Williston
VERMONT

Energy Plan

September 1, 2020

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May 19, 2020

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Executive Summary

Scientific evidence points to our planet in crisis, and the impacts of climate change will increasingly become a matter of public safety and economic prosperity as extreme weather events occur with greater frequency and intensity. In looking towards the future, action must take place at all levels to cut greenhouse gas (GHG) emissions that result from the use of fossil fuels and to mitigate their impacts. To meet these challenges, towns need to design and implement plans that ensure safe, sustainable, and thriving communities in the context of a changing climate and energy landscape. The 2020 Williston Energy Plan was developed in accordance with the Vermont Department of Public Service's energy planning standards. This is the first attempt by our local municipality to achieve the goals outlined by the 2016 State of Vermont Comprehensive Energy Plan (CEP). Beginning with the Energy Plan Task Force in July 2018, volunteer residents devised this energy plan with guidance from town staff and Chittenden County Regional Planning Commission (CCRPC) staff, and oversight from the Planning Commission, to provide direction for the reduction of greenhouse gas emissions by focusing attention on five key areas:

1) transportation and land Use
2) building energy usage
3) recycling and consumption
4) renewable energy generation
5) agriculture

Within each major focus area, the plan articulates measurable *goals* the town aims to achieve, outlines *objectives* to achieve said goals, identifies *pathways* that list the responsible entities, and suggests a timeline for task completion. As with any plan, there are limitations to what can be accomplished without investing sufficient resources for implementation. Yet, the Town of Williston is in a unique position to establish our community as a leader in innovation and sustainability at a time when environmentally driven action can no longer wait – for the sake of our residents, our town, and our planet.

Vision

To create a community powered by renewable, locally produced and owned energy, fed by town farms, housed in efficient homes with an environmentally responsible transportation system, all sustained by a vibrant, local economy and social network. We believe our resources are finite; and that we are an integral part of nature.

Introduction

While the State has set goals for 2050 through the 2016 Comprehensive Energy Plan (CEP), the August 2018 report of the International Panel on Climate Change (IPCC) states that, "**we must switch from fossil fuels to renewable, non-carbon based energy sources by 2030 to avoid a 1.5 degree increase in global temperature; a change which is projected to cause catastrophic risks to human systems."** This means that Williston needs to take an all-in approach with bold, aggressive actions to move the town off fossil fuels and onto renewable energy sources. Climate change is an issue of public safety with severe weather events sure to occur with greater frequency and intensity. Therefore, addressing climate change deserves attention and resources on a similar scale to our other town public safety departments.

This plan has several functions:

- It is a stand-alone document and a supplement to the 2016-2024 Williston Comprehensive Plan
- It is a plan to help Vermont achieve the goals of the state Comprehensive Energy Plan (CEP) at the local level
- It is a plan to obtain a "determination of energy compliance" from the Chittenden County Regional Planning Commission (CCRPC) that will assure the plan will receive "substantial deference" when siting renewable energy projects within the town.

This plan was developed according to the Vermont Department of Public Service's energy planning standards. The energy planning standards focus on a long-term horizon. The Town of Williston will consider accelerating the pace of change needed to implement the pathways outlined in this plan. The plan is written based on current technologies, with the flexibility to adapt to future technological advances.

While the town can educate and inform, it has limited power to effect change by itself. The town recognizes that progress will only be achieved through the leadership, innovation and actions of residents, businesses, partners and government entities.

The major areas addressed in this plan, since they create the bulk of the greenhouse gas (GHG) emissions and the energy budget, are:

- Transportation
- Building Energy Usage
- Recycling and Consumption
- Electrical Energy Generation
- Agriculture

The sections of this plan are organized into:

- *Goals* that tell us what we are aiming for.
- *Local Objectives* that indicate the areas we will address to get to our *goals*.
- *Pathways* that identify the task, the responsible entity, and a time frame to accomplish each *local objective*.

ACT 174 AND SUBSTANTIAL DEFERENCE

In 2016, Act 174 established a process for "enhanced energy planning," which encourages municipalities to write plans that are "energy compliant." This plan meets the standards for energy planning established by Act 174 and outlined in 24 V.S.A. §4352. Therefore, the policies of this plan will receive substantial deference in §248 proceedings. The Public Utility Commission shall apply the land conservation measures or specific policies in accordance with their 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. This is a higher standard of review than "due consideration," which the municipal plan's policies would otherwise receive.

State Goals

The 2016 State of Vermont Comprehensive Energy Plan (CEP) and Vermont Statute set ambitious statewide energy goals:

- To reduce greenhouse gas emissions, with a 50% reduction below 1990 levels (8.59 MMTCO2e) [1] by 2028, and 75% reduction below 1990 levels by 2050 (10 V.S.A. § 578).
- To reduce total energy consumption per capita by 15% by 2025 and by more than 33% by 2050.
- To meet 25% of remaining energy needs from renewable sources by 2025, 40% by 2035, and 90% by 2050.

Three goals to achieve by 2025, identified in the 2016 Vermont CEP, are:

- 10% renewable transportation energy
- 30% renewable building energy use
- 67% renewable electric power

An additional 2020 goal is: To substantially improve the energy efficiency of 25% of the state's housing stock by 2020.

Going forward, Vermont is expecting to rely more on electricity as an energy source. This includes shifting most light duty vehicles to electric vehicles and transforming the way buildings are heated. Even though more electricity is being used, electric appliances such as heat pumps and electric vehicles are more energy efficient than fossil fuel counterparts, resulting in a reduction in total per capita energy use. Building and retrofitting structures from an energy efficiency perspective while generating and using more renewable energy is also a critical step. The Community Energy Profile section of this plan provides quantitative details of Williston's current energy profile and the magnitude of change needed to make these transformations.

[1] Vermont Greenhouse Gas Emissions Inventory Update (1990-2015), June 2018

Local Objectives

Meeting the State goals at the local level will require ambitious action to transform the way Williston uses and produces energy. This transformation will enhance the health and vigor of the Town's local economy and long-term affordability for residents. To do so, Williston will increase public awareness of energy issues, assess local energy use, and identify opportunities for conservation, energy source conversion, and renewable energy generation.

Between now (2020) and 2050 Williston intends to:

1. Reduce total energy use per capita by 27%
2. Reduce greenhouse gas emissions, with a 50% reduction below 1990 levels by 2028, and a 75% reduction below 1990 levels by 2050.
3. Double the amount of renewable energy generation sited in Williston
4. Reduce energy used to heat, cool and power buildings by individuals, organizations and the Town of Williston.
5. Weatherize 90% of homes and at least 50% of commercial and industrial establishments
6. Require all new construction to verify that it meets defined energy efficiency standards.
7. Increase the share of light-duty electric vehicles registered in Williston to 10% by 2025 and 89% by 2050.
8. Fuel 96% of heavy-duty municipal vehicles with renewable resources and work with the school district to fuel school vehicles with renewable sources
9. Equip 84% of homes with cold-climate heat pumps (CCHP) and 14% of homes with wood heat as a primary heat source.
10. Shift from fossil fuels as the primary heat source to renewable sources of heat energy, including heat pumps powered by renewable energy and wood heating.
11. Educate Williston citizens, town government, Champlain Valley School District (CVSD) and private businesses about the economic and environmental value of transitioning from a fossil-fuel vehicle society.
12. Act to decrease transportation energy demand by promoting electric vehicles, increasing the awareness of and supporting the use of public transit, walking/biking infrastructure, carsharing, and ridesharing.
13. Continue a land-use policy that embraces smart and sustainable growth
14. Reduce our waste stream by reducing consumption, expanding the sharing economy and fixer-spaces, and recycling 100% of our materials thereby reducing energy needed to produce these materials.
15. Increase the use of regenerative design principles in landscaping, agriculture and conservation land management methods

Meeting 90% of energy needs with renewable sources by 2050 will require Williston to produce an additional 14,775 MWh to 44,819 MWh megawatt hours (MWh) of electricity annually by 2050. It is essential that Williston move to a distributed energy system which utilizes solar, wind, biomass, storage, and microgrids. Williston produces 29,872 MWh from solar, wind, and hydro facilities (see the Renewable Energy Generation section and Table 6 for more details).

Finally, improving the energy efficiency of 90% of the town's housing stock will require a major effort on the part of the town's government. This should include partnering with outside organizations, and educating homeowners to ensure that the housing stock is weatherized and energy efficient.

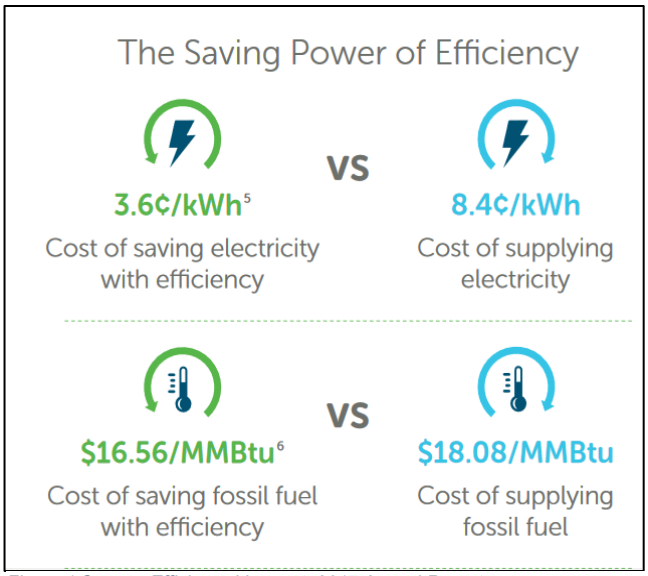

Figure 1 Source: Efficiency Vermont, 2017 Annual Report

The transformation of the energy landscape in Williston also can increase energy security and economic stability for residents, if the goals are met equitably. Residents and businesses can save money by retrofitting buildings to be more energy efficient as the cost of efficiency improvements is lower than the cost of purchasing additional energy (see Figure 1.0). The cost of saving electricity through improved efficiency is 3.6 cents/kWh vs a cost of 8.4 cents/kWh for supplying electricity. Additionally, the cost of saving fossil fuel through improved efficiencies, compared to the cost of supplying fossil fuel is $16.56/MMBtu vs. $18.08/MMBtu. The savings between efficiency and supplying fossil fuels is small because oil and gas are cheap today (2020). Regardless, efficiency is still a sound investment for residents, the town, and local business.

Residents of all income levels must be able to access weatherization services, more efficient technology, and renewable energy. A Williston Energy Committee and other parties within Williston will strive to ensure equal access to services and technology by leveraging a network of partners and funding sources. The work to move towards a more equitable and efficient energy system involves everyone and can benefit the entire community. Energy efficiency and renewable energy development also support green jobs and adds to the local economy.

Details on changes that must occur within Williston to meet these goals are described in the following sections. Meeting these goals will require a great deal of work in the short term. Progress towards the weatherization goals set in the 2016 Comprehensive Energy Plans and legislation is already behind schedule. For example, Vermont's statutory energy goals call for the weatherization of 60,000 homes in Vermont by 2017, and 80,000 by 2022. According to the Energy Action Network 2017 Annual Report, only 23,397 homes in the state had been weatherized. Unfortunately, data is not available for the Town of Williston that provides an accurate count of the number of homes weatherized to date. Going forward, the Chittenden County Regional Planning Commission (CCRPC), in collaboration with Efficiency Vermont, hopes to be able to better track progress on building weatherization and be able to share the data. The following paragraph describes assumptions that can be made on the energy efficiency of the current housing stock based on the age of the housing and the year when the Vermont Energy Code became effective. Assumptions for the commercial stock cannot be made.

The 1997 Vermont Residential Building Energy code became effective in 1998. According to the CCRPC's housing data 2,674 housing units were built in Williston before or during 1997 and 1,321 units were built after 1997. Therefore, about 33% of homes were likely built according to the energy code effective at the time of construction. Amendments to the energy code are made periodically. This is not intended to mean that Williston has met its weatherization goal. Rather it is background information to assist the town with understanding how to prioritize efforts to promote weatherization strategies for the housing stock that predates the energy code. Additionally, energy modeling has indicated that Williston needs to weatherize 90% of housing. This energy plan is intended to put the town back on track towards meeting the vital goals stated above.

Energy Compliance

In 2016, Act 174 established a process for "enhanced energy planning," which encourages municipalities to write plans that are "energy compliant." This plan is written to meet the standards for energy planning established by Act 174 and outlined in 24 V.S.A. §4352. After the plan is adopted by the town Selectboard, the town will seek an affirmative determination of energy compliance for this plan from the CCRPC. A plan with an affirmative determination gains "substantial deference" in Public Utility Commission (PUC) proceedings. Substantial deference means the plan's policies will be used to determine if a proposed energy project meets the orderly development criteria in the Section 248 process unless other factors affecting the general good of the State outweighs this plan.

Community Energy Profile

Where we are today: Estimates of Current Energy Consumption

The energy profile for Williston provides an estimate of current energy consumption in the heating, electricity, and transportation sectors. These estimates are intended to be a baseline starting point to assist the town with understanding where they are in respect to Vermont's energy goals. Where possible, data estimates on actual consumption are included. Where such data is not available, data substitutes are used. For example, consumption data for non-utility gas in Williston is extrapolated from Williston's proportionate share of Vermont's total consumption.

Heating

Williston consists of government and community buildings, homes, commercial/industrial buildings, farms, and other agricultural uses. About 89% of homes are heated with fossil fuels, with natural gas being the fuel type that about 65% of homes rely upon. Second to natural gas is fuel oil/kerosene at 15%. Propane is also utilized in Williston with about 9% of homes being heated with propane. Additionally, 6% of homes use wood and 5% of homes use electricity for heat. (See Table 1)

The Town of Williston needs to increase the proportion of homes that rely on renewable heat sources. This increase will help the town to reduce the amount of fossil fuels and greenhouse gas emissions from heating and advance local energy goals. Technology to heat homes with electricity and wood has

advanced significantly. For example, air source cold climate heat pumps are cost effective to operate and require electricity to move air inside and outside to heat and cool spaces. Further, the efficiency of wood heating has also improved with the advent of wood pellets and high-efficiency stoves.

Table 1 Home Heating Fuel Type

Fuel Type	Number of Homes	Margin of Error	Percent of Homes
Utility Gas	2,495	+/- 198	65%
Propane	339	+/-108	9%
Electricity	180	+/-94	5%
Fuel oil/Kerosene	556	+/-161	15%
Wood	212	+/-108	6%
Other Fuel	43	+/-44	1%
Total Homes	3,825	+/-165	100%
Source: American Community Survey Table B25040 2013-2017 5-year estimates			

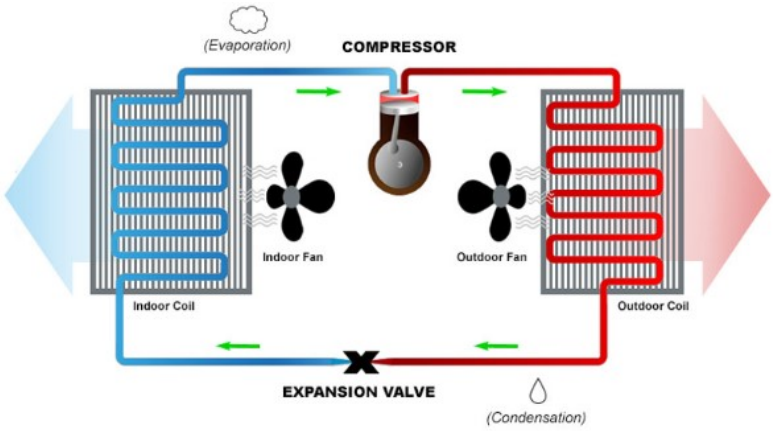

Figure 2: Typical Heat Pump Circuit (Courtesy Carrier Corporation)

Data on heating fuel types used in the commercial/industrial sector are not available. This plan assumes that businesses use natural gas because of its cost effectiveness at heating large spaces. See Table 2 on natural gas consumption for more detail on this sector.

The proportion of natural gas across the residential and commercial/industrial sectors has remained steady. Residential customers use approximately 35% of natural gas in Williston and commercial/industrial customers use about 65%. Though it is difficult to know for certain the reason, overall natural gas consumption has decreased since 2015 likely due to milder winters and progress made in building weatherization.

Table 2 Natural Gas Consumption by Sector (2015-2017) (Ref Table A3)

	2015		2016		2017	
	MMBtu	**Percentage of Consumption**	**MMBtu**	**Percentage of Consumption**	**MMBtu**	**Percentage of Consumption**
Residential	209,111	35%	191,447	36%	197,809	35%
Commercial/Industrial	391,079	65%	336,171	64%	363,277	65%
Total	600,190		527,618		561,086	
Source: Vermont Gas MMBtu: Million British Thermal Units						

For all types of heating fuel types weatherization is important to ensure that fuel is not wasted, and that the building envelope is heated or cooled efficiently. Weatherization is the practice of modifying a building to reduce energy consumption and optimize energy efficiency. A properly weatherized building typically is either built with or is retrofitted with insulation and air sealing. Air sealing greatly reduces outside air from entering the building. While insulation, keeps the conditioned air inside the building. Air sealing and insulation go hand in hand for maintaining comfort and saving money and are necessary on any surface of the building that divides the interior from the exterior. Between 2016-2018, 418 Home Performance with Energy Star Projects ® have been completed in Williston (Source: Efficiency Vermont CCRPC Report December 11, 2019). Please note that a project may be associated with multiple customers and the number of homes weatherized to date is not available at the time of writing this plan.

Electricity

Total electricity use in Williston has decreased between 2015 and 2017 even though population and the number of businesses has increased. This decrease is likely due to the installation of energy efficient appliances, lighting, and smart technologies.

Table 3 Electricity Consumption (2015-2017)

Sector	**2015**	**2016**	**2017**
Commercial & Industrial (MWh)	94,236	93,545	91,410
Residential (MWh)	26,228	26,111	25,337
Total (MWh)	120,464	119,655	116,747
Number of Residential Units	3,783	3,869	3,916
Average Residential Usage (KWH / Residential Unit)	6,933	6,749	6,470
Source: Efficiency Vermont, November 2018			

Energy Efficiency

Energy efficiency is a suite of products and services intended to reduce the amount of energy required to power lights, appliances, and building heating, ventilation and air conditioning (HVAC).

Between 2015-2017 customers in the Town of Williston have saved a significant amount of money ($1.2 million) through energy efficiencies. This is the result of reduced consumption of electricity (8.2 million KWh), and thermal energy (4.7 million MMBTUs). These savings are the result of a variety of projects ranging from HVAC upgrades, lighting controls, and building envelope insulation and air sealing. Further details on energy savings are described in Table 4 below.

Table 4 Electric and Thermal Savings (2015-2017)

	2015	2016	2017	Total
Electric Savings (MWh)	2,051	2,630	3,549	8,229
Residential	1,244	1,110	1,140	3,493
Commercial & Industrial	807,026	1,519,719	2,409,459	4,736,204
Thermal Savings (MMBTU)	2,720	867	1,277	4,864
Residential	1,204	1,436	2,216	4,857
Commercial & Industrial	1,516	(570)	(939)	7
Total Customer Cost Savings	$314,518	$384,531	$504,137	$1,203,186
Residential	$214,483	$191,133	$200,425	$606,040
Commercial & Industrial	$100,036	$193,398	$303,712	$597,146
Source: Efficiency Vermont, November 2018				

Transportation

The Town of Williston relies on fossil-fuels for most of its transportation needs. In 2015, there were 6,605 fossil-fuel burning light duty vehicles registered in the community. Additionally, there were several heavy-duty vehicles. In 2017, 35 electric cars were registered in Williston.

Table 5 Number and Type of Vehicles (Ref Table A1)

Type	Number
Fossil Fuel Burning Light Duty Vehicles (2015)	6,605
Heavy Duty Vehicles	Unknown
Electric Light Duty Vehicles (July 2017)	35
Source: DMV, Drive Electric Vermont	

Renewable Energy Generation

Renewable energy generation in Williston is produced by 325 solar sites, 1 small net-metered wind site, and a hydro dam. The energy generation produced by the hydro dam on the Winooski River is shared with Essex Junction, according to guidance from the Department of Public Service which states that generation be counted based on its physical location.

Table 6 Existing Renewable Energy Generation (2019)

	Sites	Power (MW)	Energy (MWh)
Solar	319	10.358	11,909
Wind	1	0.0095	23
Hydro	1	4.025	18,300
Total	321	14	30,232

Source: Energy Action Network, Community Energy Dashboard (September 2019)

Where we are going: Estimated Future Energy Targets

The data included in this section illustrates one path that Williston could take to meet the energy goals described earlier in this plan. The path to meet these goals is discussed in terms of targets. The targets are intended to be a demonstration of one possible scenario to reach 90% renewable by 2050.

To meet the goals, Williston must:

- Plan for a major shift away from fossil fuels to renewable sources of energy in the transportation, heating, agricultural, and industrial sectors.
- Improve efficiencies in transportation, heating, and other electricity consumption.
- Increase renewable energy generation sited in Williston.

However, the actual path may change. Actions or technology will likely evolve between now and 2050 as new and improved technologies become available.

The targets in this section provide checkpoints for future energy use across all sectors (transportation, heating, and electricity). The estimates also include renewable energy generation targets. Williston's targets represent the amount of renewable energy generation that the community will site in order to meet the amount of local renewable energy generation required. Please note that these data are a starting point for considering a renewable energy future. This information will provide the framework for a discussion about changes that will need to occur within Williston to ensure energy goals are met.

Targets for future energy use are drawn from the Long-Range Energy Alternatives Planning (LEAP) analysis for Chittenden County. Completed by the Vermont Energy Investment Corporation (VEIC), the LEAP model is an accounting framework that provides targets which represent one way to achieve the energy goals. Other strategies may allow Williston to meet its goals (for example, switching some wood heating systems to heat pump systems). See the 2018 Chittenden County ECOS Plan Supplement 6 for information about the methodology.

To achieve these targets, a concerted effort in Williston is needed to engage all stakeholders to conserve energy and transition to renewable sources. The Energy Plan Task Force has recommended multiple projects in each area. Despite the initial investment, completing the projects will lead to energy savings and an improved quality of life for all residents in Williston through financial savings, improved air quality, health, and reduced greenhouse gas emissions.

Total Energy Use Per Capita

The LEAP model estimates that total future energy use will decrease over the next 30 years, even as fuel switching occurs from fossil fuels to renewably-sourced electricity, including the transportation and heating sectors. As shown in the table below, total energy use and per capita energy use decrease (even as population increases) because of technological advances in more efficient electric appliances such as electric vehicles and cold climate heat pumps, which use less energy than fossil fuel counterparts.

Table 7 Future Total Energy Use Per Capita Estimates (2015-2050) (Ref Table B5)

	2015	2025	2035	2050
Total Energy Use (MMBTU)	1,563,338	1,521,745	1,426,100	1,321,309
Population	9,409	10,014	10,402	10,926
Total Energy Use Per Capita (MMBTU)	166	152	137	121
Reduction in Total Energy Use Per Capita	--	-9%	-17%	-27%

Source: LEAP (includes industrial energy use)
Note: The per capita use only includes the people which reside in Willison. It does not include the employment population.

Heating Targets for the Commercial and Residential Sectors

Thermal targets for Williston in 2050 estimate a reduction in total commercial thermal energy use (see Table 8 below) This will primarily be achieved through weatherization and the use of more efficient heating technologies such as cold climate heat pumps (CCHP) and biomass/wood heat. These targets also estimate that renewable sources of heat will become more common. By 2050, 35% of businesses are projected to be using heat pumps and 10% of businesses to be using wood heating.

Thermal energy use in Williston homes is projected to decrease (see Table 8 and 9 below). Residential buildings will use less energy for space heating due to an increase in the percent of buildings that are weatherized, and by increased efficiencies in heating technology. To achieve the projected energy savings, 90% of homes in Williston need to be weatherized by 2050. Additionally, the percent of homes relying on heat pumps needs to increase to 86%.

Heat pumps are powered by renewably sourced electricity are a more efficient way to heat a building compared to fossil fuels, including fuels such as propane delivered by vehicle. Wood heating also plays an important role in reducing thermal energy use and increasing the amount of renewable fuel sources for the thermal sector. The LEAP model estimates that at least 14% of homes will rely on wood heat for space heating by 2050.

Table 8 Future Commercial Thermal Energy Use Estimates (2025-2050) (Ref Table B2)

	2025	2035	2050
Total Energy Usage (MMBtu)	376,345	358,468	317,071
Percent of Commercial Buildings Weatherized	18%	20%	34%
Energy Saved by Weatherization (MMBtu)	20,231	28,051	67,601
Percent of Total Buildings using Heat Pumps*	19%	31%	35%
Heat Pump Energy (MMBtu)	30,517	60,326	90,134
Percent of Total Buildings using Wood Heat	8%	9%	10%
Wood Heat Energy (MMBtu)	45,538	62,722	91,827
Source: LEAP Model *Heat pumps fueled by renewably sourced electricity			

Table 9 Future Residential Thermal Energy Use Estimates (2025-2050) (Ref Table B3)

	2025	2035	2050
Total Energy Usage (MMBtu)	338,820	287,280	198,900
Percent of Residential Buildings Weatherized	14%	36%	90%
Energy Saved by Weatherization (MMBtu)	15,816	43,200	135,216
Percent of Buildings using Heat Pumps	18%	37%	60%
Heat Pump Energy (MMBtu)	21,960	45,180	66,240
Percent of Total Buildings using Wood Heat	14%	14%	14%
Wood Heat Energy (MMBtu)	62,220	62,280	54,720

Electricity Targets

The electricity targets (shown in Table 10) for Willison estimate that electricity consumption will increase as the heating and transportation move to renewably-sourced electricity. Although, an increase in electricity is estimated to occur in future years, residential use of electricity will continue to decline as household appliances become even more advanced and efficient given smart technology and behavior management. Regardless of the end use, electricity demand will likely require new approaches to load management for homes and businesses. Additionally, Emerging appliances need to be paired with electricity storage technologies to manage peak demands, and store excess power generated by intermittent renewable sources. These will become more important as the

technology develops and the proportion of generation from renewable sources increases. The community will work with electric utility companies to support these infrastructure needs and educate residents and businesses on changes in technology.

Table 10 Estimated Future Electricity Demand

	2025	2035	2050
Commercial/Residential (MWh)	92,341	117,696	152,528
Industrial (MWh)	29,963	38,743	52,006
Total (MWh)	122,304	156,439	204,533
Total Electricity Saved by Residences (MWh)	6,420	12,960	24,240
Target percentage of Residences that need to increase their Electrical Efficiency	30%	58%	98%
Target percentage of Commercial/Industrial Establishments that need to increase their Electrical Efficiency	30%	58%	98%

Source: LEAP Model
*Please not that industrial electricity use is recognized as the most difficult element to estimate because of variations in the sector. Therefore, future electricity use and total electricity is reported with and without the industrial sector.

Transportation

The transportation energy targets for Williston, are described in Table 11 below. These represent an ambitious electrification of the transportation sector to increase the amount of renewable energy used to power passenger vehicles. To meet the energy goals, fossil fuel consumption from light duty vehicles will need to decrease. This will primarily be achieved by converting fossil fuel vehicles to more efficient electric vehicles. The LEAP model shows that to achieve this reduction, 89% of passenger vehicles must be electric. Electrifying the light duty sector will also lead to a dramatic increase in electricity use in the transportation sector and a significant decrease in gasoline consumption.

The LEAP model estimates that the heavy-duty sector will transition to biodiesel as its primary fuel source. Biodiesel energy use is projected to increase to about 96% for heavy duty fleet vehicles by 2050. This plan disagrees with that assumption and projects that electric and fuel celled vehicles will replace fossil fueled vehicles in all categories as technology develops and cost are lowered.

In addition to switching to electric vehicles, Williston can reduce the energy used in the transportation sector through Transportation Demand Management (TDM) strategies. TDM strategies are low-cost programs that focus on decreasing use of Single Occupancy Vehicles (SOVs) and increasing the use of other modes of transportation. Williston already has some transit and bike path infrastructure. Improvements could be made to increase the frequency of transit service and availability of bike lanes

and bike paths to better enable residents to use these modes more regularly. Low cost pilot projects could also be helpful in locating separated bike lanes. Open Street Programs, such as Burlington's Open Streets Program may educate and motivate residents to bike more. TDM has great potential for saving energy as automobiles are identified as the predominant mode of transportation for Williston residents. Reducing single occupancy rides for local trips and replacing the former 1V bus route with a micro-bus system that engages all of Williston's neighborhoods should be an energy-reducing strategy.

Table 11 Future Transportation Energy Use Estimates (2025-2050) (Ref Table B1)

	2025	2035	2050
Total Light Duty Transportation Energy Use (MMBtu)	389,278	246,582	107,470
Electricity Used for Light Duty Transportation (MMBtu)	5,191	35,782	75,520
Light Duty Electric Vehicles (% of Vehicle Fleet)	6%	41%	41%
Biofuel Blended* Energy Used for Light Duty Transportation (MMBtu)	384,087	210,800	31,951
Biofuel Blend*Light Duty Vehicles (% of Vehicle Fleet)	94%	59%	11%
Heavy-Duty Transportation Energy Use from Renewable Energy	33%	58%	96%
Heavy-Duty Transportation Energy Use from Fossil Fuels (Percent of Total)	67%	42%	4%

*This estimate measures biofuels blended with fossil fuels. Source: VTrans, LEAP Model. While the CCRPC believes that biofuels will play a major part in reducing GHGs, there is no evidence that the market is pivoting to this strategy and this plan believes that electric vehicles will eventually replace combustion technologies in all sectors. The transportation pathways in this plan are based upon this belief.

Renewable Energy Generation Targets and Generation Potential

The 2018 Chittenden County ECOS Plan estimates the regional and municipal roles in advancing the State goal. The ECOS Plan sets high and low regional renewable energy targets. The Chittenden County targets are 756,250 MWh (Megawatt hours) of energy to meet the low target, and 1,265,134 MWh to meet the high target.

Regionally, this means an additional 255,054 MWh of generation capacity to meet the low target, or 763,938 MWh to meet the high target. The ECOS Plan allocates the total amount of renewable energy to each municipality based on each municipality's share of the region's population and electricity consumption, and nets out existing renewable energy generation. Williston's generation target for 2050 is an additional 14,775 MWh on the low end and 44,819 MWh on the high end.

The generation targets are technology neutral, meaning Williston can use any form of renewable generation (wind, solar, biomass, hydroelectric, etc.) to meet its goals. For example, if the targets were met with current solar technology only, meeting the target would require 192 acres to 292 acres of land dedicated to solar (See Figure 2). For more information on the methodology to estimate generation targets see the ECOS Plan Supplement 6.

Table 12 Renewable Energy Generation Target (Ref ECOS Plan Table 29)

	Low Target	High Target
Existing (MWh)	29,872	
Additional (MWh)	14,775	44,819
Total (MWh)	44,647	74,691
Source: CCRPC		

The amount of wind and solar generation potential is estimated in tables 13 and 14. This illustrates Williston's ability to meet the targets described above. Energy generation is represented by the total acreage required for prime solar, base solar, or wind.

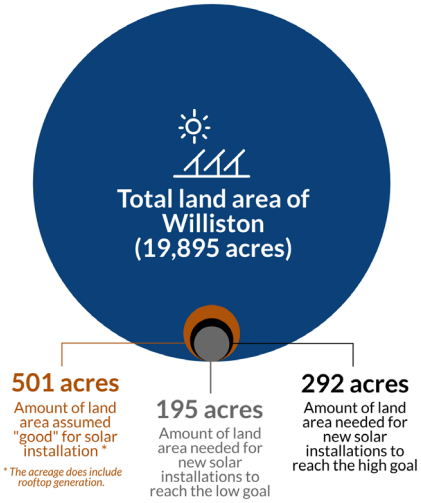

Figure 2: Renewable Solar Energy Land Requirements

Prime solar or prime wind are areas where models show the appropriate conditions for electricity generation, and where there are no constraints.

Base solar or base wind are areas where models show the appropriate conditions for electricity generation, but where there are possible constraints. These constraints must be considered and may reduce the development potential of a site. The siting policies in this plan indicate that "development will be located to avoid state and local known constraints that have been field verified, and to minimize impacts to state and local possible constraints that have been field verified". Please see the list on page 38 for the list of constraints. Williston's reported land available for existing and potential wind and solar generation are based on models of the elevation, slope, and aspect of land, or the modeled wind speed, in a municipality. These models do not remove existing impervious surfaces. Therefore, land-based generation potential may be over-estimated in more developed areas.

Table 13 Land Available for Wind and Solar Generation (Ref Table C1, ECOS Plan Tables 30 & 31)

	Prime Acres	Base Acres
Solar	501 acres (3% of town)	4,556 acres (19% of town)
Wind	931 acres (5% of town)	9,464 acres (48% of town)
Source: CCRPC, VCGI, DPS Note: It takes about 2.5 acres of solar panels to generate 1 MW of solar electricity		

Table 14 Estimated Renewable Energy Generation Potential (Ref Table C2)

	Power (MW)	Energy (MWh)
Rooftop Solar	9	11,495
Prime Ground Mounted Solar	63	76,803
Base Ground Mounted Solar	570	698,435
Prime Wind	37	114,178
Base Wind	379	1,160665

Source: CCRPC and the Department of Public Service

*Rooftop solar potential is calculated by assuming that a certain percentage of both residential and commercial rooftops can hold solar systems. Some rooftops cannot physically bear the weight of solar panels, therefore 100% Ground-mounted solar potential reports how much land could be developed with solar based on its aspect and elevation and does not remove space taken up by impervious surfaces like roofs. Therefore, rooftop solar potential cannot be added to ground-mounted solar potential, as this would lead to generation potential being double counted.

Implementation

Implementation Overview

Williston will achieve the energy goals in a holistic way by conserving and using energy efficiently, reducing fossil fuels, and generating more renewable energy that will benefit the transportation, heating, and electrical energy sectors. Williston's implementation methodology for taking energy action is rooted in a logical progression of concepts along the continuum of influencers and entities within town government, regional and local partners, residents, and business. The methodology begins with the state energy goals found in the State of Vermont Comprehensive Energy Plan of 2016 and is required to be included in the plan by the Vermont Department of Public Service's energy planning standards. The state energy goals are the framework and reason for enhanced energy planning at the local level. Making progress towards these goals requires an all-in approach as the State will not be able to meet these goals alone. The Town of Williston has embraced these goals as their own and has set local objectives which describes the activity to be undertaken. In order to meet these objectives, the Town of Williston intends to work with partners, residents, and businesses on pathways that are either policy changes, education, or administrative initiatives. A critical key to the implementation of the energy goals is accountability. Accountability comes in the form of identifying who will be leading the action and the timeframe for completion (short/medium/long).

This plan has presented the following logic model for implementation:

State Goals ----------> Local Objectives ----------> Pathways

Williston will do its part to assist in achieving the macro state goals by using the local objectives identified in this plan as the guiding points. The pathways are the "boots on the ground" components for implementing the plan, which are a means to achieve the local objectives and therefore the state goals.

The following are pathways to achieve the local objectives identified by issue area. The timeframes established are as follows:

Short term: 1-3 years
Medium term: 4-7 years
Long term: 8-10 years

To ensure successful accomplishment of the local objectives and state goals, the timeframes for many of the goals is front-loaded. Many of them are shorter or medium term rather than long term.

1. General Pathways

Local Objectives 1-14

This is a vast plan over many years and to execute the pathways recommended, the town will require sufficient funding and human resources.

Pathways

1.1 Hire an Energy Coordinator on a full-time basis and additional staff as required to implement the Energy Plan in the timeframes established in the plan. The Energy Coordinator will ensure that the goals defined in Renewable Energy Generation Target (table 12) are met.

Lead Entity: Selectboard
Timeframe: Short term

1.2 Establish a permanent, volunteer staffed Energy Committee to assist the Energy Coordinator with implementing the measures contained in the Energy Plan. The Committee will monitor the energy plan pathways to assess progress made against the plan's stated benchmarks, and make recommendations to alter the pathways to assure that the town will reach its energy goals. The Energy Committee will be appointed by and report to the Selectboard and contain 5-7 members including the Town Energy Coordinator. The Energy Committee will serve as the liaison to the community. Subcommittee volunteers may be added as needed.

Lead Entity: Selectboard
Timeframe: Short term

1.3 Monitor changes to state and federal policies as they relate to energy plan goals and objectives. Continue to proactively participate in the legislative process. Seek out funding opportunities beyond existing municipal revenue sources such as utility companies, public-private partnerships, state funding, and federal funding to achieve stated pathways while minimizing burden on Williston taxpayers.

Lead Entity: Energy Committee
Timeframe: Ongoing

2. Transportation Energy

Local Objectives

1. Educate Williston citizens, town government, Champlain Valley School District (CVSD) and private businesses about the economic and environmental value of transitioning from a fossil-fuel vehicle society.
2. Act to decrease transportation energy demand by promoting electric vehicles, increasing the awareness of and supporting the use of public transit, walking/biking infrastructure, carsharing, and ridesharing.
3. Increase the share of light-duty electric vehicles registered in Williston to 10% by 2025 and 89% by 2050.
4. Fuel 96% of heavy-duty municipal vehicles with renewable resources and work with the school district to fuel school vehicles with renewable sources Pathways

2.1 Partner with Drive Electric Vermont and Go-Vermont, for-profit and nonprofit organizations, vehicle dealers and manufacturers, and state agencies to organize high-visibility events where people can see and test drive Electric Vehicles (EVs), such as energy fairs and other community events. Events will also leverage local media and public access coverage to showcase residents and organizations that are helping to propel the transition to EVs. Host a "show and tell" day featuring different kinds of EVs and giving people interested in purchasing them an opportunity to talk with fellow community members who own them.

Lead Entity: Energy Committee
Timeframe: Short-term/On-going

2.2 Promote the Drive Electric Vermont webpage, which connects users to financial incentives, dealers, and recharging stations for EVs. Work with the town to add a link to this page on the Town of Williston web site.

Lead Entity: Energy Committee
Timeframe: Short-term

2.3 Continue to work with Local Motion to make Williston safe and welcoming for bicycling, walking, running, skiing, etc. Identify issues and opportunities for walk-bike improvements and connections.

Lead Entity: Planning Commission or a new Mobility Committee
Timeframe: Ongoing

2.4 Create local park-and-ride spaces and explore opportunities to expand the number of vehicle parking and EV charging spaces. Provide greater connectivity between public transit and park-and-ride locations. (Town Plan 6.4.4)

Lead Entity: Town Administration
Timeframe: Ongoing

2.5 Work with Green Mountain Transit (GMT) to create a diverse mobility solution to connect the residential areas of Williston to the Taft Corners commercial area. To be successful, the transit schedule must be frequent and cost of ridership inexpensive. The benefits of this approach include improving transportation services for Town residents, reducing single occupancy vehicle usage, and reducing transportation energy and emissions. This is an emerging field of transportation that has high levels of operational flexibility.

Lead Entity: Town Administration
Timeframe: Short Term

2.6 Work with public utilities to assess current access to public and workplace EV charging stations. Identify strategic locations where charging stations will be added. The town will work with non-governmental entities to encourage the installation of EVs at these strategic locations. The town will provide charging stations at prominent publicly owned locations such as municipal parking lots.

Leading Entity: Town Administration
Timeframe: Short-term

2.7 Create a provision in the town's Unified Development Bylaw that requires any new commercial, industrial or residential development to install an appropriate quantity of EV charging stations, and establish infrastructure for future expansion. This also applies to significant changes to existing commercial, industrial or residential development.

Leading Entity: Planning Commission
Timeframe: Short-term

2.8 Work with the school district to maximize ridership for public school buses by improving and promoting the school bus schedule and busing policies, encourage walking (Safe routes to School), minimize use of private vehicles for student transport, and to replace their buses with electric buses when the individual buses are due for replacement.

Leading Entity: Town Administration
Timeframe: Ongoing

2.9 Support employer and residential property manager programs to encourage transit use, 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. Work with Go Vermont and other organizations.

Leading Entity: Town Administration
Timeframe: Ongoing

2.10 The town will replace their light duty vehicles with EVs (electric vehicles) as the individual vehicles are due for replacement. Heavy duty municipal will be replaced as their electric counterpart become available.

Leading Entity: Town Administration
Timeframe: Medium term

2.11 Explore a tiered electric transportation (for example, electric vehicles or bicycles, public transit fares) rebate program, ensuring it is not regressive and explore funding mechanisms available to the town.

Leading Entity: Energy Committee
Timeframe: Short Term

2.12 The town should establish a multimodal path plan to ensure that it is adequate to address the greater need to conserve energy by moving single occupant vehicle trips to bicycle and pedestrian commuting, including connections to neighboring jurisdictions. The greatest need is to create paths that support commuting with the secondary benefit of recreation activities.

Lead Entity: Town Administration
Timeframe: Short Term

2.13 Maintain bike paths and sidewalk year-round to provide an alternative transportation option. Town highway infrastructure should utilize street design that reduces speeding, supports safe use of shared road facilities, provide protected on and off-road infrastructure for cyclists, and safe pedestrian connections.

Lead Entity: Town Administration
Timeframe: Short Term

3. Building Energy Usage

Local Objectives:

1. Shift from fossil fuels as the primary heat source to renewable sources of heat energy, including heat pumps powered by renewable energy and wood heating.
2. Weatherize 90% of homes and at least 50% of commercial and industrial establishments
3. Equip 84% of homes with cold-climate heat pumps (CCHP) and 14% of homes with wood heat as a primary heat source.

Pathways:

3.1 The town will publish a summary of energy used by Town buildings and vehicles in the annual report, as well as the estimated or calculated impact of efficiency measures already taken. The report will describe the progress the town is making towards the goals of the town's energy plan using the summarized Energy Star Portfolio Platform. The energy consumed (gallons of oil/cubic foot of natural gas, kilowatt hours of electricity used, etc.) will be summarized along with costs and benchmarking to show changes. Building performance should be represented in terms of an energy use index of millions of BTUs per square foot and energy star rating, over a 12-month period.

Leading Entity: Town Administration
Timeframe: Ongoing

3.2 The Energy Coordinator will work with the Champlain Valley School District (CVSD) to publish a summary of energy used by school buildings in their annual report, as well as the estimated or calculated impact of efficiency measures already taken. The report will describe the process the schools are making toward the goals of the state's Comprehensive Energy Plan of 2016 using the summarized Energy Star Portfolio Platform. The energy consumed (gallons of oil, /cubic foot of natural gas, kilowatt hours of electricity used, etc.) will be summarized along with costs and benchmarking to show changes. Building performance should be represented in terms of an energy use index of millions of BTUs per square foot and energy star rating, over a 12-month period.

Leading Entity: Energy Coordinator & School Administration
Timeframe: Ongoing

3.3 Review the energy audits of municipal buildings that have already been performed for compliance to those audits and review and implement actions that were recommended but not performed. These actions shall be part of the capital budget.

Lead Entity: Energy Coordinator
Timeframe: Identify short-term, capital plan medium term

3.4 The town will work collaboratively with the utilities and energy vendors to develop a plan and schedule to assess the efficiency levels of municipal thermal building envelopes, lighting, HVAC, and

other equipment and replace as necessary with renewable energy equipment that has an energy star rating.

Lead Entity: Energy Coordinator
Timeframe: Developing a plan & schedule short-term, capital plan medium term

3.5 The Energy Coordinator will assist the Champlain Valley School District to work collaboratively with the utilities and energy vendors to develop a plan and schedule to assess the efficiency levels of municipal thermal building envelopes, lighting, HVAC, and other equipment and replace as necessary with renewable energy equipment that has an energy star rating.

Lead Entity: Energy Coordinator & School Administration
Timeframe: Developing a plan & schedule short-term, capital plan medium term

3.6 Create a revolving-fund program to perform Energy Audits on municipal buildings that have not been previously audited. Develop a program to weatherize these buildings and return a portion of the energy savings for three years to the fund to support other municipal energy audits resulting in 100% of all municipal buildings weatherized by 2025.

Lead Entity: Energy Coordinator
Timeframe: Identify short-term, capital plan medium term

3.7 Work collaboratively with businesses, utilities and energy vendors to develop a plan and schedule to assess the efficiency levels of the business' thermal building envelopes, lighting, HVAC and other equipment and replace as necessary and feasible. This assessment should include an analysis of how conversion to heat-pump or pellet wood heating sources would affect the building and what the cost to replace or supplement current equipment to these sources would be.

Lead Entity: Energy Coordinator & Energy Committee
Timeframe: Medium term

3.8 Perform a survey of Town residences to determine which had an energy audit performed and have been weatherized.

Lead Entity: Energy Coordinator
Timeframe: Short term

3.9 Create a funding mechanism to perform energy audits on town residences that have not been previously audited and develop a program to weatherize these residences to put the town on track to achieve the intended goal of having 90% of Williston's homes weatherized by 2050. Of the 3,825 homes in Williston, 2,674 houses were built before the Vermont Residential Building Code was adopted in 1998. The intention is to weatherize these, where the energy savings will be greatest

first. The audit should include a life cycle cost analysis of various energy saving measures and renewable energy options.

Lead Entity: Energy Coordinator
Timeframe: Short-term to develop program, yearly to identify and implement; yearly in capital budget

3.10 Create a funding mechanism to incorporate air-source, cold-climate heats pumps or other fossil-fuel free devices in at least 90% of residences by 2050, including a collaboration with utility companies.

Lead Entity: Energy Coordinator
Timeframe: Short term to develop program, offer annually

3.11 On an annual basis, monitor building system performance (building commissioning) of municipal facilities to ensure controls and automation settings are working properly and to improve performance This will take place alongside routine system maintenance.

Lead Entity: Town Administration
Timeframe: Ongoing

3.12 Work with the Champlain Valley School District to incorporate commissioning so school facilities can improve performance by ensuring controls and automation settings are working properly on an annual basis. This will take place alongside routine system maintenance.

Lead Entity: School Administration
Timeframe: Ongoing

3.13 Energy efficiency and conservation must be a part of the town's procurement process. The town will buy Energy Star certified appliances, heating equipment, and office equipment. Items that go out to bid will have an energy efficiency requirement for consideration if the technology exists for the item. The purchase of recycled paper materials and environmentally friendly office products will be utilized, being mindful to purchase products that will be effective in their role. The town will transition to paperless system for internal proceedings and town services (permitting, taxes, billing, etc.)

Lead Entity: Town Administration
Timeframe: Ongoing

3.14 Work with the Champlain Valley School District to establish a procurement process that prioritizes energy efficiency and conservation. The schools will buy Energy Star rated appliances, heating equipment, and office equipment. Items that go out to bid will have an energy efficiency

requirement for consideration, if the technology exists for the item and is cost effective. The purchase of recycled paper materials and environmentally friendly office products will be utilized, being mindful to purchase products that will be effective in their role. The school district will transition to paperless systems.

Lead Entity: School Administration & Energy Coordinator
Timeframe: Ongoing

3.15 Business signage and parking, as well as municipal street lighting should be upgraded with the most efficient lighting solutions (ex. LEDs) and lighting standards shall set stricter standards on overnight sign lighting.

Lead Entity: Energy Coordinator
Timeframe: Ongoing

4. Building Energy Education

4.1 In collaboration with energy vendors and Efficiency Vermont, identify opportunities for consumer outreach and education on topics such as weatherization, home energy, and heating efficiency such as Do it Yourself, Button Up, and other similar energy efficiency efforts.

Lead Entity: Energy Committee
Timeframe: Short-term/ongoing

4.2 Participate in education campaigns to provide best practices on cordwood and wood pellet selection, storage and combustion to promote the most efficient, clean, and cost-effective use of wood heating technology while protecting human and environmental health.

Lead Entity: Energy Committee
Timeframe: Short-term/ongoing

4.3 Promote wood stove change-out programs that take older non-EPA certified stoves out of service and replace them with more efficient and lower emitting cord and pellet stoves.

Lead Entity: Energy Committee
Timeframe: Short-term/ongoing

4.4 Facilitate a workshop and conduct building walk-throughs for owners and tenants of rental housing to encourage implementation of energy efficiency measures.

Lead Entity: Energy Committee
Timeframe: Short-term/ongoing

4.5 Facilitate a workshop and conduct building walk-throughs for commercial and industrial businesses to encourage implementation of energy efficiency measures.

Lead Entity: Energy Committee
Timeframe: Short-term/ongoing

4.6 The town will promote awareness of energy and climate change issues through education, participation in town-wide challenges, and friendly regional competitions to bring down energy consumption and renewable expansion

Lead Entity: Energy Committee
Timeframe: Short-term/ongoing

4.7 The Energy Committee shall review proposed bylaw amendments for compliance with the energy plan and draft proposed bylaw amendments as directed by the Planning Commission.

Lead Entity: Energy Committee
Timeframe: Short-term/ongoing

4.8 Collaborate with local and regional partners, such as Go Vermont, Drive Electric Vermont and EAN (dashboard) to connect commuters and vehicle owner to education and resources about reducing vehicle trips.

Lead Entity: Energy Committee
Timeframe: Short-term/ongoing

5. Land Use

Local Objectives

1. Require all new construction to verify that it meets defined energy efficiency standards.
2. Continue a land-use policy that embraces smart and sustainable growth

Pathways

5.1 Review and adopt the Vermont Building Energy Stretch Code or other comparable standard for all development and renovations/additions in the Unified Development Bylaw.

Lead Entity: Energy Committee to Recommend to Planning Commission
Timeframe: Short Term

5.2 Require all new development to undergo the verified building performance assessment adopted from Pathway 1 to ensure the building meets the current adopted codes for the type of construction. At the time of the writing of this plan that document is the 2015 Vermont Stretch Code, which includes a building envelope inspection. In order to receive a certificate of occupancy this code must be met by providing the Zoning Administrator with a certificate of compliance from a licensed third-party inspector.

Lead Entity: Planning Commission / Zoning Administrator
Timeframe: Medium Term

5.3 Review the Unified Development Bylaws to ensure parking and sign regulations do not burden the installation of electric vehicle charging stations, including Level III charging stations, and prioritize vehicles that use non-carbon-based fuels.

Lead Entity: Planning Commission
Timeframe: Medium Term

5.4 In all zoning districts, incentives for installing overhead parking lot solar energy arrays should be considered, such as setback relief or other means.

Lead Entity: Planning Commission
Timeframe: Medium Term

5.5 Revise the Williston Unified Development Bylaw to require any new development to provide a significant percentage of renewable energy generation and/or on-site storage, while considering constraints such as topography or neighboring structures. Sizing, energy output and storage should be based on the expected on-site consumption of electricity, including heat pumps and electric charging for automobiles and trucks.

Lead Entity: Planning Commission

Timeframe: Medium Term

5.6 To encourage site planning for energy conservation and renewable energy generation, the town requires an applicant to work with Efficiency Vermont and electric utility companies. Such standards might include language to maximize southern exposure for living spaces and solar generation, protecting solar access to south facing walls and roofs, and providing windbreaks. (Existing Town Plan10.4.1)

Lead Entity: Energy Committee
Timeframe: Medium Term

5.7 Continue to analyze future land use plans in terms of emissions, energy use, and mobility to inform local land use policy. Building, maintaining, and servicing infrastructure requires energy. Evaluate land use standards throughout the town to ensure that energy expenditure on infrastructure is done in manner that achieves energy plan goals and targets.

Lead Entity: Planning Staff, Planning Commission, and consultant
Timeframe: Long Term

5.8 Consider revisions to Chapter 11 Growth Management that further incentivizes any level of energy efficiency beyond the base requirements of Efficiency Vermont or simple calculation on-site generation/storage requirements and uses a non-fossil fuel source for heating/cooling buildings.

Lead Entity: Planning Commission
Timeframe: Medium Term

5.9 Explore a requirement that all new development provide cold-climate heat pumps (CCHPs), or other devices using renewable energy sources, as the primary source for building and domestic hot water heating.

Lead Entity: Planning Commission
Timeframe: Medium Term

5.10 Reevaluate allowable residential density in mixed use and village zoning districts. Provide housing opportunities in attractive, efficient building forms that equitably serve existing and future residents of Williston enables a lifestyle without the expense of owning and operating a personal vehicle and reduces expenditures on building energy consumption.

Lead Entity: Planning Commission
Timeframe: Medium Term

5.11 Reevaluate district boundaries and residential density in the Agricultural Rural District (ARZD) with an understanding of the energy consumption of existing development standards.

Lead Entity: Planning Commission
Timeframe: Medium Term

5.12 Reevaluate the district boundaries, residential density, and design standards of the Residential Zoning District (RZD) with the goal to have more compact development and preserve open space, reduce energy consumption from building and maintaining existing development patterns.

Lead Entity: Planning Commission
Timeframe: Medium Term

5.13 Create a Transferable Development Rights (TDR) bank to transfer residential unit development from the rural and residential zoning districts to the Growth Center to shift new growth to parts of town where sustainable transportation and reduced energy use is possible. The bank could be an element of the Environmental Reserve Fund (ERF).

Lead Entity: Planning Commission
Timeframe: Medium Term

6. Renewable Energy

Local Objectives

1. Reduce total energy use per capita by 27%
2. Double the amount of renewable energy generation sited in Williston

Pathways

6.1 Create a program to incentivize residents and businesses to install solar arrays on their roofs, over parking lots, or as appropriate as free-standing structures.

Lead Entity: Energy Coordinator
Timeframe: Short term to develop program, offer annually

6.2 The town shall continue to lead the community by increasing its renewable energy production and battery storage portfolio of municipal buildings.
Lead Entity: Town Administration
Timeframe: Long Term

6.3 The Town of Williston will not assess property taxes on renewable energy systems and structural support systems (such as reinforcements and canopies), as allowable under Vermont state law. 32 V.S.A. § 3802[2]

Lead Entity: Town Administration
Timeframe: Short Term

6.4 The town will seek opportunities to encourage Utility-Scale Renewable Energy Projects. Farm methane plants, solar orchards, wood-burning co-generation plants, and ridgeline wind farms are examples of large-scale renewable energy projects that will likely have a significant impact on regional energy production in the years to come. The Town of Williston will support these utility-scale technologies as clean energy sources continue to develop. Permitting these projects should consider the renewable energy benefits along with environmental and aesthetic impacts as discussed in the following section. (Town Plan11.2.5)

Lead Entity: Town Administration
Timeframe: Medium Term

6.5 The town will seek opportunities to pair renewable energy generation with electrical energy storage to ensure energy is utilized to the fullest potential, to increase resiliency/reliability of electrical system during outages and decrease fossil fuel usage during peak periods. Renewable energy generation projects that can accommodate energy storage are strongly encouraged.

[2] Under Vermont law, a town can vote to exclude renewable energy systems from local property tax. This means that renewable energy improvements to the home will not increase the property assessment. By applying this policy, the Town of Williston will both promote and enable the use of renewable energy. (Town Plan 11.1.4)

Lead Entity: Planning Commission
Timeframe: Ongoing

6.6 All energy generation, distribution and storage facilities should consider a decommissioning plan with its Section 248 application.

Lead Entity: Planning Commission
Timeframe: ongoing

6.7 The town will participate in the Public Utility Commission's Section 248 process by utilizing the siting policies identified later in this plan to review whether an energy project meets the orderly development criterion [30 V.S.A. § 248(b)(1)]. The town will be given substantial deference in the Public Utilities Commission's permitting process for ground mounted solar projects greater than 15kW and for facilities using other technologies (not including hydroelectric facilities) of 50 kW or more.

Lead Entity: Department of Planning/Zoning
Timeframe: Ongoing

6.8 To the greatest extent possible, energy storage equipment should be coupled with renewable energy generation projects to add a resilient source of energy.

Lead Entity: Department of Planning/Zoning
Timeframe: Ongoing

7. Consumption and Recycling

Local Objective:

1. Reduce our waste stream by reducing consumption, expanding the sharing economy and fixer-spaces, and recycling 100% of our materials thereby reducing energy needed to produce these materials.

Pathways

7.1 Coordinate with the Chittenden Solid Waste District (CSWD) to educate the public on the proper sorting and waste reduction techniques. Raise awareness about single-use versus long-lasting quality products.

Lead Entity: Town Administration
Timeframe: Ongoing

7.2 All public school and municipal facilities must provide composting, returnable, recycling and trash bins on site.

Responsible Entity: Town and School District Administration
Timeframe: Ongoing

7.3 Municipal events must provide compostable or reusable containers, plates, cups and cutlery. Work with the school district to require compostable or reusable items at school events.

Responsible Entity: Town and School District Administration
Timeframe: Ongoing

7.4 The town should explore enforcement options in accordance with Act 69 (single use plastics ban).

Responsible entity: Town Administration
Timeframe: Law is in effect July 1, 2020

7.5 Designate a municipal employee to oversee the reducing/reusing/recycling/composting/returning of municipal purchases to reduce the waste stream.

Responsible Entity: Town Administration
Timeframe: Ongoing

7.6 Establish a lending library of tools, household items, sports equipment, clothing exchanges, e-bikes, collective ownership of big-ticket items, and strong public spaces (playgrounds, community kitchen, meeting rooms, etc.) to reduce consumption of minimally used household items.

Lead Entity: Town Administration
Timeframe: Ongoing

8. Agriculture

Local Objective:

1. Increase the use of regenerative design principles in landscaping, agriculture and conservation land management methods

Pathways

8.1 The town will establish a tree nursery on a suitable parcel of town land (for example the Catamount Community Forest). The objective is to 1) provide a diverse and affordable supply of trees for the replacement of street and park trees maintained by the town (Town Plan 4.7.5); and 2) Create a yearly food tree (fruits and nuts) planting schedule to sequester a specific amount of carbon dioxide and to provide more local food sources.

Lead entity: Town Administration / Tree Warden / Sustainable Williston
Timeframe: Medium term

8.2 Establish a policy for regenerative agricultural practices that must be adhered to own any Town owned property that is subject to a land lease agreement, including a condition of utilizing cover crops during non-production seasons to prevent erosion, build healthier soil and help sequester carbon.

Lead entity: Town Administration
Timeframe: Short term

8.3 Create and expand community gardens on Town and School owned property near residential areas. Benefits include providing food to supply the school kitchens, farm to school programs, community food education, reducing food-energy miles, increasing food security and saving money.

Lead entity: Town and School District Administration
Timeframe: Short term

8.4 Prohibit the burning of trash, and discourage the burning of brush with an ordinance.

Lead entity: Selectboard
Timeframe: Medium term

8.5 Establish development standards for land clearing, including organic material removal, when it is a component of site development

Lead Entity: Planning Commission
Timeframe: Long-term

Renewable Energy Generation Siting Policies

The siting policies identified in this section will provide structure and guidance for increased renewable energy generation capacity in Williston. Once the energy plan is adopted, the town will seek a "determination of energy compliance" from the Chittenden County Regional Planning Commission and will be given substantial deference from the Public Utilities Commission.

Municipalities can have input over the siting of renewable generation in two ways: by defining preferred sites, where they wish to strongly encourage renewable energy development, and by defining constraints, where they wish to place restrictions on development, including renewable energy.

Preferred Sites

Vermont's Net Metering Rules (Rule 5.100, effective 7/1/2017) defines preferred sites for renewable energy development (any renewable technology besides hydroelectric). Net metering on preferred sites can be larger (up to 500 kW instead of 150 kW) and being on a preferred site confers financial benefits in the net metering rates. See the latest Vermont Public Utility Commission (PUC) Rule Pertaining to Construction and Operation of Net-Metering Systems for details on the financial and scale benefits of preferred sites. Systems up to 15kW and rooftop solar systems up to 500kW go through a registration process rather than the full Public Utilities Commission process. However, all other preferred sites do not have an expedited review process and must meet the same requirements as any other system. Preferred sites as defined under the PUC rule include:

- On a pre-existing structure
- Parking lot canopies over permitted paved areas
- Previously developed land
- Brownfields
- Landfills
- Gravel pits
- Superfund sites
- On the same parcel as a customer taking 50% or more of the output
- Town-designated sites

Town-designated preferred sites will be identified in a duly adopted municipal plan or through a joint letter of support by the town planning commission, town legislative body and regional planning commission.

State and Local Constraints

Some areas are not appropriate for any type of development, including renewable energy generation facilities. The State of Vermont has defined certain resources as known and possible constraints, which are protected by the ECOS Regional Plan and state agency review during the Public Utility Commission review process. The Town of Williston has added additional constraints based on local policy, as discussed in the siting policy section of this plan.

Known constraints are areas in which development, including renewable energy generation, is not appropriate. Known constraints are listed below and are shown on Map 23:

- State
  - Federal Emergency Management Agency (FEMA) Floodways
  - Department of Environmental Conservation (DEC) River Corridors
  - National Wilderness Areas
  - State-significant Natural Communities
  - Rare, Threatened, and Endangered Species
  - Vernal Pools (confirmed and unconfirmed)
  - Class 1 and 2 wetlands (VSWI and advisory layers)
- Local
  - Slopes 30% or greater
  - Water Protection Buffers

Possible constraints are areas in which the effects of development, including renewable energy generation, may need to be mitigated. Possible constraints are listed below and are shown on Maps 24a-c:

- State
  - Agricultural Soils and Hydric Soils
  - Act 250 Agricultural Soil Mitigation Areas
  - FEMA Special Flood Hazard Areas
  - Vermont Conservation Design Highest Priority Forest Blocks (Connectivity Blocks, Interior Blocks, Physical Landscape Diversity Blocks)
  - Highest Priority Wildlife Crossings
  - Protected Lands (State fee lands and private conservation lands)
  - Deer Wintering Areas
- Local
  - Slopes 15-30%
  - Vermont Conservation Design Priority Forest Blocks (Connectivity Blocks, Interior Blocks, Surface water and Riparian Blocks)
  - Scenic Viewshed outside of the growth center
  - Conservation Areas (See Map 18 of the Comprehensive Plan: Natural Communities, Wildlife Travel Corridor, Wildlife Core Habitat)

Focal Points of Viewsheds

- Brennan Field
- Martel Hill
- Southridge Fields
- Former Mahan Farm Fields
- LaCasse Fields
- Brownell Mountain
- Former Lyons Fields
- Pastures along River Cover Road
- Fields Southwest of the Mountain View Rd and Old Stage Rd intersection
- Meadows south of Governor Chittenden Road
- Several Parcels along Oak Hill
- Richmond Ridge
- Highlands above I-89 between South Brownell and Oak Hill Rds.
- Gamma Ridge

Siting Policies

The policies in this section are the land conservation measures to be applied in the Section 248 decision making process with respect to the PUC's review of a petition for an electric generation facility.

1. The Town of Williston will use these siting policies while reviewing all Section 248 applications. The Town will also use these siting policies to determine support for designating a municipal preferred site when a site does not meet the criteria to be a State-designated preferred site**.** Municipally-identified preferred sites shall meet the intent of the following siting policies. Field verification of known or possible constraints is required.

2. Large scale solar facilities and wind turbines should be located to preserve the scenic quality of the viewsheds identified in Chapter 13 of the Comprehensive Plan. The Planning Commission and Selectboard will review viewshed relevance to a proposed renewable energy generation project on a case by case basis on. Measures to preserve the scenic quality include, but are not limited to, selecting and siting equipment which keeps the project from being the dominant feature of a viewshed. The project should be positioned in such a way so that it blends into the site. This can be achieved by following state setback requirements and using the natural topography to break the mass of the project.

3. Development, including energy generation, distribution, storage, transmission facilities and fencing, should be carefully located and designed to avoid habitat fragmentation and impacts that would demonstrably reduce the ecological function on a parcel in conservation areas/wildlife travel corridors/wildlife core habitat.

4. Watershed protection buffers shall remain undeveloped with the exception of consolidating existing utility infrastructure (See Table 1 in the 2016-2024 Comprehensive Plan for specific buffer distances).

5. Locate energy generation proximate to existing distribution and transmission infrastructure with adequate capacity and near areas with high electric load (See Green Mountain Power's Solar Map). Larger projects that want to connect to constrained infrastructure or where there is a lack of adequate infrastructure may be costlier and have a bigger impact on the town.

6. Locate small distributed wind energy system consisting of a single turbine producing up to 100 kW outside the designed village center or designated growth center. Wind energy systems must be consistent with set back and noise rules in effect by the State of Vermont Public Utility Commission. The intent is to maintain the historic character for properties with frontage on Williston Road, while allowing wind/ground-mounted solar elsewhere in the Designated Village Center (such as the Central School or behind Town Hall).

7. Locate ground-mounted solar larger than 15 kW AC and wind turbines with a hub height larger than 30 meters (98 ft.) outside of the historic districts on the State or National Register.

8. Locate utility lines serving new developments underground and site transmission lines, substations, and similar support facilities within existing utility corridors and be placed underground except where the presence of bedrock or other environmental constrains makes underground installation prohibitively expensive. Careful siting and screening will be required for above ground utility lines. Impacts to constraints identified in the constraints section should be minimized according to applicable policies in this section and in the comprehensive plan.

9. Renewable energy generation projects that can accommodate energy storage are strongly encouraged.

Conclusion

Future generations will look back at the actions or inactions that are taken in regard to this plan. The time for action is now.

Maps

- Map 21 Preferred Sites
- Map 22 Existing Generation
- Map 23 Known Constraints
- Map 24a State Possible Constraints
- Map 24b Local Possible Constraints
- Map 24c Forest Blocks Possible Constraints
- Map 25 Solar Base & Prime Generation Areas
- Map 26 Wind Base & Prime Generation Areas

Glossary of Terms

Term	Description
BTU	British Thermal Unit. A common unit of energy. One BTU is the energy required to raise the temperature of one pound of water by 1-degree Fahrenheit.
kw	Kilowatt. A unit of power. (A kilowatt is 1,000 watts). One kilowatt is the equivalent of 0.746 horsepower.
kwh	Kilowatt-Hour. A unit of energy, most commonly referred to for electrical consumption. (1,000 watts of power for one hour). 33.7 kwh of energy is the equivalent of one gallon of gasoline.
Viewshed	Viewshed. The geographical area that is visible from a location. It includes all surrounding points that are in line-of-sight with that location and excludes points that are beyond the horizon or obstructed by terrain and other features (e.g., buildings, trees).
CCF	A volumetric measure of Natural Gas in hundreds of cubic feet (CCF). It represents the amount of **gas** contained in a space equal to one hundred cubic feet. One CCF of natural gas has the equivalent energy of 1.28 gallons of gasoline.
LEAP	Long Range Energy Alternatives Planning: An analysis completed by VEIC. The LEAP model is an accounting framework that shows one possible path for Chittenden County to meet the State Energy Goals.
VEIC	The Vermont Energy Investment Corporation. VEIC is a sustainable energy company with a mission to enhance the economic, environmental, and societal benefits of clean and efficient energy use for all people. VEIC operates three large-scale energy efficiency utilities which includes: Efficiency Vermont
CCRPC	The Chittenden County Regional Planning Commission. Also referred to as the Chittenden County RPC.
ECOS Plan	A comprehensive regional plan developed by the Chittenden County RPC. ECOS = Economy, Community, Opportunity, Sustainability. The plan can be found at www.ecosproject.com/plan
90x2050	The State of Vermont's Energy Goal: 90% of the state's total energy needs will be from renewable sources by 2050.
CEP	State of Vermont's Comprehensive Energy Plan. This includes the 90x2050 goal.
MWH	Megawatt-Hours. 1 megawatt-hour = 1,000 kilowatt-hours
EVT	**Efficiency Vermont**: A Vermont public utility with an objective to save energy through efficiency. EVT is part of the VEIC.

Brownfield	An area of land which has been contaminated and is not suitable for agriculture or human habitation but may be a viable site for an energy efficiency project such as a solar or wind power installation.
VT PUC	**Vermont Public Utility Commission:** The Vermont PUC is an independent, three-member, quasi-judicial commission that regulates the siting of electric and natural gas infrastructure and supervises the rates, quality of service, and overall financial management of Vermont's public utilities: electric, gas, energy efficiency, telecommunications, cable television (terms of service only, not rates), water and large wastewater companies
Policy	A **policy** is a guiding principle used to set direction **in an** organization.
Procedure	A **procedure** is a series of steps to be followed as a consistent and repetitive approach to accomplish an end result.
Regenerative design	Regenerative design is an approaching to landscaping, agriculture and conservation land management that integrates the needs of society with the integrity of nature. Benefits include topsoil regeneration, increasing biodiversity, enhancing ecosystem services, bio-sequestration of carbon, food system security, and an overall increased resilience to climate change
Renewable	A renewable resource is a natural resource which will replenish to either through natural cycles or other recurring processes in a finite amount of time in a human time scale.
Weatherize	Weatherize/weatherization. To make a house or other climate-controlled building resistant to cold, heat, temperature fluctuation, or stormy weather by adding insulation, storm windows, siding, weatherstripping, etc. and maintaining these components for optimal function
Microgrid	A **microgrid** is a group of interconnected loads and distributed energy resources within clearly defined electrical boundaries that acts as a single controllable entity with respect to the grid. Microgrids (paired with storage) are self-contained electric grids paired with storage that can operate as an “island” independent of the central power grid. This allows an entity to keep lights on in the event of an outage which provides resiliency and security.