

E. ENERGY AND ENERGY CONSERVATION

History

Early settlers in East Montpelier used rivers and streams to provide energy to run the machines of industry. Wood, cut locally, provided fuel for heat, hot water, and cooking. Ice cut from local ponds was stored to provide year-round refrigeration. Homemade candles or kerosene lanterns provided light. For the most part, early town residents were self-sufficient in meeting their energy needs.

The first rights-of-way for power lines in town, purchased in 1926 by the Montpelier and Barre Light and Power Company, were located along US 2 through East Montpelier Village and along VT 14 to North Montpelier. Later, Green Mountain Power purchased these rights and proceeded to lay out the power lines.



Washington Electric Cooperative (Julie Potter)

In 1939, Washington Electric Cooperative began to install electric lines in the more rural areas of town that Green Mountain Power would not serve. By the end of 1939, 55 miles of line had been installed in an area between East Montpelier and Peacham. The electricity that first flowed on December 2, 1939 was generated in East Montpelier Village by two 95-kilowatt diesel generators. The greater availability of electricity to rural areas dramatically changed the town, especially its agricultural industry.

During the second half of the twentieth century, American lifestyles depended on increasing use of energy, from more and bigger cars to larger houses and countless appliances. Such expansive energy use has contributed to environmental degradation, climate change, and diminished energy supplies. For the past two decades, there has been an increasing focus on renewable energy sources in Vermont and globally. This has been coupled with efforts to conserve energy, because the cheapest form of energy is the energy one doesn't use.

Current Status

As of November 2017, East Montpelier residents use electricity, oil, gas, wood, coal, solar, and water (hydro) for heating, electricity, and transportation—roughly 330,000 million British Thermal Units (MMBTU) annually.

Approximately one-third of that amount is from renewable sources.

East Montpelier Energy Use		
Purpose	Renewable	Non-Renewable
Heating	37%	63%
Electricity	79%	21%
Transportation	13%	87%
Source: Vermont Energy Dashboard		

Thermal Heating Energy Data

Wood continues to be a significant source for home heating along with fuel oil and propane. Both the elementary school and U-32 high school are heated with wood boilers. The Vermont Energy Dashboard identifies 41 sites in town with solar hot water heaters.

Electricity Data

Map 7 shows the location of transmission and three-phase power lines in town along with electrical substations and hydroelectric power generation sites.

The town is served by two electrical utilities: Washington Electric Cooperative (WEC) and Green Mountain Power (GMP). WEC serves 666 meters in town, while GMP serves 614 meters.

WEC's electricity is 100 percent renewably generated. GMP currently procures 60 percent of its electricity from renewable sources. Vermont's Renewable Energy Standard (RES) requires utilities in the state to provide at least 55 percent of their electricity from renewable sources in 2017, increasing to 75 percent by 2032.

There are limited sources of hydroelectric power generation in East Montpelier. A private company, Winooski Hydroelectric, owns and operates a generation station on the Winooski River off US 2 at the Berlin town line. This station generates and sells about three million kWh per year to the Vermont Power Exchange which distributes electricity to utilities throughout the state—about as much energy as would be used by 480 homes. The privately-owned Kingsbury Hydroelectric facility in North Montpelier generates both hydroelectric solar photovoltaic electricity and sells about 500,000 kWh annually to the Vermont Electric Power Producers Inc. (VEPPI)—enough to serve about 120 homes.

As of December 2017, the Vermont Energy Dashboard identifies 135 solar electric installations, a total capacity of 1,181 kW. The largest array in town is the Lazar group net-metered array on US 2 with 500 kW capacities. The second largest installation is the 100kW solar array at the McKnight Farm.

Transportation Energy Data

According to data from the Central Vermont Regional Planning Commission, East Montpelier residents own 2,018 vehicles and drive an average of 12,500 miles per vehicle per year (less than the state average of 15,000 miles/year). We use a total of 1,356,183 gallons of fuel per year for transportation. Our use of renewable energy for transportation is increasing as more people purchase electric vehicles. According to the Vermont Energy Dashboard, 13 percent of our transportation energy is renewable.

Energy Efficiency Data

Vermont utilities, organizations, and homeowners are increasingly recognizing the value of efficient energy use. Efficiency Vermont, the state's energy efficiency utility, provides advice, funding, and expertise to homeowners, businesses, and farms. Several Vermont utilities have rate structures that favor low-usage customers. Many houses have been renovated to improve efficiency, but the demographic trend towards smaller household size means that for the same

population more houses are required. Thus the average electricity consumption per person tends to increase. Nevertheless, newer homes must now be built to minimum efficiency standards.

Act 174 and the East Montpelier Energy Plan

The goal of the 2016 *Vermont Comprehensive Energy Plan* is to supply 90 percent of our total energy needs from renewable sources by 2050. This goal would reduce greenhouse gas emissions by 75 percent. To meet the statewide goal, every community is expected to increase its share of energy conservation and renewable energy generation.

Act 174, passed in 2016, establishes a new set of municipal and regional energy planning standards. Prior to Act 174, towns had little authority over the permitting and siting of utilities, which is regulated by the state. Towns with an approved energy plan will receive “substantial deference” by the Public Utilities Commission (PUC, formerly known as the Public Service Board) during the Section 248 state energy permitting process. Meeting these planning standards is voluntary; if regions and municipalities do not wish to develop energy plans, they will continue to receive “due consideration” in the Section 248 process. By adopting an enhanced municipal energy plan, East Montpelier will have input into how and where renewable energy is generated in town.

Enhanced energy plans must meet standards in four areas: conservation and efficiency, transportation, land use, and siting. East Montpelier’s Energy Committee, in cooperation with the town and regional planning commissions, is developing an energy plan to meet these standards. The energy plan will include the required elements: Analysis and Targets, Pathways and Implementation Actions, and Mapping. When finalized, the enhanced municipal energy plan will be incorporated into this Town Plan by amendment.

East Montpelier proposes specific actions to support the goal of 90 percent renewable energy use by 2050. These actions encompass greater efficiency, alternative modes of transportation, renewable sources, smart land development choices, and building code compliance.

Conservation and Efficiency

The town Energy Committee, founded in 2008, believes that energy conservation and efficient use of energy are the most important component of the state’s energy plan. The more energy reduction we achieve, the less energy we will need to generate. Act 174 includes a building efficiency goal of 25 percent of homes made efficient by 2020.

Since its inception the Energy Committee has held workshops, participated in energy fairs, received grants for energy efficiency renovations in town offices and the town garage, and created neighborhood networks for encouraging and sharing information.

Renovations of town buildings are saving energy and taxpayer money. The Town Office, fire station, East Montpelier Elementary School, and U-32 Middle/High School have all been upgraded to a high energy standard.

East Montpelier and its Energy Committee continue to work with statewide organizations to promote home weatherization, energy-efficient appliances, and transportation alternatives to improve the town’s overall energy footprint.

Since 1998, the Vermont Residential Energy Code (21 V.S.A. §266), also known as the Residential Building Energy Standards (RBES), has set minimum energy efficiency requirements for new residential construction and additions larger than 500 square feet. Effective October 2015, the RBES was updated to reflect updates to the underlying global standard (International Energy Conservation Code; IECC 2009). Vermont also has Commercial Building Energy Standards that apply to new commercial construction.

Transportation

Reducing fossil fuel use for transportation is a challenge for a rural community like East Montpelier. Conserving transportation energy requires reducing single-occupancy trips, increasing walking and bicycling, and increasing use of public transportation. Alternative fuel vehicles, such as electric vehicles, can also help meet energy goals. We cannot force individual choices but we can publicize alternatives and make new habits as easy as possible.

East Montpelier has taken a number of steps to encourage the use of public transit and facilitate bicycle and pedestrian use in East Montpelier Village. In 2017, a new Park and Ride facility was completed in the village. This facility has a bus shelter and is a stop for the Route 2 Commuter bus between Montpelier and St. Johnsbury. The Park and Ride has two electric vehicle charging stations. Sidewalks and bike lanes have been constructed in East Montpelier Village. More sidewalks and bicycle lanes are called for by this Town Plan.

Anyone who has driven by one of our schools at the beginning or end of the school day sees a long line of cars dropping off or picking up a single student. We encourage the schools to educate students and their parents about the inefficiency of this practice.

Land Use

A significant goal of this Town Plan is to concentrate future growth within the town's villages and growth areas. Compact communities encourage walking and bicycling and facilitate access to public transportation. When trip origins are closer to trip destinations, even single-occupancy trips use less energy. The recent municipal planning grant award will enable updating the town's *Land Use and Development Regulations* to implement the *East Montpelier Master Plan* which focuses new compact residential and commercial growth in the village.

New Renewable Energy Siting

Act 174 requires municipal energy plans to analyze and identify areas that are potentially suited to developing various types of new renewable energy facilities such as wind, solar, hydro, and biomass. Towns may also identify preferred sites for new renewable energy production, and develop guidelines for siting distributed energy generation and related transmission lines. The intent of the guidelines is to minimize:

- Overly restricting the siting of distributed renewable energy to the detriment of environmental goals and consumer choices, or
- Acquiescing to a “gold rush” of renewable energy installations with their accompanying negative impact on rural cultural life, equitable payment for electric power, potential grid instability, and subsequent backlash to the further development of renewable energy.

The potential for new large-scale hydroelectric generation is limited in East Montpelier; the suitable locations already have generation facilities. The potential for wind energy development is also limited; no suitable primary wind sites exist, and the small area of secondary wind suitability is in a priority forest block.

Therefore, in order to meet the town's new renewable energy generation target, the town must rely on solar energy projects. To meet the town's share of the total goal set by the *Vermont Comprehensive Energy Plan*, an additional 9.5 MW of solar photovoltaic (PV) capacity must be installed within the town by 2050. This corresponds to approximately 76 acres of land devoted to new solar arrays based on today's technologies. East Montpelier's low rolling hills with significant areas of open fields and scrub vegetation is potentially suited to solar development, so there appears to be little impediment to accommodating this goal. Three-phase electric transmission lines are important to support larger solar projects (100 kW or greater). Map 7 shows the town's existing three-phase transmission lines.

The scenic quality of East Montpelier's landscape and its openness make careful siting of development important. Town development tends to be small in scale and new solar development must be consistent in scale and character with existing and future planned development. Siting considerations are generally not intended to constrain smaller net-metering projects (in the range of 10-50 kW) that serve to reduce the net electrical consumption of residences, businesses, or small groups of residences abutting the photovoltaic array. Larger solar projects may be possible in certain preferred areas; but regardless of scale, all solar installations must comply with development standards that will reduce any undue adverse impacts to significant scenic and natural resources identified in this Town Plan.

The Public Utility Commission (PUC) has adopted rules relating to setbacks and aesthetic considerations for new photovoltaic systems (Rule 5.100). These rules apply regardless of whether the photovoltaic system is net metered, standard-offer, utility-owned or not grid-tied. No solar PV installation of any scale should be situated to be an eyesore to a neighbor by reflecting light toward them, significantly blocking a neighbor's view, or omitting visual mitigation to screen an array from being a dominant feature of the neighbor's view. In invoking the Quechee test for aesthetics and the potential need of visual mitigation, a majority of the East Montpelier Selectboard, or a five-person panel chosen from the East Montpelier voter list by the Selectboard, will serve as the voice of the "average person." Furthermore, siting electric infrastructure and PV arrays in or around wetlands or shorelines must strictly follow state Agency of Natural Resource regulations. Easements controlled by the Vermont Land Trust may require their permission for any type of development including solar arrays of any size.

All electric customers in the town should have a reasonable opportunity to offset their power usage using PV arrays adjacent to their homes or businesses, —with due consideration of the views from local roads and neighboring property owners. While more stringent siting guidelines apply to large-scale projects that are intended to feed power into the regional grid independent of local needs, the town recognizes that solar development may not be restricted differently than other types of development. Siting regulations for solar PV arrays must not be inconsistent with town zoning laws or siting requirements in existing statutes.



The McKnight Farm 100kw solar array seen from The Four Corners Schoolhouse is sited to minimize visual impacts
(Jean Vissering)

Siting Standards

This Town Plan establishes siting preferences and constraints on sites with specific characteristics:

- **Preferred Sites:** The town will support installations at these sites that meet design guidelines;
- **Potentially Suitable Sites:** The town may support installations at these sites, but installers must pay careful attention to siting restrictions in statute; and
- **Prohibited Sites:** The town will not support installations at these sites because of the scenic, significant natural resource, or cultural values of the specified areas.

Residential-scale arrays of 15kW or less are acceptable in almost any location in town. Commercial and community arrays up to 150 kW are also acceptable in most locations.

Large-scale solar arrays (up to 500 kW) are encouraged to be sited in “preferred” locations where scenic preservation, natural character, or village character are not limiting issues.

Subject to meeting location-dependent criteria, East Montpelier will accept solar arrays of up to 500 kW in capacity. Any proposal to install an array of large capacity must receive approval of a majority of the Selectboard or a five-person committee (minimum) appointed by the Selectboard as a condition to file a Certificate of Public Good.

The town should engage WEC, GMP and the Vermont Electric Power Company (VELCO) when a large project comes up for approval to ensure that the reliability of the local grid is being assessed adequately.

Preferred Siting

Preferred sites for larger solar photovoltaic arrays (150 kW or larger) are located within the current Industrial District and Commercial District (excluding defined villages). These areas are generally on or near state highways and near three-phase transmission lines. Appropriate screening from roadsides and residential areas is required for all solar projects.

Several portions of East Montpelier are zoned for commercial and/or industrial usage and are suitable for larger solar projects. These areas are located in the southeast quadrant of the town. Because of the potential for commercial energy load in this area and the pre-existing of light industrial development in this area, these areas are preferred for larger-scale solar development. Note that zoning districts may change.

Preferred sites include:

- Rooftops of municipal buildings, such as U-32 Middle/High School and East Montpelier Elementary School.
- Above parking lots and impervious ground surfaces.
- Adjacent to existing light industrial and commercial sites that are comparable in scale to the proposed array.
- Adjacent to existing large farm buildings comparable in scale to the proposed array.
- Casella Waste Management Capped Landfill: The available land area is unknown, and will determine the potential project size.
- Industrial District: East Montpelier's industrial district is designed to accommodate industrial and business uses unsuited to residential areas, and is therefore economically important to the town. No solar development shall be located on portions of the industrial district that is within the East Montpelier Village as defined in the *East Montpelier Village Master Plan*.
- Commercial District: The commercial district extends from East Montpelier Village along US 2 to the Plainfield town line. Portions of this district may be suited to solar development. These include areas immediately adjacent to existing commercial uses. Areas that are not suitable include actively used farmland, lands within East Montpelier Village, flood hazard areas, river corridor areas, or wooded slopes greater than 10 percent. Screening from roadsides and nearby residential areas is particularly important as this area serves as the eastern gateway into East Montpelier's primary village.

- Portions of the Residential and Commercial District: Generally, areas in close proximity to Route 2 and to three-phase transmission lines are preferred. Excluded areas include East Montpelier Village and the conserved Clark property. This is an area with a mix of residential uses, and screening from residential and roadside views will be important.

Areas of Possible Constraints (Possible Siting)

Renewable energy generation projects that are not located within “preferred sites” will need to be designed and sited so that the scale and location does not unduly detract from the character of the area or natural resource values. Owners of conserved land must seek approval from the Vermont Land Trust or other organization that conserved the land.

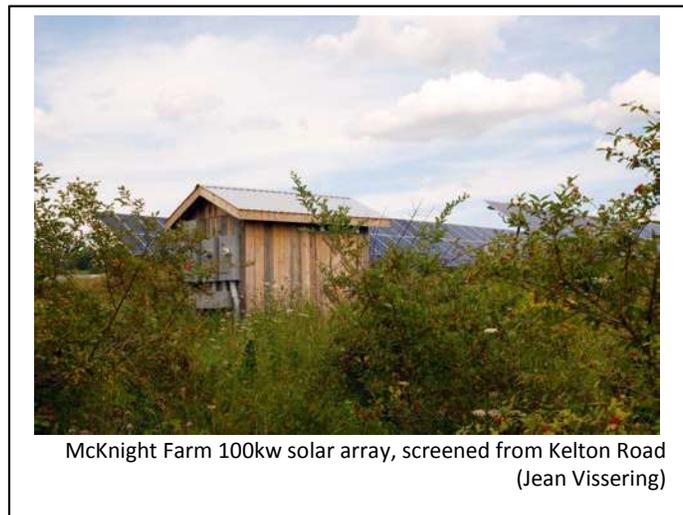
Larger non-commercial projects up to 150 kW serving the specific needs of local businesses or farms may be permitted provided they are designed and sited to fit within the character of the surrounding area. The following types of renewable energy projects will be appropriate in these areas:

- Roof mounted solar panels;
- Free-standing solar panels up to 15 kW for single residences or up to 150 kW serving a nearby community of homes;
- Non-commercial solar projects up to 150 kW designed to serve the specific needs of a local business, institution, or farm;
- Small wind turbines suited to specific residential or business use.

The 100 kW solar project at the McKnight Farm serves as a good example of appropriate siting. The project is located on non-productive land and is well screened from the adjacent road by a hedgerow.

Areas of Significant Constraints (Prohibited Areas)

Areas with important natural, cultural, or scenic values are unsuited to solar projects except where it can be demonstrated that development will not interfere with the identified resource. These restrictions are not intended to prevent the installation of arrays to offset residential or farm use of inhabitants within the designated prohibited area, but sensitive siting and screening may be required.



McKnight Farm 100kw solar array, screened from Kelton Road
(Jean Vissering)

Significant Natural Resources: These areas are identified in the Town Plan and include flood hazard areas, river corridor areas, wetlands, high elevation protection zones, wildlife habitat areas, significant forest blocks, and prime agricultural soils. Minimum buffer areas of 50 feet are required between any part of a solar project and these resource areas

Identified Scenic Views: Roadside areas with significant scenic views are identified in the Town Plan and shown on Map 12. No solar project shall be visible within the foreground (one-half mile) of any viewing area.

Significant Cultural Resources: No projects greater than 50kW shall be located within a Village zone. These areas are intended for residential and business growth to provide a sense of community, economic growth, and opportunities for affordable housing.

Goals and Actions

- **Goal 6.13:** Adopt the East Montpelier Energy Plan.
 - ✓ **Action 6.13.1:** Complete the East Montpelier Energy Plan and incorporate it into the 2018 Town Plan by amendment.

- **Goal 6.14:** Promote energy conservation and efficiency.
 - ✓ **Action 6.14.1:** Publicize home weatherization and other energy conservation programs to East Montpelier residents.

- **Goal 6.15:** Reduce use of fossil fuels in transportation.
 - ✓ **Action 6.15.1:** Develop a plan for reducing the use of fossil fuels in town vehicles.
 - ✓ **Action 6.15.2:** Encourage schools to reduce single-student transportation.

This goal cuts across other areas. See actions for Infrastructure (6.2.1, 6.2.2, 6.2.3, 6.5.1, 6.5.2, 6.6.1).

- **Goal 6.16:** Focus growth in villages and growth areas.

This goal cuts across other areas. See actions for Land Use (10.2.1, 10.2.2, 10.2.3, 10.2.4).

- **Goal 6.17:** Create guidelines for siting and design of new renewable energy development.
 - ✓ **Action 6.17.1:** Provide specific siting and design standards in the East Montpelier Energy Plan.