

Mount Ascutney Regional Commission

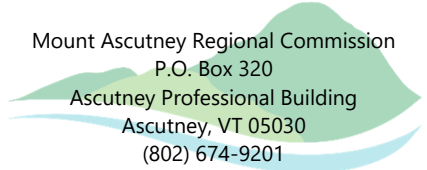
REGIONAL PLAN

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Acknowledgements

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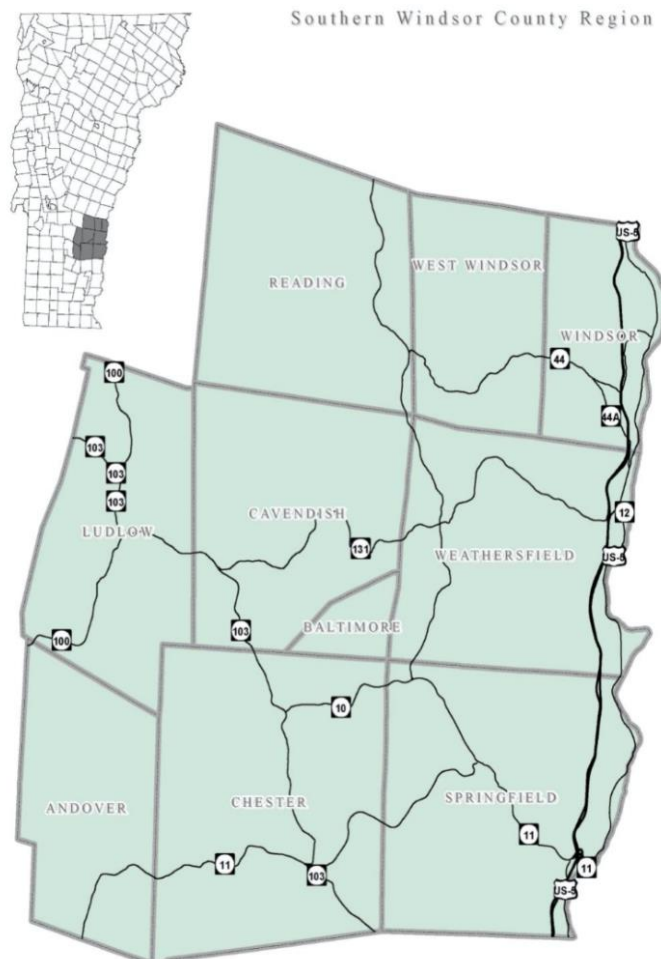


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CH 1: INTRODUCTION

A. Background of the Commission

The Mount Ascutney Regional Commission (MARC) was established in 1966, as the Southern Windsor County Regional Planning and Development Commission, through the action of its constituent towns. The original eight member towns were not contiguous, and it wasn't until 1970 that the Commission began receiving state and federal funds and operated as the Southern Windsor County Regional Planning Commission (SWCRPC) for many years. In 2021, the SWCRPC changed its name to Mount Ascutney Regional Commission.

Currently, the MARC's activities and programs are governed by a ten-person Board of Commissioners; each appointed by the legislative body of his or her member town, with assistance from up to three "at-large" Commissioners as appointed by the Board of Commissioners. In addition, the Board has the responsibility of hiring staff to carry out the goals and policies of the Regional Planning Commission.

The MARC also has the authority to establish advisory committees to address specific regional issues. Currently, the Commission has two such committees, the Brownfields Steering Committee and Transportation Advisory Committee (TAC). Representation on the Transportation Advisory Committee consists of one representative from each community, an ex-officio representative of the Agency of Transportation and provision for four "at-large" members. The primary mission of the Transportation Advisory Committee is to develop and evaluate transportation policy and recommendations as they relate to the Regional Transportation Plan and the Regional Plan.

The primary intent of the MARC and its advisory committees has always been to assist with and advocate for the planning and development activities of its member towns. The MARC exists primarily to provide technical assistance to its member towns; assist in mediating inter-jurisdictional planning and development issues that arise between member communities; facilitate discussion and understanding between local and state entities; develop plans, policies, strategies, and procedures for addressing issues that are regional in scope; assist communities with downtown revitalization and community development projects; annually compile, review, and prioritize regional transportation improvement projects for submission to the Agency of Transportation; and to serve as an information resource for member towns and residents.

B. Statutory Authority

The MARC is authorized pursuant to the duties and optional powers listed in the Vermont Municipal Planning and Development Act (herein referred to as “the Act”) [24 V.S.A. §4345]. The MARC is required to adopt a regional plan in accordance with the Act [24 V.S.A §4348]. Volumes 1, 2 and 3 of the Regional Plan are adopted together as one document.

C. The Regional Plan

The purpose of the Regional Plan, in accordance with the Act [24 V.S.A §4347], is to create a vision for coordinated growth and development in the Region in accordance with existing and future needs and resources. The Regional Plan is advisory in nature, purpose, and effect. However, there are a limited number of areas where the Plan can have regulatory implications as discussed below. The Regional Plan is also used to support a host of grant applications including Community Development Block Grants and housing or farmland conservation applications to the Vermont Housing and Conservation Trust Fund.

The Regional Plan guides the MARC in evaluating public and private actions affecting the Region’s communities and is the foundation for the MARC’s annual work program. The Regional Plan also serves as the Region’s basic planning manual and should be used as a guide by the Region’s towns in the local planning process.

Because of the inherent interrelationship of all aspects of the Regional Plan, the policies in any section are not to be considered in isolation, but rather in conjunction with all other sections and chapters of the Regional Plan. Each section of the Regional Plan includes statements designed to guide the growth and development of the Region. These guiding statements are defined later in this chapter to help the reader understand the context in which they are used.

The format of the Regional Plan is intended to include all plan elements as required by law (24 VSA § 4348a). Volume 2 of the Regional Plan consists of the Regional Transportation Plan, which serves as both the statutorily required transportation element and the requirements of the MARC’s Transportation Planning Initiative with the Vermont Agency of Transportation. Volume 3 of the Regional Plan consists of the Enhanced Energy Plan for the Region, which serves as the energy element under § 4348a as well as the enhanced energy plan under § 4352. Volume 1 includes all other required elements of the Regional Plan. Each chapter in Volume 1 focuses on particular issue areas of regional or statewide interest. Background issues, goals, policies, and recommendations are contained in each chapter. The final chapter of the Plan discusses implementation of the Regional Plan.

D. Use of the Plan in Regulatory Proceedings

The Regional Plan has a regulatory role under three state review processes:

- Act 250/District Environmental Commission Hearings (10 V.S.A., Chapter 151);
- Public Good Determination Hearings for electric generation or transmission facilities (30 V.S.A. §248, or “Section 248”)
- Solid waste facility certification (10 V.S.A. §6605).

Major developments are reviewed for conformance with any duly adopted local or regional plan under Act 250 or Section 248. If, however, a conflict exists between the local and regional plans, the regional plan will be given effect over the municipal plan if a proposed development has a “substantial regional impact.” See the Implementation Chapter for a definition of substantial regional impact.

The MARC works closely with its member towns in order to ensure that municipal plans are not in conflict with the regional plan. This synergistic relationship attempts to recognize potential concerns with Act 250 and Section 248 applications prior to their submission. In addition, the Land Use Panel of the Natural Resources Board that oversees the Act 250 process narrowly interprets “conflict” as only existing when one plan allows the project, but the other does not. In addition, state statutes require compatibility between regional and municipal plans.

1. Act 250

In the spring of 1970, the Vermont Legislature passed the Land Use and Development Act (Act 250) in order to address growth in the 1960s resulting from the opening of I-89 and I-91, development of the IBM facility in Essex Junction, and expansion of ski tourism in Vermont. Act 250 (10 V.S.A., Chapter 151) establishes a state land use permitting process in order to protect the environment.

The law created nine District Environmental Commissions, consisting of three members appointed by the Governor, to review large-scale development projects and subdivisions using 10 criteria that address environment, aesthetic and community impacts. The District Environmental Commissions have jurisdiction over any project that encompasses more than 10 acres, or more than 1 acre for towns that do not have permanent zoning and subdivision bylaws. (See **Table 1.1** for a listing of one- and ten-acre towns.) The law also applies to any development project with more than 10 housing units or housing lots; and may also apply for construction proposed above 2,500 feet of elevation.

TABLE 1.1 – ONE- AND TEN-ACRE TOWNS FOR ACT 250 JURISDICTION	
1-Acre Towns	10-Acre Towns
Cavendish	Andover
Reading	Baltimore
	Chester
	Ludlow
	Springfield
	Weathersfield
	West Windsor
	Windsor

Source: VT Natural Resources Board (July 22, 2022).

Act 250 also created the Vermont Environmental Court to review appeals coming from District Commission rulings.

The Act 250 process allows for the review and comment on all eligible applications by municipal governments, local and regional planning commissions, the state of Vermont, along with other interested parties. Before a proposed development receives approval, it must meet the ten criteria set forth in 10 V.S.A. §6086, which are detailed on the [State Natural Resources Board website](#) and summarized below:

Criterion 1: Air and water pollution

- 1(A): Headwaters
- 1(B): Waste disposal
- 1(C): Water conservation
- 1(D): Floodways
- 1(E): Streams
- 1(F): Shorelines
- 1(G): Wetlands

Criterion 2: Water supply

Criterion 3: Impact on water supply

Criterion 4: Erosion and capacity of soil to hold water

Criterion 5: Transportation

5(A): Traffic

5(B): Transportation

Criterion 6: Educational services

Criterion 7: Municipal services

Criterion 8: Aesthetics, scenic and natural beauty

Historic sites

Historic sites – archaeology

Rare and irreplaceable natural areas

8(A): Necessary wildlife habitat

Criterion 9:

9(A): Impact of growth

9(B): Primary agricultural soils

9(C): Productive forest soils

9(D): Earth resources

9(E): Extraction of earth resources

9(F): Energy conservation

9(G): Private utility services

9(H): Costs of scattered development

9(J): Public utility services

9(K): Public investments

9(L): Settlement patterns (*formerly* "Rural growth areas")

Criterion 10: Local and regional plans

2. Section 248

The development and construction of electrical generation facilities, electrical transmission facilities, and some gas pipelines are regulated by the Public Service Board created by the Vermont Legislature under (30 V.S.A. §248). The Public Service Board has been granted partial judicial power to conduct hearings and issue decisions. The Board consists of three members, appointed by the Governor, serving staggered terms. Prior to undertaking a proposed project, an involved party must receive a "Certificate of Public Good" from the Board.

Under the Section 248 review process, projects are evaluated to determine if they serve the general public good. Pursuant to 30 V.S.A. §248(b), criteria to receive a Certificate of Public Good include:

- Orderly development of the Region with due consideration of Town and Regional Plans;
- Need for present and future demand;
- System stability and reliability;
- Economic benefit;
- Undue adverse impacts on aesthetics, historic sites, air and water purity, natural environment, public health and safety, and Act 250 Criteria 1-8 and 9(K);
- Consistent with company's approved least cost integrated plan;
- Consistent with the VT Department of Public Service's electric energy plan; and
- Does not affect designated outstanding resources waters.

Projects subject to Section 248 review, including net-metered private wind turbines, are exempt from local regulations. However, the impacted municipality and regional planning commission may participate as interveners in the proceedings.

3. Solid Waste Facility Certification

All towns, whether in a solid waste district or not, must adopt a Solid Waste Implementation Plan, which must be in conformance with the Regional Plan in accordance with 24 V.S.A., Chapter 61, §2202(a). The certification process for solid waste facilities will consider if the SWIP is in conformance with the town and regional plans (10 V.S.A., Chapter 159, §6605).

E. Goals, Policies, and Recommendations Defined

The needs of a growing population, the events and consequences that lead to a declining population, and the health of the environment and economy all require the attention of regional and local planning commissions. The goals and policies listed below are general overriding statements of the desired principles that should guide the growth and development of the Region and protect the natural and built environment. The goal and policy statements should be taken within the context of the information and analysis contained in the chapters which follow.

Goals - *Broad statements of what the Region ultimately wants to achieve. Goals reflect realistic intentions regarding a particular resource. They are not placed within a specific time frame. Specific goals are developed for each section of this Plan.*

Policies - *Agreed-upon courses of action to be followed to achieve the goals. Policies contain the principles or standards that guide the choices of implementation measures used to reach the Plan's goals.*

Recommendations - *Suggestions for specific actions to be carried out to reach the stated goals and policies.*

The following Regional Goals and Policies are consistent with the Vermont Planning Goals established by statute (24 V.S.A. §4302):

Regional Goals

1. To achieve a reasonable balance between protection of natural resources and growth in a way that maximizes the potential for both.
2. To assist all member communities in developing effective town plans and implementation documents.
3. To foster a spirit of communication and cooperation between all member communities, and with other governmental entities, and to act as a mediator when disputes arise.
4. To support the efforts of local member governments and serve as a bridge between local and state planning efforts.
5. To provide opportunity for citizen participation at all stages of the planning process.
6. To identify housing needs throughout the Region and to encourage the development and rehabilitation of housing that will meet the needs of all regional residents regardless of social characteristics or income.
7. To preserve the historical settlement patterns and rural character of the Region and to maintain the integrity of its villages.
8. To create and maintain efficient public facilities and services, including but not limited to child care, adequate to meet existing and foreseeable future needs.
9. To provide educational and vocational opportunities that will allow all residents to make the most of their abilities.

10. To develop an economic environment that will support the continuation of traditional land use activities, including sustainable agriculture, forestry, manufacturing, and commerce at scales consistent with the existing land use patterns of the Region.
11. To develop a transportation system that balances the needs of safety, convenience, cost, energy efficiency, environmental protection, economic growth, and recreation.
12. To further the Vermont Planning Goals found in (24 V.S.A. §4302).
13. To welcome people of all backgrounds to southern Windsor County, to commit to the fair, equitable and inclusive treatment of everyone in the Region, and to be a place where individuals can live freely and safely express their opinions.

Regional Policies

1. All inhabitants and wildlife should be provided with a healthy living environment through improvement and maintenance of the air, water, and soil quality.
2. Natural resource use that ensures the protection of sufficient renewable resources for future generations and provides for reasonable economic return should be supported.
3. Irreplaceable natural and fragile areas, outstanding water resources, rare and endangered species and their habitats, and significant scenic features should be protected and preserved.
4. Regionally significant natural, cultural, and archeological features, and historic sites and buildings should be protected and preserved.
5. Cooperation and coordination among member towns is encouraged in planning for growth and development, to enable an evaluation of the potential for regional and inter-jurisdictional impacts.
6. All appropriate agencies should cooperate in the development and maintenance of a safe and efficient regional transportation system that meets the vehicular and pedestrian needs of all residents with minimum impact to the Region's environmental and aesthetic qualities.
7. Environmentally benign or beneficial economic development that will provide desirable jobs for regional residents, reduce unemployment, improve per capita income, enhance the local tax base, and maintain the character of the Region should be promoted.
8. Energy efficiency and conservation, the development of renewable resources, and the use of alternative energy sources are encouraged.
9. The manufacturing and marketing of local value-added agricultural and/or forest products is encouraged.

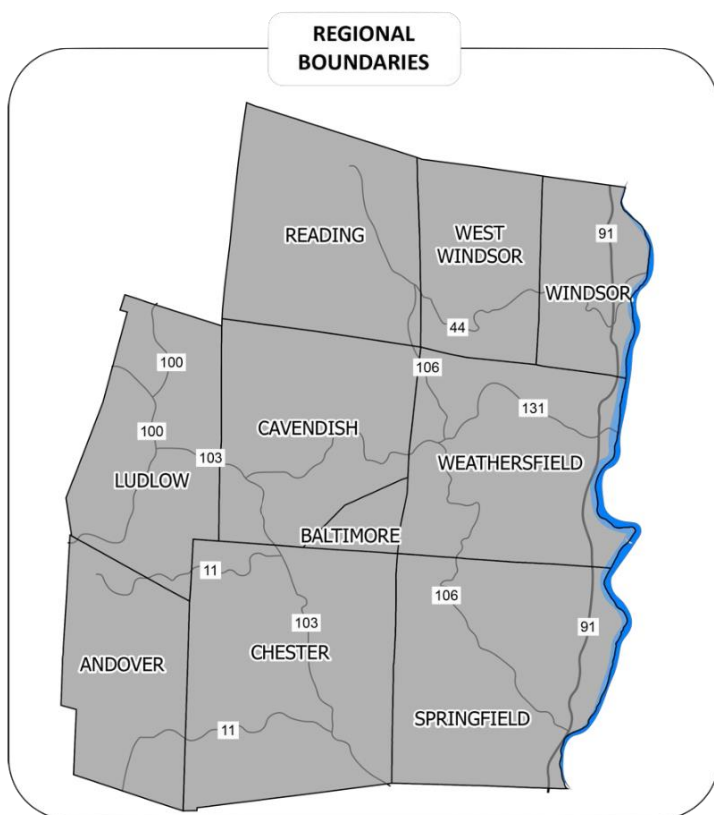
10. The provision and enhancement of recreational opportunities for all residents, and promotion of tourism-related economic development that furthers the goals of this Plan should be encouraged.
11. The protection of significant agricultural and forested land, through incentives and measures which discourage the subdivision or fragmentation of large parcels of such land is encouraged.
12. Efficient infrastructure adequate to support economic or other growth should be created prior to development.
13. Land use and development patterns that are consistent with the long- range goals and policies of local communities, the Region, and the adjoining towns in other regions should be promoted.
14. The region is comprised of diverse, inclusive, and livable communities that meet the needs of people of all ages, incomes, and abilities.

CH 2: REGIONAL PROFILE

Background

This chapter provides a historic review of the demographic, economic, and social factors that have influenced the Region. Data profiles are an important tool in the planning process as they give insight into current conditions along with historic patterns of change and those areas that will need particular attention in the future.

A. Background of the Region



The Region is comprised of ten towns including their villages, hamlets, and dispersed populations. The member towns are Andover, Baltimore, Cavendish, Chester, Ludlow, Reading, Springfield, Weathersfield, West Windsor, and Windsor. The Region is in southeastern Vermont, along the Connecticut River, with Windham County to the south, Rutland County and the Green Mountains to the west, and the remainder of Windsor County to the north. The climate is generally temperate with moderately cool summers and cold winters; as in the rest of Vermont, it creates ideal conditions for summer and winter recreation, spectacular fall foliage, and springtime sap runs. The

weather is unpredictable, and large variations in temperature, precipitation, and other conditions may occur both within and between seasons and across different parts of the region.

B. Physiographic Characteristics

Tectonic impact and glaciation have contributed to the physiographic diversity of the Region. The land is hilly and wooded with moderate to steep slopes. Southern Windsor County contains a broad range of landforms, from the rocky, acidic soils, spruce-fir forests and beech stands of the Green Mountains, to the fertile, sandy soils and white pines of the Connecticut River valley, and the hill farms, orchards, woodlots, and sugar bushes in between. The shallow upland soils tend to be dominated by bedrock, with small, dispersed sites containing "enriched" organic deposits. Soils along the Connecticut are deeper and more fertile, having been deposited by rivers of glacial melt, or by Lake Hitchcock, which covered a large part of the valley ten to twelve thousand years ago.

Much of the Region remains undeveloped or sparsely developed due to the physical constraints imposed by the terrain. Rivers and streams are interspersed throughout the Region, flowing south and east to the Connecticut River. The combination of mountains, streams, valleys, and rocky land has resulted in areas with outstanding geologic features such as Cavendish Gorge and various other peaks, gorges, cascades, and waterfalls. The three principal rivers are the Connecticut River, the Black River, and the Williams River. The broad Connecticut valley holds fertile agricultural land (discussed further in the Plan's Land Use, Natural Resources, and Cultural and Aesthetic Resources chapters), while the narrower and steeper Black and Williams valleys have traditionally been home to sawmills, woolen mills, gristmills, and small hydroelectric power dams. Numerous lakes, ponds, and wetlands comprise the remainder of the Region's surface water features.

Dominant physiographic land features in the Region include two mountains - Okemo Mountain (in Ludlow and Mount Holly) and Mt. Ascutney (shared by Windsor, West Windsor, and Weathersfield) - with elevations over 3,000 feet above sea level. Mt. Ascutney is an example of a monadnock, an isolated mountain of erosion-resistant rock rising above a surrounding area worn flat by water and ice. In addition, Terrible Mountain in Andover is over 2,800 feet in elevation and Hawks Mountain, shared by Cavendish, Baltimore, and Weathersfield, is nearly 2,100 feet above sea level.

C. Population

Vermont's earliest settlers, such as the Abenaki, lived and traveled according to the contours of the landscape and sources of food. Archeological evidence of indigenous settlements along the Connecticut River shows that the river was an important resource in this Region. Over the years,

transportation improvements and settlement patterns shifted in response to technological improvements and changing economic resources.

The following sections provide a detailed picture of population changes in the southern Windsor County Region since 1970.

1. POPULATION TRENDS

According to U.S. Census data from 1970 to 2020, populations in the Region’s towns have fluctuated (See Table 2.1 below), with the majority of the Region’s towns experiencing growth in population (Andover, Baltimore, Cavendish, Chester, Weathersfield and West Windsor). Out of towns, the highest growth was experienced in West Windsor (114.4%), and the highest decline in population was experienced in Ludlow (-28.2%). Despite this growth in the majority of towns, the overall population of the Region has declined over time, dropping from a population of 23,908 in 1970 to 23,543 residents in 2020, a 1.5% decrease, compared to the Vermont statewide population change, which increased by 40.5% since 1970.

Factors contributing to decreased population in the Region include the loss of major employers, (especially those in the machine tool industry), reductions in the average household size, the relatively high cost of living, difficulty to recruit new employees, and a lack of housing options. The COVID-19 pandemic has led to the conversion of second homes into primary residences and increased activity in the Region's real estate market driven by out-of-state buyers. Some pandemic migrants may become year-round residents in the Region. The recent increase of short-term rentals has also led to a decline of available long-term rentals. As of early 2022, it is too early to determine whether these trends will drive lasting population growth in the Region.

TABLE 2.1 REGIONAL POPULATION TRENDS 1970-2020							
Town	1970	1980	1990	2000	2010	2020	1970-2020 % Change
Andover	239	350	373	496	467	432	80.7%
Baltimore	170	181	190	250	244	312	83.5%
Cavendish	1,264	1,355	1,323	1,470	1,367	1,302	3%
Chester	2,371	2,791	2,832	3,044	3,154	3,036	28%
Ludlow	2,463	2,414	2,301	2,499	1,963	1,769	-28.2%
Reading	564	647	614	707	666	439	-22.2%
Springfield	10,063	10,190	9,579	9,078	9,373	8,935	-11.2%
Weathersfield	2,040	2,534	2,674	2,788	2,825	2,740	34.3%
West Windsor	571	763	923	1,067	1,099	1,224	114.4%
Windsor	4,158	4,084	3,714	3,756	3,553	3,354	-19.3%
Region	23,908	25,309	24,524	25,105	24,711	23,543	-1.5%

Source: U.S. Census Bureau (1970-2010 Decennial Census, 2020 American Community Survey 5-Year Estimates – Table B01001 - Sex by Age)

2. AGE CHARACTERISTICS

The Region's population is aging, with 24.1% (5,677) of residents falling within the 65+ age bracket according to 2020 Census data, while the Region's proportion of school age children (ages 18 and under) continues to decline in the same way it has since 1970, declining from 19.3% to 17.2% of the Region from 2010 to 2020. As of 2020, the town with the highest percentage of residents age 18 and under was Baltimore (25.6%), while the town with the highest percentage of the population aged 65+ was Chester (29.8%).

The 18-64 age group (U.S. Census changed this to 20-64 in 2000), which represents the labor force, has remained relatively stable since 1980. From 1990 to 2000, only Springfield and Windsor experienced declines in this age group, again probably due to subsequent employment losses. From 2000 to 2010, half of the Region's towns experienced growth in this population, Windsor having the greatest increase at 4.8%, with Springfield following with an increase of 3.8%, while West Windsor had the largest decrease in the Region with a decline of 1.1%. From 2010 to 2020, in the Region overall this age group decreased by 9.4%, with the largest increase in Baltimore (115%) and the largest decrease in Reading (-31%).

Regionally, the 65 and older age group, representing the retired and elderly, continued to increase from 1990 to 2000, but at a slower rate than the previous two decades. From 2000 to 2010, 80% of the Region's towns showed an increase in the 65 and older population, with Andover, Ludlow, Reading, Weathersfield and West Windsor showing the largest increases, ranging from 4.3 to 4.8%. Springfield and Windsor were the only towns to show decreases, at 1.2 and 2.7%, respectively. From 2010 to 2020, this aging population in the Region increased by 20.8% overall, with the largest increases in Chester (73%) and Springfield (30.4%). In terms of decreases, Andover and Weathersfield exhibited the most significant decreases with percent changes of 19.6% and 8.6% respectively.

D. Economy

1. ECONOMIC TRENDS

Southern Windsor County belongs to a region which earned the nickname "Precision Valley" early in the twentieth century. The large numbers of companies specializing in precision manufacturing created wealth and a high standard of living. Opportunities were available to anyone willing to invest the time and energy to master requisite skills up through the 1970s.

Since the 1970s, many of the large machine tool firms sold off their industrial sites or abandoned them in bankruptcy reorganizations. Despite economic development measures and programs, and the fact that the "Precision Valley" is located near institutions of higher education and has infrastructure more conducive to manufacturing, it has yet to fully recover.

2. POVERTY AND WAGES

According to the U.S. Census, as of 2020, approximately 421 (7%) of the Region’s 5,985 families were below poverty level, approximately a 17% decrease from 2010. In addition to this decrease in families below the poverty level, the average median family income in the Region has increased by roughly 24.3% from 2010, from \$62,619 to \$77,828. In the Region, Chester had the highest median family income (\$104,948), while Ludlow had the lowest, at \$58,594. However, despite increases in income, compared to the 2020 statewide average annual wages (\$54,075), all of the towns in the Region fell short, with Springfield having the highest average annual wages in the Region with \$52,479, a number that did however surpass the average value for Windsor County (\$51,962).

TABLE 2.2 POVERTY STATUS OF FAMILIES IN THE REGION OVER THE LAST 12 MONTHS (2020)								
Town	Total Number of Families		Families Below Poverty Level		Families at or Above Poverty Level		Percent Change (2010-2020)	
	2010	2020	2010	2020	2010	2020	Below	At/Above
Andover	133	117	0	4	133	113	N/A	-15%
Baltimore	63	87	1	14	62	73	1300%	17.7%
Cavendish	381	311	19	8	362	303	-58%	-16.3%
Chester	954	871	71	19	883	852	-73.2%	-3.5%
Ludlow	575	445	43	39	532	406	-9.3%	-23.7%
Reading	231	123	4	0	227	123	-100%	-45.8%
Springfield	2,590	2,117	237	263	2,353	1,854	11%	-21.2%
Weathersfield	845	726	31	42	814	684	35.5%	-16%
West Windsor	286	330	9	0	277	330	-100%	19.1%
Windsor	760	858	92	32	668	826	-65.2%	23.6%
Regional	6,818	5,985	507	421	6,311	5,564	-17%	-11.8%

Source: U.S. Census Bureau (2020 ACS 5-Year Estimates (Table B17013 – Poverty Status In The Past 12 Months of Families By Household Type By Number of Persons in Family))

TABLE 2.3 MEDIAN FAMILY INCOME BY TOWN (2010-2020)		
Town	Median Family Income (2010 Inflation-Adjusted Dollars)	Median Family Income (2020 Inflation-Adjusted Dollars)
Andover	\$54,531	\$92,250
Baltimore	\$70,625	\$78,750
Cavendish	\$57,792	\$70,938
Chester	\$61,484	\$104,948
Ludlow	\$58,869	\$58,594
Reading	\$67,250	\$70,313
Springfield	\$50,833	\$62,917
Weathersfield	\$62,306	\$79,118
West Windsor	\$86,250	\$95,833
Windsor	\$56,250	\$64,615
Regional Average	\$62,619	\$77,828

Source: U.S. Census Bureau (2020 ACS 5-Year Estimates (Table B19113 – Median Family Income in the Last 12 Months [In 2010 Income-Adjusted Dollars], Median Family Income in the Last 12 Months [In 2020 Income-Adjusted Dollars])

TABLE 2.4 ANNUAL WAGES IN THE REGION (2020)	
Town	Average Annual Wages
Andover	\$35,687
Baltimore	No data available
Cavendish	\$41,304
Chester	\$47,263
Ludlow	\$39,419
Reading	\$45,903
Springfield	\$52,479
Weathersfield	\$45,106
West Windsor	\$47,320
Windsor	\$51,583
Windsor County	\$51,962
Vermont	\$54,075

Source: <https://www.housingdata.org/profile/income-employment/wages>, Vermont Department of Labor

TABLE 2.5 RESIDENTS EMPLOYED BY INDUSTRY TYPE							
Industry By Sector	2000		2010		2020		
	Employed Residents	% of Total Industries*	Employed Residents	% of Total Industries*	Employed Residents	% of Total Industries*	% Change 2000-2020
Services	2,879	22.2%	5,969	23.4%	6,138	56.5%	113.2%
Manufacturing	2,273	17.5%	1,422	18.4%	1,160	10.7%	- 49%
Trade	1,709	13.2%	1,736	13.9%	1,094	10.1%	- 36%
Construction	904	7%	1,075	7.3%	814	7.5%	- 10%
Finance/Ins./Real	501	3.9%	426	4.1%	649	6%	29.5%
Tran./Util./Comm	760	5.9%	465	6.2%	273	2.5%	- 64.1%
Ag./Forest/Min.	319	2.5%	268	2.6%	273	2.5%	- 14.4%

*Includes industries not listed in this table, based on total employed residents in all industries (2010 = 12,315 residents, 2020 = 10,862 residents)

Source: U.S. Census Bureau (2010 & 2020 ACS 5-Year Estimates (Table C24030 – Sex by Industry for the Civilian Employed Population 16 Years and Over)

E. Housing

1. HOUSING UNIT GROWTH

According to U.S. Census data, there were 10,463 housing units in the Region in 2020, representing a 33% decrease since 2010 (15,619). The majority of households in the Region in 2020 are single-family homes (70%) with multi-family units comprising another 23%, and mobile homes representing the remaining 7%. From 2010 to 2020, just one of the Region’s towns (Baltimore) experienced increases in the number of housing units, illustrating a large decrease in housing units across the Region over the last decade. **Table 2.6** below illustrates how growth in total housing units in the Region’s ten towns has varied.

The Region has a significant need for housing as discussed in the Housing Chapter. A third of homeowners are cost burdened and more than half of renters are cost burdened (see Table 2.7). Residents at risk of homelessness have increased, especially during the pandemic. New housing options, especially of the so called “missing middle” types, are needed to provide homes for residents aging in place, starter homes, affordable housing and workforce housing.

TABLE 2.6 HOUSING UNIT GROWTH BY TOWN							
Town	2000		2010		2020		
	Housing Units	% of Region	Housing Units	% of Region	Housing Units	% of Region	% Change 2000-2020
Andover	350	2.5%	408	2.6%	159	1.5%	- 54.6%
Baltimore	113	0.8%	100	0.6%	114	1.1%	0.9%
Cavendish	852	6%	1,323	8.5%	473	4.5%	- 44.5%
Chester	1,611	11.3%	1,793	11.5%	1,421	13.6%	- 11.8%
Ludlow	3,001	21.1%	3,285	21%	839	8%	- 72%
Reading	404	2.8%	448	2.9%	209	2%	- 48.3%
Springfield	4,232	29.8%	4,324	27.7%	4,227	40.4%	- 0.1%
Weathersfield	1,315	9.3%	1,427	9.1%	1,003	9.6%	- 23.7%
West Windsor	716	5.1%	799	5.1%	494	4.7%	- 31%
Windsor	1,611	11.3%	1,712	11%	1,524	14.6%	- 5.4%
Region	14,205	100%	15,619	100%	10,463	100%	- 26.3%

Source: U.S. Census Bureau 2000-2010, (2020 ACS 5-Year Estimates (Table B25003 – Tenure))

TABLE 2.7 COST BURDEN BY TOWN – OWNERS (WITH MORTGAGES) & RENTERS (2020)								
Town	Paying Less than 30% of Income		Paying 30-49.9% of Income		Paying 50% of Income or more		Percent Cost-Burdened	
	Owners	Renters	Owners	Renters	Owners	Renters	Owners	Renters
Andover	46	1	10	21	14	0	34%	95%
Baltimore	34	4	15	0	4	3	36%	43%
Cavendish	125	16	20	27	35	26	30%	77%
Chester	444	84	61	44	19	28	15%	46%
Ludlow	158	196	70	28	61	58	45%	30%
Reading	56	13	17	0	32	8	47%	38%
Springfield	982	460	395	272	156	408	36%	60%
Weathersfield	424	19	159	2	18	19	29%	52%
West Windsor	165	22	53	16	27	11	33%	55%
Windsor	296	291	137	224	42	102	38%	53%

Source: U.S. Census Bureau (2020 ACS 5-Year Estimates (Table B25091 – Mortgage Status By Selected Monthly Owner Costs as a Percentage Of Household Income in the Past 12 Months, Table B25070 – Gross Rent As a Percentage Of Household Income in the Past 12 Months))

2. VACATION AND SECOND HOME DEVELOPMENT

In 2020, seasonal housing units made up roughly 38% of the Region’s housing stock, with 3,961 total units. **Table 2.8** breaks down this number by town. From 2010 to 2020, the number of seasonal housing units in the Region jumped slightly, with an increase of 269 new seasonal units. From 2010 to 2020, 80% of the Region’s towns’ numbers of housing units increased, with only Baltimore and Springfield showing decreases. Due to the recreational opportunities Okemo Mountain Resort and the lakes region have to offer, Ludlow holds the largest number of seasonal units in the Region, at 2,197 as of 2020. West Windsor also shows an increasing trend, influenced in part by local efforts to expand recreational opportunities.

During the COVID-19 pandemic, many second home owners stayed in their vacation homes more permanently and many out-of-staters bought properties in the Region. It is not clear at this point the proportion of these individuals that will become year-round residents or move back to their primary homes elsewhere.

TABLE 2.8 SEASONAL HOUSING UNIT GROWTH BY TOWN (2020)				
Town	2000	2010	2020	% Change 2000-2020
Andover	110	174	202	83.6%
Baltimore	3	7	0	- 100%
Cavendish	195	303	417	113.8%
Chester	261	317	453	73.6%
Ludlow	1,871	2,195	2,197	17.4%
Reading	94	142	152	61.7%
Springfield	150	134	64	- 57.3%
Weathersfield	103	102	118	14.6%
West Windsor	226	264	294	30.1%
Windsor	30	54	64	113.3%
Region	3,043	3,692	3,961	30.2%

Source: U.S. Census Bureau (2020 ACS 5-Year Estimates (Table B25004 – Vacancy Status))

G. Transportation

1. TRANSPORTATION TRENDS

Because of the largely rural nature of Vermont, automobile transportation is essential to everyday life. This prominence of automobile use is evident when looking into the state’s transportation statistics, as total vehicle miles traveled show a consistent increase from 2000 to 2010. The resulting wear and tear from this increased roadway traffic will require significant investment. However, these numbers dip back down in 2020 which could be the result of the COVID-19 pandemic and its effect on how often people were traveling, as more residents worked from home and avoided unessential travel, leading to less overall roadway usage.

TABLE 2.9 VEHICULAR TRANSPORTATION TRENDS IN VERMONT					
Category	2000	2010	2020	% Change 2000-2010	% Change 2010-2020
Population	608,827	625,741	624,340	2.8%	- 0.2%
Motor Fuel Use (Gal.)	411,065,000	388,998,000	323,840,199	- 5.4%	- 16.7%
Total Vehicle Miles Traveled	6,553,996,076	7,250,000,000	5,990,600,000	10.6%	- 17.4%
Automobile Registrations	388,773	290,000	193,407	- 25.4%	- 33.3%
Truck Registrations	137,611	271,544	384,462	97.3%	41.6%
Total Motor Vehicle Registrations	637,671	566,650	607,890	- 11.1%	7.3%
Total Miles of Highway	14,275	14,189	14,248	- 0.6%	- 0.4%

Source: U.S. Census Bureau (2020 ACS 5-Year Estimates (Table B01001 – Sex by Age), Federal Highway Administration (FHWA), Vermont Agency of Transportation (VTTrans)

A transportation system that safely and efficiently accommodates the mobility needs of commuters and businesses is essential to growing and strengthening the regional economy. Maintaining good access to major market areas by keeping existing infrastructure in good working condition and in addition to making freight, commuter, and tourist travel more efficient through intermodal connections is key.

Because the regional economy lags behind economic growth in Vermont and in the Upper Valley, a growing number of commuters will travel outside of the Region for employment, causing a spike in single-occupant vehicle use. In order to combat this upward trend, other modes of travel should be marketed and made available to employees by businesses. Infrastructure improvements such as expanded or new park-and-ride lots and increased fixed-route transit services would also provide commuters with cheaper and more efficient travel options.

2. Regional Commuting Patterns

According to the U.S. Census Bureau, in 2020 there were 6,626 residents in the Region who commute to work outside their town of residence, equating to 62%. Since 2000, the number of residents who live and work within the Region has decreased greatly, as more residents seek job opportunities outside their home towns. However, there has been an increase in the number of commuters coming into the Region from other areas to work. The traffic generated by these workers, particularly during peak hours, provides insight into the Region's commuter traffic

patterns. Public transportation providers within the Region have noted that since 2000, commuting has increased particularly between Springfield/Weathersfield and the Upper Valley.

TABLE 2.10 COMMUTING TRENDS IN THE REGION (2020)					
Town	Total Employed	Residents who Work in Town of Residence		Residents who Work Outside Town of Residence	
		2020	2020	2020	2020
Andover	186	43		143	
Baltimore	146	14		132	
Cavendish	592	150		442	
Chester	1,511	668		843	
Ludlow	779	469		310	
Reading	256	74		182	
Springfield	3,656	1,897		1,759	
Weathersfield	1,274	212		1,062	
West Windsor	566	61		505	
Windsor	1,730	482		1,248	
Region	10,696	4,070	38%	6,626	62%

Source: U.S. Census Bureau (2020 ACS 5-Year Estimates (Table B08009 - Sex of Workers By Place of Work - Minor Civil Division Level for Selected States [CT, ME, MA, MI, MN, NH, NJ, NY, PA, RI, VT, WI], Table B23025 – Employment Status for the Population 16 Years and Over)

TABLE 2.11 COMMUTING TRENDS IN THE REGION (2010)					
Town	Total Employed	Residents who Work in Town of Residence		Residents who Work Outside Town of Residence	
		2010	2010	2010	2010
Andover	236	74		162	
Baltimore	118	15		103	
Cavendish	607	152		455	
Chester	1,719	895		824	
Ludlow	1,054	634		420	
Reading	373	56		317	
Springfield	4,381	2,303		2,078	
Weathersfield	1,423	258		1,165	
West Windsor	518	166		352	
Windsor	1,556	425		1,131	
Region	11,985	4,978	41.5%	7,007	58.5%

Source: U.S. Census Bureau (2020 ACS 5-Year Estimates (Table B08009 - Sex of Workers By Place of Work - Minor Civil Division Level for Selected States [CT, ME, MA, MI, MN, NH, NJ, NY, PA, RI, VT, WI], Table B23025 - Employment Status for the Population 16 Years and Over)

CH 3: LAND USE



Brownsville from Mt. Ascutney

A. Background

Settlement and land use patterns are among the most crucial aspects of how a region functions and grows. This plan places an emphasis on those patterns that characterize our region. The most common settlement pattern is the compact center surrounded by rural countryside. This quintessential Vermont landscape is found throughout southern Windsor County. It is the reason many people choose to live here and is the foundation of the Vermont brand, which benefits many of our region's businesses.

In order to maintain this settlement and land use pattern, most of our region's growth and development will need to occur in or near existing centers, where there is already a built environment and infrastructure to accommodate it, or where traditional settlement patterns and infrastructure can be reasonably extended as needed to accommodate growth over time.

Water and wastewater solutions are needed in some existing centers, such as Perkinsville and Felchville that presently rely on on-site systems.

This goal will be met primarily through town plans and local land use regulations. Towns will need to continue setting the stage for their own land use and development through responsible planning that takes into account settlement and land use patterns in the area and the needs of current and future residents. This regional land use plan is intended to provide a guiding framework for coordinated land use planning and regulation at the municipal level. The Mount

Ascutney Regional Commission¹ (MARC) consulted our towns' existing municipal land use plans while formulating this regional plan. The regional land use plan seeks to develop policies that balance support for local land use goals and objectives with support for regional compatibility between communities. When reviewing future town plans, the MARC will consider whether local land use plans are consistent with this regional land use plan. In most instances, the policies of this plan will bolster and supplement those found in the current land use plans and regulations of southern Windsor County towns. Only in the case of a conflict between local and regional policies with regard to a regionally significant project, will this regional land use plan take precedence over a town plan.

The regional land use plan also has a role in state planning and regulation. Development activities that are subject to certain state permits need to demonstrate conformance with this regional land use plan.

As stated by the Vermont Climate Action Commission, global climate change is a fundamental threat to Vermont, to our economy, environment, and way of life. The regional land use plan seeks policies to adapt to become more resilient in face of the anticipated impacts of climate change. That includes making our community centers resilient and more attractive places to locate, promoting energy efficiency and energy conservation, and maintaining a rural working landscape that is connected, resilient and functioning. For more information and policies regarding this, see the natural resources and emergency management chapters and the enhanced energy plan for the region.

¹ The Southern Windsor County Regional Planning Commission (SWCRPC) officially changed the organization's name to Mount Ascutney Regional Commission (MARC) on January 1, 2021.

Land Use Goals

To maintain the historic settlement pattern of compact centers surrounded by a rural countryside. To achieve the desired future land use and development patterns, development in the region must positively contribute toward:

- 1. Supporting a vibrant economy;**
- 2. Providing infrastructure that supports the goals of this Plan;**
- 3. Avoiding sprawl;**
- 4. Maintaining viable farms and forests;**
- 5. Encouraging energy conservation and climate adaptation;**
- 6. Promoting flood resiliency; and,**
- 7. Protecting sensitive ecological resources.**

B. Land Use Classifications

This land use chapter is formulated around six land use classifications that represent a progression from the least developed to the most developed areas in our region, as well as other more specialized land use categories, as shown on the Future Land Use Map. See the descriptions of each land use classification on the following pages.



In addition to the six land use classifications described above, the following other land use classifications that have special characteristics are also shown on the Future Land Use Map and described in more detail in the next section of this chapter:

SPECIAL USE AREAS

1. RIPARIAN AREAS
2. RESORT AND RECREATIONAL AREAS
3. INTERCHANGE
4. COMMERCIAL NODES AND CORRIDORS
5. INSTITUTIONAL
6. INDUSTRIAL



Conservation



Working Lands



Rural Residential



Hamlets & Village Centers



Residential Neighborhood



Town & Regional Centers

Least Developed

Most Developed

CONSERVATION. This land use classification includes lands that are protected from development through public ownership or conservation easements, as well as large blocks of forest land that are largely undeveloped. Some of these lands have physical constraints such as high elevations, steep slopes, or shallow soils. Much of the land is not readily accessible from year-round maintained roads. These factors combine to make these lands poorly suited for development.



Conservation lands are an essential element of our region’s landscape and are part of the rural countryside this plan seeks to preserve. They provide ecological services – such as wildlife habitat, floodwater reduction, soil retention, carbon sequestration, recreation, and scenic beauty – that make them a valuable resource for our region. The recreational use of conservation lands contributes to the quality of life enjoyed by our region’s residents and to the tourism industry that is a significant component of our regional economy.

The most suitable uses of conservation lands are wildlife habitat and nature preserves, forestry and agriculture, hunting and fishing, outdoor recreation and seasonal camps, environmental education, flood attenuation and groundwater recharge, and similar low-intensity uses that leave the land in a primarily undeveloped, natural state. Conservation lands are generally not appropriate for residential development or for extensions of infrastructure, including but not limited to roads and utilities, that would facilitate further development.

It is our vision that conservation lands will contribute to the environmental, social, and economic well-being of our region and will remain in a largely undeveloped state for the benefit and enjoyment of future generations. To achieve this, MARC will encourage and assist towns to enact effective land use plans and controls intended to guide future residential development away from conservation lands and to limit forest fragmentation and development on land with significant natural resource constraints. On conservation lands, the overall density of residential development allowed is not to exceed 1 dwelling unit per 10 acres.



WORKING LANDS. This land use classification includes rural lands used for farming, forestry, resource extraction, renewable energy generation, and other resource-dependent land use activities. These lands generally remain in large tracts and large areas are actively managed for production. A significant portion of these lands have high quality soils that are necessary to support viable farming and forestry operations. This classification also includes undeveloped lands that are not

readily accessible from year-round maintained roads or that may have physical constraints that make them poorly suited for development.

Farming and forestry are the foundation of our region's rural economy and maintain the working landscape that is valued by residents and visitors alike. Alongside conservation lands, working lands are an essential element of our region's character and are part of the rural countryside this plan seeks to preserve. Fragmentation and conversion of these lands to residential or other uses that are not resource-based weakens that foundation and our region's overall economic health. The proliferation of residential or other uses that are not resource-based also decreases the viability of traditional working land uses due to the potential for conflicts over off-site impacts of working lands such as odors, dust, noise, traffic, etc. The most suitable uses of working lands are agriculture and forestry, farm owner and labor housing, rural enterprises, resource extraction, renewable energy generation, outdoor recreation, hunting and fishing, environmental or agricultural education, wildlife habitat and nature preserves, flood attenuation, groundwater recharge, and similar land-based or resource-dependent uses.

It is our goal that the region's working lands will continue to be actively managed for rural production. To achieve this, MARC will encourage and assist towns to enact effective land use plans and controls intended to guide future residential development away from working lands and to limit the conversion and fragmentation of productive farm and forest land. Where the goal is to maintain working lands, the overall density of residential development allowed is not to exceed 1 dwelling unit per 10 acres.



RURAL RESIDENTIAL. This land use classification encompasses rural areas where residential development has displaced farming or forestry as the primary land use. These areas may share many physical characteristics with the region’s working lands, but more of the land has been subdivided into residential lots and is no longer configured to support larger- scale or intensive rural production. These areas may

include farm and forest lands, but agricultural or timber management activities are more likely to be secondary income sources, hobby farms, or homesteading operations.

Through context-sensitive approaches to siting and design, housing can be accommodated in these rural settings in a manner that protects the productive, ecological, and/or scenic value of these lands provided that the overall density of development in the area remains low. There should continue to be a mix of undeveloped lands, working lands, and residential lands in this classification. Most of the region’s new housing should not be located in rural residential settings, but should be guided into existing settlement areas or adjoining areas designated for future growth. The most suitable uses of rural residential lands are agriculture and forestry, rural enterprises, renewable energy generation, outdoor recreation, hunting and fishing, environmental or agricultural education, wildlife habitat and nature preserves, flood storage, housing, and similar low-impact uses.

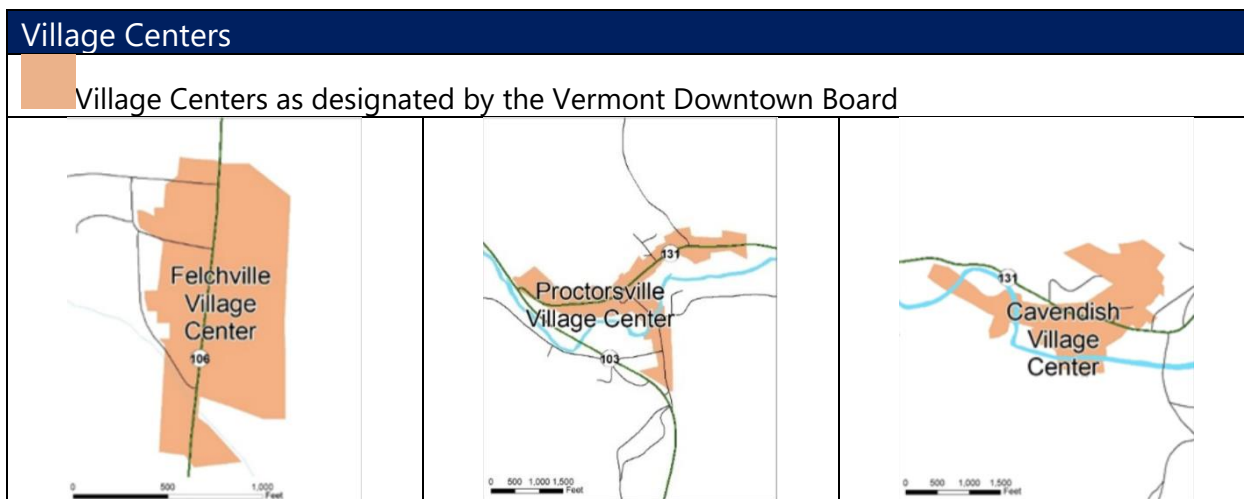
It is our vision that the rural residential areas throughout the region will continue to provide primarily single-family housing in a rural setting that maintains open space between developed sites and offers views of the surrounding natural or agricultural landscape. Accessory dwellings, two-family housing and co-housing are also suitable for rural residential areas. The development pattern will remain irregular (ex. variation in lot sizes and building design) and will respond to the topography and other natural features of the land. Given the absence or limited capacity of the public infrastructure (roadways, water, sewer) serving these areas, large-scale, high-density or rapid development that would significantly increase the amount of housing in these areas is not appropriate. To achieve this, MARC will encourage and assist towns to enact effective land use plans and controls intended to discourage further encroachment of rural residential development into areas designated as working lands or conservation areas. Where the goal is to accommodate rural residential development, the overall density of residential development allowed should not exceed 1 dwelling unit per 2 acres, and local regulations should guide the siting and design of new homes in a manner that preserve rural character and open space.

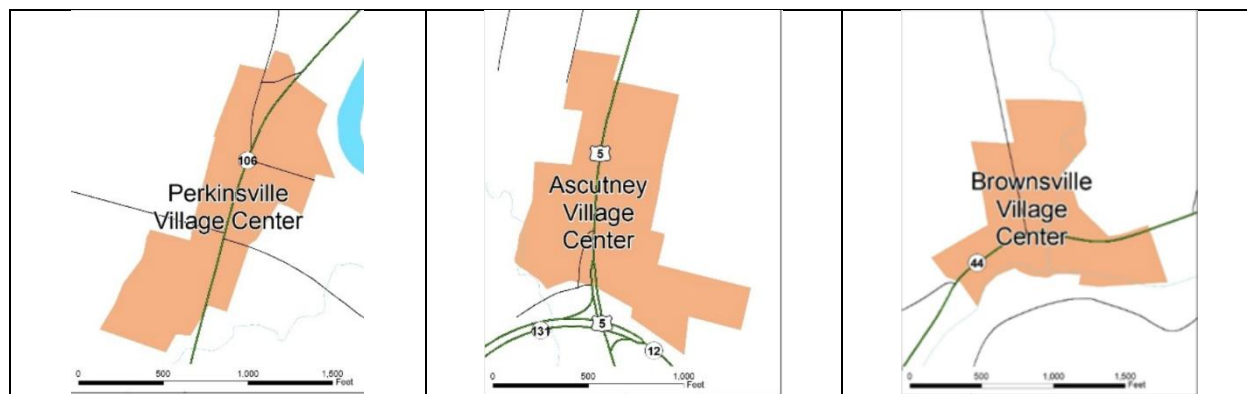


HAMLETS AND VILLAGE CENTERS. This land use classification recognizes the smaller traditional centers in our region that developed historically in locations with economic value such as sites with waterpower for mills, crossroads where travelers would stop, or railroad stations where agricultural products could be shipped to urban markets. They also served as the focus of community life with schoolhouses, churches,

cemeteries, and other civic institutions that had to be located relatively close to where people lived prior to the advent of the automobile. Most of the hamlets have long since lost any economic activity or civic function and remain solely as small residential clusters. The village centers, alternatively, have often retained some level of commercial activity such as a general store or inn, and/or active civic functions such as a school, church, library, or grange hall.

Village Centers shown on the Future Land Use Map are generally consistent with the 2020 boundaries for the state-designated Village Centers as shown below. For those villages that do not presently have designation, the Future Land Use Map approximates a boundary for each community center.





Many of these areas are suitable for infill development, more intensive use of existing buildings, and redevelopment of obsolete or abandoned structures or sites. The most suitable uses of hamlets and village centers are housing, small-scale commercial and light industrial uses, civic uses, and similar low-impact uses. Village centers may accommodate future growth and infill or redevelopment, while hamlets should remain in their current form and density without significant growth or change in the character or intensity of development.

Most of our region’s town plans call for guiding future growth and development to their hamlets and village centers. However, the lack or limited capacity of water and/or sewer infrastructure constrains development potential within many of our region’s hamlets and village centers. Many of the hamlets and village centers are located along streams or rivers and include lands, structures, and infrastructure that are at risk of flood-related damage. These challenges will need to be addressed to achieve the land use and settlement pattern envisioned by state, regional, and local plans.

It is our vision that the hamlets and village centers will retain their historic role and character as focal points in the rural landscape and major contributors to the sense of place and identity of the region’s rural towns. Our hamlets and village centers will continue to be the hearts of their towns, hosting civic buildings and uses, and providing the gathering places that sustain a sense of community. The hamlets and village centers will remain compact with distinct edges, and will not sprawl into the surrounding countryside with scattered, low-density development along roadways. Historic buildings will be rehabilitated and/or adapted for new uses in a manner that maintains or restores their architectural integrity. New development will be designed and sited in a manner that is compatible with and reinforces the traditional built pattern. Where appropriate and feasible, infrastructure will be provided within hamlets and village centers to support higher intensity use of existing buildings and new infill development. The built environment in village centers will prioritize walking and bicycling over automobiles.

To achieve this, MARC will encourage and assist towns to enact effective land use plans and controls to guide growth to hamlets and village centers to the maximum extent feasible and

appropriate given factors such as the availability of infrastructure and land suitable for development. To maintain, and extend as appropriate, the traditional settlement pattern, the overall density of residential development allowed should be at least 1 dwelling unit to the acre in hamlets and 2 dwelling units to the acre in village centers.



NEIGHBORHOOD RESIDENTIAL. This land use classification encompasses the traditional residential neighborhoods that extend out from our traditional downtowns and village centers. They feature primarily single- and two-family homes on small lots, although closer to the downtowns there is more diversity of housing types and multi-family housing. Many of these neighborhoods are served by municipal water

and/or sewer infrastructure. They are pedestrian-oriented, featuring low-traffic neighborhood streets (often with sidewalks), and offer convenient access to the services and amenities located in our downtowns and nearby commercial areas. The cohesive and intact traditional development patterns create a strong sense of community in these neighborhoods.

It is the overall policy of this plan to guide most of the region's residential growth into existing settlement areas in and around the traditional centers. While these neighborhoods are largely developed, there remains some opportunity for appropriately scaled infill and modest densification within most existing neighborhoods and for development of new neighborhoods within areas served or planned to be served by municipal infrastructure. There is also a need for ongoing maintenance and rehabilitation of the older housing stock in many of these neighborhoods, particularly energy-efficiency improvements.

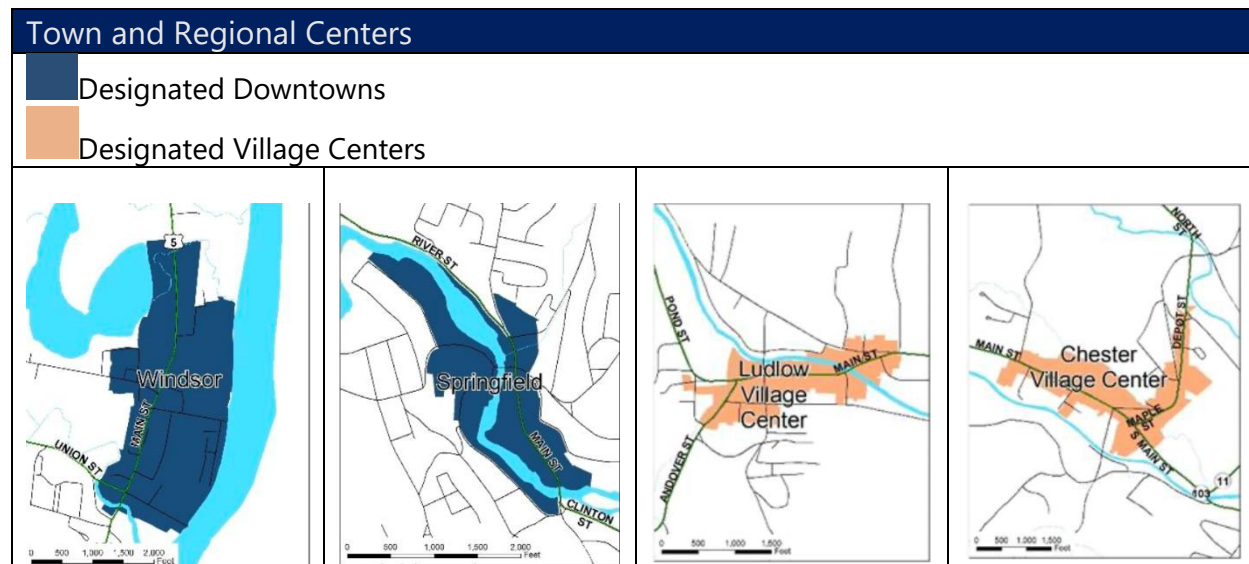
It is our vision that the neighborhood residential areas throughout the region will continue to function as they have historically – as high-density, primarily residential neighborhoods. The housing stock will be maintained and rehabilitated, as necessary. A limited amount of infill development will occur, but infill will be compatible with and not adversely affect the character or dramatically change the density of these neighborhoods. New neighborhood areas in proximity to existing centers may be created in a manner that logically extends the existing settlement pattern. The most suitable uses of neighborhood residential areas are housing, small-scale service and retail businesses that cater primarily to area residents, civic uses, and similar low-impact uses.

To achieve this, MARC will encourage and assist towns to enact effective land use plans and controls to accommodate infill and modest densification in a manner that will not dramatically alter the character of these neighborhoods. To maintain, and extend where appropriate, traditional neighborhood development patterns, local regulations and other policies or actions should seek to maintain and/or improve building quality and energy-efficiency, front yards and greenspace, and sidewalks and streetscapes in order to contribute to the quality of life and character of these neighborhoods. The density of residential development allowed in neighborhood residential areas should range from 3 to 12 dwellings per acre on average.



TOWN AND REGIONAL CENTERS. This land use classification includes the downtowns and commercial areas in our region’s four larger centers – Chester, Ludlow, Springfield, and Windsor. These centers continue to serve – as they did historically – as employment and service centers for the surrounding towns. They feature traditional downtown business districts characterized by historic buildings and settlement

patterns (multi-story buildings built at or close to the sidewalk), as well as commercial and mixed-use areas. These centers are largely served by municipal water and/or sewer infrastructure. The Town and Regional Centers shown on the Future Land Use Map are generally consistent with the 2020 boundaries for the state-designated Downtowns and the larger state-designated Village Centers as shown below.



Historically, there were distinct edges between these compact centers and the surrounding rural countryside. Auto-oriented development, particularly along the state numbered highways just outside the historic business districts and in some cases along the main streets within them, has frayed that traditional settlement pattern. As discussed in relation to the commercial nodes and corridors, the quality and character of the built environment in our downtowns and commercial areas can be preserved or enhanced through quality building and site design and the provision of streetscaping and sidewalks.

These centers have traditionally been and should continue to be the focus of growth and development in our region. They are suitable for infill development, more intensive use of existing buildings, and redevelopment of obsolete or abandoned structures or sites in a manner that is compatible with and reinforces the historic pattern, form, and character of the built environment. Revitalization of these town and regional centers is a primary goal of this plan.

It is our vision that town and regional centers will retain their historic role and character as traditional downtowns, and will be the focus of economic and community development. They will remain essential components of our region's sense of place and identity, and will host the civic uses and gathering places that sustain a sense of community. Town and regional centers may be used for a mix of commercial, industrial, civic, and high-density residential uses. The town and regional centers will remain compact with distinct edges and will not sprawl into the surrounding countryside with low-density and/or auto-oriented development along the highways that would undermine the economic viability of downtown businesses. Historic buildings will be rehabilitated and/or adapted for new uses in a manner that maintains or restores their architectural integrity. New development will be designed and sited to be compatible with and reinforce the traditional built pattern. Town and regional centers will be places where people can enjoyably and safely walk and bike – they will be designed for people rather than cars.

To achieve this, MARC will encourage and assist towns to enact effective land use plans and controls to guide future growth and development into the traditional centers. To maintain the traditional settlement pattern and encourage infill development, the overall density of development allowed should be at 4 dwelling units to the acre or higher. Local land use regulations should ensure that, in the downtown business districts, development will generally be in the form of mixed-use, multi-story buildings. These buildings should be built at or close to the edge of the sidewalk, with retail and service uses on the ground floor and office or residential uses above. Off-street surface parking will be located to the rear, side, or below buildings. While in commercial corridors, there may be single-use and single-story buildings that house retail, service, or light industrial uses that, due to their scale or character, are not well-suited to locating downtown. As these single-use, single-story buildings redevelop, it is expected that they take measures to better fit the intent of the location (e.g. add greenspace or landscaping, modify the building articulation, or increase building height). All new structures

within town and regional centers must be built to last with quality materials and architectural details that are compatible with nearby historic structures.

C. Special Use Areas

This land use chapter takes into account other future land use areas in our region that have special characteristics. These special use areas are shown on the Future Land Use Map.



RIPARIAN AREAS. The riparian areas serve as an overlay land use category, and include land along rivers, streams, lakes, ponds, and wetlands throughout our region. These areas have soil and vegetation characteristics that are strongly influenced by the presence of water and that distinguish them from surrounding lands. Historically, flooding, and the eroding and depositing of sediment that results, was the

predominate force shaping riparian areas. Now, human activities such as damming or channelizing streams, filling or draining wetlands, clearing streambank vegetation, and constructing impervious surfaces has altered, and in many cases adversely impacted, the natural dynamics and functions of riparian areas. Healthy riparian areas provide multiple benefits to our region such as:

- Helping control nonpoint source pollution (run-off from developed lands) by holding and using nutrients, and reducing the amount of sediment entering our surface waters;
- Offering recreation opportunities and contributing to the scenic beauty of our landscape;
- Supplying food, cover, and water for a diversity of animals and serving as migration and travel routes between habitats for a variety of wildlife;
- Reducing downstream floodwater velocity, erosion, and sedimentation, and flood peaks; and,
- Maintaining the water table and the base flow of streams and rivers.

It is our vision that riparian areas outside the developed areas of the region will remain largely undeveloped and naturally vegetated to preserve their critical ecological and flood mitigation functions. The most suitable uses of lands within riparian areas outside our downtowns and village centers are wildlife habitat, outdoor recreation, environmental education, flood attenuation and groundwater recharge, and similar low-intensity uses that leave the land in a primarily undeveloped, natural state. Little new development other than water-dependent structures such as bridges or passive recreation amenities, such as trails, will occur within

riparian areas. Existing development within riparian areas subject to damage from inundation or fluvial erosion will be flood-proofed or removed as most appropriate to reduce the risk to life and property. Rivers and streams will be reconnected to their floodplains and allowed to move naturally within their corridors to the maximum extent feasible given the location of existing infrastructure and development.

Within the developed areas of the region, it is our vision that riparian areas will be transformed into community amenities that provide recreational opportunities, are visually attractive, and serve as green infrastructure to the maximum extent feasible. The substantial investment in public infrastructure and private development within riparian areas will be safeguarded to the maximum extent feasible through flood-proofing and upstream flood attenuation and mitigation efforts.



RESORT AND RECREATION AREAS. This category also serves as an overlay, and identifies locations that were intensively developed primarily for recreational or seasonal use. Examples include the Okemo Mountain Resort and nearby seasonal homes in Ludlow, the public recreation areas on Mount Ascutney, and the densely developed summer home communities around Lake Rescue and Lake Pauline, also in Ludlow. These are areas

with

significant natural amenities that bring visitors and seasonal residents to our region, as well as enhance the quality of life for year-round residents. Careful planning is needed to balance development of the facilities and amenities needed to support a four-season tourism industry with preservation of the features and natural settings that are essential to attracting visitors.

The most suitable uses of resort and recreation areas are recreational uses, particularly those that extend the season, diversify offerings, and/or connect recreational facilities. Other tourism- and recreation-supporting uses, such as dining, lodging, vacation homes, recreation equipment rentals, guide services, and transportation providers, are also suitable provided they remain within compact areas designated for residential and/or commercial uses. However, MARC encourages, and will assist its resort communities to build strong, mutually beneficial ties between tourist destinations and nearby downtowns and village centers. One way to achieve that objective is to limit the amount of non-recreation, commercial development in resort and recreation areas and guide more of those uses to nearby downtowns or village centers.

It is our vision that the region's resort and recreation areas will support a tourism industry that will continue to attract visitors and seasonal residents by offering a variety of recreational opportunities throughout the year. They will continue to enhance the quality of life enjoyed by our region's residents and will remain essential components of the sense of place and identity in their host communities. Trail networks and other recreational amenities will be added, improved, expanded, and/or interconnected for the benefit of residents and visitors alike. Future commercial or residential development within resort and recreation areas will remain compact and will be thoughtfully sited and designed with a context sensitive approach to not degrade the scenic beauty, natural resource base and unique sense of place that our tourism industry depends upon.



INTERCHANGE AREAS. This category also serves as an overlay, and includes land around Interstate 91 Exits 7 and 8. These interchanges create opportunities and challenges for their communities and our region with respect to land use and economic development. Interchanges attract development that, if not properly planned, can have adverse impacts on the economic viability of traditional centers, traffic safety and congestion, environmental quality and natural resources, and scenic character.

With good planning and land use regulation, interchange areas can be attractive, efficient community assets that are developed in a manner that is integrated and compatible with the surrounding landscape, and that efficiently provides necessary services to travelers and residents. The most suitable uses of interchange areas are businesses that provide necessary services to the traveling public or that are otherwise transportation-related (transit or trucking providers, for example). Redevelopment and infill of previously developed sites is preferred over greenfield development (i.e. development on previously undeveloped sites).

It is our vision that the interchanges will be attractive gateways to the region that provide necessary traveler services while establishing a distinctive sense of place, minimizing congestion, and avoiding unsafe traffic conditions. They will not be characterized by a pattern of low-density, auto-oriented sprawl. While the interchanges may offer traveler accommodations and services, businesses will not compete with commercial activities within the downtowns or village centers. Efforts will be made to entice visitors into the region's downtowns and village centers where most of the dining, lodging, and similar uses will be located. Existing development sites will be retrofitted or redeveloped in a manner that increases their economic value, enhances their visual appeal, and improves the quality of buildings and site design elements. To achieve

this, MARC will encourage and assist towns to enact effective land use plans and controls to manage the amount, type, and scale of commercial activity that may occur at the interchanges and to promote high-quality site and building design.



COMMERCIAL NODES AND CORRIDORS.

This land use classification includes locations outside of traditional centers that have been developed for commercial and light industrial uses, primarily since the 1960s. This development pattern arose in response to transportation and economic changes that led many customer-oriented businesses to cater to motorists and locate along major roadways. This development

pattern is now commonly referred to as sprawl and is often viewed as undesirable in a planning context. Strip development and sprawl is a problem of our own making; it has been cheaper to design, easier to finance, faster to permit, and less complicated to build than compact, walkable, mixed-use development in our traditional centers.

These areas are often the gateways into our traditional centers that create the first impression of a community for travelers. While the services provided in these areas are often essential to the community and region (automobile dealers, for example), this development pattern undermines our basic land use goal of maintaining compact downtowns and village centers surrounded by rural farm and forest lands. This plan recognizes that our region's commercial nodes and corridors are serving an important economic function that can be distinguished from, and complementary to, the function of the commercial districts within our traditional centers. To further state planning goals, it is a policy of this plan to mitigate or avoid many of the issues associated with sprawl – such as poor access management, excessive signage, lot frontages dominated by pavement, lack of sidewalks, and low-quality, generic, single-purpose buildings – through appropriate site planning and design.

Targeted land use planning and regulation can encourage transformation of these areas from single-use, car-dominated development into attractive, mixed-use, pedestrian-friendly development. (See the illustrative images in the next section that demonstrate the intent of this statement.) Many of these locations, particularly those that are served by existing water and/or sewer infrastructure, are suitable for redevelopment. Existing development sites in commercial nodes and corridors often present the potential for more intensive use in a manner more consistent with our land use goals. Redevelopment should transform these areas through improved access management and site design, provision of streetscaping and sidewalks, and

construction of higher-quality, distinctive, multi-purpose buildings. Redevelopment and infill of previously developed sites is preferred over further greenfield development.

It is our goal that the region's commercial nodes and corridors will be transformed to function efficiently and adapt to changes in transportation modes, economic trends, and lifestyle preferences over time; and that a pattern of low-density, auto-oriented sprawl will not expand further into the region's rural areas. Existing development sites will be retrofitted or redeveloped in a manner that increases their economic value, enhances their visual appeal, and improves the quality of buildings and site design elements. Where appropriate and feasible, infrastructure will be improved or provided to support higher intensity use in these already developed areas. The commercial nodes and corridors will become places that people can safely walk and bike around as well as drive to.

To achieve this, MARC will encourage and assist towns to enact effective land use plans and controls to guide businesses of different types and scales to the appropriate location – downtown or village center vs. commercial node or corridor – and to promote high-quality site and building design. The most suitable uses of commercial nodes and corridors are larger-scale or land-intensive commercial and light industrial uses that are not compatible with the scale, settlement pattern, and pedestrian-orientation of our traditional downtowns and village centers and multi-unit housing located in proximity to employment, services, and transit. Where deemed desirable, commercial nodes and corridors may be designated for mixed-use (residential and commercial) development.



landmarks.

INSTITUTIONAL. This land use classification encompasses several sites and facilities throughout the region that are dedicated to public or quasi-public purposes such as airports, prisons, schools, and hospitals. These lands provide essential services or serve necessary civic functions, and most are likely to continue to do so. Many feature purpose-built structures that have unique characteristics and/or are considered local

It is our vision that most of these sites and facilities will continue in their current use, potentially with some upgrades or expansions over time, as necessary. If a special use site or facilities will no longer be used for a public or quasi-public purpose, this plan encourages its adaptive re-use in a manner that will be beneficial to the host community (provide needed housing or employment opportunities, for example) and contribute to the tax base.



INDUSTRIAL AREAS. This land use classification encompasses areas developed or designated for industrial use. Industry, particularly the machine tool industry in the Precision Valley, was a defining force that historically shaped land use and development patterns in parts of our region. Today, industry in our region tends to be smaller-scale and more diverse, increasingly based on local or artisanal products and the “Vermont”

brand, with less visibility and impact on surrounding lands. Industrial lands remain a critical economic development asset, particularly those with access to infrastructure (water, sewer, three-phase power, fiber optic lines, etc.) and to highway, rail, or air transportation.

This plan supports the full and efficient utilization of designated industrial areas to support and grow the regional economy by attracting and retaining quality businesses that create jobs and operate without adversely impacting surrounding land uses or the environment. The most suitable uses of industrial areas are larger-scale or higher-impact commercial and industrial uses that need larger sites or specialized facilities or infrastructure, or that generate substantial truck traffic or have other off-site impacts that require them to be buffered from residential neighborhoods and our downtowns and village centers. Redevelopment and infill of previously developed sites is preferred over greenfield development.

This plan also recognizes that the types of industrial uses occurring in the region have evolved away from heavy manufacturing towards artisanal or high-tech production. Smaller-scale and lower-impact industrial uses may not necessarily need to be in separate zones, and may be appropriate in mixed use areas. Similarly, traditional industrial sites such as mills or warehouses in our downtowns and village centers may be suitable for adaptive re-use – whether as housing or mixed-use commercial space.

It is our vision that the region’s industrial areas will retain their economic role and function principally as sites for industrial and non-retail commercial uses. Underutilized industrial sites, particularly those with good access to infrastructure and transportation networks, will be revitalized and adapted for new employment generating activities. Where appropriate and feasible, infrastructure will be improved or provided to support higher intensity use in these already developed areas. To achieve this, MARC will encourage and assist towns to enact effective land use plans and controls to guide industrial and other compatible commercial uses to these areas, and to guide residential and retail uses that are not compatible with industrial activities away from these areas.

D. Development Standards

Development Standards are intended to direct how future development and redevelopment can occur in ways that will achieve the goals in this Regional Plan. (See the discussion on Substantial Regional Impact in Chapter 11 for more detail and implications for Act 250 proposals.) Unless otherwise specified, each standard applies to all future land use categories. The term “compact centers,” used in the land use goal and development standards, generally includes the more developed portions of the region: Town and Regional Centers, Hamlets and Village Centers, and often Residential Neighborhoods. The term “rural countryside” includes the least developed areas: Conservation, Working Lands, and Rural Residential areas.

1. Land development will be consistent with the Future Land Use Map and the corresponding Land Use Classifications. Table 3.1 summarizes the future land use category descriptions, but the future land use map and full narrative descriptions should be referred to for the full meaning of the future land use plan for this region.

TABLE 3.1: SUMMARY OF FUTURE LAND USE CATEGORIES		
Category	Density	Description
Town and Regional Centers	Highest: 4 units per acre or higher	Historic, traditional, compact, larger community centers; Focus of economic and community development; Mix of commercial, industrial, civic, and high-density residential uses; Served by infrastructure; Designed for people rather than cars.
Neighborhood Residential	High: 3 to 12 dwellings per acre	Dense, walkable residential neighborhoods surrounding a larger community center; Served by municipal infrastructure; Where new housing is desired.
Hamlets and Village Centers	Moderate: 1 dwelling unit to the acre (Hamlets); 2 dwelling units to the acre (Village Centers)	Historic, traditional, compact, smaller community centers; Focal points, hearts of their towns; Mix of residential uses, smaller-scale commercial, civic buildings, gathering places that sustain a sense of community; Infrastructure is present or desired to support compact settlement patterns.

Rural Residential	Low-Moderate: 1 dwelling unit per 2 acres	Minimize development impacts to maintain rural countryside/rural character; Provide primarily single-family housing in a rural setting that maintains open space between developed sites and offers views of the surrounding natural or agricultural landscape.
Working Lands	Very Low: 1 dwelling unit per 10 acres	Actively managed portion of the rural countryside/working landscape; Avoid fragmentation of productive farm and forest lands; Sustain the rural landscape and traditional rural way of life.
Conservation	Very Low: 1 dwelling unit per 10 acres	Least developed portion of the rural countryside; Contribute to the environmental, social, and economic well-being of our region; Remain in a largely undeveloped state for the benefit and enjoyment of future generations.
Industrial Areas	Variable	Larger-scale or higher-impact industrial and non-retail commercial uses; Specialized facilities or infrastructure; Off-site impacts that require them to be buffered from residential neighborhoods and community centers.
Commercial Nodes and Corridors	Variable	Transform from single-use, car-dominated development into attractive, mixed-use, pedestrian-friendly development; Larger-scale or land-intensive commercial and light industrial uses that are not compatible with community centers; New multi-unit housing in proximity to employment, services, and transit.

Institutional	Variable	Public or quasi-public uses (e.g. airports, prisons, schools, and hospitals); Expected to continue in their current use; Adaptive re-use may be appropriate if it is beneficial to the community.
Resort and Recreation Areas	Variable	Support a successful tourism industry throughout the year; Development will remain compact and designed and sited in a context sensitive approach.
Interchange Areas	Variable	Attractive gateways to the region; Provide necessary traveler services.
Riparian Areas	Variable	Largely undeveloped, vegetated riparian areas outside of existing developed areas; Allow flexibility within developed areas (e.g. Compact Community Centers, Commercial Nodes and Corridors) to accommodate green infrastructure along with recreation facilities, maintenance of existing infrastructure and redevelopment of existing structures.

2. It is desirable that Municipal and other government buildings are located within **compact centers** in order to maintain and encourage the vitality of downtown and village areas, unless they do not allow for public visitation (e.g. water and wastewater facilities) or by their nature they need to be elsewhere (e.g. a shelter in the town forest).

3. Any land development occurring within **compact centers** must be compatible with the traditional settlement pattern, including the location, form, and scale of buildings in relation to the street and to each other.



NOT THIS: SUBURBAN PATTERN



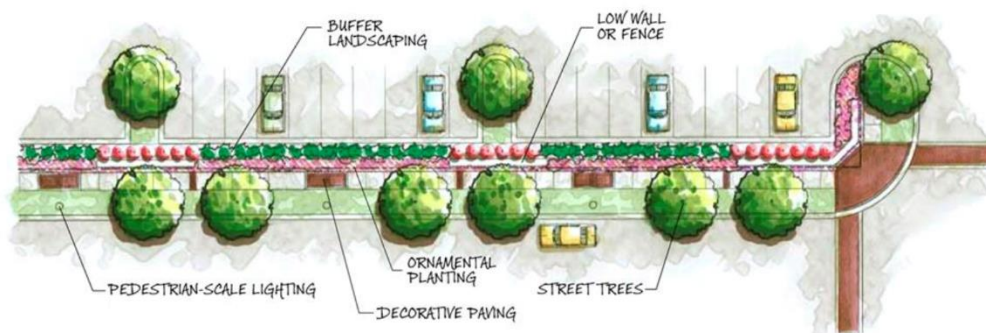
THIS: TRADITIONAL NEIGHBORHOOD PATTERN



THIS: SHARED PARKING LOCATED TO THE REAR OR SIDE OF BUILDINGS WITH CROSS ACCESS BETWEEN LOTS

- Subdivisions in **neighborhood residential areas** or in areas **adjacent to compact centers** must be designed to follow and extend traditional neighborhood development patterns. To achieve this, new or extended neighborhoods should feature small, generally narrow lots of varying size and frontage accessed by a network of interconnected streets. Houses should be located close to the street with shallow front yards. Porches, low fences, street trees and/or front yard landscaping should be used to create an attractive, walkable streetscape. Suburban-style subdivisions that feature a regular, consistent pattern of lots, a limited number of building designs, excessively wide streets or driveways, and/or cul-de-sacs are discouraged.

5. Off-street surface parking in **compact centers** must be located to the side or rear of buildings and not between the building and the street. Where lots are devoted entirely to parking or existing front parking cannot feasibly be eliminated or relocated, it should be separated and screened from the sidewalk and/or street with landscaping and/or decorative fencing.
6. New or reconstructed streets within **compact centers** must be designed to safely accommodate pedestrians and bicyclists to the maximum extent feasible.
7. As an element of any proposed land development, sidewalks within **compact centers** must be extended and repaired as necessary to safely accommodate pedestrians and to be accessible for all users.
8. Sites in **compact centers** as well as in **interchange areas** and **commercial nodes and corridors** must be designed to enhance the aesthetic character of the street or highway through well-designed signage, streetscaping and front yard landscaping, parking and service areas, and buildings.



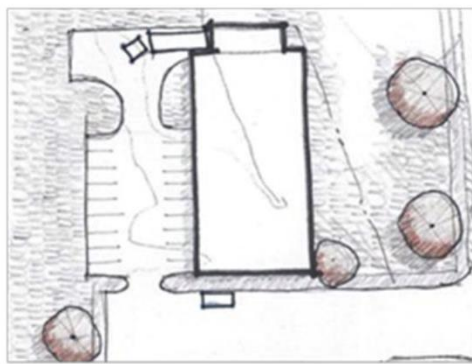
THIS: FRONT PARKING SCREENED TO ENHANCE THE STREETScape

9. Expanses of asphalt must not dominate the view from the street or highway in **compact centers, interchange areas** and **commercial nodes and corridors**. Large parking areas must be screened and landscaped, broken up into smaller units divided by landscaping, and/or located to the side or rear of buildings.

10. When any previously developed sites are modified substantially, access management and stormwater management must be upgraded as necessary to meet current standards.
11. Site plans within **commercial nodes and corridors, interchange areas, and industrial areas** must implement access management techniques such as shared drives, cross access, parallel service drives to the maximum extent feasible given physical conditions and existing development patterns on the site and adjacent lots.



Not This: Typical "Big Box" design



This: Building façade oriented to the street, parking to the rear of the building, sidewalk connections to the existing sidewalk, street trees.

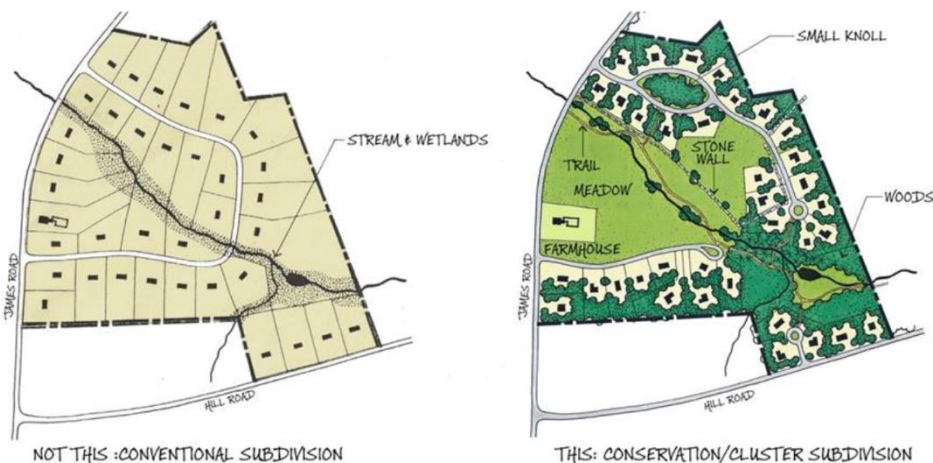
12. New site plans within **commercial nodes and corridors, interchange areas, and industrial areas** must include sidewalks and other facilities as appropriate to the location that accommodate multi-modal travel. Extension of sidewalks, multi-use paths and/or bike lanes along major corridors is strongly encouraged to facilitate connections between commercial sites and to nearby downtown / village center areas and residential neighborhoods.
13. New uses to be established in the **interchange areas** will be limited to those that do not compete with allowed businesses in a compact center unless it caters to visitor or traveler's services.
14. **Resort and recreation areas** will have transit service linking them to nearby downtowns or village centers.

15. Land development in the **rural countryside** must be sited and designed to minimize fragmentation of priority forest blocks and habitat connectors, and to minimize adverse impacts on natural resources and the ecological services they provide, including but not limited to, wetlands, floodplains, river corridors, rare, threatened and endangered species, significant natural communities, elevations above 2,500 feet, and slopes steeper than 25%.

16. In **conservation** and **working land areas**, developments on slopes between 15- 24% will be designed and located on the site to minimize adverse erosion and storm water impacts by incorporating Low Impact Development (LID) or other strategies, including:
 - a. Development of a lot or site shall require the least amount of site disturbance and reduce the lot coverage and building footprints as much as possible in order to maintain the natural hydrologic processes and reduce the volume and water quality impacts of the proposed development.
 - b. Roads, driveways, buildings, and utilities are encouraged to be located on the flattest portions of the site.
 - c. Minimize crossing steep slopes with roads and driveways and lay them out to follow topographic contours to minimize soil and vegetation disturbance.
 - d. Minimize the length of driveways.
 - e. Reduce the total length of residential streets by examining alternative street layouts to determine the best option for increasing the number of homes per unit length.
 - f. The scale of development will not exceed the development capacity of the site.

17. Resource extraction operations must be designed and managed to avoid, minimize or mitigate (listed in preferential order) impacts to natural resources, transportation facilities and nearby land uses. Applications for new or expanded extraction operations must at a minimum include: an erosion control and stormwater management plan to ensure that the operation will not result in sedimentation of nearby surface waters and wetlands, or other impacts to water quality, adjoining property and public infrastructure downslope from the site; a landscaping plan that maintains existing mature vegetation or establishes naturalistic plantings to screen the operation as viewed from public vantage points and nearby property; and a reclamation plan to return the site to a condition suitable for other land uses allowed on the site.

18. Rural enterprises, such as value-added processing and direct marketing of farm and forest products, that support the economic viability of keeping farm and forest land in productive use are encouraged. Rural enterprises must be similar in scale and intensity to traditional farming or forestry operations, and must not result in undue off-site impacts, such as noise or traffic, (that are not customary) in the immediate area. Rural enterprises must have a direct and significant connection to local farming and forestry operations, and should not be dependent on importing non-local agricultural or forest products.



19. Any residential development occurring in the **rural countryside** must be sited and designed to minimize conversion and fragmentation of productive land, and to protect rural character. To achieve this, thoughtful site designs that cluster house lot (e.g. conservation subdivisions), locate homes off the land best suited for farming or forestry, and preserve open space are preferred, as is use of shared driveways and other infrastructure. Suburban-style subdivisions that feature a regular, consistent pattern of lots, a limited number of building designs, excessively wide streets or driveways, and/or cul-de-sacs are not consistent with our region's rural character.



20. Any new or expanded transportation facilities or utility infrastructure in the **rural countryside** must be located within existing corridors to the maximum extent feasible. When a new corridor is the only feasible option, it must be sited and designed to follow the natural grade and existing contours to the maximum extent feasible, and to minimize the amount of soil disturbed, forest canopy opened (both during and after construction), land taken out of production, and impervious surface created.
21. Water and wastewater infrastructure provided along state highways and Class 2 town highways **outside of existing compact centers** should not encourage or facilitate sprawl.
22. New development must manage all run-off from developed areas through green stormwater management practices to the maximum extent feasible given the physical characteristics of the site, and previously developed sites must be retrofit as necessary and feasible to provide improved stormwater management.
23. Preservation, rehabilitation, and adaptive re-use of historic buildings in a manner that preserves their architectural character is strongly encouraged.
24. Rehabilitation and re-use of structurally sound buildings listed in the national or state registers of historic places, or listed as a contributing structure within a historic district, is preferred whenever feasible and such buildings generally should not be demolished unless the property owner demonstrates that the demolition is part of a redevelopment plan for the property that will have significant community or economic development benefits.
25. To promote flood resilient communities:
 - a. New development in the floodway area is prohibited.
 - b. New development in river corridor areas within compact centers must not exacerbate or divert the flow of flood waters, increase the risk of fluvial erosion hazards, and endanger the health, safety and welfare of the public or of riparian

owners during flooding. All other new development in river corridor areas will be avoided.

- c. Any modifications to existing development in identified floodway and river corridors will maintain the existing distance between the existing primary building and the top of bank².
- d. When rebuilt, substantially damaged structures in floodway or river corridors shall relocate to a location on the lot that is outside of the floodway or river corridors. If no such location on that lot exists, the structure must be relocated as far away from the hazard area as possible.
- e. New development in identified floodway fringe (i.e. floodplain) areas will locate on a portion of the lot that is outside of the floodway fringe hazard area. If no such location on that lot exists, the structure must be located as far away from the hazard area as possible.
- f. Development in identified floodway fringe (i.e. floodplain) areas will not significantly increase the peak discharge of the river or stream within or downstream from the area of development and endanger the health, safety, or welfare of the public or riparian owners during flooding.
- g. The capacities of drainage channels and detention facilities will be maintained, and substantial reductions in flood storage through wetland destruction must be avoided.
- h. The protection and restoration of floodplains, and upland forested areas³ that attenuate and moderate flooding and fluvial erosion should be encouraged.
- i. New berms that restrict rivers and streams access to adjacent wetlands and floodplains are prohibited, unless warranted to protect public safety. Efforts to improve river and stream access to adjacent wetlands and floodplains shall be made as appropriate based upon hydrologic studies.

26. When any alternative exists, developments will not be sited on soils that are susceptible to flooding or on soils that are not suited for foundations and/or septic systems.

² "Top of bank" refers to the point along a stream bank where an abrupt change in slope is evident, and where the stream is generally able to overflow the banks and enter the adjacent floodplain during flows at or exceeding the average annual high water stage.

³ Upland forested areas are described in the Flood Resilience section of this Plan

CH 4: COMMUNITY UTILITIES AND FACILITIES

In the Mount Ascutney Region there are numerous infrastructure systems and other public services that are essential to the health and welfare of our citizens, the functioning of communities, and to support the economy. This includes such things as water and wastewater systems, communication technologies, electricity, solid waste management, health and human services, emergency services, and other civic facilities and services. Transportation facilities and services are addressed separately in Volume 2 of this Plan.

The purpose of this chapter is to document existing facilities and services; evaluate how they support or could better support local, regional, and state planning goals; and to identify priority investments. Vermont's planning goals (24 V.S.A. §4302) seek "to maintain the historic pattern of compact village and urban centers separated by rural countryside." A critical focus for this chapter is planning how the existing facilities and services should be changed to better serve community needs as well as to support this land use goal. For example, villages without adequate water or wastewater systems will continue to struggle with village revitalization efforts and support affordable housing developments.

Utilities and Facilities Goals

To plan for and provide public facilities and services that meet the current and future needs of the Region and its individual towns and villages. To accomplish this in such manner that maintains the historic settlement pattern of compact centers surrounded by a rural countryside and supports and promotes the economic vitality and development goals of the individual communities and those of the Region. To achieve this goal we will:

1. Promote public water and sewer infrastructure in community centers and other areas designated for growth in the Regional Plan and municipal plans.
2. Facilitate and support broadband improvements so that every household in the Region has access to a fast, efficient and affordable broadband connection at speeds of 100mbps (upload)/100mbps (download).
3. Provide other public facilities and services – such as solid waste, health and safety, communications, and educational services – to all inhabitants of the Region in a financially sustainable, energy efficient, and equitable manner.
4. Maintain, enhance, and promote recreational, entertainment, and cultural opportunities for all residents of and visitors to the region.
5. Promote and support efforts to meet the demand for quality, safe, and affordable child care across the Region. (See also Economic Development and Health Chapters goals and policies)

A. Electricity, Water, and Sewer

The efficient use of community water and sewer services, and electricity, is vital to the health and welfare of regional residents. The placement and use of these services (and of the transportation network) often determine the character and development patterns of a town. Therefore, towns should carefully plan the placement of service lines to correspond to the areas in which they would most like to see development occur.

1. Electrical Transmission

TABLE 4.1 ELECTRICAL TRANSMISSION SERVICE PROVIDERS BY TOWN		
Towns	Electric Service Providers	
	Ludlow Electric	Green Mountain Power
Andover		X
Baltimore		X
Cavendish	X	X
Chester		X
Ludlow	X	X*
Reading		X
Springfield		X
Weathersfield		X
West Windsor		X
Windsor		X

Electric transmission service in the Region is provided by the Vermont Electric Power Company (VELCO). Electric distribution service is provided by Green Mountain Power (GMP) and the Village of Ludlow Electric Light Department. (Electricity producers are discussed in the Energy Chapter.) Electricity, like water and sewer, is an important service for present and future development. The provision of electric utility services enables developers to plan for building structures and developing land at significant cost reductions and increased efficiencies. It is therefore important to place transmission lines and substations in areas that have been designated as desirable for growth.

Transmission lines transport electricity from various generators to customers through switching stations and substations. The larger network of transmission lines and stations are referred to as "the grid." In 2011, a VELCO Connecticut River Valley Study revealed deficiencies in the Coolidge to Ascutney transmission line. Efforts are ongoing to address these issues.

Customers can help defer costly transmission line upgrades and the construction of new power plant capacity through the use of energy efficient appliances and by taking measures to reduce their electricity use during peak demand periods. Other demand side management efforts include encouraging "green buildings," siting new houses to maximize solar advantage,

decentralized energy production such as generating electricity for individual residential or commercial buildings, or through energy conservation measures. (See the Regional Energy Plan, Volume 3 for conservation strategies.)

Power generating facilities and electrical transmission facilities are approved by the Public Utility Commission (PUC) under 30 V.S.A. §248 (Section 248). Projects subject to Section 248 review, including net-metered private wind turbines, are exempt from local regulations. However, the impacted municipality and regional planning commission may participate as interveners in the proceedings. Under Section 248 review process, projects are evaluated to determine if they serve the general public good and if they are consistent with the Regional Plan. In 2018, MARC’s Energy Plan received a Certificate of Energy Compliance from the Vermont Public Service Department, granting the Plan “substantial deference” in Section 248 proceedings. See the **Regional Energy Plan** for more.

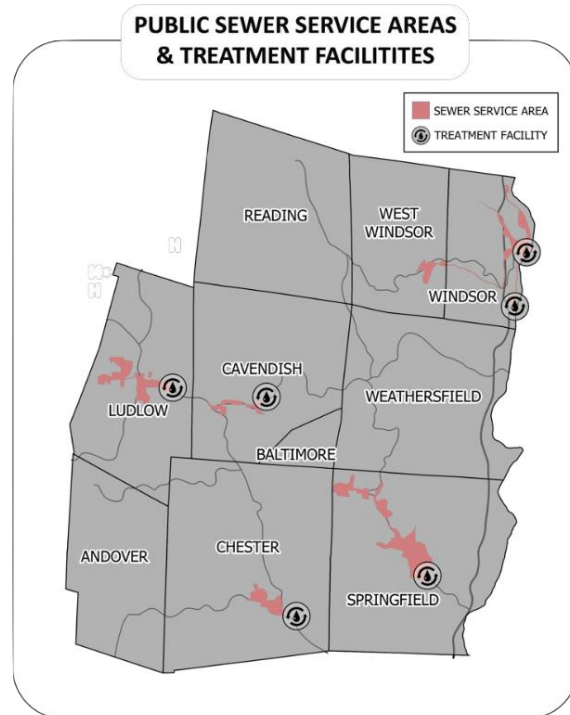
2. Community Water and Sewer Service

Availability of community water and wastewater service is essential to meet Vermont’s planning goal to maintain compact centers and a rural countryside. Regional centers listed in the Land Use chapter of this Plan were chosen largely because of their proximity to existing services, or potential for the efficient creation of new or expanded systems. These centers represent the Region’s highest priorities for directing growth through the creation of additional municipal water and wastewater capacity. (See the Land Use chapter for more on smart growth, growth centers, and sprawl.)

TABLE 4.2 MUNICIPALLY OWNED PUBLIC WATER SUPPLIES IN THE MOUNT ASCUTNEY REGION	
Town/System Name	Population Served ⁴
Cavendish & Proctorsville Villages	950
Chester Village	3,200
Ludlow Village	2,818
Springfield	9,800
Windsor	2,350
Ascutney Fire District #2	485

⁴ Source: Vermont Water Supply Division; SDWIS Program, August January 2021.

Apart from the Clean Water State Revolving Loan Fund,⁵ limited public infrastructure funding opportunities mean that small communities are often limited in their ability to encourage dense, mixed-use development in villages not currently served by water and wastewater facilities. For this reason, the American Rescue Plan Act (ARPA) presents a unique opportunity for towns to invest in water and sewer infrastructure. Lack of shared or centralized water or wastewater service make the further growth of many villages in the Region difficult or impossible. Perkinsville and Felchville both face challenges due to a lack of public water and wastewater services. While Ascutney Village does have a public water system, lack of a public wastewater system limits further growth. Currently, Cavendish, Chester, Ludlow, Springfield, and Windsor host public water and wastewater facilities. The town of Windsor provides wastewater service to the former Ascutney Mountain Resort area and Brownsville Village. With the exception of the Weston Heights system in Windsor, all wastewater facilities in the region operate around or under 50% of their design capacities and have sufficient excess capacity to meet their needs for the foreseeable future. However, certain industries such as breweries can put a greater strain on treatment plants due to the high concentrations of nutrients in their effluent regardless of overall flow volume. Pre-treatment, project phasing, or capacity upgrades may be a necessary local permit condition to accommodate certain new industries or developments.



Improvements continue to be made to wastewater treatment facilities in the region to improve their operations and increase capacity. Chester completed a \$1.1 million upgrade of its wastewater treatment facility in 2007 and Ludlow completed a \$2.9 million upgrade in 2020. Springfield completed system upgrades in 2004, expanding its facility from 2.2 to 2.4 million gallons per day and improving phosphorus treatment. Springfield also expanded its infrastructure along VT Route 11 to the Southern State Correctional Facility. Since a pressure reduction valve was necessary to tap into a force line, it is unlikely that many of the properties along the line will connect to it; therefore, it is not seen as a contributor to sprawl. Springfield's public water system is currently operating under a temporary permit, and the Town is actively working to address low pressure problem areas. Springfield has voted to allocate the majority

⁵ <https://dec.vermont.gov/water-investment/water-financing/cwsrf>

of its ARPA funding to replacing the water main on Clinton Street from Seavers Brook Road to South Street.

Towns are encouraged to engage in capital planning for their water and wastewater systems to meet requirements of state statute, maintain current levels of service, and to support planned future growth. Carefully planned investments coupled with appropriate zoning provisions can encourage smart growth and discourage scattered and strip development.

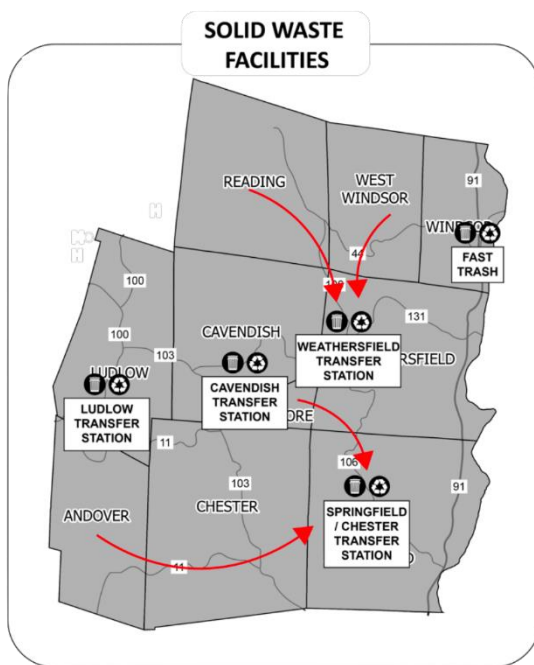
3. Private Water and Sewer Systems

In addition to municipal water and wastewater systems, the Region is also served by privately owned wells and on-site septic systems. There are a total of 50 non-municipal water systems in the Region⁶, examples of which include those serving mobile home parks, condominiums, schools, industrial sites, and campgrounds.

De-centralized septic systems may allow for greater densities where municipal wastewater systems are not available. A decentralized system is where a cluster of structures share a common wastewater system for either on-site or off-site disposal. *Wastewater Solutions for Vermont Communities* (Vermont Department of Housing and Community Affairs, January 2008) is a good guidance document for solving community wastewater problems. In some cases, the establishment of a public or community water system serving village lots with on-site septic systems may facilitate increased densities. Monitoring to ensure the efficiency of these systems is important for the protection of the water supply, which is essential to the health and welfare of the Region.

⁶ Source: Vermont Water Supply Division; SDWIS Program, August January 2021.

B. Solid Waste Facilities



Until its dissolution on June 30, 2007, the New Hampshire/Vermont Solid Waste Project was a bi-state agency, consisting of two districts and serving a total of 29 towns in New Hampshire and Vermont. The districts were formally organized in 1981. Two facilities were constructed in New Hampshire, including a waste to energy facility in 1987 and an ash monofill in 1988. At that time, the Project contracted with Wheelabrator Claremont, Inc., to incinerate solid waste from its member towns' residential, institutional, and commercial sources. All of the towns in the Region are part of the Southern Windsor/Windham Counties Solid Waste Management District (District). See the District's website at www.vtsolidwastedistrict.org for more




information.

In 1987, Vermont legislature passed Act 78, a revision to state solid waste law that recognized the environmental and economic impacts of landfilling and incinerating an ever-increasing waste stream, and articulated policies encouraging reduction, reuse, and efficient disposal of solid waste. State law also defines a role for regional planning commissions in solid waste planning, conditioning certification of solid waste facilities on conformance with a regional plan.

All Vermont municipalities, either individually or as part of a solid waste district or an intermunicipal association, are required by Vermont law to adopt a Solid Waste Implementation Plan (SWIP). The SWIP documents town or district waste management facilities and articulates how solid waste will be managed over the subsequent five years and must be in compliance or consistent with the State goals, as well as in accordance with any municipal or regional plan, prepared and adopted pursuant to 24 V.S.A. Chapter 117.

In conformance with Act 78, the District adopted a Comprehensive Solid Waste Management Plan in 1993. On June 2, 2008, the District received pre-approval from ANR of its revised SWIP and adopted the SWIP that year after two public hearings. Subsequently, ANR approved the District's updated SWIPs in 2013 and 2018.

In 2012, the Vermont Legislature unanimously passed the Universal Recycling Law (Act 148), which bans three major categories of materials from Vermonters' trash bins:

- ["blue bin" recyclables](#) 
- [leaf and yard debris; clean wood](#) 
- [food scraps \(organics; compostable kitchen wastes\)](#) 

Act 148 was phased in over the course of five years, 2015 – 2020, with updates made in 2018 and 2019:

1. Beginning October 1, 2019, unclaimed bottle bill deposit fees (escheats) are collected and remitted to the Department of Taxes, and deposited into the Clean Water Fund.
2. Effective July 1, 2020, Single Use Products Ban of plastic straws, plastic stirrers, single-use plastic bags, and expanded polystyrene ("Styrofoam") food and beverage containers

1. Household Hazardous Waste Collections

The District sponsors two, one-day Hazardous Household Waste Collection events per year, at which residents and businesses from all member towns can safely dispose of hazardous household waste materials that are banned from incinerators and landfills. There is no pre-registration or fee for residents, but businesses are required to pay a fee and pre-register for all collection events. The District is in the process of constructing a permanent facility at the Springfield Transfer Station. Once this facility is open, much more household hazardous waste will be able to be disposed of, diverting it from the waste stream.

In order to ensure that solid waste management in the Region protects the environment, is economically efficient, and safeguards the health of the Region's residents, the goals, policies, and recommendations at the end of this chapter are adopted.

C. Community Health and Safety Resources

The health and safety of residents are of primary importance within any community. The provision of adequate services and facilities, including hospitals, ambulances, clinics, elderly care, convalescent homes, senior citizen centers, psychiatric care, police and fire protection, and detention facilities, helps to ensure a safe and healthy social environment. For a more in-depth discussion of public health in the Region beyond services and facilities see the Health Chapter.

1. Hospitals

Health care for the Region is provided through a variety of facilities and services, including two hospitals, medical clinics, and various facilities located outside the Region. Springfield Hospital is a 25-bed facility that provides a full-range of inpatient and outpatient care including 24-hour emergency services. The Hospital also provides care through the Windham Center, a 10 bed,

inpatient psychiatric center in Bellows Falls. Springfield Medical Care Systems (SMCS) collaborates with the Hospital and provides adult day care and specialty clinics operated in collaboration with Dartmouth Hitchcock Medical Center (DHMC) and Cheshire Hospital. Mount Ascutney Hospital in Windsor is affiliated with Dartmouth Hitchcock Medical Center, and provides 35 beds and a variety of services, including 24-hour emergency medical facilities, acute care, rehabilitation services and specialty clinics. Medical clinics are located in Chester, Springfield, and Ludlow. Residents also commute to additional facilities in Vermont, including the Mountain Valley Health Center in Londonderry and Rutland Regional Medical Center. Several hospitals in New Hampshire also provide service to the Region, including Alice Peck Day Hospital in Lebanon, Valley Regional Hospital in Claremont, and DHMC in Lebanon. Residents must travel to DHMC, Cheshire Medical Center in Keene, NH, or other hospitals outside of the region for specialized care, such as dialysis or radiation treatments.

2. Nursing Homes and Assisted Living

The Vermont Health Care Association currently lists two nursing homes, one residential care facility, and two assisted living facilities in the Region as members (see **Table 4.3**). There is a high demand for more elderly care and housing facilities in the Region, and that need is expected to grow during the next several years (see the Housing chapter for more information).

TABLE 4.3 NURSING HOMES, RESIDENTIAL AND ASSISTED LIVING FACILITIES IN THE MOUNT ASCUTNEY REGION				
Facility Name	Location	Services	Number of Beds	Demand
Gill Odd Fellows Home	Ludlow	Nursing	46	High
Springfield Health & Rehab Center	Springfield	Nursing	102	High
Cedar Hill Health Care Center	Windsor	Nursing	39	High
Village at Cedar Hill	Windsor	Assisted Living	20	High
Stoughton House- Historic Homes of Runnemedede	Windsor	Assisted Living	27	High
Evarts House- Historic Homes of Runnemedede	Windsor	Residential	12	High

Source: MARC, Staff at the above facilities, 2020

Increasing numbers of seniors prefer to “age in place”.⁷ Significant investment in public transportation, home care and other services is necessary to provide for elders and persons with disabilities to age in place safely and comfortably. The 2016 *Vermont Elders & Persons with Disability Transportation Program Review* report emphasized the need for additional funding for transportation services for elders “aging in place”.

⁷ https://www.vhfa.org/documents/publications/housing_elderly.pdf

3. Correctional Facilities

Southern State Correctional Facility in Springfield is the only correctional facility located in the region following the closure of the Southeast State Correctional Facility in Windsor in 2017. According to a May 2020 report from the Vermont Department of Corrections, the Springfield facility currently houses 337 male inmates, occupying approximately 89% of the facility's 377 available beds. A committee made up of state, regional, and local stakeholders, including MARC, are currently planning for the adaptive reuse of the Windsor facility. Land may also be available at the Southern State Correctional Facility for commercial redevelopment.

See the Emergency Management chapter for emergency services in the Region.

D. Communications Facilities

TABLE 4.4 COMMUNICATIONS SERVICE PROVIDERS											
Utility Type	Service Providers	And.	Balt.	Cav.	Che.	Lud.	Rea.	Spring.	Wea.	West Winds.	Winds.
Telephone	Comcast (Xfinity)			X		X		X*	X*	X	X
	VTel				X			X			
	TDS		X	X		X			X*		
	Consolidated Comm.	X		X	X		X*	X*	X	X	X
Cable	TDS			X							
	Comcast			X		X		X*	X*	X	X
Local Access	SAPA				X			X	X		
	Okemo Valley TV			X		X					
	Windsor On-air	X	X	X	X	X	X	X	X	X	X
	VTel*	X	X	X	X	X	X	X	X	X	X
Broadband	Comcast (Xfinity)			X		X		X*	X*	X	X
	TDS	X	X	X		X		X	X*		
	Consolidated Comm.	X		X	X		X*	X*	X*	X*	X
	HughesNet	X	X	X	X	X	X	X	X	X	X
	EC Fiber						X			X	X
	Viasat	X	X	X	X	X	X	X	X	X	X
	Wavecomm	X	X	X	X	X	X	X	X	X	X
VTel	X			X			X				

Communications facilities are an essential service for most Vermont residents and businesses. Countless economic, social, and cultural benefits are available to communities that possess free

and open access to people and ideas in other parts of the world. Developing the necessary communications infrastructure and access to these services, such as broadband, is an integral component of economic development and land use planning. The COVID-19 public health emergency emphasized the importance of broadband access when in-person economic and educational activities are restricted.

1. Telecommunications

a. Land-Line Telephone Services

Over ninety percent (90%) of Vermont residents had one landline telephone in their household, according to the 2018 Vermont Telecommunications Plan prepared by the Vermont Department of Public Service. While mobile phones and email are now everyday means of communication, land-line phones continue to provide critical functions, including 911 emergency services and health care information networks. In the Region, these services are provided by four providers: Comcast (Xfinity), VTel, TDS, and Consolidated Communications (formerly FairPoint).

b. Wireless Communication Facilities

The Department of Public Service, records 22 telecommunications facilities approved by the Vermont Public Utility Commission (PUC) under 30 V.S.A. § 248a between 2011 and 2017⁸. The majority are located in Ludlow. A 2018 Wireless Drive Test conducted by the Department of Public Service collected wireless service data along State Highways, for each of Vermont's six facility based operating providers: AT&T, Sprint, T-Mobile, US Cellular, Verizon Wireless and VTel Wireless. The measurements ranged from No Service to Great Service at a download speed of over 10 Mbps (megabits per second). In the Region, service was generally worse along state routes in western areas, especially in Reading, Cavendish, and Chester.⁹ Improving wireless service in the region is vital not only for convenience but to improve public safety. Public safety agencies, such as emergency medical services, fire, and police departments, rely on wireless communications and telecommunications to provide essential services, disseminate vital information, and respond to emergencies.

⁸ A map showing locations of approved facilities is available here:

<https://publicservice.vermont.gov/content/tower-locations>

⁹ The resulting report can be found here:

https://publicservice.vermont.gov/sites/dps/files/documents/Mobile%20Wireless%20Coverage%20in%20VT_Jan%202019.pdf

The accompanying map can be found here:

<https://www.arcgis.com/apps/webappviewer/index.html?id=444a3d49c2374d509958f1c0e1d0d21b>

Network infrastructure must be developed in an efficient, safe, and thoughtful manner. Possible impacts upon scenic and cultural resources, aesthetics, and public health should all be considered during the planning process.

(1) Telecommunications Act of 1996

Congress enacted the Telecommunications Act of 1996, which called for the rapid deployment of advanced telecommunications and information technologies and services. The Act significantly limited communities' traditional zoning and health authorities over the siting of towers, giving the FCC almost sole power to regulate a variety of environmental siting issues including public health concerns.

Wireless telecommunication facilities require near "line of sight" access from the user to a tower to avoid disconnected calls. In addition, the new technology, PCS and SMRS in particular, operate at a low frequency with a range of only one and half to two miles. Our Region's topography dictates that these facilities are located at close intervals, resulting in more locations.

(2) Local and Regional Planning

Thoughtful local and regional planning, which includes viewshed analysis, should be done for the inevitable siting and development of future wireless communications facilities. The Vermont League of Cities and Towns has prepared a Model Wireless Telecommunications Facilities Bylaw. Contact the RPC office if your town would like a copy. The MARC can also assist towns in understanding the limitations of the Telecommunications Act of 1996 and how Act 250 applies, identifying which ridge lines and viewsheds to preserve, determining alternative locations and designs that could mitigate negative impacts, and outlining provisions for the removal of a facility when it is no longer needed. 24 V.S.A. § 4412(9) authorizes local administrative review for telecommunication facilities with no or de minimis impacts.

2. Television, and Other Media

While television and radio are largely used for entertainment purposes, they are also a key part of the communications system in the Region. Both play a role in accessing information and emergency broadcasting. Cable television is available in at least a portion of eight towns in the Region (see Table 4.4). There are two satellite television providers that can serve any location as long as the site allows for adequate satellite reception. Local public access television channels include Springfield Area Public Access television (SAPA TV), Okemo Valley TV, and Windsor On-Air.

Numerous commercial radio stations serve this area, but only one station broadcasts from this region. Vermont Public Radio broadcasts on eight stations statewide, one of which – 89.5 WVPR – broadcasts from the summit of Mount Ascutney in Windsor.

Newspapers that serve this Region include the Eagle Times, The Vermont Journal, The Shopper, Vermont Standard, Springfield Reporter (online only), The Valley Marketplace, Valley News, Chester Telegraph (online only), and Rutland Herald.

3. Broadband and Public Wi-Fi

a. Broadband

In the last decade, broadband service has not just become a prominent means for communication, but a necessary means for businesses and residents to perform day-to-day tasks. “In 2018, through Acts and Resolves No. 169, the General Assembly found that broadband is essential for supporting economic and educational opportunities, strengthening health and public safety networks, and reinforcing freedom of expression and democratic, social, and civic engagement.” During the COVID-19 pandemic, this proved to be especially true. People rely heavily on efficient broadband service for schools, workforce training programs, distance learning programs, remote work, telehealth visits, amongst other tasks. It is yet to be seen how the COVID-19 pandemic will affect our Region permanently, but it is projected that some of the “temporary” lifestyle and work changes set about in the pandemic, will become more permanent.

It is imperative to the success of the Region that every household has access to, not just broadband, but fast and efficient broadband connection. As noted in the “2019 Broadband Speeds” map below, Andover, Chester, Springfield, and most of West Windsor have access to adequate internet service. Windsor, Weathersfield, Baltimore, Cavendish, and Ludlow all struggle with consistent access to service.

Broadband – High-speed Internet and communication networks provided by a wide band of frequencies that enables many messages to be communicated simultaneously.

Fiber Optics – Fiber optic cable is a high-speed data transmission medium. It contains tiny glass or plastic filaments and has a speed of a symmetrical 100mbps (upload)/100mbps (download) speed.

Cable – Cable broadband connects your home to a fiber cabinet in your area. However, instead of using copper wires, cable broadband uses coaxial cables to connect to the cabinet, giving you a much faster internet connection than the traditional copper phone line at speed that can range from asymmetrical 25mbps (upload) / 3mb(download) speed to anywhere over 100mbps upload speeds. Although speeds can be high, this can be inconsistent.

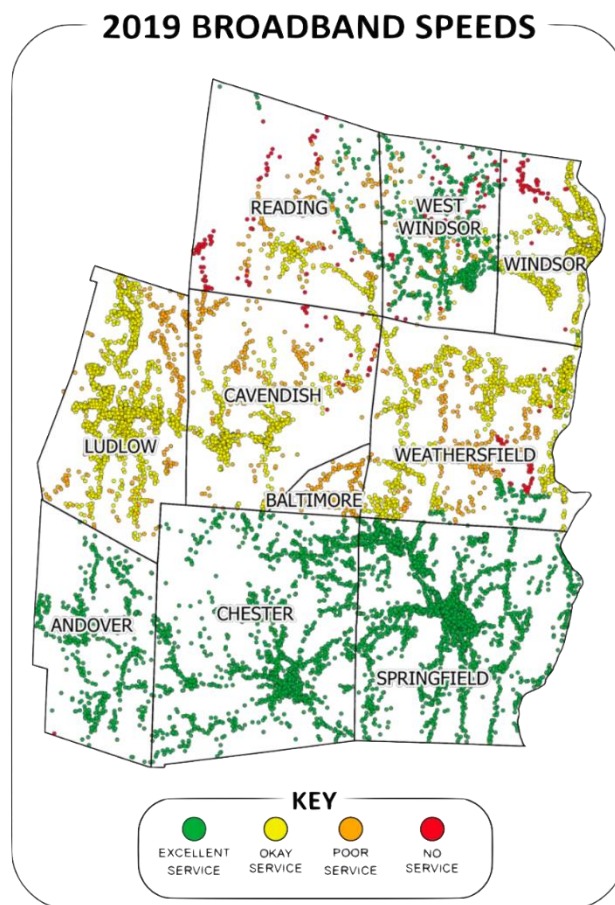
Digital Subscriber Line (“DSL”) –

Technologies that extends the ability of copper telephone lines to carry data and communications, this technology is becoming increasingly outdated and sometimes fails to reach over 4 (upload)/ 1 (download) speeds, which is considered “underserved” according to federal standards.

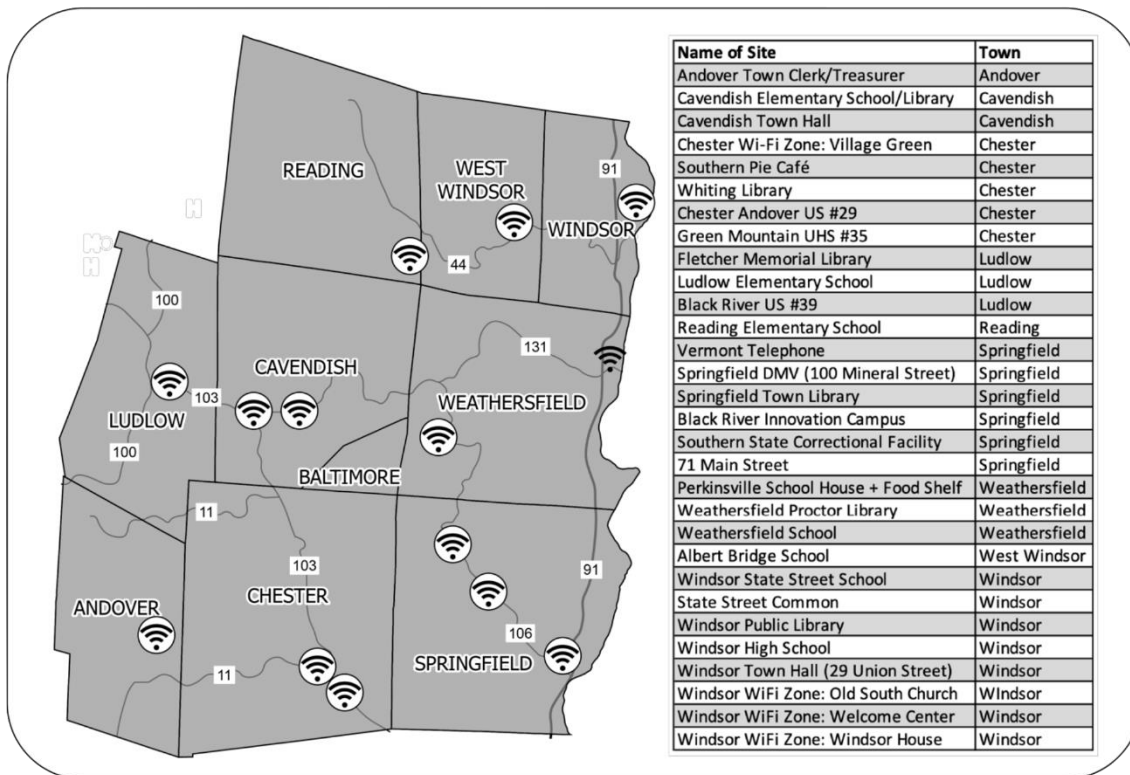
Satellite – High-speed satellite internet services are generally not as fast as DSL; however, are available on any site with a clear view of the southern sky.

Communication Union Districts – According to the Department of Public Service, “A Communications Union District (CUD) is an organization of two or more towns that join together as a municipal entity to build communication infrastructure together”

A map of broadband providers for each town can be found at this [link](#).



Public WiFi Locations



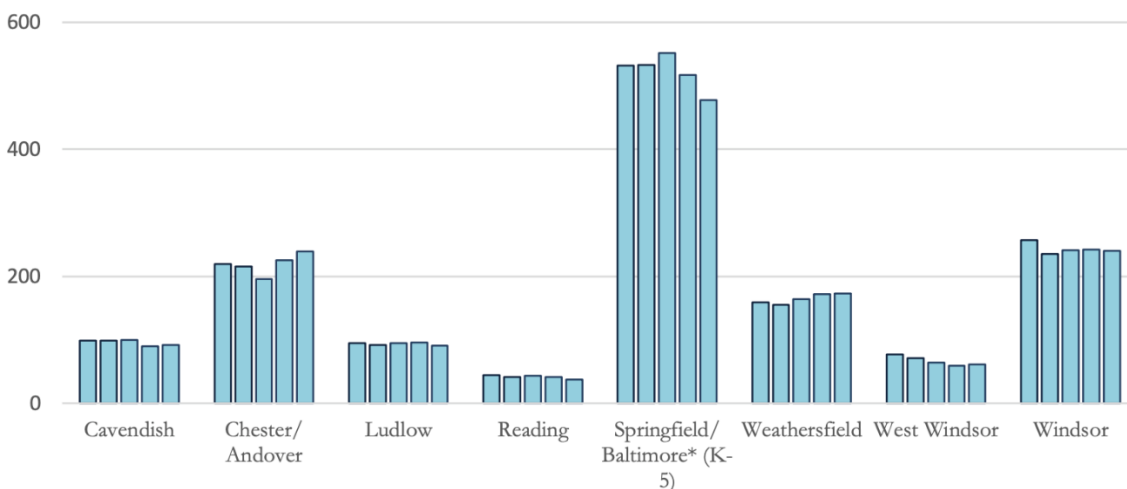
E. Educational Resources

Educational opportunities available in the Region include childcare facilities; elementary, middle, and high schools; vocational and technical schools, colleges, and universities; continuing education programs, museums, and historical societies; and libraries and cultural opportunities. Many factors should be considered in the analysis of schools and their ability to serve as adequate facilities for providing educational opportunities to area residents. Program and policy issues for public schools are generally addressed by local school or school district boards.

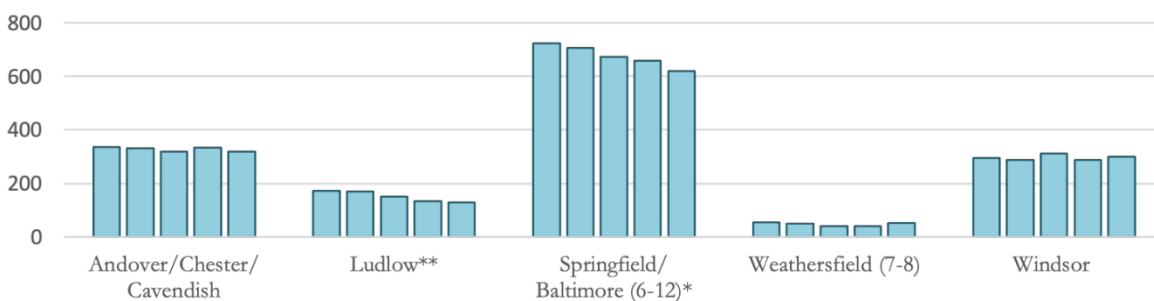
The Region is currently served by four supervisory unions: Springfield School District (SSD), Two Rivers Supervisory Union (TRSU), Windsor Central Supervisory Union (WCSU) and Windsor Southeast Supervisory Union (WSESU). Springfield, Chester, and Windsor are now the only towns in the Region with public high school facilities. . The student population in the Region has remained relatively stagnant in recent years. Many smaller schools have closed consolidated with larger schools under Act 46. Act 46 was enacted in 2015 to create a more sustainable student population and educational experience. These mergers occurred throughout the Region, leading to the closure of a number of schools, including Black River High School in Ludlow. The independent Expeditionary School at Black River has since opened in the former Black River High School building in Ludlow.

The River Valley Technical Center is in the Howard Dean Education Center in Springfield. It serves over 450 students for at least one period of course work per day and provides services for 600-1,000 adults. Services include a job training program which is contracted through Vermont Technical College. Also located in the Howard Dean Education Center are the Community College of Vermont's Springfield Office, and UVM Extension.

K-6 Enrollment by Academic Year
2014/15 - 2018/19



7-12 Enrollment by Academic Year
2014/15 - 2018/19



Source: Vermont's Education Data Warehouse (edw.vermont.gov). *Superintendent of schools office
** Black River High School in Ludlow closed in 2020.

The Vermont Legislature has enacted several educational funding programs seeking to provide all students with an equal opportunity for education regardless of municipal tax base. The current program, Act 68, sets statewide residential and non-residential tax rates providing base level funding per pupil in all school districts. Each district may then request additional funding from local taxpayers. This program remains controversial as overall costs and tax rates continue to rise. According to the Vermont Department of Education, per pupil spending in Fiscal Year

2018 was \$18,400. In its 2014 session, the Vermont Legislature passed Act 166 requiring school districts to provide at least 10 hours of pre-kindergarten instruction.

F. Child Care

The availability of affordable, high-quality childcare is vital to the health and economic development of the Region and its inhabitants. Quality childcare contributes to early childhood development, enables parents of young children to enter or remain in the workforce, enhances the productivity of working parents, and contributes to the expansion of the local and regional economies. In addition, facilities that are located near residential clusters, schools, the workplace, or public transportation may reduce automobile trips and congestion. Public facilities such as schools, town offices, and libraries are often located in convenient locations and should consider providing childcare or space for childcare services as should private businesses. For more on the role of childcare in the region's health and economic stability and the potential role of businesses in providing childcare, see the Health and Economic Development Chapters.

The State of Vermont Child Development Division maintains a list of all registered home care providers and licensed childcare centers in the State, with the exception of informal arrangements. The State regulates childcare providers, requiring they meet the basic standards for children's health and safety. Many programs achieve a higher standard through accreditation by a national program.

In our Region the availability of childcare varies greatly by town. There are currently no listed state licensed facilities in the smallest, rural towns of West Windsor, Andover and Baltimore. The existing lack of access to child care has been exacerbated by the COVID-19 crisis. The Springfield Area Working Communities Challenge, a Federal Reserve funded initiative to increase workforce participation in the region, estimates that current capacity can only meet approximately half of the demand for child care. For a current listing of licensed providers and registered homes by town, visit www.brightfutures.dcf.state.vt.us, which currently lists 47 state registered facilities in the Region.

Child care expenses can deter some families from seeking safe and convenient services. The Child Care Subsidy Program, established by the Vermont Agency of Human Services, which is based on gross monthly income and family size can assist some low-income families with the cost of childcare. There are also some tax credits available for both businesses and employees and employer childcare subsidies, but many are underutilized.

In response to the COVID-19 crisis, the Springfield Area Working Communities Challenge created a one-time grant fund for families in the Springfield Agency of Human Services (AHS) district, which includes all 10 towns in the Mount Ascutney Region. This fund was distributed by the Springfield Area Parent Child Center (SAPCC). It was intended to help parents and guardians

remain in the workforce or reengage in the workforce by temporarily covering costs pertaining to childcare, including back bill and registration fees.

SAPCC offers additional financial support for families to cover unexpected costs of living including transportation and housing challenges.

G. Recreation



Recreation Photograph 1 - Town of Ludlow with Okemo Ski Area in the Background, Source: MARC

1. Introduction

The Mount Ascutney Region offers many recreational opportunities to residents and visitors alike. Some of these opportunities include hiking, biking, camping, downhill skiing, x-country skiing, hunting, horseback riding, ATV riding, paddling, and fishing. The abundance and variety of opportunities within the region are not only a reason to live within or visit the region (outdoor recreation is commonly associated with the Vermont 'way of life'), but also an important sector of the economy.

2. Recreation Resources

The region is home to many areas devoted to indoor and outdoor recreation, ranging from public opportunities on state and municipal lands to those available on private lands. Ludlow is home to the Okemo State Forest and the Okemo Ski Resort, West Windsor is home to Ascutney Trails (a multi-use trail system) and Ascutney Mountain which is one of the Northeast's premier

hang-gliding spots, Windsor is home to the Mt. Ascutney State Park which offers several hiking trails, Springfield is home to the Toonerville multi-use path; and Reading is home to a large portion of the Green Mountain Horse Association's trail network. Furthermore, VAST (Vermont Association of Snow Travelers) maintains an expansive network of snowmobile trails in the region. Indoor recreation opportunities include craft fairs, contra dances, indoor concerts, and recreation centers.

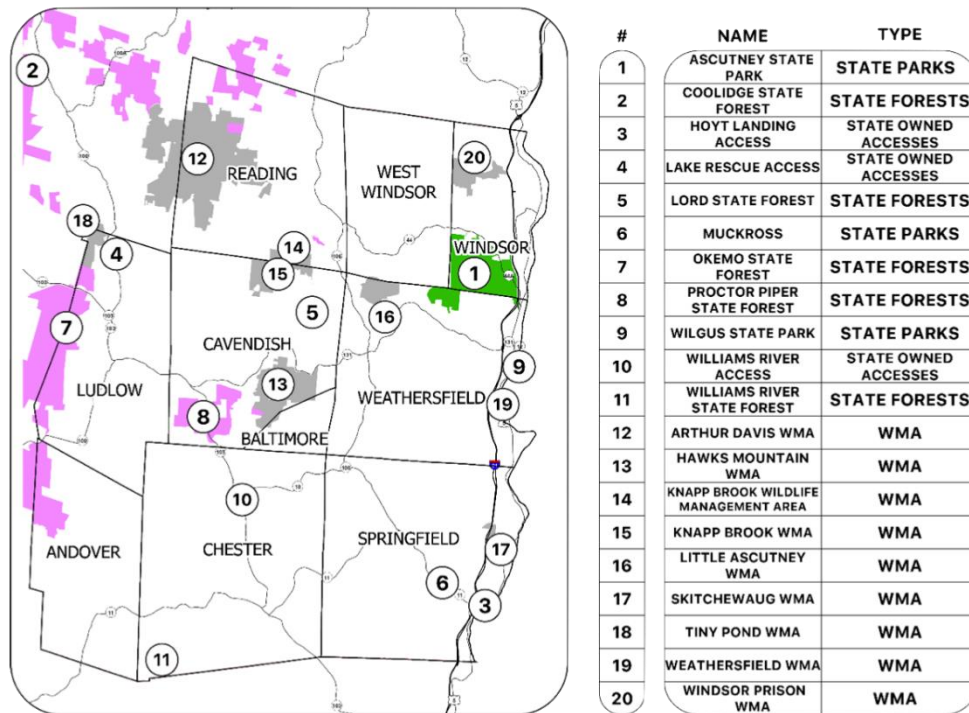
Public and private entities work continuously to improve and expand recreational opportunities in the region. Of particular note is the multi-jurisdictional Mount Ascutney Outdoor Recreation Plan, a multi-town initiative to improve the trail network on and around Mount Ascutney. A more comprehensive list of the Region's recreational resources is included below.



Recreation Photograph 2 - Trailhead at the North Springfield Reservoir, Source: USACE

a. Federal Lands

The U.S. Army Corps of Engineers owns and operates a dam along the Black River in Springfield. The associated land and impoundment, covering 1,361 acres of fields, forests, wetlands, and lakes is available to the public. Summer activities include swimming, sunbathing, picnicking, fishing, boating, kayaking, canoeing, and wildlife viewing. A shelter is available to rent for daytime use at the Stoughton Pond Recreation Area. In the winter, the land is available for cross-country skiing, snowmobiling and snowshoeing. For more information, visit: <http://www.nae.usace.army.mil/Missions/Recreation/NorthSpringfieldLake.aspx>.



STATE-OWNED RECREATION LAND

b. Wildlife Management Areas (WMAs)

WMAs are owned by the Vermont Department of Fish and Wildlife and are managed primarily for the conservation of fish, wildlife, and their habitat, but the areas also provide opportunities for outdoor recreation. There are nine WMAs in the southern Windsor County Region of varying size.

c. State Parks

There are three State Parks in the Mount Ascutney Region: Wilgus, Mount Ascutney and Muckcross.

Wilgus State Park sits along Route 5 in Weathersfield and offers a campground with shelters, access to the Connecticut River, and hiking with great views of the Connecticut River Valley. For more information about Wilgus State Park please visit the following webpage: <https://vtstateparks.com/wilgus.html>.

Ascutney State Park is located along Route 44 in Windsor, and offers camping and hiking opportunities. The Park includes a "Summit Road" ending approximately 1/2 mile from the summit of Mt. Ascutney. The summit can also be reached using a network of hiking trails. The

summit of Mt. Ascutney is home to a viewing tower and several other vantage points offering spectacular views of the surrounding countryside. The West Peak area is used as a hang-gliding launch platform. For more information on the Ascutney State Park including a recreational guide, please see the following website: <https://vtstateparks.com/ascutney.html>.

Muckcross State Park is located off of Route 11 in Springfield, a short walk from the park and ride. The Park is the region's newest, established in 2016. The Park offers areas for picnicking and a network of informal trails for visitors to hike and explore. Since it is a new park, Muckcross has no established facilities, but the State has commissioned a Master Plan outlining potential future uses and facilities for the Park. For more information about Muckcross State Park, please visit the following website: <https://vtstateparks.com/muckcross.html>.



Recreation Photograph 3 - Mt. Ascutney over Lake Runnemedede, Source: MARC

d. State Forests

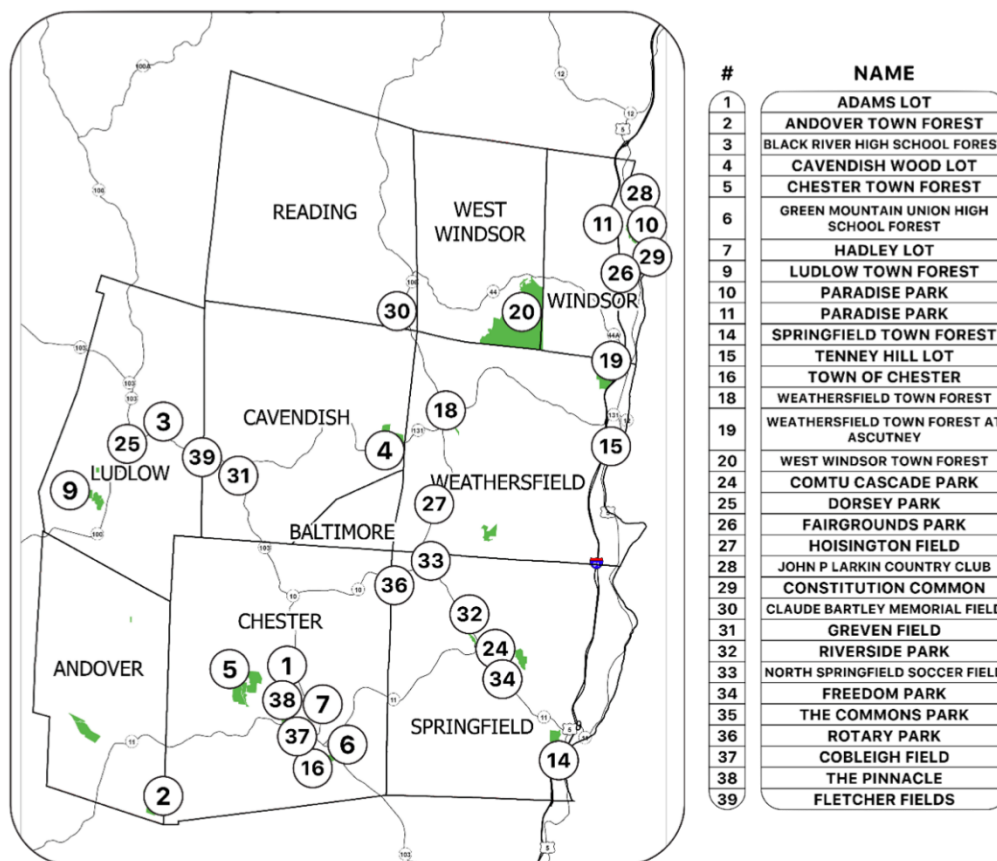
There are four different State Forests in the Mount Ascutney Region, the Albert C. Lord, Proctor Piper, Williams River, and Okemo State Forests. These lands are owned by the State of Vermont and are managed by the Vermont Department of Forests, Parks, and Recreation. The Department's mission includes stewardship of these lands for the health, integrity, and diversity of important species, natural communities, and ecological processes, as well as management of

the forests for sustainable use including compatible outdoor recreation activities, such as multi-use trail systems. The Okemo State Forest is the only one in the region with its own informational document, which can be found here:

https://vtstateparks.com/assets/pdf/okemo_sf_trails.pdf .

e. Other State-Owned Lands

Hoyt’s Landing in Springfield offers fishing and boating access to the Connecticut River and picnic areas in the summer and ice fishing access in the winter.



TOWN-OWNED RECREATION LAND

f. Town Forests and Town Parks

In addition to the State-owned lands, many of the municipalities in the Mount Ascutney Region own land that is used for recreational purposes. These lands include municipal parks, forests, ballfields, and fairgrounds.

g. Road Network

It is also worth recognizing the importance of our state and local road networks for recreational uses, which are perhaps the most frequently used resource for routine recreation by residents. Roads are used for walking, jogging, bicycling, equestrian and other uses. With the advent of fat bikes and electric bicycles, bicycling is becoming a year-round recreational activity and more difficult routes are accessible to a greater number of people. The region's scenic gravel roads make it well situated to take advantage of these developments. MARC has published maps and descriptions of bicycling routes in the region on the Ride Windsor County webpage at <https://ridewindsorcountylvt.weebly.com/>.

Variable widths of the existing roadway shoulders on paved routes may limit recreational uses. Many class 4 town highways and legal trails are used for snowmobiling, snow shoeing, and cross-country skiing; however, their use is subject to local rules and restrictions. In accordance with Vermont's Complete Streets Law (Act 34, 2011), accommodating all modes of travel (i.e. walking and bicycling) is to be considered in all state and municipally managed transportation projects on paved roads.

h. Water Access

The Connecticut River forms the eastern boundary of the area, providing the towns of Springfield, Weathersfield, and Windsor with ample river-based recreational activities such as canoeing, kayaking, fishing, and swimming. In addition to the Connecticut River, the region also is home to two other major rivers, the Black River and Williams River, and various streams and ponds that contribute to water-based recreation. Many informal swimming holes also exist along the network of streams and rivers in the region. According to the Basin 10 Management Plan, the Black River hosts Twenty-Foot Hole on the North Branch in Reading, and Buttermilk Falls in Ludlow, on Branch Brook. Also on the Black River are Tolles Hill Dam, a USACE recreational area in Perkinsville, and Flat Rock, opposite Mill Road just north of the Route 106 river crossing in Perkinsville. For more information on water-based recreation, please see the [Connecticut River Joint Commission's Recreation Plan](#), the [Basin 10 Water Quality Management Plan](#), and the [Connecticut River Paddlers' Trail Guide](#).

i. Events



Black River, Source: MARC

In addition to the resources listed above, the region is also host to several events devoted to outdoor recreation. The Vermont 100 and Vermont 50 are two long distance races that are very popular, utilize the forests, and are a boon to the local economy. The Vermont 100 is the last ultra-marathon to host both humans and horses on the same track. The Toonerville trail hosts several marathons and is being actively promoted to become a venue for the marathon circuits. There are many smaller events held in towns throughout the region such as Old Home Days, July 4th firework shows, outdoor concerts, ducky derbies, and many more.

3. Key Priorities

The list of key priorities included below was taken directly from the State of Vermont's 2019-2023 Statewide Comprehensive Outdoor Recreation Plan. Towns and regions should be aware of these priorities when conducting planning for recreational opportunities.

a. Stewardship of Natural Resources and Recreational Assets

Conserving Vermont's natural, cultural, and recreational assets ensures that the opportunities we enjoy now will continue to be available for future generations. By monitoring, restoring, and maintaining healthy soil and forests, clean water and air, high-quality habitat and biological diversity, we promote healthy, functional ecosystems while creating a foundation for sustainable access and recreation.

b. Stakeholder Communication, Coordination, and Engagement

Vermont boasts a broad array of public, private, and non-profit partners who play active roles in supporting outdoor recreation across the state (and beyond it in some cases -- the Appalachian Trail, Northern Forest Canoe Trail, and Lake Champlain, for example). These independent but

interdependent organizations plan for, provide, and manage land and water resources, human resources, and equipment, programming, and recreational infrastructure.

c. Participation and Access for All

While Vermont provides exceptional recreation opportunities, access is not consistently available and not all Vermonters are able to participate. Vermont has the opportunity to bridge this gap through, among other strategies, continued support of recreation access and opportunities in Vermont's downtowns, villages, and neighborhoods.

d. Community Connections, Health, and Wellness

Supporting and building connectivity between neighborhoods, community facilities, trail networks, and recreation infrastructure within communities will provide greater opportunities for promoting health and wellbeing. Focusing on the role of outdoor recreation in fostering livability can lead to benefits for multiple audiences, including the significant projected population increases for older adults.

e. Economic Vitality & Tourism

Vermont's landscape of forests, farms, and human communities and their associated outdoor recreation opportunities are major reasons why people visit and live in Vermont. Outdoor recreation contributes to sustaining vibrant rural economies and strengthens the state's position as a premier tourism destination.

For additional information regarding the priorities, please see the [2019-2023 Vermont Comprehensive Outdoor Recreation Plan](#).

H. Policies

Water, Sewer and Electricity Policies

1. Extensions of service infrastructure should take place in areas proposed for development by town plans and local bylaws and should not lead to sprawl or strip development or service use that exceeds existing or planned system capacity.
2. Water conservation techniques should be used in new development, and in the rehabilitation of existing development, to lengthen the life of wastewater treatment facilities and slow the depletion of groundwater resources.
3. Careful facility siting, landscaping and other mitigation techniques should be employed to minimize aesthetic impacts of transmission line projects.

Solid Waste Facilities Policies

1. Promote efforts within or among the Region's towns to reduce waste production, reuse, recycle, and compost. The hierarchy, as described in the Vermont Solid Waste Management Plan, of "reduce, reuse, recycle" should form the basis for all solid waste planning in the Region.
2. Land application of sludge¹⁰ in the Region is encouraged provided that it does not pose a risk to human health or have negative impacts on aesthetics or the natural environment.
3. When measuring the economic viability of solid waste reduction or recycling programs, avoided costs of solid waste production and disposal, and of environmental cleanup, shall be considered as economic benefits.

¹⁰ Sludge, also known as biosolids, is a byproduct of wastewater treatment. For more on biosolids and their potential uses, see the EPA webpage: <https://www.epa.gov/biosolids/basic-information-about-biosolids>.

Community Health and Safety Resources Policies

1. Expansion or creation of health and safety facilities is encouraged in locations selected for the efficient delivery of services and as necessary to meet the current and future demand.
2. Existing or proposed correctional facilities should be sited, maintained, and managed in a manner which ensures the safety and security of local residents.
3. The impact of existing and potential development on public health and safety facilities and services should be evaluated prior to new development.
4. New nursing homes and assisted living facilities should be located in close proximity to services or along public transportation routes in order to provide efficient access to services for residents.

Communication Facilities Policies

1. Support the development of broadband communication networks Region-wide.
2. New or expanded wireless communications services must collocate on existing facilities or be sited on existing structures, where feasible, and shall minimize negative visual impacts.
3. New communications facilities must minimize impacts on wildlife habitat and corridors, forest blocks, wetlands, rivers, streams, ridgelines, and other natural, scenic, and aesthetic resources, and should comply with the following standards
 - a. Protecting view corridors from highways, residential areas, historic districts, public use areas, and outdoor recreation areas such as hiking trails, rivers, lakes, and ponds should be paramount in the design and siting permitted.
 - b. All new wireless communications facilities sited on a ridge should be located below the ridge so that the tops of any such facility are below the site lines of persons using the highways or in the residential areas and historic districts. At a minimum, the tops of such facilities must not exceed the elevation of the immediate ridge.
 - c. New access roads should be designed for minimal ground disturbance and clearing, follow the land contours, and avoid open land to minimize visual and ecological impact.
 - d. If new wireless communications facilities are added to existing wireless communications facilities on peaks or ridges, such existing facilities should be retrofitted or maintained in a manner to minimize any negative visual impact.

- e. At the site of wireless communications facilities, the existing vegetation and tree cover should be maintained to the maximum extent possible.
 - f. Prior to the application hearing, a demonstration of the visual impact of the tower must take place to inform the public (by simulating the silhouette of the facility by raising a dark colored balloon to the height of the top of the proposed facility, or other reasonable simulation).
4. Decommissioned wireless communications facilities or portions of facilities must be removed and the site restored and reclaimed to its original condition. All roads and accesses to the site which are no longer needed should be reclaimed and restored.
5. Permits for communications facilities should require a performance bond or other financial security ensuring the reclamation and restoration of the site should the facility be abandoned or rendered obsolete by technological advances. The performance bond should take inflation into account as many years may elapse between construction and removal of the facility.
6. The development and use of alternative technologies to serve the industry is encouraged. These include, but are not limited to, "stealth" designs for wireless communications facilities or complete coverage of such facilities within existing buildings and structures, and satellite technology, which would reduce the need for new, and allow for the removal of existing, wireless communications facilities.

Educational Resources Policies

1. Expansion or restructuring of academic, vocational, recreational, and cultural education facilities and resources to meet the needs of all residents will be supported, where communities show need and/or where existing facilities are inadequate.

Child Care Policies

1. Town plans should assess current and future local needs and supplies of child care services, including whether local barriers exist for the provision of these services.
2. Member towns should periodically review land use regulations to identify unnecessary barriers to childcare facilities and mechanisms to promote the development of childcare services in appropriate locations convenient to local services and densely populated areas.

Recreation Policies

1. High impact recreational activities such as horseback and ATV riding shall be located outside of ecologically sensitive areas, which are defined as natural features that contribute to the survival and/or reproduction of wildlife or are more susceptible to damage from human activities. For the purposes of this chapter those areas include: wetlands and vernal pools; concentrated black bear feeding habitat (mast stands); rare, threatened, and endangered species habitat; significant natural communities; riparian areas and surface waters; prime agricultural soils; slopes greater than 25%; ledge, talus, and cliff habitat; land in excess of 2,500' in elevation; and habitat as identified by the Vermont Department of Fish and Wildlife as either significant wildlife habitat or necessary wildlife habitat in accordance with 10 V.S.A. § 6086(a)(8)(A).
2. Multi-use and multi-season trails are preferred over single-use and single-season trails, provided that the various uses can be accommodated without undue risks to health and safety.
3. Public access to major water bodies and watercourses should be maintained and expanded in accordance with local goals and the area's capability to handle increased traffic without undue adverse impact on the natural or cultural features of the area.
4. Expansion of public access to ecologically sensitive areas is generally not encouraged. Where it is demonstrated that increased public access to ecologically sensitive areas is important for educational or experiential needs a management plan that addresses preservation and protection of the sensitive area should be prepared.
5. Development that could threaten the quality of recreational waters should be discouraged and alternatives sought.
6. Planning and construction of recreational opportunities on sites of public utilities or public works facilities (e.g. incorporation of trail networks into public utility corridor planning) is encouraged as it will help to achieve more efficient and productive use of these lands.
7. The development of multi-purpose trails using abandoned railroad beds, Class 4 roads, and other public rights-of-way is supported.

Ch 7: CULTURAL & AESTHETIC RESOURCES

Long before European settlement, Abenaki people inhabited and were stewards to the land. Because of cultural and historic genocide put in place by European settlers throughout history, there are few Abenaki people left. Because of the history of violence towards this group, it is important that we, as a Region, commit to equitable policies and acknowledgements that benefit future generations of Abenaki descendants and vow to omit future harm.

Abenaki History

While the exact dates of Abenaki and indigenous settlement cannot be traced back exactly, Abenaki oral history and archeology point to people being in Vermont and New Hampshire as far back as 12,000 years ago, and data signifies that as far back as 7,000 years ago indigenous people were propagating plants and using agricultural practices in the Northeast. Abenaki people were and still do plant corn, beans, squash, and sunflowers to sustain their families. In addition, Abenaki people hunted, fished, and gathered resources both as a form of sustenance, but as a part of a long-standing culture. The Abenaki people have historically and presently played a large part in reforestation and conservation efforts throughout the state.

From the 1620's to present day, with the first colonizers from Europe reaching the Americas to present day, Abenaki people have seen thousands of their burial goods and sacred items stolen. Every European foray into Abenaki land included "searches" for gold and treasure that included looting sacred burial sites, and murdering Abenaki people. In addition to pillaging villages, and murdering the indigenous people, European colonizers exposed smallpox and other diseases that devastated the Indigenous communities. More acts of harm have been enacted over the history of European colonization through harmful policies, treaties, and unequal distribution of punishment.

Since then, there have been some preservation efforts by the State of Vermont to recognize harm done and acknowledge and preserve indigenous resources and recognize indigenous Abenaki people and stewards of the land.

In 2006, the Vermont Legislature formally recognized the Abenaki.

In 2019, the State replaced "Columbus Day" with "Indigenous People's Day".

In 2020, hunting and fishing rights were recognized by the State of Vermont.

While hundreds of years of harm cannot be undone overnight, the Region can take steps to enact goals and policies that recognize significant historical and archeological indigenous sites and recognize the contribution of knowledge the Abenaki people have understanding scenic lands.

For more information on the Sokoki Abenaki people, [click here](#).

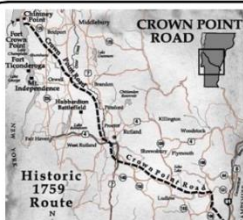
A. 1. Cultural and Historic Resources

Cultural and Historic Resources Goals

Ensure the protection, promotion, and restoration of culturally and historically significant resources by

1. Promoting equitable acknowledgements of indigenous populations throughout the Region through cultural and historic preservation methods as defined by the Abenaki and indigenous people themselves;
2. Ensuring the preservation, maintenance, and enhancement of significant cultural and historic resources throughout the Region;
3. Promoting the historical and cultural heritage of the Region.

Cultural, natural, economic, and political history has shaped the character of the Region. This character is reflected in the buildings, archeological sites, structures, events, and traditions established by residents throughout the Region's history. The importance of these cultural and historic resources is reflected in their ability to provide a sense of continuity to the Region's cultural fabric. A shared sense of history and cultural pride creates stronger communities and encourages the appreciation of other cultures. Historic and cultural sites, buildings, and events can also provide economic benefits because they draw visitors from around and outside of the region to enjoy the rich cultural fabric these resources provide. Cultural and historic resources can also serve dual purposes as unique community gathering places for the enjoyment of music, theater, and other cultural performances. In all, it is important to protect significant cultural and historic resources from destruction or inappropriate alteration to avoid losing the sense of place that has been developed over hundreds of years.



Crown Point Military Road

The Crown Point Road originally served as a military supply route for the British army, and later for American forces during the Revolutionary War. Started in 1759, The Crown Point Military Road connected Fort No. 4 in New Hampshire with other military fortifications at Crown Point and Mt. Independence on Lake Champlain. The road was built through Springfield, Weathersfield, Cavendish, and Ludlow and sections of the road are still in use for transportation and recreation.



U.S. Congressman and General Lewis Morris

Morris was clerk of the [Vermont House of Representatives](#) in 1790 and 1791, and was a member of the convention to ratify the [United States Constitution](#). The General Lewis R. Morris House property lies in eastern Springfield township. The house and related outbuildings constitute a cluster next to the west side of the historic valley road (now called Old Connecticut River Road).



U.S. Consul William Jarvis

Jarvis came to Weathersfield, Vermont in 1812. Jarvis played an integral part in introducing Merino sheep to the United States and subsequently in the development of the sheep herds in this country. The successful introduction of the Merino herds in Vermont resulted in "merino mania" and the growing demand for wool by the textile industry of New England led to a change in farming practices.



U.S. Secretary of State William Evarts

Evarts was an American lawyer and statesman. He was involved in three of the most important political cases in his day. He was buried at Ascutney Cemetery in Windsor. Evarts owned numerous properties in Windsor, including Evarts Pond and Evarts Estate. The homes included 26 Main Street in Windsor that was later restored and reopened as the Snapdragon Inn.



President Calvin Coolidge

Coolidge was educated at the Black River Academy in Ludlow. Black River Academy operated as a school, serving as the Town of Ludlow's public [high school](#) until 1938, when a new school was built. The original academy building burned early in the school's history, and the school operated in a church for 44 years until this building was built in 1888.



American Precision Museum

The Region is home to the development of the American machine tool industry. The Robbins and Lawrence Armory was an early manufacturer of rifles for the United States government and produced 50,000 rifles during the Civil War for use by Union troops. Today, it houses the American Precision Museum. Out of the armory came industries like Jones and Lamson (J&L) Company, Fellows Gear Shaper, Bryant Grinder, and Lovejoy Tool. Since that time, only Lovejoy continues to operate today. In Windsor, the industry continued after the demise of the armory, with the evolution of the Cone-Blanchard Company, which closed in the late 1990s. The building is now occupied by Seldon Technologies, which specializes in nanotechnology.



The Woolen Mill

The Mill was also an important part of Vermont’s history and economy in the 19th and early 20th centuries. Although the mills no longer operate, some of them can still be seen across the Region. The Woolen Mill complex in Ludlow and the Mack Molding building in Cavendish are both excellent examples of how historic buildings can be reused while preserving their historic character. The old mill in Proctorsville serves as an example of how important historical development patterns are to Vermont communities.



Covered Bridges

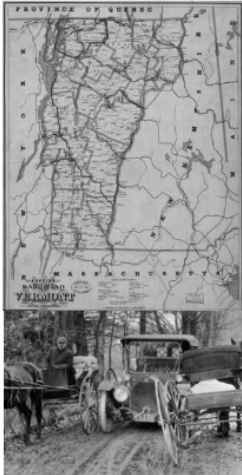
The Region is home to several covered bridges built in the 19th century including: Upper Falls in Weathersfield, Bests and Bowers in West Windsor, Baltimore in Springfield, Titcomb in Cavendish. Built in 1866, the Cornish-Windsor Bridge is 465 feet long and is the second longest covered wooden bridge in the United States.



Architectural Styles

There are distinct architectural styles common to the Region. The most obvious example is the “Snecked Ashlar” which were built in the 1830’s and 1840’s with stone from the nearby hills. Making up Chester’s Stone Village are the original ten snecked ashlar buildings built on North Street. These buildings can also be seen in homes, schoolhouses, and churches across the Region. In Vermont, this type of construction is found almost exclusively in southern Windsor County. Another distinct architectural feature found more often in the Region than in other parts of New England is the recessed balcony, which can be seen in Ascutney, Perkinsville, and Ludlow.

The Region also has many individual buildings that are notable historic resources. Two examples are the NAMCO block apartment building and the Windsor House. The NAMCO block was built to house employees of the National Acme Manufacturing Co., which occupied the Lawrence and Robbins Armory building after the turn of the century. It is noteworthy because of its symmetry and efficient use of space, air circulation, and light. It was designed to provide the most comfortable living quarters possible within available space. The Rockingham Area Community Land Trust and Housing Vermont have rehabilitated the building into 58 affordable housing apartments. The Windsor House, according to the National Register of Historic Places, “served as a prominent hostelry for almost 150 years and had many important personages.” In the 1970s, the Windsor House was rescued from destruction by a local group calling itself Historic Windsor. This group saved the building, established it as a newly thriving commercial and cultural center that has brought new life to downtown Windsor.



Transportation Systems

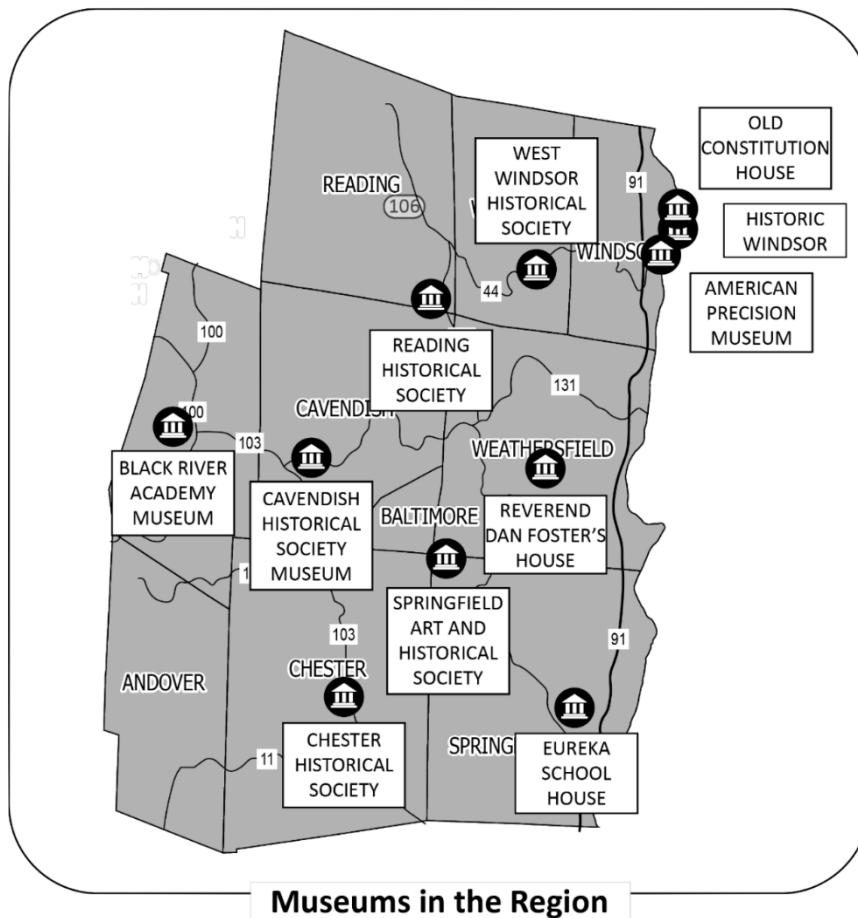
Like most places in the United States, Vermont was transformed first by the train and then by the automobile. The construction of the railroad system in the 1800s was instrumental in developing industries such as mining and manufacturing. The passenger rail system accelerated the westward migration by Vermonters in the latter half of the century. The ease of rail travel first brought vacationers to the state and the Region in large numbers. Tourists were attracted by the pastoral scenery, mineral springs, and mountaintop hotels. By 1950, Vermont was aggressively marketing itself across the country as a tourist destination, and the interstate system played a vital role in maintaining this status. The boom of the automobile industry and interstate took over for the passenger rail system in the 60s. While passenger rail travel is not as important as it once was for passenger travel, rail is still very important to move goods in and out of the Region.



The Vermont Constitution

In 1777, the Vermont Constitution was drafted and signed in Windsor. The Vermont Constitution was the first in North America to abolish slavery and was ahead of its time in expanding voting rights. The Old Constitution House still stands in Windsor and is now open to the public as a state historic site.

The Vermont Division for Historic Preservation (DHP) keeps track of national and state historic designation documentation, which can be found [here](#). There are also numerous sites in the Region listed on the National Register of Historic Places. Chester, Ludlow, Springfield, Weathersfield and Windsor all have historically designated districts listed on the National Register. The Weathersfield Historical Society has produced its own detailed registry for the town, which has been adopted by the Vermont DHP. According to DHP, the state register is a list of “districts, sites, buildings, structures, and objects” of local, state, and national significance in “history, architecture, archeology, and culture”; the National Register is “the official federal listing of historic, architectural, and archeological resources worthy of preservation”. The structures, sites, markers, and districts listed in these registries, along with the Region’s cemeteries, all have regional significance. The figure below identifies museums located in the Region, celebrating both the cultural heritage and the contemporary talents of the Region’s residents.



Source: RPC; this is not a comprehensive list of all historic resources for each town, but only a preliminary survey to determine what the towns consider as five of their most important historic resources.

The Region hosts numerous fairs and festivals that draw visitors from outside, including the Ludlow Fireman's Auction and the Springfield Apple Festival. Local events specific to each town, such as the annual Autumn Moon Festival in Windsor, also contribute to a strong sense of community.

A. 2 Tools for Historic Preservation

The following are some of the most commonly used tools for protecting historic resources in Vermont.

State and National Registers - Listing on the State or National Register identifies a resource as having historical or cultural significance. While listing does not place any restrictions on property owners, it can foster a sense of pride and responsibility in individuals and communities. Listing on the National Register provides protection against the use of federal funds to negatively affect the

historic character of a site; it can also provide communities and individual property owners with federal funding for rehabilitation projects, and with investment tax credits.

Downtown Designations - Vermont's "[Historic Downtown Development Act](#)" is intended to "encourage investment in and restoration of municipal downtown districts". Areas that receive designation as a "downtown development district" are eligible for benefits in the form of financial aid and tax incentives for certain projects. In our Region, Springfield and Windsor have designated downtown status. As of 2021, Ludlow is seeking downtown designation.

Designated Village Centers – [Village center designation](#), as provided for in 24 V.S.A. Chapter 76A, was created by the legislature to recognize and encourage local efforts to revitalize Vermont's traditional village centers. While village center revitalization is an ongoing process to improve a community's vitality and livability, village center designation is only one tool and its focus is on supporting commercial activity in the center of Vermont's villages. In our Region, the villages of Ascutney, Brownsville, Cavendish, Chester, Felchville, Perkinsville and Proctorsville are Designated Village Centers.

Certified Local Governments (CLGs) - A 1980 amendment to the National Historic Preservation Act of 1966 requires that at least 10% of states' Historic Preservation Funds be given to "Certified Local Governments" (CLGs). A local government becomes eligible for this program when the State Historic Preservation Officer (SHPO) certifies that the local government has established its own historic preservation commission and a program that meets state and federal standards. In addition to being eligible for matching survey and planning grants, CLGs review nominations of National Historic Register properties within their jurisdictions and provide local perspective to the plans and programs of the VT Division of Historic Preservation. Windsor is the only town in the Region that is a CLG.

Local Zoning - Under Vermont law, towns may include Design Review Districts and Historic Districts in their zoning bylaws. Design Review Districts offer communities, after public hearing and preparation of a design plan, the opportunity to review and approve the construction, demolition, substantial alteration, movement, or change in use of a building within the district. Historic Districts offer a more specific set of guidelines for reviewing projects in the district based on historical and architectural significance and a predetermined set of criteria. Springfield and Windsor have adopted downtown design review districts in their zoning bylaws. Towns may also include review of historic impacts under conditional use and site plan approval guidelines in their zoning bylaws.

Act 250 - Some development may be subject to review of potential impact on historic resources under criteria 8 and 10 of Act 250. Under criterion 8, applicants must show that a project will "not have an undue adverse effect on the scenic or natural beauty of the area, aesthetics, historic sites or rare and irreplaceable natural areas". Under Criterion 10, a project must be shown to be in conformance with "any duly adopted local or regional plan or capital program".

Section 106 of the National Historic Preservation Act of 1966 – The Vermont Division for Historic Preservation reviews projects when a federal agency/funding is involved with a project.

Vermont Historic Preservation Act – In accordance with 22 V.S.A. §742 the Vermont Division for Historic Preservation reviews projects when a state agency/funding is involved with the project, on behalf of the Vermont Advisory Council on Historic Preservation.

The most important tools for historic preservation in any town are a sense of pride and a strong stewardship ethic in its residents. Education and cooperation between local planning and development bodies, historical societies, residents, visitors, the business community, and property owners should be fostered throughout the Region. The cultural and historic resources of southern Windsor County may represent its most distinct and outstanding feature. Recognizing and protecting their value can foster civic pride; stimulate improvements in education; encourage environmental protection and sound land use planning; help attract businesses and expand tourism; and support the agricultural and forestry economies through the preservation of farms and maintenance of historical settlement patterns.

B. Aesthetics: Scenic Lands and Open Space

Scenic Lands and Open Space Goals

Achieve a balance between scenic or open land uses and other land uses in the best interest of the environment and the Region's residents through:

- 1. Maintaining and/or enhancing the diversity of ecosystems throughout the Region by promoting connectivity between significant habitat wherever possible;**
- 2. Protecting the environmental character and integrity of significant natural and scenic resources as identified by member towns.**
- 3. Integrating indigenous knowledge of conservation into policies and practices.**

The harmonious mix of open space, villages, farms, country roads, mountainous terrain, historic architecture, and surface waters in the Region provides for scenic vistas and an attractive landscape. This landscape is also an economic asset and has a tangible economic value to the Region. The rural lifestyle and scenic landscapes attract many tourists. Tourism is a significant industry in the Region. The preservation of these aesthetic and scenic resources has become increasingly difficult due to economic and development pressures. Over the past several decades, highway strip development has emerged between town and village centers and the countryside thus threatening the Region's traditional land use pattern. Agricultural fields and working forestlands juxtaposed to dense villages combine to create the traditional Vermont landscape that residents and tourists cherish. Development can occur in ways that do not adversely impact this traditional landscape, such as innovative site plans, clustering around already established villages and town centers. Future development needs to be cognizant of the landscape's heritage and work towards mitigating any adverse impacts to the land's historic legacy.

Scenic Resources

Scenic resources are public or publicly accessible areas, features, landscape patterns, or sites that are easily recognized by the Region and contribute to Region's distinct character. Vermont has been involved with scenery preservation issues as early as 1937. In 1966, the State established the Scenery Preservation Council. Key milestones for the Council were the passage of the "outdoor Advertising Law, i.e., the billboard ban in 1968; numerous studies on Vermont's scenic qualities; and the publication of



the "Vermont Backroads Handbook". Efforts to mitigate any negative effects of development are necessary to protect, preserve, and improve the significant aesthetic resources within the Region. Such efforts should include a continued emphasis and restructuring of municipal planning and zoning administration, which protects and preserves the landscape heritage in the Region. Identifying key scenic resources is imperative to protecting the rural landscape and value of the

Region. While scenic resources can be hard to identify, they can be sorted into four main categories; Highlands, Lowlands; Centers; and Countryside.

Highlands:



Mountainous areas made up of scenic ridgelines with significant changes of topography, bedrock and soil conditions that also host woodlands containing native plant and wildlife habitat. The Region has prominent ridgelines and mountain tops that are inherently and especially sensitive, e.g. the Alps and Little Ascutney Mountain. Development in these areas is strongly discouraged. Such proposed development should work towards design plans that retain the prominent natural appearance by locating

in less visible areas and away from highly visible ridgelines, blending and or hiding structures within existing wooded hillsides, and where possible, avoid excessive use of reflective glass.

Aesthetic resources are protected by Criterion 8 of Vermont's Act 250, which does not relegate scenic beauty to pristine areas alone, but to settled areas and farmlands as well.

Lowlands:



Characterized by riparian corridors, wetlands, waterways, and floodplains, areas like this can provide ecological benefits as well as recreational opportunity. Lowland areas, like those around the Connecticut River, are good examples of resources that should be preserved. Covered Bridges that go over waterways are of particular interest to this region and help create a unique aesthetic experience for visitors and community members alike.

Central Gateways:

Dense central places like a village center that is characterized by significant or historic buildings like public offices, monuments, a commercial core, and a more urbanized residential area.

Countryside:

Woodland or agricultural areas outside of an urban center with limited residential development. Countryside can be characterized by open fields, managed crop fields, and/ or orchards.

Scenic Roadways:

The Scenic Roads Law was passed in 1977, initiating the state Scenic Roads Program. The purpose of the Scenic Roads Program was to protect the physical character and condition of the roadway right-of-way.

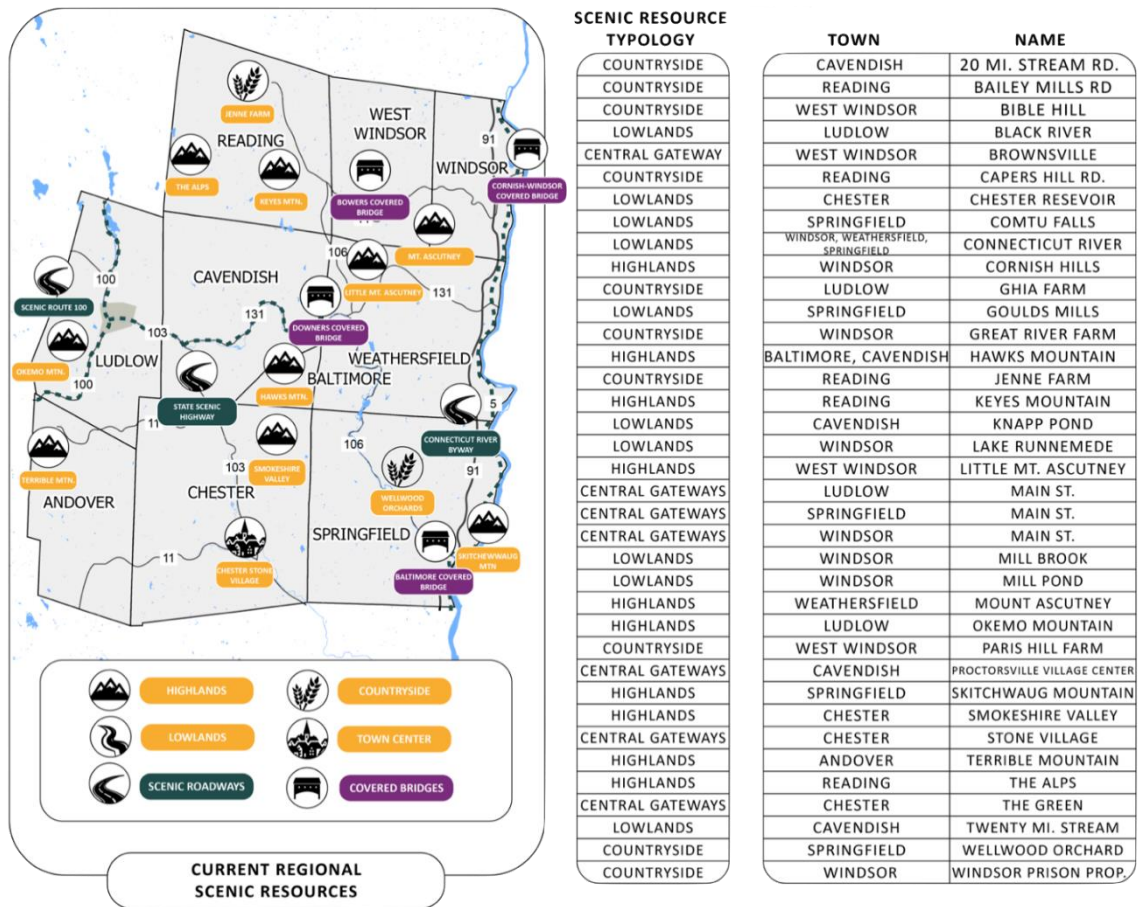
National Scenic Byways Program: The purpose of the Byway program is to foster cooperative ventures or public-private partnerships, and to protect, enhance, and/or promote the natural, cultural, historic, archeological, recreational, and scenic qualities. The Connecticut River Byway was awarded national designation by the Federal Highway Administration. The segment of the Byway in this Region includes the US Route 5 corridor through Windsor, Weathersfield and Springfield. The two spurs including VT Route 44 to Brownsville and VT Route 11 to downtown Springfield, continue to be part of the originally designated Connecticut River Scenic Byway.

State scenic roads may be established by recommendation of the Scenery Preservation Council per 19 V.S.A. §2501. Any construction or maintenance work on designated state scenic roads must be consistent with the standards established by VTrans pursuant to 10 V.S.A. §425. The segment of VT Route 131 in Cavendish is the only designated State Scenic Highway in this Region.

Towns in Vermont are enabled to designate municipally maintained roads as “scenic roads,” as established by 19 V.S.A. §2502. Town scenic roads are also subject to the standards established by the State Transportation Board. Those standards for scenic roads address appropriate minimum roadway widths, alignment, landscaping, and traffic control methods, pursuant to 10 VSA §425. There are no town designated scenic roads in this Region currently.

Covered Bridges:

Covered bridges are a staple of New England, and the character of many of the scenic resource elements listed above are amplified by covered bridges in the region. For example, the iconic Cornish-Windsor covered bridge from multiple angles frames a view of Mount Ascutney and the Connecticut River.



Preserving Scenic Resources:

Limiting Light Pollution:



One of the most valued resources of a rural region is a night sky unimpaired by “sky glow” from the misdirected light of urbanized areas and recreational resorts. Many outdoor lights are poorly designed or improperly aimed, allowing light to project above the horizon and wash out the view of the stars. Poorly designed exterior lighting also creates glare, light trespass on neighboring property, and energy waste. There are now options for outdoor lighting, which are better

designed to direct light downward where it belongs. These fixtures are commonly referred to as “dark sky compliant,” and maintain light distribution towards the ground full cutoffs avoiding projection into the sky. Future consideration of this technology would help reduce cumulative negative effects on aesthetic resources. Groups like the Springfield Stellafane astronomy club rely on the dark sky created by limited light of sky to recreate. Springfield also has an “Observatory Protection Overlay District” that minimizes light effecting observatories in Springfield.

Maintaining Open Space:

“Open space” may be defined as land which is not developed and is of some benefit to the public for many of the reasons described throughout this chapter and the Natural Resources chapter. Open space that is publicly owned or permanently protected through the sale or donation of development rights may ensure the long-term productive capacity of forest or agricultural land; preserve wildlife habitat; protect groundwater resources; provide recreation land; and preserve important historic, scenic and cultural resources.

The Upper Valley Land Trust (UVLT) is in Hanover, New Hampshire, and provides conservation leadership, tools and expertise to permanently protect the working farms, forested ridges, wildlife habitat, water resources, trails and scenic landscapes that surround residential areas and commercial centers. UVLT focuses its mission in 45 Vermont and New Hampshire towns (including Springfield, Weathersfield, Windsor, West Windsor, and Reading) in the upper Connecticut River valley. UVLT is a sponsor member of the [Land Trust Alliance](#), an organization that promotes land

conservation by providing advocacy and professional resources to over 1,600 land trusts nationwide.

To ensure that open lands that provide the greatest public benefit are protected for present and future generations, towns should develop open space plans.

For more information: [Open Space & Resource Protection Programs](#)

Policies

A. Cultural and Historic Resources Policies

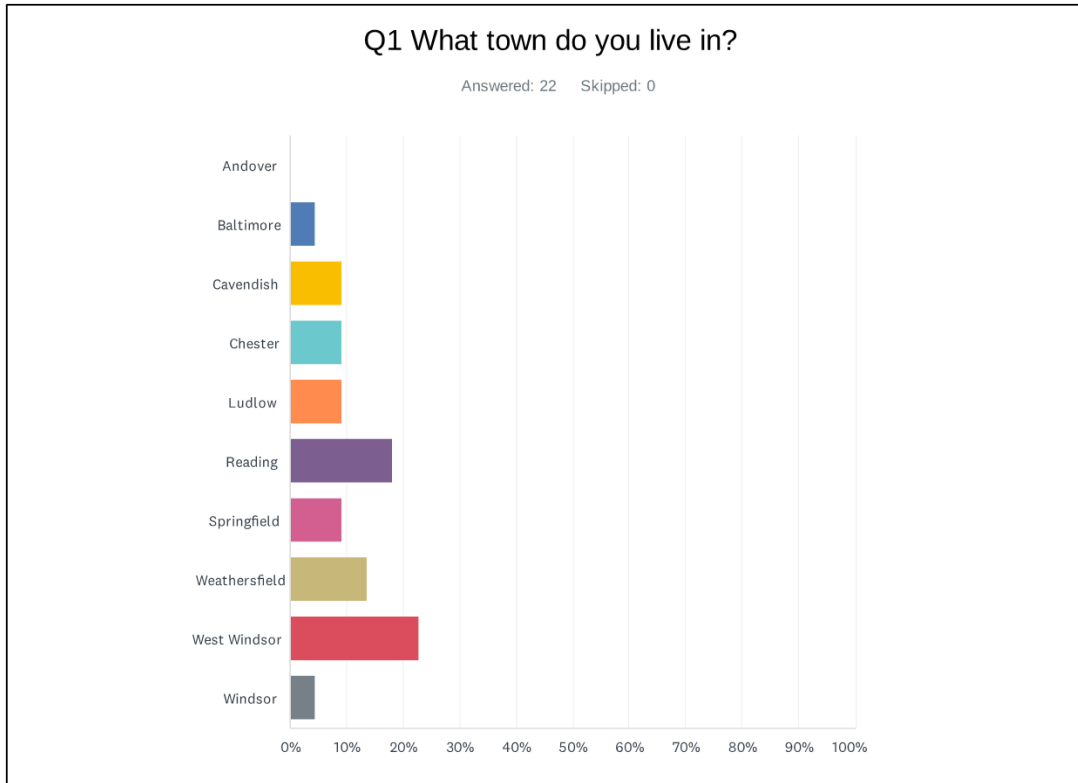
1. Acknowledge the presence and continuous stewardship of indigenous people to the cultural and historical resources in the region.
2. Proposed development adjacent to or within historic or cultural sites must adhere to similar massing, size, scale, and overall design of the site. Development must enhance historical or cultural value and appreciation.
3. Increase awareness of community, regional, state, and federal programs which sponsor or provide financial or technical assistance for cultural and historic preservation and education.
4. Adaptive reuse of historically significant buildings and sites is desired as long as the project is consistent with the Secretary of the Interior's Standards for the Treatment of Historic Properties and any local historic or design review guidelines.
5. Regionally significant historic buildings and sites should be preserved unless existing conditions make it unreasonably cost prohibitive. Necessary renovations should reflect the historic character of the resource. In the case of private homes, owners are encouraged to consider the site's historic, cultural, and economic value to themselves and the community when deciding how best to maintain and manage them.
6. Promote the education and increased awareness of significant cultural/aesthetic resources, such as cellar holes and stonework.
7. Acknowledge, protect, respect, and memorialize Abenaki and indigenous burial sites, archeology, ethnohistory, and traditional knowledge.

B. Scenic Lands and Open Space Policies (See also Natural Resources Chapter)

1. Support local, state, or federal programs and legislative efforts which protect and enhance the economic, cultural, environmental, and aesthetic values of forested and scenic resources.
2. Support, and promote, the continuation of programs that provide incentives for landowners to conserve farmland, forestland, and open space (e.g., Forest Legacy Program, Use Value Appraisal Program).
3. Conservation easements of important open and scenic lands are supported.
4. Historic, archeological, and indigenous sacred resources that enhance the scenic resources of the Region are preserved.
5. The sites highlighted in the Scenic Resources section of this chapter are inherently and especially sensitive. Development around the Region must not result in undue adverse impacts on these scenic resources.
6. Structures and exterior areas shall be illuminated only at levels necessary to ensure the safety and security of persons and property. Any lighting that will disturb the natural or aesthetic value of a scenic resource shall not be used.

Exterior lighting must be fully shielded and minimize the amount of blue light in the nighttime environment (i.e., Dark Sky Friendly).

APPENDIX: Scenic Resources Survey



ANSWER CHOICES	RESPONSES	
Andover	0.00%	0
Baltimore	4.55%	1
Cavendish	9.09%	2
Chester	9.09%	2
Ludlow	9.09%	2
Reading	18.18%	4
Springfield	9.09%	2
Weathersfield	13.64%	3
West Windsor	22.73%	5
Windsor	4.55%	1
TOTAL		22

Q2 What would you say are the outstanding scenic mountains or highlands in your town or region? Highlands: Hillsides and ridgelines, that because of topography, bedrock, and soil conditions prominent mountains, forest cover, and other elements, are outstanding scenic resources. (ex. View of Mt. Ascutney from Paradise Park in Windsor)

Answered: 22 Skipped: 0

#	RESPONSES	DATE
1	Springfield is not really a mountain or highland place, it however has been attracting glamping sites and a rural retreat. The development of these resources has been impeded by ANR and Acr 250 restrictions that sometimes make little sense.	2/1/2022 10:59 PM
2	Mt. Ascutney, Skitchewaug Mt., Mt. Ephraim, Hawk's Mt. (see this link about plane crash on Hawk's Mt. http://www.gendisasters.com/vermont/11490/hawk039s-mountain-vt-bomber-crashes-june-1947)	2/1/2022 12:19 PM
3	Keyes Mountain, Mt Moses	12/6/2021 5:38 PM
4	Mount Ascutney as seen from various points in W. Windsor. one is along Bible Hill Road but there are many more	11/29/2021 7:54 PM
5	hawkes MT Keyes MT	11/29/2021 7:38 PM
6	Steadman Fro the East Side	11/22/2021 8:37 AM
7	View from the height of S. Reading Rd. looking south south east. Hawks mountain.	11/22/2021 7:08 AM
8	Hawks Mountain Little Ascutney	11/18/2021 3:01 PM
9	Views of ascutney, view of Cornish hills and ridges across the river from Jarvis St, view from the beach of Kennedy Pond, covered bridge, windsor town forest, prison property	11/18/2021 12:46 PM
10	Views of: The Alps, Mt. Ascutney, Little Ascutney In Reading. Region: Okemo Mtn, Skitchewaug Mtn, Terrible Mtn	11/18/2021 12:04 PM
11	View from the top of Okemo View from the top of North Hill View from the top of the Ford Farm/Burns residence View from the top of the cemetery View from the top of East Hill View from the dams on Route 100 South/Andover Road View of the lakes from parts of Okemo	11/18/2021 10:57 AM
12	View of Okemo as you drive into town from the south. Views of the Lakes on VT Rt. 100 North. New England style architecture in the village.	11/18/2021 8:07 AM
13	Mt Ascutney, Little Ascutney and the valley between. View of Hawks Mtn from the Weathersfield Center Rd.	11/18/2021 7:08 AM
14	Jenne Rd., Town Hill, Grasshopper Rd. Ridgeline views, Pastures, Available trails	11/18/2021 5:57 AM
15	The land on both sides of Birmingham Road before Chaos; outcropping on one side with an amazing assortment of spring wildflowers and the ledge on the other with lady slippers and below, wetlands.	11/17/2021 8:01 PM
16	Mt. Ascutney, Rt. 44, and the Brownsville/Hartland ridgeline.	11/17/2021 5:04 PM
17	hawk mt.	11/17/2021 4:04 PM
18	View of Ascutney from the end of High Street, Smokeshire valley,	11/17/2021 3:55 PM
19	Mount Ascutney and Little Mount Ascutney not to mention every ridgeline in town	11/17/2021 3:53 PM
20	Mt. Ascutney--view from every angle.	11/17/2021 3:50 PM
21	Mt Ascutney, Little Ascutney Mtn, Hawks Mtn, Ludlow Mtn, Terrible Mtn	11/4/2021 4:13 PM

Q3 What would you say are outstanding scenic lowland features in your town or region? Lowlands: Characterized by riparian corridors, wetlands, waterways, and floodplains, areas like this can provide ecological benefits as well as recreational opportunities. (ex. The Connecticut River)

Answered: 20 Skipped: 2

#	RESPONSES	DATE
1	The Black River could be a major asset of the Town, however its ability to serve as such has been destroyed by buffer zone requirements which have surrounded it with poison ivy, tree debris, dying trees, and other obstructions which impede its visibility, accessibility, and use. The Town is protected from flooding by a large flood control dam, yet it is still subjected to unnecessary restrictions, against the wishes of the Town	2/1/2022 10:59 PM
2	Black River, Connecticut River and Hoyt's Landing, North Springfield Bog	2/1/2022 12:19 PM
3	Land around the Black River as it flows through Felchville. Land around the Mill Brook in and north of Hammondsville.	12/6/2021 5:38 PM
4	Mill Brook as it runs through West Windsor. In the region, the Connecticut River is very scenic, especially with the Windsor/Cornish Covered Bridge. In Taftsville, the river, dam, and River Road	11/29/2021 7:54 PM
5	Beaver meadows along 106 Reading. Beaver meadows upper Black R for flood resilience and habitats	11/29/2021 7:38 PM
6	The North Branch Williams River Valley North of Chester	11/22/2021 8:37 AM
7	20 mile stream road as it parallels the alps. Route 131 corridor. Davis Road	11/22/2021 7:08 AM
8	Black River and Valley	11/18/2021 3:01 PM
9	Paradise park, CT river (duh), old mill brook	11/18/2021 12:46 PM
10	Mill Brook, North Branch Black River, wetlands along Tyson Rd in Arthur Davis WMA, Niagara Falls, Twentyfoot Hole in Reading. Region: CT River and valley, Black River along RT 131, Goulds Mill & Comtu Falls (Springfield), Paradise Park wetlands and Lake Runnemedede, west Windsor flats along Rt 44, Hoyts Landing and setback	11/18/2021 12:04 PM
11	Black River watershed Lake Pauline and Lake Rescue Flood Control Dams (includes our recreation pond)	11/18/2021 10:57 AM
12	See above. Scenic drive along VT Rt 100, North and South. (Maybe that's why it's a 'scenic corridor')	11/18/2021 8:07 AM
13	Protected areas along the Black River (Army Corps), Black River North Branch fields following Rte 106	11/18/2021 7:08 AM
14	Mill Brook	11/18/2021 5:57 AM
15	Twenty Mile Stream as it flows along Heald Road.	11/17/2021 8:01 PM
16	Mill Brook, West Windsor Rt. 44 valley corridor.	11/17/2021 5:04 PM
17	Connecticut River and every stream in the area	11/17/2021 3:53 PM
18	The Mill Brook water way, including the low land area along Rt. 44	11/17/2021 3:50 PM
19	Covered bridges, Connecticut River, Black River along Scenic Route 131, Ludlow lakes region, Black River through downtown Springfield, Knapp Ponds, Lake Runnemedede, Mill Pond, Chester Reservoir	11/4/2021 4:13 PM
20	Mill Brook	11/4/2021 10:06 AM

Q4 What would you say are outstanding scenic community centers in your town or region? Centers: Dense central places like a village center that is characterized by significant buildings or historic architecture like public offices, monuments, a commercial core, and a more urbanized residential area. (ex. Main Street in Downtown Windsor)

Answered: 21 Skipped: 1

#	RESPONSES	DATE
1	The potential scenic center for Springfield is the Black River, however, because of buffer zone restrictions it cannot be easily seen, accessed, or used. Muckross State Park could also be a major scenic center but its structures are being neglected and falling into decay by the State. And the State has not improved its access or trail system. It needs more funding and local control.	2/1/2022 10:59 PM
2	Downtown Springfield	2/1/2022 12:19 PM
3	Felchville; Hammondsville; land around Bailey's Mills	12/6/2021 5:38 PM
4	In the region, the Town of Woodstock - Main Street, Billings Farm.	11/29/2021 7:54 PM
5	Old barns. Stone walls along roads... which are often pushed over for the sake of "road drainage". The better back roads program by the way destroys scenic roads with armoring that was at times a useless need	11/29/2021 7:38 PM
6	The Green In Chester	11/22/2021 8:37 AM
7	Proctorsville village center. Cavendish historical society building	11/22/2021 7:08 AM
8	None	11/18/2021 3:01 PM
9	Main st downtown windsor, Waterfront area in downtown windsor, Juniper Hill Inn, Snapdragon Inn	11/18/2021 12:46 PM
10	Reading: Fletchville, Indian Stone marker. Region: Chester Stone village, Weathersfield Bow, Windsor main St old buildings	11/18/2021 12:04 PM
11	Historic Preservation area Village Center Black River Academy Museum Ludlow Town Office Building Veteran's Park and Minipark (Daniel Kesman Park) Historic Churches: Baptist, Catholic and United Church Dorsey Park and Town Recreation Area The Armory that includes our TV station, Good Neighbors and Recreation areas	11/18/2021 10:57 AM
12	See #2 above. Main St. Ludlow. No billboards. No "big box" stores.	11/18/2021 8:07 AM
13	I suppose Perkinsville although additional infill development would make it more attractive	11/18/2021 7:08 AM
14	The village green in Proctorsville	11/17/2021 8:01 PM
15	Mt. Ascutney and associated ski area.	11/17/2021 5:04 PM
16	town office	11/17/2021 4:04 PM
17	The village green along Main Street (VT Route 11)	11/17/2021 3:55 PM
18	Main street, Windsor	11/17/2021 3:53 PM
19	Brownsville Village center, Ascutney Outdoors	11/17/2021 3:50 PM
20	Main Street in downtown Windsor, State Street Common Windsor, Proctorsville green, Chester Village Green, core Main Street in downtown Springfield, Stone Village, Brownsville, Weathersfield Center Church and Grove, Perkinsville Green, Ludlow Village Center, Felchville	11/4/2021 4:13 PM
21	Brownsville	11/4/2021 10:06 AM

Q5 What would you say are outstanding scenic countryside vistas in your town or region? Countryside: woodland and/or agricultural areas outside of an urban center with limited residential development. (ex. Jenne Farm in Reading)

Answered: 20 Skipped: 2

#	RESPONSES	DATE
1	The complex being developed by Jim Veltrop	2/1/2022 10:59 PM
2	As you say - Jenne Farm; Lexington Farm in Felchville; New Hall Farm in S. reading; Springbrook Farm	12/6/2021 5:38 PM
3	Already mentioned - River Road in Woodstock/Taftsville, Bible Hill in West Windsor, Route 12A along the river with the Covered Bridge. Almost every road has beauty!	11/29/2021 7:54 PM
4	The visat from south reading stone schoolhouse of a scarred up MT ascutney. Let the whole darn thing grow back and leave it the sacred it once was. Ascutney Outdoors center is about to kill the solitude of the MT	11/29/2021 7:38 PM
5	Mount Ascutney and little Ascutney from the 131 west side	11/22/2021 8:37 AM
6	S. Reading Rd. 20 mile Stream Road. Sections of East Road	11/22/2021 7:08 AM
7	Views of Mountain Ascutney from various high points. Views of the southern Green Mountains from Center Road and Skyline Drive. And Connecticut Valley from same. North Branch valley.	11/18/2021 3:01 PM
8	Great River Farm, Windsor prison property and windsor town forest, view from Kennedy Pond	11/18/2021 12:46 PM
9	Reading: Caper Hill Rd & farms, Jenne Farm, Baileys Mills Rd., Knapp ponds. Region: Twentymile Stream Rd fields, CT River valley	11/18/2021 12:04 PM
10	South Hill, East Hill and North Hill have beautiful woodlands, farms and meadows. Our zoning requires 3 acres in our agricultural, residential areas. The aquifer district (Terrible Mountain) requires 5 acre zoning. Parts of West Hill encompass several different zoning areas. Example: the Ghia Farm on West Hill has beautiful fields and scenery, but is surrounded by chalets and second homes.	11/18/2021 10:57 AM
11	Any area outside of the Village. Especially those areas with views of the valleys and opposing ridge lines.	11/18/2021 8:07 AM
12	Weathersfield Center meeting house and surrounding lands, open agriculture fields across from Crown Point GC, Wellwood Orchard	11/18/2021 7:08 AM
13	Jenne Farm / Rd, Baileys Mills Rd, Town Hill all in Reading	11/18/2021 5:57 AM
14	The western side of East Road	11/17/2021 8:01 PM
15	West Windsor Story Town Hall and Butcher & Pantry Store.	11/17/2021 5:04 PM
16	woodland and agricultural	11/17/2021 4:04 PM
17	view of farms along 103 North	11/17/2021 3:55 PM
18	Armstrong property, GMHA, mile long field, certainly tree lines roads such as Bryant Rd and Cowshed in W. Windsor	11/17/2021 3:53 PM
19	Views from Cemetery Road towards Bible Hill and beyond.	11/17/2021 3:50 PM
20	Paris Hill farm	11/4/2021 10:06 AM

Mount Ascutney Regional Commission

REGIONAL PLAN

VOLUME 3: ENERGY

Adopted June 25, 2018
Re-Adopted October 14th, 2022
Effective November 18th, 2022



Acknowledgements

The Mount Ascutney Regional Energy Plan was developed by the Mount Ascutney Regional Commission with support and assistance from the following organizations:

Vermont Public Service Department

Vermont Energy Investment Corporation

Bennington County Regional Commission

Public input was sought through a series of presentations during the development of this draft plan. Thanks to the many town officials and members of the public who provided valuable feedback. We would like to extend a special thanks to town energy coordinators and town energy committee members for your valuable coordination and assistance.

Executive Summary

❖ Background and State Energy Goals

Vermonters rely on energy to support their lifestyles. We are heavily reliant on fossil fuels for much of the energy that is currently consumed in both Vermont and southern Windsor County. Fossil fuels are problematic due to a number of factors, including their finite supply, highly variable costs, negative environmental impacts (e.g. extraction operations, fuel distribution, emissions, climate change), and need to be imported from outside of the region. In response, Vermont has established ambitious goals to conserve energy, increase the utilization of renewable energy, and reduce greenhouse gas emissions.

The intent of this plan is to serve as the energy element of the Mount Ascutney Regional Plan per 24 V.S.A. §4348a(a)(3) as well as to meet the requirements of an “Enhanced Energy Plan” in accordance with 24 V.S.A. §4352. The Mount Ascutney Regional Commission (MARC) intends to submit this Plan to the Commissioner of Public Service for a determination of energy compliance, which would enable this document to receive “substantial deference” in Section 248 proceedings. Accordingly, this Plan hereby embraces the following State energy goals:

Expanding upon the statutory goal of 25% renewable by 2025 [10 V.S.A. § 580(a)], the **2016 Vermont Comprehensive Energy Plan (CEP)** establishes the following set of goals:

1. Reduce total energy consumption per capita by 15% by 2025, and by more than one third by 2050.
2. Meet 25% of the remaining energy need from renewable sources by 2025, 40% by 2035, and 90% by 2050.
3. Three end-use sector goals for 2025:
 - a. Transportation: 10% renewable;
 - b. Buildings: 30% renewable; and,
 - c. Electric power: 67% renewable.

10 V.S.A. § 578(a) calls for **reducing emissions of greenhouse gases** from the 1990 baseline by:

1. 50% by January 1, 2028;
2. 75% by January 1, 2050, If practicable using reasonable efforts.

25 by 25 State goal [10 V.S.A. § 580]: By the year 2025, produce 25% of the energy consumed within the State through the use of renewable energy sources, particularly from Vermont's farms and forests.

Building efficiency goals [10 V.S.A. §581]

1. To improve substantially the energy fitness of at least ... 25% of the State's housing stock by 2020 (approximately 80,000 housing units).
2. To reduce annual fuel needs and fuel bills by an average of 25% in the housing units served.
3. To reduce total fossil fuel consumption across all buildings by an additional one-half percent each year, leading to a total reduction of ... 10% annually by 2025.

4. To save Vermont families and businesses a total of \$1.5 billion on their fuel bills over the lifetimes of the improvements and measures installed between 2008 and 2017.
5. To increase weatherization services to low-income Vermonters by expanding the number of units weatherized, or the scope of services provided, or both, as revenue becomes available in the Home Weatherization Assistance Fund.

❖ Regional Energy Profile

Current energy usage is discussed in Section III; some key points are summarized below:

- Transportation accounts for nearly half of the region's current energy costs, with electricity at 25% and heating at about 26%.
- As a rural area, we are heavily reliant upon the automobile for personal mobility. According to Estimates for the region, more than 283 million vehicle miles were traveled in 2015. Significant changes are needed in order to meet our targets. This will probably be the most difficult sector to address.
- Electricity consumption has been fairly level over the past few years. Looking to electric vehicles and heat pumps as strategies to meet the statewide energy goals will place additional demands on electricity, which will need to be off-set by reducing demand in other ways and increasing generation of electricity from renewable sources.
- Our building stock is old¹, indicating that weatherization may have a large impact on energy demand for heating. We are far behind meeting our statutory goal for weatherization of homes by 2020.
- Fossil fuels are currently used to heat about 75% of all homes in the region.
- Heating commercial and industrial buildings is estimated to cost about \$8 million annually, or about \$9,500 per business.

Targets are established for the region in Section IV. They illustrate the levels of change that will likely be needed in order to meet the stated energy goals. These goals are extremely ambitious. Therefore, the changes needed to meet them are also significant.

❖ Policies and Implementation Actions

In order to meet the above energy goals, the MARC has identified a number of implementation strategies. These strategies are detailed in Section V, and some are highlighted below:

We will encourage the **conservation and efficient use of energy** through various means that include, but are not limited to, the following:

- Support municipal energy planning initiatives and educational outreach efforts.
- Increase public awareness of energy efficiency programs made available through Efficiency Vermont, and provide staff support to assist Efficiency Vermont's education and outreach efforts.
- Encourage building techniques and technologies that reduce general energy demand or peak energy demand (e.g. day-lighting buildings or utilizing energy storage systems).

¹ 1972 is the median year homes were built in Windsor County

- Assist towns and partner organizations with education and outreach efforts to influence behavioral changes needed to meet these goals.

We will promote efforts to **reduce transportation energy demand, decrease single-vehicle occupant use**, and encourage **renewable or lower-emission energy sources for transportation** through various means that include, but are not limited to, the following:

- Increase awareness of existing services and programs such as public transportation services and the Go Vermont program.
- Assist towns with the maintenance and improvement of pedestrian and bicycling infrastructure in village centers, and with the connection of residential neighborhoods to common destinations, such as schools and job centers.
- Promote or encourage high-speed internet development/access in order to enable telecommuting.
- Encourage development of infrastructure necessary for the wider use of electric vehicles (i.e. EV charging stations).

The MARC has established policies to encourage **land use patterns and densities that are more likely to result in energy conservation**. These policies can be found primarily in the land use chapter of the *Mount Ascutney Regional Plan*. Policies in the transportation element of the *Regional Plan* also contribute toward this end.

This Plan establishes policies on the development and siting of renewable energy projects. In our baseline year (2015), this region had about 9.41 MW of renewable energy capacity – or 17,942 MWh of renewable energy generation – from known existing facilities (i.e. 276 solar arrays, 4 residential-scale wind turbines, and 6 hydropower facilities). In order to meet the stated energy goals, considerably more renewable energy generation is needed. This region’s 2050 target for new renewable energy generation is 194,612 MWh (nearly 11 times the baseline renewable energy generation in 2015). The region encourages new renewable energy generation in the types and in the appropriate scales as discussed in Section V. In general, this Plan calls for a mix of roof-top solar, ground-mounted solar, residential-scale wind, and, where feasible, hydropower at existing dam sites. Commercial-scale wind (i.e. no greater than 50 meters at the height of the hub) may be acceptable if it meets the policies contained in Section IV. The MARC encourages the use of biomass primarily for heating. Smaller-scale biomass power generation facilities may be appropriate if they generate both heat and power, and meet the policies laid out in this Plan.

Megawatt (MW) is a unit of electrical power equal to one million watts. A MW is equal to 1,000 kilowatts (kW). This unit of measurement is used in this plan to represent the installed capacity of power generation facilities.

Megawatt hour (MWh) is a unit of measure of electric energy. A MWh is equal to 1,000 kilowatt-hours (kWh). A MWh is the amount of electricity generated by a one megawatt (MW) power generation facility producing electricity for one hour (i.e. generation output). On an electricity bill, electricity usage is commonly reported in kilowatt-hours.

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Section I: Introduction

A. Background of Regional Enhanced Energy Planning in Vermont

In 2016, two initiatives advanced energy planning in Vermont: Act 174 (2016) and a pilot program to develop regional enhanced energy plans.

The **Department of Public Service** provided funding for a pilot project to support the development of new energy plans by three of the state's regional planning commissions. The Department recognized that local and regional enhanced energy planning would help to advance Vermont's energy goals and facilitate implementation the **2016 Vermont Comprehensive Energy Plan**. The three pilot plans utilize statewide data, and serve as a model for similar plans in the remaining regions around the state, including southern Windsor County.

The **Department of Public Service** is funding the development of this plan. The **Department of Public Service**, the **Vermont Energy Investment Corporation (VEIC)**, the **Energy Action Network**, and other organizations also provide staff and technical support for the regional planning process.

Act 174 (2016) enables municipalities and regional planning commissions to obtain "substantial deference" in the Section 248 permitting process for renewable energy generation facilities, but only if they have completed enhanced energy plans. On November 1, 2016, the Department of Public Service published standards that local and regional plans must meet in order to qualify as enhanced energy plans under Act 174.

Each of the regional plans has been developed using quantifiable energy conservation and renewable energy generation targets. VEIC developed these targets, in consultation with the regional planning commissions, using the **Long-Range Energy Alternatives Planning System or LEAP**. **LEAP** is a computerized system used for modeling future energy supply and demand. The model presupposed achieving the state goal to generate **90% of all energy used in Vermont from renewable sources by 2050**. The output of the energy model predicted total energy usage statewide and in each region projected over time (from 2015 through 2050), broken down by sector and fuel type. The regional planning commissions then worked with local communities to determine what those numbers meant in practical terms, and developed regional strategies guided by the resulting quantitative targets.

The regional planning commissions also worked with officials from several state agencies, nonprofit organizations, interest groups, and utility companies to define parameters used in the creation of renewable energy generation maps. The maps illustrate areas where renewable energy development is more feasible based on the presence of renewable energy resources and accounting for environmental and other locally identified constraints. The regional planning commissions reached out to local communities to identify general guidelines to consider when siting generation facilities.

B. ENERGY BASICS²

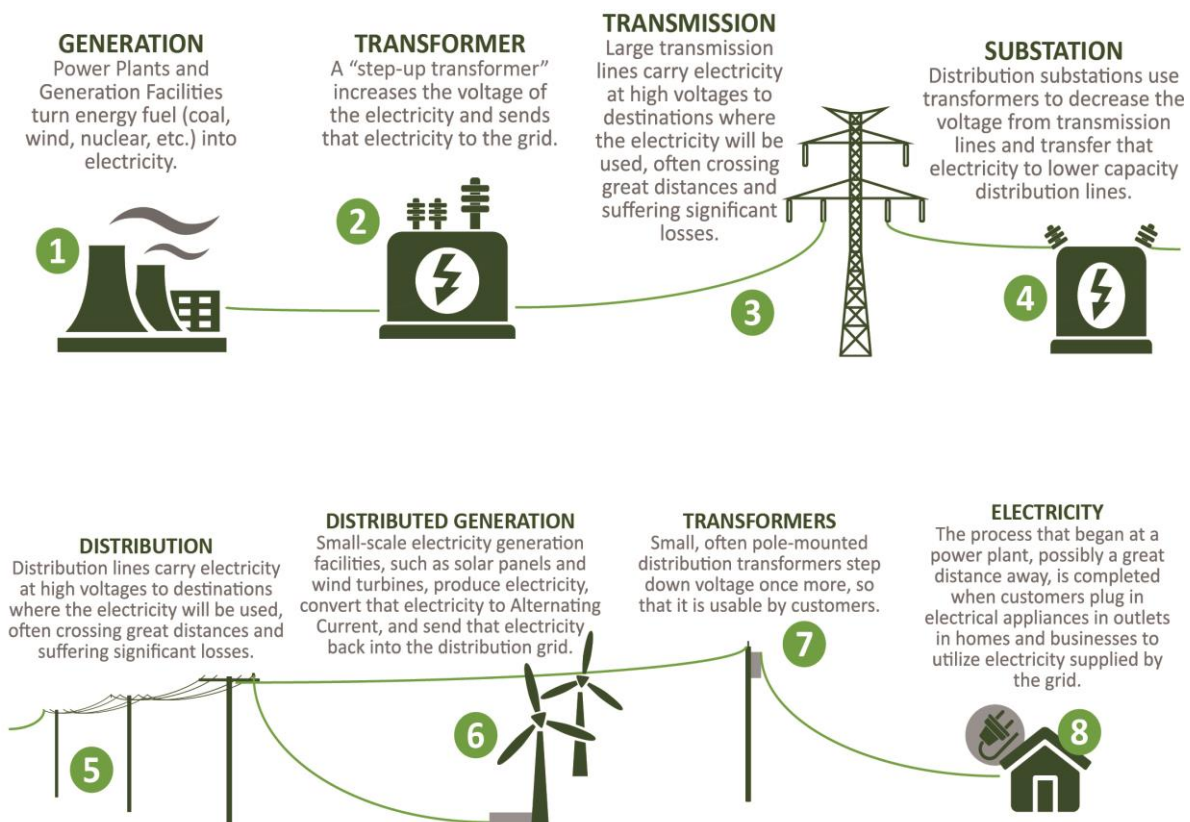
Scientists define energy as the ability to do work. Modern civilization is possible because people have learned how to change energy from one form to another and then use it to do work. People use energy to move cars along roads and boats through water, to cook food on stoves, to make ice in freezers, and to light and heat homes.

Energy comes in different forms: heat (thermal), light (radiant), motion (kinetic), electrical, chemical, nuclear, and gravitational. For the purpose of this plan, we are talking about energy that is used for heating buildings, transportation, and providing electricity.

Energy sources can be categorized as renewable or nonrenewable. Most of the energy consumed in the United States is from nonrenewable energy sources. Nonrenewable energy sources include petroleum products – such

Figure 1. Understanding the Grid

The diagram below outlines the major components in the electrical generation and distribution grid. (Source: Northwest Regional Energy Plan.)



² Based on information from the U.S. Energy Information Administration (U.S. EIA) <https://www.eia.gov/energyexplained/>

as oil, natural gas, and coal – and nuclear energy. Unlike fossil fuels, which are finite, renewable energy sources regenerate. Renewable energy sources include: solar energy from the sun, geothermal energy from heat inside the earth, wind energy, biomass, biofuels, and hydropower from flowing water.

In general, electricity is generated at power plants and moves through a complex system of electricity substations, transformers, and power lines – sometimes called “the grid” – that connect electricity producers and consumers. Figure 1 illustrates how “the grid” functions. Most “local” grids are interconnected for reliability and commercial purposes, forming larger, more dependable networks that enhance the coordination and planning of the electricity supply. In Vermont, VELCO operates the electric transmission system. In our region, Green Mountain Power and Ludlow Electric provide power within their respective service areas. Power is also generated at smaller, decentralized facilities, such as solar panels and wind turbines (i.e. “distributed generation”).

C. Purpose of Plan

Vermonters rely on energy to support their lifestyles. We are heavily reliant on fossil fuels for much of the energy that is currently consumed in southern Windsor County. Fossil fuels are problematic due to a number of factors including, their finite supply, highly variable costs, negative environmental impacts (e.g. extraction operations, fuel distribution, emissions, climate change), and need to be imported from outside of the region. In response, Vermont has established ambitious energy goals to conserve energy, increase the utilization of renewable energy, and reduce greenhouse gas emissions.

The intent of this plan is to serve as the energy element of the Mount Ascutney Regional Plan per 24 V.S.A. §4348a(a)(3) as well as to meet the requirements of an “Enhanced Energy Plan” in accordance with 24 V.S.A. §4352. The Mount Ascutney Regional Commission (MARC) intends to submit this Plan to the Commissioner of Public Service for a determination of energy compliance, which would enable this document to receive “substantial deference” in Section 248 proceeding. Accordingly, this Plan hereby embraces the State 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 2016 Vermont Comprehensive Energy Plan.

D. ENERGY GOALS

In the 2016 Vermont Comprehensive Energy Plan (CEP), the State of Vermont identified a number of goals and strategies to achieve energy conservation throughout the state. The most significant of these goals is referred to as “**90/50**”. (See Below.)

By 2050, 90% of Vermont’s total energy will be derived from renewable sources.

This overarching goal has informed the regional conservation strategies and renewable generation requirements that are articulated throughout this plan.

State Statutes and the 2016 Vermont Comprehensive Energy Plan (CEP) contain energy planning goals that include but are not limited to:

- ❖ By 2025, 25% of remaining energy needs will be met by renewable sources, 40% by 2035, and 90% by 2050
- ❖ By 2025, total energy consumption per capita will be reduced by 15%, and by 2050 by more than one-third.



- ❖ By 2025 Renewable sources will meet the demand for 10% of transportation needs, 67% of electricity demand, and 30% of building energy demand.
- ❖ By 2032, 75% of electricity demand will be derived from renewable sources
- ❖ By 2050, 50% of electricity will be obtained from locally distributed energy generation.
- ❖ Major reductions in contributions to greenhouse gas emissions will be made.
- ❖ By 2020, 80,000 housing units will undergo weatherization in Vermont.

The MARC hereby adopts the goals established in statute and in the 2016 CEP for the region. The region will strive to achieve these goals through the detailed policies and actions identified in this plan. Below is a list of some of the methods outlined in this plan to further energy conservation and efficiency efforts within our region:

- ❖ Reduce total energy consumption throughout all sectors, including: electricity, space heating, and transportation.
- ❖ Support efforts at the local level to choose energy efficient and renewable options.
- ❖ Create a diverse mix of energy sources to reduce the impact of supply restriction.
- ❖ Utilize local, renewable sources of energy to decrease reliance on out-of-region, and out-of-state forms of fuel.
- ❖ Select energy choices that help preserve the environment.
- ❖ Strive for both an adequate supply of electricity, as well as a distribution network to meet the region's needs.
- ❖ Maximize energy efficiency by matching fuel type to end use.
- ❖ Support adaption and lifestyle changes that contribute to meeting the State's goals for future energy use and generation.

E. Plan Organization

This Plan is intended to address the Guidance for Regional Enhanced Energy Planning Standards as developed by the Vermont Department of Public Service on March 2, 2017. This document is organized into the following sections:

- Section I is an introduction that presents background information and highlights key issues for the region.

- Section II documents the current energy use in the region, including in the transportation, heating, and electricity sectors.
- Section III lists the regional energy targets that were developed based upon the Vermont Energy Investment Corporation (VEIC)'s Long-Range Energy Alternatives Planning (LEAP) system. The purpose of the targets is only to provide a sense of the scale of change needed to meet the State energy goals.
- Section IV lists policies and implementation strategies (or "pathways") for the region to pursue in order to meet these energy goals. This section includes specific pathways including, but not limited to, energy conservation, transportation, land use, and the siting of renewable energy projects.

F. Key Issues

❖ Energy Security

The state of Vermont has come to rely heavily on energy sources that are primarily from out-of-state sources. For example, the majority of electricity supply for the state is provided by hydroelectric facilities in Quebec and Labrador. Although this electricity is being generated through a renewable source at low cost, continuing the dependency on out-of-state sources could leave the state and region vulnerable to uncertain supply and cost. In Vermont, all gasoline and diesel fuels are imported to support vehicular transportation. Moreover, fossil fuels, such as transportation fuels, have a finite supply, highly variable costs, and well-documented negative environmental impacts. The scarcity of non-renewables, as well as dependence on outside suppliers, will leave the state and the region at risk. Creating facilities to generate renewable energy throughout the state will counter long-term security issues by ensuring consistent supply and helping to manage costs.

To provide the state with better energy security, one of the state goals calls for 25% of the energy used within the state to be produced (from renewable sources) within the state by 2025 [10 V.S.A. §580(a)].

Technologies must be carefully selected to ensure that net energy yields are as high as possible. Electricity generation from wind and hydropower has high energy returns relative to other renewables, provided they are sited in areas where the resource is sufficiently concentrated and relatively close to end users. Solar energy for thermal applications can be effective, and photovoltaic generation is becoming more efficient and cost-competitive. Wood biomass has proven to be a high-yielding heat source, provided it is sustainably harvested and used near its source in order to limit transportation costs. Other "renewable" energy technologies are less promising; the energy required to grow, harvest, and process corn into ethanol, and then to transport it for use, often exceeds the energy content of the resulting fuel.



Figure 2: Utilizing energy sources that are renewable and locally-available (e.g. solar, wind, woody biomass, and hydropower) should be more commonplace.

Aggressive energy conservation efforts, electricity generation from properly sited in-state renewable sources, and heating from locally-sourced biomass offer the best long-term approach to ensuring the region’s energy security. There is no question that some significant portion of Vermont’s future energy supply will have to be imported, but increasing local generation will result in greater security, less risk, and improved efficiency.

❖ Environmental Protection

Over the last few centuries, the reliance on fossil fuels to support our way of life has had a blatant, damaging impact on the environment. For Vermont, climate change has the potential to threaten both our economy and quality of life. These harmful effects have become increasingly apparent due to impacts on forests, which threaten the maple syrup industry. Furthermore, a warmer climate and unpredictable weather will also impact the skiing industry. More frequent severe weather events are likely to result in damage to infrastructure and property, which will have additional financial impacts. The environmental damage alone calls for a change in energy use and the way in which it is obtained, but the threat to our safety and local economy provides even further justification for transitioning to renewable, less-impactful energy sources. See the state’s [Climate Change in Vermont website](#) for more information.



Figure 3: Reduce greenhouse gas emissions from 1990 levels
40% reduction by 2030
80% to 95% reduction by 2050
(2016 VT Comprehensive Energy Plan)

❖ Economic Needs and Opportunities

In the Region, recent annual expenditures on energy for space heating, transportation, and electricity are estimated to be roughly \$117 million, equivalent to about \$4,600 per person. The state of Vermont spends over \$3 billion on energy expenses annually. The burden of paying for the high cost of energy falls on the consumer. Furthermore, the majority of the money being spent on these forms of fuel, such as gasoline and diesel, are not only leaving both the region and state, but in many cases the country. If this money could be retained within the local economy, the financial gain would have an immense impact and help to improve quality of life for local residents.

The changes required to decrease overall energy use within the region may stimulate economic growth by encouraging businesses to innovate, creating jobs within the state and region. According to the Public Service’s Department’s *Clean Energy Industry Report for 2015*, there are now 2,500 “clean energy” businesses employing 16,000 people in the state. Transitioning to renewable energy sources has benefits for the state and region including, achieving greater energy security and environmental protection, retaining much of the money spent on energy locally, and creating new business and job opportunities.

❖ Adaptation and Lifestyle

Ultimately, achieving many of the state and regional energy goals will require people to change their behaviors and lifestyles. Reductions in daily energy use will require more than just efficiency improvements. People will have to alter their behavior patterns, using electricity, transportation, and heating systems with greater thought given to limiting energy use and increasing energy efficiency. Changing behavior is very difficult, but it is critical in order to reach the state’s ambitious energy goals.

Section II: Regional Energy Supply and Consumption

The following section summarizes the existing conditions and analyzes recent trends related to energy supply and consumption in the region. All estimates and projections presented in this Plan are derived from 2015 base year data from a variety of federal, state and regional sources, unless indicated otherwise. These sources include, the U.S. Census Bureau, Vermont Energy Investment Corporation (VEIC), Vermont Center for Geographic Information (VCGI), Vermont Agency of Transportation (VTrans), Vermont Agency of Commerce and Community Development (ACCD), Vermont Department of Public Service, and others. Examining current energy consumption and sources provides a basis for projections of future renewable energy needs and potential savings from conservation, increased efficiency, and the use of alternative fuel sources.

Energy usage is broken down by the following sectors:

- ❖ Residential Space Heating and Home Weatherization
- ❖ Commercial/Industrial Space Heating
- ❖ Transportation
- ❖ Electricity

Figure 4 shows total energy use by sector in Vermont. Transportation is the largest component at nearly 40% of total energy use.

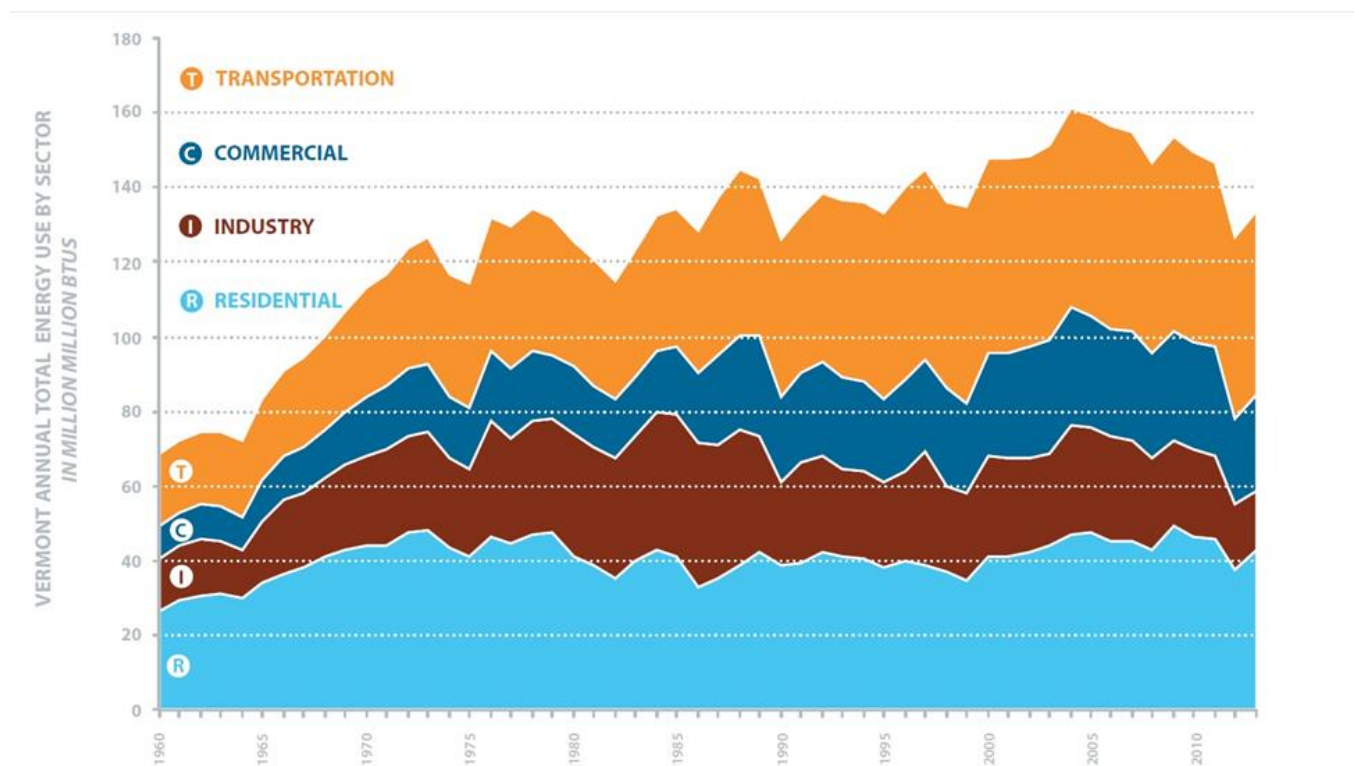


Figure 4: This graph shows the annual energy use by sector in Vermont between 1960 and the baseline year of 2015. (Source: Vermont Energy Investment Corporation)

Examining current energy consumption and sources will help identify inefficiencies and determine strategies for conservation and areas that can be accommodated with renewable sources of energy.

A. Heating

❖ Residential Heating

In the region, roughly \$22 million is spent on residential heating annually. Of approximately 14,000 households in the region, about 11,000 are occupied year-round. According to the American Community Survey, the average annual heating cost is \$2,100 per household³. Fuel oil is the most widely consumed residential heating fuel in the region for both owner and renter occupied households. For owner occupied households, wood, in the form of cord wood and wood pellets, is the second most commonly used fuel source in the region at about 22%. Conversely, propane gas is the second most common fuel source for renter occupied households in the region at about 25%. Renter occupied spaces also utilize electricity as a heating source, while very few owner-occupied homes do (See Figure 7⁴). An increasing number of households are using electricity as a heating source, likely due to programs that encourage the use of cold-climate heat pumps.



Figure 5: Renewable energy systems were more the exception than the rule in the region in 2015. However, there are a lot more systems being installed in the last few years, such as this solar hot water system (evacuated tubes) on a house in Weathersfield. (Julia Lloyd Wright)

³ Calculated by the MARC based on the number of housing units, heating fuel types and average fuel costs for 2015.

⁴ U.S. Census Bureau ACS (2011-2015); Fact Finder, table: B25117

When examining potential strategies for improving energy usage, it is important to understand how housing characteristics impact space heating usage. In the region about 30% of the housing stock are rental homes. It may be more challenging to incentivize energy efficiency investments in both lower-income owner occupied units as well as rental properties.

Geothermal heat pumps are now often encouraged for new developments by some local companies, but we do not have good data on how many of those systems currently exist. Wood is the only locally-sourced fuel type, and its use supports the local forestry economy.

Median house size in the northeast of the U.S. has increased by 61% since 1973. Median house size was 1,450 square feet in 1973, and increased to 2,336 square feet in 2010. While new construction is subject to energy building codes, building smaller new homes will also help to reduce energy demand for heating. In addition, smaller homes – such as tiny houses, cottages, bungalows, co-housing and/or accessory dwelling units – are gaining in popularity and provide needed housing options for our changing demographics.

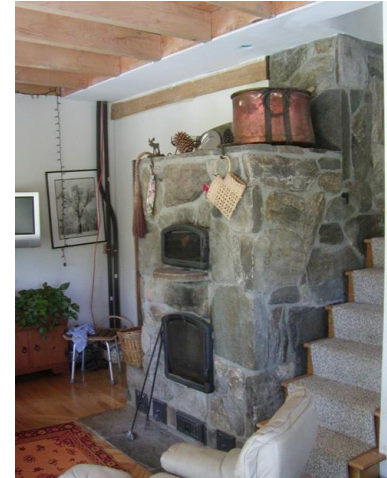
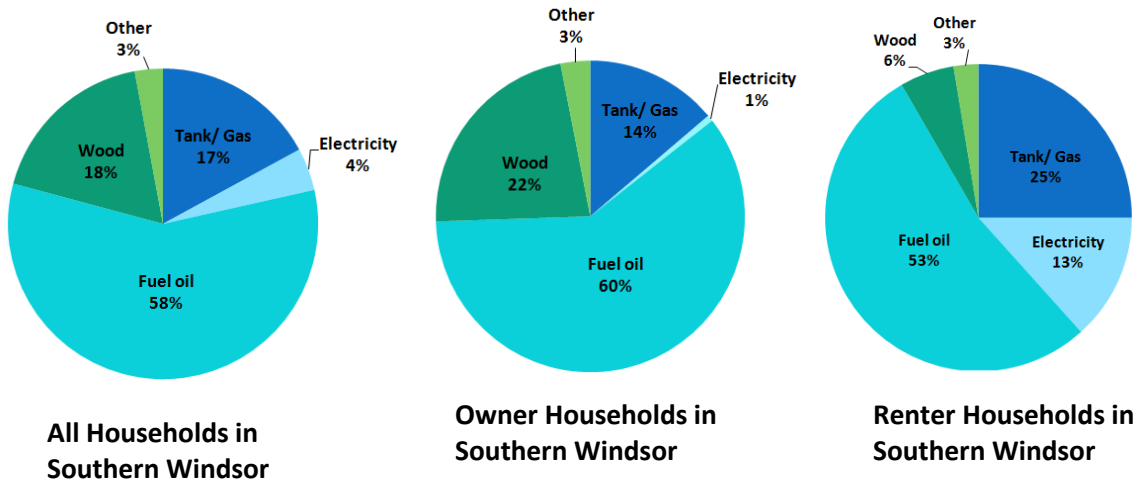


Figure 6: A masonry heater is a very efficient way to heat a home with wood. (Peter Hudkins)

Figure 7. Home Heating Estimates

The following table shows current regional heating fuel use based on fuel and household type.

Home Heating Fuel Type	Number of Households	Average Annual Use	Annual Cost
Propane/Gas	1,813	1,810,365 gal	6,245,759
Electricity	469	9,097,715 KWh	1,338,274
Fuel Oil/Kerosene	6,129	4,374,861 gal	12,030,869
Wood	1,900	9,247 cord	2,066,010
Other	312	N/A	
Total	10,623		21,680,912



❖ Home Weatherization

Weatherization of homes is an important step in the efforts to decrease energy utilized for space heating and create better efficiency. Slightly more than half of the homes throughout the state, and the region, are more than 50 years old. Therefore, roughly half of the housing stock in the state and region is likely to be poorly insulated and not properly air-sealed. To remedy this issue, the state passed Act 92 (10 V.S.A. § 581) in 2008 that called for **20% of the state’s housing units to be properly weatherized by 2017 (about 60,000 homes), and 25% by 2020 (about 80,000 homes)** statewide. According to the Comprehensive Energy Plan as of 2014, roughly 18,300 units had been weatherized, which is well shy of this goal⁵.

There are several programs throughout the state to help private home owners and businesses properly weatherize their existing buildings. Programs offered by *Efficiency Vermont* and *SEVCA* have made improvements to about 900 housing units since 2009 in the Region. Additional programs, such as *Vermont Weatherization Assistance Program*, offer assistance to low income families, with a particular focus on elderly individuals or those with disabilities. Strategies that educate the public and make these programs more widely available will help in meeting weatherization goals for the state and the region. Local weatherization programs have had varying levels of success, but generally not anywhere near the scale needed to meet the goals set out in state statute.

Table 1: Weatherization of Housing Unit Goals

Region	# Units Since 2009	2017 Goal	2020 Goal
State of Vermont	20,909	60,000	80,000
Southern Windsor County	900	2,100	2,600

⁵ 2016 Vermont Comprehensive Energy Plan

❖ Commercial and Industrial Heating

Determining the heating costs for commercial and industrial structures is more difficult than for residential structures due to the lack of data regarding the square footage of existing non-residential buildings. Calculating estimates for the size of the buildings were made⁶, which allowed for estimates of energy use and costs associated with that use. In this region, commercial and industrial buildings utilize roughly 40% of space heating fuel. It must be taken into account that, within the region, there is a wide range in size and use of commercial and industrial space. There are about 900 businesses in the region inhabiting over 8,000 estimated square feet of space on average. Commercial and industrial heating-related costs are estimated to be as high as \$8 million annually in the region, which is about \$9,500 per business. Many of the larger industrial buildings, those of approximately 10,000 square feet and larger, are located in Springfield and Windsor. The MARC estimated that total energy use by the commercial and industrial sector exceeded 360 billion BTUs of fuel oil and gas⁷.

Oil and propane are the primary heating fuels for commercial buildings throughout the region with wood used commonly as well. Industrial buildings also primarily utilize oil and propane, but wood sees wider use as a heating source in industrial than in commercial buildings. In addition, some industrial buildings heat with coal as well. As with residential structures, the age, size and location of these buildings will dictate what renewable fuel sources make the most sense to switch over to, as well as what energy conservation measures can be taken. In general, weatherization can reduce heating demand regardless of fuel source. As such, weatherization is encouraged as a priority investment to make before pursuing heating system upgrades.

⁶ Based upon estimate of average commercial/manufacturing floor space per employee from the U.S. Energy Information Administration

⁷ Based on the number of units, estimated floor space, heating fuel types and average fuel costs for 2015.

B. Transportation

The transportation sector dominates energy use more than any other sector in the state and region. This is due to the heavy reliance on automobiles for private transportation in this rural area. The 2014 *Housing and Transportation Affordability* study evaluated the majority of Windsor County, including all of the towns within the region. The study presupposed that a household’s transportation budget was affordable if it did not exceed 15% of annual household income. The study found that the majority of the area in the study exceeded that 15% affordability target for a median household income (\$41,000).⁸ This study estimated household transportation costs for a certain income level and based on a variety of prevailing conditions (e.g. demographics, housing and work locations, commuting patterns, proximity to services, and other factors). As a rural area with many residents traveling to jobs and services in locations outside of the region, transportation costs tend to be higher. We observe that when people purchase homes, the focus is often to find as big and as nice of a home as the household can afford, which is usually located in a more rural area. However, the choice to live in rural areas, as opposed to within town centers, generally means a greater reliance on transportation for routine travel needs. This transportation usually takes the form of single occupant vehicle (SOV) travel.

Not surprisingly, petroleum-based fuels are the predominant fuel type used for transportation. Vermonters utilize roughly 306 million gallons of gasoline per year. Residents of the Region consume an estimated 17 million of those gallons to travel an estimated 283 million miles annually.⁹ Moreover, heavy duty vehicles, such as trucks and buses, add an additional 2 million gallons of diesel fuel consumption per year within the Region. There are nearly 19,000 personal vehicles in the region, which residents generally rely on for meeting their travel needs. Workers living in this region have relatively long commuting distances. For example, a typical resident in Springfield commutes approximately 22.2 miles per day to reach

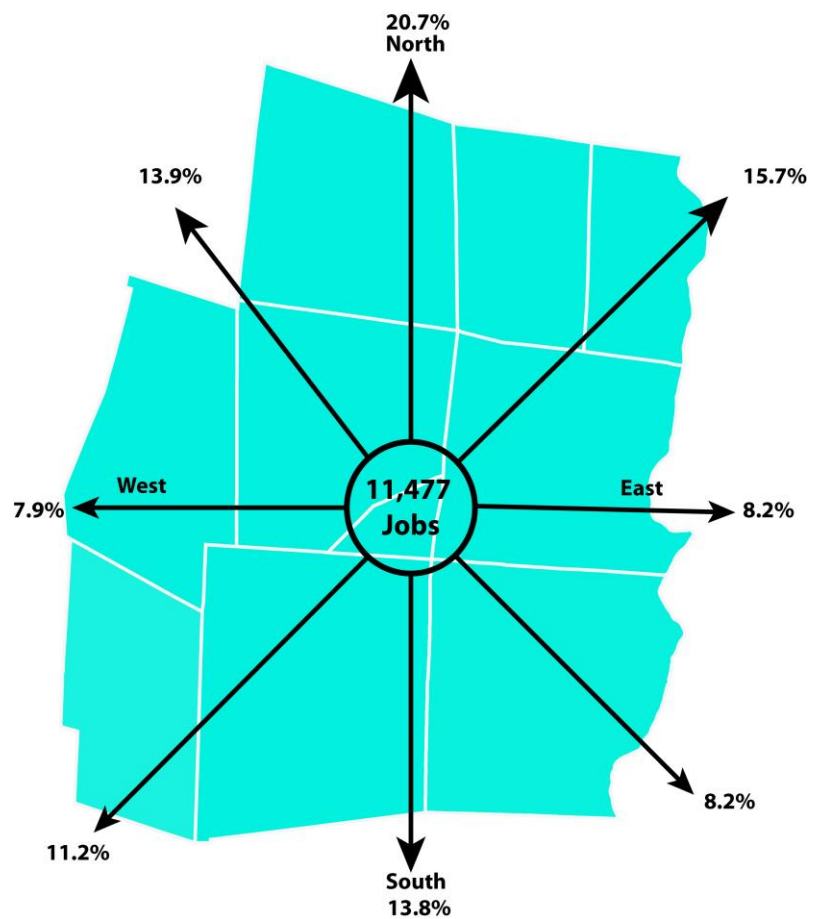


Figure 8: Commuting out of the Region. The graph above illustrates commuting patterns for residents in the region who are working outside of southern Windsor County.

⁸ East Central Vermont Housing and Transportation Affordability

⁹ <https://www.afdc.energy.gov/states/vt>

jobs in and around the region, largely in SOVs. All resident Springfield workers combined commute over 97,000 miles per day.

Table 2: Regional Transportation Estimates	
Total Number of Vehicles	18,790
Estimated Gallons of Fuel	16,803,287
Total Miles Traveled	283,300,512
Total Estimated Cost	\$57,551,257

While Springfield is the traditional job center for the region, many Springfield jobs are filled by people that live elsewhere and many Springfield residents travel to work in other towns. This results in greater travel distances for work, which could be minimized if people chose to live and work locally. Our relatively rural and low-density development patterns in the region generally result in SOV travel, although the Upper Valley commuter bus has good ridership.

Transportation issues within the region harken to a much larger economic problem facing the region: limited job opportunities result in residents commuting outside of the region, typically to the Upper Valley where wages tend to be higher. Localization of jobs would enable walking or biking to work, and in some larger towns, such as Springfield, public transportation could be utilized better. However, this transition would require a greater mix of employment options within the region and/or significant behavior changes.

Since the region is predominantly rural, walking and biking could only become common practice in limited areas. Larger towns have sidewalk networks in the built-up areas. VTrans is generally in support of making state routes bicycle-friendly, but to do so can be expensive. As a result, bicycling facilities are not as robust as many residents would like them to be. A practical solution for reducing the region’s use of non-renewables in the transportation sector would be carpooling, as many residents in the region are employed in the Upper Valley. *Go Vermont* is a program currently supported by the state that provides online ride matching services. Currently, the park and ride lots found along I-91 are heavily used. There are two public transportation providers in the region, Southeast Vermont Transit and Ludlow Municipal Transit. Travel to destinations such as Boston, New York, Burlington, and Montreal are served by Dartmouth Coach, Vermont Translines and Greyhound, which are found just outside the region in White River Junction and Lebanon, NH. The Windsor Amtrak station and a few nearby train stations serve the region to provide access by train to northern Vermont and New York City. Other options to reduce transportation fuel demand include telecommuting, plug-in hybrid vehicles, electric vehicles, and the use of biofuels. Future technologies may present other options.

Units of Measurement
1 Kilowatt (KW) = 1,000 watts of electrical power
1 Megawatt (MW) = 1,000 KW
1 Gigawatt (GW) = 1,000 MW
1 Kilowatt Hour (KWh) = power consumption of 1,000 watts for 1 hour
1 Megawatt Hour (MWh) = 1,000 KWh
1 Gigawatt Hour (GWh): = 1,000 MWh

C. Electricity

According to the **Vermont Comprehensive Energy Plan (CEP)**, the state consumed roughly 5,500 GWh of electricity in 2014. This amount was down from 2007, when it was closer to 6,000 GWh, and had stayed relatively constant until 2014. This consistency over this eight-year period may be partly due to the growing popularity of energy efficient appliances and lighting. In 2014, the CEP indicated that the state

generated 45% of its electricity from renewable sources. Further, the CEP projected that by 2017 this would increase to 55%, and, by 2032, to 75%.

Throughout Vermont's history, electricity use in the winter has been consistently higher than in the summer. However, on average, electricity consumption during both seasons has consistently risen since 1990 according to Vermont Electric Power Company (VELCO). Consumption of electricity is projected to rise over the next twenty years, as more heating/cooling needs in the region will be sourced with electricity, contrary to the flat trends in recent electricity use depicted in Figure 10. Changing climate conditions, and the trend toward hotter summers, may result in greater future electricity demand in the summer as residents rely more on air conditioning.

As used in the LEAP model, electricity consumption was determined based on zip codes, not individual towns. The map in Figure 9 illustrates how the zip codes correlate to each town. Figure 10 shows electricity usage trends for the region as a whole. Electricity consumption in the residential sector has been relatively constant since 2007, and there was a slight decrease in the commercial/industrial sector in that time period. As one would expect, Springfield (05156), Ludlow (05149), and Windsor (05089) as regional hubs for commercial development, show the greatest electricity consumption in the commercial and industrial sector.

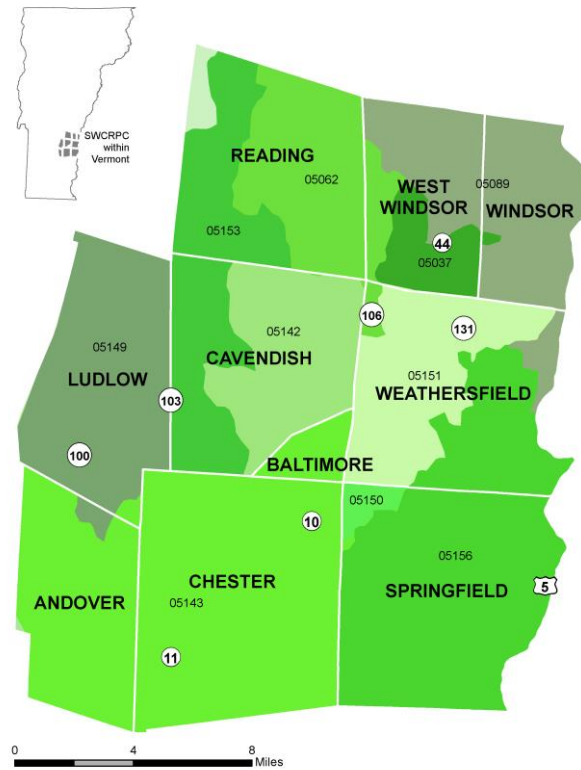
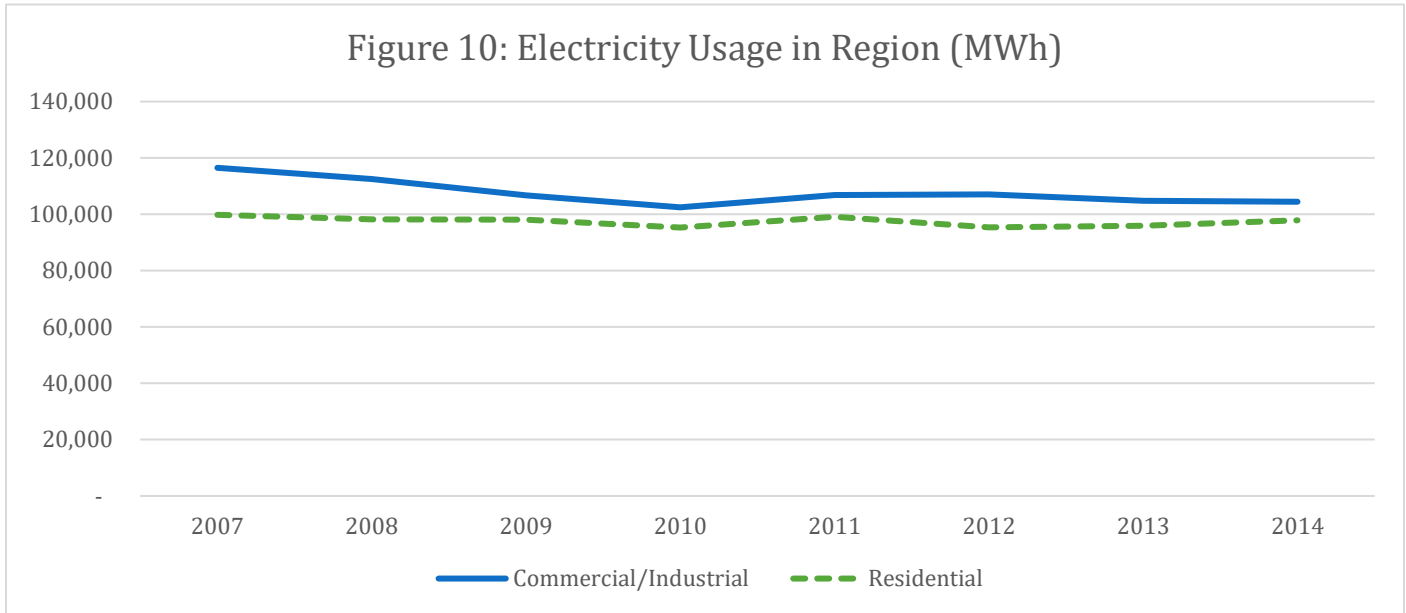


Figure 9. Map of Regional Zip Codes. Data organization regarding electricity consumption was based upon the zip codes outlined above.



Efficiency Vermont has also made available electricity consumption data for 2014 through 2016 at the town-level. Below is a summary of the average residential electricity consumption in 2015 for each town:

- Baltimore 8,224 KWh
- West Windsor 7,315 KWh
- Weathersfield 7,211 KWh
- Springfield 6,921 KWh
- Windsor 6,731 KWh
- Chester 6,689 KWh
- Reading 6,565 KWh
- Andover 6,465 KWh
- Cavendish 6,255 KWh
- Ludlow 5,491 KWh

❖ Regional Generation

Ludlow Electric is the electricity provider for portions of Ludlow and Cavendish. Green Mountain Power (GMP), a public utility, provides electricity to the remainder of the region and beyond. GMP’s power supply comes from several generation facilities throughout New England and Quebec, as well as from short-term system or open-market purchases and individual Purchase Power Agreements (PPA). Fuel sources for GMP generating facilities are primarily renewable, with hydro, nuclear, and wind comprising over 65%.¹⁰

¹⁰ Northwest Regional Planning Commission, Regional Energy Plan, Adopted June 28, 2017

There are no significant non-renewable energy generation facilities in the region, with the exception of backup generators at substations. Electricity transmission service is provided by the Vermont Electric Power Company (VELCO). The existing transmission lines, three-phase power lines and substations are shown on the Utility Service Map. Consideration should be given to the condition of our electricity transmission system and its ability to support the state and regional goals for renewable energy targets. The MARC should engage with VELCO as it relates to this issue when updating Vermont’s Long-Range Transmission Plan. Emerging technologies, such as battery storage, may help to address capacity issues with the grid.

Table 3: Renewable Energy Generation in Southern Windsor County

Renewable Source	# of Sites	Installed Capacity (MW)	Annual Generation (MWh)
Solar	276	6.6	8,087
Wind	4	0.02	65
Hydropower	6	2.8	9,790
TOTAL	286	9.4	17,942

At this time in this region, energy production from renewable sources is limited. The region currently has 6.6 MW of installed capacity of solar energy between both roof-mounted and ground-mounted sites, the majority of which are residential units.¹¹ Only a few residential-scale wind turbines have been installed to date. The total installed capacity of these turbines, located in Cavendish, Ludlow, and Springfield, is roughly 0.02 MW. Active hydropower sites include the Green Mountain Power hydroelectric facility in Cavendish and five smaller facilities in Springfield that are all located along the Black River. These hydro facilities have over 2.8 MW of installed capacity. In addition, the Wilder and Bellows Falls hydropower facilities are located outside of the region, but affect some areas within southern Windsor County that lie along the Connecticut River. Biomass is presently used exclusively for heat.

In order to meet the 90/50 goal outlined in Vermont’s Comprehensive Energy Plan, major increases in renewable electricity production for both the state and the region will be needed.

¹¹ <http://www.vtenergydashboard.org>

Section III: Regional Energy Targets

Attaining state energy goals will require each region to set targets for energy use, conservation, and generation. This Section projects regional energy needs, and establishes future energy targets to meet state goals. The **Long-range Energy Alternatives Planning (LEAP)** software system, which was relied upon for estimating projections and determining the regional energy targets, is described below. The purpose of establishing energy targets is to provide guidance and a sense of the scale of change needed to meet the energy goals. Individual targets presented in this plan are not intended to be interpreted as actionable goals.

This section first looks at the methodology used for determining the state and regional energy targets under the 90/50 goal scenario, and dissects these targets by energy use sector and by fuel type over the projected period (2015 to 2050). The section closes with an analysis of the projected additional demand for electricity in the region derived from the projected use targets, and how this demand may be met through generation from renewable sources.

In general, it will be difficult to accomplish the significant levels of change and investment that will be needed to reach our energy goals. However, this is a working plan that represents one potential pathway to attain our 90/50 energy goal. As conditions change, this plan should be updated accordingly in the future.

A. LEAP Model & Methodology

LEAP System and Energy Targets

To generate the regional targets needed to meet overall state guidelines for energy conservation, RPCs throughout the state partnered with Vermont Energy Investment Corporation (VEIC). VEIC staff utilized the **Long-range Energy Alternative Planning (LEAP)** software system to produce an energy use model to project future energy usage for the region. The model is based on current energy usage and projections.

This complex model allows users to project energy consumption and demand for types of fuel with inputs that reflect current trends in usage and future energy needs in the region. Population growth, number of households, commercial building square footage, vehicle miles traveled, and fuel source assumptions are examples of the type of data input used to model and project consumption.

British Thermal Units

BTUs are the standard measurement throughout the plan to allow for easy conversion between different fuel sources.

Measurement	BTUs
1 gallon of gasoline	124,000
1 gallon of diesel	139,000
1 gallon of heating oil	139,000
1 gallon of propane	91,330
1 cord of wood	20,000,000

To determine regional targets, the **LEAP** model compared two scenarios – the “*reference scenario*” versus the “*goal scenario*.” The *reference scenario* is essentially a “do-nothing” scenario which assumed a continuation of existing policies and energy usage in combination with an increase in vehicle fuel efficiency based on industry

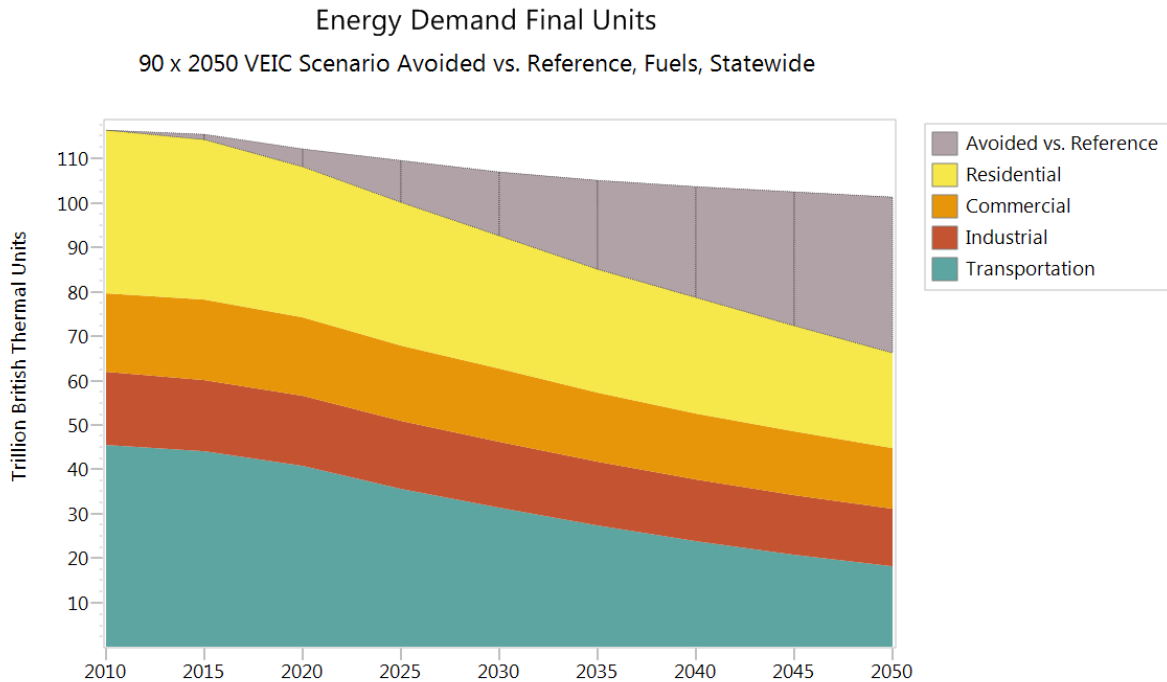


Figure 11: Projected statewide energy consumption by sectors comparing the reference scenario (gray portion) and the 90% by 2050 goal (Source: Vermont Energy Investment Corporation)

projections. The regional *goal scenario* was designed to represent a regional energy supply/demand projection that attains Vermont’s goal of meeting 90% of energy demand with renewable sources by 2050.

Statewide Energy Targets

The statewide model for energy demand by sector under the goal scenario is shown in Figure 11. Implementation of the statewide energy plan versus a continuation of current policies is projected to reduce total statewide consumption by significant levels. This difference in energy demand between these two scenarios represents the amount of energy consumption that will need to be eliminated through conservation, efficiencies, and other means in order to meet the state and regional goals.

B. Regional Energy Targets by Sector

The Regional LEAP Goal Scenario estimates that a 50% reduction in total energy consumption will be required to meet our 90/50 goal. This dramatic decline by 2050 is despite projected future conditions (i.e. a very modest population increase per ACCD population projections), and relies primarily on the assumptions made for increased efficiency and conservation. As residential heating makes the switch to heat pumps (i.e. cold-climate heat pumps or ground-source heat pumps as defined in Appendix C) and transportation to electric vehicles and away from fossil fuels, these sectors will be powered by electricity that is generated with renewable sources. Due to the greater efficiency of electricity compared to fossil fuels, overall energy consumption is expected to

decrease. This can be seen in Figure 12 below. As with the statewide scenario, most of this decline will come from the regional residential heating and transportation sectors.

Overall, the total amount of energy utilized in the region will decline by 50% by 2050.

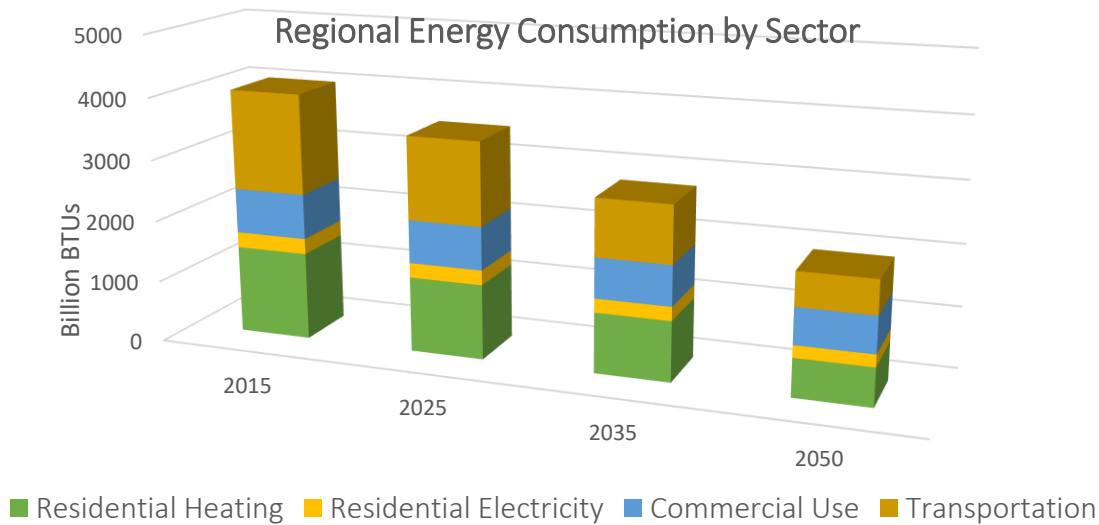


Figure 12: Southern Windsor County Regional Energy Targets by Sector (Source: LEAP Regional Model Goal Scenario)

The regional targets clearly show that a substantial increase in efficiency, conservation, and electrification of energy production and consumption will be needed across all sectors. Residential heating and transportation in particular will be transformed, with the most dramatic change over the next 30 years. Transportation energy consumption will need to drop by over 65%, and Residential Heating by 56%, in order to meet the 90/50 goal by 2050. Note that these aspirational targets are primarily intended to show the scale and types of changes needed to achieve the energy goals. They represent only one potential pathway to 90/50.

C. Regional Energy Use by Fuel Type

In order to meet 90/50 energy targets, the changes required for the region generally mirror the changes necessary for the entire state. Figure 13 below illustrates the following changes in regional energy consumption by fuel type across all sectors:

- A dramatic reduction in total energy consumption by approximately 50%;
- A shift from nonrenewable to renewable direct energy sources; and,
- Growth in demand for electricity generated from renewable sources.

The direct consumption of energy from nonrenewable fuels such as diesel, gasoline and heating oil will fall from 69% of total energy consumption to 8% by 2050, according to the LEAP analysis. Direct energy consumption from renewable fuels, such as wood for heating, ethanol and biodiesel, will increase from 18% to 53% of total regional energy consumption over the same period. Electricity consumption, which currently makes up only 13% of regional energy demand, will make up the difference and increase to 39% of total energy consumption due to the increase in utilization of electricity for space heating and transportation. Currently, generation of

electricity by renewable sources is minimal as a percent of total generation, but will become the primary fuel source by 2050 in order to meet state goals. The breakdown of electricity generation by fuel source and transition to renewable fuels is described in the section on target electricity generation.

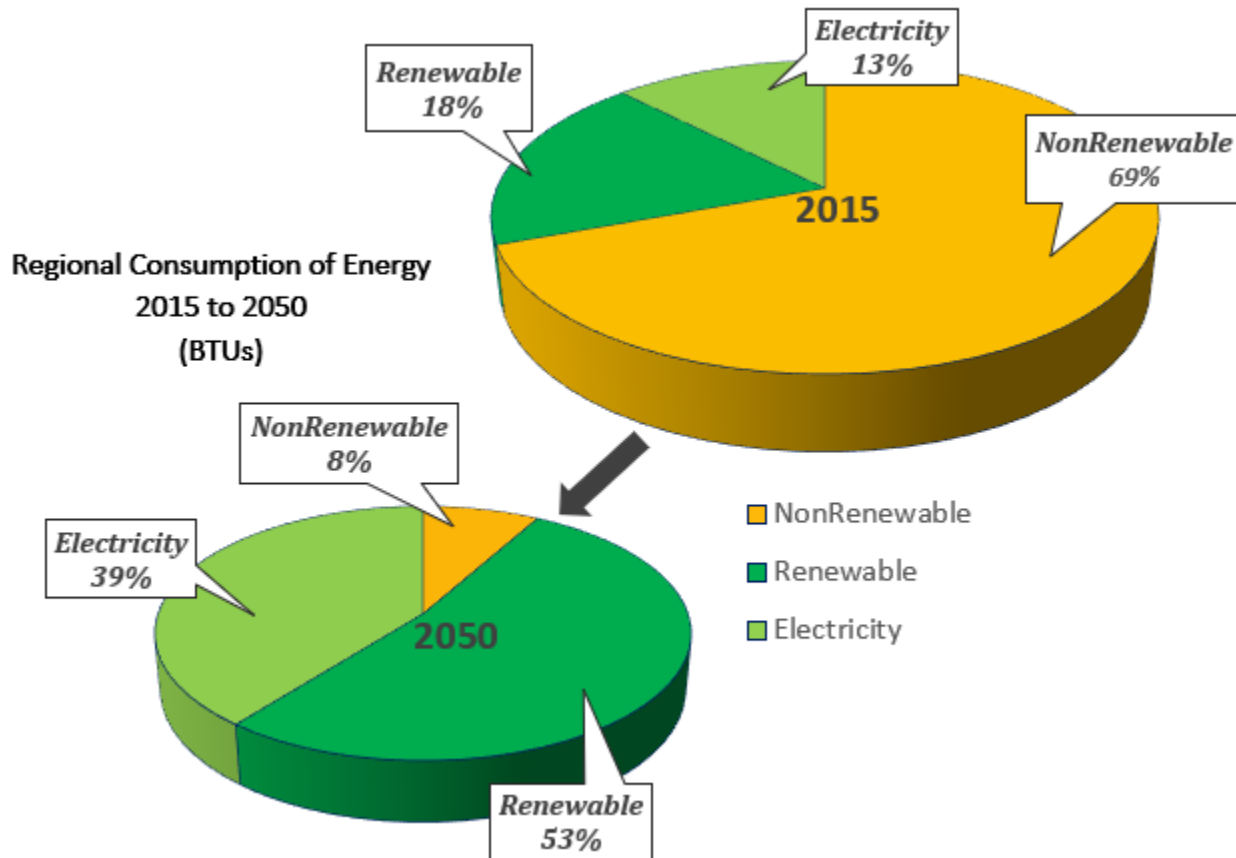


Figure 13: Regional targets for energy consumption across all sectors. Note how the size of the 2050 pie chart shrinks to about half the size of 2015, reflecting the overall reduction in energy demand needed to meet energy goals. Electricity will largely be generated from renewable sources by 2050. The other energy sectors are broken down by renewable and non-renewable, reflecting the significant shift away from non-renewables by 2050.

90% of regional energy demand will be generated with renewable sources by 2050.

Figure 14 below gives a closer look at the breakdown by fuel source. In order to meet the energy goals, transportation fuels that today are primary sources of fuel, such as gasoline and diesel, will need to be almost entirely eliminated by 2050. It is anticipated that, along with increased vehicle electrification, biodiesel will be utilized as an alternative to the fuels used now by the trucking fleet. More on these changes can be found in the transportation and space heating portions of this section. Although compressed natural gas is expected to be utilized by other regions throughout the state, the Region has no pipeline and it will therefore not be incorporated in this plan as a “bridge” fuel. Under this scenario, fuel oil for heating is replaced by heat pumps and wood, including cord and pellet. Due to the elimination of other fuel sources, wood increases as a proportion of total energy consumption, going from 15% in 2015 to 28% by 2050.

Regional Energy Use by Fuel Type
 LEAP Model Goal Scenario Targets

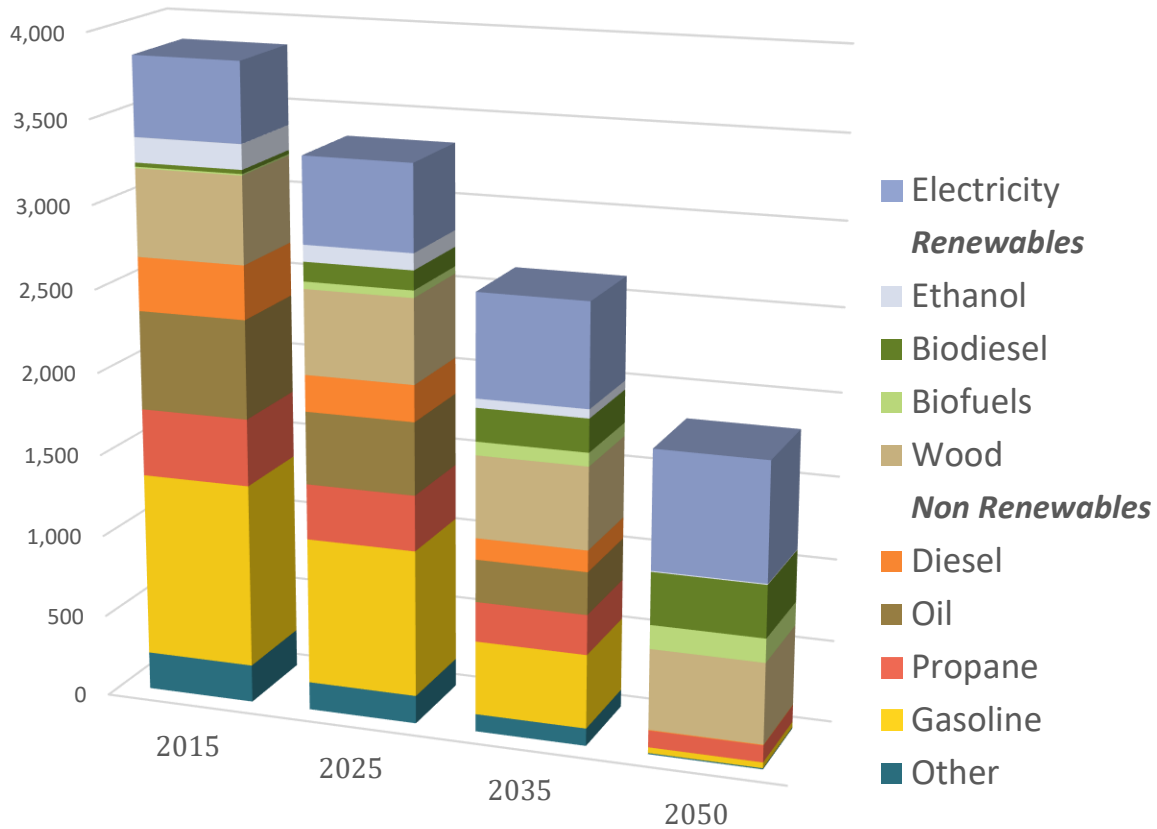


Figure 14: Southern Windsor County Regional Energy Targets by Fuel Type (in billion BTUs)

D. Residential Energy Targets

Regional residential energy targets encompass all energy consumption in the home. **To achieve the 90/50 goal, the amount of energy used in homes will need to be reduced by more than 50%, with a reduction in non-renewable sources from 60% to 6% as depicted in Figure 15 below.** Of the total residential energy demand in 2015, home heating accounted for 85% and the remainder for other uses including appliances and lighting.

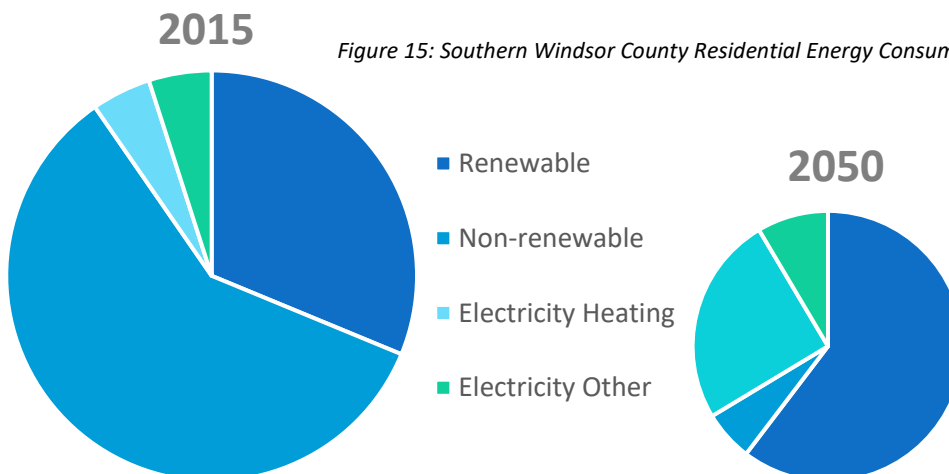


Figure 15: Southern Windsor County Residential Energy Consumption Targets for Goal Scenario

Table 4: Residential Thermal Fuel Targets by Percent of Total Systems

System Type	2025	2035	2050
Wood Heating	34%	40%	55%
New Heat Pumps	3%	8%	18%

The transition to more efficient appliances and lighting, as well as proper weatherization of existing homes, will help to reach this reduction. It is anticipated that inefficient heating systems will be replaced, or at least supplemented by air source heat pumps, to further reduce dependence on non-renewable forms of heating. It has been projected that, by 2025, heat pumps will only account for 3% of residential heating energy demand. By 2050, however, it will have risen to 18%¹². With the exception of a small amount of propane remaining for kitchen appliance use, by 2050 almost all fossil fuels will be eliminated as energy sources in the residential sector.¹³

Figure 16 breaks down residential energy consumption in the region by fuel type. Cord wood, fuel oil and propane are the three primary heating fuels, today comprising over 80% of total home energy use. Currently single family homes burn over 5.5 million gallons of oil per year, but by 2050 this will be reduced to a negligible amount. By 2050, fuel oil together with propane will all but disappear to be replaced by more efficient heat pumps. Wood as a heating source for homes will have increased from 30% to 50% of residential energy use. Although cord wood falls off, the use of more efficient wood pellets will increase.

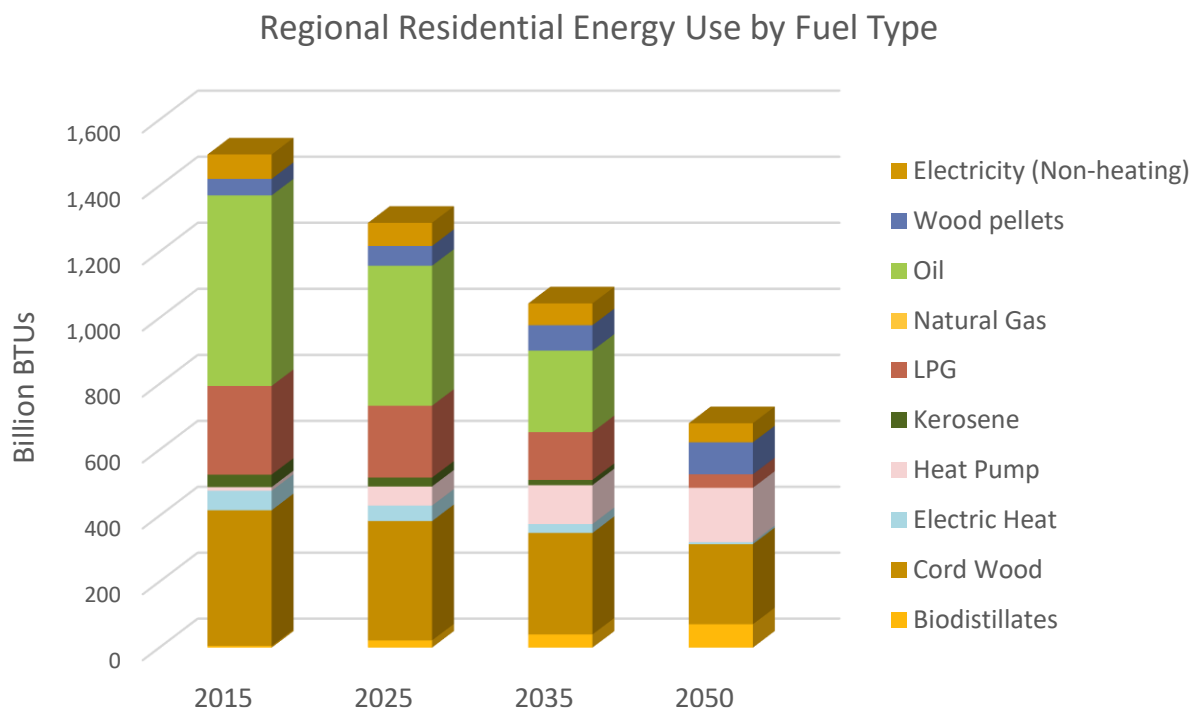


Figure 16: Southern Windsor County Residential Energy Consumption Targets by Fuel Type

¹² These targets are based upon the LEAP Model System for the Regional Goal Scenario.

¹³ These targets are based upon the LEAP Model System for the Regional Goal Scenario.

The LEAP model assumes that weatherization and conservation improvements in the region will account for more than 30% of the overall drop in residential heating demand. The Regional Planning Commission has predicted that in order to achieve residential thermal efficiency throughout the region, **17% of homes will need to be weatherized by 2025, increasing to 31% by 2035, and 63% by 2050.** Strategies to achieve these goals can be found in the following section.

As mentioned in the previous section, multi-family housing units, and especially renter occupied households, predominantly utilize fuel oil and propane for heat at the present time. The LEAP model expects these, often large, complexes to shift to wood chips or pellets as a primary heating source in the future. These wood-burning systems are regarded as being more efficient and more cost-effective. Some buildings have already begun the transition. For example, the Old Windsor Village, in the town of Windsor, has insulated the building, upgraded the windows, and converted to a pellet heating system. Smaller rental properties are more likely to convert to air-sourced heat pumps (i.e. cold-climate heat pumps). Ground-sourced heat pumps (i.e. geothermal heat pumps) are best for new construction applications. It is anticipated that weatherization and efficiency improvements will be made in both renter- and owner-occupied spaces in order to increase heating efficiency and help decrease overall consumption.

E. Commercial & Industrial Energy Targets

The commercial and industrial sectors are not projected to have as dramatic a decline in energy consumption as the residential and transportation sectors. This sector is projected to reduce overall energy consumption by only 20% and will, therefore, represent a larger portion of total regional energy usage at over 30%. While electricity use is projected to remain relatively constant, use of wood and biofuel will increase as propane and fuel oil consumption falls. By 2050, commercial/industrial electricity consumption will represent roughly half of the sector's overall energy usage. Wood will follow at 25%.

The utilization of wood for heating is estimated to rise for both commercial and industrial space, due to increased use of biomass heating in larger buildings instead of oil and propane. **It is expected that by 2025, 33 new wood heating systems will be installed in facilities within the region. Then by 2035 a total of 73 new units are expected to be installed, and finally, by 2050, 149 new units will be installed.** Some larger facilities have already converted to wood chip or wood pellet heating systems, such as the Weathersfield School in Ascutney and the Springfield High School and Technical Center. In addition to new wood heat systems, new heat pumps will also be installed in some facilities. **By 2025, 14 heat pump units will be installed, followed by 30 units by 2035, and 62 units by 2050.** (See Table 5.)

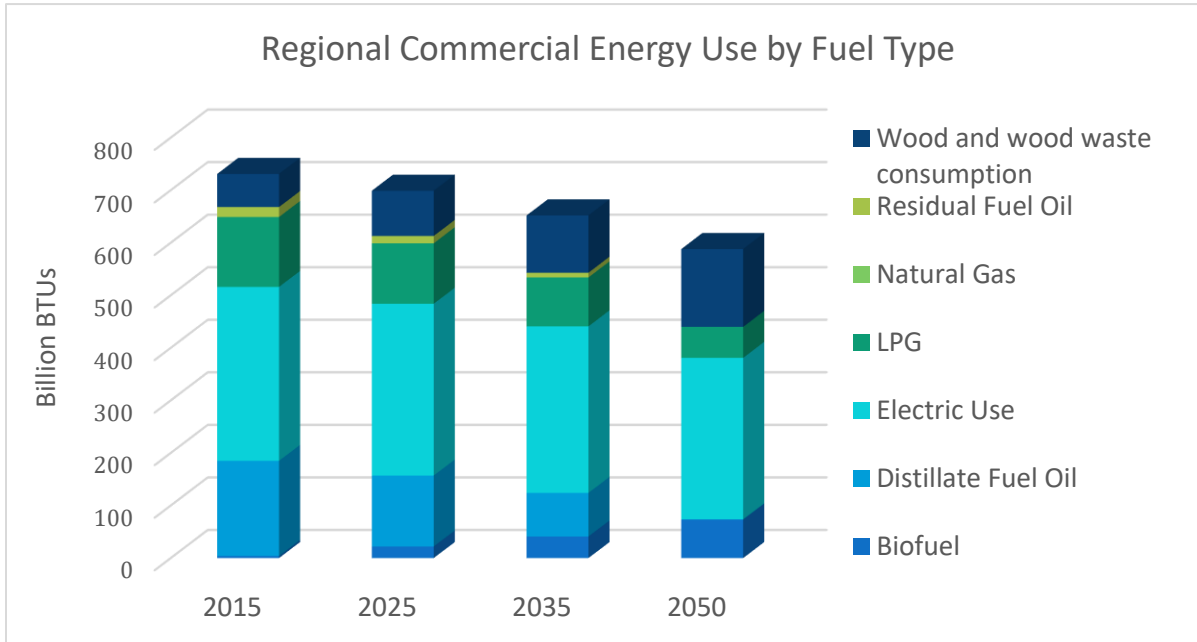


Figure 17: Southern Windsor County Commercial Energy Consumption Targets by Fuel Type

Within the commercial sector, the LEAP model assumes that oil-based fuels will be reduced dramatically over time, and completely eliminated by 2050. In the industrial sector, similar non-renewable fossil fuels, such as coal, will also be removed from the fuel source mix by 2050. Conversely, propane is anticipated to remain as a fuel source for both sectors, but at half the current usage in the commercial sector by 2050. In addition to converting heating fuel sources, it will be necessary to weatherize commercial and industrial buildings to conserve resources. **The model has estimated that by 2025 only 4% of commercial establishments are expected to be weatherized properly, followed by 7% by 2035, and then only 15% by 2050¹⁴.** These targets seem low; exceeding these targets is preferable.

Table 5: Commercial Thermal Fuel Targets by Number of Systems			
System Type	2025	2035	2050
New Wood Heating	33	73	149
New Heat Pumps	14	30	62

Although transportation is a key cost component for regional commerce, due to the reliance on shipping materials both in and out of the region, the future energy demand for the transportation sector will be addressed in the section below.

Table 6: Weatherization Targets as a Percent of Total Establishments			
Sector	2025	2035	2050

¹⁴ These targets are based upon the LEAP Model System for the Regional Goal Scenario.

Residential	17%	31%	63%
Commercial & Industrial	4%	7%	15%

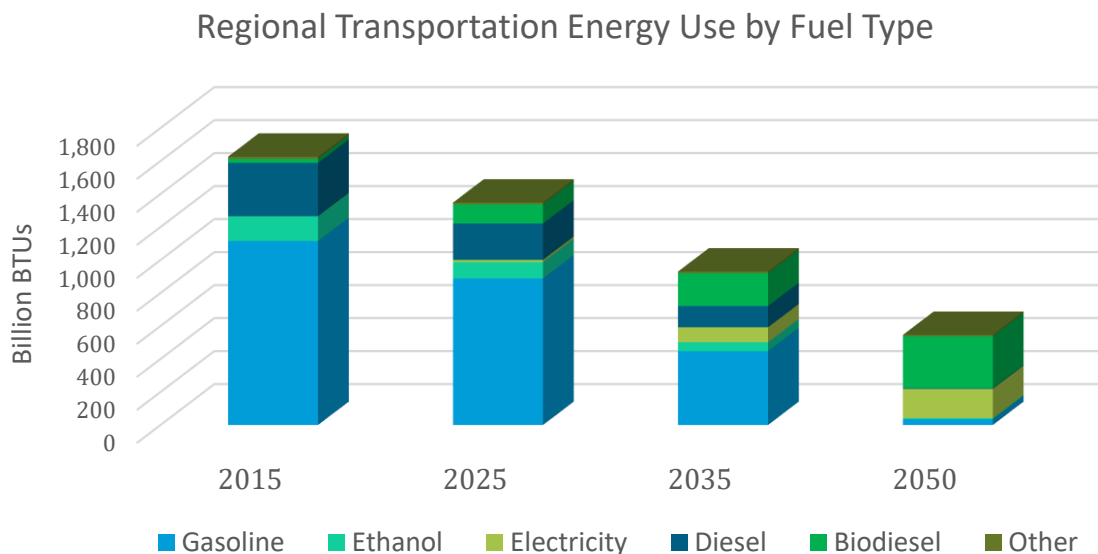
F. Transportation Energy Targets

The transportation sector currently accounts for 40% of the region’s total energy use. **The LEAP model has projected that the transportation sector will require an overall reduction in energy demand of up to 65% to meet the 90/50 goal.** As shown in Figure 18, non-renewable fossil fuels, gasoline and diesel, are currently the predominant fuel types consumed in transportation at 88%. However, fossil fuel consumption will drop to 7% by 2050 with their replacement by biofuels and electricity.

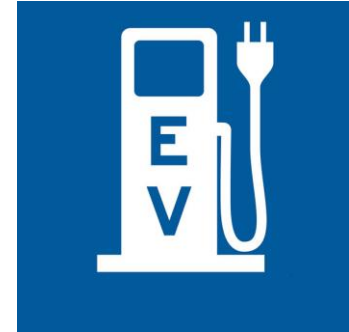
Privately owned vehicles in the region use roughly 17 million gallons of gasoline to travel up to 300 million miles annually. Diesel fuel utilized for heavy duty vehicles, such as trucks and buses, add an additional 2 million gallons of fuel consumption per year. This reliance on non-renewable fuels will require a major transition in the transp

Figure 18: Southern Windsor County Transportation Energy Consumption Targets by Fuel Type

necessities, renewable energy, biomass and solar power. Renewable energy, biomass and solar power consumption will need to occur over the next 35 years, from the current 17 million gallons to only 350,000 gallons by 2050. Diesel fuel consumption will also need to experience a similar reduction to a negligible amount by 2050.



As the transition is made away from non-renewable fossil fuels, the transportation sector will need to employ alternative fuels sources, such as electricity. The LEAP model assumes that the widespread adoption of electric vehicles will represent one of the key means of achieving the energy goals. Electric cars will become more prevalent in Vermont as a viable option for private vehicles if extended-range and all-wheel-drive features become readily available and affordable features. Based on LEAP data, electric vehicle adoption will get off to a slow start. **By 2025, electric passenger car usage will meet only 1% of transportation energy demand, but will rise substantially over the next 25 years to 70% of demand by 2050.**



Charging stations are presently located in two sites in Springfield; one is in the parking lot next to the town office, and several plug-ins are located at the I-91 Exit 7 park and ride facility. In order to meet the projected increase in electric car use, there will need to be a significant increase in the number of available charging stations throughout the region.

It is expected that biodiesel will slowly replace diesel as the primary fuel source for heavy duty vehicles. The LEAP data estimates that the number of passenger vehicles using biodiesel will be 1% by 2025, and will only rise to 13% by 2050. For heavy duty vehicles, however, biodiesel will be the primary renewable fuel, reaching 32% by 2025, 58% by 2035, and 96% by 2050. However, biodiesel is not currently a widely utilized fuel, and engine warranties may not cover damages if biodiesel is used at certain fuel blend concentrations (e.g. above B20). Ethanol, which is used as a blend with gasoline, is often labeled as a renewable fuel. Yet, ethanol will see decreasing use over the next 35 years due to its complex and resource intensive production process.

To achieve the major reduction in total energy use for the transportation sector required to meet the 90/50 goal, the transition away from non-renewable sources alone will not be sufficient. A decline in **vehicle miles traveled (VMT)** will also be required. **The LEAP model has assumed that, despite a slight increase projected in population, the vehicle miles traveled should remain relatively constant over the next 35 years.** Changes in lifestyle and land-use patterns will contribute to reductions in VMT. These changes will be accomplished by consolidating growth and investment within village and town centers. VMT can also be reduced by shortening commute distances and increasing public transportation usage, telecommuting, bicycling, and carpooling.

The anticipated changes in the transportation sector needed to meet the 90/50 goal, specifically the transition away from fossil fuels, would lead to a decline in the number of traditional fueling stations. This transition would need to be managed to minimize the impacts on Vermont (e.g. automotive fueling businesses, transportation fund revenues, tourism industry).

Vehicle Type	2025	2035	2050
Electric	1%	14%	70%
Biodiesel	1%	4%	13%
Heavy Duty Biodiesel	32%	58%	96%

G. Electricity Generation Targets

State Electricity Generation Targets

As mentioned in Section II, the majority of the Vermont’s electricity is provided by out-of-state sources, most notably Hydro Quebec, as well as limited in-state sources. This leaves the state of Vermont vulnerable. The closing of the Vermont Yankee nuclear power plant further limited the amount of electricity generated within the state. To compensate for this loss in electricity generation, some regions have utilized natural gas and wood biomass powered generators. Other renewable sources of energy will be able to further bridge this growing gap of electricity production. Nuclear has very high life-cycle costs for energy production, and there is no permanent long-term plan for waste storage. It seems unlikely that a new nuclear power plant will be permitted in Vermont. For the purposes of this

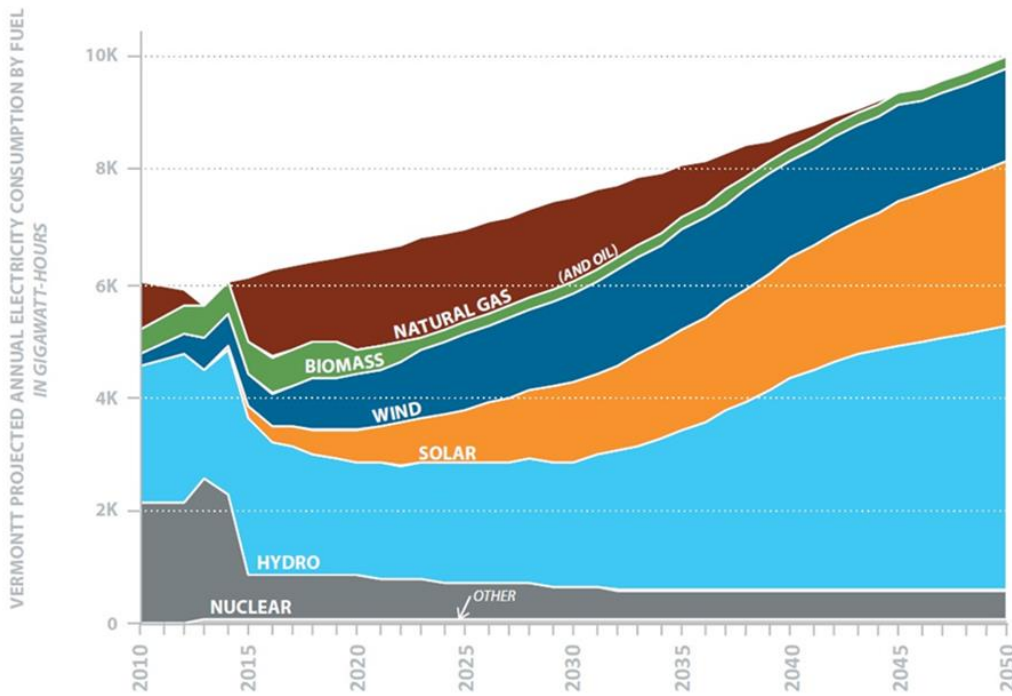


Figure 19: Projected Electricity Consumption Annually in Vermont (VEIC)

plan, we are assuming that no new non-renewable power plants (i.e. nuclear or fossil fuel-based power plants) will be constructed in this region.

Due to the dramatic increase in electricity consumption required for the state to achieve the 90/50 goal, it is estimated that 50% of Vermont’s electricity will need to be produced in-state. Figure 19 shows that by 2050 total state annual electricity demand will increase from 6,000 GWh to 10,000 GWh. This increase is primarily due to the transition for heating and transportation away from fossil fuels to electricity. Anticipating the increased demand for electricity production, the LEAP model has predicted that hydro, solar, and wind power will be the prevailing sources of electricity production throughout the state. Hydroelectric is estimated to provide half of the state’s electricity production by 2050, however, the majority of this supply will be imported. Projections also indicate that nuclear power, along with natural gas, will decrease over time as sources of

electricity. By 2050, there should be little to no fossil fuel-based -electricity production in the state. Figure 19 also shows that in-state solar and wind generation will provide 5KGwh or 50% of total electricity demand by 2050.

Regional Electricity Generation Targets

As noted earlier, the need for electricity within the region will double over the plan period, and will become a considerable portion of the region’s overall energy usage by 2050. The increase in regional electricity consumption by sector is shown in Figure 20. The remainder of this section will discuss the projected regional electricity generation targets as modeled by LEAP and one scenario for providing that additional generation capacity.

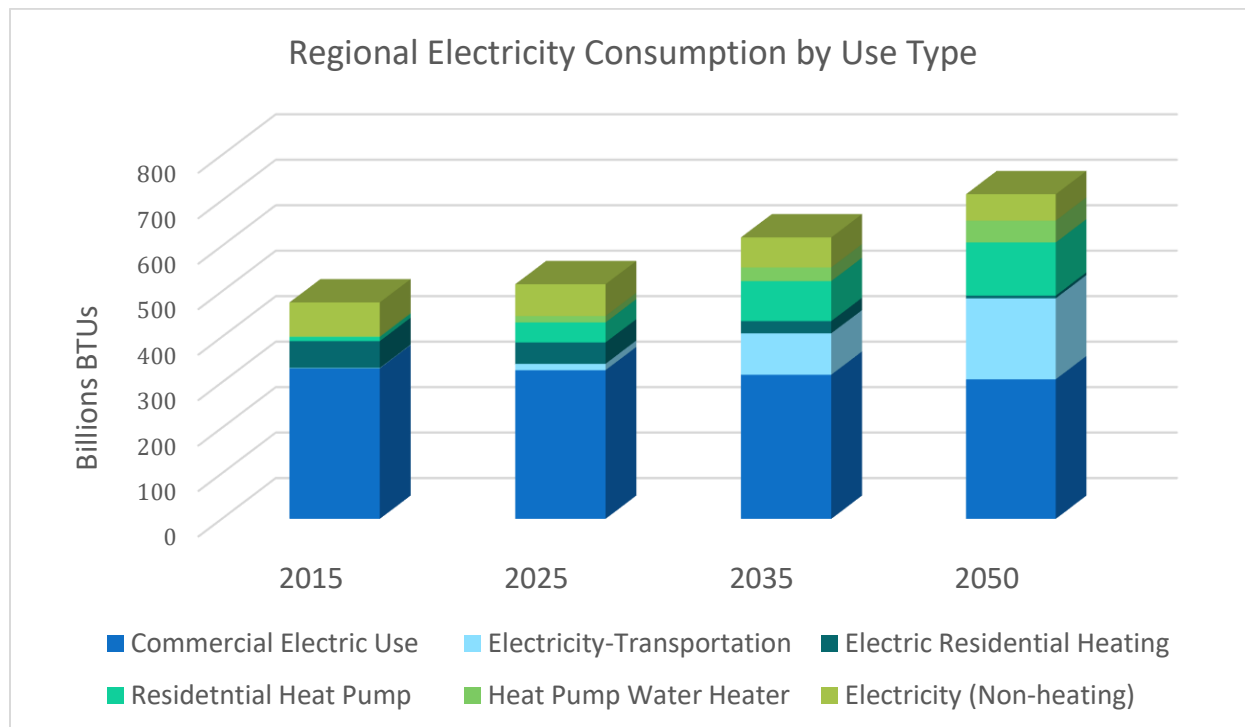


Figure 20: Southern Windsor County Electricity Consumption Targets by Use Type

The Department of Public Service and the regional planning commissions developed targets for regional generation. Targets were allocated to regions based on estimates generated by the LEAP model. Population and current and prospective generation potential were among the variables considered when determining the regional generation target. The intent of the targets is to achieve the overall state goals of generating 50% of statewide electricity demand in-state, and to have 90% of all energy come from renewable sources.

The resulting regional renewable generation target for the southern Windsor County region of 194,612 MWh was then broken down by town and is outlined in Table 8. The target MWh generation for each town in the region was determined by the regional planning commission. Each town’s target is based on several factors, each as a percentage of the regional total: town population; the potential land area for ground-mounted solar generation, which is determined from resource mapping (See the maps in Appendix B); and each town’s commercial/industrial electricity usage. For reference purposes only, the potential land area used for this exercise was based on solar potential within 1 mile of 3-phase power lines in each municipality.

Table 8: Renewable Energy Generation Targets By Town	Population	Percent Contribution	Target (MWh)
Andover	550	5%	10,261
Baltimore	292	2%	3,496
Cavendish	1504	7%	13,588
Chester	3110	12%	24,015
Ludlow	2140	11%	21,825
Reading	708	4%	8,298
Springfield	9258	32%	62,386
Weathersfield	2794	11%	21,811
West Windsor	1136	5%	9,884
Windsor	3496	10%	19,078
Total Regional Target	24,988	100%	194,612

H. Renewable Energy Generation Targets

❖ Statement of Policy on the Development and Siting of Renewable Energy Resources

The intent of this plan is to provide for the development of renewable energy resources per 24 V.S.A. §4302(c)(7) in order to achieve the goals established in the *2016 Vermont Comprehensive Energy Plan*. In order to meet 90% of Vermont’s energy need from renewable sources by 2050 a significant amount of new renewable energy generation will be necessary, in addition to conservation efforts. Our target to meet the 90% by 2050 state goal is to develop 194,612 MWh of new renewable energy generation output. (This target is equivalent to installed capacity of 158.7 MW of ground-mounted solar.) The purpose of this subsection is to articulate how we wish to achieve the Region’s target.



❖ Renewable Generation Targets

As further described below, developing a mix of renewable generation types is desirable in order to meet the overall renewable targets established in this plan. The targets presented in Table 9 represent one possible scenario for how southern Windsor County can meet the region’s overall renewable generation target.

Table 9: Renewable Generation Targets (MWh)	2025	2035	2050
Rooftop Solar	6,630	10,605	23,861
Ground-Mounted Solar	41,235	82,661	158,876
Wind (residential-scale)	613	3,066	6,132
Hydro	175	974	5,743
Total New Renewable Generation Target	48,653	97,306	194,612

This particular scenario for regional renewable generation targets was determined based on resource mapping, assumptions on site cost feasibility, and regional preferences regarding industrial wind generation. (See the related discussion in Section IV). Resource mapping, which is described in more detail in the sub-section below, identifies site generation potential for both solar and wind. Site generation potential is determined based on known and potential land use constraints. The following assumptions were then applied to determine the region’s renewable generation targets.

1. Maximize the potential that the region has for rooftop solar.
2. Maximize the potential for generating hydro power at 22 existing dam sites.
3. Determine contribution from residential-scale wind turbines. (Utility-scale and commercial-scale wind generation are not considered in this scenario.)
4. Determine ground-mounted solar generation from preferred sites and most cost efficient mapped areas.

As more fully explained in the Energy Resource Map sub-section below, these targets represent a very small percentage of the total potential for the region. In 2050, our ground-mounted solar target is only 2.4% of the region’s solar potential. This 2050 ground-mounted solar target is equivalent to about 130 MW of installed capacity, which might require an estimated 1,040 acres of land to accommodate the solar arrays and related facilities. The wind target is only 0.02% of the total potential in southern Windsor County, representing the installation of about 200 residential-scale wind turbines, each approximately 30 meters high measured at the hub.

There are a few projects in development that are not incorporated in the existing conditions baseline for the region. These projects, discussed in more detail below, are either recently approved but not yet constructed and online, or petitions for a Certificate of Public Good are still pending. It is the MARC’s assumption that once approved and online, these pending new facilities will contribute toward meeting the new renewable generation targets.

❖ Energy Resource Maps

This section describes how energy resource maps are generated and interpreted when analyzing the region's potential for solar and wind generation.

POTENTIAL AREAS

The wind and solar maps both include “potential areas,” which depict the portions of the region that have the potential for renewable energy generation based upon computer models and GIS mapping data. These areas do not represent “preferred sites” nor do they indicate with exact precision where solar and wind projects are desired to be constructed. Rather, they delineate where the potential for generation exists, and aid in evaluating whether sufficient land area exists to meet our regional renewable generation targets. In fact, some sites located outside of the mapped potential areas may prove to be viable for renewable energy generation.

Potential areas reflect two types of constraints: “known constraints” and “possible constraints.” Both are described below:

“Known Constraints” involve conditions which would likely make development not feasible. Known constraints include the following resources:

- a) Vernal pools with a surrounding 50-foot buffer;
- b) DEC river corridors;
- c) 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.

“Possible Constraints” have potential for renewable energy generation, but have one or more of the constraints listed below. These constraints signal conditions that would likely require mitigation and which may render a site unsuitable after a site-specific study has been conducted. Currently adopted and in-force state, regional or local policies may prevent development in areas with Possible Constraints.

- 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.

The accompanying maps show “prime” areas for both solar and wind resources. These prime areas represent potential areas that avoid both types of constraints (i.e. “known constraints” and “possible constraints”).

The accompanying maps also show “secondary” areas for both solar and wind resources. These secondary areas do not have any “known constraints” based on available GIS data, but they have one or more “possible constraints” present.

See the Constraints Map for more detail.

PREFERRED SITES

The following sites indicate preferred locations for siting a generator of a specific size or type in this region:

- a) Rooftops of existing buildings;
- b) Remediated brownfield sites;
- c) Disturbed portions of extraction sites (i.e. gravel pit, quarry);
- d) Vacant lands within industrial parks; and,
- e) Any preferred sites that are clearly and specifically identified in a municipal plan that has received an affirmative determination of energy compliance.

The MARC reached out to our towns as part of the process to develop this plan. Local planning commissions and energy committees found it very challenging to identify specific preferred sites on a map. No specific preferred sites were located on a map for this Regional Energy Plan. The MARC will work with developers and municipal boards to consider proposed preferred sites under PUC Rule 5.100 for any specific sites not clearly within the above categories.

UNSUITABLE AREAS

This category represents areas that are not suitable for renewable energy generation projects (i.e. “no go” areas). Unsuitable sites include the presence of one or more of the “known constraints” as described above. However, there may be other unsuitable areas that cannot be mapped at this time (i.e. archeological resources).



The MARC will provide technical assistance to our member towns to develop local enhanced energy planning maps, including but not limited to identifying local constraints and preferred sites.

Solar Resource Potential

The growth of solar power generation projects in this region has been significant between 2013 and 2017. According to data provided in support of this enhanced energy planning process as of May 2017, this region has 276 known solar project sites with a total capacity of nearly 6.6 MW. Common issues with ground-mounted solar projects include, but are not limited to, choosing a suitable site for the scale of the project, setbacks from roads and adjacent buildings, landscaping/screening, maintenance, and site decommissioning.

The Potential Solar Resources Map shows where prime and secondary ground-mounted solar potential sites are located in relation to transmission lines and three-phase power lines. The solar potential data is based upon a computer model that takes slope direction, slope steepness, and solar radiation values into consideration. Figure 21 depicts the proportional relationship between the total land area in the

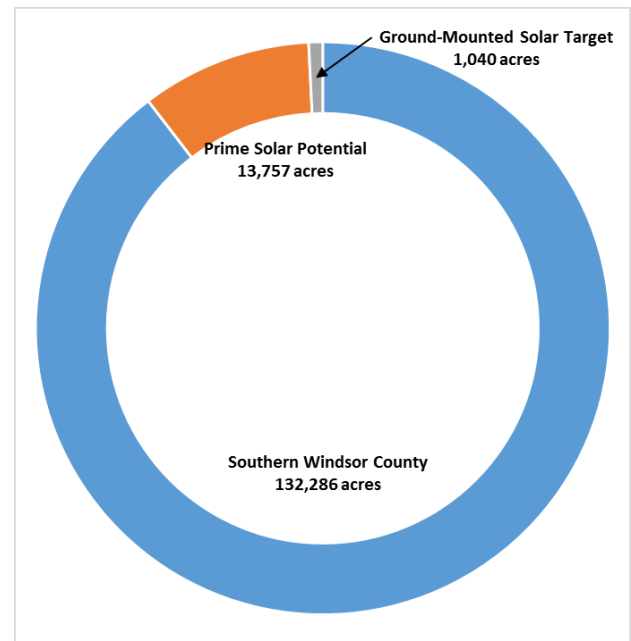


Figure 21: Proportional relationship between total land area in the region, land area of prime solar potential, and the estimated land area needed to address our renewable target via ground-mounted solar in Table 9.

region, prime solar potential land area, and estimated land area needed to meet the ground-mounted solar target.

Approximately 43,700 total acres of combined prime and secondary solar potential land areas were in the region. That is about 33% of the region's total land area. Reducing the solar potential area to include only those areas within 1 mile from 3-phase power lines resulted in a reduced solar potential land area of just over 18,000 acres, or nearly 14% of the land area of the region. There are nearly 6,175 acres of prime solar potential land within 1 mile of 3-phase power lines. If we were to meet our region's total renewable energy target through ground-mounted solar alone, we would need an estimated 1,270 acres, which is about 1% of the total land area in the region. These areas represent a combination of public and privately-owned lands.

Certain projects are perfectly sited, such as a 150 kW photovoltaic array constructed on town-owned land on a south-facing slope behind the Cavendish wastewater treatment facility. It is hidden from view from most vantage points. There are no neighbors, and travelers on the adjacent section of VT Route 131 would never know it is located there. (See Figure 23.)

In 2016, a petition was withdrawn for a 4.5 MW ground-mounted solar project proposed to be located on the prison lands in Windsor due to local opposition and concern for both the scale of the project and impacts upon scenic resources and wildlife habitat. The MARC did not take a formal position on the project.

In 2017, the Public Utility Commission issued a Certificate of Public Good (CPG) for a 20 MW solar power generation facility in Ludlow and Cavendish known as the Coolidge Solar Project [Docket #8685]. This project is not included in the existing conditions data presented in this plan due to the timing of the CPG. Despite the project's large size, the visual impacts are highly localized due to its location in a bowl-shaped area. The Coolidge Solar Project is in very close proximity to the existing Coolidge Substation.

Wind Resource Potential

According to available data (May 2017), there are four known wind turbine sites in this region, generating about 0.02 MW of installed capacity and nearly 65 MWh of output. There have not been any commercial- or utility-scale wind power proposals in this region to date. Notable local opposition has been observed for recent utility-scale wind turbine proposals in Grafton and Windham, located adjacent to this region.



The wind potential (i.e. utility-scale) is greatest in the western portion of the region. However, residential-scale wind generation may be possible throughout most of the region at lower elevations. The Wind Resources Map shows where prime and secondary wind potential sites are located in relation to transmission lines and three-phase power lines. The wind potential data is based upon a numerical weather model and a micro-scale wind flow model to produce a high-resolution (200m) wind resource map. The models are the product of a collaborative effort between the Massachusetts Technology Collaborative, the Connecticut Clean Energy Fund and the Renewable Energy Trust Northeast Utilities. It is intended as a preliminary assessment of wind potential areas.

Table 10: Summary of Generalized Wind Turbine Types			
Scale	Hub Height	Lower Wind Speed Cutoff	Generalized Capacity
Residential	30 meter	4.5 m/s	≤ 10 kW
Community/Commercial	50 meter	5.5 m/s	≤ 100 kW
Utility	70+ meter	6.5 m/s	≥ 1 MW

A significant portion of the potential wind areas are located further than one mile away from transmission and three-phase power lines, which makes them more expensive and less feasible to develop for wind power generation. Local concern has been expressed about potential wind project impacts including forest fragmentation, damage to wildlife habitat, degradation of scenic resources and ridgelines, and excessive noise¹⁵. These concerns are consistent with the Land Use policies and Goals established in the Regional Plan with respect to natural, cultural, and scenic resource preservation and the constraints placed on industrial development¹⁶. Input received while doing outreach in Andover and Ludlow, in particular, showed very little support for utility-scale wind projects, especially since a project often involves 10-15 turbines and the related clearing for access roads and interconnection. The siting of utility-scale wind is a divisive issue in this region and across Vermont as a whole.

The MARC remains committed to providing for wind generation as a component of meeting our regional renewable energy targets, but only through the construction of appropriately-scaled wind generation facilities. Through consultation with our towns, and based upon an analysis of generation potential and likely negative impacts, the MARC has concluded that utility-scale wind power does not conform to this plan.

If a municipality, through its local planning process, identifies a preferred location(s) for utility-scale wind facilities within their boundaries, the MARC may consider amending this plan to account for this local preference. Coordination and consensus among neighboring municipalities will be a critical component of any process to amend the regional plan in this regard. Additionally, the MARC shall only consider such an amendment if the location, or locations, identified by the municipality do not include “known constraints” and mitigate impacts to “possible constraints” as identified in this plan.

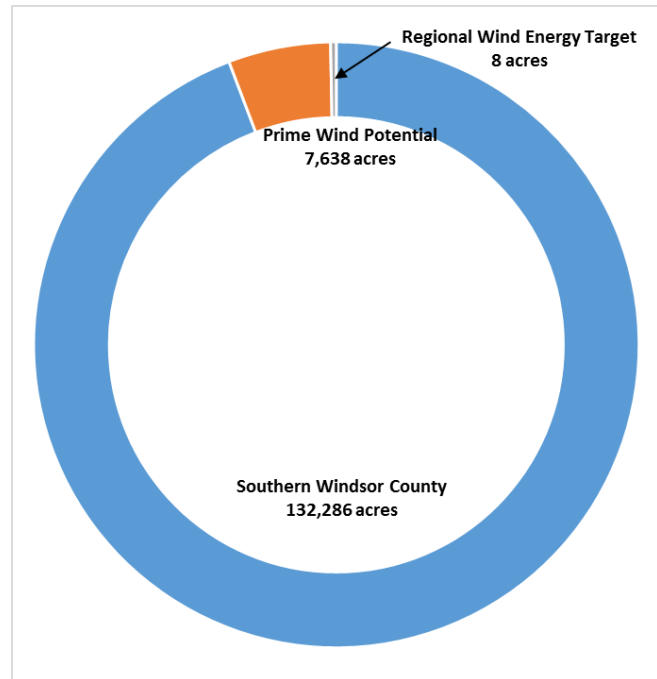


Figure 22: This graph illustrates the proportional relationship between the total land area in region, estimated wind potential land area, and the approximate land area needed to meet our wind target in Table 9.

¹⁵ Including both infrasound, low-frequency noise as well as the typical loudness and frequency noise impacts

¹⁶ Many wind potential areas coincide with both the Resource future land use category as well as notable sites identified in the Scenic Lands and Open Space Policies.

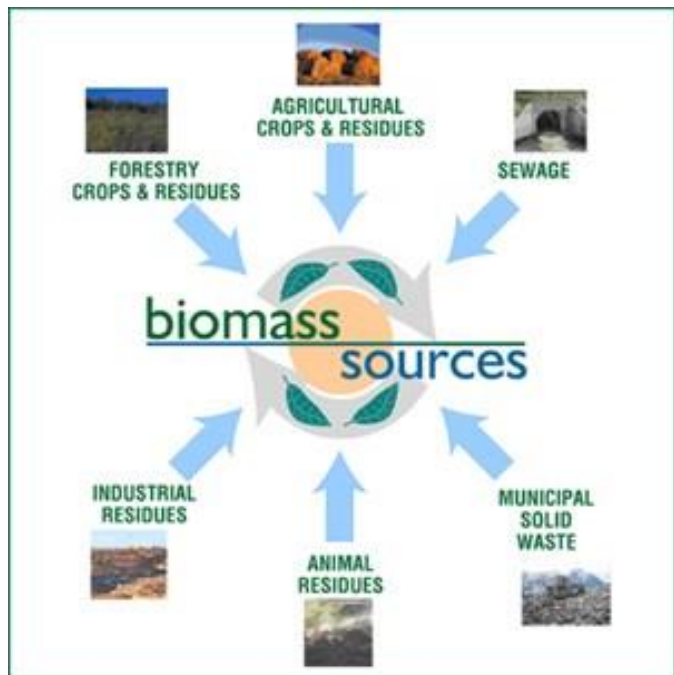
Hydroelectric Resource Potential

Six existing hydro facilities are located in the southern Windsor County region, totaling almost 2.8 MW of capacity (see Map 4). These existing hydro dams include the GMP facility in Cavendish and five dams in Springfield: Fellows, Gilman, Comtu Falls, Lovejoy and Slack Dam. A number of other existing dams in this region do not presently generate hydro-power.¹⁷ The process to permit a hydro facility is complex and, as a result, we are assuming that new hydro facilities can only be established or re-established at existing dam sites. However, the cost and attendant permitting procedures may discourage the development of new hydro facilities. Our renewable energy generation scenario summarized in Table 9 represents generating power at the existing dam sites in the region, as depicted on Map 4. The generation potential for each dam site is based upon estimates provided by the Vermont Sustainable Jobs Fund.

The hydropower facilities along the Connecticut River are not located within this region. However, towns along the eastern boundary of the region are adjacent to the impoundment area of the Bellows Falls facility and, as a result, are affected by dam operations.

Biomass Resource Potential

Biomass is primarily to be used in the region for heating buildings. Approximately 80% of the land in the region is forested, representing a potentially significant renewable local energy resource. According to the 2010 analysis by the Biomass Energy Resource Center, Windsor County as a whole annually produces approximately 104,055 green tons of Net Available Low-grade Growth (NALG) wood. This represents the estimated amount of wood used for biomass fuel that can be sustainably harvested from Windsor County above and beyond current levels.¹⁸ Around 1,900, or approximately 18%, of the region's homes currently use cord wood or wood pellet heating systems. By 2050, 55% of all homes should use Biomass as a heating fuel in order to meet the 90/50 goals. There are a number of wood chip or wood pellet heating plants in larger commercial and industrial buildings in this region currently, and it is anticipated that this use will increase with time.



Supplying sustainably harvested wood products for heating is also beneficial to the local economy. The MARC supports wood processing industries as long as they conform to the best practices outlined in the Regional Plan. The Regional Plan supports forestry management practices that further "regional goals concerning open space, wildlife habitat, air and water quality, scenic resources, access to recreation, and the tourism economy" and

¹⁷ Existing and Potential Hydro Sites from Vermont Sustainable Jobs Fund, 2010,

¹⁸ Biomass Energy Resource Center, Vermont Wood Fuel Supply Study (2010 Update), 2010.

logging operations that “follow Vermont’s Acceptable Management Practices, and help conserve valuable forest, air, water, wildlife, and recreation resources.”¹⁹ By adhering to these principles, this region has the potential to support an expanded, sustainable use of biomass resources that also benefits the local economy.

In 2014, a proposed 25-35 MW wood-fired biomass power generating facility in North Springfield was denied by the Public Utility Commission due, in part, to expected annual greenhouse gas emissions and the low level of thermal efficiency at which the project would operate [Docket No. 7833]. The impact of wood deliveries on the road network was a concern for some towns in the area and for the MARC. However, the merits of each proposed project should be duly considered.

¹⁹ Pages 71-72.

Section IV: Energy Strategies

The following section provides policies and strategies to achieve the regional targets and goals outlined in the previous section. These strategies represent implementation pathways that are intended to meet the need for both energy conservation and generation in the region that will make progress towards our energy goals.

By 2050, 90% of Vermont's total energy will be derived from renewable sources.

The following are policies and strategies to be executed by the MARC as well as private citizens and businesses owners. Although residents of the region cannot be forced to change current energy patterns, steps to encourage conservation through education and incentives can be provided. The implementation strategies outlined below represent the initial framework designed to achieve the 90/50 goal, and are expected to evolve over time to better meet the needs of the region.

General Energy Conservation Strategies

- 1) Encourage towns to establish energy committees to serve as advisory committees in accordance with 24 V.S.A Chapter 117 §4433 and §4464.
- 2) Work with town energy committees and other organizations to provide outreach and education for businesses concerning energy conservation practices for new construction and retrofits.
- 3) Encourage towns to support their local energy committees (e.g. providing meeting spaces, conducting public outreach, releasing press releases, putting out calls for volunteers, coordinating with schools and services, and asking for input from the committees on all matters related to energy).
- 4) Support local efforts to identify businesses/facilities that are large energy consumers (manufacturing, industrial parks, and schools) and encourage their participation in Energy Efficiency Utility (i.e. Efficiency Vermont) programs.
- 5) Support municipal efforts to encourage the development of locally-controlled renewable energy projects.
- 6) Encourage statewide discussions with stakeholders (e.g. trucking industry, fuel dealers) about the transition from our current energy situation towards our ambitious energy goals for 2050.

*Total regional energy use
to decrease by 50%*

A. Electricity Conservation

As outlined in the previous section, electricity consumption will become a greater contributor to the region's overall energy consumption over time. In order to realize the state goals as in the manner assumed by the LEAP model, additional electricity production will be required throughout the region. However, despite the increased need for electricity use, overall energy consumption must be reduced. The following strategies highlight necessary steps in conservation. Implementation steps to support increased electricity production are included below, in Section D.

- 1) Support programs, such as Efficiency Vermont, that promote the use of energy efficient equipment and devices.
- 2) Support and encourage manufacturers to provide energy efficient utilities and appliances.
- 3) Encourage expansion of energy storage systems within the region to reduce peak energy demand and provide backup power.
- 4) Promote building/design techniques that take advantage of day-light in order to minimize the need for daytime use of artificial lighting.
- 5) Influence behavioral changes to reduce electricity consumption at the individual level.
- 6) Support and encourage school participation in the Vermont Energy Education Program to foster an early appreciation for energy savings.



Electricity Targets

- By 2050, electricity consumption will increase to 35% of overall energy use in the region.
- Increase in electricity consumption indicates 50% will need to be produced in state.

B. Transportation Conservation

The region's transportation sector will require a 65% reduction in overall energy consumption, which is the largest reduction in usage for any sector. This massive reduction in energy use will require considerable changes in how transportation is utilized throughout the region. This will be best achieved through conservation, utilization of fuel efficient vehicles, and land use pattern changes. The following strategies highlight necessary steps to reduce transportation energy use.

- 1) Assist with efforts to increase awareness of existing public transportation services
- 2) Work with public transportation providers to evaluate and plan for future service modifications.

Transportation Targets

- The transportation sector accounts for 40% of the region's energy use.
- By 2050, overall transportation energy consumption will need to be reduced by 65%
- Privately owned vehicles consume 17 million gallons of gasoline per year – this will need to be reduced to 350,000 gallons by 2050.

- 3) Promote the GO Vermont program, which provides ride share, vanpool, public transportation, and park and ride options.
 - 4) Identify key areas where improvements to bicycle and pedestrian access would be beneficial (in downtowns and surrounding areas for example) and work to improve access and infrastructure in those areas.
 - 5) Encourage upgrades to internet speeds throughout the region in order to enable telecommuting as a way to reduce the need to drive to work.
 - 6) Prioritize projects that close gaps in the transportation network, for example by providing pedestrian or bicycle connections between residential neighborhoods, village centers, schools, and work destinations.
 - 7) Promote a jobs/housing balance that allows more residents to live and work within the same community in order to decrease single-occupant vehicle travel, reduce greenhouse gas emissions, and conserve energy.
 - 8) Goals and policies in the land use and transportation chapters of the Mount Ascutney Regional Plan serve as statements of policy on patterns and densities of land use likely to result in conservation of energy.
- 1) [Electric Vehicles](#) Promote the Drive Electric Vermont webpage, which informs drivers of financial incentives, dealers, and recharging stations for EVs.
 - 2) Contact local vehicle dealers to encourage them to offer EV and fuel-efficient vehicles both for sale and lease.
 - 3) Partner with Drive Electric Vermont, nonprofit organizations, vehicle dealers, and/or state agencies to organize high-visibility events where people can see and test drive EVs, such as county fairs, energy fairs, and summer festivals.
 - 4) Partner with Drive Electric Vermont, the Vermont Clean Cities Coalition, and other organizations to promote the expansion of workplace charging, in particular by continuing to fund incentives that help employers cover the costs of installing charging stations.
 - 5) 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.
 - 6) Expand the use of electric vehicles throughout the region by supporting education, availability, and infrastructure.
 - 7) Promote the use of electric-assist bicycles.



C. Thermal Efficiency

Steps to reduce energy consumption for residential and commercial building heat will require a focus on weatherization measures and the installation of alternative heating systems. As previously stated, members of the community cannot be forced to weatherize their private homes or businesses. Therefore the strategies suggested below are intended to provide resources and education to further incentivize thermal efficiency.



Thermal Efficiency Targets

- Weatherization and conservation measures will help decrease residential heating demand by 30%
- Wood as a heat source will increase in both Commercial and Industrial sectors with the installation of biomass heating systems.

Residential Heating Efficiencies

- 1) Inform residents about Efficiency Excellence Network (EEN) contractors by providing links to EEN information through our website.
- 2) Promote the use of Vermont’s residential building energy label/score.
- 3) Educate and promote State energy codes for residential structures (RBES).
- 4) Educate local zoning staff about their statutory role to promote the use of residential and commercial building energy standards by:
 - a) Distributing State energy code information to all applicants seeking a zoning permit for a structure that is heated or cooled.
 - b) Issuing a certificate of occupancy only after the applicant provides a certificate that ensures compliance with the State Energy code.
- 5) Encourage all residential Act 250 projects to follow the residential stretch energy code.
- 6) Promote and educate the public on energy codes for both residential and commercial buildings.
- 7) Encourage geothermal heat pumps for new construction.

Commercial Heating Efficiencies

- 1) Work with towns, partner organizations, and EEUs to offer workshops and educational opportunities for businesses on efficiency in new construction, retrofits, and conservation practices.
- 2) Identify large energy usage customers, such as large businesses, manufactures, and schools, as targets to encourage participation in commercial and industrial EEU programs.
- 3) Encourage all commercial Act 250 projects to follow commercial stretch energy guidelines.
- 4) Encourage new buildings to incorporate net-zero ready construction methods.
- 5) Educate and promote State energy codes for commercial structures (CBES).
- 6) Assist local planning commissions in considering incentives (e.g. density bonuses) for developments that exceed the [state’s stretch energy code](#) to locate in and around village centers and downtowns.

Weatherization

- 1) Inform towns and residents about Energy Efficient Utility (EEU) programs and the state Weatherization Assistance Program for low-income households and encourage residents to participate.
- 2) Encourage reductions in energy wasted through heating by creating more efficient buildings through weatherization and use of high-performance building methods.
- 3) Support local weatherization initiatives.
- 4) Work with partners to improve upon the availability and accessibility of data about completed weatherization projects within the region.



D. Renewable Energy Generation

General Renewable Energy Generation Strategies

The following tactics focus on implementing strategies for increasing renewable energy production, which will contribute to achieving the 90/50 goals for all previous sectors (Electricity, Transportation, and Thermal Efficiency).

*Total regional
renewable generation
of 194,612 MWh by
2050*

- 1) Show support for renewable energy generation facilities that conform to our statements of policy on the development and siting of renewable energy resources.
- 2) Promote and/or structure policies and incentive programs to promote installation of solar projects where there is electricity demand and on locations where the land has already been impacted by previous development (e.g. roofs, parking lots, landfills).
- 3) Promote the utilization of [passive solar design](#) and siting principles to be incorporated into new buildings in order to reduce heating loads.
- 4) Support updates to municipal building standards and energy codes that promote incorporation of solar photovoltaics for new construction and major renovations.

Solar Generation

The following statements of policy apply to the development of solar energy generation projects in the Mount Ascutney region:

- 1) Encourage the exploration of newer technologies that improve energy production and/or reduce impacts as they become available.
- 2) Encourage infrastructure improvements that further our energy goals (e.g. larger container sized battery storage systems).
- 3) Support rooftop solar projects.
- 4) Encourage the location of solar projects on preferred sites, as identified in this Plan, as long as they are appropriately designed and scaled for the character of the area in which they are located.
- 5) Support residential-scale ground-mounted solar projects.
- 6) Ground-mounted solar projects of 150kW and greater must demonstrate that the proposed project siting is appropriate in scale as it relates to the character of the area in which it is to be located, and that all reasonable options have been considered in siting the facility.
- 7) The setback standards in 30 V.S.A. §248(s) apply to all applicable ground-mounted solar projects.
- 8) All ground-mounted solar projects of 150 kW or greater²⁰ that are within view of major roadways (i.e. interstate highways, state highways, US routes, and Class 1 and Class 2 town highways) must provide adequate landscaping in order to appropriately screen the project from the view of the traveling public.
 - a) This landscaping must consist of a mix of native plants that provide adequate screening during all months of the year (i.e. conifers or a mix of deciduous and conifers).
 - b) All landscaping materials will be planted at a size that provides adequate screening within 5 years of being planted.
- 9) The applicant must maintain any landscape plantings required for mitigation, including the replacement of 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.
- 10) The applicant is expected to provide a plan for the site to be adequately decommissioned at the time when the project ceases commercial operation in accordance with PUC Rule 5.900.
- 11) Ground-mounted solar facilities must avoid “known constraints”.



Figure 23: This is a photo of the Town-owned 150 kW solar project in Cavendish as described on page __. This is an example of a perfectly sited project. Because it is not visible from any major public roads and has no neighbors, no landscaping is warranted. (Credit: Peter LaBelle)

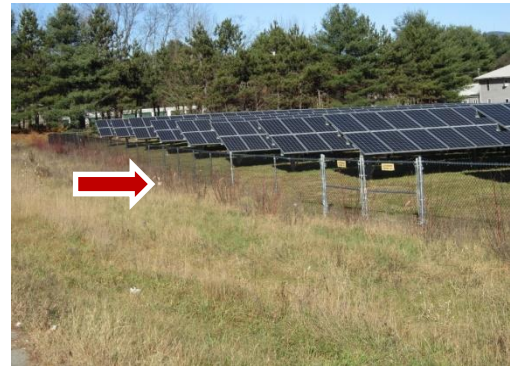


Figure 24: This project is an example of inadequate landscaping/screening. Note deciduous shrubs do not provide year-round screening, small plants will take many years to grow up to provide effective screening, and a lack of mowing the grass between the landscaping and roadway, which is to the left of the photo.

²⁰ This includes all applicable projects that are not exempt under [PUC Rule 5.800](#).

- 12) Ground-mounted solar facilities must not have undue adverse impacts on “possible constraints”. In addition, applicants shall demonstrate that the project will not have undue adverse impacts on significant wildlife habitat, wildlife travel corridors, stormwater, water quality, flood resiliency, important recreational facilities or uses, scenic resources identified in this plan, or inventoried historic or cultural resources. Project proposals must consider placement of such facilities in locations where impacts are minimal or employ reasonable measures to mitigate undue adverse impacts on the applicable resources.

Wind Generation

The following statements of policy apply to the development of wind energy generation projects in the region:

- 1) The MARC supports the installation of residential-scale wind turbines (i.e. not to exceed 30 meters in height, measured at the hub).
- 2) The MARC encourages consideration of newer technologies (e.g. vertical axis wind turbines).
- 3) Commercial-scale wind turbines (i.e. not to exceed 50 meters in hub height) must demonstrate that the proposed project siting is appropriate in scale as it relates to the character of the area in which it is to be located, and the applicant must also demonstrate that all reasonable options have been considered in siting the facility.
- 4) All wind turbines and related facilities (e.g. access roads, power line interconnections) must avoid “known constraints”.
- 5) All wind turbines and related facilities must not have undue adverse impacts on “possible constraints”. In addition, applicants shall demonstrate that the project will not have undue adverse impacts on public safety (e.g. ice shedding, ice throw), significant wildlife habitat, wildlife travel corridors, stormwater, water quality, flood resiliency, important recreational facilities or uses, scenic resources identified in this plan, or inventoried historic or cultural resources. Project proposals must consider placement of such facilities in locations where impacts are minimal or employ reasonable measures to mitigate undue adverse impacts on the applicable resources.



Figure 25: This photo is an example of a vertical axis wind turbine.

Hydroelectric Generation

This plan assumes that the construction of new dams is highly unlikely due in part to the negative impacts dams have on rivers and streams. Dams act as a barrier that interferes with natural river dynamics, resulting in negative consequences such as:

- Sediment build-up above the dam (up-stream), and erosion of the stream bed below the dam (down-stream);
- Lowered dissolved oxygen levels;
- Higher water temperatures;
- Impeded nutrient flow - nutrients are blocked from flowing downstream of the dam;
- Fragmented aquatic passage; and/or,
- Trapped pollution in the sediment build-up above the dam (up-stream).

Additionally, the recurring fluctuation of water levels as a result of hydropower operations can cause piping erosion. Common issues of concern include, but are not limited to, erosion, methylmercury, fish passage and recreation.

The following statements of policy apply to the development of hydropower projects that impact the Mount Ascutney Region:

- 1) Encourage exploration of micro-hydropower that has minimal impacts on environment.
- 2) Support efforts to discuss the possibility of exemptions to FERC or other permitting requirements for micro-hydropower projects.
- 3) The applicant must provide adequate levels of data and analysis in order to evaluate the impacts that the hydropower facility will have on river dynamics and flood resiliency.
- 4) When hydropower facilities are to be licensed or relicensed, best management practices must be considered to avoid or minimize undue adverse impacts. Such practices include but are not limited to: providing adequate fish passage, moderating ramping rates, maintaining daily operating logs to be sure that the water levels remain within license limits, and requiring an independent gage to be installed to verify dam operations.

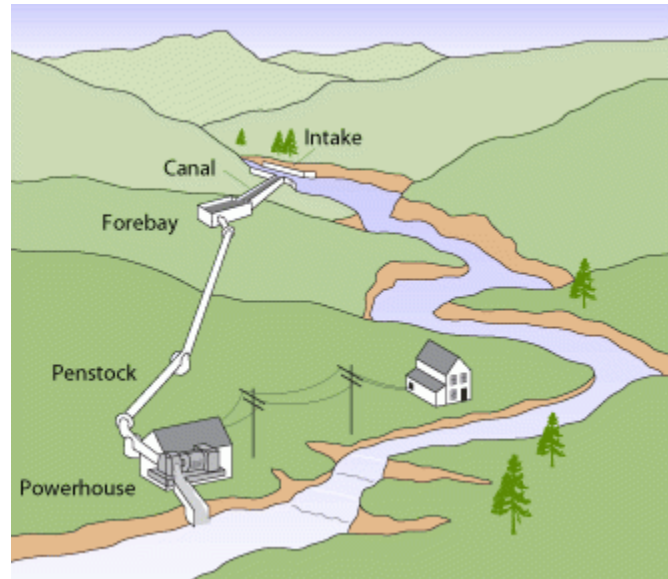


Figure 26: Illustration of a micro-hydropower system (U.S. Department of Energy)

- 5) A mitigation and enhancement fund shall be considered as one way to help address potential negative impacts of dam operations.

Biomass

While the primary intent of this energy plan is to support the use of biomass for heating, biomass power generating facilities that are modest in scale (possibly 10 MW or less) and that produce both heat and power may be desirable in certain locations (i.e. industrial parks).



Figure 27: Wood chip heating system at Weathersfield School.

The following statements of policy apply to the development of biomass projects that impact the region:

- 1) The MARC supports biomass for the purpose of heating buildings (e.g. wood stoves, masonry heaters, wood pellet stoves, wood chip boilers).
- 2) Wood processing industries shall meet all applicable goals and policies in the Land Use, Economic Development and Natural Resources sections of the *Regional Plan*.
- 3) Biomass power plants must demonstrate that the proposed project siting is appropriate in scale as it relates to the character of the area in which it is to be located, and the applicant must also demonstrate that all reasonable options have been considered in siting the facility.
- 4) Applicants for a biomass power plant must demonstrate that they have an adequate and sustainable wood supply for the proposed facility.
- 5) Biomass power plants must not have undue adverse impacts on air quality or the regional transportation system. If such a facility is proposed, transporting fuel via railroad is strongly encouraged.



Figure 28: Wood stove (Peter Hudkins)

Southern Windsor County has very limited potential for biogas at any commercial scale. There may be some opportunities; for example, capturing methane from anaerobic digesters to generate heat or power at wastewater facilities. The MARC, supports efforts to generate heat or power from biogas that is a bi-product from the ongoing uses at existing facilities, such as municipal wastewater facilities, composting facilities, or farms.

Presently, there are no food waste composting facilities in this area of the scale that would contribute toward energy generation. The Solid Waste Implementation Plan (SWIP) for the Southern Windsor/Windham Counties Solid Waste Management District does not call for any such facilities at this time.

Appendix A – Energy Data Summaries

The following section provides data for the ten individual towns in the MARC Region.

Appendix content is available to view at marcvt.org/2022-Regional-Plan/.

Appendix B – Regional Energy Maps

This section provides the following maps for the MARC region:

- Land Use
- Utility Service Areas
- Existing Solar Resources
- Hydropower Resources
- Wind Resources
- Woody Biomass Resources
- Geothermal Resources
- Constraints

Appendix content is available to view at marcvt.org/2022-Regional-Plan/.

Appendix C – Glossary

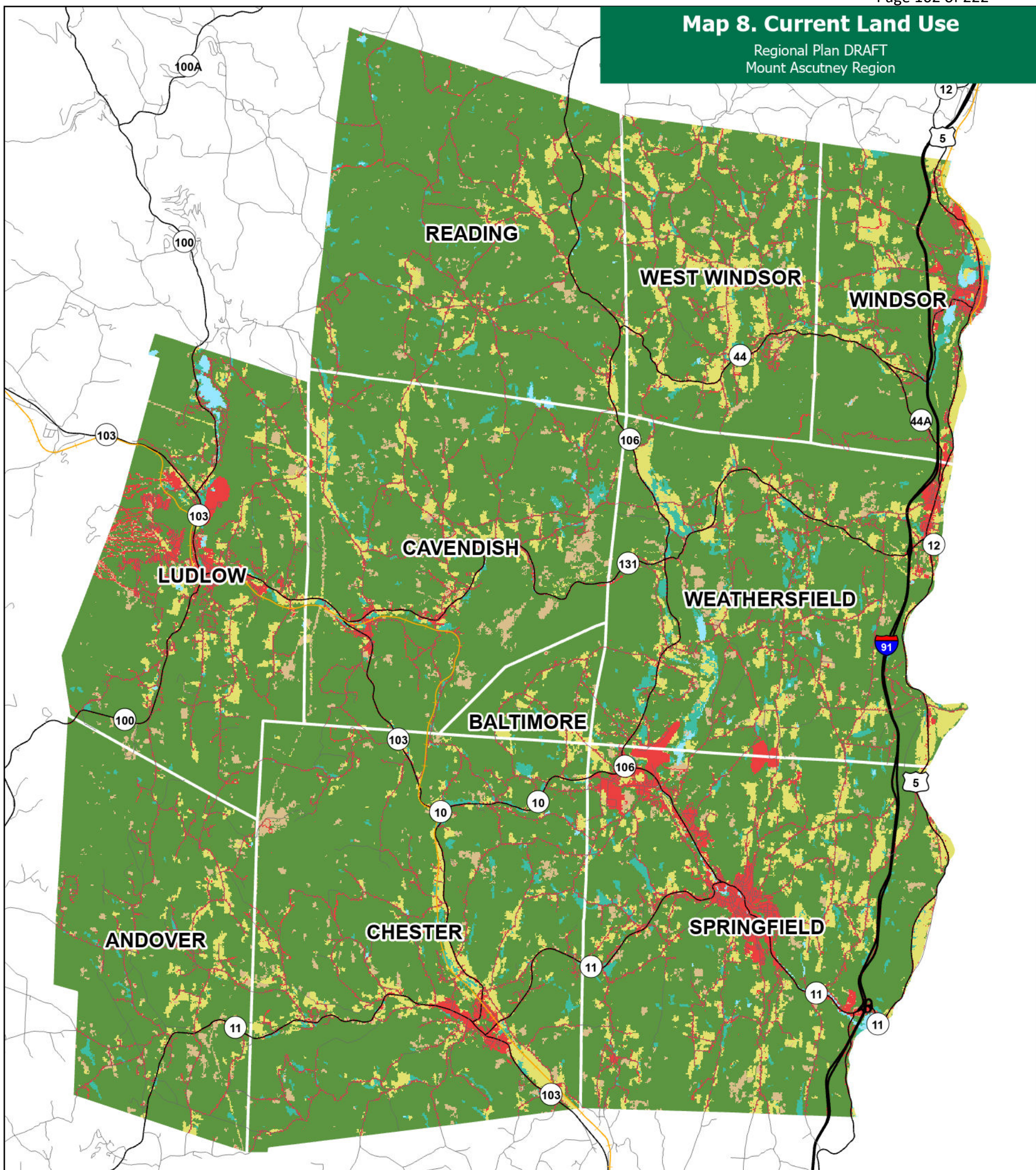
Appendix content is available to view at marcvt.org/2022-Regional-Plan/.

Appendix D – Acronyms

Appendix content is available to view at marcvt.org/2022-Regional-Plan/.

Map 8. Current Land Use

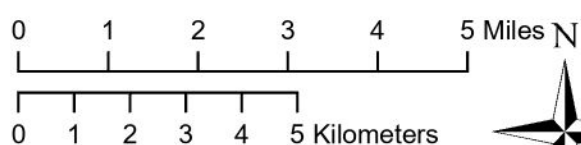
Regional Plan DRAFT
Mount Ascutney Region



- Developed
- Forest
- Agricultural
- Open Land (brush, transitional, or barren)
- Wetlands (including wooded wetlands)
- Water

Current land uses in the Mount Ascutney Region including developed areas, forests, agricultural areas, and wetlands. This is a simplified version of data from the 2019 National Land Cover Database (NLCD). The NLCD is provided by the Multi-Resolution Land Characteristics (MRLC) consortium, a group of federal agencies who coordinate and generate consistent and relevant land cover information at the national scale. NLCD data is collected by LandSat and has a resolution of 30 meters.

Data Sources:
Boundaries (VCGI, 2016; NH Granit, 2014); Roads (VTrans, 2019); Land Cover generalized from MRLC (NLCD, 2019)



1 inch equals 2 miles



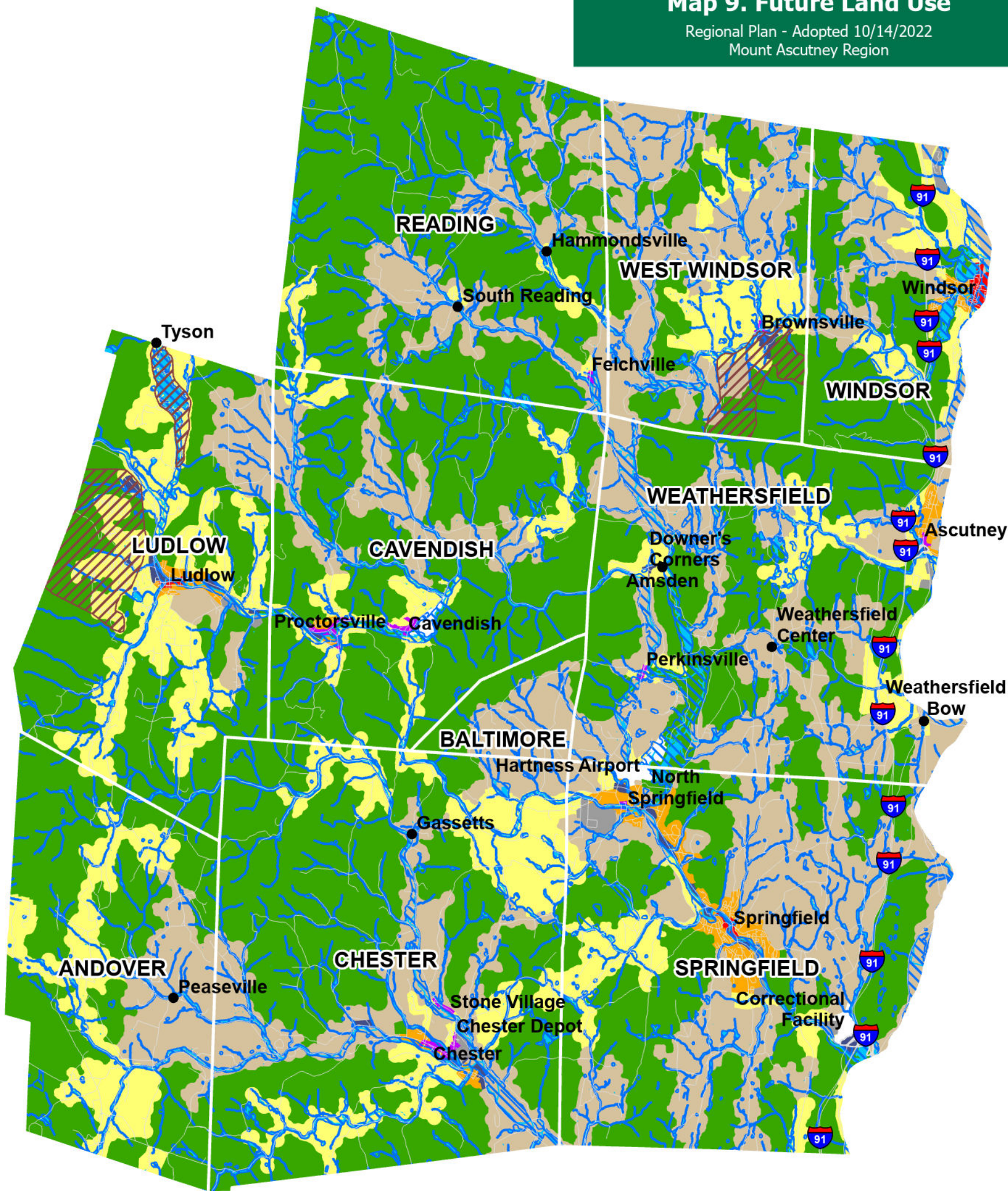
PO Box 320, Ascutney, VT 05030
www.marcvt.org

VT State Plane, Meters, NAD 83

Map drawn January 11, 2022
Plan Adopted: October 14, 2022
Plan Effective: November 18, 2022

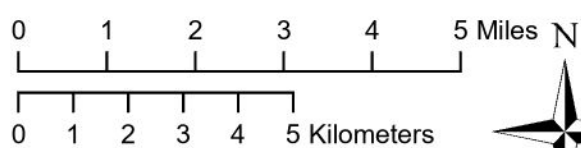
Map 9. Future Land Use

Regional Plan - Adopted 10/14/2022
Mount Ascutney Region



- Hamlet
- ▨ Interchange Overlay
- ▨ Resort/ Recreation Overlay
- ▨ Riparian Overlay
- Commercial Nodes/ Corridors
- Conservation
- Village Centers
- Industrial
- Neighborhood Residential
- Rural Residential
- Special Use Areas
- Town and Regional Centers
- Working Lands

Data Sources:
Boundaries (VCGI, 2016; NH Granit, 2014)



1 inch equals 2 miles



PO Box 320, Ascutney, VT 05030
www.marcvt.org

VT State Plane, Meters, NAD 83

Map drawn: September 25, 2021
Plan Adopted: October 14, 2022
Plan Effective: November 18, 2022

WINDSOR TOWN PLAN

Windsor, Vermont



**Adopted by the Windsor Selectboard
November 12, 2019**

This Town Plan was updated in 2019 by the Windsor Planning Commission with assistance from the Southern Windsor County Regional Planning Commission, Ascutney, VT

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WINDSOR TOWN PLAN

1. INTRODUCTION

ABOUT THE TOWN PLAN

The Windsor Town Plan is a comprehensive municipal development plan in accordance with 24 V.S.A. §4381. This Plan is intended to include all required elements per §4382, to be consistent with State planning goals under §4302, and to be compatible with the Regional Plan and adjacent town plans in accordance with §4350.

The purpose of this Plan is to describe existing conditions and articulate policies and implementation strategies that help to achieve the desired future conditions for Windsor. The primary goal of this Plan is to maintain the historic settlement pattern of a compact downtown area surrounded by a rural countryside as identified in the subsequent sections of this document.

Although the Plan is adopted for five years at a time, it can and should be modified and readopted as often as necessary to meet the changing needs of the Town. The Plan was written through the efforts of the Windsor Planning Commission and the Southern Windsor County Regional Planning Commission, with input from municipal staff and townspeople, and adopted by the Windsor Selectboard.

BACKGROUND

Windsor is a small town in terms of land area (12,544 acres), but has a population of 3,439 residents in 2017 (according to American Community Survey, U.S. Census Bureau). The area to the west of I-91 is mostly a low-density rural countryside, with high density areas to the east of I-91, primarily located in and around the downtown area. Located between Exits 8 and 9, Windsor has good access to I-91. The historic buildings in the Downtown are surrounded by outstanding natural assets, including the Connecticut River, Mount Ascutney State Park, Mill Pond, Lake Runnemede and Paradise Park. A large infrastructure system, built for the large manufacturing industry that thrived in the mid-1900s, serves the more developed parts of Town. Mt. Ascutney Hospital, the Windsor school system and smaller-scale shopping opportunities in Windsor serve the surrounding towns. In recent years Windsor's economy is transitioning away from a large-scale manufacturing center to one with residents increasingly traveling to work in larger surrounding towns. The Town is focused on supporting the existing businesses, revitalizing the Downtown, providing the amenities desired by residents, and attracting new businesses in and around the Downtown where infrastructure exists.

HISTORY

A portion of a letter printed in London in 1797, by John Andrew Graham best describes Windsor in a manner that still holds true today:

Windsor is built immediately on the bank of the river, and is the capital of the county to which it gives its name. The site rises sufficiently to secure houses from any apprehension of being inundated: and a more picturesque, or more commodious or situations for building upon can scarcely be conceived than those formed by the curvatures of the waters along this delightful shore. The houses are of wood, some of them erected with great taste and judgment.... Added to the beauty of its situation Nature has profusely bestowed vast local advantages on this charming spot. Lying on one of the first rivers of the world, and contiguous to, and maintaining a constant and unavoidable

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intercourse with New Hampshire, and the immense country to the North; these circumstances, and industry and enterprising spirit of its inhabitants, the great probability of its increasing population from the accession of fresh numbers drawn thither from other countries (and now states) by the real and solid attractions it holds forth; its rising manufactures; in short, everything unites to increase its consequence and render WINDSOR sooner or later, a grand emporium of commerce and wealth.¹

The bridge built in 1796 is described as follows:

This bridge is universally allowed to be the best and most perfect in AMERICA, and is the first of its kind thrown across the Connecticut River. Later the bridge was even built to be more grand in 1866 as a 'covered bridge.'

The Ascutney Mill Dam was erected in 1834 by the Ascutney Mill Dam Company and is the first masonry, gravity-arch dam built in the United States. The purpose of the dam was to increase the utility and potential of the Mill Brook's waterpower to sites located along the brook by providing a storage reservoir which would regulate the flow of water in the brook and thereby eliminate seasonal irregularities. The Ascutney Mill Dam Company's principal interest in building the dam was to accelerate the industrial growth of the village of Windsor by guaranteeing continuous waterpower. The dam was designated a National Historic Civic Engineering Landmark in 1970.

In this historical background, the assets of the community today are revealed. The beautiful wooden and brick structures, the enterprising spirit, the vast beauty of the location, and the welcome arrival of new manufacturing and business trades still echo the history of the town.

The Birthplace of Vermont

Windsor's original 23,600 acres were chartered by New Hampshire to Samuel Asgley, Jacob Cummings and 57 others on July 6, 1761. The town was named "Windsor" for John Stuart, the Earl of Windsor. At the time, New Hampshire did not have the right to grant these lands but the Province of New York did. However, the lack of clear title did not prevent settlers from building homes, roads and mills. The people immediately sought to be granted a new charter from The Province of New York. Clear titles were secured eleven years later, in 1772.

Windsor is the birthplace of Vermont. The first meetings of the town were held as Province of New York in 1769 but operated under the New Hampshire Charter until 1777. The name Vermont was proposed and approved on June 4, 1777; however, the proposed constitution received no action on this date. A constitutional convention was held in Windsor, starting on July 2, 1777. On July 8, 1777, the delegates retreated from the meeting hall to Elijah's tavern. As the meeting was adjourned, word came that Ticonderoga once again had been seized by the British. A severe thunderstorm followed this news, making it difficult for the delegates to leave. It was then and there that the Vermont Constitution was adopted. A Council of Safety was formed to run the State until government became formally organized. Delegates left to join their militia units and prepared to defend their homes.

In March of 1778 the first meeting of the Vermont Legislature was held at the Windsor Town and Meeting House. In 1781, Windsor was named a town in the State. In 1791, after the Revolutionary War, Congress admitted "Vermont" as the fourteenth state in the Union.

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IMPLEMENTATION PLAN

Implementation of the Windsor Town Plan will be carried out primarily by the Town's legislative body (Selectboard), Department Heads, Development Review Board, and the Planning Commission. The Town will work to achieve the goals described in this Plan by coordinating its efforts on a number of fronts. These efforts will include the following broad implementation recommendations, which are further developed in each section of the Plan:

1. The Town will apply for renewal of Windsor's Downtown Designation in order to further the goals of this Plan.
2. Redefine Windsor's role in the region;
3. Revitalize Downtown Windsor;
4. Review and amend land use regulations (zoning and subdivision regulations, and official map) where appropriate;
5. Refer to the Town Plan when planning additions and improvements to local infrastructure such as local roads and public utilities. Such additions or improvements should be used to plan for appropriate growth and development;
6. Implementation of sewer and water allocation policies;
7. Use tax policy and tax stabilization contracts to further goals of this Town Plan;
8. Maintain an up-to-date Capital Budget and Program;
9. Capital expenditures on municipal services to further goals of this Town Plan;
10. Participate in regional and state-wide planning initiatives, including regional planning, solid waste, transportation and economic development;
11. Participate in Act 250 proceedings;
12. Participate in Section 248 proceedings (resulting in a Certificate of Public Good issued by the Public Service Board);
13. Work with public and private entities to help them design development or resource management plans in ways that will further the goals of this Plan;
14. Continue to plan and work to conserve important resource lands; and,
15. Work with the Regional Planning Commission on evaluating and addressing local housing needs.
16. Engage in coordinated planning efforts with surrounding towns on issues of mutual interest, such as evaluating regionalized municipal or school services, multi-town recreational facilities (i.e. trail networks), and transit services between Exits 8 and 9.

Appendix B contains an Implementation Matrix that lists municipal capital needs. The Matrix will provide a basis for municipal efforts to implement important action steps identified in this plan. The Matrix should also be consistent with the town's Capital Budget and Program. Implementation of the plan will also be completed through the recommendations found throughout this document.

The Plan will be implemented in less direct ways, as well. It is hoped that landowners and private developers will use the document when designing projects (e.g. adaptation/renovation, in-fill development). The Plan can be used to express local concerns to state agencies when they create planning and resource management policies and programs. It can also be used to demonstrate local foresight and commitment when applying for state and federal funding for planning, development, and infrastructure improvement projects.

The Planning Commission must carefully monitor changing conditions – this includes declining population, aging population, and other trends – in the Town and amend the Plan and Zoning Regulations in accordance with the changing needs of the community.

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WINDSOR'S RELATIONSHIP TO THE REGION

Windsor borders New Hampshire, via the Connecticut River, at the Towns of Cornish and Plainfield. Windsor's Vermont neighbors are Weathersfield, West Windsor, and Hartland. Of this cluster of towns, only Windsor has: a regional hospital; a downtown area equipped with infrastructure (i.e. public water and sewer, extensive sidewalk network, etc.); a modern industrial park; full time police, fire, and ambulance services; and a high school that also serves surrounding towns. In addition, Windsor's downtown offers a concentration of retail opportunities to shoppers, including a supermarket, drug store and pharmacy, none of which are available in neighboring towns. The geographic location of Windsor's downtown is such that, with the exception of US Route 5, most of Windsor's borders with its neighbors are rural and wooded.

The Town Plans of the neighboring Vermont communities were evaluated for compatibility along the shared town boundaries (see below).

Hartland

Hartland's Town Plan calls for a *Rural* future land use category along most of Windsor's town line, with a small section designated as *I-91 Interchange* along US Route 5. The corresponding future land use categories in Windsor include: *Conservation* between the railroad and Connecticut River, *Industrial* immediately to the west of the railroad track, and *Rural* along the remaining area. The *Industrial* designation reflects the existing land uses in Windsor's Industrial Park (i.e. Artisans Park). The 2013 Windsor Town Plan eliminated the former *Mixed Use* category along the US Route 5 border with Hartland. Policies were added to improve compatibility with Hartland's Town Plan and access management provisions were added to discourage strip commercial development in this area.

Weathersfield

The future land uses in Weathersfield's Town Plan mostly consist of *Conservation* along the Windsor town line. A combination of *Open and Agricultural* as well as *Rural* categories are located by the town line and along the US Route 5 corridor. Windsor's Land Use Chapter includes a *Conservation* designation that is consistent with the State park and Weathersfield's Town Plan. It reduced the size of the *Industrial* category to reflect the existing uses (i.e. Biebel Builders, Miller Construction) just north of the Weathersfield town line. The Town Plan also includes policies that seek to allow for this current type of use, while minimizing the impacts on Weathersfield neighbors. These changes improve compatibility with Weathersfield's Town Plan, and this designation does not appear to significantly reduce the desired effect of implementing that Plan.

West Windsor

West Windsor's Town Plan designates the following future land uses along the Windsor town line: *Conservation* along the State Park area, *Village/Primary Growth/Affordable-Moderate Housing Overlay* along the VT Route 44/sewer line corridor, *Secondary Growth/Residential* located in the Brook Road and Coon Club Road areas, and *Rural Residential* along the northerly boundary with Windsor. Windsor's future land use designations include *Conservation* (e.g. State Park, Grasslands Wildlife Management Area), *Agriculture and Open Land* along Brook Road and Hunt Road), and *Rural* in the remaining areas. Windsor's designations do not reduce the desired effect of implementing West Windsor's Plan.

This Windsor Town Plan offers goals and recommendations which should lead to a better future for Windsor as well as its neighbors. The planning goals of surrounding towns, and a recognition that Windsor provides many services for the region as a whole, should be considered when implementing and updating this Plan. The time for Windsor to be a major source of influence beyond its immediate

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neighbors has come, gone, and will come again when economic forces so dictate. Until such time, Windsor will pride itself on being a good neighbor and a good place to live.

However, Windsor and the surrounding towns would benefit from coordinated planning efforts, such as evaluating regional municipal services (e.g. multi-jurisdictional police force, regional water or sewer services, etc.), connections to establish outdoor recreational facilities that connect multiple towns (e.g. mountain bicycling trails around Mount Ascutney), linking transportation facilities and transit services between Exits 8 and 9 in order to better serve all affected towns, and consideration of designating the Windsor High School to serve area towns.

Southern Windsor County Regional Plan

Windsor's Town Plan is compatible with the 2018 Southern Windsor County Regional Plan as both documents call for maintaining the historic settlement pattern of Windsor's downtown area to be surrounded by a rural countryside. Windsor's Downtown and Residential future land use categories correspond with the Regional Center and Medium-Density Neighborhood categories in the Regional Plan. The industrial areas in both documents are compatible. Windsor's Town Plan encourages non-residential uses in the Roadside category along US Route 5 North, while the Regional Plan does not. However, Windsor's Town Plan includes provisions to limit strip commercial development in these areas and reduce negative impacts on the Downtown. Both the Regional Plan and Windsor's Town Plan call for a rural, working landscape in the rest of the community. Based upon this analysis, Windsor's Town Plan does not significantly reduce the desired effect of the implementation of the Regional Plan.

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7. LAND USE

PURPOSE

This chapter documents existing land use patterns and articulates the desired future growth patterns for the Town of Windsor in accordance with 24 V.S.A. §4382(a)(2).

A community rich in history, Windsor is the birthplace of Vermont and is notable for the precision manufacturing industry that was the foundation for the American industrial revolution in the 1800s. While manufacturing is still an important component of the local economy, Windsor has largely transitioned in recent years into a bedroom community for people employed in the Upper Valley.

Windsor's walkable historic downtown, surrounded by a rural countryside is a rare, real-world example of the State planning goal to "maintain the historic settlement pattern of compact village...separated by rural countryside" [24 V.S.A. §4302(c)(1)]. The downtown is surrounded by outstanding natural and recreational assets, such as the Connecticut River, Mill Pond, Runnemedede Pond, Paradise Park and Mt. Ascutney State Park. The Downtown Master Plan completed in 2012 explores what is possible when focusing redevelopment efforts on the downtown area, along with strategic infrastructure investments.

EXISTING LAND USE

Land use patterns in Windsor have developed naturally in a classic village pattern. There is a downtown commercial center near the Connecticut River with industrial uses nearby. The downtown is home to many beautiful historic buildings. Immediately outside of the downtown and to the west of Route 5 are high- and medium-density residential neighborhoods, sprinkled heavily with historic structures. Beyond these neighborhoods are rural areas, where large residential lots are the rule, with substantial farmland and forested areas. All of the high-density residential areas are served by Town water and sewer, as are most of the medium-density residential areas, and portions of the rural residential areas along County Road and Route 44. The density of development and population is highest in and around downtown, and tapers off to the north, south, and west. The Interstate highway generally separates the densely developed areas from the rural countryside that consists of forests, farms, and rural settlements that are generally limited by steep slopes and other natural constraints.

Discussed below, and shown on the Existing Land Use Map which is included with this Plan, is an illustration of existing development patterns.

Downtown

Historic buildings line the streets in Windsor. The original site of the town center is where the legion hall stands today. It is characterized by the village green on the north side of State Street. A granite marker, south of the Congregational Church, was the spot of the first meetinghouse until 1798.

Downtown Windsor is easily accessible by foot. Banking, restaurants, retail shops, professional services are located within downtown, and schools and the Mount Ascutney Hospital are located within a half mile of downtown. This area is served by infrastructure, including sidewalks, on-street parking, Amtrak rail station, and public water and sewer services. Connecticut River Transit provides public transportation services for Upper Valley-bound commuters as well as dial-a-ride services for medical appointments and similar trips.

The Downtown Master Plan identifies neighborhoods that combine to create the downtown area, including the following:

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- Central Business District (CBD) along Main Street where dense, multi-storied buildings support commercial uses on the ground floor with offices or residential uses on the second and third floors.
- North Main Street comprises an area between the CBD and Price Chopper, with many large historic homes and a mix of museums, inns, residences and professional offices.
- South Main Street extends from the CBD to Lowell Street and includes a mix of uses, including churches, professional offices, commercial uses, museums, and residences.
- Court Street Square and the surrounding historic neighborhood along State Street include residential and civic uses in many notable historic buildings.
- The Bridge Street neighborhood is between the Cornish Windsor Covered Bridge and the New England Central Railroad tracks. This area includes a number of historic homes, but it is largely located in the floodway. Buildings along much of this road are subject to the flood hazard regulations.
- Riverfront includes areas along River Street east of the railroad tracks and the Jarvis Street neighborhood. Similar to Bridge Street, this area is located within either floodway or floodplain zones, and is subject to local flood hazard regulations.
- Industrial heritage area includes a few large industrial sites located between the railroad track and the Connecticut River, including Goodyear, Cone-Blanchard and the railyard area. While redevelopment is subject to floodplain-related local standards, there is significant potential for redevelopment. Portions of this area are active in the regional and state brownfield cleanup programs.

A number of local initiatives and rules are in place for all or portions of this downtown future land use area, including the following:

- **Downtown Program Designation:** In 1999, Windsor applied to the Vermont Downtown Board to include the downtown historic district, Court Square and the Industrial Heritage area (formerly known as Rails-to-Riverfront) as a “Designated Downtown.” Designated downtowns are eligible for state grants and tax credits through the Downtown Program and receive priority for state and federal funds. (See the Downtown District boundary on the Future Land Use Map.) Designation under this program is a highly valuable tool for implementing many aspects of this Plan. Designation was last renewed in 2016. See the Economic Development Chapter for more discussion.
- **Design Review District:** In 2005, the Selectboard adopted an expanded Design Review District to encompass the entire designated downtown district, in accordance with an amendment to state enabling legislation requiring that the boundaries of the Design Review District must coincide with those of the designated downtown. Buildings within this District are subject to the applicable design review standards in the Zoning Ordinance and the Design Review Guidelines.
- **Windsor Village Historic District:** The historic district in Windsor was expanded in 2014 to include 360 buildings, and is now the second largest historic district in Vermont. See the Historic Preservation section in Chapter 8 for more detail.
- **Certified Local Government:** Windsor is designated as a Certified Local Government (CLG). A 1980 amendment to the National Historic Preservation Act of 1966 requires that at least 10% of states’ Historic Preservation Funds be given to CLGs. A local government becomes eligible for this program when the State Historic Preservation Officer (SHPO) certifies that the local government has established its own historic preservation commission and a program that meets state and federal standards. In addition to being eligible for

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matching survey and planning grants, CLGs review nominations of National Historic Register properties within their jurisdictions and provide local perspective to the plans and programs of the VT Division of Historic Preservation.

Residential

Residential development is most concentrated surrounding Windsor's downtown where the most municipal services are provided. There is a mix of single- and multi-family housing with single-family housing becoming prevalent immediately west of Route 5. Minimum lot sizes range from 7,000 to 12,000 square feet allowed by existing zoning standards for locations served by public water and sewer. In the further reaches of the town, low-density residential development predominates, and is permitted by current zoning, in minimum lot sizes ranging from 40,000 square feet to 25 acres.

US Route 5 Corridor

US Route 5 connects Windsor to I-91 to the north at Exit 9 in Hartland and at Exit 8 in Ascutney to the south. Sections of US Route 5 both north and south of downtown are notable for clusters of single-family residences and scenic farm land. Development along the Roadside Business and Industrial zoning districts is starting to look like typical strip commercial development. However, there are a number of opportunities for redevelopment along this corridor in ways that improve this situation, as articulated in the future land use section.

VT Route 44 Corridor

VT Route 44 is the western approach to Windsor, and connects to Ascutney State Park, and the Towns of West Windsor, Reading and Woodstock. This is an important access to the Ascutney Mountain Resort, once it reopens. Most of the land along this road is developed as small residential lots, and has topography or natural features that limit commercial development options. A sewer force main line runs along this corridor servicing the ski resort area, but it does not currently serve the rural areas located between downtown and the resort. A small cluster of residences is located around the area roughly defined by the area near VT Routes 44 and 44A, Cole Hill Road, and a portion of Brook Road. Scenic fields and prime or statewide important agricultural soils are found along much this corridor.

Industrial Areas

Industrial activities have historically occurred in three areas, all between Route 5 and the Connecticut River. The Windsor Industrial Park (i.e. Artisans Park) consists of a total of 23.6 acres. Businesses in the park currently include Simon Pearce Glassblowing and Pottery, Harpoon Brewery, Lebanon Screw Products, Land Air Express, Vermont Farmstead Cheese Company, and American Crafted Spirits Distillery. This area also houses a canoe rental establishment and a garden for visitors to stroll through. The remainder of a permitted Planned Unit Development may still be developed. The Windsor Industrial Park now offers recreation and amenities, and in addition allows visitors to view pottery, glass-blowing and beer-making operations in action. Industrial uses are also allowed on Route 5 to the south of the industrial park, where they have access to town water and sewer, as well as easy access to the Interstate.

The second industrial area is a tract of land immediately north of the Weathersfield town line which is currently occupied by Biebel Builders and Miller Construction. It is not fully utilized, but may be the best location for heavier industrial development. However, industrial uses can have a dramatic impact on neighboring non-industrial uses. Special consideration should be given to how these uses impact neighboring Weathersfield.

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The third industrial area is discussed as the Industrial Heritage area in downtown. This area was the historical core of the local manufacturing area. It is now occupied by older industrial buildings that are currently occupied, but underused. Seldon Technology, a nanotechnology firm, occupies a portion of the former Cone manufacturing building. Several small manufacturers, woodworkers, recycling center, offices and retail uses occupy buildings on the former Goodyear campus.

Agricultural and Open

Agriculture in Vermont has been on the decline for many years but now appears to be growing. Windsor typifies this change. The largest tracts of prime agricultural land in town lie in the flood plain along the Connecticut River both north and south of the downtown area. These strips of good, usable farmland are valuable not only for their agricultural function, but also for their scenic and cultural significance along the Connecticut River Corridor and for their capacity to store and convey flood waters.

The farmlands along US Route 5 north and south are noteworthy not only as quality agricultural soils, but also as scenic resources. These fields communicate a visual transition between the more built up downtown and roadside business district areas, with the rural portion of town.

Since even “postage stamp” gardens can produce significant yields of fruits and vegetables to their owners, agricultural uses of any scale should be encouraged in every part of town. Roadside stands and farmers' markets for selling locally grown produce should be supported by the community.

Prime farmland and soils of statewide importance are identified based on county-based soils mapping data and USDA definitions. Not all of these mapped areas may be economically viable for farming and, therefore, may be well suited for development, especially in close proximity to the downtown. Additional scientific and economic information may be required to refine these areas and to determine if mitigation efforts are warranted for developments on a case by case basis.

Open fields contribute to the valued scenic resources in Town, affording dramatic views of the Connecticut River, Mt. Ascutney and other resources. Open fields are also beneficial as wildlife habitat.

Outdoor Recreation and Forest Lands

Nearly one-third of Windsor’s total land area is publicly-owned, a large proportion of which is owned by the State. In the northwestern part of town, the State owns 946 acres on which the former Southeast State Correctional Facility and the Grasslands Wildlife Management Area is located. Most of this land consists of woods and open fields, and is available for outdoor recreational uses. In the southern part of town, Mt. Ascutney State Park covers 2,333 acres of land, most of which is wooded and is used for outdoor recreational purposes. Town-owned recreation lands, such as the Mill Pond beach area, Paradise Park, and the Fairgrounds, are discussed in the Public Lands and Recreation sections of the Municipal Services/Utilities and Facilities portion of this Plan. Although these lands do not directly contribute to the local tax base, they generally do not require local expenditures to provide services. In addition, they contribute toward rural character, protect water quality and provide opportunities for outdoor recreation. The economics of outdoor recreation are notable; see the Mount Ascutney Outdoor Recreation Plan for more details. Despite the abundance of forest and recreation lands in Windsor, Town-owned access to the Connecticut River is lacking.

FUTURE LAND USE

In accordance with the State Planning Goals, growth is desired to further the existing settlement patterns by concentrating most commercial and civic uses as well as multi-family residential in the

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downtown and surrounding residential areas where infrastructure supports such densities, and maintaining a rural countryside in the surrounding areas to support a working landscape and low-density residential uses and home occupations. Industrial uses are desired in those locations shown on the future land use map and discussed below. Non-residential uses located outside of the downtown shall take measures to avoid or mitigate strip commercial development as discussed below. The Downtown Master Plan provides specific ideas for growth in the downtown, including infrastructure improvements to support such growth.

The Future Land Use map is a representation of the general land use patterns that the Town would like to see develop in the years to come. The future land use designations described below correspond with the designations included on the Future Land Use map. Together, this information is intended to show the types and relative concentrations of development that are most appropriate for different parts of Windsor. This information is meant to:

1. Guide and update effective implementation of local bylaws;
2. Give clear guidance on local priorities in state planning and regulatory proceedings; and,
3. Provide landowners and developers with a tool that will help them locate and design projects in efficient and locally acceptable ways.

Downtown

This area, including a number of discrete neighborhoods that combine to represent the traditional center of the community, is served by infrastructure allowing for the highest densities in Town and encourages travel by walking, bicycling and public transit. All of the following desired traits shall apply to the downtown area:

- a) Served by public water and sewer;
- b) Served by sidewalks, bicycle lanes, bicycle parking, bus stops;
- c) Served by on-street parking; off-street parking, when needed, shall be located to the side or rear of buildings;
- d) Pedestrian building orientation; new developments shall not be auto-oriented or result in strip development patterns;
- e) Existing buildings that are substantially redeveloped (i.e. knock-down, rebuild) shall incorporate site design techniques to meet the desired character of the area, including points (c) and (d) above;
- f) This area shall be the primary location in Town for commercial activities, such as retail, and civic uses typical for downtown areas;

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- g) Design review is required per the Zoning Ordinance in order to maintain historical character.

Downtown Neighborhoods: In addition to the desired downtown traits as described above, desired future conditions for each sub-category shall be as described below.

Central Business District (Downtown)

This area shall continue to serve as the commercial center of the community in accordance with the following desired attributes:

- a) Highest densities in Town (5,000 square feet minimum lot size);
- b) No setbacks/buildings are built along the edge of sidewalks;
- c) Relaxation of parking standards for existing buildings;
- d) New parking lots shall not front Main Street; existing parking lots that front Main Street shall provide landscaping or other improvements for a change or expansion of use;
- e) Mixed use buildings:
 - 1) Primary first floor use is commercial or professional offices;
 - 2) Second and third floor are used for apartments or professional offices;
 - 3) On side streets, mixed use buildings may allow residential uses on the first level as long as a conversion to commercial or office space is enabled;
- f) Public and recreational uses.
- g) North Main Street (Downtown)

The primary objective for North Main Street is to preserve the historic character. This portion of the downtown shall primarily allow for the adaptive reuse of the existing large, historic homes while maintaining the existing character of the area. The following attributes apply to this area:

- a) Moderate to high density (7,000 square feet minimum lot size); Desired uses include:
 - 1) A mix of residential uses (i.e. single-family, two-family, and multi-family units);
 - 2) Professional offices;
 - 3) Civic uses (e.g. museum, etc.);
 - 4) Inns and bed and breakfasts;
- b) Restaurants without drive-through windows;
- c) Maintain historic character and existing land use patterns, including the existing tree canopy along Main Street;
- d) Adaptive reuses are encouraged, but shall not undermine the historical character of buildings, including historically significant interior features.

South Main Street (Downtown)

This area currently serves a mix of uses including professional offices, churches, museum, restaurants, gas stations, banks and apartments. In-fill development and investments in some of the existing buildings is desired. This area is intended to facilitate a continuation of the traditional village center, but at slightly lower densities than the CBD. The following attributes apply to this area:

- a) High density (5,000-7,000 square feet minimum lot size)
- b) Desired uses include:
 - 1) A mix of residential uses (i.e. single-family, two-family, and multi-family units)
 - 2) Professional offices
 - 3) Civic uses (i.e. post office, museum, etc.)
 - 4) Inns and bed and breakfasts
 - 5) Restaurants without drive-through windows
- c) Maintain historic character where appropriate or improve the existing character to be more in keeping with the desired downtown traits
- d) In-fill development is desired as identified in the Downtown Master Plan

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Industrial Heritage (Downtown)

This area is comprised of the former Goodyear and Cone-Blanchard sites as well as the Windsor Railyards area. The following attributes apply to this area:

- a) High density (5,000 square feet minimum lot size);
- b) Redevelopment is desired as identified in the Downtown Master Plan;
- c) Desired uses include:
 - 1) Retail;
 - 2) Professional offices;
 - 3) Civic uses;
 - 4) Inns and bed and breakfasts;
 - 5) Bars and restaurants without drive-through windows;
 - 6) Cultural facilities;
 - 7) A mix of residential uses (i.e. single-family, two-family, and multi-family units);
 - 8) Light industrial uses that are compatible with residential and other existing adjacent uses;
 - 9) Solar farms are desired in this area, but only if they are incorporated into a design that is in keeping with the desired character of the area (e.g. roof-mounted, built onto the existing Goodyear slab, etc.);
- d) Maintain historic character where appropriate or improve the existing character in order to be more in keeping with the desired downtown traits;
- e) Where appropriate, development in this area is subject to local flood hazard regulations
- f) Construction or improvement of a recreational path along the Connecticut River, including recreational access to the River.

Court Square and State Street Area (Downtown)

This area currently serves a mix of uses including single-family residential, apartments, the square, churches, library, and other compatible uses. The following attributes apply to this area:

- a) Moderate to high density (7,000 square feet minimum lot size)
- b) Maintain the character of this residential neighborhood with the existing mix of compatible uses
- c) Maintain the historic character, including the existing tree canopy

Riverfront and Bridge Street Neighborhoods (Downtown)

For the purposes of this document, these two neighborhoods generally have the same desired future conditions. The intent of this area is to maintain and improve the existing buildings and neighborhood, and mitigate against flood hazards. The following attributes apply to this area:

- a) Allow for the active and safe use of existing buildings;
- b) Where appropriate, development in this area is subject to local flood hazard regulations;
- c) Construction or improvement of a recreational path along the Connecticut River, including recreational access to the River.

Roadside

Historically, these were rural areas that, combined with the other sections along US Route 5 North, served as an attractive gateway into Windsor from the north. In the last few decades, these transitional areas are developing a mix of uses that are not, in their current form, desirable. There are a few distinct areas along US Route 5 north of downtown that currently have a mix of non-residential uses and exhibit emerging strip commercial development patterns, including the following areas:

- a) Price Chopper plaza area – this is an area severely impacted by flood issues. Due to the essential services located here (i.e. supermarket, hardware store), great attention should be given to provide a pathway for the continuation of these services in the future.

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- b) Roadside Business Zoning District – a wide variety of existing land uses are present in this area, such as small engine repair, restaurant, the Barn People, mobile home park, and a gas station.
- c) The area between the golf course and Industrial Park includes existing uses such as contractor yards, fuel distribution and quarry gravel pit which is effectively played out.

The recent transitional development detracts from both rural character and the visual effect of the northerly gateway into Windsor. In order to improve this situation, these areas shall be subject to special design considerations under site plan or conditional use review, and development of this type is to be limited in nodes in order to avoid spreading out along the entire highway corridor. In addition, industrial-type uses (e.g. contractor yards, fuel distribution and similar uses) must provide landscaping and screening in order to reduce the visual impact of travelers along US Route 5 and adjacent properties. Travelers' services, such as gas stations and automotive repair, may be suitable in these areas as long as they provide landscaping and screening as noted above. Retail and other businesses that are compatible with Vermont's so-called "Downtown Initiative" shall locate within Windsor's downtown, not in these Roadside areas. Development that meets the definition of strip commercial development – which exhibits auto-oriented designs such as parking in the front, large internally-lit signs, and big box-type siting of structures – are not appropriate in these areas. Traveler services and similar uses will be allowed if they provide pedestrian-oriented design, which shall include siting the building close to the roadway, providing parking to the rear or side of the building, and similar techniques. These areas are also subject to the access management requirements noted in the special considerations section.

Residential

The residential designation provides an area for residential and other compatible uses at moderate- to high-densities, as appropriate for the physical characteristics of the land and the availability of community facilities and services. Residential land uses will predominate within these areas, but dispersed agricultural and open land, small-scale neighborhood stores and/or home based businesses, and country inns and Bed & Breakfasts may be appropriate within some residential areas. In some rural areas, where preservation of open lands, wildlife habitat, or scenic views is a priority, cluster development is the preferred development approach for any large development. Smaller developments are encouraged to protect these resources and shall be consistent with historic settlement patterns.

Industrial

The industrial designation makes provision for uses which are inappropriate for commercial or residential areas. The overriding use within the industrial area will be light industry, including light manufacturing or related "See it Made" uses. There may be a few remaining residences within the industrial area; however, future residential development is to be discouraged. Industrial uses shall limit negative impacts on neighboring non-industrial uses by providing landscaping or screening and meeting the other performance standards in the zoning bylaws.

Rural

This category includes rural areas that are generally comprised of larger tracts of land which are best suited to maintaining rural character and supporting outdoor recreation or working landscape activities, including farming and sustainable forestry. Many of the forested areas provide valuable wildlife habitat. Low-density residential and home occupations are also allowed in these areas. Development densities shall depend on several factors, including

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proximity to major roadways and infrastructure, and environmental constraints, such as topography, wetlands, prime agricultural soils, important wildlife habitat, site suitability for on-site water and sewage disposal, and other factors. Larger developments shall not be allowed in these areas unless approved as Planned Unit Developments (PUDs) that allow for increased densities of the houses in order to preserve the majority of prime agricultural soils and/or large tracts of forested lands in order to minimize fragmentation.

Conservation

This area is designated for conservation or preservation based on unique environmental characteristics, such as wetlands, shorelines, flood hazard areas, rare and endangered plant and animal species, aquifer recharge areas or a combination of important environmental characteristics. This area also includes publicly-owned lands that are designated for outdoor recreation, agriculture, forestry or other civic uses. This designation consists of areas designated for large-scale outdoor recreation, including but not limited to hiking, camping and snowmobiling. Other varied land uses may occur in these areas, but will be comprised primarily of very low density residential, agricultural and forestry uses. Very low density residential uses may be allowed, but shall be located to the periphery of important natural resources as noted above and identified in this Plan. Any commercial services provided within this designation will directly support the outdoor recreation activity.

Overlays

Farmlands and Open Fields

These areas include a combination of prime agricultural soils, agricultural soils of statewide importance, active farmlands and open fields. These areas are valued for their existing and future farming uses, as well as their contribution toward rural character. In these areas, clustered or low density development may occur as long as it maximizes the area of land on which economically viable agricultural uses may occur (including forestry, tree farms, and other horticultural activities). Development plans should also consider the aesthetic and rural nature of these areas. Innovative site plans may be required to protect these features. Strong consideration will be given to maintaining healthy, local food production.

Forest Blocks

This overlay category consists of larger, priority forest blocks and connections between them that provide important wildlife and ecological functions as discussed in more detail in Chapter 8. Ascutney State Park and the Grasslands Wildlife Management Area include large areas of forested lands, which are part of a larger complex of forest blocks that serve a very important function for wildlife connections between VT and NH. Development within this overlay shall be designed and constructed in a way that avoids or minimizes fragmentation and parcelization of these priority forest blocks and habitat connectors.

Special Considerations

Special Design Considerations. The area between I-91 and the Connecticut River due to site conditions and being located in close proximity to public water and sewer infrastructure, invite more intensive developments. Therefore, land development is subject to special design considerations (i.e. site designs, development/building envelopes, building pattern, minimum densities, landscaping, etc.) in order to encourage appropriate types of uses while avoiding strip commercial development patterns. Development in these areas shall be consistent with Smart Growth Principles as defined in 24 V.S.A. §2791(13). Buildings and roads will be sited in order

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to achieve pedestrian-oriented designs, minimize strip commercial development, avoid irregular shaped lots, promote safe pedestrian accommodations, and minimize impacts to natural resources such as steep slopes, prime agricultural soils, wetlands, significant wildlife habitat areas, flood hazard areas and other development constraints. Minimum densities and site appropriate setbacks may be considered by the Development Review Board.

Access Management. Development along the US Route 5 North corridor is also subject to access management and setback considerations in order to reduce strip-like developments, require new parking areas to locate to the side or rear of buildings, minimize curb cuts/promote shared access, and not adversely affect traffic safety. This area currently exhibits emerging strip development land use patterns. Developments and re-developments along Route 5 should incorporate sound access management practices. VTrans' standards within their Access Management Design Guidelines shall apply to all developments in this area. New developments will share driveways and access roads or seek direct access from side roads to the greatest extent possible.

Ridgelines and Prominent Knolls. Any development which is proposed at moderate and high elevations and along ridgeline or other prominent knolls should demonstrate that measures have been taken so as the development is not visually obtrusive to surrounding and distant neighbors or from public roadways.

Flood Hazards. All development located within the FEMA special flood hazard areas is subject to flood hazard review in accordance with the Windsor Zoning Ordinance. These special flood hazard areas are primarily subject to inundation flooding. Conservation of the broad floodplains along the Connecticut River, including extensive farmland north and south of downtown, will maintain flood storage capacity, which will help mitigate flooding in the lower elevations of the downtown area.

During Tropical Storm Irene, significant erosion damages were sustained in other areas along the Mill Brook. The SWCRPC is currently beginning a stream geomorphic assessment which will help to determine where the river erosion hazard areas are located. Until that process is complete, residents are advised not to build new structures in flood or erosion prone areas of the Mill Brook in particular.

TIMING AND SEQUENCE OF DEVELOPMENT

One of the most important aspects of planning for future land use patterns is coordination of public investments in local infrastructure. By directing development within the guidelines of the Future Land Use map, the Town can ensure that future investments in roads, water and sewer lines, sidewalks, etc., will not place an unnecessary burden on taxpayers. Conversely, if the Town has an idea of where different types of growth should occur, it can construct utilities and other services in advance, as a way to attract development to Windsor while maintaining some control over its pace and location. Development in any land use designation must be carefully planned in order to maintain the outstanding natural resource characteristics of the area.

The Future Land Use map is based in large part on two important ideas: first, that historical development patterns are what make Windsor attractive, and will foster a healthy economy, strong community spirit, and a stable and affordable tax structure; second, that the most intensive development (commercial, industrial, and medium- to large-scale residential) should occur first and at the fastest pace in and around established and designated centers of these activities. Retail and civic uses shall occur in the downtown

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and surrounding area that is served by water and sewer. Outlying areas should grow at a slower pace, and should see relatively low-intensity and low-density uses.

Goal

- 1) Preserve the historic development pattern of a compact mixed-use village areas surrounded by open land, agriculture, forest and low-density residential uses.

Policies

- 1) Future development shall be consistent with the future land use categories and map.
- 2) Develop only those land use regulations necessary to protect and preserve the health, safety, and welfare of residents and visitors, Windsor's economic viability, and important natural and historic resources, and to effectively reduce municipal costs to support development.
- 3) Intensive growth shall be directed to those areas along major roads and served by existing or planned public water and sewer infrastructure. Where infrastructure expansions are planned, the developer shall pay their proportional share of the necessary expansion costs.
- 4) Ensure that the pace of development correlates with the Town's ability to provide necessary public services, through the use of bylaws and through strategic investment in public infrastructure.
- 5) Direct the placement of appropriate governmental buildings, such as municipal offices, state offices, and Post Offices, to downtown areas, and utilize existing space whenever possible.
- 6) Develop a diverse economic base that will provide jobs, grow the Grand List, increase the number of users of water and sewer services, and have no undue adverse affect on surrounding neighborhoods.
- 7) Efforts to revitalize and redevelop the former industrial and commercial base within the designated downtown shall enhance the vitality and livability of the downtown while restoring employment opportunities for local residents.
- 8) Where development encroaches unnecessarily on forestlands, farmlands, wildlife habitat and/or wildlife travel corridors, development shall cluster or locate to the periphery in order to minimize fragmentation. Planned unit development review shall be required for large developments or developments on large tracts of land.
- 9) Development on large lots in rural areas shall be designed to focus development activities along existing roadways and on portions of land that have the least constraints (i.e. minimize disturbance of water courses, wetlands, steep slopes and other constraints).
- 10) Encourage shared driveways for developments off VT Route 44 outside of the village.

Recommendations

- 1) Review and revise the zoning, subdivision and flood hazard bylaws to ensure conformance with the Town Plan. Explore ways to streamline the local permitting process for desirable projects that are consistent with the future land use categories and map.
- 2) Seek funding to translate the Downtown Master Plan into a Smart Code, Form Based Code or other innovative land use regulation in order to better guide development in the Downtown area.
- 3) Develop special review standards and procedures for development along US Route 5 North in accordance with the Special Considerations in this Chapter.
- 4) Regularly update the Capital Budget and Program to reflect the goals of this Plan.
- 5) Coordinate local land use planning activities with local conservation and recreation groups, local and regional economic development agencies, and historic preservation groups.
- 6) Actively explore cooperative agreements between landowners and the Town to meet on-street

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- and off-street public parking needs. Provide adequate signage to clearly direct visitors to public parking areas.
- 7) Review permit applications for commercial developments outside the downtown area with the potential impacts on the downtown business climate in mind.
 - 8) Actively encourage downtown revitalization and scenic byway beautification programs and projects.
 - 9) Seek easements or land purchases to gain public access to the Connecticut River-
 - 10) Promote the development of a Connecticut River Corridor Greenway through Windsor.
 - 11) The removal of any additional lands from the tax rolls must be very carefully considered, especially with regard to the likely impact on the remaining tax base.
 - 12) Invite and actively encourage public participation in local planning and development activities.
 - 13) Develop an open space plan in order to lay out priorities for open space preservation and protection, including the identification of economically viable farmlands.
 - 14) Work with the Vermont Department of Fish and Wildlife and Southern Windsor County Regional Planning Commission to refine the wildlife habitat map and identify important wildlife travel corridors.
 - 15) Seek improvements to non-motorized connections between recreational facilities, civic areas and residential areas.
 - 16) Consider establishing impact fees to help finance the Capital Budget and Program.
 - 17) Maintain designation in Vermont's Downtown Program in order to provide tools that help to implement goals of this Town Plan.
 - 18) The Town should continue to develop planning approaches aimed at protecting and maintaining the current rural nature of all lands west of I-91, and strive to focus any significant development to appropriate areas in and around Downtown.
 - 19) Consider all of the areas currently identified as Industrial to see if the classification is still seen as the best and highest use.

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8. NATURAL, SCENIC AND CULTURAL RESOURCES

GROUNDWATER/WELLHEAD PROTECTION AREAS (WHPA)

Groundwater is the primary source for drinking water in Windsor, and has many points of exchange both to and from surface water systems. Maintaining good quality and adequate quantities of groundwater are important considerations for preserving the public health and safety.

Windsor’s municipal water supply comes from wells on Pumping Station Road near Lake Runnemede. The wells are fed by a “confined unconsolidated aquifer,” as defined by the Vermont Department of Environmental Conservation, Water Supply Division. The Water Supply Division identifies Public Water Source Protection Areas for each Public water system source. Groundwater sources are protected through the delineation of Wellhead Protection Areas (WHPAs), which “include recharge areas, transmission zones and groundwater storage areas.” The approximate area of a WHPA, which the Water Supply Division defines as “the surface and subsurface area surrounding a water-well or field, supplying a Public water system, through which contaminants are likely to move toward and reach such water well or field,” is 175 acres. This area for the municipal WHPA encompasses Lake Runnemede, a large portion of Paradise Park, and sections of high and medium density residential neighborhoods (see map in Appendix). All buildings within the municipal WHPA are served by Town water and sewer. If properly protected, this abundant source of excellent drinking water should provide for Windsor’s community water needs well into the future.

Contamination at brownfield sites may impact the quality of groundwater and the public drinking supply. The Town is actively engaged in the regional Brownfields Program, and should continue to monitor and seek funding to cleanup these contamination sites.

WHPAs serving smaller populations are established for the Southeast State Corrections Facility and the Mt. Ascutney Trailer Park.

Goal

- 1) Preserve the integrity and security of aquifers and maintain the sustainability of Windsor’s groundwater resources.

Policies

- 1) Protect Windsor’s community water supply by minimizing the introduction of new sources of pollution, and containing existing sources of pollution, within the Wellhead Protection Area.
- 2) Discourage new high-density development in Wellhead Protection Areas.
- 3) Do not allow salt or salted sand piles and limit the use of road salt in WHPAs.
- 4) No new roads or parking areas should be allowed in WHPAs.
- 5) Do not allow on-site disposal of hazardous waste, including disposal of household hazardous waste through on-site sewage disposal systems.
- 6) New and existing on-site underground storage tanks should be designed, installed, and inspected in accordance with the Agency of Natural Resources Underground Storage Tank Regulations for Aquifer Protection Areas or Class II Groundwater Areas.
- 7) All storm water runoff should be managed by best management practices or diverted away from wells and Wellhead Protection Areas.
- 8) Any use of herbicides or pesticides within WHPAs must be strongly discouraged.

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- 9) Chemically treated swimming pool or hot tub water should not be drained in WHPAs.

Recommendations

- 1) Consider refining the WHPA map.
- 2) Monitor the soils, surface water and groundwater to ensure that hazardous substances from the contaminated site at the high school do not contaminate the town water supply or surface waters.

SHORELANDS/SURFACE WATERS/WETLANDS

Shorelands, surface waters, and wetlands are parts of very fragile and important ecosystems (see map in Appendix). Surface waters, wetlands, and adjacent land areas provide recreational and educational opportunities (fishing, boating, wildlife viewing, etc.), and contribute to the scenic and aesthetic properties of Windsor. They also supply local residents with food (by providing habitat for fish and wildlife) and drinking water (through exchanges with groundwater sources). Proper protection of these areas is vital to the protection of water quality, the basis of all life on our planet. We want our waters to be beautiful, clean, and accessible.

The Connecticut River Corridor is still partially undeveloped and much of the land within 500 feet of the river is open farmland. However, there is some industrial, commercial, and residential property along the river as well. Both types of riverfront property are valuable assets, and the town should support efforts to improve environmental and aesthetic resources along the river banks.

Other valuable shorelands in Windsor surround Mill Pond, Lake Runnemedede, and several major streams. The Town owns shoreline and the Town beach on Mill Pond. Paradise Park abuts Lake Runnemedede, and the Town water wells are by the shore of Lake Runnemedede. The shores of these two major water bodies are largely undeveloped, though future development pressure seems likely.

Valuable public and private wetlands are scattered throughout Windsor. The Town has historically provided no special protection to these fragile and indispensable natural resources. One large wetland is located in the Wellhead Protection Area and may have a direct impact on the quality and quantity of groundwater used by the community water system. Another is located along Mill Brook just upstream from Mill Pond, which serves as the Town's swimming area. This wetland provides important wildlife habitat, and removes significant quantities of pollutants from water entering the pond. Wetlands also provide flood storage capacity and can be used as valuable educational tools. All wetlands in Windsor deserve special attention and protection.

Phosphorus influences surface water quality in Vermont more than any other single pollutant. Controlling the introduction of phosphorus into Windsor's surface and ground waters is critical to maintaining the quality of these waters.

Maintaining adequate vegetated buffers along surface waters is beneficial for the community. Natural vegetation, including trees shrubs and natural ground cover plants, should be encouraged along all surface waters. According to guidance from the VT Department of Environmental Conservation (*Native Vegetation for Lakeshores, Streamsides and Wetland Buffers*, 1994), minimum width of 50 feet is needed to protect streambank stability and aquatic habitat. Widths of 100 feet may be necessary to remove suspended sediment in runoff. In some cases, buffer widths between 200 and 600 feet may be beneficial as habitat for birds and mammals. The widths of each buffer should depend on site conditions, including soil type, slope and the purpose of the buffer.

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Watershed Planning

Tactical basin plans (TBP) for Vermont's watersheds are developed by the Vermont Agency of Natural Resources. Each TBP contains objectives, prioritized strategies, benchmarks and tasks in order to facilitate the implementation of the plans. Windsor and its waters are addressed in the Basin 10 Plan for the Black and Ottauquechee river watersheds. The TBP is the guidance document for the ANR's work on water resources. It is used to prioritize projects and target resources for restoration and protection. The goals of the Windsor Municipal Plan and improvement and protection projects desired by the town should be listed in the town plan in order to prioritize them in the TBP. The Vermont Agency of Natural Resources completed the [Tactical Basin Plan for the Black and Ottauquechee Rivers](#) in June 2018.

Windsor will receive additional consideration on grant funding applications if it adopts higher levels of protection for flood hazard areas. These protections also qualify the Town for reduced cost share after a declared disaster for damage to public infrastructure including roads and culverts through the Emergency Relief and Assistance Fund (ERAF). For disasters after October 23, 2014, the State of Vermont will contribute an additional 7.5% toward the costs. Currently for Windsor, following disasters the State contributes 12.5% of the cost share. If Windsor adopts river corridor protections this rate will increase to 17.5%.

Goals

- 1) Prevent nutrients (especially phosphorus) and sediments from entering Windsor's wetlands and surface waters.
- 2) Strive for aesthetically pleasing shoreland landscapes with buffers of natural vegetation on all shores and around all wetlands, while providing as much free access as possible to the shores of the Connecticut River, Mill Pond, and Lake Runnemedede.
- 3) Prevent the introduction of exotic, invasive species to unaffected water bodies.
- 4) Encourage the conservation of wetlands so they can continue to provide valuable wildlife habitat.

Policies

- 1) Maintain buffers of natural vegetation around surface waters. Adequate buffer widths depend on soil conditions and slope. Limited buffer maintenance activities may be necessary and should be defined in the land use regulations.
- 2) Prevent erosion of disturbed soil, particularly if there is danger of sediment being washed directly into wetlands, lakes, streams, or rivers. Routine measures may include the use of diversion dikes, vegetated buffers, seeding and mulching, hay bale sediment traps, and barriers consisting of a snow and silt fence combination.
- 3) Maintain adequate buffers between on-site sewage disposal systems and surface waters or wetlands. The Health Officer shall report any failed septic systems or related problems to the Vermont Department of Environmental Conservation for enforcement.
- 4) Require boaters to clean Eurasian milfoil and other exotic, invasive species, from boats after use in infested waters (i.e. Mill Pond), and before use in unaffected waters, to prevent the spread of this noxious weed.

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- 5) Paths providing access to shores should not run straight down to the shore so that they provide a conduit for runoff. They should follow best management practices in order to reduce runoff and minimize erosion.

Recommendations

- 1) Provide relevant public education concerning the control of Eurasian milfoil and other exotic, invasive species, with the goal of eliminating the problem in all local surface waters.
- 2) Discourage the use (or presence) of fertilizers, pesticides, insecticides, and other hazardous chemicals in and near surface waters and wetlands.
- 3) Adopt and implement the Connecticut River Corridor Management Plan as proposed by the Connecticut River Joint Commissions.

LAND AND MINERAL RESOURCES

Soils vary greatly in their composition, which will determine where water impoundments occur, the kind and amounts of vegetation that will grow, and what types and intensities of land uses are most appropriate. In rural areas, where public water and sewer services are not available, the development potential of each site will be determined by the on-site septic suitability of the soils.

STEEP SLOPES

According to the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS), all types of construction should be avoided on lands with slopes over 25 percent. However, some uses – such as hiking or ski trails – may be suitable in those steep slope areas. Slopes between 15 and 25 percent may not be suitable for development due to limitations for septic systems, erosion and stormwater runoff problems, and high construction costs. Engineering or other special design techniques may be needed to avoid these potential problems. Driveways over 12 percent in grade are generally considered to be too steep for safe emergency vehicle access, and are difficult for maintenance and vehicle access in the winter months. Town highway standards, subdivision and zoning regulations contain provisions regulating the steepness of grade and drainage techniques of roads and driveways.

AGRICULTURAL SOILS

There are a few working farms in Windsor, which contribute to the local economy, provide crops to support local businesses (e.g. American Crafted Spirits), and maintains rural character. Working farms are important to support the growing desire for local foods and healthy lifestyles. Farm-to-Plate and Farm-to-School programs are valuable, and are supported by a number of organizations, such as Vital Communities, Vermont Sustainable Jobs Fund and the National Farm to School Network. As discussed previously in this chapter, some active farms also serve as floodplains or other important functions.

The NRCS has identified the most productive agricultural soils (see the Natural Resources Map). The NRCS category of “prime agricultural soils” has the greatest potential for productivity and is important for current and future food production. “Soils of statewide significance” are also important, but limited in their productive capacity by slope or other mitigating factors. Once these soils are disturbed for construction, their potential for farm productivity is lost. Preserving

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large contiguous areas of these important agricultural soils is important for future local food production.

FORESTS

Forests serve a variety of functions and uses (i.e. protect air and water quality, wildlife habitat, forestry, home heating fuel, maple sugaring, and outdoor recreation), and contribute significantly to rural character. Large forest blocks and connections between them serve important wildlife and ecological functions. Certain riparian corridors and smaller forest blocks are important as connections between priority forest blocks. (The Current Land Use Map shows undeveloped, forested areas and conserved lands. The Forestland Map shows where priority forest blocks and habitat connectors are located in Windsor.) Ascutney State Park and the Grasslands Wildlife Management Area include large areas of forested lands, which are part of a larger complex of forest blocks that serve a very important function for wildlife connections between VT and NH. In addition, there are over 3,000 acres enrolled in the Use Value Appraisal (Current Use) program. However, significant forested areas are under private ownership at this time. Fragmentation and parcelization of forest lands threaten the value of or access to these resources.

WILDLIFE HABITAT/NATURAL AREAS

Along with surface waters, wetlands, and shorelands, forest land is especially valuable as wildlife habitat, and should be managed as an important natural resource. Large blocks of forest lands and the connections between them are important for wildlife habitat and biodiversity. Policies regarding the use of forest land are discussed in the Land Use chapter of this plan. See the related discussion in the Forests section earlier in this Chapter.

Windsor also possesses several unique and outstanding natural areas. These are areas that deserve special attention because they contain rare plant or animal species; provide unique or irreplaceable economic, aesthetic, recreational, or educational value; or represent an outstanding or unique example of a particular type of natural feature or habitat. Examples include Lake Runnemedede, Mill Pond, Paradise Park, Ascutney State Park, and rare, threatened and endangered species as shown on the Natural Resources Map. Special care should be taken to protect these unique natural features from future development or redevelopment.

Goals

- 1) Maintain and improve significant wildlife habitat and travel corridors.

Policies

- 1) Avoid adverse impacts of development to rare, threatened and endangered species. The Development Review Board may seek recommendations from the Vermont Fish and Wildlife Department in order to evaluate how a project impacts known locations of rare, threatened and endangered species.
- 2) Developments shall be sited in order to minimize impacts on significant wildlife habitat and travel corridors. Require a conceptual master plan for the entire parcel for projects that involve multiple development phases or large parcels (i.e. 30 acres or larger) that may support subsequent phases of development. The purpose of the conceptual master plan is to thoughtfully create an overall plan that minimizes impacts on wildlife habitat and travel corridors.

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- 3) Maintain adequate food, water, shelter, and travel corridors for wildlife.
- 4) Promote a heightened level of awareness among the general public concerning the fact that most natural areas contain wildlife habitats which deserve our respect and protection.

Recommendations

- 1) Consider the potential impact of any development proposal on wildlife.
- 2) Recognize, maintain and improve wildlife habitat and travel corridors in and between Paradise Park, Grasslands Wildlife Management Area, State Park and Connecticut River corridor.
- 3) Surface water must be kept clean for wildlife. (See "Shorelands/ Surface Waters/Wetlands")
- 4) Maintain up-to-date maps of deer wintering areas and other significant wildlife habitats, particularly if threatened or endangered species are involved as recognized under state or federal law. Work with the Vermont Fish and Wildlife Department to improve habitat maps and identify priority habitat and wildlife travel corridor areas for protection.
- 5) Establish a Conservation Commission to inventory significant plant and animal species and their locations, map wildlife travel corridors, and to advise the Planning Commission on these and other matters concerning the natural environment.
- 6) Study options of preserving significant habitats and woodlands such as the purchase, donation, or transfer of development rights.
- 7) Encourage local school use of environmental educational programs to instruct children on environmental issues and the Farm-to-School initiative.

EARTH EXTRACTION

Rock, sand, gravel and other mineral resources are important commodities for home or road construction or other uses. There are a few gravel pits or quarries in Town: adjacent from Miller Construction on US Route 5 South, next to the golf course on US Route 5 North, and the Town-owned gravel pit off the Back Mountain Road. Local production of these materials could benefit the taxpayers. However, mining and mineral extraction activities can also adversely affect the roads, rural landscape, essential wildlife habitat, and the peace and quiet of the rural community. New or expanded extraction operations are subject to conditional use review under the zoning bylaws.

Goals

- 1) Land use types and intensities will be consistent with the suitabilities and limitations of the soils and topography of each site.
- 2) Promote the continued use of agricultural and forested lands in a manner which helps to maintain or preserve the natural beauty, function and productivity of the lands.
- 3) Encourage the sustainable extraction and processing of mineral resources in a manner that is appropriate and consistent with Windsor's rural character.

Policies

- 1) Development on steep slopes must take special precautions to avoid undue environmental impacts, such as erosion and stormwater, including:
 - a) Avoid development (other than appropriately designed recreational trails and related facilities) in areas predominated by slopes exceeding 25% or at elevations above 2,500 feet; and,
 - b) Developments on slopes over 15% shall:

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- i. Minimize areas of earth disturbance (i.e. clearing vegetation and grading);
 - ii. Minimize the potential impacts of erosion and stormwater; and,
 - iii. Maximize on-site water infiltration.
- 2) Primary agricultural lands, as defined by the USDA, should be devoted to the production of agricultural products, or to uses that will maintain or preserve such lands for future agricultural operations.
- 3) Promote farming and the production of local, healthy foods.
- 4) Any development planned for agricultural or forested lands should locate to the periphery of these resources in order to avoid fragmentation and encourage the natural productivity of these lands.
- 5) Earth resource extraction activities shall:
 - a) Not cause undue adverse effects upon surrounding properties;
 - b) Mitigate adverse impacts on important wildlife habitat and the environment; and,
 - c) Provide adequate site restoration at the completion of extraction activities.

Recommendations

- 1) Review zoning and subdivision bylaws for consistency with the policies in this section.
- 2) Provide healthy food, an increase awareness of agricultural and environmental responsibility.
- 3) Support Farm-to-Table and Farm-to-School programs.

AIR RESOURCES

Windsor currently does not have an air quality problem according to national standards. As a result, the Town's good air quality constitutes an environmental resource that has aesthetic as well as human health benefits. Elements that could negatively affect air quality include: smell, light, particulate matter (from dust, smoke or fumes), radiation, chemical vapors, motor vehicle exhaust and power plant emissions. Outdoor lighting can also negatively impact safety and the dark night sky.

Goals

- 1) Maintain Windsor's existing ambient air quality.

Policies

- 1) Development is subject to the performance standards in the Windsor Zoning Regulations as they relate to air resource impacts.
- 2) Proposed new lighting shall avoid glare and other unnecessary light pollution.
- 3) Outdoor lighting levels should be a balance between aesthetics, security, energy efficiency, reducing adverse impacts on the night sky, and safety (i.e. reducing glare).

Recommendations

- 1) Town equipment should meet emission standards.
- 2) The Town should take an active role in the review of development proposals or plans that could adversely affect air quality.

SCENIC RESOURCES

Mount Ascutney, which is partially located in the Town of Windsor, is known regionally as an important scenic resource. Distant views of the mountain are an important sense of identity for

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Windsor and the surrounding area. The scenic mountain was an important focal point for the Cornish Artist's Colony centered in Cornish, NH in the late 1800s and early 1900s.

Other significant scenic resources include:

Connecticut River – Views of the River from US Route 5 are an essential aspect of the Connecticut River Scenic Byway. The large farm fields located between US Route 5 and the River both to the north and south of Downtown are very significant to maintain this scenic corridor.

Pastures and Farm Fields – In general, these features contribute to rural character and are results of the desired working landscape economic activities in rural areas. Specifically, fields along US Route 5 across from Artisans Park are scenic and maintain a pleasant rural gateway from I-91 Exit 9 into the Town of Windsor, as well as the fields along the river as discussed above.

Ridgelines and Prominent Knolls – High elevation areas and ridgelines include Mount Ascutney as well as the long ridge that roughly parallels I-91 to the west and extends generally between Hunt Road and the Hartland town line. Not only is this ridgeline in itself scenic, but it also divides the rural countryside to the west from the more developed areas in Windsor to the east.

Natural areas controlled by the State including the State Park and the scenic portions of the Grasslands Wildlife Management Area (WMA) along the Marton Road area. Not only are these areas scenic, but they provide other valuable functions, such as wildlife habitat, stormwater/groundwater recharge, and outdoor recreational opportunities.

Lakes and Ponds – Mill (Kennedy) Pond, Lake Runnemede and the Grasslands WMA pond are important scenic assets for the community.

Paradise Park – Not only is this park an outstanding recreational asset, it is also an important scenic area surrounding Lake Runnemede. Located just north of Downtown, this area provides a clear divide between the more developed area and the rural countryside. This area contributes to a pleasant rural gateway for visitors entering Windsor from the north.

Great views of the Connecticut River can be found from the Great Farm and other properties to the east of US Route 5 North. These areas could support developments that take advantage of these views and great access to I-91 Exit 9. These scenic qualities may be impacted by adjacent uses, such as fuel distribution and contractor yards.

Hunt Road – Rural western sections of Hunt Road are very scenic and worth preserving the rural character that it currently provides.

Goals

- 1) Preserve these scenic resources that most contribute to Windsor's rural character.

Policies

- 1) Development is discouraged in identified scenic resource areas. Any development in these areas shall minimize negative visual and environmental impacts through the careful placement

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of buildings, limited clearing, landscaping, screening and other methods.

Recommendations

- 1) Consider mapping scenic resources.
- 2) Consider land use regulations to restrict developments in scenic areas.

HISTORIC PRESERVATION

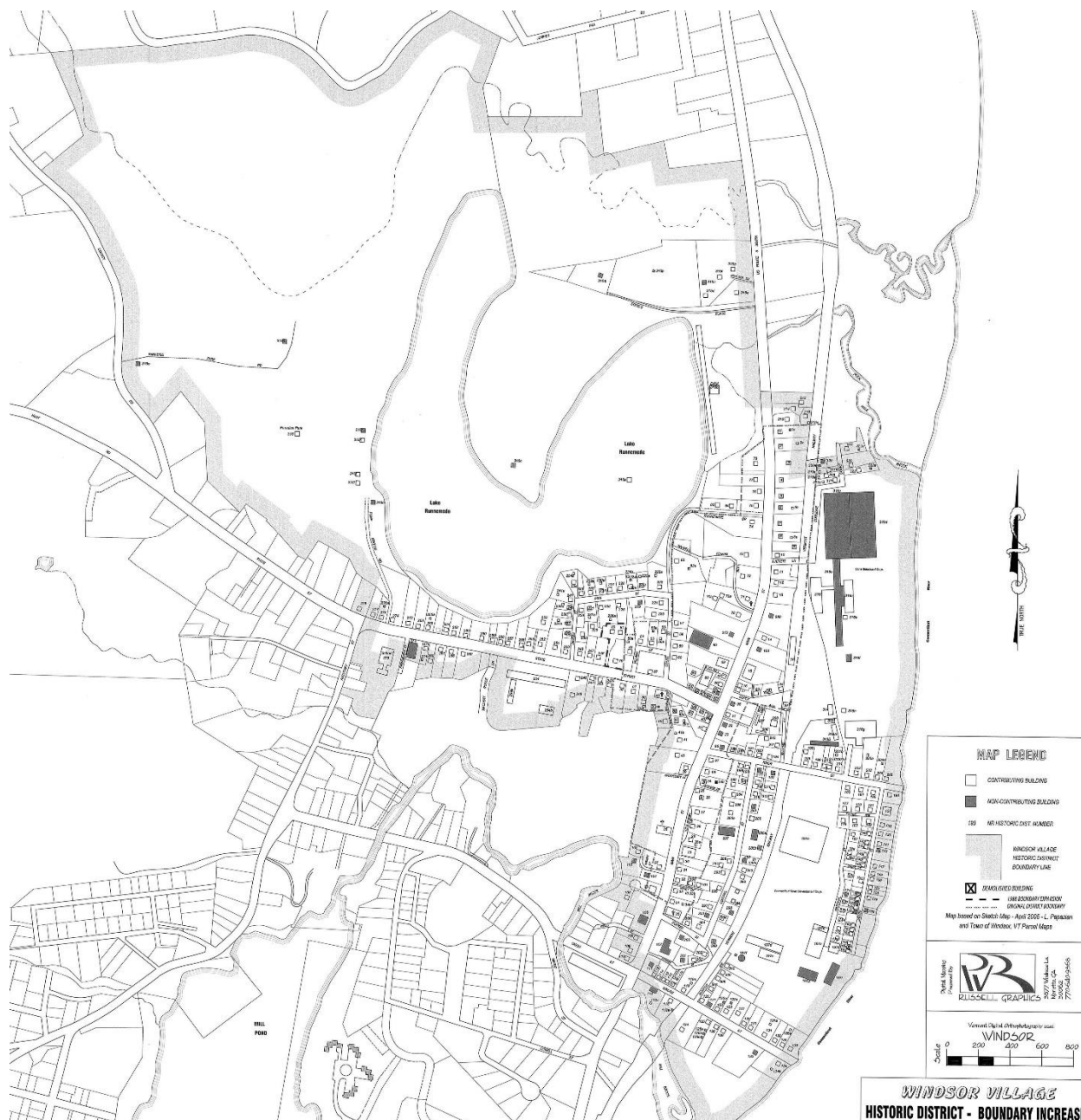
The Town of Windsor has played a conspicuous and important role in the history of Vermont and of the United States. Groundbreaking political events have taken place in Windsor: the ratification of the Vermont Constitution in 1777 in Elijah West's tavern on Main Street established the Republic of Vermont and set an important precedent for the guarantee of personal freedom enjoyed today by all Americans. Windsor was home, in the 19th Century, to the birth of the American machine tool industry and to the pioneering of mass production techniques; a local factory supplied federal troops with rifles during the Civil War. This part of the town's history is preserved and explained today at the American Precision Museum. Windsor was also important in the early development of Vermont's legal and correctional systems.

The town's role in the making of regional, state, and national history is a source of pride and community spirit for local residents. It is also an economic engine for the town and the region. The development and promotion of "heritage tourism" can simultaneously preserve valuable resources and support the local economy.

Windsor's architectural heritage spans the late Eighteenth, Nineteenth, and early Twentieth Centuries and represents the entire spectrum of commercial, domestic, and public architectural styles. Individual buildings and the streetscapes on Main Street and around the Common create a downtown with many of its historic resources intact. Only a few non-contributing buildings interrupt the cohesiveness of the following distinct areas in Town:

- a) Updated and expanded in 2014, Windsor's Village Historic District is listed on both the National and State Registers of Historic Places. The expanded Historic District now includes most of the Downtown, the State Street corridor, and Paradise Park.
- b) The Ascutney Mill Dam Historic area that is listed on the State Register of Historic Places centers around the Ascutney Mill Dam and surrounding buildings. The boundaries are Ascutney Street, Union Street, a parallel line approximately 300 feet west of Clough Avenue and a parallel line approximately 400 feet south of Union Street.

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An important part of Windsor’s downtown revitalization and historic preservation efforts is maintaining the Downtown District that is designated under Vermont’s Downtown Program. See the Land Use Chapter for a map and more information. Also important are the Design Review Districts and related standards as most recently adopted in Windsor’s zoning bylaws.

Another important part of Windsor’s history and heritage is agriculture. Agriculture has seen significant declines in recent years, but has historically played an important part in Windsor’s culture and economy. Policies for the use of agricultural land are discussed in the Land Use chapter.

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Historic farmhouses, barns and other accessory structures, such as carriage houses, are important resources for the community.

Goals

- 1) Identify, protect and preserve important historic features, including important historic structures, sites or districts, and archaeological sites.

Policies

- 1) Preserve the existing facades, and, to the extent possible, preserve the historic integrity of the interiors of all buildings of historic significance.
- 2) Continue appropriate regulations for signage.
- 3) Ensure compatibility of new buildings and additions in the Historic Districts.
- 4) Promote the cultural heritage (local, state, and national) of Windsor, in order to protect historic resources and expand the heritage tourism economy.
- 5) Maintain and extend the inventory of historic districts and landmarks.
- 6) Identify significant archeological sites that may be hidden or not readily apparent.
- 7) Any development should take precautions to preserve historic farmhouses, barns and other historically significant accessory structures, such as carriage houses, where structural conditions make it feasible.
- 8) Preserve and maintain the historic character of the Cornish-Windsor Covered Bridge.
- 9) When making repairs to the historic concrete arch bridge (i.e. Bridge #55) on South Main Street efforts should be made to preserve the historic arches and railings.

Recommendations

- 1) Utilize the Windsor Design Review Commission as advisors to the Development Review Board for review of exterior changes in buildings, demolition, and new construction within locally designated Historic Districts or involving Historic Landmarks.
- 2) Utilize Historic Windsor, Inc. staff and volunteers, and volunteers from the Windsor Historical Society for assistance, planning, and implementation of preservation projects in the community.
- 3) Encourage and support the concept of historic, or heritage, tourism and make the promotion of local and regional historical and cultural resources a priority of the community in order to increase the number of tourists visiting Windsor annually.
- 4) Review land use regulations to ensure that they encourage use and reuse of existing buildings and carefully control land use, signage, and parking in locally designated Historic District(s).
- 5) Encourage the Board of Selectmen to enact tax incentives for rehabilitation of buildings and compatible new construction in the Historic Districts.
- 6) Encourage the town to provide the highest quality maintenance and upkeep of all cemeteries in Windsor.
- 7) Encourage the use, and require the maintenance and upkeep of vacant and historic structures.
- 8) Encourage owners of downtown historic properties to take advantage of tax credits for building rehabilitation, façade or code improvements, available through Vermont's Downtown Program.
- 9) Develop an adaptive reuse provision in the zoning regulations to allow and guide continued use of buildings that pre-date zoning regulations and are out of compliance with current zoning standards.

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9. ECONOMIC DEVELOPMENT

PURPOSE

The purpose of this chapter is to document the existing local economy and identify desired future economic development conditions in accordance with 24 V.S.A. §4382(a)(11).

PRESENT ECONOMIC CONDITIONS

Windsor has a proud history as a manufacturing center. While manufacturing has declined in recent decades, it is still an important local economic sector along with education, health care, government, trade/transportation/utilities and professional services. A large proportion of residents are employed in the Upper Valley, an easy 15-20 minute drive north on I-91. Historic and existing economic conditions are discussed in the next sections.

History

Windsor's economy has traditionally been based largely on industry and manufacturing. As long ago as the early 1800s, the foundation for the American industrial revolution was being laid in Windsor. The Town's industrial base took shape and expanded during the years leading up to the turn of the Century, and remained strong for another 75 years or more. Its growth went beyond town borders and blossomed throughout the region, most notably in Springfield. The design and manufacture of machine tools were so prevalent in the regional economy during this period, and played such an important role in the industry at the national scale, that the area became known as Precision Valley.

During the past few decades, national and international economic trends have brought major changes to Windsor. Manufacturing continues to play an important role in the local and regional economy, but it does so at a dramatically reduced scale when measured in jobs and contribution to the local tax base. A large network of infrastructure and services established to support the historic manufacturing center is expensive to maintain, but presents a unique opportunity to support desired growth in and around the historic downtown.

Local Businesses

According to the Vermont Department of Labor statistics, there were 138 local employment establishments in 2017 (see Table 1). A few notable, large employers include Mt. Ascutney Hospital, Windsor School District, and Cedar Hill Continuing Care Community. Located in Artisan's Park are Harpoon Brewery, Simon Pearce, Land Air Express, Lebanon Screw Products and other businesses. Recently established local businesses include American Crafted Spirits, Vermont Farmstead Cheeses, and The Sustainable Farmer.

Since 1990, employment trends in Windsor have been mixed. The recent growth of Artisan's Park has been positive. Mount Ascutney Hospital, the largest employer in town, has been expanding in recent years and has an excellent reputation. Revitalization of several downtown properties is completed or underway, and many are fully leased. The former Cone property recently installed solar panels, but remains underutilized. A number of small businesses occupy the former Goodyear Campus and a solar project is to be developed on the slab located south of the main building. This area is severely limited in terms of expanded future development by brownfields and flood-related constraints. However, the community's goal for the site is to allow for the reasonable reuse of existing buildings and to clean up the site, making it more attractive. New construction is unlikely in the portions of the lot that are within the floodway, but it may be possible within floodplain areas in the northernmost portion of the site.

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However, the loss of the two largest employers in Town, Goodyear and Cone-Blanchard, has impacted the community in terms of lowering household incomes and reducing local tax revenues. Household incomes lag behind Windsor County and the State of Vermont; the Town’s median family adjusted gross income is about 82% of the County level (see the Economic Profile). During this same period, Windsor’s population has declined 20% since it apex in 1960.

Employment sectors that have been growing in Windsor between 2010 and 2017 include education, health care, financial activities, professional and business services, leisure and hospitality, and local government (see Table 1 below). Other important local economic sectors include manufacturing and trade, transportation, and utilities, which have declined during the same 7-year period. In addition to employment by economic sector, Table 1 also presents average wage rates by sector. See the Housing Chapter for more information on wages.

Table 1: Covered Employment & Wages in Windsor

Industry	Establishments		Employment		Average Wage	
	2010	2017	2010	2017	2010	2017
Manufacturing	12	13	180	153	\$49,223	\$39,161
Trade, Transportation, and Utilities	26	27	188	150	\$25,654	\$32,468
Information	2	1	N/A	N/A	N/A	N/A
Financial Activities	8	11	N/A	54	N/A	\$37,962
Professional and Business Services	20	20	73	87	\$45,686	\$66,145
Education and Health Services	15	16	632	636	\$43,792	\$39,164
Leisure and Hospitality	9	10	60	78	\$16,182	\$23,442
Other services, except public administration	15	13	67	N/A	\$20,421	N/A
Federal Government	2	2	11	11	\$46,837	\$52,196
State government	2	2	60	63	\$56,782	\$57,415
Local government	8	8	204	233	\$34,311	\$40,564

Source: VT Department of Labor, Economic & Labor Market Information (2017)

Many residents commute to the regional job center in the nearby Upper Valley (i.e. Lebanon and Hanover, NH and Hartford and Norwich, Vermont) due to higher wages and large employers, such as Dartmouth-Hitchcock Medical Center, Veterans Administration Hospital and Dartmouth College. According to 2015 Longitudinal Employer-Household Dynamics (LEHD) data from the U.S. Census Bureau, nearly 40% of working residents commute to the Upper Valley. Relatively low housing costs, easy access to the Upper Valley via I-91, and other factors combine to make Windsor an attractive location for commuters. As a result, Windsor is becoming increasingly a bedroom community for this area.

Local Assets and Opportunities

Windsor has a number of assets that can serve to attract new development and expand existing businesses. These assets include the following:

1. **Access** - Excellent Interstate access (I-91 and I-89) and the strong “influence” of regional metropolitan areas (Boston, New York, and Montreal) that offer complimentary opportunities for tourism and economic development. Windsor is also accessible by rail for both passenger and freight transportation.
2. **Downtown Property** - A substantial amount of “unused facilities assets” in the town and the region are available for development without adversely impacting open land. These include several former industrial properties, including the former Goodyear campus, that are undergoing site assessment in order to determine the nature and extent of contamination, and the costs for cleanup. These properties are already connected to public water and sewer, and are therefore attractive for commercial and light industrial development. Relatively cheap rents for downtown

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store fronts present a unique opportunity for start-up businesses. The Downtown Master Plan identifies vacant properties that can support a lot of growth in a way that is consistent with State planning goals and Smart Growth principles.

3. **Artisan's Park** – The Industrial Park has grown significantly in recent years. Now called Artisan's Park, it is home to Simon Pearce, Harpoon Brewery, Vermont Farmstead Cheese Company, Sustainable Farmer, Great River Outfitters, American Crafted Spirits and Path of Life Garden. The park has demonstrated that a market exists for tourism inspired, small-scale manufacturing. While there is little room for future expansion on the property, it does provide a model that may be considered for some parts of the former industrial properties in the downtown.
4. **Entrepreneurial energy** - A high level of entrepreneurial energy presents an opportunity for economic development. This energy is the result of the major economic changes that have taken place in the region over the last few decades. The opportunity to provide relatively inexpensive, highly adaptable space available to start-ups, tech firms and other non-typical users could become a significant asset to bring these firms to Windsor if it can be successfully promoted and given community support.
5. **Infrastructure** - The Town has ample infrastructure capacity in its water treatment and sewer plant, as well as established sewer and water lines within most of the desired area for economic development. The downtown industrial areas are supported by more than adequate three-phase power. Rail access exists; zoning should include provisions that projects be evaluated for rail access and that rail access remain available for future potential use. There is currently planning being developed that will make some amount of fiber internet available in the immediate area of these properties with the ability to expand the service as the need/desirability develops.
6. **School Capacity** - The Town has ample space within its school system to encourage property and business development that would attract a younger workforce with school age children. The school facility was completed in 1997. It is within the Downtown, and conveniently located near residential neighborhoods and recreational assets. West Windsor eliminated school choice and now send their students to the Windsor Schools for grades seven and beyond.
7. **Natural Resources** - Natural resources abundantly located within Windsor add an intrinsic value to the Town as a location for economic development. Nowhere else in this area is such an attractive historic downtown surrounded on all sides by water: the Connecticut River, Mill Brook, Lake Runnemedede and Mill Pond. Mount Ascutney provides a scenic backdrop for the downtown, with the State Park and trail networks providing excellent recreational opportunities.
8. **Historic and Cultural Resources** - The commitment of the Town and property owners to preserving important historic resources and celebrating local history, combined with strong community support for the arts and innovation adds value to existing businesses and enables economic development officials to market the cultural vibrancy of the community.
9. **Social Services** - Along with Windsor's cultural and historical attractions, the community's continued commitment to strengthening the Town's social services infrastructure via the Mount Ascutney Hospital, the Mount Ascutney Prevention Partnership, the Windsor Community Resource Center, the Windsor Recreation Department and other organizations and programs denotes a community invested in all of its citizen's needs.
10. **Local Incentive Programs** – The Town offers a wide array of programs to encourage economic development, including: a Downtown Program and related tax credit programs, tax stabilization, revolving loan fund, Windsor Improvement Corporation (WIC), as well as a brownfield

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redevelopment program (in coordination with the State and Southern Windsor County Regional Planning Commission).

Trends and New Directions

In addition to the assets that favor Windsor's economic future, the Town faces several challenges or limitations in its economic development efforts:

1. **Balancing Growth and Change with Quality of Life** – As the town has evolved from a bustling community of over 4100 residents to a smaller community with a residential focus, there has been a simultaneous change in social trends that now considers smaller homes and more urban, walkable communities to be highly desirable for both empty nesters and millennials. This has left Windsor in a position to reimagine itself and focus more on providing quality housing and the required supporting services. Such things as recreational activities, restaurants, the arts and theater will have greater importance and viability, and mesh nicely with the desire to maintain the community's historic character. This trend can be put to advantage to attract new residents, which will help to support some types of retail uses, especially those stores that can provide an intimate retail experience and do not attempt to compete with internet shopping. This change will further enhance the opportunities for increased tourism and attracting some kinds of regional commerce.
2. **Housing and Job Creation** – The increased need for housing in the Upper Valley has allowed Windsor to show itself in a new light as a realistic choice when deciding where to live. While the number of jobs immediately within Windsor has declined, the town remains very convenient to the Upper Valley. Again, the increasing desirability of walkable, "urban" lifestyles is positioning the town such that it can market itself as a premier community providing a quality of life that is unique in the area.
3. **The NH Advantage** – Windsor borders the State of New Hampshire, which does not assess a state sales or income tax. This limits the ability to establish a local option tax in Windsor.
4. **Available Land Area** – Windsor is one of the smallest towns with a total land area of 12,544 acres, while the average size of a municipality in Vermont is approximately 24,000 acres. In addition, approximately 4,360 acres of land in Windsor are owned by the State of Vermont, leaving Windsor with potential taxable acreage of just over 8,000 acres, or one-third the amount of taxable land available to most other towns. Development opportunities are further reduced by other constraints including lands with excessive slope, FEMA floodway and floodplain areas and other factors. However, the Downtown Master Plan identified significant development and redevelopment potential within and adjacent to the downtown. Furthermore, the future land use map identifies other areas that, with careful site planning, could be developed with significant benefit to the Town.
5. **Infrastructure** – The public water and sewer infrastructure system and level of municipal services – that is similar to those found in larger communities – was designed for Windsor's past role as a regional center and hub of manufacturing activity. It is costly and there is only a limited tax base to maintain the existing levels of service and the aging infrastructure. Therefore, Windsor seeks to grow the grand list in areas that are served by this infrastructure and maximize existing buildings to hook into the water and sewer systems when applicable.
6. **Brownfield Contamination** – Assessment and remediation of contamination on former industrial properties (i.e. brownfield sites) designated for economic development hamper the timely development of buildings and/or properties for other uses. The Town is actively working to help remediate these contaminated sites.

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7. **Floodplains** – Much of the Town needs to resolve issues inherent in the re-mapped floodplain areas along the Connecticut River and other sections of the Town with the Federal Emergency Management Agency (FEMA) so that developers and property owners can accurately determine the costs associated with construction and insurance. The Town is developing a community flood study to better understand the development limitations and educate property owners.

A significant amount of planning and environmental assessment work has been completed for the Downtown area. The strong economy of the Upper Valley has resulted in a tight housing market that brings many who work in the Hanover and Lebanon area to Windsor in search of housing. Windsor's current challenge is to continue the work of rebuilding and revitalizing its downtown while working to achieve a balance of jobs and housing. A strong employment base in or near the downtown is important for maintaining and building a strong downtown business district.

DESIRED FUTURE ECONOMIC DEVELOPMENT

Windsor's primary goal is to encourage economic development that is consistent with the Land Use Chapter and State Planning Goals. Economic development activity is desired in locations that are to the east of I-91 and where infrastructure exists to support it. The Downtown Master Plan identifies opportunities for significant development and redevelopment. Desired land use development patterns are described in more detail in the Land Use Chapter, the following descriptions highlight the types of economic growth that the Town would like to see in certain areas of the community.

1. **Downtown** – In general, the Downtown is the location for retail, civic and other high-intensity and pedestrian-oriented uses. Economic development in this area generally involves adaptive reuse of historic buildings, upgrading existing facilities and in-fill development opportunities. The Downtown Development Committee supports this activity by working with current and prospective business and property owners. (See the Downtown Master Plan presentations available through Windsor on Air for more information.) The most likely types of manufacturing uses will probably not be heavy, dirty industry and could be made compatible with other residential and commercial activities in the downtown. Compliance with flood regulations is readily achievable, especially on the Railyards and Windsor Technology Park sites.
2. **Industrial Activity** – Artisan's Park is effectively built out at this time. The market there has been developed to include primarily small manufacturers, often with a tourism related component which has helped to minimize adverse impacts on surrounding properties. The growth of the park as well as the perceived improvements in the overall image of downtown Windsor will help to lure park visitors to the downtown, especially as attractions/amenities like the proposed pathway are implemented.
3. **Roadside Areas** – These areas as shown on the Future Land Use Map is for traveler-related services, but shall not include retail and other uses that detract or compete with uses designated for the Downtown area. The primary concerns for this area are to site buildings closer to the road, place parking to the side or rear of the buildings, and employ sound access management strategies in order to prevent strip commercial development and to create a safe and pleasant gateway into downtown Windsor.
4. **Rural Working Landscape** – Rural working landscape economic activities (e.g. farming, forestry, and earth extraction) are suitable for the rural areas that surround the downtown and other built-up areas. These working landscape activities and home occupations will help to preserve rural character and provide economic development options for rural parts of Town.

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Such activities should follow best management practices in order to minimize impacts on the environment and adjacent properties.

ECONOMIC DEVELOPMENT STRATEGIES

The following economic sectors have seen a great deal of growth in the last few years or are highly desirable, and are encouraged to locate or expand in Windsor:

- **Wood products**, from craftsman level to the small manufacturer, is a consistent growth sector in Vermont, Windsor County and the Town of Windsor. Specialty and niche market Vermont made wood products have global appeal and a sustainable market. Wood specialty products are a viable economic activity.
- **Entrepreneurial start-ups** and established **“high tech” research and development companies** are viewing our area as an attractive location for its quality of life and proximity to higher education
- **“Cultural Heritage Tourism”** offers a significant opportunity to attract visitors to the community. Windsor’s has numerous opportunities to capture this economic sector by capitalizing on its historical significance, early industrial activities, and proximity to art colonies, artists and museums.
- The **Creative Economy** is a term that refers to the changing nature of the economy from one that is machine-driven to one that relies on the creativity of individuals. The term also refers to the value of cultural amenities in the decisions that individuals and companies make about where they want to live and work.
- Ranging from artisan-based shops to internet-based services and products, this sector is growing in Vermont, and has strong representation in Windsor. This “creative sector” includes the activities of cultural organizations, individual artists, self-employed creative professionals, inventors, performers, and craftspeople. It also includes services such as: software development, news, entertainment, and advertising and is an economy based on ideas that add value across the economic spectrum.
- Maintain designation in Vermont’s Downtown Program.

WINDSOR’S DESIGNATED DOWNTOWN DISTRICT

The purpose of this section is to document Windsor’s designated Downtown District and the importance of maintaining this designation in order to further goals of this Plan per Act 59 [24 V.S.A. §2793(c)]. Benefits of designation are listed in 24 V.S.A. Chapter 76A.

Windsor has been pursuing economic revitalization efforts in the downtown for many years. In 1999, Windsor received an official Downtown Designation from the State of Vermont. This designation was most recently renewed in 2015. Renewal is due again in October 2020. It is critically important to maintain designation in support of Windsor’s downtown revitalization efforts.

The boundaries of the Downtown District are shown on the Future Land Use Map. Windsor’s Designated Downtown is one of the larger in the state, and includes not only the traditional Central Business District, but also the former industrial properties and several of the most important and densely developed residential neighborhoods. This configuration allows for a more coordinated effort to consider the downtown area and its combined effect in creating a highly attractive experience, combining shopping, the arts, housing, outdoor recreation and cultural tourism and history.

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A Design Control District was adopted by the Town to maintain the historic character and scale of the structures within this area. Both design control sub-districts, when combined, coincide with the Designated Downtown boundary.

The Windsor Downtown Committee is the entity that is primarily responsible for the local Downtown Program. The Town and Committee have been very active in recent years, completing the following downtown revitalization efforts:

- a) Completing a Downtown master planning effort;
- b) Reconstructed numerous sidewalks throughout the downtown;
- c) Made streetscape improvements along Depot Avenue and River Street;
- d) Rehabilitated the historic arch bridge on South Main Street;
- e) Hired a consultant to develop a scoping and feasibility study for bicycle and pedestrian improvements within the Downtown and extending north along US Route 5;
- f) Developed a Capital Budget and Program for planned infrastructure improvements within Downtown and beyond;
- g) Hired a consultant to develop a plan for redeveloping the portion of the Downtown generally located between the railroad tracks and the Connecticut River.

Renewing Downtown Designation is important to recognize local efforts to preserve and revitalize historic downtown Windsor, and to provide tools that help to implement goals, policies and recommendations of this Plan, including the following excerpts:

- a) Furthering the intent of the Land Use Chapter for the Downtown to serve as the traditional center of the community, with an infrastructure that allows for the highest densities in Town and enables travel by walking, bicycling and public transit.
- b) Implementing the Downtown Master Plan as discussed in Land Use and Economic Development Chapters.
- c) Windsor's participation in the Downtown Program makes these building owners eligible for tax credit programs that encourage improvements to historic buildings (see page 27).
- d) The importance of keeping Downtown Designation for maintaining certain local incentive programs for economic development as discussed on pages 59-60.

Goals

- 1) Create a diversified, sustainable economic base within Windsor that will provide measurable job creation and retention.
- 2) Seek economic activities that will provide competitive wages, benefits and job opportunities.
- 3) Create an incubating environment for "creative economy" enterprises to start-up and flourish in Windsor.
- 4) Maintain local downtown revitalization programs and initiatives in order to achieve an economically strong Downtown District in accordance with the Historic Downtown Development policies and purposes in 24 V.S.A. §2790.

Policies

- 1) Promote available technology environment (Wi-Fi, high speed internet access and bandwidth) within the core downtown area that will support potential business applications.

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- 2) Achieve sustainable occupancy within designated economic development areas with businesses and activities that are compatible with the goals and objectives of this chapter.
- 3) Establish Windsor as a prime destination for “heritage tourism” and outdoor recreation, and as a regional center for cultural institutions and events.
- 4) Provide reliable, affordable, and relevant social services attractive to employers and workers, such as day care, elder care, recreation, health care, arts and culture, etc.
- 5) Build on the community’s past history of innovation and cultural development to attract the casual visitor with goal of encouraging them to think of Windsor as a place to spend time, and perhaps live or start a business.
- 6) Match economic development activities with proportional growth in Town provided infrastructure, services and support required to sustain a robust and diverse community.
- 7) The Town shall continue to participate in Vermont’s Downtown Program.

Recommendations

- 1) Continue to develop ways of extending fiber optic into Windsor in order to support local economic development initiatives.
- 2) Improve connections between Downtown and Artisans Park via a Riverwalk path, bicycle routes or other linkages.
- 3) Support the Windsor Improvement Corporation as Windsor’s Economic Development “arm.”
- 4) Continue to work towards integration of local economic development efforts through WIC with regional efforts through the Springfield Regional Development Corporation and statewide efforts through the Vermont Agency of Commerce and Department of Economic Development.
- 5) Participate in the creation and maintenance of a web-based database of commercial and industrial properties in Windsor.
- 6) Ensure continued cooperation between the planning commission and local economic development groups.
- 7) Ensure the availability of adequate municipal services in Windsor’s designated downtown and other locations where development is specifically encouraged in this Plan.
- 8) Encourage the rehabilitation and use of existing, downtown retail and industrial space through zoning, local tax incentives, and other appropriate means.
- 9) Support the continued use and expansion of rail facilities for passenger and freight service.
- 10) Work with state and regional agencies to market Windsor and the surrounding area as part of the Connecticut River Scenic Byway.
- 11) Ensure the presence of a stable and capable workforce by supporting local education and encouraging local businesses to participate in the local vocational curriculum.
- 12) Collaborate with Mt. Ascutney Hospital to maintain a strong health care presence in the region.
- 13) Support the continued development of the hospitality industry.
- 14) Encourage Windsor Improvement Corporation and large businesses to work with area daycare providers to support expanding the daycare capacity in town.

Appendix A: Enhanced Energy Plan for the Town of Windsor, Vermont

A. Introduction

Windsor's *Enhanced Energy Plan* is a component of the *Windsor Town Plan* prepared in accordance with 24 V.S.A., Chapter 117, Subchapter 5. The intent of this plan is 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 document was prepared based upon the *Guidance for Municipal Enhanced Energy Planning Standards* (DPS; March 2, 2017) in order for the Windsor Town Plan to be given greater weight in the Section 248 process. The Section 248 process refers to the Vermont Public Utility Commission's (PUC) decision making process for public utilities, including, but not limited to, power generation facilities under [30 V.S.A. §248](#). For more information, see the [A Citizen's Guide to the Public Utility Commission](#) on the PUC's website.

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

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

A.1 Energy Goals

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

By 2050, 90% of Vermont's total energy will be derived from renewable sources.

The CEP includes additional goals to achieve the overall, long-term "90x50" goal. These goals serve as the platform for determining energy policies, targets and pathways for the Town of Windsor, as articulated throughout this plan.

A.2 Windsor's Energy Goals

The Town of Windsor hereby adopts the goals established in state law and the 2016 CEP. Through the detailed policies and actions contained in this plan, Windsor will strive to achieve these goals. See Appendix C that lists these energy goals. Below is a list of some of the methods outlined in this plan to further energy conservation and efficiency efforts within our community:

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*]

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- Reducing total energy consumption throughout all sectors, including: electricity, heating, and transportation.
- Support efforts at the local level to choose energy efficient and renewable options.
- Create a diverse mix of energy sources to reduce the impact of supply restriction.
- Utilize local, renewable sources of energy to decrease reliance on out-of-region, and out-of-state forms of fuel.
- Select energy choices that help preserve the environment.
- Strive for both an adequate supply of electricity, as well as a distribution network to meet the region’s needs.
- Maximize energy efficiency by matching fuel type to end use.
- Support adaptation and lifestyle changes which are consistent with changes in future energy use and generation.
- Reduce greenhouse gas emissions.

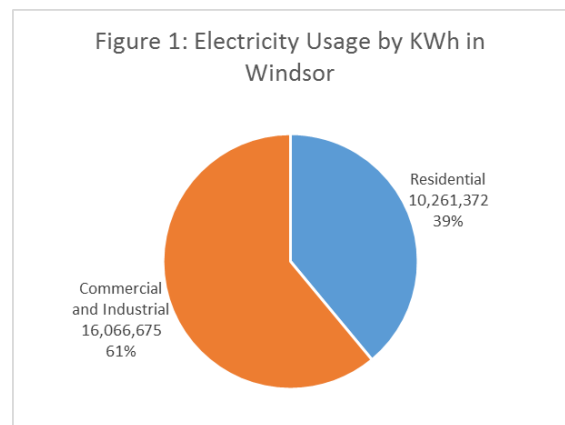
B. Analysis of Current Energy Use

This section involves a summary and analysis of existing conditions in Windsor with respect to energy use. Appendix A includes more detailed data figures, which are summarized in this section. Appendix B includes maps that depict the current energy facilities in Windsor. This section relies on data analysis provided by the Southern Windsor County Regional Planning Commission. The *Regional Energy Plan* for Southern Windsor County contains an important regional context for this analysis of Windsor’s energy use and targets.

Vermont’s Comprehensive Energy Plan (CEP) calls for 25% of energy needs to be met by renewable sources by 2025, 40% by 2035, and 90% by 2050. To help put that into perspective, existing renewable energy facilities in Windsor generate about 2.3% (596,030 kWh) of the total annual electricity used in Town (26,328,047 kWh). In 2014, about 45% of the electricity in Vermont was generated from renewable sources, according to the CEP.

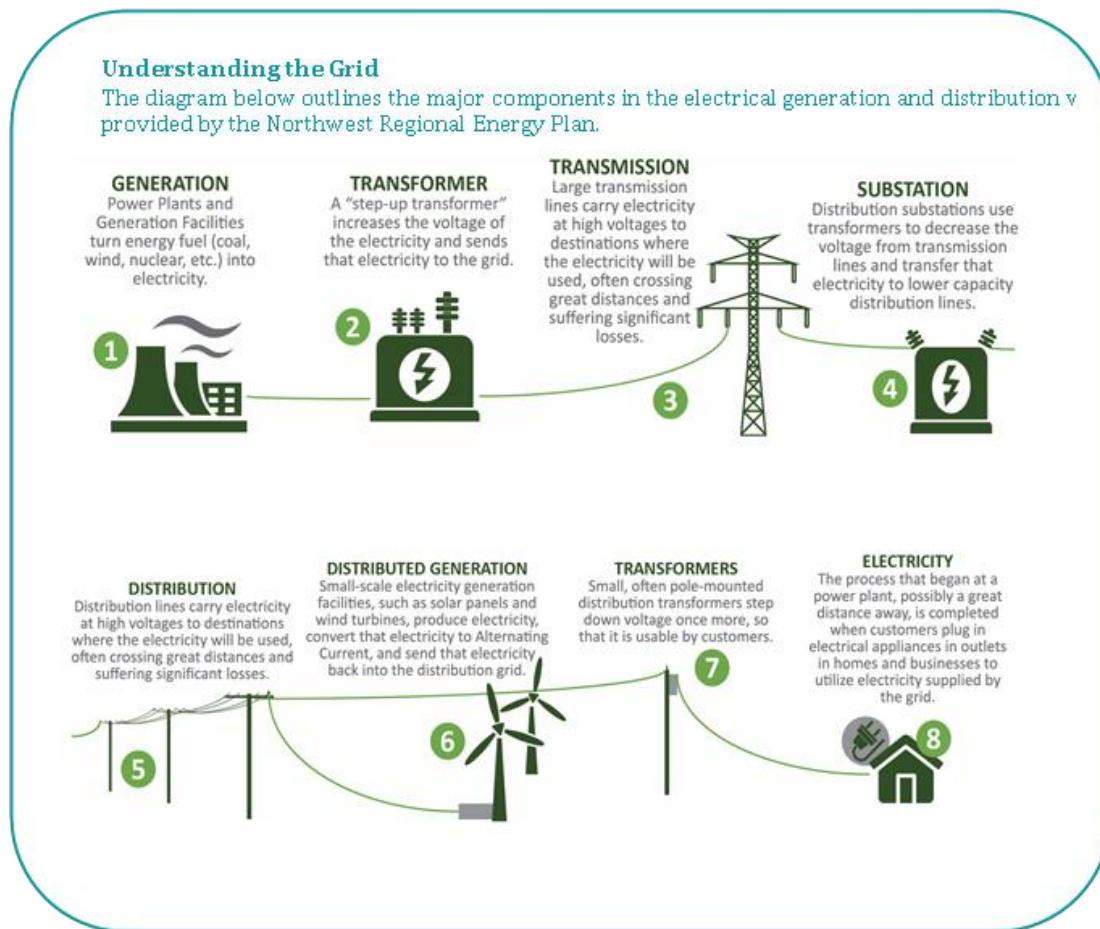
B.1 Electricity

Electricity is provided by Green Mountain Power throughout Windsor. There is one transmission line that passes north-south through Windsor. There are a number of three-phase distribution lines in Windsor. One follows the US Route 5 corridor. Another one generally parallels the state park auto road and terminates near the summit of Mount Ascutney. A third three-phase line parallels County Road and ends at the former prison. There is also a network of three-phase lines in downtown Windsor. The maps in Appendix B show these facilities.



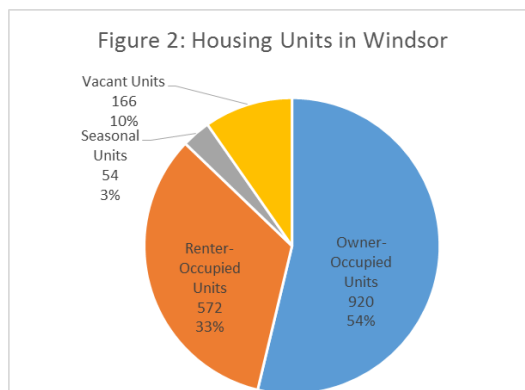
In 2015, residences accounted for 39% of the current total electricity usage, and commercial and industrial uses accounted for 61% of the total 6,998,859 kWh used in Windsor. See Figure 1 that summarizes electricity use data provided by Efficiency Vermont. Average residential usage is 7,315 kWh (2015). According to Department of Labor Statistics, there were 142 commercial establishments in Windsor during 2015.

Total electricity consumption in the region has essentially leveled off in recent years. Still, nearly 6% decrease in total electricity usage occurred in Windsor between 2014 and 2016. See Appendix A for more detail.



B.2 Thermal (Heating Buildings)

Windsor has a large proportion of rental housing units (about 33% of the 1,712 total housing units). See Figure 2 which summarizes total housing units in Windsor by type from the 2010 Census Bureau.



According to American Community Survey (ACS) data (2011-2015), the predominant ways to heat homes in Windsor include fuel oil (56%), propane (16%), and wood (11%). In 2015, the estimated average annual cost to heat a home was \$2,091.

In 2015, the annual average cost to heat businesses in Windsor was estimated to be \$11,042. There are a few very large industrial buildings in Windsor which may skew the average heating cost figure. It is likely that smaller businesses in town have much lower heating costs.

See Appendix A for more detail about heating existing buildings in Windsor.

B.3 Transportation

Windsor has a very dense, attractive downtown that has urban infrastructure, including sidewalks, on-street parking, and public water and sewer services. There is an extensive sidewalk network that serves much of the downtown, including many of the institutions (i.e. town offices, recreation facilities, schools, hospital). This encourages travel by walking. Bicycling is generally accommodated along the sides and shoulders of existing roads, some of which are better suited for cycling than others. Many residents rely on jobs in other locations (e.g. the Upper Valley). Public transportation services are available through The Current, including commuter service to the Upper Valley with stops at the park and ride lots by I-91 Exits 8 and 9. The bus does not presently have designated stops in the downtown. Many residents rely on driving their own motor vehicle to get to common destinations, as discussed in more detail in the Transportation Chapter of the Town Plan.

Data was compiled and is presented to understand the existing transportation energy use in Windsor (see Appendix A). Commute distances are moderately long; the average commute time is 22 minutes. Common work destinations for residents are Lebanon, Windsor, Hanover, White River Junction and Claremont. According to ACS data, there were about 1.5 vehicles per occupied household in 2015. The total vehicle miles traveled in a year is estimated at 39.8 million, which accounts for approximately 2.1 million gallons of total fuel used and an estimated total fuel cost of more than \$4.9 million.

C. Scenarios (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. Windsor is utilizing targets (or scenarios) developed using the Long-Range Energy Alternatives Planning (LEAP) Model and provided to Windsor 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 and development of new local renewable energy generation.**

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

- 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.

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, technological advances may help us to achieve our energy goals and targets in ways that we cannot anticipate today.

C.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.

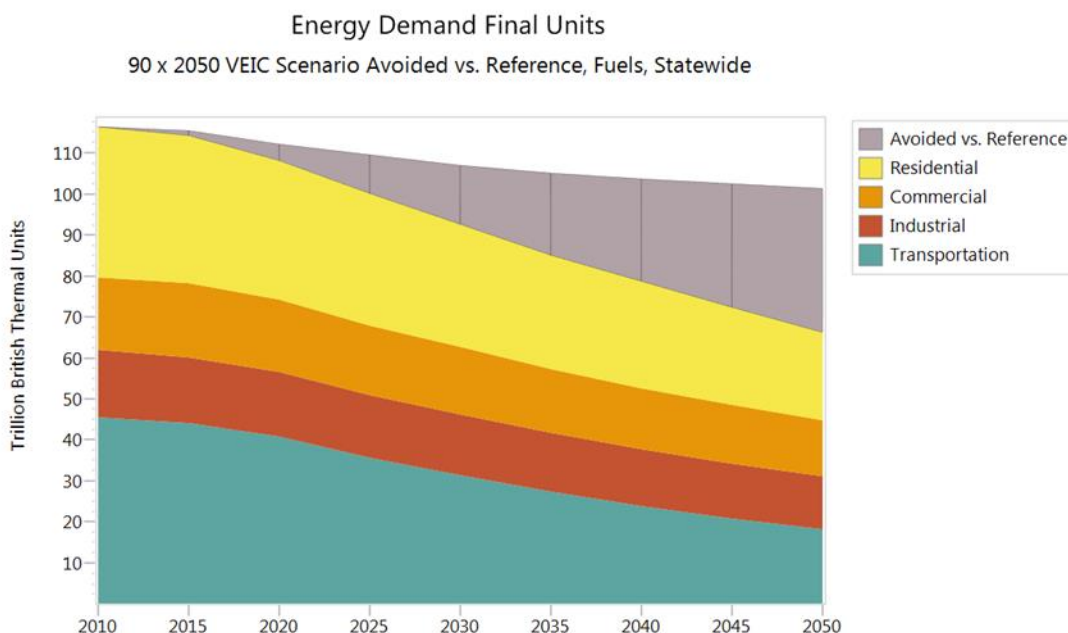


Figure 3: This figure depicts energy demand for the whole state. Vermont must significantly reduce total energy use by 2050 to be successful in implementing the goals of the Comprehensive Energy Plan. The LEAP model referenced in this Plan calls for substantial reductions in energy use by residences 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 Section D.

Table 1: Windsor’s Renewable Generation Targets (in MWh)			
	2025	2035	2050
Total renewable generation in MWh	4,770	9,539	19,078

C.2 Thermal (Heat for Buildings)

The first step to reduce energy demand for heating is to weatherize homes and businesses (e.g. air sealing, insulation). Table 2 shows the targets for weatherizing existing structures in Windsor. For example, the target is for 90% of all homes in Windsor to be weatherized by 2050. Note that the LEAP model-based targets for weatherization of homes in Windsor 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	30%	47%	94%

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 Windsor. 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
	51%	65%	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. The targets below represent the cumulative numbers of new systems needed to meet the energy goals. There may be multiple heating systems in one structure. (See Table 4.)

	2025	2035	2050
New efficient wood heating systems	6	15	76
New heat pumps	129	352	675

Cold-climate heat pumps are also referred to as air-source heat pumps, mini-splits or ductless heat pumps. (See Figure 4.) 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.

Ground-source heat pumps provide heating and cooling for buildings. (See Figure 5.) They work similarly to air-source heat pumps, but instead they pump water or other fluid through pipes buried in the ground to collect energy. A more detailed description for how these systems work

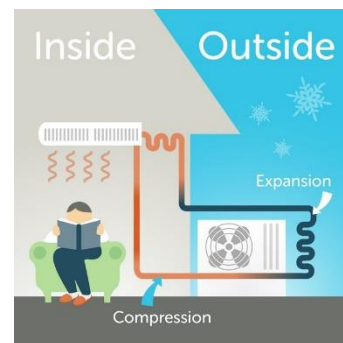


Figure 4: Illustration of how cold-climate heat pumps work. Source: Efficiency Vermont.

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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.

C.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.

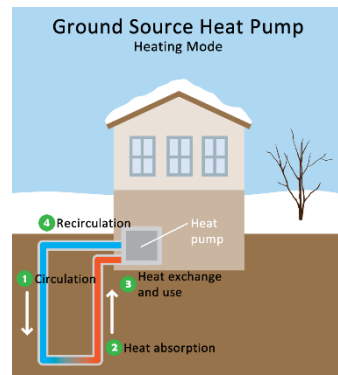


Figure5: Illustration of how ground-source heat pumps work. Source: US EPA.

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 Windsor. In other words, 90% of fuels used for transportation in 2050 should be from renewable sources.

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.

	2025	2035	2050
Passenger cars switch to electric vehicles	183	1257	2589
Trucks switch to biodiesel	316	588	980

D. Implementation Actions (Pathways)

In order to meet our stated energy goals and targets, the Town of Windsor identifies the following implementation actions, also referred to as “Pathways.” The following sub-sections are intended to be

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consistent with the pathway standards used in the *Guidance for Municipal Enhanced Energy Planning Standards* (VDPS; March 2, 2017).

D.1 Pathways Standard: Conservation and Efficient Use of Energy

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

Windsor has identified the following implementation actions to achieve this policy. The Town can use the Town website, the Town Manager's weekly e-news, direct mail, and Front Porch Forum to get information out to residents regarding many of the following implementation actions.

D.1.1: Encourage Conservation by Individuals and Organizations

The Town will lead by example, serve as a resource, and encourage individuals and organizations to conserve and use energy efficiently. To do so, Windsor identifies and promotes the following resources to provide guidance to individuals and organizations:

- a) Inform residents and businesses about available programs that can assist with energy conservation and efficiency improvements, including:
 - 1) Programs available through [Efficiency Vermont](#), such as workshops and educational opportunities to businesses on efficiency in new construction, retrofits, and conservation practices; and,
 - 2) Weatherization Assistance Program through Southeastern Vermont Community Action ([SEVCA](#)) for low-income households.
- b) Inform residents about Efficiency Excellence Network (EEN) contractors by providing [links to EEN information](#) through the Town website or through other means.
- c) Provide data that demonstrate why these improvements make sense for residents (e.g. estimated return on investment, case studies).
- d) Hold an information forum at the Town Offices and invite residents to speak about the energy improvements that they have made to their homes, invite local businesses to talk about the related services they can provide, and/or sponsor an energy savings challenge.
- e) Facilitate strategic tree planting to maximize energy benefits (i.e. shade trees, wind blocks).

D.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.

Windsor 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 and commercial building energy standards in accordance with 24 V.S.A. §4449. The Zoning Administrator distributes State energy code information to all applicants seeking a zoning permit for a structure that is heated or cooled. (Certificates of occupancy are not currently required in Windsor's zoning bylaws.)
- c) Promote benchmarking using the free [EPA Portfolio Manager tool](#) and/or with assistance from Efficiency Vermont for commercial buildings.
- d) Encourage that all residential and commercial projects follow the [stretch energy code or guidelines](#).
- e) Promote the use of [landscaping for energy efficiency](#).

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D.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. Windsor identifies the following to encourage less use of fossil fuels to heat buildings:

- a) Provide educational presentations on ways to decrease the use of fossil fuels, in coordination with Efficiency Vermont.
- b) Promote the use of [cold-climate heat pumps](#) for retrofitting existing buildings.
- c) Encourage the use of [ground-source heat pumps](#) for new construction.
- d) 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 cordwood or pellet stoves.
- e) If renewable energy systems are not practicable, encourage homeowners to replace old furnaces or boilers with [high-efficiency models](#).
- f) Encourage and promote advanced wood heating by: supporting the conversion of existing fossil fuel heating systems to wood; encouraging local manufacturing of advanced wood heat technology; supporting development of wood fuel delivery infrastructure; and/or supporting development of sustainable forestry and procurement services.

D.1.4: Demonstrate the Town's Leadership by Example with Respect to the Efficiency of Municipal Buildings

Windsor 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) 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.
- 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) Implement appropriate recommendations from the recent energy audits of municipal facilities.
- e) The Town will construct all new public buildings according to standards of energy efficiency at least equivalent to U.S. EPA [Energy Star](#) rating or similar certification where it can be demonstrated to be cost-effective.

D.2 Pathways Standard: Transportation

- a) The Town of Windsor encourages the reduction of transportation energy demand and single-occupant vehicle use.
- b) The Town of Windsor encourages the use of renewable or lower-emission energy sources for transportation.

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

D.2.1: Encourage Increased Use of Public Transit

Public transit utilization at a meaningful scale to make a difference toward this goal is not likely considering existing levels of service, as enabled by current funding levels. However, improving access

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to public transit services is a priority. Windsor will implement the following actions to encourage public transit:

- a) Improve awareness of existing public transportation services available to residents (e.g. Volunteers in Action, The Current). For information about public transportation services, see the SWCRPC's [A to B Mobility Study](#).
- b) Work with public transit providers in your region to promote full utilization of existing routes and where necessary, identify and develop new public transit routes or stops.
- c) Plan and advocate for access to public transit, especially during Act 250 proceedings for larger developments.
- d) Investigate if the public transit provider can stop at or near the municipal park-and-ride lot.

D.2.2: Promote a Shift Away from Single-Occupancy Vehicle Trips

Existing public transit services can meet the mobility needs of some residents, notably commuters to the Upper Valley, elders and persons with disabilities. Additional efforts to enhance utilization of existing services will help. Windsor will work to encourage a reduction in single-occupant vehicle trips through the following actions:

- a) Work with public transportation providers to evaluate possible expansions of transit services, such as establishing bus stops within Downtown Windsor.
- b) Continue the ongoing discussions with AMTRAK about maintaining passenger rail service in Windsor.
- c) Identify any structural barriers to telecommuting, such as office policies or internet connectivity and speed.
- d) Work with partners to improve internet speeds to enable telecommuting by residents.
- e) Promote the [Go Vermont](#) webpage, which provides rideshare, vanpool, public transit and park-and-ride options.
- f) Support employer programs to encourage telecommuting, carpooling, vanpooling, walking, and biking for employees' commute trips. Encourage employers to offer such programs and provide information on tax benefits that may be available for doing so.

D.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. Windsor has identified the following pathways to shift toward electric vehicles and other non-fossil fuel travel:

- a) Increase awareness of the benefits of electric vehicles and alternative-fuel vehicles through education and outreach efforts.
- b) Seek grants to fund the installation of electric vehicle charging infrastructure at municipal facilities or at a suitable location along the US Route 5 corridor.
- c) Encourage the use of biodiesel in all diesel vehicles in a manner that does not compromise the manufacturer's engine warranty.
- d) Promote the [Drive Electric Vermont webpage](#), which connects users to financial incentives, dealers, and recharging stations for electric vehicles.
- e) Evaluate the zoning bylaws to ensure that bio-fuels businesses of the appropriate scale and intensity are enabled in appropriate locations within Town.

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D.2.4: Facilitate the Development of Walking and Biking Infrastructure

Active transportation, such as walking and bicycling, offers significant health benefits and requires no transportation fuels. Downtown Windsor has an extensive sidewalk network and the Town has been investing in sidewalk improvements in recent years. In order to continue promoting active transportation, Windsor has identified the following pathways:

- a) Maintain roads in order to better accommodate travel by walkers and bicyclists. For example, this includes paving/overlays to maintain a smooth roadway surface on major roads as well as modest shoulder widening in areas where pedestrian activity is observed or desired.
- b) Continue to invest in sidewalk maintenance as the Town has been doing in recent years.
- c) Consider cost-effective options to accommodate safe walking in areas outside of the downtown (e.g. mowed grass walking path).
- d) Continue to explore opportunities to construct walking and biking infrastructure that is identified in town planning documents and studies.

D.2.5: Demonstrate the Town'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. Windsor wishes to do so through the following ways:

- a) Install an electric vehicle charging station at the Town Offices and/or at the Welcome Center.
- b) When purchasing new vehicles, the Town will seek a model with the best fuel efficiency standards available, including electric vehicles.

D.3 Pathways Standard: Land Use Patterns and Densities

- a) The Town of Windsor encourages maintaining the historic settlement pattern of compact village centers surrounded by rural countryside in accordance with [24 V.S.A. §4302](#).
- b) The Land Use Chapter of the *Windsor Town Plan* seeks to maintain/enhance a vibrant downtown surrounded by a rural countryside/working landscape.
- c) The Economic Development Chapter of the *Windsor Town Plan* states: "Windsor's primary goal is to encourage economic development that is consistent with the Land Use Chapter and State Planning Goals. Economic development activity is desired in locations that are to the east of I-91 and where infrastructure exists to support it."
- d) Zoning bylaws adopted by the Town are consistent with the goals of the *Town Plan*.
- e) Windsor has a State-designated Downtown under 24 V.S.A. Chapter 76A, and the *Town Plan* calls for maintaining that designation.

The DPS anticipates that if municipalities are actively participating in the above statutory frameworks for community planning, they will likely meet Pathways Standard 8. Windsor is currently working to amend the Zoning Bylaws.

D.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.

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- a) The Land Use Chapter in the Town Plan limits intensive commercial and industrial activity to a few areas indicated on the Future Land Use Map (i.e. Downtown, Industrial), calls for high-density residential in areas surrounding the downtown, and it generally calls for low density rural development patterns elsewhere in keeping with the rural countryside aspect of the state planning goal.
- b) The *Town Plan* discourages sprawl and strip commercial development. It recognizes the existing development and allows for continued commercial activity in the Roadside/US Route 5 North area but calls for sound access management in order to discourage strip development.
- c) The parts of Windsor located to the west of I-91 are considered to be rural and the *Town Plan* and the Zoning Bylaws both call for maintaining the rural character.
- d) The plan supports attracting local businesses to Windsor so residents can work locally.

D.3.2: 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. Downtown Windsor is the compact, mixed-use center for the community. With that in mind, Windsor chooses to encourage these desired patterns by:

- a) Continuing the community's efforts to revitalize downtown Windsor.
- b) Adopt/maintain a Capital Budget and Program that includes infrastructure investments necessary to support the compact development as envisioned in the *Town Plan* (e.g. sewer and water, pedestrian and biking facilities, parking).
- c) Maintain Downtown designation under 24 V.S.A. Chapter 76A.
- d) Complete the ongoing Better Connections-funded planning effort to revitalize the portion of downtown that is located between Main Street and the Connecticut River. Seek implementation of recommendations from that plan. Continue to pursue completion of the ongoing flood hazard mitigation projects in the riverfront neighborhood.

D.4 Pathways Standard: 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 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 "90x50" energy goal. The following subsections discuss how the Town wishes renewable energy generation to take place in Windsor.

D.4.1: Evaluate Existing Renewable Energy Generation

There are currently 37 known existing solar sites in Windsor, representing 486 KW of installed capacity and 596,030 KWh of generation output. There are no known wind turbines, hydro power, or biomass power facilities in operation in Windsor at this time. See Appendices A and B or the [Community Energy Dashboard](#) for more detail.

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D.4.2: Analyze Generation Potential from Preferred Sites and/or Potentially Suitable Areas

An analysis of renewable energy generation potential was conducted by Windsor with assistance from the SWCRPC. This consisted primarily of an analysis of available GIS mapping data and was based upon the guidelines established by the DPS for enhanced energy planning. Table 7 below summarizes the findings of this analysis.

Table 7: Windsor’s Potential Renewable Energy Generation

Type	Installed Capacity (MW)	Generation Output (MWh)
Roof-top Solar	4.3	5,274
Ground-mounted solar	193.3	237,063
Wind	79.4	243,440
Hydro	0.232	813
Total	277	486,590

Based upon these raw numbers, there is significant potential to generate power from renewable sources in Windsor, primarily through ground-mounted solar and wind. There is potential to generate about 27.6% of Windsor’s target through rooftop solar alone. Hydropower has potential for future generation, although the permitting procedures and high costs to do so are obstacles. Ground-mounted solar and/or some forms of wind will be needed in order to meet the “90 by 50 goal.” See the discussion in the next section for more detail about the potential for ground-mounted solar and wind power.

D.4.3: Identify Sufficient Land for Renewable Energy Development to Reasonably Reach the 2050 Targets

Table 1 in Section C.1 summarizes Windsor’s overall targets for renewable energy generation. There is more than an adequate land area in Windsor that has potential for solar to meet our 2050 renewable energy target of 19,078 MWh. That target is the equivalent of approximately 15.6 MW of ground-mounted solar at the installed capacity. The guidance assumes 8 acres of land are generally needed to support 1 MW of solar. This would amount to about 124 acres of land needed to meet this target. This represents about 26% of the land area in Windsor that is estimated to have *prime* potential to generate solar power.

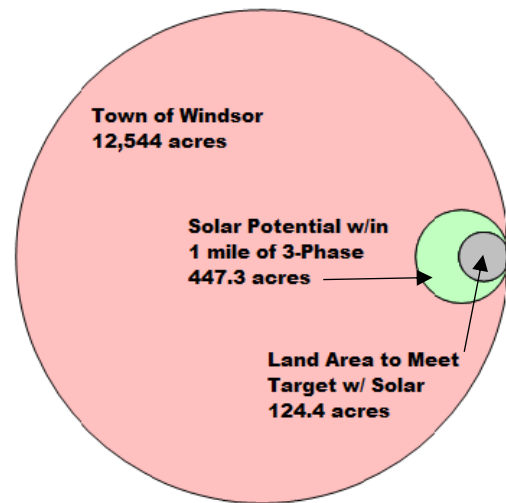


Figure 6: Land area comparisons. The total land area in Windsor is 12,544 acres. There are 484.6 acres of land estimated to have prime solar potential, 92% of which is within 1 mile of existing three-phase power lines (447.3 acres). An estimated 124.4 acres is needed to meet Windsor’s renewable energy target through ground-mounted solar alone.

There are an estimated 1,670 acres of land in Windsor that have potential for solar production (see the Solar Resource Map). However, this potential is reduced when examining the prime potential areas, which account for about 485 acres. Solar potential is reduced further to 447 acres when evaluating prime areas that are within 1 mile of existing three-phase power lines¹ (see Figure 6). As

¹ An assumption being made here is that it is more cost-feasible to develop renewable energy generation projects if they are within one mile of three-phase power lines.

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discussed above, 124 acres might be required to meet Windsor’s renewable energy target for 2050 through ground-mounted solar alone. That represents about 27.8% of the land areas that have prime solar potential within 1 mile of three-phase power lines. Thus, adequate land area with solar potential is available to meet Windsor’s target. However, we acknowledge that to do so will require land owners (both public and private) to be willing to pursue solar projects with developers.

Furthermore, Windsor completed an analysis of a future solar development scenario to determine if our goal of keeping solar projects east of I-91 is feasible. As of January 2019, 8 solar proposals for about 5,335 MWh of energy generation are either approved by the PUC or pending approval. An additional 13,743 MWh is needed to meet our renewable energy target. The Planning Commission identified 9 potential sites east of I-91 and within 1 mile of 3-phase power where solar projects might be acceptable to them. Those areas combine to include a total land area of 100.38 acres. If 8 acres are required to generate every 1 MW of solar, these areas could generate 15,388.25 MWh of generation. When combined with the 5,335 MWh of proposed solar projects, this could exceed Windsor’s target (19,078 MWh) for the state’s 90X50 goal by 1,645 MWh. This analysis does not factor in rooftop solar or residential wind, which adds to the potential for future renewable energy generation beyond our target for Windsor.

In Windsor, only about 318 acres of land have been identified as having wind potential, as shown on the Wind Resources Map. In theory, Windsor’s renewable energy target could be reached with about six utility-scale wind turbines (measured at 70 meters high at the hub) that generate 1 MW each. It is estimated that about 25 acres of land area would be required to accommodate those wind turbines. Based upon the wind potential maps, there are only a few small areas with potential for utility-scale wind within 1 mile of three-phase power lines. However, prevailing conditions are such that it seems unlikely that Windsor could support a large wind farm. Windsor’s Town Plan also calls for maintaining rural character to the west of I-91 and it generally limits uses there to residential and working landscape activities. We also understand that the proposed new state noise standards may make it difficult to permit utility-scale wind turbines in the State of Vermont.

The Town of Windsor’s observation is that, in general terms, solar projects have more localized aesthetic impacts, while utility-scale wind projects have regional aesthetic impacts. Wind turbines of 70 meters or greater in height, built on a ridgeline, can usually be seen from many miles away.

A mix of renewable generation types is desirable in order to meet the overall renewable targets for Windsor. The following more detailed targets in Table 8 represent one scenario for how Windsor can meet the overall renewable generation target for the Town. Rooftop solar is desirable. Residential-scale ground-mounted solar is desirable. Commercial ground-mounted solar (150KW and above) is encouraged east of I-91 as long as it meets our siting criteria as articulated in this plan. Residential-scale wind turbines (not to exceed 30 meter hub height) are also encouraged. Commercial-scale wind turbines (not to exceed 50 meter hub height) may be acceptable as long as they meet all applicable policies in the Town Plan. Small renewable energy systems, such as one commercial-scale wind turbine, that are incorporated thoughtfully into a subdivision are encouraged. Utility-scale wind turbines appear to be unlikely in Windsor due to the existing landscape and prevailing wind conditions.

Table 8: Windsor’s Detailed Renewable Generation Targets (in MWh)

Type	2025	2035	2050
Roof-top solar	1,468	2,348	5,283

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Ground-mounted solar	3,148	6,884	12,415
Residential-scale wind (30 meter hub height)	153	307	460
Commercial-scale wind (50 meter hub height)	0	0	920
Total renewable generation in MWh	4,769.5	9,539	19,078

This plan embraces the “90x50” goal and we believe that the above analysis demonstrates that Windsor’s plan for new renewable energy is adequate to meet our future needs and the renewable energy generation target, without utility-scale wind turbines.

D.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

Local constraints for renewable energy generation are as summarized in this section. These constraints have been analyzed, and the Town of Windsor 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 based upon the mapping methodology in the enhanced energy planning guidance and are hereby excluded from the potential wind and solar sites, as depicted on the map (i.e. “known constraints”):

- a) Vernal pools with a surrounding 50 foot buffer;
- b) DEC river corridors;
- c) FEMA floodways;
- d) State significant natural communities and rare, threatened and endangered species;
- e) National wilderness areas;
- f) Class 1 and Class 2 wetlands; and,
- g) Significant agricultural soils/scenic fields as depicted on the solar potential map.

Also based upon the enhanced energy planning guidance, the following list represents 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 (i.e. “potential constraints”):

- 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.

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D.4.5: Statements of Policy to Accompany Maps

Windsor 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) Establishing new utility-scale power generation facilities that utilize non-renewable fuel are not consistent with the goals of this plan.
- b) All large residential, commercial and industrial developments must demonstrate that they have considered renewable energy in their application.
- c) Windsor prefers renewable energy projects to be located east of the I-91 corridor and carefully sited and integrated into existing development patterns in order to be consistent with the surrounding area.
- d) Renewable energy generation facilities must avoid “known constraints.”
- e) In Windsor, unsuitable sites for renewable energy generation facilities include Paradise Park, the Great Farm, state wildlife management areas, agricultural soils located between Mill Pond and US Route 5, and the Oak Knoll Farm fields along the Connecticut River. See the map.
- f) Renewable energy generation facilities must not have undue adverse impacts on “possible constraints.” In addition, applicants shall demonstrate that the project will not have undue adverse impacts on significant wildlife habitat, wildlife travel corridors, stormwater, water quality, flood resiliency, important recreational facilities or uses, scenic resources identified in this plan, or inventoried historic or cultural resources. Project proposals must consider placement of such facilities in locations where impacts are minimal or employ reasonable measures to mitigate undue adverse impacts of the applicable resources.
- g) The applicant is expected to provide a plan for the site to be adequately decommissioned when the project ceases commercial operation in accordance with PUC Rule 5.900.

SOLAR

- h) All new home construction should be designed to be solar-ready (i.e. be oriented for solar advantage, enabling future rooftop solar power generation.)
- i) Windsor supports rooftop solar projects.
- j) Windsor supports residential-scale ground mounted solar projects.
- k) Ground-mounted solar projects must demonstrate that the proposed project siting is appropriate in scale as it relates to the character of the area in which it is to be located, and the applicant must also demonstrate that all reasonable options have been considered in siting the facility.
- l) All applicable ground-mounted solar projects are subject to the minimum setback standards in 30 V.S.A. §248(s).
- m) All ground-mounted solar projects of 150 kW capacity or greater must be east of I-91, unless it is located and the power is used on the same parcel or adjacent parcel.

WIND

- n) Windsor encourages wind power that is consistent with the character of the surrounding area; as such:

- a. Wind turbines of any scale must be east of I-91, unless it is located and the power is used on the same parcel or adjacent parcel.
- b. All applicants must demonstrate that for any proposed wind project all reasonable siting options have been explored and that the project has minimized the negative impacts of interconnection.

BIOFUEL

- o) Woody biomass is suitable to heat buildings.
- p) A biomass power plant may be acceptable if the scale is appropriate for the proposed location, fuel deliveries do not cause excessive traffic or wear and tear on the roadways, it does not create a nuisance for the neighborhood (e.g. smoke, noise, pollution), the project utilizes higher-efficiency technology, and it produces both heat and power.
- q) Biogas that is collected as a byproduct of farming operations is encouraged for use as heat or power.

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.

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D.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 or 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 Windsor include:

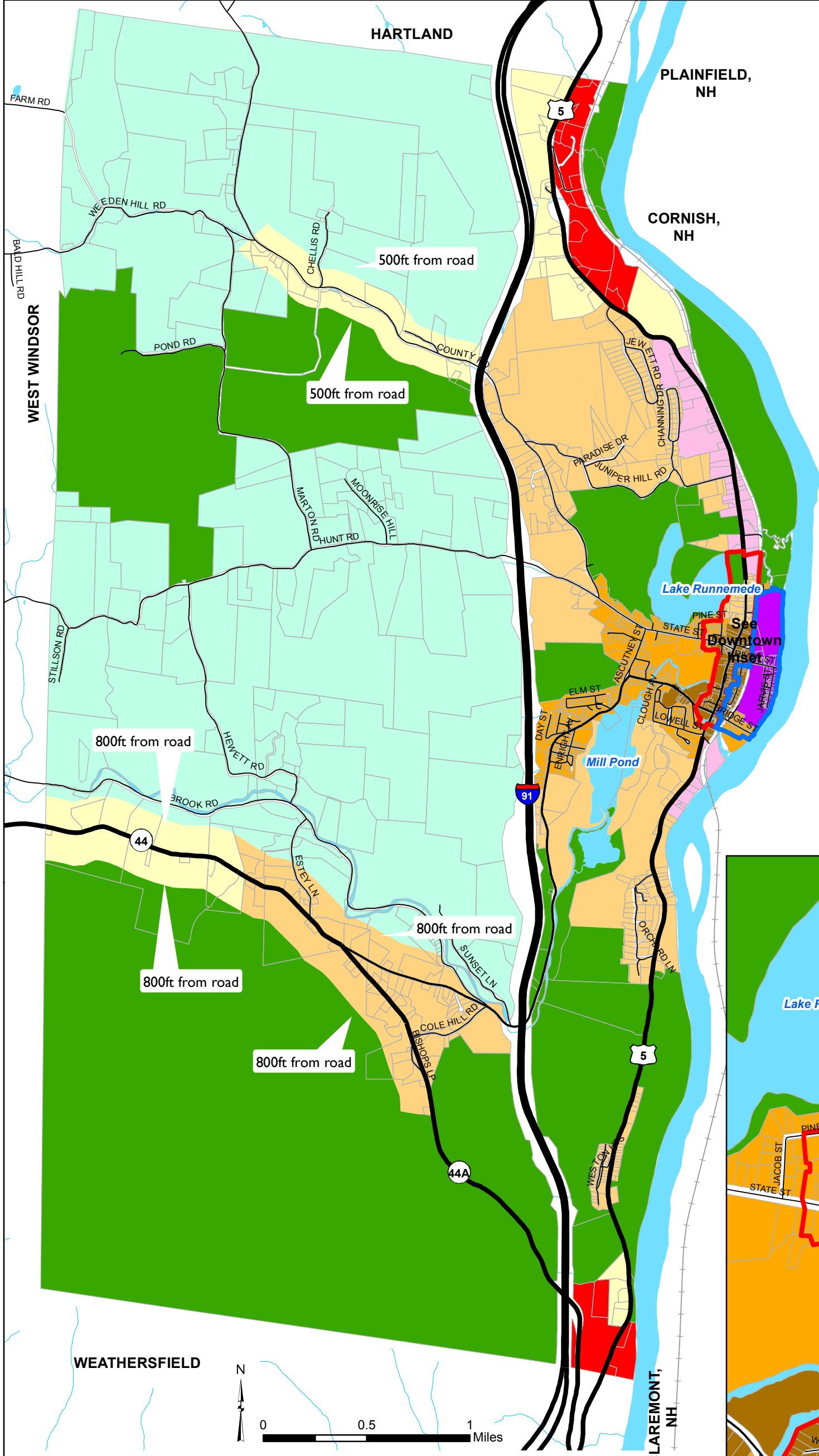
- a) Rooftops;
- b) A canopy over paved parking lots;
- c) Brownfield sites; and,
- d) Disturbed portions of extraction sites (i.e. gravel pit, quarry or similar mineral resource extraction site).

D.4.7: Demonstrate the Town's Leadership by Example

The Town of Windsor will lead by example through the following means:

- a) Working collaboratively with the Windsor Improvement Corporation, Springfield Regional Development Corporation and other partners to identify opportunities for local renewable energy generation that benefits the community and furthers the goals and policies of this plan.
- b) Consider installing solar systems on the roofs of town buildings.
- c) Create a capital reserve fund to pay for energy improvements to Town buildings.

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Zoning Map
Adopted March 24, 2015
Town of Windsor, VT
Effective Date: April 14, 2015



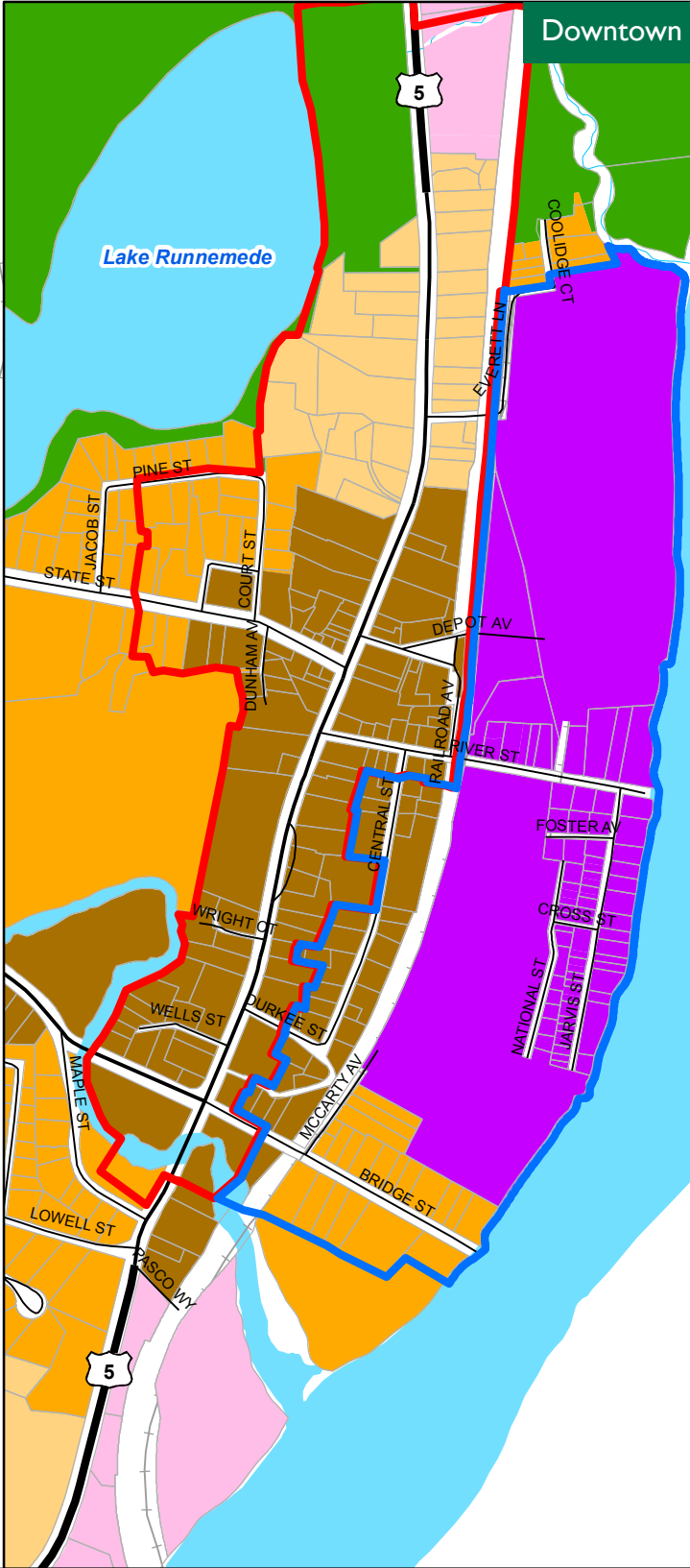
Design Review Subdistrict

- Main Street
- Rails to Riverfront

Zoning Districts

- Central Business District
- Village Mixed Use
- High Density Residential
- Medium Density Residential
- Low Density Residential
- Rural
- Industrial
- Resource
- Roadside Business
- Surface Water
- ROW

- 2010 Parcels
- Waterbody
- Interstate, US and State Highway
- Class 1 Town Highway
- Class 2 and 3 Town Highway
- Railroad



Where district boundaries are indicated as approximately following streets or highways, the centerlines of such street or highway rights-of-way shall be construed to be the boundary unless more accurate data is available.

Where the boundary of a district follows a railroad line, such boundary shall be construed to be the middle of the main track of the railroad line unless better data is available.

VT State Plane, Meters, NAD 83
Data depicted on this map are for planning purposes only and are based on best available information. Some of the data do not line up.

Data Sources:
Road centerline (VTrans 2012), Parcels (Russell Graphics 2010), Railroad (VTrans 2003 and NHGranit 1993), Zoning Districts (RPC 2015), Design Review Districts (Unknown)



For planning purposes only
Not for regulatory interpretation
Drawn February 11, 2016

