



Renewable Resources

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3 For the Town, individuals or small groups of homeowners, the keys to becoming a more 4 sustainable community are increasing measures to become more energy efficient, including 5 conservation, as well as developing renewable energy. The term "renewable energy" refers to the 6 production of electricity and fuels from energy sources that are naturally and continually 7 replenished, such as wind, solar, geothermal (using the earth's heat to create power), 8 hydropower, and various forms of biomass (trees, crops, manure, etc.). Alternative fuels 9 produced from renewable sources are attractive options for displacing petroleum-based fuels. 10 11

Although initial set-up costs for renewable energy generation systems can be high, these systems
 can save money over the long-term. Renewable energy also creates a more distributed energy
 system, thereby relying less on centralized plants.

15 Wood: Wood is considered a renewable resource and heating with wood saves non-renewable 16 energy sources, eliminates the use of fuel to transport sources long distances, and supports the 17 local economy. The Department of Public Service has estimated that the average wood burning 18 house-hold uses between 3 and 4 cords of wood each year during the heating season. Although 19 burning wood can increase air pollution, particularly in the valleys, clean burning furnaces and 20 stoves can mitigate this problem which will help reduce the purchase of energy from utilities. 21 The Town encourages residents to operate wood burning furnaces and stoves that meet the 22 EPA's efficiency ratings, available on the EPA website at: https://www.epa.gov/compliance/list-23 epa certified wood stoves.

25 Solar Energy: Solar has potential for providing clean, reliable, and safe energy. The cost of 26 photovoltaic panels has come down dramatically in recent years. Most areas in Vermont have the 27 potential for some solar energy production though Vermont generally ranks toward the bottom 28 nationally in terms of the number of clear days (49th) and number of hours of sunlight (43rd). In 29 general, Vermont has about 2,295 hours of sunlight per year (26% of total annual hours, as 30 compared to Arizona which has about 3,806 hours of sunlight per year, or 43% of total annual 31 hours). Still, "going solar" can be cost-effective for the individual home owner homeowner. The 32 potential for solar depends on whether the site (whether roof mounted mounted, or pole mounted) 33 faces south and whether there are any obstructions that would impede solar absorption.

<u>Water Heating</u> – Solar water heating is the most common form of residential-scale solar use in Vermont. Solar systems are not regulated at the state level and are subject to local regulations. According to the National Renewable Energy Laboratory, it has been shown that water heating by solar is not generally cost effective due to high up-front costs and in colder climates due to the increased energy demand and "solar fraction" (see, e.g., report entitled "*Break-even Cost for Residential Solar Water Heating in the United States: Key Drivers and Sensitivities*"). More recent studies have shown that a solar PV option or combination solar PV and heat pump is more cost-effective than a solar thermal system (see, e.g., Green Building Advisor, cost analysis, December 26, 2014).

<u>Net Metering</u> – Decreasing costs of equipment have made solar electric generation systems more prevalent. Solar systems are no longer utilized exclusively by "off-grid"

Chapter 5: ENERGY

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buildings. The advent of net-metering allows buildings to be connected to the grid while utilizing renewable energy. Act 99 (passed in 2014) requires net metering regulations to be revised as of January 1, 2017. If the current draft Rule 5.100 (March 30, 2016) goes into effect, it may make it less advantageous for Vermonters to go solar because the renewable attributes would be devalued or transferred to the utilities. As of the drafting of this plan, the PSB has been unable to finalize Rule 5.100 by the deadline established in Act 99 (2014).

<u>Preferred Siting</u> – Pomfret generally encourages development of roof-mounted solar of less than 10KW. This is the preferred type of siting. One pole-mounted solar arrays at a scale appropriate for one residential private use (less than 10KW) are allowed where roof-mounted panels are not feasible, with reservation about adverse visual impact, both individually and cumulatively. Pomfret does not have <u>Town-Town-</u>owned land that would be suitable for the siting of larger solar projects, including community-scale projects. However, if land became available for acquisition or if a private <u>land</u> <u>ownerlandowner</u> was willing to host a community scale solar project, then a larger scale, community project would be allowed. All ground or pole-mounted solar arrays will provide screening so it cannot be seen from public roads and trails.

At the 2016 Town Meeting, 61% of the 23 residents who completed a survey of attitudes toward solar installations strongly supported residential solar systems of less than 15KW, and no resident marked "strongly do NOT support." Ratings for community solar systems greater than 15KW were mixed, but more negative; 22% "strongly support," but 41% "strongly do NOT support," with the average midway between the extremes. On siting, 39% thought solar systems should be limited to rooftops. For ground mounted systems, about half the respondents wanted complete screening and half would be satisfied with limited or no screening.

Community/Commercial-scale solar: Pomfret prefers solar development at a scale of 10KW or less and is generally not suitable for larger projects greater than 10KW. The reasons are as follows (see the Two Rivers Ottauquechee Regional Commission website, Regional Energy Plan, TRORC Region Potential Solar Sites as a reference):

- The only three-phase power in Pomfret is approximately ³/₄ mile from the Pomfret road, at the Woodstock Property Line, to the Suicide Six ski area.
- Steep slopes, wetlands, and meadows that are used for agriculture, scenic vistas, as well as limitations in the South Pomfret village area.
- Much of the most viable land for community or commercial-scale solar is on or near prime, productive agricultural soil and productive forest land.
- Some land suitable for community or commercial-scale solar abuts endangered species habitat.
- The Town does not own land that would be suitable for community or commercial-scale solar (e.g., gravel pits or brownfields).

Chapter 5: ENERGY

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1 2 3	• The Prosper Valley School has land but any available land is currently used for parking, sports rec. field, and hillside used as for Agriculture, Biology, and Forestry education and recreation activities for the students.	
4 5	• Pomfret's topography limits large-scale solar development. Additionally, South facing land and other land in the rural area are limited by the following factors:	
6 7	• Extremely steep slopes of greater than 20% grade make up 12,573 acres (49%) of Pomfret's total acres.	
8 9	 Steep slopes of 15% to 20% grade make up 5,904 Acres (23%) of Pomfret's, 25,280 total acres. 	
10 11	 Clearing forested areas on steep slopes for any kind of large-scale development increases erosion and disrupts wildlife habitat. 	
12 13 14	 South facing sites have some of the most desirable open meadows and pastures currently being farmed and managed forested land. These areas have scenic vistas and command some of the highest property values. 	
15	 5,835 acres of conserved land not subject to development. 	
16 17	• As of 2016; 16,913 acres enrolled in the Current Use program.	
18	A comprehensive overview of Pomfret's energy use and targets is located in the	Formatted: Highlight
19	appended energy packet	Formatted: Normal, Left, No bullets or numbering
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development projects, the developer must inform the Town whether the RECs will be sold out of state, or retired.

Impacts: Ground and pole mounted shall avoid undue adverse impacts to significant cultural, natural and scenic resources.

Decommissioning: All facilities greater than 10 KW shall specify conditions for system abandonment and decommissioning, including required sureties (bonds) for facility removal and site restoration to a safe, useful, and environmentally stable condition. All hazardous materials and structures, including foundations, pads and accessory structures, must be removed from the site.

The decommissioning plan for the a solar development project will provide details and a cost estimate for removal of the solar facility and rehabilitation of the project property back to its pre-project condition At the end of the life, the project will be evaluated whether (1) it is financially viable to continue to operate the project as is; or (2) A Section 248 amendment should be filed to repower the project with new solar modules and equipment at that time; or (3) the project should be decommissioned. The decommission plan also will address decommissioning in the event of project abandonment. A detailed cost estimate will be included in the decommissioning plan. The petitioner will establish a decommissioning fund in the cost estimate amount, prior to project construction and name the Public Service Board as beneficiary. The decommissioning fund would initially be funded by an irrevocable standby letter of credit that includes an auto-extension provision provide for inflation using the CPI for the length of the contract and would be issued by an A-rated financial institution solely for the benefit of the Board, or security deposit to held in a federally insured bank in the United States.

Solar facility siting requirements: New solar facilities shall be sited in locations
 that do not adversely impact the South Pomfret Village Area, and the rural
 residential areas including working farm and forest land. Solar facilities shall,
 therefore, not be sited in locations that adversely impact scenic views, roads, and
 views across open fields, hillsides, or ridgelines. All solar development must not
 use reflective colors; only earth-tone colors acceptable.

Prohibited Areas: Solar facilities are prohibited in the following locations:

- Floodways.
- Fluvial erosion hazard areas.
- Surface waters and riparian buffer areas (except stream crossings).
- Classified wetlands.
- Areas that will result in fragmentation of Pomfret's working landscape, including underdeveloped forestland and open meadows and pastures. Any development

Chapter 5: ENERGY

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employment and income for land owners.
• Rare, threatened, or endangered species habitat or communities as mapped or
identified through site investigation, and core habitat areas, migratory routes and
travel corridors.
Wind Energy: Power generated from wind is done through a wind turbine installed on top of a
tall tower, where it collects and converts wind into electricity. Towers for home use are generally
80-100 feet in height and are far less obtrusive than larger, commercial "wind farms" that have
become a subject of great debate throughout Vermont.
Similar to solar, wind energy is an intermittent resource and its generation fluctuates in response
to environmental conditions. The amount of energy produced by a specific wind tower can
depend greatly on location, height of the tower and proximity to other obstructions.
There are multiple levels of potential wind energy generation, ranging from Class 1 (10-11 mph)
to Class 7 (19-25 mph). Commercial wind farms generally are sited in Class 3 or higher areas.
With this in mind, and as illustrated in Table 5, Pomfret has potential for 81 acres of large

19 commercial-scale wind energy. However, the majority of much of these lands is are conserved.

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 Table 1 - Potential Wind Development Areas (Acres)

	Class 1 (10-11 mph)	Class 2 (12-13 mph)	Class 3 (13-14 mph)	Class 4 (15-16 mph)	Class 5 (16-17 mph)	Class 6 (17-18 mph)	Class 7 (19-25 mph)
Residential (30-meter)	8,852	453	0	0	0	0	0
Small Commercial (50-meter)	0	1,138	427	0	0	0	0
Large Commercial (70-meter)	0	0	5	76	0	0	0

Source: Vermont Energy Atlas

Agriculture:

Cow-power: Cow power is the conversion of manure to usable energy. While cow power is successful in certain areas of Vermont, Pomfret does not have large scale dairy farms that would allow for the quantities of manure needed for viable cow power.

Biomass: Biomass energy has the potential to supply a significant portion of energy needs, while improving rural economies, increasing energy independence, and reducing

Chapter 5: ENERGY

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pollution. Biomass energy comes in many forms; virtually all plants and organic wastes can be used to produce heat, power, or fuel.

A commercial biomass power plant would require a great deal of space to accommodate the various stages of collection and conversion of the mass into fuel before burning it to produce electricity. Therefore, commercial biomass energy generation facilities should be located close to available biofuels to reduce transportation impacts and costs. Water can also pose a problem as large commercial biomass facilities require large quantities to handle the recycling process of waste materials. Materials would have to be transported to and from the facility, so truck traffic should be a consideration in selecting a site.

There are currently no biomass energy generation facilities in Pomfret. Before a biomass energy generation facility is located in Pomfret, developers should prove that their proposed project will not negatively impact the rural character of the community or the local road system.

Hydropower: According to the Vermont Energy Atlas in 2013 three potential hydro sites were identified in Pomfret: Freeman and McCord, both located on Mill Brook Stream and Martin located on Cloudland Brook Stream. Martin-Cloudland Brook, is considered "in-service," meaning while it is not actively producing power, it has the basic infrastructure to do so. Retrofitting the "in-service" existing sites presents the most effective means of adding potential hydropower while keeping environmental impacts low.

While these sites have been identified as "having potential," a wide range of environmental, economic, and permitting challenges exist.

Section 248 Considerations

To the extent possible, placement of energy generation systems should meet the purpose and intent of "Ridgeline and Hillside Conservation Areas" (Part 15) of the Pomfret Zoning Ordinance.

Placement of infrastructure systems of any type in Pomfret should ultimately and directly benefit Pomfret residents in some measurable way.

For all large infrastructure systems, with regard to regarding preferred, prohibited, and significant areas, please reference page 286, section F. Permitting Considerations of the Two Rivers-Ottauquechee Regional Plan (2015).

Residential Energy Efficiency

There are a number of ways that the town of Pomfret can meet its local energy demand, first by lowering that demand, and then by working to meet the remaining need with local, untapped energy resources.

45 Decreasing Energy Use by Changing Behavior: Decreasing energy use by changing behavior
 46 and by decreasing energy use by implementing energy efficiencies are key. Please refer to the

Chapter 5: ENERGY

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Page 8

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Although communities are unlikely to have an impact on energy consumption at the global level, they do have an impact at the local level given their demand for and use of energy. The relationship between a municipality and its energy use creates opportunities to have an impact on local energy use reduction. Energy Committee: Pomfret does not have an Energy Committee (EC), which acts as an advisory board to the Selectboard and Planning Commission (PC) on all things energy related. The EC is a volunteer group that is appointed by the Selectboard for the purpose of establishing and implementing the town's energy goals. EC's activities can include conducting energy audits on municipal buildings, tracking energy use for these buildings, and working with the PC on the Energy Plan. Auditing Municipally Owned Buildings: Many towns in Vermont own buildings that are old and inefficient in many respects. For instance, older buildings often have insufficient insulation, wasteful heating and cooling systems, and out-of-date lighting. These kinds of infrastructure problems result in higher energy use with the resulting cost passed onto taxpayers. Municipal officials should consider conducting audits on additional Pomfret buildings determine what improvements are necessary, and which projects would have the highest c benefit ratio in terms of energy and financial savings. Property Assessed Clean Energy (PACE): Vermont enacted legislation in May 2009 (Act 45) that authorizes local governments to create Clean Energy Assessment districts. Once created, municipalities can offer financing to property owners for renewable energy and energyefficiency projects. Eligible projects include the installation of solar water and space heating, photovoltaic panels (PV), and biomass heating, small wind, and micro-hydroelectric systems. Property-Assessed Clean Energy (PACE) financing effectively allows property owners to borrow money to pay for energy improvements. The amount borrowed is typically repaid via a special assessment on the property over a period of up to 20 years; if the property owner wishes to sell the parcel before fully repaying the obligation, then the obligation is transferred to the new

Vermont Residential Building Code handbook for compliance with residential building energy and standards (RBES) available at http://publicservice.vermont.gov/energy_efficiency/rbes.

6 property owner at the time of sale.

8 Energy, Land Use, and Transportation

Municipal Role in Energy Efficiency

Pomfret recognizes that energy efficient land use patterns that utilize existing infrastructure and
are designed to accommodate all modes of travel are vital parts of increasing energy efficiency
and reducing the carbon footprint.

Vermont promotes development policies that maintains and enhances the "historic development
pattern of compact centers surrounded by rural landscape." Pomfret by its very history and
nature is that "surrounding rural landscape." Currently there is no compact center. Efforts to

Chapter 5: ENERGY

Page 9

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1 2 3 4 5 6 7 8	direct future development to existing hamlets or village areas as proposed in the Land Use chapter of this plan could reduce energy expended for transportation within the town. Pomfret has no public transportation (beyond on-demand for the elderly) and is unlikely to have any in the near future. However, because transportation is such a substantial portion of local energy use, Pomfret supports the continued development of conveniently located Park-n-Ride facilities. The closest Park-n-Ride to Pomfret is currently in Sharon; however a Woodstock Park- n-Ride is currently under development and will be convenient for Pomfret commuters.	
9 10	Energy Scarcities and Costs	Formatted: Font: Bold, Highlight
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12	There are no scarcities of energy foreseen in the 8-year life of this plan. Our electrical providers have plenty of power supply resources either under contract or available to purchase at this time.	Formatted: Font: Bold, Highlight
14 15 16 17 18 19 20	Total energy demand is likely to shrink modestly in the near term as population is not expected to grow much and efficiency is constantly improving. There should be ample amounts of heating and transportation fuels for the life of this plan, but we must encourage a shift away from fossil fuels to meet our goals. Wood is a plentiful local source of heating fuel, and many more cords could be sustainable harvested than are being cut now. Plenty of sun and wind are available if we decide to use them.	Formatted: Highlight
21 22 23 24 25 26 27 28 29 30	That is not to say that plentiful energy will be cheap. Fossil fuels have varied widely in price over the last several years, and the overall trend is for dwindling supplies. Also, whether it is carbon pricing or other methods, fossil fuels will have to increase in cost to disincentivize their use. The cost of energy is not an issue for some families, but is still an issue for many, and will be less of an issue for all if targets for better insulating buildings, switching to EVs, and using heat pumps and advanced wood heat systems are met. An EV has much less maintenance costs, as they have no engine or exhaust system, and the cost of electricity to power a car comes out (or the equivalent of about \$1,50 per gallon (in today's value), much less than current gasoline prices.	
31 32 33 34 35	For many, the cost barriers are not the daily or monthly energy costs, but the implementation of these changes to existing buildings and vehicles. There are rebates and programs available that are income-based, and even for those that have too much income to qualify over time these investments will pay off, but they still require getting financing or having considerable savings on hand.	Formatted: Left
36 37	Long Range Goals	
38 39 40 41	<u>1. To support increased energy efficiencies in Higher energy efficiency in existing buildings, new buildings, and transportation. and new buildings, in transportation and to support the</u>	Formatted: Indent: Left: 0.5" No bullets or
42	$\frac{1.2.\text{The}}{1.2.\text{The}}$ long-term availability of safe, reliable, renewable, and affordable energy supplies.	Formatted: Left. Numbered + Level: 1 + Numbering
43 44 45	Objectives and Policies	Style: 1, 2, 3, + Start at: 1 + Alignment: Left + Aligned at: 0.25" + Indent at: 0.5"

development objectives are identified and considered in future utility development.	
2.1.Pomfret supports the development and use of private renewable energy resources. As a guide, solar Solar projects should be less than 10 KW and should ideally be of a scale that promotes individual use, or group net-metering.	
3. Developers must make all possible efforts to minimize damage to important natural areas as identified in the Land Use and Natural Resource section of this Town Plan. Developers must also make all possible efforts to ensure that projects are sited and designed so that they do not create undue adverse effects on the scenic and rural character of the Town.	
 4. Pomfret officials will work in cooperation with state, regional and local agencies, emergency service providers, regional suppliers and municipalities to develop local emergency contingency plans that ensure access to critical energy supplies and measures to reduce nonessential energy consumption in the event of an abrupt energy shortage. 	

Pomfret officials (the Selectboard and Planning Commission) will participate in the

and transmission facilities to onsure

Public Service Board's Certificate of Public Good review of new or expanded generation

- 2. Pomfret encourages new significant public investments (including, public recreational areas and municipal facilities) to be located in close proximity to existing infrastructure that utilizes existing roads whenever possible.
 - The use of electric vehicles and the installation of charging stations at town facilities is encouraged.
- 5.4. The Town encourages residents to operate wood burning furnaces and stoves that meet the EPA's efficiency ratings, available on the EPA website at: https://www.epa.gov/compliance/list-epa-certified-wood-stoves,

Recommendation Actions

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- Pomfret officials (the Selectboard and Planning Commission) will participate in the
 Public Service Board's Certificate of Public Good review of new or expanded generation
 and transmission facilities to ensure that local energy, resource conservation and
 development objectives are identified and considered in future utility development.
 WHO?
- 2. Pomfret officials will work in cooperation with state, regional and local agencies, emergency service providers, regional suppliers and municipalities to develop local emergency contingency plans that ensure access to critical energy supplies and measures to reduce nonessential energy consumption in the event of an abrupt energy shortage. (WHO?)

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Chapter 5: ENERGY

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- 2.4. Pomfret officials or volunteers are encouraged to track municipal energy use and costs (for example: through the EPA's free Energy Star® Portfolio Manager Program), and develop an overall energy budget to manage Pomfret's energy consumption, which may also include the development of local generating capacity. [WHO?]
- 3.5.Implementation of energy efficiency measures are encouraged for existing and future facilities as opportunities arise (e.g., facility retrofits, renovations, and equipment upgrades). WHO?
- 4.6. Town officials are encouraged to develop municipal procurement and purchasing policies that incorporate life-cycle costs (purchase, energy, operation, maintenance and disposal costs) for future purchases that emphasize products that are energy efficient (e.g., Energy Star® rated). There should be available locally, durable, recyclable, nontoxic, and manufactured products with post-consumer recycled material. [WHO?]
- 5-7. Facility maintenance and operation policies that maximize energy efficiency while maintaining comfort levels for employees and visitors are encouraged. Examples include: installation of day-lighting tubes, programmable thermostats, occupancy light sensors, smart strips and energy star appliances. [WHO?]
- 6. Development of municipal vehicle purchase, maintenance and use policies, including minimum fuel efficiency standards for new vehicles is encouraged.
- 8. Consideration of the benefits of using regionally available alternative-fuels, such as biodiesel, in municipal vehicles is encouraged. (WHO?)
- <u>Municipal officials should consider conducting audits on additional Pomfret buildings in order to determine what improvements are necessary, and which projects would have the highest cost-benefit ratio in terms of energy and financial savings.</u>
 <u>Automatical savings.</u>

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Chapter 5: ENERGY