

Chapter 10 - Economic Development

The purpose of this Chapter is to describe the current local economic conditions, articulate the desired future economic conditions, and identify municipal efforts that will foster the desired economic growth in Chester. This section is informed by comments received at the public economic development forum held on February 1, 2016.

Present Economic Conditions

Chester is a quintessential Vermont town, with a charming village center that is surrounded by a picturesque rural landscape. Current economic activity is generally concentrated within a few parts of town, including:

1. Traditional commercial center of the village comprised of three sub-sections:
 - a) The Green features a very dense cluster of traditional, multi-story buildings that surround the common located on Main Street (VT Route 11). This is the traditional heart of the community's economic activity. There are a variety of restaurants, stores and inns in this area.
 - b) The Depot area located along Depot Street (VT Route 103) and surrounding the train station exhibits a moderately dense mix of housing, commercial operations, and civic buildings. Economic activity currently involves uses such as antique stores, hair dresser, hardware store, feed store, Lisa's Market, and home-based businesses.
 - c) Stone Village comprises an area along North Street (VT Route 103) known for historic stone buildings. Uses currently include a mix of residences, home-based businesses, and a variety of small-scale retail operations that sell antiques, art, produce or furniture.
2. Elm Street comprises an area that is located along the Green Mountain Railroad and exhibits a mix of commercial or industrial uses, along with some residences. Present economic activity includes businesses that involve such things as screen printing, fuel distribution, equipment and power-sports retail, vehicle maintenance, state highway maintenance, insulation, and propane dealer.
3. The southern gateway area includes the locations along VT Route 103 South in the vicinity of the Green Mountain Union High School. This area has experienced more recent commercial development and includes a variety of businesses including Drew's All Natural, arts and crafts retail, antique stores, restaurants, and a credit union. This area serves as a gateway between the village and the rural sections of VT Route 103 toward Rockingham and I-91.
4. Located near the intersection of VT Route 11 and Balch Road, the area surrounding the former armory building represents a very small cluster of commercial uses, including tourist lodging. A new light manufacturing business is proposed for the former Chester Armory building.
5. Gassetts, located around the intersection of VT Routes 10 and 103, represents a small, moderately-dense cluster of commercial and residential buildings. Non-residential uses in Gassetts include a local foods market and retail of stone and masonry materials.

The remainder of the town is primarily rural in character, and current economic activities in these rural areas involve such things as farming, forestry, home occupations, inns, and small-scale antique stores. In addition, many residents commute to jobs in other towns. This is discussed more in the next section. A regional economy that provides good jobs within a short drive from Chester is highly valuable.

Economic Profile

A variety of jobs are available in the larger geographic area (i.e. Chester, Springfield, Ludlow, Bellows Falls and other towns in the vicinity), including high tech, automotive, food manufacturing, food distribution, education, health care, recreation, tourism, and school and governmental services. Major employers in Chester include

Newsbank, Drew's All Natural, municipal government and the school system. The small businesses that populate Chester's economic growth areas are the lifeblood of an economically successful community. Chester's economy relies heavily upon tourism to support the many restaurants, inns and many of the retail shops (e.g. antiques, arts, crafts and other tourist-oriented merchandise).

The following tables summarize Chester's economy based upon the most recent data made available through the Longitudinal Employer-Household Dynamics (LEHD) dataset from the U.S. Census Bureau. According to this information, Chester employment for 2013 involved a total of 1,619 primary jobs¹. Approximately 11% of those jobs reflect Chester residents who work in town, 56% involve Chester residents commuting to a job in another town, and 33% represent people who work in Chester but live elsewhere. Common job locations for Chester residents include Chester, Springfield, Ludlow, Londonderry and Rockingham.

Table 10.1 summarizes details of the jobs that are located in Chester. Table 10.2 is based on jobs that Chester residents commute to in other towns.

¹ The "primary jobs" figure does not include second jobs. This LEHD dataset under-reports self-employed jobs.

Table 10.1: Summary of Chester Jobs (2013)

Total Primary Jobs		717	
Jobs by Earnings			
	Count	Share	
\$1,250 per month or less	156	21.8%	
\$1,251 to \$3,333 per month	281	39.2%	
More than \$3,333 per month	280	39.1%	
Key Sectors			
	Count	Share	
Information	159	22.2%	
Educational Services	156	21.8%	
Accommodation and Food Services	76	10.6%	
Public Administration	71	9.9%	
Other Services (excluding Public Administration)	42	5.9%	
Retail Trade	41	5.7%	
Construction	39	5.4%	
Manufacturing	31	4.3%	
Jobs by Worker Educational Attainment			
	Count	Share	
Less than high school	40	5.6%	
High school or equivalent, no college	166	23.2%	
Some college or Associate degree	182	25.4%	
Bachelor's degree or advanced degree	205	28.6%	
Educational attainment not available (workers aged 29 or younger)	124	17.3%	
Home Locations			
	Count	Share	
Chester town (Windsor, VT)	184	25.7%	
Springfield town (Windsor, VT)	95	13.2%	
Rockingham town (Windham, VT)	35	4.9%	
Ludlow town (Windsor, VT)	29	4.0%	
Andover town (Windsor, VT)	28	3.9%	
Westminster town (Windham, VT)	25	3.5%	
Cavendish town (Windsor, VT)	25	3.5%	
Weston town (Windsor, VT)	22	3.1%	
Londonderry town (Windham, VT)	17	2.4%	
Weathersfield town (Windsor, VT)	13	1.8%	
All Other Locations	244	34.0%	

Source: U.S. Census Bureau, OnTheMap Application and LEHD Origin-Destination Employment Statistics (Beginning of Quarter Employment, 2nd Quarter of 2002-2013).

Table 10.2: Summary of Chester Resident's Jobs (2013)

Total Primary Jobs		1,086	
Jobs by Earnings			
	Count	Share	
\$1,250 per month or less	297	27.3%	
\$1,251 to \$3,333 per month	386	35.5%	
More than \$3,333 per month	403	37.1%	
Key Sectors			
	Count	Share	
Health Care and Social Assistance	171	15.7%	
Educational Services	151	13.9%	
Manufacturing	133	12.2%	
Accommodation and Food Services	131	12.1%	
Retail Trade	125	11.5%	
Public Administration	71	6.5%	
Construction	51	4.7%	
Wholesale Trade	38	3.5%	
Jobs by Worker Educational Attainment			
	Count	Share	
Less than high school	72	6.6%	
High school or equivalent, no college	273	25.1%	
Some college or Associate degree	291	26.8%	
Bachelor's degree or advanced degree	228	21.0%	
Educational attainment not available (workers aged 29 or younger)	222	20.4%	
Work Destination			
	Count	Share	
Chester town (Windsor, VT)	184	16.9%	
Springfield town (Windsor, VT)	171	15.7%	
Ludlow town (Windsor, VT)	93	8.6%	
Londonderry town (Windham, VT)	55	5.1%	
Rockingham town (Windham, VT)	50	4.6%	
Weston town (Windsor, VT)	41	3.8%	
Westminster town (Windham, VT)	37	3.4%	
Cavendish town (Windsor, VT)	30	2.8%	
Brattleboro town (Windham, VT)	27	2.5%	
Hartford town (Windsor, VT)	27	2.5%	
All Other Locations	371	34.2%	

Source: U.S. Census Bureau, OnTheMap Application and LEHD Origin-Destination Employment Statistics (Beginning of Quarter Employment, 2nd Quarter of 2002-2013).

According to a comparison of American Community Survey data, median household income in Chester was estimated as \$47,656 in 2013, which represents a 12% increase since 2009. This 2013 income for Chester lags behind the median household incomes for both Windsor County at \$52,460 and the State of Vermont at \$54,267 (see Table 10.3). The 2015 median income of households that are served by the municipal water system was \$33,480².

According to estimates from the American Community Survey, the unemployment rate in Chester was 4.8% in 2013. The poverty rate was 8% in 2013 based upon the same data source.

Table 10.3: Household Income 2005 - 2013

	Median Household Income		
	2005-2009	2009-2013	% Change
Vermont	\$51,282	\$54,267	5.8%
Windsor County	\$51,066	\$52,460	2.7%
Andover	\$51,667	\$43,750	-15.3%
Baltimore	\$49,792	\$46,875	-5.9%
Cavendish	\$42,130	\$51,667	22.6%
Chester	\$42,535	\$47,656	12.0%
Ludlow	\$44,276	\$39,850	-10.0%
Reading	\$57,100	\$58,125	1.8%
Springfield	\$40,290	\$44,149	9.6%
Weathersfield	\$58,846	\$62,468	6.2%
West Windsor	\$69,722	\$70,250	0.8%
Windsor	\$49,231	\$40,472	-17.8%

Source: Source: 2005-2009 & 2009-2013 American Community Survey, US Census Bureau

Existing Programs and Assets

Chester has many outstanding assets that make it an attractive place to live and work. The quaint, charming village surrounding the Green is one of the key assets as it forms the center of the community's business district and exhibits an attractive "post card" quality. Other community assets identified during the 2016 public forum include the following:

- ✓ Excellent quality of life;
- ✓ Attractive, walkable village;
- ✓ Historic architecture;
- ✓ Very fast internet speeds;
- ✓ Good proximity to jobs in surrounding communities;
- ✓ Chester is well known for arts and antiques;
- ✓ Strong existing businesses;
- ✓ Traffic volumes along VT Route 103;
- ✓ Large number of skilled workers;
- ✓ Proximity to tourist destinations;
- ✓ Outdoor recreational assets;
- ✓ Successful community events (e.g. Fall Festival).

Programs that currently support local or regional economic development efforts include the following:

- ✓ Chester Community Alliance, Inc.:
 - ✓ Chester Economic Development Committee;
 - ✓ Chester Townscape Committee;
 - ✓ Green Mountain Festival Series Committee;
- ✓ Okemo Valley Regional Chamber of Commerce;
- ✓ Springfield Regional Development Corporation;
- ✓ East Central Vermont Economic Development District;
- ✓ Revolving Loan Fund;

² From a household income survey conducted by the Vermont Rural Water Association for the Town of Chester

- ✓ Village Center Designation.

Desired Future Economic Conditions

Chester's vision is for a thriving, equitable and resilient economy that strengthens and revitalizes our village, preserves and honors our history and working landscape, maintains the special charm that is what Chester is currently known for, and improves the socio-economic well-being of Chester residents.

Village Center

In 2013, the Vermont Downtown Board approved the designation of Chester's Village Center. The designated Village Center boundary is shown in Figure 10.1. Designation under this program does not create any regulatory requirements for buildings within this area. This program is intended to recognize local revitalization efforts and provide incentives to help further local initiatives to improve the Village Center. Benefits of designation are summarized below:

- 10% Historic Tax Credits;
- 25% Facade Improvement Tax Credits;
- 50% Code Improvement Tax Credits;
- 50% Technology Tax Credits;
- Priority Consideration for State Grants;
- Priority Consideration by State Building And General Services (BGS);
- Eligibility for designation of a Neighborhood Development Area (NDA) within ¼ mile of the Village Center.

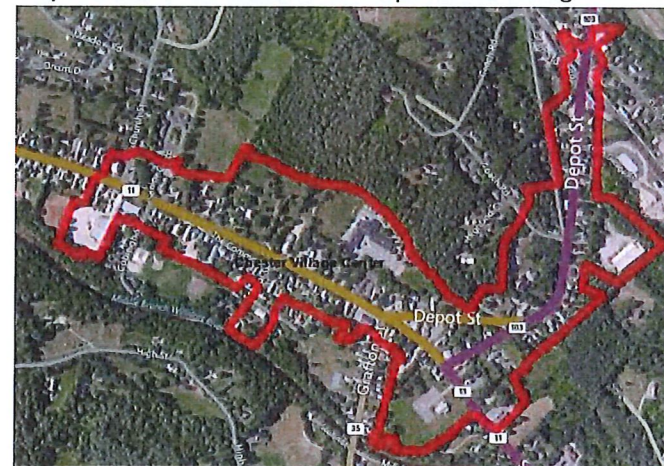


Figure 10.1: Chester's Village Center Boundary

Renewal of this designation is due by July 2021.

As described earlier in this Chapter, the Village Center represents the traditional commercial center of the community. The Green and the Depot form the basis of this area as shown in Figure 10.1. This area is the primary location where economic growth is to be focused. This area is served by an extensive sidewalk network, buildings are set close to the roadway, and historic buildings and related infrastructure form a pleasant walking environment. Future investments in this area are expected to be in keeping with smart growth principles and to maintain or enhance the existing charm of the built environment. This is where retail, restaurants, professional offices and other economic activities typically located within Vermont community centers are desired.

In recent years, the Town has been making investments to the infrastructure in this area to support the desired future conditions.

Additional investments in this regard may be desired to improve signage, parking, sidewalks, pedestrian crossings, public restrooms, public transportation and other strategic improvements. Particular attention to making enhancements, such as on-street parking and creating inviting public outdoor spaces, will help to make the Green an attractive destination for tourists and business investment.

Smart Growth Principles:

As defined in State Statutes, this term means growth that:

- Maintains the historic development patterns;
- Develops compact mixed-use centers at an appropriate scale;
- Supports a diversity of viable businesses in village;
- Promotes walking and bicycling;
- And as described in more detail under [24 V.S.A. §2791\(13\)](#).

The Village Center designation achieves the following goals:

- *Furthering the intent of the Land Use Chapter – The Town Plan identifies the need to revitalize village commercial, residential and mixed use areas. Continued designation will focus additional resources to help these areas thrive, including the ability to have tax credits, a special assessment district and priority consideration for several grant programs.*
- *Preserving significant historic, architectural, and cultural heritage – The access to historic tax credits and code improvement tax credits will support redevelopment of older and historic properties, preserving the historic character of the Village Center.*
- *Continued support of transportation improvements – The Town has benefited from the priority consideration for Municipal Planning Grants, Historic Preservation Grants, Agency of Transportation Grants, recreation grants and other state funding opportunities. Some of the projects that were spearheaded by the 2017 Village Center Master Plan and have been funded through these opportunities include:*
 - Depot Street Sidewalk Design and Construction
 - Church Street Scoping Study
 - School Street Pocket Park
 - Wayfinding Plan
 - Signage Design
 - Unified Development Zoning Bylaws Rewrite
 - Marketing Plan

The Village Center Master Plan is a key element for revitalizing the village area that ties in with the Village Center designation. Funded through the Strong Communities Better Connections Grant, this document was developed with significant community input and presents specific initiatives to move Chester forward while still preserving the historic character of the area.

Elm Street

This area is served by the municipal water system and partially served by the municipal sewer system. Elm Street connects to two major highways (i.e. VT Route 11 and VT Route 103) and it is adjacent to the Green Mountain Railroad. Additional commercial and light industrial uses are desired in this area. Such businesses are desired at a scale that is generally consistent with the existing non-residential uses in this area, and to be compatible with adjacent land uses with respect to minimizing impacts related to traffic, noise, smell and other routine performance criteria. Land uses that take advantage of the railroad are encouraged.

Southern Gateway

This area has been developed with a mix of commercial and manufacturing uses in recent years. This commercial area is separated from the village by a residential area that runs along VT Route 103 between Mountain View and Pleasant Street.

When the town was working to develop the VT Route 103 Corridor Management Plan in 2009, concern was raised over the emerging strip development patterns in this area. Since this area forms the initial

perception of travelers entering the Chester village area from the south along VT Route 103, its appearance matters significantly for a tourist-oriented economy. The corridor plan explored alternative land use patterns that could extend the village feel through this area. Additional commercial uses are desired in this area, but only in a way that helps to transform this currently automobile-oriented area to look and function more like a village. This would include site design techniques such as traditional village settlement patterns, creating a walkable environment, parking lots placed to the side or rear of buildings, avoiding “big box” building designs, sound access management techniques and other considerations as more thoroughly described in the VT Route 103 Corridor Management Plan.

In order to facilitate this development, the Town should investigate infrastructure improvements to encourage these desired future land use patterns. This might include traffic calming by the High School, installing gateway treatments (e.g. welcome signs, landscaping), constructing a sidewalk or walking path to connect to the High School, and other enhancements.

Armory Building Area

The area surrounding the Chester armory building near the intersection of VT Route 11 and Balch Road is served by municipal water services, but not municipal sewer. This small area is where a mix of commercial and light industrial uses are desired at a lower-density scale as allowed for in the Adaptive 3 District per the Unified Development Bylaws.

Gassetts

The density of development in the hamlet of Gassetts is limited by soil conditions since it is not served by municipal water or sewer services. A low- to moderate-density of residential and non-residential uses are desired in this area as allowed for under the *Unified Development Bylaws*.

Rural Working Landscape

The remainder of Chester is generally rural in character where farming and sustainable forestry activities are desired. In striving to pursue healthy community and local food initiatives, Chester wishes to encourage the local production of farm-fresh foods and value-added farm products in order to improve access to fresh and healthy foods. There may be opportunities to pursue local businesses that tap into the growing farm-to-table and natural food, hormone-free or GMO-free food initiatives.

Facilitating a working landscape for sustainable forestry and local foods production is important, but Chester also wishes to build upon our excellent outdoor recreational assets (i.e. The Pinnacle, trails) as an integral part of our economic development strategies.

Home-Based Occupations and Businesses

Home-based jobs are encouraged throughout town and particularly in the rural areas as a positive opportunity to diversify the local economy and increase employment. Home-based occupations refers to a resident working out of a minor portion of their home. High-fast internet speeds in Chester encourage telecommuting. Home-based businesses may involve up to four employees. In the Unified Development Bylaws, home occupations are approved under permitted use review and home businesses require conditional use review.

Strategies to Foster Desired Economic Conditions

In order to achieve these desired future economic conditions, the Town of Chester wishes to work with partner organizations on the following strategies:

1. Promote a business-friendly attitude for new and existing businesses that are in keeping with the goals of the Town Plan.
2. Enhance marketing efforts through a variety of means, such as working with partners, enhanced website, and increased social media presence.
3. Promote existing events and expand community events and activities.
4. Promote additional creative economy-based businesses, such as artisans and craft persons, in order to expand on the current business offerings. Consider creating marketing materials to highlight excellent local and regional assets, such as a series of maps or visitor guides that highlight local artisans, historical points of interest, and/or great restaurants in the area.
5. Explore incentives that the Town may be able to provide to help bring businesses into Chester, which reinforce the scale, character and economy of the community.
6. Conduct a study to determine if the availability of housing is adequate for local employees , presently and in the future.
7. Work with educational institutions to better prepare high school graduates for the work force and to provide work force training opportunities for those seeking new careers.
8. Coordinate with Southeast Vermont Transit, which operates the Current, in order to improve the marketing of existing bus service and identify enhancements to improve access to quality work opportunities.
9. Maintain Village Center Designation in order to help implement village revitalization efforts called for in this Town Plan. Consider expansion of the existing designated Village Center boundary in order to include more of the center of Chester.
10. Consider applying for Neighborhood Development Area Designation in order to incentivize the creation of compact, walkable neighborhoods that attract more people and business to our existing Village Center.
11. Install wayfinding signage in order to direct travelers along VT Route 103 toward the Green.
12. Improve traffic circulation, sidewalks, crosswalks and parking around the Green.
13. Design and construct streetscape enhancements that will help to make the Green a destination, such as replacing pavement with pavers, increasing sidewalk width to accommodate outdoor seating, outdoor lighting and planting street trees.
14. Create an attractive gateway along VT Route 103 through welcome signs, landscaping, traffic calming or other design techniques.
15. Design and construct a sidewalk or path and streetscape improvements along the VT Route 103 South commercial area in order to transform and improve the appearance of the area.
16. Develop facilities appropriate in scale and design for Chester that facilitate ridesharing and improve bus service options (e.g. park-and-ride lot, bus shelters).
17. Evaluate economic growth areas in Chester and identify possible additional sites if the existing options are found not to be adequate.
18. Coordinate with surrounding towns and regional partners to promote a strong and vibrant regional economy that benefits both Chester and the region.

Economic Goals

1. To foster a strong and diverse economy that provides satisfying and rewarding job opportunities and that maintains high environmental standards.

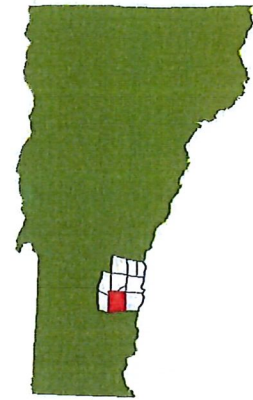
2. To promote economic growth that strengthens and revitalizes our village, preserves and honors our history and working landscape, maintains the special charm that is what Chester is currently known for, and improves the socio-economic well-being of Chester residents

Economic Policies

1. Economic growth is desired within the Village Center, Elm Street, Southern Gateway, and in the Adaptive 3 District as described in Chapter 10.
2. The Town of Chester will strive to maintain a business-friendly approach to economic development and the associated local permitting process.
3. The expansion of existing businesses that support the goals and aspirations of the community is encouraged.
4. New business establishments are desired. Such businesses will contribute to furthering the goals of this Town Plan and shall be consistent with the Desired Future Economic Conditions as described in Chapter 10.
5. Applications for new businesses and industrial enterprises will demonstrate how they further the community's desire to improve the quality of life, contribute toward the existing charm of the village, and maintain or improve the viability of the local tourist-based economy.
6. Home occupations and home-based businesses are encouraged as long as they are appropriate to adjoining land uses, and do not adversely affect air, water or scenic resources or cause noise that is offensive to surrounding neighbors.

Chapter 6 Appendix A: Enhanced Energy Data Summary

Chester



Population Table A-1

Total Populationⁱ (2015): 3,110
 Proj. Annual Avg. Growth Rateⁱⁱ: 0.0
 Population Density: 55.6 persons/
 square mile



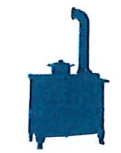
Households Table A-2

Owner-Occupied Unitsⁱⁱⁱ: 1,040
 Renter- Occupied Unitsⁱⁱⁱ: 362
 Total Householdsⁱⁱⁱ: 1,793
 Avg. Household Sizeⁱⁱⁱ: 2.25 people/
 household



Businesses^{iv} Table A-3

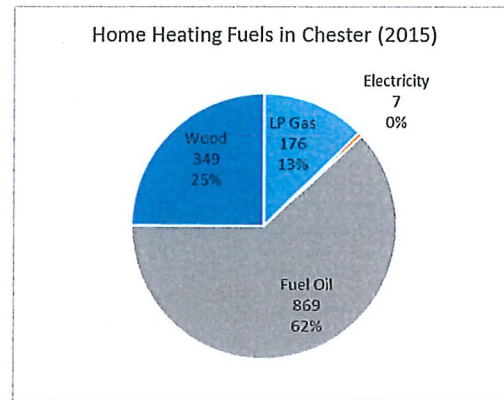
Total businesses in Chester: 129
 Employees working in Chester: 909
 Average wage: \$37,378



Heating Table A-4

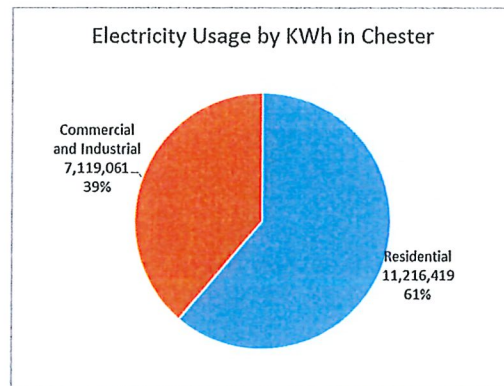
Residentialⁱ (see figure)
 Businesses^v:

Estimated avg. building space: 5,398 sq. ft.
 Total energy use: 33.8 billion
 BTUs
 Estimated total annual cost: \$806,005
 Avg. annual cost per business: \$6,248



Transportation Table A-5

Number of vehicles: 2,694
 Estimated vehicle miles traveled: 35.5 million
 Estimated gal. fuel used per year: 1.9 million
 Estimated fuel cost per year: \$4.4 million
 Residents driving alone to work: 71%
 Average commute time: 21 minutes



Electricity Use Table A-6

Electricity Usage in 2015^{vi} (see figure)
 Avg. Residential Usage: 6,689 KWh
 Total Usage (2014-2016): ↑ 254,657 KWh
 ↑ 1.4%



Energy Generation Table A-7

Existing Renewable Energy Generation

Solar	38 sites	2.17 MW	2,666.6 MWh
Wind	0	0	0
Hydro	0	0	0
Biomass	0	0	0

Renewable Energy Generation Targets^{vii}

2015 (Baseline)	2,666.6 MWh
2025	6,004 MWh
2035	12,008 MWh
2050	24,015 MWh

Potential for Renewable Energy Generation^{viii}

Rooftop Solar	3.1 MW	3,802 MWh
Ground-Mounted Solar	517.2 MW	634,306 MWh
Wind	854.6 MW	2,620,326 MWh
Hydro	0.016 MW	56 MWh

ⁱ U.S. Census Bureau, American Community Survey (ACS) 2011-2015

ⁱⁱ Based on Scenario B population projections for 2030 (VT ACCD, 2013)

ⁱⁱⁱ U.S. Census Bureau, Decennial Census (2010)

^{iv} Vermont Department of Labor Statistics (2015)

^v Estimated based on number of units, estimated floor space, heating fuel types and average fuel costs for 2015.

Floor space was estimated from average commercial/manufacturing floor space per employee from the U.S.

Energy Information Administration.

^{vi} Efficiency Vermont (2017)

^{vii} SWCRPC

^{viii} Based upon an analysis of GIS data mapping data (i.e. land area shown on the solar and wind potential maps)

Chapter 6 Appendix B: 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 draft *2017 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.**

In order to meet the 90% by 2050 goal, total energy use in southern Windsor County will need to decrease by 50%. Primarily this must involve a vast reduction in the use of non-renewable fuels, such as gasoline and fuel oil. The LEAP model relies on a number of generalized assumptions to reach the 90% by 2050 goal, such as:

- Electricity use today is about 20% of total energy consumption, but it will increase to 35% of total consumption in 2050;
- The use of non-renewable fuels will be vastly reduced from about two-thirds today to about 10% by 2050;
- Renewables will increase from about 18% now to more than half by 2050. This involves wood consumption remaining relatively constant and biodiesel usage increasing substantially.

Please note that the above section is intended to summarize the assumptions made for this LEAP model. In the intervening years between 2018 and 2050, there are likely to be technological advances that may help us to achieve our energy goals and targets in ways that we cannot anticipate today.

B.1 Electricity

Targets for electricity are mixed. Significant efforts to reduce electricity usage through conservation and efficiency measures will be needed. However, the LEAP model utilizes the increased use of electricity to achieve the goal for both transportation (i.e. electric vehicles) and heating sectors (i.e. cold-climate heat pumps). See Figure 3 below.

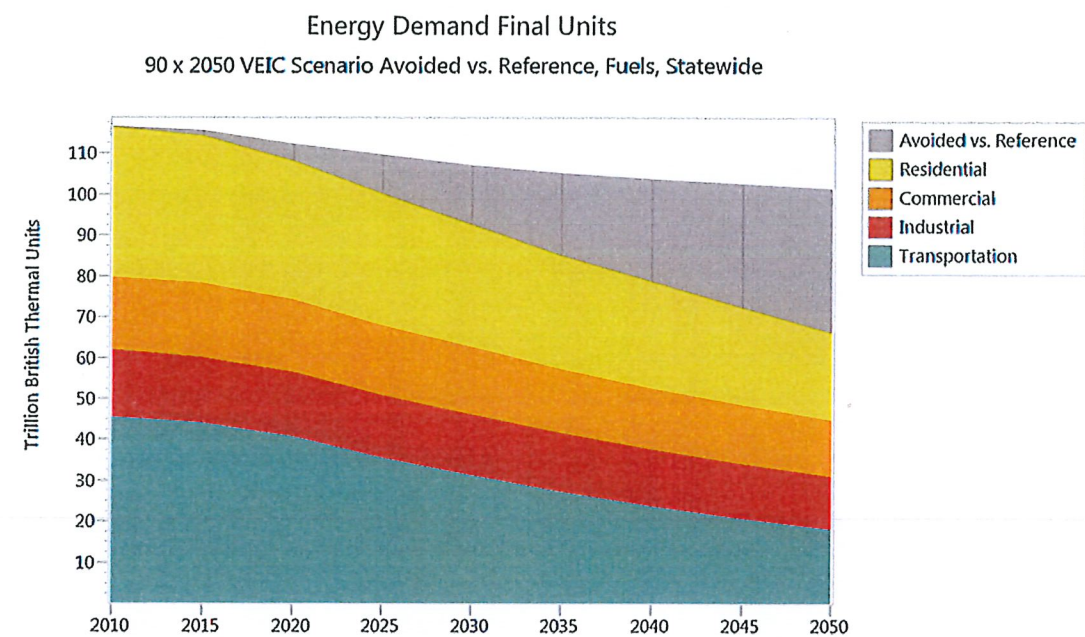


Figure 3: Vermont must significantly reduce total energy use by 2050 to be successful in implementing the goals of the Comprehensive Energy Plan. The LEAP model referenced in this Plan calls for substantial reductions in energy use by residences and transportation. The line above the grey area represents projections for if we do nothing else to reduce energy demand. The grey area itself represents efforts needed to reduce total energy demand.

Reducing electricity demand through energy conservation and efficiency measures will involve taking advantage of programs offered by Efficiency Vermont, utilization of high-efficiency/energy star appliances, LED lighting upgrades, and other efforts at energy demand management.

Electricity targets also include the development of additional renewable energy generation. The LEAP model includes assumptions for additional imported renewable energy from sources such as Hydro Quebec. However, local generation is also required. Targets for local renewable generation are summarized below in Table 1 and discussed in more detail in the renewable siting discussion under the Implementation Actions section of the Energy Chapter.

	2025	2035	2050
Total renewable generation in MWh	6,004	12,008	24,015

B.2 Thermal (Heating Buildings)

The first step to reduce energy demand for space heating is to weatherize homes and businesses (e.g. air sealing, insulation). Table 2 shows the targets for weatherizing existing structures in Chester. Note that the LEAP model-based targets for weatherization in Chester did not appear to be reasonable, so these targets are modified to be more consistent with statutory goals. Based upon our experience over the past few years, it will be difficult to reach these weatherization targets for existing structures. We assume that all new applicable structures will comply with the State energy building codes (i.e. [Residential Building Energy Standards](#), [Commercial Building Energy Standards](#)).

	2025	2035	2050
Weatherize Homes	25%	50%	90%
Weatherize Businesses	25%	50%	90%

The next step is to then move toward the widespread utilization of renewable energy to heat homes and businesses. The LEAP model established the following targets for doing so in Chester. Table 3 shows the scale to which buildings should switch over to renewable heating systems in order to meet the state energy goals.

Thermal renewable energy use	2025	2035	2050
	49%	64%	92%

In order to achieve the overall renewable target for heating, the LEAP model is calling for investing in new efficient wood heating systems, cold-climate heat pumps or ground-source heat pumps. (See Table 4.)

	2025	2035	2050
New efficient wood heating systems	6	14	89
New heat pumps	173	468	901

Cold-climate heat pumps are also referred to as air-source heat pumps, mini-splits or ductless heat pumps. These systems are a good option to retrofit existing houses, and can be used to supplement an existing heating system. As explained on the [Efficiency Vermont website](#), “heat is collected from the exterior air, concentrated via an outdoor compressor, and distributed inside through an indoor room unit. Heat pumps require electricity to run, but can deliver more energy than they use.” They also provide air conditioning during the warmer months.

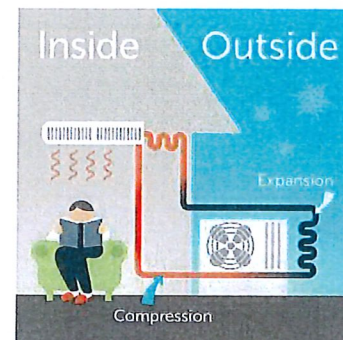


Figure 4: Illustration of how cold-climate heat pumps work. Source: Efficiency Vermont.

Ground-source heat pumps provide heating and cooling for buildings. They work similarly to air-source heat pumps, but instead they pump

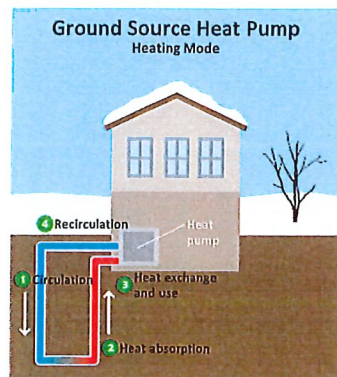


Figure 5: Illustration of how ground-source heat pumps work. Source: US EPA.

water or other fluid through pipes buried in the ground to collect energy. A more detailed description for how these systems work can be found on the [US EPA website](#). These are generally a better option for new construction installations.

Heating with wood is generally encouraged as it uses a locally-available fuel. However, sustainable wood harvesting is important in order to protect the environment and provide a viable, long-term local energy source. New efficient wood stoves that are EPA-certified are encouraged. Wood-chip heating systems are considered a good option to heat larger commercial, industrial or institutional buildings. See the [Efficiency Vermont website](#) for more information. A number of schools in the region use such heating systems.

B.3 Transportation

Transportation is probably the most difficult area to “bend the curve” to meet the energy goals, considering the rural nature of this area and how challenging it is to change human behavior. However, it must be done if we are to achieve the 90% by 2050 goal. The LEAP model used a number of assumptions in addressing this issue. The following targets are based on that LEAP model.

Table 5: Renewable Energy Use for Transportation			
Use of renewables for transportation	2025	2035	2050
	10%	31%	90%

Overall, transportation needs to shift to renewable fuel sources as shown in Table 5. The LEAP model is largely expecting this to happen through using electric vehicles, and the use of biodiesel by the trucking industry. Table 6 below shows the fuel switching targets for Chester.

Also required to meet the goals will be additional efforts to lessen the use of energy for transportation, including land use patterns that encourage walking and bicycling, public transportation, driving less, and ride sharing. Efficiency Vermont has information on its [website](#) about ways to achieve transportation efficiencies.

Table 6: Transportation Fuel Switching Targets			
	2025	2035	2050
Passenger cars switch to electric vehicles	478	765	1,722
Trucks switch to biodiesel	195	312	703

Chester Energy Survey
January, 2018

Five years ago, the State of Vermont embarked on a new energy plan. The goal is to meet 90% of Vermont's total energy needs from renewable sources by 2050. The state has asked towns to create their own energy plans to help reach this goal. State legislators believe Vermont can be a leader in global climate change efforts, while increasing our energy security, improving our economy, protecting ratepayers and reducing our total energy costs. The Town of Chester may choose to participate in this goal by adding an energy plan chapter to its Town Plan, thus gaining some say in the placement of renewable energy installations such as solar and wind. If this chapter is not added, the town will have no voice in the placement of renewable energy projects. The Planning Commission would like to get a sense of how Chester residents feel on this issue. Your input is vital to this process. We included a self-addressed envelope for your reply. You may also find a copy of the survey online by going to the Planning Commission page on the town website: <http://www.chestervt.gov/planning-commission.html>. You may also scan your filled-out form and e-mail it to Cathy Hasbrouck, the Planning Commission recording secretary at cathy.hasbrouck@chestervt.gov.

Thank you from the Chester Planning Commission:

Naomi Johnson, Claudio Veliz, Barre Pinsky, Tim Roper and Cheryl Joy Lipton

1. On a scale of 1 – 5, how important are energy issues to you?

<u>207</u>	<u>105</u>	<u>36</u>	<u>8</u>	<u>6</u>	<u>3</u>
1 – Very important	2	3 - Neutral	4	5 - Not important at all	Blank

2. On a scale of 1 – 5, rate your view of non-residential wind power:

<u>113</u>	<u>86</u>	<u>78</u>	<u>34</u>	<u>49</u>	<u>5</u>
1 – I favor it enthusiastically	2	3 - Neutral	4	5 – I oppose it completely	Blank

3. On a scale of 1 – 5, rate your view of non-residential solar power:

<u>166</u>	<u>89</u>	<u>53</u>	<u>24</u>	<u>29</u>	<u>4</u>
1 – I favor it enthusiastically	2	3 - Neutral	4	5 – I oppose it completely	Blank

4. Do you currently have solar energy generating facilities at your home or business?

45 Yes 319 No 1 Blank

5. Do you have a wind generator at your home or business?

1 Yes 363 No 1 Blank

6. Do you burn wood or wood pellets for heat at your home or business?

190_Yes 166_No 9 Blank

7. Would you be in favor of allocating town resources to develop an energy plan chapter for the Town Plan if it gave the town a voice in the placement of renewable energy projects?

291 Yes 46_No 5 Pending or unknown 23 Blank

8. How do you feel about large solar arrays?

106	1	<u>91</u>	76	<u>36</u>	<u>41</u>	14
1 – I favor them enthusiastically	1.5	2	3 - Neutral	4	5 – I oppose them completely	Blank

9. How do you feel about solar arrays on buildings, public or private?

184	89	<u>63</u>	12	<u>8</u>	9
1 – I favor them enthusiastically	2	3 - Neutral	4	5 – I oppose them completely	Blank

10. Do you support the state goal of 90% of energy coming from renewable sources by 2050?

<u>201</u>	73	<u>46</u>	<u>15</u>	18	12
1 – I favor it enthusiastically	2	3 - Neutral	4	5 – I oppose it completely	Blank

11. Do you currently benefit from solar credits which are generated from a location other than your Chester home or business?

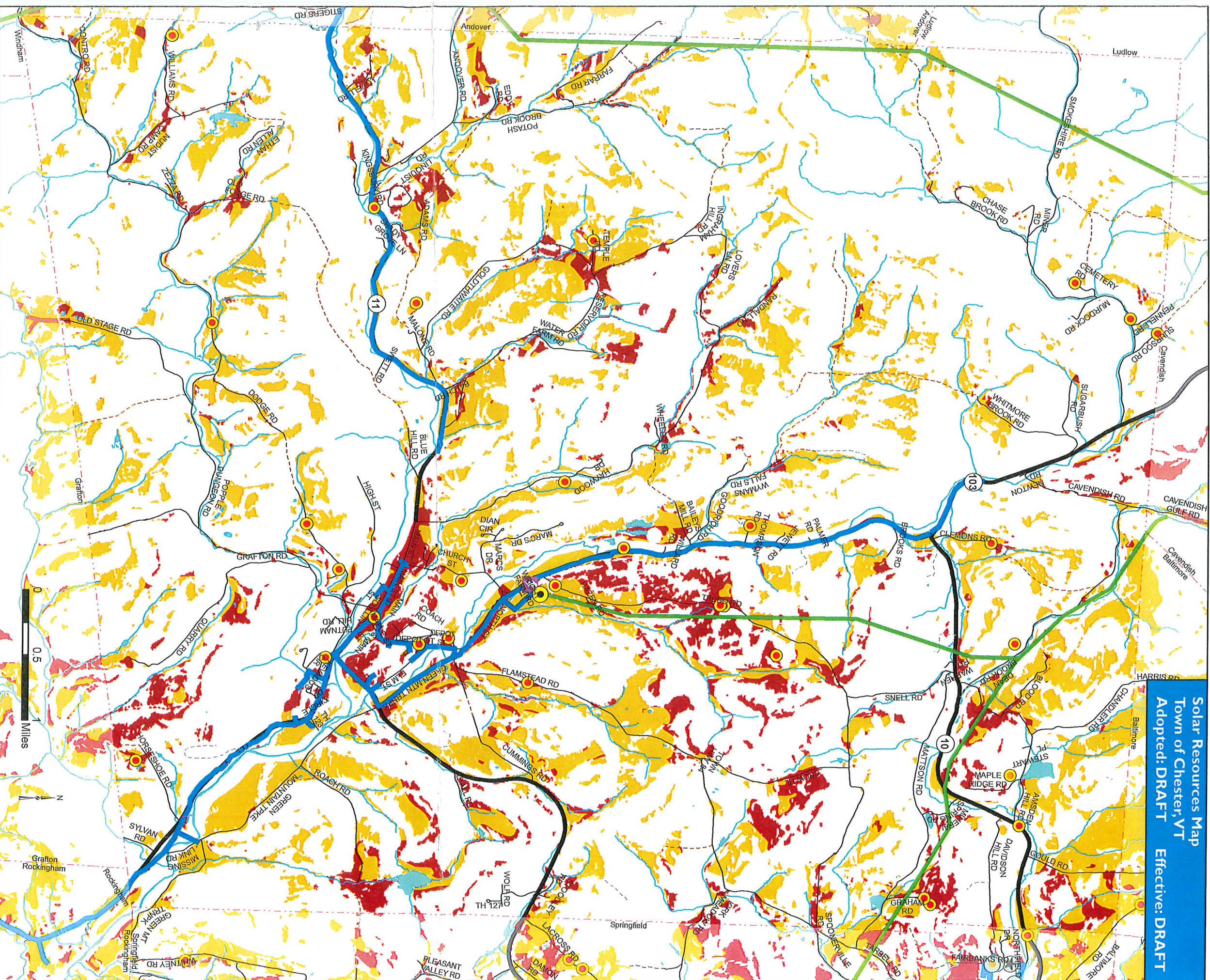
13_ Yes 336 No 4 Unknown 9 Blank

12. Do you currently live in the village or outside the village center?

90 in the village center 262_ outside the village center 13 blank

13. On a scale of 1 – 5 how informed do you feel about energy issues?

<u>88</u>	1	<u>114</u>	<u>117</u>	<u>27</u>	<u>8</u>	10
1 – Well informed	1.5	2	3	4	5 – Not informed at all	Blank



- Business, Institution or Municipality with a capacity of 150kW or more
- Business, Institution or Municipality with a capacity of 15kW or less
- Business, Institution or Municipality with a capacity of 15.1kW - 150kW
- Residential, Capacity of 150kW or more
- Residential, Capacity of 15.1kW or less
- Residential, Capacity of over 15kW but less than 150kW
- Substation
- Electric Transmission Line
- Three Phase Electricity Distribution Lines
- Prime solar resource
- Secondary solar resource
- Rivers and Streams
- Lakes and Ponds
- Town Boundary
- State Highway
- Class 1, 2 and 3 Town Highway
- Forest Rd, Legal Trail, or Private Rd

This map shows the existing solar energy production according to capacity for electricity generation and organization type. This map also shows the potential for ground-mounted solar energy production considering

- Statewide analysis of solar potential
- Statewide, Regional and Local constraints which prevent or may impact development of solar energy generation facilities

The VT Public Service Board divides applications for a Certificate of Public Good by net metering system capacity: 15kW or less, over 15kW but less than 150kW, and 150kW or more.

Solar potential for ground-mounted systems was calculated to consider the following conditions: slope direction, slope steepness, and radiation values from ESRI solar analyst. For more info see <http://vcgi.vermont.gov/opendata/act174>

Known constraints include areas that should not be developed with renewable energy generation facilities. Possible constraints include areas that may impact the siting of renewable energy generation facilities, but do not necessarily prevent their development. In addition to constraints listed in the November 2016 Regional Energy Planning Standards, SWCRPC has included the following Regional constraints (???) and the Town has included the following constraints (???)

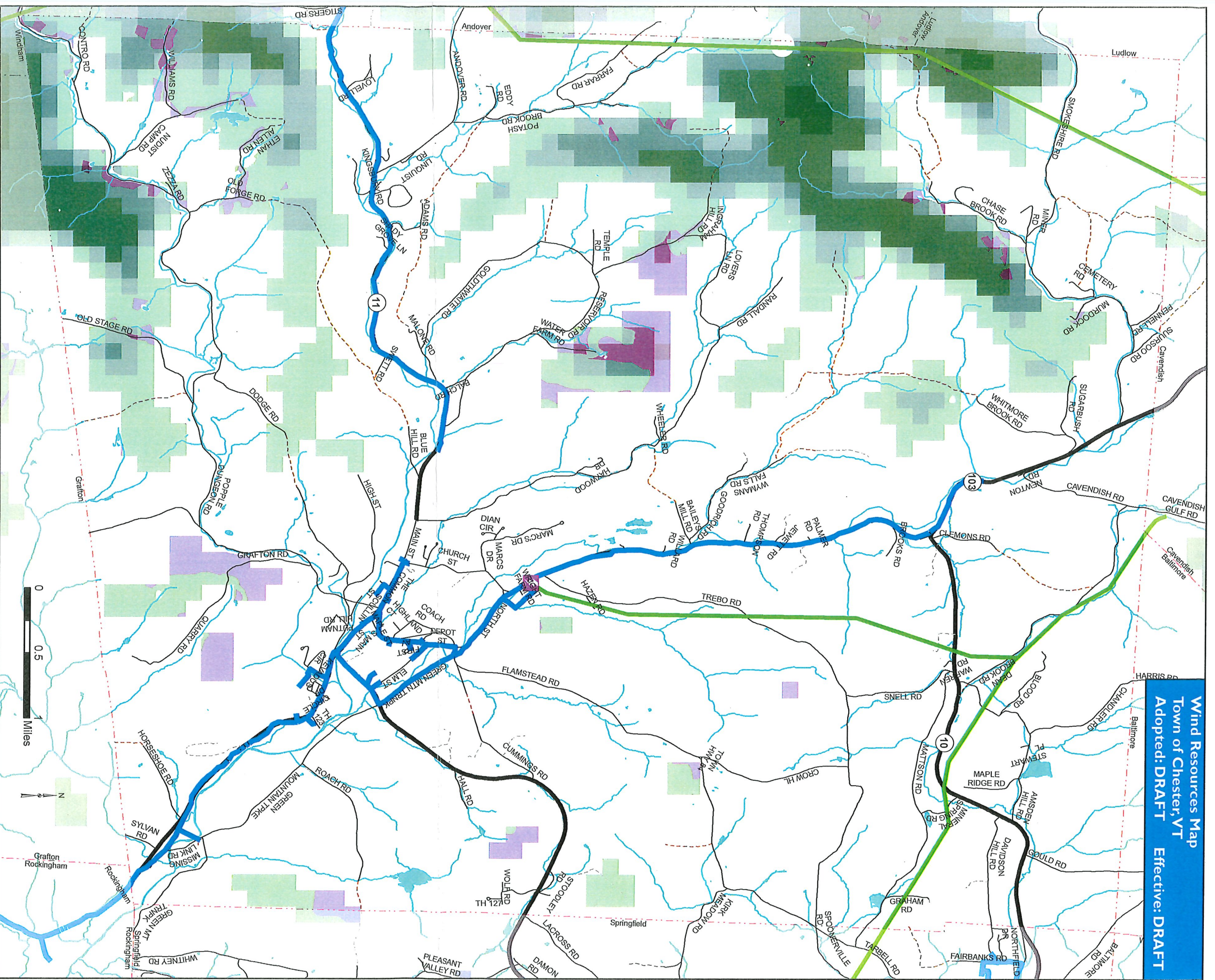
The Regional Energy Planning Standards are available at <http://publicservice.vermont.gov/content/act-174-recommendations-and-determination-standards>

Data sources: Solar Facilities (VT Energy Dashboard. Sites listed on Atlas on 02/03/2017), Prime and Secondary Solar Potential (VCGI 2017) (Regional Constraints and Town Constraints for TO BE DEFINED), Substations (BCRC 2015 and SWCRPC 2016), Three Phase Electricity Lines (BCRC 2015), Transmission Lines (RPC 2016), Waterbodies (VHD 2008), Roads (VTrans 2016), Town Boundary (VCGI 2012).

VT State Plane Meeters, NAD 83
 Map for planning purposes only.
 Not for regulatory interpretation.

Map drawn April 12, 2017

Wind Resources Map
Town of Chester, VT
Adopted: DRAFT Effective: DRAFT



- Prime Wind Potential**
- 10.070000 - 10.94 mph
 - 10.940001 - 12.10
 - 12.100001 - 13.82
 - 13.820001 - 16.46
 - 16.460001 - 25.70
- Secondary Wind Potential**
- 10.070000 - 11.45 mph
 - 11.450001 - 12.82
 - 12.820001 - 14.32
 - 14.320001 - 16.46
 - 16.460001 - 25.70
- Commercial Wind Facility**
- Residential Wind Facility**
- Substation**
- Electric Transmission Line**
- Three Phase Electricity Distribution Lines**

- Lakes and Ponds
- Rivers and Streams
- Town Boundary
- State Highway
- Class 1, 2 and 3 Town Highway
- Class 4 Town Highway
- Forest Rd, Legal Trail, or Private Rd

This map shows the existing wind energy general sites and the potential for wind energy production considering - Statewide analysis of wind potential - Statewide, Regional and Local constraints which prevent or may impact development of wind energy generation facilities

Potential wind speeds were calculated using the TrueWind Solutions Mesomap wind mapping system. For more info see www.vtenergyatlas.info.com/windmethodology

There are currently no commercial wind facilities in the area.

Known constraints include areas that should not be developed with renewable energy generation facilities. Possible constraints include areas that may impact the siting of renewable energy generation facilities, but do not necessarily prevent their development. In addition to constraints listed in the November 2016 Regional Energy Planning Standards, SWCRPC has included the following Regional constraints (???) and the Town has included the following constraints (???)

The Regional Energy Planning Standards are available at <http://publicservice.vermont.gov/content/fact-174-recommendations-and-determination-standards>

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VT State Plane, Meters, NAD 83 Map for planning purposes only. Not for regulatory interpretation.

Map drawn April 12, 2017

