, and schools) as a target audience and encourage participation in commercial and industrial efficiency programs through Efficiency Vermont.
- g) Encourage local business start-ups to conduct energy audits.

#### 4.1.2 Promote Efficient Buildings

Heating buildings accounts for about 30% of all energy consumed in Vermont. Creating more efficient buildings can be achieved through weatherization and high-performance construction methods. Chester identifies the following to encourage efficient buildings:

- a) Promote the use of Vermont's residential building energy label/score.
- b) Promote the use of the [Residential Building Energy Standards](#) and [Commercial Building Energy Standards](#). To do so, the Zoning Office will distribute State energy code information to all applicants seeking a zoning permit for a structure that is heated or cooled. (Please note that the Town does not currently issue Certificates of Occupancy.)
- c) Promote benchmarking (using the free [EPA Portfolio Manager tool](#) and/or with assistance from Efficiency Vermont) for commercial buildings.
- d) Require that all residential Act 250 projects follow the residential stretch energy code.
- e) Require that all commercial Act 250 projects follow commercial stretch energy guidelines.
- f) Encourage new buildings to incorporate net-zero ready construction methods.
- g) Consider providing incentives (e.g. density bonuses) to developments that exceed the state's stretch energy code, or net-zero ready or net-zero demonstrated requirements, and that are located in an area identified as appropriate for growth.
- h) Promote building placement and location with [passive solar](#) and active solar in mind, and promote the use of [landscaping for energy efficiency](#).

**Net-Zero:** A construction method for buildings that generate as much energy as they consume. Also known as a zero-energy building.

**Net-Zero Ready:** A building constructed in a manner that, with subsequent on-site renewables installed, it can make as much energy as it uses.

**Stretch Code:** A building energy code that achieves greater energy savings than the base Residential Building Energy Standards (RBES). The Stretch Code is required for Act 250 projects and may be adopted by municipalities.

#### *4.1.3 Promote Decreased Use of Fossil Fuels for Heating*

Heating buildings accounts for about 30% of all energy consumed in Vermont and is the second largest contributor to greenhouse gas emissions. Home heating is heavily reliant on fossil fuels at this time. Solutions to address this situation involve high-efficiency heating system upgrades and fuel switching. Chester identifies the following to encourage using less fossil fuels to heat buildings:

- a) Promote the use of cold climate heat pumps with education/presentations in coordination with the Efficiency Vermont/electric utilities.
- b) Support the use of ground-source heat pump heating and cooling systems for new construction.
- c) Identify municipal buildings that would be good candidates for cold climate heat pumps, and develop a plan and schedule to add the heat pumps to those buildings.
- d) Encourage, promote, and incentivize advanced wood heating in certain situations by:
  - 1) Supporting the conversion of existing fossil fuel heating systems to wood;
  - 2) Encouraging local manufacturing of advanced wood heat technology with low-particulate emissions;
  - 3) Supporting development of wood fuel delivery infrastructure;
  - 4) Supporting development of sustainable forestry and procurement services;
  - 5) Expanding wood fuel processing facilities, encouraging bulk wood pellet delivery systems; and,
  - 6) Providing training and education on the benefits of heating with efficient, clean wood energy systems that have low-particulate emissions.
- e) Promote wood stove change-out programs that take older non-EPA certified stoves out of service and replace them with more efficient and lower emitting cord or pellet stoves.
- f) Identify municipal buildings that would be good candidates for wood pellet or chip heating and develop a plan and schedule to convert those buildings to wood heat.
- g) Explore opportunities for anaerobic digesters as appropriate.

#### *4.1.4 Demonstrate the Municipality's Leadership by Example with Respect to the Efficiency of Municipal Buildings*

Chester wishes to lead by example and demonstrate to individuals and organizations the benefits of building efficiency through the following efforts:

- a) Seek support and guidance from Efficiency Vermont for efforts to improve the efficiency of municipal buildings.
- b) Develop an inventory and conduct energy audits on municipal facilities, and develop a strategic plan to make energy efficiency and conservation upgrades.
- c) Assess the life cycle costs of potential energy improvements during design and construction planning. For example, investment in a new, efficient heating system may be more expensive up front, but more economical to operate over time.
- d) Incorporate weatherization/energy efficiency projects into the municipal Capital Budget and Program.
- e) Implement [low-impact development](#), [green stormwater infrastructure](#) practices, and/or strategic landscaping to shade buildings and reduce temperatures, thereby increasing overall efficiency.
- f) Develop policies so that if investing in new municipal buildings, municipalities strongly consider locations that will give people the option to get to those buildings without driving – for

example, by putting a new town hall near the post office or school or other village location instead of distant from the town center.

- g) Replace older municipal fossil-fired heating systems with high-efficiency, cold-climate heat pumps, geothermal heat, or advanced wood heating systems with low-particulate emissions (including wood-fired district heat), or considering switching over to biofuels.

#### 4.2 Transportation

- a) The Town of Chester encourages the reduction of transportation energy demand and single-occupant vehicle use.
- b) The Town of Chester promotes the use of renewable or lower-emission energy sources for transportation (e.g. electric vehicles or hybrid vehicles).

Chester has identified the following implementation actions to help achieve these policies.

##### *4.2.1 Encourage Increased Use of Public Transit*

There is a public transit operator that has routes that serve Chester (i.e. Southeast Vermont Transit, a.k.a. "The Current"). Maximizing public transit ridership is a priority. Chester will implement the following actions to encourage public transit:

- a) Improve awareness of existing public transit services to residents and visitors.
- b) Plan and advocate for access to public transit, especially for Act 250 proceedings for larger developments.

##### *4.2.2 Promote a Shift Away from Single-Occupancy Vehicle Trips*

Public transit can meet the needs of some mobility needs, but additional efforts will be needed in order to reach the energy goals for reducing transportation energy use. Chester will work to encourage the following actions to encourage a reduction in single-occupant vehicle trips:

- a) Encourage people to re-think their trip before leaving home.
- b) Given the very fast internet speeds in Chester at this time, telecommuting is enabled. Evaluate if these internet speeds are available in all parts of town. Explore opportunities for shared work space that better enable residents to telecommute.
- c) Promote the Go Vermont webpage, which provides rideshare, vanpool, public transit and park-and-ride options.
- d) Support employer programs to encourage telecommuting, carpooling, vanpooling, walking and bicycling for employees' commute trips. Encourage employers to offer such programs and provide information on tax benefits that may be available for doing so.

##### *4.2.3 Promote a Shift Away from Gas/Diesel Vehicles to Electric or Other Non-Fossil Fuel Transportation Options*

To meet State energy goals, municipalities will need to contribute toward efforts to reduce the number of vehicle-miles traveled, and switch to renewable, non-fossil fuel transportation options. Chester has identified the following pathways to shift toward electric vehicles and other non-fossil fuel travel:

- a) Promote general awareness of the benefits of, and access to, electric vehicles and alternative-fuel vehicles.
- b) Promote and seek grants to fund the installation of DC fast-charging infrastructure at strategic locations along major travel corridors and in transit hubs such as park-and-ride locations.



- c) Plan, advocate for, and consider requiring the installation of Electric Vehicle charging infrastructure as part of new development or redevelopment, especially for developments subject to Act 250.
- d) Encourage the establishment of a local biofuel supplier.
- e) Support the development of additional refueling stations for alternative fuels for both private and public transportation fleets by sharing station development costs between public and private interests.

#### *4.2.4 Facilitate the Development of Walking and Biking Infrastructure*

Active transportation, such as walking and bicycling, offers significant health benefits and requires no outside energy resources. Chester encourages completing short trips by walking or bicycling instead of driving, by planning for safe and convenient infrastructure that support “Complete Streets Principles”. In order to do this, Chester has identified the following pathways:

- a) Update municipal road standards (for maintenance and new construction) to reflect [complete streets principles](#).
- b) Seek to implement bike and pedestrian improvement recommendations identified in the [Village Center Master Plan](#).
- c) Create a committee to create more opportunities to walk and bicycle around town.

#### *4.2.5 Demonstrate the Municipality’s Leadership by Example with Respect to the Efficiency of Municipal Transportation*

In order to meet the State energy goals, municipalities should lead by example and demonstrate to individuals and organizations the benefits of energy efficiency in transportation. Chester wishes to do so through the following ways:

- a) Establish policies that allow employees to telecommute.
- b) Install electric vehicle charging infrastructure on municipal properties.
- c) Purchasing plug-in hybrid or plug-in all-electric municipal and fleet vehicles when possible, and choosing the most fuel-efficient models if EVs are not practicable.
- d) Establishing minimum fuel efficiency standards for the purchase of new vehicles.
- e) Consider incentives for employees who commute using methods alternative to single occupancy vehicles, e.g. walking, biking, public-transit, and carpooling.
- f) When purchasing diesel fuel, the Town should use the highest biodiesel blend available without compromising the manufacturer’s engine warranty. All manufacturers fully warranty their engines with the use of B5, a blend of 5% biodiesel and 95% diesel.

#### *4.3 Land Use Patterns and Densities*

- a) The Town of Chester encourages maintaining the historic settlement pattern of compact downtowns and village centers surrounded by rural countryside in accordance with [24 V.S.A. §4302](#) and as described in the Chester Town Plan.
- b) The Town of Chester recognizes that compact development has a number of benefits, including furthering both State planning goals and State energy goals.
- c) The Future Land Use Map and corresponding descriptions in the Land Use Chapter of the Chester Town Plan encourages the types of land use patterns and densities that are likely to result in the conservation of energy.
- d) Zoning bylaws adopted by the Town generally enable the above land use patterns and densities.

- e) Chester's Village Center has been designated by the State Downtown Board under [24 V.S.A. Chapter 76A](#).

According to their Guidance, the DPS anticipates that if municipalities are actively participating in the above statutory frameworks for community planning, they will likely meet Pathways Standard 8.

*Chester's Town Plan* and various implementation methods, both regulatory and non-regulatory, combine to demonstrate a commitment to the above statutory planning framework. This plan documents what the municipality is doing in this area as it relates to encouraging the conservation of energy through land use development patterns and densities.

#### *4.3.1 The Plan Includes Land Use Policies (and Descriptions of Current and Future Land Use Categories) that Demonstrate a Commitment to Reducing Sprawl and Minimizing Low-Density Development*

According to the enhanced energy planning guidance, the reduction of sprawl and low-density development not only reduces energy consumption, but also can improve the local and regional economy.

- a) The Future Land Use Map and corresponding descriptions in the Land Use Chapter of the Town Plan generally calls for growth to occur in the Village areas and in discrete nodes of activity, including Gassetts and the special mixed use area (i.e. by the Armory Building). (See the Future Land Use Map and the corresponding language in the Land Use Chapter.)
- b) Chester's Future Land Use Map and Town Plan language also calls for maintaining the rural countryside in the areas surrounding the growth areas described in "a" above. (See the Future Land Use Map and the corresponding language in the Land Use Chapter.)
- c) Statements for access management and other provisions intended to control strip development along major roadways are included in both the Land Use Chapter and Transportation Chapter.

#### *4.3.2 Strongly Prioritize Development in Compact Mixed-Use Centers*

As indicated in the enhanced energy planning guidance, households within a compact, mixed-use center typically use less energy than those located in outlying areas. The energy savings are realized through reduced vehicle-miles-traveled and generally smaller homes, which require less energy to heat and cool. Transportation energy use can be further reduced by locating services such as shopping or daycare within walking or biking distances to the places where people work and live. This enables people to either choose an alternative to driving a single-occupancy vehicle or to significantly reduce the length of their drive. Chester chooses to encourage this by:

- a) Maintaining Village Center Designation, and improving the awareness of property owners about the tax credit opportunities to help pay for improvements to eligible buildings within Chester's Village Center.
- b) Coordinating with Southeast Vermont Transit (The Current) and the Go Vermont program to discuss options to promote car-sharing and public transit services.
- c) Continuing to actively work on making sidewalk improvements based on the recent Village Center Master Plan.

#### *4.4 Statement of Policy on the Development and Siting of Renewable Energy Resources*

The heating, transportation and conservation targets and pathways combined are not sufficient to meet the 90% by 2050 energy planning goal. The Long Range Energy Alternatives Planning (LEAP) model also

assumes the purchase of additional out-of-state renewable energy will help to reach this goal; however, that is also not sufficient to meet the energy goals. New local renewable energy generation is also needed in order to achieve the ambitious “90 by 50” energy goal. The following sections discuss how the municipality wishes renewable energy generation to take place in Chester.

**4.4.1 Evaluate Existing Renewable Energy Generation**

According to existing data, there are 38 known renewable energy generation facilities in Chester as of November 2017<sup>4</sup>, as summarized in Table 7. Existing facilities nearly amount to 2.17 MW of installed capacity. In order to more easily compare existing facilities with the targets for new renewable energy needs, generation output was estimated in MWh based upon the conversion factors found in the Guidance for regional enhanced energy plans.

Table 7: Existing Renewable Generation in Chester<sup>4</sup>

Type	Number of Sites	Installed Capacity (MW)	Est. Output (MWh)
Solar	38	2.17	2,667
Wind	0	0	0
Hydro	0	0	0

**4.4.2 Analyze Generation Potential from Preferred Sites and/or Potentially Suitable Areas**

An analysis of renewable energy generation potential was conducted for Chester by the SWCRPC. This consisted primarily of an analysis of existing and available GIS mapping data based upon the guidelines established by the DPS for enhanced energy planning. Table 8 below summarizes the findings of this analysis.

Table 8: Potential Renewable Energy Generation<sup>5</sup>

Type	Capacity (MW)	Generation Output (MWh)
Roof-top Solar	3.1	3,802
Ground-mounted solar	517.2	634,306
Wind	854.6	2,620,326
Hydro	0.016	56
<b>Total</b>	<b>1,375</b>	<b>3,258,490</b>

Based upon this analysis, there is significant potential to generate power from renewable sources in Chester, primarily through ground-mounted solar and wind. There is limited potential to generate hydropower from the three existing dam sites that do not generate power at this time. The potential for rooftop solar projects is limited. Without ground-mounted solar and/or some forms of wind, there is not adequate generation potential from hydro and rooftop solar to meet the “90 by 50 goal” alone.

**4.4.3 Identify Sufficient Land for Renewable Energy Development to Reasonably Reach the 2050 Targets**

Table 9 summarizes Chester’s targets for renewable energy generation<sup>6</sup>. There is more than adequate land area in Chester that has solar potential to meet our 2050 renewable energy target of 24,015 MWh, which is the equivalent of approximately 19.58 MW of ground-mounted solar at the installed capacity.

<sup>4</sup> Vermont Energy Dashboard (February 2017)

<sup>5</sup> Derived from GIS mapping analysis (SWCRPC, 2017)

<sup>6</sup> SWCRPC, derived from Regional Shares of In-State Generation Target (DPS, 2017)

The guidance assumes 8 acres of land is generally needed to support 1 MW of solar. This would amount to about 157 acres of land to meet this target. This represents about 4.3% of the total land area in Chester that is estimated to have potential to generate solar power.

Renewable Energy Generation	2025	2035	2050
Chester Targets (in MWh)	6,004	12,008	24,015

*4.4.4 Ensure that Local Constraints do not Prohibit or Have the Effect of Prohibiting the Provision of Sufficient Renewable Energy to Meet State, Regional or Local Targets*

These constraints have been analyzed, and the Town does not believe that these constraints prohibit or have the effect of prohibiting sufficient renewable projects needed to meet the state, regional or local energy goals.

The following resources are not appropriate locations for renewable energy projects and are hereby excluded from the potential wind and solar sites as depicted on the map. The following are consistent with the “known constraints” as described in the DPS mapping guidance.

- a) Vernal pools with a surrounding 50 foot buffer;
- b) Department of Environmental Conservation (DEC) river corridors;
- c) Federal Emergency Management Agency (FEMA) floodways;
- d) State significant natural communities and rare, threatened and endangered species;
- e) National wilderness areas; and,
- f) Class 1 and Class 2 wetlands.

The following represent constraints that will likely require mitigation and which may prove a site unsuitable after a site-specific study has been conducted based upon state, regional or local policies that are adopted and currently in effect. Points a) through g) below are consistent with the “possible constraints” as described in the DPS mapping guidance.

- a) Agricultural soils (NRCS-mapped prime agricultural soils, soils of statewide importance or soils of local importance);
- b) Act 250 agricultural soil mitigation areas;
- c) FEMA special flood hazard areas (floodplain);
- d) Protected lands (state fee lands and private conservation lands);
- e) Deer wintering areas;
- f) ANR conservation design highest priority forest blocks; and,
- g) Hydric soils.

#### 4.4.5 Statements of Policy to Accompany Maps

Chester hereby promotes the development of renewable energy generation in order to achieve the energy goals and targets as established in this plan. The following statements of policy apply to renewable energy projects:

- a) All new development should be sited to accommodate solar.
- b) Chester encourages rooftop solar projects.
- c) Chester encourages residential-scale wind turbines.
- d) Renewable energy projects, including ground-mounted solar projects of 15 KW and bigger, must not be located in the following areas:
  1. Vernal pools with a surrounding 50 foot buffer;
  2. Commercial scale projects in the river corridors as most recently mapped by the Vermont Department of Environmental Conservation (DEC);
  3. FEMA floodways;
  4. State significant natural communities and rare, threatened and endangered species;
  5. National wilderness areas;
  6. Class 1 and Class 2 wetlands; and,
  7. Within 50 feet of all streams and Class 1 and 2 wetlands.
- e) All ground-mounted solar projects must meet or exceed the setback standards in 30 V.S.A. §248(s).
- f) Any new biomass facility and all ground-mounted solar projects of 150 kW or greater that are within view of public roadways (i.e. state highways, US routes, and Class 1, 2 and 3 town highways) must provide plantings that blends the project with its surroundings. This shall consist of naturalistic plantings using a mix of native plants and avoid introducing [invasive species](#).
- g) The applicant must replace any dead or diseased vegetation serving as part of the landscape mitigation measures throughout the life of the project or until the project ceases commercial operation.
- h) In accordance with PUC Rule 5.900, the applicant is required to provide a plan for the site to be adequately decommissioned at the time when the project ceases commercial operation. This should involve the removal of all parts of the project from the site including, but not limited to, the solar panels or wind turbine, inverters, metal framework that supports the solar panels, fencing, control invasive species, and any necessary site recovery as stipulated in the permit.

#### Undue Adverse Effect (Impact)

An adverse impact that meets any one of the following criteria:

- (1) Violates a clear, written community standard intended to preserve the aesthetics or scenic, natural beauty of the area;
- (2) Offends the sensibilities of the average person (i.e. it is offensive or shocking because it is out of character with its surroundings or significantly diminishes the scenic qualities of the area); or,
- (3) Fails to take generally available mitigating steps that a reasonable person would take to improve the harmony of the proposed project with its surroundings.

This definition is based upon Vermont case law. The term undue adverse effect is used in accordance with 30 V.S.A. §248.

#### Wind Turbine Categories

*Residential-scale* – wind turbines that are up to 30 meters (or 98 feet) tall, measured at the hub, or the center of the wind turbine blades.

*Community-scale* (sometimes referred to as commercial-scale) – wind turbines that are up to 50 meters (or 164 feet) tall, measured at the hub.

*Utility-scale* – wind turbines that are usually 70 meters (or 230 feet) tall or greater, measured at the hub.

Plants for site reclamation and restoration after decommissioning an energy generation site should be chosen with plant communities in mind, and considering the original composition of the community before disturbance. Consideration of soils, hydrology, solar access and physiographic region should guide plant selection. Plants should include canopy, mid-story, and woody and herbaceous understory layers. All plants should be native to Vermont. Publications to refer to include:

Mixed Hardwood Forests:

[http://dec.vermont.gov/sites/dec/files/wsm/lakes/Lakewise/docs/lp\\_naturalcomm.pdf](http://dec.vermont.gov/sites/dec/files/wsm/lakes/Lakewise/docs/lp_naturalcomm.pdf)

Lacustrine, Riparian and Wetland Areas:

[http://dec.vermont.gov/sites/dec/files/wsm/lakes/Lakewise/docs/pl\\_native-veg.buffer-manual.1994.pdf](http://dec.vermont.gov/sites/dec/files/wsm/lakes/Lakewise/docs/pl_native-veg.buffer-manual.1994.pdf)

General Information for determining Plant Community to restore:

<https://www.uvm.edu/rsenr/sal/vbp/VBP.pdf>

<http://vtfishandwildlife.com/node/200>

<http://vtfishandwildlife.com/learn-more/landowner-resources/liep-invasive-species-program/terrestrial-invasive-plant-resources/native-plant-sources>

- i) Proposed renewable energy facilities must not have undue adverse impacts on significant wetlands, significant wildlife habitat, wildlife travel corridors/habitat connectivity, stormwater, water quality, flood resiliency, important recreational facilities or uses, scenic resources identified in this plan, or inventoried historic or cultural resources.
- j) Proposed renewable energy facilities must not result in forest fragmentation or perpetuate invasive species.
- k) For all utility-scale wind (i.e. hub height of 70 meters/230 feet) and commercial-scale wind projects (i.e. hub height of 50 meters/164 feet hub height), the applicant must demonstrate that the proposal was evaluated and that reasonable mitigation was considered with respect to the following criteria:
  - 1. Operational noise, to be measured at the property line, will result in noise levels consistent with state standards.
  - 2. Avoid or minimize “shadow flicker” through careful project siting, planting trees or other methods.
  - 3. Avoid or minimize adverse impacts to significant wildlife habitat and wildlife travel corridors, including applicable terrestrial, aquatic and aerial species (e.g.

**Shadow Flicker**

A flickering effect caused when rotating wind turbine blades periodically cast shadows, such as through the windows of adjacent homes. Shadow flicker is considered by some individuals as a nuisance and may cause headaches. No more than 30 hours per year is commonly used as a limit to reduce nuisance complaints.

migratory, resident and breeding bird and bat populations).

4. Avoid or mitigate safety hazards in the vicinity of the project area (i.e. ice shedding or ice throw hazards, blade throw hazard, and tower fall zones).

#### *4.4.6 Maximize the Potential for Renewable Generation on Preferred Locations*

Preferred locations include specific areas or parcels that are specifically identified to indicate preferred locations for siting a generator or a specific size of type of generator. Identifying preferred sites informs the community where renewable generation is desired. The identification of such sites can help to streamline the permitting process.

Preferred sites for Chester include:

- a) Rooftops;
- b) Parking lots;
- c) Brownfield sites; and,
- d) Disturbed portions of extraction sites (i.e. gravel pit, quarry).

#### *4.4.7 Demonstrate the Municipality's Leadership by Example*

Chester will lead by example by working with partner organizations to identify opportunities for local renewable energy generation that benefits the community and furthers the goals and policies of this plan.