

Energy Technology Article

Credit Where Credit Is Due: Renewable Thermal Energy Heats Up

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Using renewable fuels to heat and cool buildings has many virtues, but their use for this purpose is distressingly low. Fuels such as biomass, biogas, and liquid biofuels — as well as geothermal, solar heating, and ocean thermal systems — can reduce greenhouse gas emissions, stabilize volatile energy costs, increase local jobs, and keep consumer energy spending local. Despite these valuable benefits, high initial capital costs or differences in fuel costs often discourage energy consumers from committing to them. While a number of states have proposed to create incentive programs that would overcome these barriers, few have been able to enact the legislation needed to do so.

However, in the summer of 2014, the Commonwealth of Massachusetts enacted legislation that guarantees the award of tradable credits for the operation of systems that use renewable fuels to generate thermal energy.² Beginning in January of 2015, the state's retail electricity suppliers will purchase these credits to fulfill their obligations to obtain a minimum percentage of their annual electricity sales from alternative energy sources. Needless to say, the companies that deliver these fuels and install these technologies are elated.

This article describes the process that led to enactment of this legislation. It may help renewable companies and advocates in other states identify and capitalize on similar opportunities to obtain their own legislation. Doing so is not easy because it requires solving a number of strategic and policy challenges. Yet the Massachusetts example demonstrates that renewable energy companies and advocates can join forces to secure state legislation that provides the financial incentives that these fuels deserve.

Some Progress in Some States

Many legislators and policymakers do not appreciate the benefits of renewable thermal energy. Even if they do, the use of renewable fuels to create thermal energy is frequently considered less important than their use to produce electricity. To date, some 29 states and the District of Columbia have enacted legislation mandating the use of renewable fuels to generate electricity.³ But as of 2012, only two states, Wisconsin and New Hampshire, had passed legislation that provides financial incentives for using renewable fuels to heat and cool buildings.

New Hampshire became the first state to make thermal renewable technologies eligible for its Renewable Portfolio Standard (RPS)⁴ and award tradable credits for thermal energy production.⁵ More recently, that state's Public Utilities Commission established minimum RPS percentage requirements specifically for renewable thermal energy.⁶ In Wisconsin, state agencies developed rules to award tradable credits for thermal output from various forms of biomass, including biogas, densified fuel pellets, and pyrolysis. However, Wisconsin has not mandated minimum purchase requirements for thermal technologies.⁷

A number of other states have tried to establish renewable thermal requirements, but have not been able to do so. These include Connecticut,⁸ Illinois,⁹ Indiana,¹⁰ Maine,¹¹ Maryland,¹² and New Mexico.¹³ Each has mounted legislative and regulatory initiatives in recent years, but those efforts have not yet progressed to the enactment of legislation that mandates incentives. Efforts to include renewable thermal requirements in a federal clean energy policy have made little progress to date.¹⁴

Support in Massachusetts

The process that led to renewable thermal legislation in Massachusetts began with an unusual degree of interest



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in rewarding the use of renewable fuels among certain of that state's legislators. In an energy bill passed in the spring of 2012, they included a provision directing the governor to complete a study of using renewable fuels to produce thermal energy. That study was completed by the state's Department of Energy Resources in December of 2012. It concluded that

Increasing the market share of renewable and useful heating and cooling technologies will enable the Commonwealth to address a series of important challenges. These include decreasing dependency on heating fuels that are either costly (oil, propane, electricity), constrained (natural gas), or both. It will help Massachusetts meet greenhouse gas reduction targets, increase energy efficiency, and improve air quality. It is therefore justified to develop additional incentives to support renewable and useful thermal technologies....¹⁵

This report provided a detailed analysis of the fuels used for heating and cooling in Massachusetts and a comparison of the costs of conventional and renewable fuels. It noted that in states with cold winters or hot summers, the average commercial building owner or homeowner spends as much as *one third* or more of their entire annual energy expenditure on heating and cooling its buildings.¹⁶ And thermal energy production often represents a major portion of states' consumption of carbon-emitting fossil fuels.

It also examined policy options for providing incentives to renewable fuel use, including the addition of renewable fuels for thermal energy production to the state's existing program to encourage use of "alternative" fuels — the Alternative Portfolio Standard (APS).¹⁷ Perhaps most importantly, it signaled to the legislature that the governor would support enactment of legislation that would provide incentives for increased renewable thermal energy production.

Forming a Coalition of Advocates

This state report encouraged companies with an interest in renewable thermal energy to form a coalition to support passage of such legislation. The coalition included companies and associations involved in delivering solar heating, biomass, geothermal, gas, and other renewable fuels for heating and cooling buildings in Massachusetts. While coalition members knew that someday they would compete with one another to sell renewable thermal credits, they set aside those differences to focus on their shared interests in creating a general mandate for the purchase of credits where there presently was none. Several national associations and companies with business activities beyond the state's border joined the coalition hoping to establish a legislative precedent that could be replicated in other states.¹⁸

The coalition set about the process of educating legislators, building support from environmental and other advocacy groups, and responding to questions and concerns. It drafted legislation to add renewable thermal fuels to those eligible to earn credits under the APS. It then found legislators willing to sponsor that legislation. It cultivated alliances with other business associations. Surprisingly, the coalition was able to gain the support of the state's oil heat dealers who recognized that incentives for bio-oil would help them retain customers while diversifying their product offerings. The coalition conferred with environmental groups to gain their support. After engaging in lengthy negotiations, those groups and the coalition reached agreement on changes to the legislation that would address their concerns, especially regarding carbon emissions from biomass, bio-oil, and biogas (which are discussed in more detail below).

The Structure and Size of the Incentive

Massachusetts chose to use tradable credits as the mechanism to generate additional revenue for renewable thermal installations. This is a mechanism used in most RPS programs across the country, including the RPS program in Massachusetts.¹⁹ Also, since 2008, the Massachusetts APS has relied on the use of tradable credits. After accruing these credits, thermal producers can sell them to retail electricity suppliers to gain additional operating revenue.²⁰

The prevailing market value of APS credits has been approximately \$20 per megawatt-hour. The state energy department's report to the legislature estimated this amount to be sufficient to accelerate the market penetration of renewable thermal technologies.²¹ The chief virtue of this mechanism is that it rewards the actual production of thermal energy. Another is that it does so in an economically efficient way by having suppliers compete to earn and sell credits. It does not reward the mere installation of a system.²²

The technologies made eligible for APS credits in 2008 (mainly combined heat and power systems) had consistently failed to provide enough electricity to meet the annual compliance requirements. There were never been enough credits produced to allow retail electricity suppliers to buy enough to meet the mandated minimum percentage of their total annual electricity sales. Each year, the suppliers have had to pay the state hefty “alternative compliance payments” to make up the difference.²³

This persistent shortage of credits made the APS an attractive vehicle. By adding renewable fuels to those eligible to earn APS credits, while keeping overall demand requirements the same, the cost of those credits could be expected to fall and the alternative payments to the state would be reduced. Both electric suppliers and their customers would benefit from avoiding the costly strategy of using compliance payments to meet their APS requirements.

Electricity Customers Pay for the Incentive

The approach adopted in Massachusetts requires retail electricity suppliers to purchase the credits earned by the producers of renewable thermal energy. This places responsibility for bearing the costs of the program on the customers of these electricity suppliers. This allocation of costs seemed unfair to some, who suggested that the responsibility for paying for the program should be allocated to the customers of companies that install and deliver heating and cooling fuels throughout the state.

However, consumers of natural gas, heating oil, propane, or electricity in Massachusetts receive their supplies from a wide variety of retail companies. Some are regulated utilities but many are not. Some are large, multistate corporations, while others are local businesses. In all, there are many hundreds of thermal energy suppliers. Assigning the obligation to purchase renewable thermal credits to such a numerous and diverse group of suppliers, and holding them accountable for compliance with that requirement, would have been administratively difficult for state regulators. Moreover, it would have imposed significant compliance costs on the many smaller thermal suppliers among them.

By contrast, Massachusetts has only a few dozen electricity suppliers. All of these are regulated to some degree, and each must comply with the requirements of the APS. In addition, any customer who pays for thermal energy also pays for electricity. So, by assigning the responsibility for paying the cost of the thermal incentives to electricity consumers, the law effectively allocates the costs of the program to all thermal customers.

Winning the Support of Environmental Groups

Including eligibility for wood-burning technologies proved to be the source of greatest controversy for the legislation. In recent years, out of a concern for the greenhouse gas impacts of carbon released by wood burning, the state had promulgated regulations that severely restricted the eligibility of biomass to be eligible for its RPS. While the technologies used for thermal production are much smaller and more widely distributed than those used to generate electricity, there was still concern that increased use of biomass, biogas, and bio-liquids for thermal energy production might contribute to inappropriate forestry practices and increased greenhouse gas impacts.

To secure support from environmental groups the coalition agreed, after lengthy negotiations, to several eligibility restrictions specific to these fuels. To qualify for credits, biomass, biogas, and bio-liquids will have to demonstrate that any wood used to create them is “produced by sustainable forestry practices.” In addition, these fuels will have to be used in “efficient energy conversion” technologies that meet emission performance standards achievable by “best-in-class, commercially feasible” technologies. In addition, they will have to achieve at least a “50% reduction in life-cycle GHG emissions” compared to the fuel that is being displaced.²⁴

Conclusion

Companies that provide thermal energy using renewable fuels and technologies make valuable contributions to consumers and the environment. But those contributions are not adequately compensated by the conventional energy marketplace. As a result, the actual contributions from these thermal technologies fall far short of their potential.

These companies can help themselves, as well as diversify fuel supplies and reduce fossil fuel emissions, by securing state policies that appropriately reward their contributions. Generally, that requires legislation that provides some form of financial incentive for the installation of these technologies or delivery of these fuels. These incentives can be used to attract and secure new customers.

Admittedly, the process of getting any legislation passed can be long and difficult. But in states with pressing energy and environmental concerns, such legislation is being given serious consideration. Legislators in these states are trying to change their energy policies to reward renewable thermal energy. As the process in Massachusetts demonstrates, when thermal companies and renewable energy advocates mount a targeted campaign of education, advocacy, and negotiation, they can obtain valuable incentives for expanding the use of renewable fuels and gain appropriate credit for their contributions to the greater good.

Endnotes

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² The Massachusetts bill is available online [here](#).

³ See the "[Resource Eligibility Notes](#)" appendix from DSIRE — the Database of State Incentives for Renewables and Efficiency. Of these 29 states, 14 have included rewards for electricity production generated by renewable thermal technologies.

⁴ Renewable Portfolio Standards (RPS) are state regulations used to increase production of energy from renewable energy sources by mandating that electric supply companies purchase a minimum percentage of their electricity from renewable sources.

⁵ View text of the New Hampshire legislation — S.B. 218 — [here](#).

⁶ See Erin Voegele's [article](#) in *Biomass Magazine* for coverage of the New Hampshire Public Utility Commission's proposed amendments; view the text of the amendments [here](#).

⁷ Visit DSIRE for information on Wisconsin's Renewable Portfolio Standard and other states' renewable incentives.

⁸ In Connecticut, a [bill](#) introduced in March of 2013 to incorporate thermal renewables in its RPS was unable to make it out of committee.

⁹ In Illinois, a [bill](#) filed in February of 2013 extending renewable energy credits for organic waste biomass, tree waste, and geothermal heat pumps failed to move forward after being referred to the Rules Committee.

¹⁰ In Indiana, a 2011 law was enacted to make thermal biomass technologies eligible to earn credits under the state's RPS, but Indiana's RPS operates on a voluntary basis only. This means that utility companies are not bound by law to purchase credits of any kind, and they do not face penalties if they choose not to purchase credits. More information on the incentives for renewables in Indiana can be found [here](#).

¹¹ In Maine, [legislation](#) was enacted in April of 2014 directing the Public Utilities Commission to study the possibility of adding thermal renewables to its RPS. This legislation was vetoed by Governor LePage.

¹² In Maryland, two bills enacted in 2012 allowed [geothermal](#) and [animal-waste biomass](#) systems to earn eligibility for renewable energy credits that can be used for compliance in the state's RPS. In 2014, a [bill](#) introduced in the state Senate requiring utilities to buy specific amounts of credits produced by thermal renewable systems did not make it out of committee.

¹³ In New Mexico, a [bill](#) to make renewable thermal energy eligible for credits was passed by the state Senate in March of 2013. But after being referred to the House, no further action has been taken on the proposed legislation.

¹⁴ In 2012, legislation to study the inclusion of thermal energy in a federal clean energy standard was introduced in Congress but did not progress. See the [Clean Energy Standard Act of 2012](#), p. 23.

¹⁵ Executive Office of Energy and Environmental Affairs, Department of Energy Resources; "Heating and Cooling in the Massachusetts Alternative Portfolio Standard: Report to the Legislature," December 2012, p. 5.

¹⁶ See “[Heating and Cooling in the Massachusetts Alternative Portfolio Standard](#),” p. 7.

¹⁷ Massachusetts’s Office of Energy and Environmental Affairs provides for more information on the Alternative Portfolio Standard [here](#).

¹⁸ The Massachusetts Renewable Thermal Energy Coalition was led by an executive committee composed of representatives of the Solar Heating and Cooling Alliance, the Coalition for National Renewable Natural Gas, the Massachusetts Forest Alliance, the Biomass Thermal Energy Council, New England Geothermal Professionals Association, and Ensyn Corporation. Visit the coalition’s website about its [campaign](#) to pass the renewable fuels legislation.

¹⁹ Since 2003, Massachusetts has had an RPS program that relies on the use of tradable credits to reward production and insure compliance. Electricity suppliers, in particular, are very familiar with the mechanism.

²⁰ See the Massachusetts Department of Energy Resources’ “[Heating and Cooling](#)” Report to the Legislature, p. 13.

²¹ The report stated that \$20 per credit (equal to about \$0.02 per kilowatt-hour) “could significantly improve the competitive position of renewable thermal technologies compared to oil and natural gas prices.” See “[Heating and Cooling](#),” p. 27.

²² The chief deficits of a tradable credit system are that it does not reduce so-called “up front” costs to install the technologies and makes the future revenue stream from the credits unpredictable. Both of these conditions are well known to be barriers to installation of renewable thermal systems. Other mechanisms could be expected to deal with these barriers more effectively than a production incentive. One would be a grant program that would offset the capital costs to install a heating and cooling system that uses renewable fuels.

²³ Until enactment of the thermal renewable law, the Massachusetts APS only awarded credits for the production of electricity, and then only for the production of power by a combined heat and power system and certain other steam-producing technologies, including never-before-used coal gasification and flywheel electricity storage. (See “[Heating and Cooling](#),” p. 5.) The new bill eliminated the eligibility of coal gasification and flywheel storage technologies.

²⁴ The environmental restrictions in the Massachusetts legislation related to biomass, biogas, and bio-liquids can be found, [here](#).