

TOWN OF WEATHERSFIELD

Planning Commission Report For

Municipal Plan Amendment

Energy Chapter

24VSA §4384 *Preparation of plan; hearings by planning commission*

24VSA §4384(a): *A municipality may have a plan.*

The Town of Weathersfield has a Plan that was adopted in 2009.

At the outset of the planning process and throughout the process, planning commissions shall solicit the participation of local citizens and organizations by holding informal working sessions that suit the needs of local people.

The Planning Commission sought out community input early in the revision process through a town-wide mail survey to all residents. The Commission also held “neighborhood” meetings in five different locations throughout the Town to allow public debate and “brainstorming” of planning topics. In addition, regular monthly meetings were open to the public.

An amendment or repeal of a plan may be prepared by or at the direction of the planning commission or by any other person or body.

This amendment was prepared by the Weathersfield Planning Commission.

24 VSA §4384(b): *If any person or body other than a municipal planning commission prepares an amendment to a plan, that person or body shall submit the amendment in writing and all supporting documents to the municipal planning commission.*

This amendment was prepared by the Weathersfield Planning Commission.

24 VSA §4384 (c): *When considering an amendment to a plan, the planning commission shall prepare a written report on the proposal.*

This report is prepared in compliance with this requirement.

The report shall address the extent to which the plan, as amended, is consistent with the goals established in section 4302 of this title.

- **24 VSA §4302(a)** *“to encourage the development of renewable resources”*.

This amendment calls for analysis of available renewable energy resources within the Town and the feasibility of their development.

- **24 V.S.A. §4302(b):**
 - 1) *To establish a coordinated, comprehensive planning process and policy framework to guide decisions by municipalities, regional planning commissions, and state agencies.*

Weathersfield has a well-established planning process and policy framework, which is supported with the help of the Select Board, the Planning Commission, the Conservation Commission, other municipal boards and commissions, Town staff, and committed community members.

The Town’s Energy Coordinator is an ex officio member of the Planning Commission. She was an active participant in the writing of this chapter.

- 2) *To encourage citizen participation at all levels of the planning process, and to assure that decisions shall be made at the most local level possible commensurate with their impact.*

The Planning Commission sought out community input early in the revision process through a town-wide mail survey to all residents. The Commission also held “neighborhood” meetings in five different locations throughout the Town to allow public debate and “brainstorming” of planning topics. In addition, regular monthly meetings were open to the public.

If the proposal would alter the designation of any land area, the report should cover the following points:

The proposed amendment will not alter the designation of any land area.

- **24 V.S.A. §4302(c):**
 - (7) *To encourage the efficient use of energy and the development of renewable energy resources.*

The proposed amended Energy chapter contains the following statements that clearly promote the efficient use of energy and the development of renewable energy resources:

(Page 5):

- *Cost savings can be realized from:*
 - (a) *Weatherization of buildings*

- (b) *Light-bulb changes*
- (c) *Air conditioning changes*
- (d) *Conservation measures (reduction in use)*
- (e) *Fuel-efficient vehicles*
- (f) *Analysis of plowing and bus routes.*

(Pages 6 & 7):

Statement of policy on the conservation of energy including programs to implement that policy

Weathersfield will strive to conserve energy as follows:

- (1) *Maximize energy efficiency in existing municipal buildings and operations in order to avoid or postpone the need for costly sources of additional energy*
- (2) *Consider energy efficiency in all aspects of transportation planning including purchases of vehicles for the municipality and/or school buses.*
- (3) *Make available information to residents and businesses that will help them save energy.*
- (4) *Adopt policies and guidelines that encourage (or require) energy lighting standards throughout the town.*
- (5) *Encourage the use of alternatives to the private automobile, including but not limited to carpooling, public transportation and charging stations.*
- (6) *Review the results from prior energy audits for all municipal buildings. Identify, prioritize, and schedule installation of recommended energy efficiency measures.*
- (7) *Encourage the continued application of SEVCA's (and other service providers) weatherization program for single-family residences occupied by low and moderate income individuals or families*
- (8) *Encourage the town and school libraries to expand and update regularly their energy publications and publicize this information source to the public.*
- (9) *Encourage the use of renewable resources through local demonstrations of innovative energy installations and other similar means.*
- (10) *Publish information about energy related emergencies, e.g. what to do in case of power outage or a fuel outage.*

(11) *Investigate and promote opportunities and/or programs which encourage or assist in the reduction of costs to home and business owners associated with increasing energy efficiency.*

(Page 7)

Statement of policy on the development of renewable energy resources

Weathersfield supports and encourages the development and use of renewable energy resources so long as there is a balance between the costs of the renewable energy, the pollution its development or use may create, the aesthetics of its presence in the community, its impact upon the community's natural resources, and its impact upon the environment of the community and surrounding region.

In addition, Weathersfield will:

- (1) Encourage the availability of renewable energy resources for all cost-effective purposes;*
- (2) Not support alternate energy production if the adverse impacts outweigh the benefits of the energy produced.*

ENERGY

We all need energy in many forms to conduct our daily lives. That energy can come from local sources or be imported from outside of the Town. Either source can be renewable or non-renewable. Renewable energy is energy which comes from sources that are naturally replenished. Renewable energy sources can include biomass (wood, corn, grasses, and vegetable oil), the sun (solar), wind, the earth (geothermal), water (hydro), or cow manure (methane digesters - “cow power”). Non-renewable energy is produced from sources that cannot be renewed by human activity or within the human time scale. These include oil, natural gas, uranium, and coal.

Weathersfield is heavily dependent upon imported, non-renewable energy to meet its energy needs. This plan provides an analysis of our energy resources and needs, as well as energy scarcity, costs and problems in our community. The overall purpose of this energy plan is to provide decision-making guidance to:

1. Weathersfield Town Government
2. Residents of Weathersfield
3. Weathersfield Business and Agricultural Community
4. Agency of Natural Resources in the Act 250 permit process
5. Public Service Board in the Act 248 permit process
6. Southern Windsor County Regional Planning Commission

In addition, this plan seeks to:

- help the Town identify ways to conserve energy in its municipal functions,
- identify alternative sources of energy that are suitable for the Town,
- promote a balance between economics and pollution reduction,
- encourage the Town’s residents to conserve energy, and
- encourage development of appropriately-scaled alternative energy resources

ANALYSIS OF ENERGY RESOURCES IN WEATHERSFIELD (renewable resources)

At the present time, only a few households in town generate power or heat with small renewable energy systems. Weathersfield as a whole does not produce any significant amounts of renewable energy. However, the town has the *potential* for energy generation from any of the following renewable resources; biomass, geothermal, hydro, solar, and wind.

The Vermont Online Energy Atlas (<http://www.vtenergyatlas.com/>) is an excellent source of information regarding the availability and potential production of renewable energy resources in Vermont by Town.

Biomass

The term “biomass” includes bio-diesel, perennial grasses, methane digesters, waste to energy, and woody biomass.

Bio-diesel

Bio-diesel is a type of fuel made from vegetable oils, animal fats, or waste cooking oil. It can be used in its purest form or combined with petroleum diesel. It is biodegradable, nontoxic, far less polluting than fossil fuels and can be used in ordinary diesel engines with little or no modification.

Vegetable oils are derived from oilseed crops such as mustard, rapeseed or sunflowers. According to the Atlas, there are 2,217 acres in Weathersfield that are suitable for oilseed production. This land area has the potential to produce approximately 138,000 gallons of oil or roughly 16,156 MBTUs. This is equivalent to 4,735 Kwh of electricity or 116,556 gallons of home heating oil. There are no oilseed crops being produced in Weathersfield nor are there the facilities to convert the seeds to bio-diesel within a reasonable distance.

Bio-diesel can also be produced from waste cooking oil. There are nine functioning restaurants in Weathersfield that could provide small amounts of waste cooking oil for conversion to bio-diesel.

Woody Biomass

Wood is used in a variety of forms to provide heat or to generate electricity. In the simplest form, wood from trees is split and sold for firewood for wood-burning stoves and furnaces in home-heating. The Weathersfield School uses wood chips to heat the school. Wood pellets are also a popular way to provide home heating.

Studies show that burning woody biomass to generate heat is far more efficient than burning it to generate electricity. Additional challenges to using woody biomass for energy production on a large scale are truck traffic (large logging trucks), waste heat (if the biomass is used for electricity production), and carbon dioxide emissions.

According to the Atlas, there are 12,412 acres of wooded land in Weathersfield with an annual potential yield of 5,763 tons of available low grade wood (0.464 tons Net Available Low Grade Wood (NALG)/acre x 12,412 acres = 5,763 tons of NALG wood). This wood has the potential to produce 2,881 Mwh of electricity annually or 40,357 MMBH of thermal energy.

Perennial Grasses

There are 2,217 acres of land suitable for production of perennial grasses (Switch grass and Bluestem) in town (same as for oilseed crops). 7,391 tons of grass from these crops could annually produce an estimated 517,422 BTUs. There are, however, problems associated with the burning of perennial grasses that must be taken into consideration when considering this fuel source.

Methane Digesters

According to Green Mountain Power (GMP), Cow Power, "one cow can produce about 30 gallons of manure a day which, in turn, can generate enough electricity to power two 100-watt light bulbs for 24 hours. The waste from 4-6 cows can generate about 1 kw of electricity." (VT

Renewable Energy Atlas) Weathersfield has a number of various types of livestock in town, but only one working dairy farm. There are currently no methane digesters in the town.

Geothermal

“Geothermal, or ground source heating, is the direct use of energy absorbed from the sun at the earth’s surface, and supplemented from the earth’s core. Modern geothermal heating and cooling systems rely on the stable temperature of the earth (55 degrees Fahrenheit), or groundwater in a well, along with an electric heat pump. Water is pumped through tubes buried in the ground, or from a well. In wintertime this water is warmer than the outside temperature, so the heat pump “extracts” heat from the water to distribute throughout the building, and the now-cooled water is returned to the earth to be re-warmed. The system is reversed in the summer, with the heat pump drawing hot air out of the building, and sending warmed water into the earth to be chilled.
(<http://www.vermont.org/main/technology/geothermal/>)

This technology is viable in Weathersfield. There are two geothermal system drillers in Weathersfield. It is more efficient to install in newly built structures.

Hydro

There are three potential sites in Weathersfield for hydroelectric power - Stoughton Pond, Springfield Reservoir, and the Soapstone Dam on the Black River. The Vermont Energy Atlas estimates they have the potential to produce a total of 207 kW of power.

With the abundance of streams in Weathersfield, micro hydro-power (run-of-river) is another alternative that should be considered. Micro hydro-power generation requires as little as two gallons per minute of stream flow and does not require the usual reservoir associated with standard hydro power projects. Peak power production is in the winter when electricity demands are high. Installation costs and maintenance fees are relatively small in comparison to other technologies.

(<http://www.alternative-energy-news.info/micro-hydro-power-pros-and-cons/>)

Solar

Solar energy can be used to generate electricity or heat. It can be stored on site or “sent back” to the grid (“net-metered” sites). There are presently five net-metered sites in Weathersfield. The Vermont Energy Atlas estimates that there are 1,522 potential solar sites in the town with a combined potential of 2,087,698 kWh.

Wind

There is only one net-metered wind site in Weathersfield.

According to the U.S. Department of Energy’s Wind Program and the National Renewable Energy Laboratory, areas with annual average wind speeds of 21.3 ft/s (or 14.5 mph) and greater at a height of 262 feet are suitable for wind energy development. Unfortunately, according to their map, the wind speeds in Weathersfield at this height average 16.4 ft/s (or

ANALYSIS OF ENERGY NEEDS IN WEATHERSFIELD

Transportation is the largest component of energy use (43%) in the State of Vermont. Other components include space heating (28%), water heating (9%), industrial processing (8%), and other (12%). Transportation in Weathersfield is dominated by single-occupant vehicle use, although utilization of carpooling and public transit is increasing in recent years. Home heating in Weathersfield is done primarily with fuel oil (62%), but LP gas (20%) and wood (17%) are also significant space heating fuels.

In Weathersfield, 22% of the electricity consumption is for commercial and industrial uses, while the remaining 78% is residential consumption (5 year average) based on data provided by Efficiency Vermont and as used for the Vermont Energy Atlas.

Municipal buildings make up 37% of the annual energy costs. Martin Memorial Hall and the Highway Garage use a significantly larger amount of energy than other municipal buildings.

ANALYSIS OF ENERGY SCARCITY

Fossil fuel refers to oil, natural gas and coal. Fossil fuels are imported and domestically produced. As they are non-renewable, their supply is finite. There are widely varying estimates of the amount of fossil fuels remaining. Estimates must vary because there may be supplies as yet undiscovered and technologies are constantly changing in ways that allow extraction from sources that were previously unavailable. The actual supply is only part of the supply/demand equation, however. Availability is a key factor. Political factors play a critical role in making supplies available to consumers.

The future of the VT Yankee nuclear energy facility is at the time of this writing undetermined. If it is not re-licensed, then the output from the plant will have to come from elsewhere.

ANALYSIS OF ENERGY COSTS

To provide a complete or accurate analysis of energy costs, the Town must establish a baseline of energy costs from municipal buildings, vehicles and operations and diligently maintain the data base so as to determine where energy costs can be stabilized or reduced.

As scarcity increases so will the cost. Since Weathersfield residents are dependent on imported energy, so too will their costs increase. Municipal buildings are lit and heated/cooled using the same imported energy, which in turn will cost the taxpayers more as energy costs increase.

- Cost savings can be realized from:
 - (a) weatherization of buildings
 - (b) light-bulb changes
 - (c) air conditioning changes
 - (d) conservation measures (reduction in use)
 - (e) fuel-efficient vehicles
 - (f) analysis of plowing and bus routes.

ANALYSIS OF ENERGY PROBLEMS IN WEATHERSFIELD

The primary energy problem in Weathersfield at this time is the energy that is wasted through inefficient use of vehicles, engine idling, escape of building heat, and incandescent light bulbs.

Problems could arise in the future as a result of future electrical transmission projects. The Town should carefully review the impact of additional overhead transmission lines or additional transmission facilities for non-renewable electricity on costs, aesthetic, natural resources, and the environment. There are specific areas in Town where the Town would not like to see overhead transmission lines. They are:

- View of Mount Ascutney:
~ from Route 131 near 9 Little Ascutney Road (formerly the Joe Stoughton house)
~ from the Weathersfield Center Road near 478 Weathersfield Center Road (the Kamel residence)
- View from the Weathersfield Center Road, looking west, near 2811 Weathersfield Center Road (Hunter Press)
- View from Skyline Drive at the height of the land, looking east
- View of the Center Church and grove

Statement of policy on the conservation of energy including programs to implement that policy

Weathersfield will strive to conserve energy as follows:

- 1) Maximize energy efficiency in existing municipal buildings and operations in order to avoid or postpone the need for costly sources of additional energy
- 2) Consider energy efficiency in all aspects of transportation planning including purchases of vehicles for the municipality and/or school buses.
- 3) Make available information to residents and businesses that will help them save energy.
- 4) Adopt policies and guidelines that encourage or require energy lighting standards throughout the town.
- 5) Encourage the use of alternative-fueled vehicles, carpooling, and public.
- 6) Review the results from prior energy audits for all municipal buildings. Identify, prioritize, and schedule installation of recommended energy efficiency measures.

- 7) Encourage the continued application of SEVCA's (and other service providers) weatherization program for single-family residences occupied by low and moderate income individuals or families.
- 8) Encourage the town and school libraries to expand and update regularly their energy publications and publicize this information source to the public.
- 9) Encourage the use of renewable resources through local demonstrations of innovative energy installations and other similar means.
- 10) Publish information about energy related emergencies, e.g. what to do in case of power outage or a fuel outage.
- 11) Investigate and promote opportunities and/or programs which encourage or assist in the reduction of costs to home and business owners associated with increasing energy efficiency.

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In addition, Weathersfield will:

- (1) Encourage the availability of renewable energy resources for all cost-effective purposes;
- (2) Not support alternate energy production if the adverse impacts outweigh the benefits of the energy produced. Feasibility studies shall be required in order to demonstrate compliance with this policy.

Statement of policy on patterns and densities of land use likely to result in conservation of energy

Weathersfield will strive to:

- (1) Utilize land use planning to influence development patterns and site design in an energy efficient manner;
- (2) Promote compact, land-efficient forms of development by emphasizing development in the villages.