

## Section 1 – Summary

The Town of Brattleboro is an excellent location for a new community-wide sustainable energy infrastructure. Winters are cold with nearly 7,000 heating degree days and since natural gas is not available the primary heating fuels are oil, propane and electricity, all of which are expensive. Residential and commercial buildings in the built-up area of the town currently spend around \$30 million dollars annually on heating fuel, nearly all imported from outside the state. A high percentage of Brattleboro's residents live in multi-family rental housing, and the community has a high percentage of low-income households who are particularly exposed to the debilitating effects of fuel poverty. Brattleboro has a large number of governmental and institutional energy consumers, a few large commercial and industrial facilities, and many former industrial facilities that are currently underused and could be used to attract employers to the area if lower cost energy was available. The Brattleboro area, like many parts of Vermont, also faces significant electric supply and reliability issues.

A new sustainable energy infrastructure includes many different components, but the two basic elements are:

- Increase the efficiency of energy production, distribution and use, and
- Utilize local renewable energy resources to replace imported fossil fuels

Although individual building owners have some sustainable energy options available, a community as a whole has many more options to secure its own energy future as has been established in thousands of locations in Europe and especially Scandinavia. A preliminary evaluation of applying these proven, commercially available technologies in the Town of Brattleboro shows that a new community-wide district energy system could:

- Eliminate almost all fossil fuels used for building heating
- Reduce heating costs for participating consumers
- Keep Brattleboro's energy dollars in the local community
- Displace electricity used for cooling in some larger buildings
- Generate about two-thirds of Brattleboro's electric requirements
- Increase electric generation in Vermont
- Provide local electric generation that can provide at least some of Brattleboro's electric needs during transmission system outages
- Allow Brattleboro to control its own energy future

The proposed district energy system would consist of three major elements:

- One or more low cost heat sources, which would be combined heat and power (cogeneration) plants fueled with local renewable fuels such as wood residues and short-rotation energy crops grown on local farms.
- A new low temperature hot water district heating network to distribute thermal energy to about 5,000 households and 1,400 commercial and industrial consumers in the built-up area of the community.
- Piping connections to approximately 4,000 residential, commercial, and industrial buildings, including conversions of existing heating systems where necessary and providing cooling service where suitable.

The same renewable energy source used for the district energy system could also be utilized for additional purposes, in particular producing biodiesel that could fuel machinery and trucks used to

harvest and transport the renewable fuels along with other diesel vehicles. In addition, a new fiber optic data network could also be installed along with the new hot water distribution system to deliver high capacity data service to every building connected to the district heating network.

In a typical electric generation plant, more than two-thirds of the energy input is dumped into the atmosphere as waste heat. The cogeneration plant(s) turn this heat into low temperature hot water for district heating and would be designed to operate efficiently in a “thermal following” mode to satisfy Brattleboro’s heating requirements, but could also provide full electric output whenever required or when market prices make this less efficient operation economical. The plant’s electric energy, capacity, and ancillary services could be sold into a number of potential markets and would also qualify for additional payments under Renewable Portfolio Standards in several northeast states.

Several ownership options are possible for the proposed district energy system and the cogeneration plant(s) and hot water distribution network could be owned by separate entities. The distribution system, for instance, could be owned by a non-profit 501(c)(3) entity modeled after District Energy St. Paul and the Buffalo District Energy Corporation. This ownership model provides access to a wide range of financing options and also avoids many taxes that could negatively impact the economic value of a project of this magnitude. This not-for-profit entity could also own the cogeneration plant(s), or alternatively be owned by a cooperative managed by local renewable fuel providers. This would give them control over the entire renewable fuel chain and eliminate the uncertainty over the long-term fuel demand that has been a problem at other renewable energy facilities in New England. Another option would be for a private developer to own some share in the plants, which might also provide a source of capital to develop the project.

The capital cost of the district energy system could be financed in a number of ways, but one attractive potential option is to participate in Vermont’s new Sustainably Priced Energy Enterprise Development Program (SPEED), whose purpose is to promote development of low-cost renewable electric generation resources in Vermont. Qualifying SPEED resources are entitled to classification as an eligible facility by the Vermont Economic Development Authority, which allows the entire facility to qualify for tax-exempt Economic Development Revenue Bonds.

The district energy system would recover its fixed and variable expenses by selling heat and power. One of the key elements of the project is to use revenues from electric sales to offset the cost of fuel, allowing hot water to be provided to heating consumers at a very low or even negative variable cost. The heating consumers would, in turn, pay for the fixed costs of the system based on their share of thermal energy consumption. The fixed costs include debt service, labor, and ongoing operating, maintenance, and customer service expenses, and should remain fairly stable over time. This in turn will reduce and stabilize heating costs for participating consumers. A detailed financial model verifying this would be prepared and validated prior to proceeding with project construction.

A community-wide district energy system will deliver substantial economic and environmental benefits to Brattleboro and Vermont. Hard-earned local dollars that now line the bulging pockets of big energy corporations would remain in the region and local farmers would benefit by growing energy crops under long term contracts. The construction activity would also generate substantial economic value, as would the ongoing buildout of the distribution system and conversion of building heating systems.