

Developing a Mature Market for Renewable Thermal Technologies

Policy Summary: Policies are being implemented and designed to achieve a mature and self-sustaining market for renewable thermal technologies in both residential and commercial buildings. This support for the renewable thermal market, with such technologies as clean biomass, ground source heat pumps, and solar thermal, builds on work promoting solar hot water, and will facilitate a market transition to renewable fuels as the dominant fuels for heating purposes by 2050. The policy will also establish robust job and business growth in the renewable thermal sector in the Commonwealth.

	Savings from full policy implementation	% of 1990 level
Economy-wide GHG reductions in 2020	1.0 MMTCO ₂ e	1.1%

Clean Energy Economy Impacts: Large reductions in fuel costs in exchange for investments in renewable thermal heating equipment will reduce the cost of living for residents and the cost of business for commercial customers. New installations will result in the growth of the renewable thermal industry in Massachusetts, and to a lesser extent, local maintenance work. Directly offsetting spending on imported fuel will keep more money in the region, and thereby create additional jobs in the broader state economy.

Rationale: Hot water and space heating are large energy users that do not require very high grade fuels (unlike motor vehicles for example). This makes them excellent candidates for active solar heating and other renewable fuels and technologies, including biomass and ground source heat pumps. The technology for active solar thermal heating, biomass, and ground source heat pumps has matured and comes with decade-long warranties to protect the up-front investment. The relatively small market for renewable thermal in New England can benefit from industry support to accelerate its growth to the scale needed to maintain continued growth and provide a realistic option to interested customers.

Design Issues: Similar to the Solar PV industry in Massachusetts prior to its recent exponential growth, the small size of the renewable thermal market burdens it with high levels of soft costs in sales and marketing (finding customers and designing and installing well-sized systems). This forms a barrier to consumer awareness and competitive pricing in comparison to the dominant market share of fossil fuel-based heating systems. The hard costs of quality equipment are being driven down by global market growth. Once Massachusetts can develop a significant demand, entrepreneurial companies will likely be able to bring turn-key pricing down considerably.

GHG Impact: The CECP Update forecasts a 1.0 MMTCO₂e reduction in emissions due to these renewable thermal technologies. More robust reductions are predicted from renewable thermal air-source heat pumps, but these reductions are included in *All Cost Effective Energy Efficiency* goals. Greenhouse gas emissions from biomass and biofuels used for thermal energy are

important to consider, but Massachusetts policies will limit the eligibility of feedstocks (advanced biofuels and residue woody biomass) to those which demonstrate real and rapid GHG benefits, such as advanced biofuels and residue woody biomass.

Other Benefits: Expanding renewable thermal energy will create and expand businesses in Massachusetts in a manner similar to our early stimulation of the solar PV market. Jobs will include system marketing, design, finance, installation, and maintenance, along with manufacturing and fabrication of renewable thermal system components. In addition, a mature renewable thermal market complements *All Cost Effective Energy Efficiency* and *Advanced Building Energy Codes* policies.

Costs: In order to accelerate the market for renewable thermal systems, the Commonwealth should support either technology rebates or market based incentives.. Any state incentive should leverage existing incentives primarily from federal tax credits and the utility managed zero-interest HEAT loan program.

Equity Issues: As with any upfront capital intensive investment, the early adopters of renewable thermal systems are often relatively affluent homeowners, large well capitalized businesses, and the public sector that have the resources to take advantage of the long term benefits of renewable heating both for their bottom-line and co-benefits. As these early actors bring down the costs associated with marketing, these technologies become increasingly accessible and desirable to the broader market. Renewable thermal systems are often incentivized and utilized in affordable multifamily complexes where energy savings impact the low income communities. Further promotion of renewable thermal technologies in the moderate and low income sector will be an active policy priority.

Experience in Other States: Eleven states and the District of Columbia have renewable thermal technologies as part of their Renewable Portfolio Standard.

Legal Authority: The Act Relative to Credit for Thermal Energy Generated with Renewable Fuels of 2014 directed “useful thermal energy” to be added to the alternative energy portfolio standard. The Massachusetts Clean Energy Center will continue to be authorized to provide technology based incentives as mandated in the Green Communities Act of 2008.

Implementation Issues: The perceived barriers to renewable thermal adoption can be summarized in the following four areas: (1) Upfront cost of system, (2) Lack of consumer education and confidence, (3) Shortage of experienced system designers and installers, and (4) Permitting costs and inspections. As the use of renewable thermal technologies continues to grow, especially in incentivized demonstration projects, these barriers will decrease.

Uncertainty: The market for renewable thermal technologies will be based on the savings these technologies can provide. Therefore, their market will vary as natural gas, electricity, and fuel oil costs fluctuate. As the need for these technologies and the savings they can provide grows, the technologies may continue to become more efficient and effective.