MODERN WOOD HEATING PROMOTION

STAFF REPORT OF THE EFFICIENCY MAINE TRUST

Submitted to the Joint Standing Committee on Energy, Utilities and Technology

of the Maine State Legislature

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1. Regulatory Framework

In 2025, the Maine Legislature passed LD 1212, *Resolve: to Study Opportunities for the Efficiency Maine Trust to Support the Promotion and Use of Modern Wood Heating*,[1] directing the Efficiency Maine Trust ("the Trust" or "Efficiency Maine"), to study and make recommendations relating to programs and incentives encouraging the promotion and use of modern wood heating systems in the State. The resolve directs the Trust to conduct this study in collaboration with the Department of Economic and Community Development (DECD), the Department of Agriculture, Conservation and Forestry (DACF) and the Department of Energy Resources (DOER), working with representatives of the modern wood heating system industry.[2]

The resolve also requires that the Trust submit a summary report to the Legislature's Energy, Utilities and Technology Committee by December 3, 2025 and that this report include recommendations for Efficiency Maine programs and incentives supporting the promotion and use of modern wood heating systems in the State.

2. Background

What is "modern wood heat"? The term is not defined in Maine statute or in the LD 1212 resolve. The Maine DACF defines modern wood heat as "ultra-modern automated central heating boilers and furnaces using wood chips and wood pellets as fuel."[3] Notably, this excludes systems using cord wood and biofuels, as well as stoves.[4] For the purposes of this report, we focus primarily on modern wood heat as defined by DACF. By taking this narrow approach, the report is not taking a position on or implying anything about the pros and cons of other forms of fuel derived from biomass or other types of biomass-fueled heating systems.

This report also limits the scope of "programs and incentives encouraging the promotion of wood heat" to initiatives that have the potential to increase consumer demand. The principal focus of the report is on demand-side initiatives that target commercially available equipment using financial incentives and related marketing and education. Supply-side initiatives, such as incentives for biomass fuel production, research and demonstration opportunities, or generic education initiatives, are outside the scope of this report.

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[1] Resolves, Chapter 54, 132nd Maine Legislature, First Special Session, LD 1212, Resolve, to Study Opportunities for the Efficiency Maine Trust to Support the Promotion and Use of Modern Wood Heating.
[2] The full list of participating stakeholders can be found in Exhibit A.
[3] Maine Department of Agriculture, Conservation and Forestry, Wood Heat Maine: Modern Wood Heat – what do we mean? https://www.maine.gov/dacf/mfs/projects/woodheatmaine/modern_wood_heat.html
[4] Note that stakeholders were generally in agreement over this definition, but a subset advocated for the inclusion of central boilers and furnaces using advanced liquid biofuels.

3. Promotional Programs – Regional Context

This section of the report provides a recap of existing or recent promotional programs from Maine and other states.

a. Maine

The Trust is the independent, quasi-state agency established to plan and implement energy efficiency programs in Maine which it does under the brand of "Efficiency Maine." Its suite of offerings includes incentives for both residential and commercial modern wood heating equipment as well as other biomass incentives. The Maine Public Utilities Commission (PUC) also administers a biomass heating-related incentive program. These programs are briefly described below.

Efficiency Maine Trust – Home Energy Savings Program

Efficiency Maine's Home Energy Savings Program (HESP) offers a rebate covering one-third of the cost of a residential pellet boiler or furnace up to $6,000. These rebates are funded with revenues from the Regional Greenhouse Gas Initiative (RGGI). The Trust provides information about this technology and the available incentives on its website, and includes similar information in its generic residential brochures and presentations. The Trust's program has relied principally on trade allies – the businesses, contractors and vendors in the supply chain – to market pellet boilers and furnaces to customers in Maine.

Over the past decade, consumer demand for rebates on pellet boilers and furnaces through the Trust's residential programs has ranged from a low of 41 to a high of 269 per year. Notwithstanding reports of good customer satisfaction, the Trust's analysis indicates mixed results on the cost-effectiveness of these projects, primarily because there is lack of clarity on total costs and benefits associated with various system permutations. Chief among these uncertainties are the cost of pellets (impacted by whether consumers are using bulk pellets or bagged pellets), and the costs of ancillary equipment (e.g., a hopper). These permutations can result in significant differences in cost which in turn have a large impact on cost-effectiveness and payback period and impact consumer demand.

Efficiency Maine Trust –Thermal Energy Investment Program

In 2021, the Legislature enacted LD 597, An Act to Establish the Thermal Energy Investment Program (TEIP), requiring the Trust to establish a new program to provide incentives and loans to businesses, municipalities, educational institutions, and non-profit entities for the installation of new thermal energy-derived projects.[5,6] The law provides that the Thermal Energy Investment Fund supporting this program be funded through alternative compliance payments (ACPs) from electricity suppliers that fail to secure their required quota of thermal renewable energy credits (TRECs).[7]

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[5] 35-A MRS §10128.

[6] Thermal energy-derived projects include, but are not limited to, modern wood heating systems. They are defined in the statute as projects that produce thermal energy and TRECs under Maine's renewable portfolio standard, such as wood-fueled combined heat and power or the conversion of fossil fuel-fired boilers to wood-fueled boilers or boilers using biofuels derived from wood.

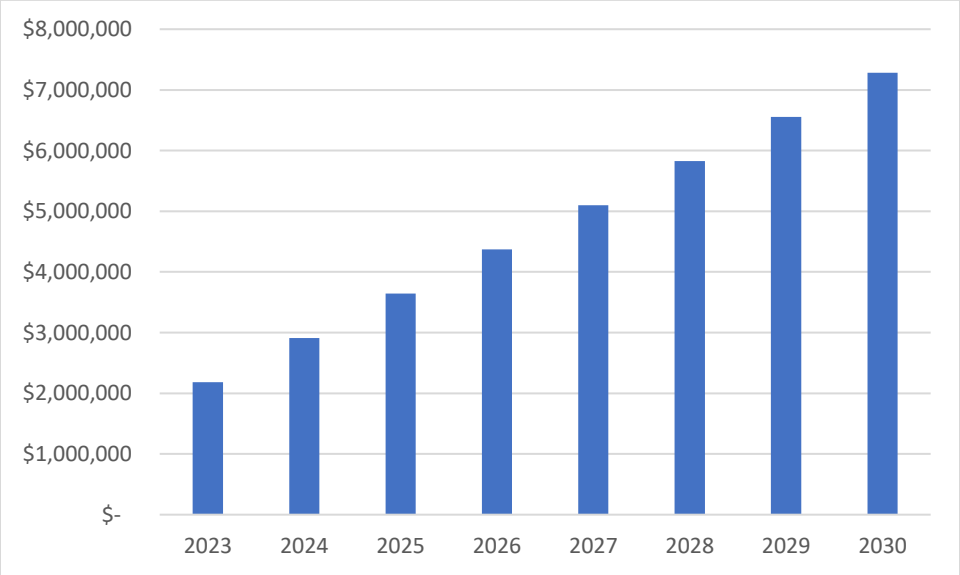
[7] 35-A MRS §3210(9)(C).

The Trust launched the TEIP in December of FY2023. Implementing recommendations from industry representatives, the program has offered qualifying projects an incentive of 35% of project costs. The program also offers an additional 10% incentive for projects that include the installation of advanced emission controls or energy meters. The program has been marketed at conferences and events, especially in conversations with school facilities managers. The program has so far paid out incentives for two small, completed projects (totaling $7,904 in incentives) and has pre-approved five other larger projects (totaling $616,525 in incentives) that are in various stages of development.

The TEIP statute does not stipulate any cost-effectiveness requirements for these projects. Nevertheless, as with its residential modern wood heating projects, the Trust's analysis of completed and pending TEIP projects indicates mixed results on the cost-effectiveness of these projects, which can have an impact on consumer demand. There has been a similar lack of clarity on total costs and benefits associated with various system permutations in projects in the commercial sector. These uncertainties include the actual fuel costs (e.g., for pellets or chips), and other operation and maintenance (O&M) costs which, depending on the circumstances, can be significant. The Trust's program has had minimal insight into the magnitude of those expenses.

The Thermal Energy Investment Fund is expected to grow substantially over the next few years. Figure 1 shows the projected growth through 2030.[8]

Figure 1: Thermal Energy Investment Fund Revenue Projections



[8] The Trust's forecast is based on data in the PUC's 2023 Annual Report on New Renewable Resource Portfolio Requirement. It assumes that a) adjusted gross sales of electricity remain flat at 2023 levels, and b) the proportion of compliance between TRECs and ACPs remains constant at 2023 levels (which assumes that as the compliance increases there is growth in the production of TRECs but not enough to keep up with rising obligations.)

Efficiency Maine Trust – Commercial & Industrial Custom Program

Efficiency Maine's Commercial and Industrial (C&I) Custom Program incentivizes tailored energy projects that require site-specific engineering analysis and/or projects with energy conservation measures that are not otherwise covered by prescriptive incentives. These may include cost-effective biomass projects. The program typically sets its incentives at 50% of project costs for retrofits, and 75% of incremental costs for lost opportunity or new construction projects.[9] Projects that generate thermal savings are generally funded using the Trust's revenues from RGGI.

Though the C&I Custom Program has approved a number of biomass-fueled combined heat and power projects in recent years, it has not received any qualifying modern wood heating project applications. It did, however, complete a handful of biomass boiler projects prior to 2015 using federal American Recovery and Reinvestment Act (ARRA) funds. The Trust's analysis of these completed projects shows mixed economic results, owing to the same lack of clarity on total costs and benefits articulated in the prior section on TEIP.

Public Utilities Commission – Thermal REC Program

Through a program administered by the Maine PUC, both residential and C&I customers can earn TRECs based on the volume of biomass fuels they purchase. Residential customers access these payments through their fuel suppliers, while C&I facilities can petition the PUC for Thermal Energy RPS certification. The market price of TRECs fluctuates and can be worth up to a cap of $25 each. For an average homeowner using about 8 tons of pellets per year this could mean grossing over $700/year.

In its 2023 Annual Report on New Renewable Resource Portfolio Requirement, the PUC found that thermal resources have been in short supply since the TREC requirement was established. The report reads: "There was a significant expansion of TREC capacity in 2023, but not enough to relieve the supply shortage. It may still be too early to determine whether or not existing incentives to develop thermal resources are sufficient to keep pace with the growing requirement. If development of Thermal resources remains slow, the Commission will consider recommendations for stimulating growth in the category."[10]

b. Vermont

The state of Vermont promotes wood heating through three different entities: Efficiency Vermont, an energy efficiency utility established to deliver energy efficiency services; the Vermont Department of Forests, Parks and Recreation (FPR); and the Department of Public Service (PSD). Further details on incentives issued by each entity are detailed in the section below.

All three entities host information or webpages dedicated to wood heating. Efficiency Vermont has an "Advanced Wood Heating" webpage that provides an overview of benefits of heating with wood, wood fuel options, and descriptions of various wood heating systems including woodstoves, pellet stoves,

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[9] These incentives are capped based on the lesser of this cost share, $25/MMBtu saved, $1,000,000, or a 1-year simple payback.

[10] Maine PUC, Annual Report on New Renewable Resource Portfolio Requirement – Report for 2023 Activity, March 31, 2025, p. 15.

central pellet boilers, and woodchip boilers. It also describes the different incentives available for residential, commercial and industrial customers.[11] The Vermont FPR hosts a webpage dedicated to "Wood Energy" and supports the adoption of an advanced wood heating program.[12] The department additionally employs a Wood Energy and Forest Products Specialist that helps facilitate grants for small businesses, schools, and municipalities. The Vermont PSD recently published two reports detailing the states' commitment to heating with wood: 2022 Update: Wood Heat Use in Vermont[13] and 2022 Update: Advanced Wood Heat Sector in Vermont.[14] The former details the total use of wood fuels and appliances in Vermont and the latter provides an assessment of the advanced wood heat industry and market in Vermont. In addition to providing detailed information on the wood heating sector, PSD currently offers wood heating grants for schools and low- and moderate-income households in Windham County, detailed below.

Efficiency Vermont – Central Pellet Boiler and Furnace Program

In 2025, Efficiency Vermont offers incentives of $6,000 total cash back for new, high-efficiency wood pellet boilers or furnaces installed as primary central heating systems in homes or businesses. These systems must be installed indoors by a contractor in Efficiency Vermont's Efficiency Excellence Network, and pellets are the only eligible fuel source. The systems must have at least one ton of fuel storage and have automated on/off fuel feed. Systems serving buildings up to 5,000 square feet are rebated through this program.

Efficiency Vermont – Custom Program

Efficiency Vermont offers incentives for qualifying wood heating projects in commercial spaces greater than 5,000 square feet. Efficiency Vermont does not provide a prescribed structure for these rebate amounts, but rather takes into account several factors, such as simple payback on the incremental cost, fossil fuel savings, and customer type. For a limited time, the program offered to double the incentives, capped at $25,000 or 100% of the total project cost, whichever is less.[15]

VT Department of Forests, Parks and Recreation – Maintaining Markets Program

The Vermont FPR was awarded a $300,000 Wood Innovation Grant from the United States (US) Forest Service (USFS) to facilitate the installation of advanced wood heating systems in Vermont schools. Through the Maintaining Markets Program, individual schools can receive a 50% cost share up to $25,000 in grant funds to install or upgrade advanced wood heat systems. FPR offers a complimentary

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[11] Efficiency Vermont, Advanced Wood Heating, https://www.efficiencyvermont.com/products-technologies/renewable-energy/advanced-wood-heating

[12] Vermont Agency of Natural Resources, Department of Forests, Parks and Recreation, Wood Energy, https://fpr.vermont.gov/forest/wood-energy .

[13] Vermont Energy Investment Corporation, 2022 Update: Wood Heat Use in Vermont, Prepared for Clean Energy Development Fund at Vermont Department of Public Service, March 19, 2024.

[14] Vermont Energy Investment Corporation, 2022 Update: Advanced Wood Heat Sector in Vermont, Prepared for Clean Energy Development Fund at Vermont Department of Public Service, March 19, 2024.

[15] Efficiency Vermont, "Efficiency Vermont doubles custom business incentives—up to $25,000 in extra cash" August 5, 2025. https://www.efficiencyvermont.com/news-blog/news/efficiency-vermont-doubles-custom-business-incentives-up-to-25-000-in-extra-cash .

technical feasibility assessment through the USFS to ensure the selected system meets heating requirements while adhering to air quality and efficiency standards.[16]

VT Department of Forests, Parks and Recreation – Working Lands Advanced Wood Heating Initiative

The Vermont FPR Working Lands Advanced Wood Heating Initiative was awarded a $300,000 Wood Innovations Grant from USFS to help working lands businesses install new or upgrade existing advanced wood heating systems, or automated central heating systems that use pellets, chips, or cord wood to provide heat and meet certain high efficiency and low emission requirements. Businesses may be reimbursed up to 50% of project costs, up to $25,000 per project, to install or upgrade systems.[17]

VT Public Service Department – Vermont School Heating Assistance with Renewables & Efficiency (SHARE) Program

The Vermont PSD SHARE program received $2 million of state funds in 2023 to provide financial and technical assistance to Title I eligible schools[18] to install, repair, or renovate existing woodchip or wood pellet heating systems.[19] The maximum incentive award per project is $200,000 and the minimum is $20,000. This grant requires a total project cost share from recipients of 10%, 25%, or 45% of project's total cost, depending on the degree of household poverty in the school district. Project eligibility is limited to new advanced wood-fueled heating systems, wood pellet/chip storage systems and/or heating system controls, or repairs and upgrades of existing wood-fueled heating systems (including control and emission components).

Prior to the SHARE Program, the Vermont PSD issued rebates through the Vermont Small Scale Renewable Energy Incentive Program (SSREIP), funded by the CEDF. In the program, eligible efficient wood pellet boilers in homes or small businesses (having less than 5,000 square feet of heated space), could qualify to receive flat rate incentive in the form of a discount to the cost of the equipment when installed in Vermont by an Efficiency Excellence Network contractor. From 2015 to 2018 CEDF offered non-residential customers an incentive of $1.25 per square foot of heated space.

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[16] Vermont Agency of Natural Resources, Department of Forests, Parks, and Recreation, Schools and Municipal Incentives, https://fpr.vermont.gov/schools-municipal-incentives .

[17] Vermont Agency of Natural Resources, Department of Forests, Parks, and Recreation, Small Business Incentives, https://fpr.vermont.gov/woodenergy/rebates/small-business-incentives

[18] Title I, Part A (Title I) of the Elementary and Secondary Education Act, as amended by the Every Student Succeeds Act provides financial assistance to local educational agencies and schools with high numbers or high percentages of children from low-income families to help ensure that all children meet challenging state academic standards.

[19] Vermont Department of Public Service, Funding Opportunities and Projects, https://publicservice.vermont.gov/renewables/clean-energy-development-fund-cedf/funding-opportunities-projects

VT Results

In 2019, Vermont PSD conducted a program evaluation of advanced wood heat measures funded both by the Clean Energy Development Fund (CEDF) program and through Efficiency Vermont from 2015-2018. This is one of the few programs to have commissioned a third-party evaluation of program results. The evaluation found that over the three years studied, the program had promoted the installation of:

- 219 residential cord wood stoves, using rebates of $1,200 per stove, and achieving a simple payback for customers of 7 years;
- 28 residential pellet stoves, using rebates of approximately $1,400, to achieve a simple payback of 14.5 years;
- 82 pellet boilers, using incentives of about $3,000 per boiler, to achieve a simple payback of 41.7 years.[20]

c. New Hampshire

Up until July 1st, 2025, New Hampshire promoted wood heating through Renewable Energy Fund incentives issued by the State of New Hampshire Department of Energy.[21]

NH Department of Energy – Residential Bulk-Fed Wood-Pellet Central Boilers and Furnace Rebate Program

The New Hampshire DOE previously offered a rebate of 40% of the system and installation cost, up to a maximum of $10,000, for bulk-fuel fed, wood-pellet central heating boilers and furnaces having an efficiency rating of 80% or greater. Standalone pellet stoves and fireplace inserts were not eligible for this rebate and the system needed to have at least 3 tons of pellet storage and be automatically fed from that storage to the furnace or boiler.

NH Department of Energy – C&I Bulk Fuel-Fed Wood Pellet Central Heating Systems Rebate Program

The New Hampshire DOE also offered a rebate of 40% of the system and installation costs, up to a maximum of $65,000, for non-residential bulk-fuel fed wood pellet boilers and furnaces of 2.5 million BTU or less. This rebate was available to businesses, non-profit organizations, educational institutions, governmental or municipal entities, or multi-family residences of four units or greater, that do not qualify for a rebate under the residential wood pellet rebate program. Additional rebates for C&I customers included rebates for 30% (up to $5,000) of the thermal storage tank and related components, and $5,000 to assist in the cost of meters for systems that become REC eligible.

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[20] The Cadmus Group, "Evaluation of CEDF's Advanced Wood Heating Programs," October, 2019, Table 12 at p. 15. https://publicservice.vermont.gov/renewables/clean-energy-development-fund-cedf/reports-documents. These findings assumed costs of $250 for a cord of wood, $265 for a ton of pellets, $2.82 for a gallon of fuel oil, and $3.35 for a gallon of propane.

[21] All incentives from the Renewable Energy Fund were suspended in on July 1st, 2025. New Hampshire does not currently appear to offer any incentives for wood heating.

NH Results

According to the 2025 New Hampshire Renewable Energy Fund Annual Report, between July 9, 2016 and June 30, 2025, the program averaged 59 residential, and between 8-9 non-residential, wood pellet furnaces and boilers each year using incentives totaling $6.3 million over that period.[22]

Results for the most recent year of New Hampshire DOE program activity, (FY2025, or July 1, 2024 – June 30, 2025), are in Table 1 below.

Table 1: NH FY2025 Results

Rebate Program	Number of Applications Received	Number of Rebates Awarded	Rebate Funds Disbursed	Average Rebate Award
Residential Wood Pellet Furnace/Boiler	15	13	$133,390	$ 9,527
C&I Wood Pellet Furnace/Boiler	1	1	$ 30,150	$ 30,150

d. New York

Until August 2021, New York promoted modern wood heating through the New York State Energy Research and Development Authority (NYSERDA) – a public benefit corporation the promotes energy efficiency, renewable energy, and emissions reduction across New York's economy and energy system.[23]

NYSERDA – Renewable Heat NY Program

Between 2017-2021, NYSERDA ran a Renewable Heat NY (RHNY) initiative to promote, research, and provide support toward the installed costs of high-efficiency, low-emission wood heating systems.[24] NYSERDA offered incentives to residential and commercial customers through three different programs – the small biomass boiler, the large biomass boiler, and the residential pellet stove. The rebate amounts provided for different types and sizes of heating systems through these programs are outlined in Table 2 below.

[22] New Hampshire Department of Energy, Renewable Energy Fund Annual Report, November 1, 2025, https://www.energy.nh.gov/renewable-energy/renewable-energy-fund

[23] According to the NYSERDA Clean Energy Fund Annual Performance Report Final Report, the RHNY initiative stopped accepting new applications on 8/20/2021 after funds were fully allocated.

[24] NYSERDA**,** Clean Energy Fund Annual Performance Report Final Report through December 31, 2024, published June 2025, https://www.nyserda.ny.gov/About/Publications/Program-Planning-Status-Reports/Clean-Energy-Fund-Reports

Table 2: Renewable Heat NY rebates[25]

Program	System Type	Installation Incentive		Installation Incentive (Income Qualified)	Additional Incentive		
Small Biomass Boiler	Advanced Cordwood Boiler with Thermal Storage	25% installed cost ($7,000 maximum)		65% installed cost ($18,000 maximum)	-	Recycling $5,000/unit for old indoor/outdoor wood boiler or $2,500/unit for old wood furnace	-
	Small Pellet Boiler with Thermal Storage	≤120 kBtu/h (35 kW)	45% installed cost ($16,000 maximum)	65% installed cost ($23,000 maximum)	**Thermal Storage Adder** $5/gal for each gal above the minimum thermal storage requirement		-
		≤300 kBtu/h (88 kW)	45% installed cost ($36,000 maximum)	-			-
Large Biomass Boiler	Large Pellet Boiler with Thermal Storage	>300 kBtu/h (88 kW)	65% installed cost ($325,000 maximum)	-			**Emission Control System** $40,000
	Tandem Pellet Boiler with Thermal Storage		75% installed cost ($450,000 maximum)	-			
Residential Pellet Stove	Pellet Stove	$1,500		$2,000	-	**Recycling** $500 (income qualified residents only)	-

NY Results

The NYSERDA Clean Energy Fund Annual Performance Report Final Report published the following results for the RHNY initiative.

Table 3: Renewable Heat NY Results[26]

		Baseline	*Cumulative Progress*	*Cumulative Targets by Year*
	Indicators	**Before/Current**	**2021**	**2021**
Outputs	Large commercial Projects (>88 kW)	4	0	9
	Residential / Small Commercial Projects (<88 kW)	23	61	170
	Residential Pellet Stove Projects	89	4382	1450

Table notes
a. A 0 (zero) denotes that the actual value is currently believed to be zero for baseline/market metrics.
b. Baseline values include projects that precede CEF funding.

e. Massachusetts

The Massachusetts Clean Energy Center ("MassCEC"), a state economic development agency dedicated to accelerating the growth of the clean energy sector across the state, promoted residential and commercial wood heating between 2015 and 2020 through both residential and commercial biomass rebates. It appears that the initiative was discontinued in 2020.

[25] NYSERDA, Renewable Heat NY Program Opportunity Notice (PON), p. 1, https://portal.nyserda.ny.gov/CORE_Solicitation_Document_Page?documentId=a0lt0000000kziUAAQ
[26] NYSERDA, Clean Energy Fund Annual Performance Report Final Report through December 31, 2021, published March 2022, https://www.nyserda.ny.gov/About/Publications/Program-Planning-Status-Reports/Clean-Energy-Fund-Reports

MassCEC – Residential Biomass Heating Program

MassCEC provided grants through its Residential Scale Biomass Heating Program for the installation of small-scale high-efficiency, low emissions central biomass boilers and furnaces at residential properties. The base rebate was 40% of eligible project costs or up to $10,000, whichever is less. Higher rebates amounts were offered for low- and moderate-income households.[27]

MassCEC – Commercial-Scale Biomass Heating Program

MassCEC provided grants through its Commercial-Scale Biomass Heating Program to install high-efficiency, low-emitting biomass heating systems at commercial, public, non-profit, agricultural, and multi-family properties. Grants covered up to 50% of eligible project costs up to $500,000.[28]

MA Results

Over five years, the MassCEC Residential Biomass Program paid out 133 total rebates for completed installations. The program provided an average of 22 rebates per year, with an average rebate amount of approximately $14,000. The program reported an average total cost for the qualifying biomass heating systems of approximately $28,000.[29]

The Trust was unable to find published results of the Commercial-Scale Biomass Heating Program.

f. Federal

In addition to promotional programs at the state level, there are also federal funding opportunities that support modern wood heating. For example, the US Department of Agriculture (USDA) Forest Service's Community Wood Grant Program covers 35% of project costs up to $1 million for several biomass-related project types, including C&I modern wood heating systems.[30] The USDA Rural Energy for America Program (REAP) provides grants and loans for energy efficiency projects (including modern wood heating systems) at agricultural producers and small businesses in rural areas. Grants cover up to 50% of project costs up to $500,000, and loans cover up to 75% of project costs. A project may receive both a grant and a loan guarantee, but the combined federal assistance cannot exceed 75% of the total project cost.[31]

Efficient wood boilers have also been eligible for a federal tax credit of 30% of the installed project cost up to $2,000 annually. With the passage of the One Big Beautiful Bill Act in 2025, the expiration date for

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[27] Massachusetts Clean Energy Center, Residential Biomass Heating Program Program Manual, November 8, 2019, https://www.masscec.com/eligible-modern-wood-heating-systems

[28] Massachusetts Clean Energy Center, Commercial-Scale Biomass Heating Program Program Manual, February 8, 2019, https://www.masscec.com/eligible-modern-wood-heating-systems

[29] Massachusetts Clean Energy Center, Public Records Requests, Biomass Heating Residential Projects Database, https://www.masscec.com/public-records-requests

[30] USDA Forest Service, Wood Innovations webpage at https://www.fs.usda.gov/science-technology/energy-forest-products/wood-innovation

[31] USDA Rural Development, Rural Energy For America Program webpage at https://www.rd.usda.gov/inflation-reduction-act/rural-energy-america-program-reap#:~:text=USDA%20is%20announcing%20$145%20million,by%20the%20Inflation%20Reduction%20Act.

this tax credit was accelerated to December 31, 2025, rather than 2032. Commercial wood heating projects can also take advantage of the 30% Investment Tax Credit (ITC).

4. Recommendations for Consideration

a. Increase Marketing and Outreach

Industry stakeholders consulted for this report asserted that there is a lack of widespread public knowledge about Maine's various modern wood heat incentive programs. These stakeholders' top recommendation is to boost marketing and outreach for these opportunities.

Efficiency Maine Trust

In recent years, the Trust's marketing and outreach efforts for modern wood heating incentives have been minimal.

Across its suite of programs, the Trust places heavy reliance on Maine's trade allies (installers, contractors, vendors, suppliers, etc.) to conduct most of the marketing and outreach. Contractors that participate in the Trust's residential programs (called "Residential Registered Vendors" or "RRVs") market their products and services – and the Trust's rebates for those products and services – through sales calls, direct mail, tabling at trade shows and public events, websites, paid online ads, and paid ads for radio, television and print. The Trust currently reimburses 50% of eligible marketing expenses, up to a maximum reimbursement of $5,000 per calendar year per RRV, promoting heat pump and weatherization projects. One recommendation for the Trust in this report is to make a marketing reimbursement available to RRVs installing modern wood heating systems.[32] The Trust could advise modern wood heat vendors about this opportunity in its monthly newsletter to RRVs.

A second recommendation for the Trust is to develop specific marketing collateral about modern wood heating to distribute at its various residential and commercial outreach events, customer meetings, and online. New collateral could include a brochure (formatted for print and digital) detailing the residential rebates, and another summarizing the TEIP.[33] The Trust could also develop residential and commercial case studies, both for print and for inclusion on its website, social media, and blog.[34] The Trust could promote all of these new resources by increasing visibility on its website and boosting related posts on its social media and blog. It could also consider paid digital advertising (e.g., Google and Facebook ads) to drive web traffic to these new materials. Note that the Trust makes many of these types of resources available to the public (including contractors, nonprofits, etc.) for free; anyone can request certain printed materials on the Trust's website and have them mailed to them at no cost. The same would apply for the Trust's collateral materials about modern wood heating.

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[32] Some RRVs install both modern wood heating systems and heat pumps. For avoidance of doubt, the RRV reimbursement for promoting modern wood heating would be separate and in addition to any reimbursement for promoting heat pumps.

[33] See Exhibit B for examples.

[34] See Exhibit C for examples.

Several stakeholders pointed to schools as the ideal candidates for modern wood heating systems, in part because they serve as highly visible community demonstration projects. A third recommendation for the Trust is to host a targeted webinar for school facility decisionmakers to highlight all of Efficiency Maine's incentive and technical assistance offerings, in which modern wood heating would be prominently featured. More generally, the Trust could make a more concerted effort to highlight modern wood heating options in its presentations at the appropriate forums, whether led by Efficiency Maine or outside groups.

Public Utilities Commission

Stakeholders noted that the PUC's TREC opportunity is not well advertised on its website or elsewhere. The PUC's Maine Renewable Portfolio Standard (RPS) webpage does provide basic certification instructions for thermal energy facilities, but does not explain that smaller customers can access TREC incentives through a biomass fuel supplier.[35] The PUC website could provide a more detailed overview of this opportunity and include a list of participating suppliers. Efficiency Maine could also mention the opportunity in its modern wood heating collateral, ideally linking to this PUC webpage.

Maine Statewide Wood Energy Assistance Team (Maine SWEAT)

The Maine SWEAT was a group of private and public sector stakeholders that was active between 2016 and 2018 promoting high-efficiency/low-emissions biomass heating technologies through outreach and education and professional guidance. The group's mission was to coordinate the delivery of technical, outreach, and financial assistance to interested individuals, communities, and organizations across the state. The initiative was coordinated by the Maine Forest Service and supported by the USDA Forest Service Wood Innovation Grant Program.

Several industry stakeholders observed that the dedicated staff person at Maine Forest Service was instrumental in the Maine SWEAT initiative's success. Rather than reinstating the initiative entirely, they suggested that assigning an energetic Maine Forest Service employee to expand the utilization of wood heating would largely accomplish the same purpose. They also suggested seeking federal funds to support the position. Many stakeholders noted that the Vermont FPR effectively supports these efforts in that state; the agency hosts a webpage devoted to highlighting the myriad benefits of wood heat and linking to incentive opportunities, and supports a staff position dedicated to outreach and promotion. Stakeholders asserted that this concerted effort is an important driver of Vermont's current success in adopting modern wood heating.

b. Provide TEIP Financing

As noted above, the TEIP legislation directs the Trust to provide incentives (rebates) *and loans* for the installation of new thermal energy-derived projects at C&I facilities. Eligible projects may use pellets, chips, or other biofuels. Though the Trust recently launched its TEIP incentive offering, it delayed offering TEIP loans for C&I facilities until it could make an informed forecast of future TEIP revenues, the annual budget that will be needed to sustain rebates, and the balance available to capitalize loans.

[35] See Maine RPS webpage at https://www.maine.gov/mpuc/regulated-utilities/electricity/renewable-programs/rps

While incentives help defray the upfront costs associated with an energy efficiency investment, the remaining project cost may present a significant barrier for certain customers. Financing can help overcome that barrier by bringing the upfront amount due from the customer down to (or close to) zero. In this way, the Trust's finance initiatives can serve as a valuable component of its promotional efforts. Given revenue projections (see Figure 1, above) for the Thermal Energy Investment Fund, the Trust expects to have a sufficient source of capital for this effort. Therefore, an additional recommendation of this report is for the Trust to move ahead with designing and offering a financing initiative for C&I facilities to complement the existing incentives and further promote investment in TEIP-eligible projects.

c. Increase TEIP Incentives

Another of this report's recommendations for consideration is for the Trust to increase its TEIP incentive for projects at C&I facilities from the current level of 35% of project costs. Specifically, this report recommends that the Trust take a closer look at the C&I incentive levels offered in Vermont and New Hampshire and the results those states have achieved. With an eye to sustaining a sufficient balance in the fund to support future rebate demand and the introduction of loans, the Trust's TEIP program should consider increasing rebates to between 40%-50% of upfront project costs.

d. Statewide Goals for Modern Wood Heating

In 2022, the Vermont Comprehensive Energy Plan adopted a goal of meeting at least 35% of Vermont's thermal demand with wood heat by 2030. Industry stakeholders suggested that a similar goal would help promote modern wood heat here in Maine. At the moment, Maine does not have any such goals in its statute, energy plan, or climate action plan.[36] No specific goal was developed in the context of this report. Nonetheless, a recommendation for consideration is to set a goal for modern wood heating.

e. Rebates for Supplemental or Emergency Backup Biomass Heating

During the discussion on LD 1212, some legislators asked whether the Trust had considered promoting modern wood heating systems as a supplemental or emergency backup heating source in homes primarily heated by heat pumps.

One option for consideration is using a *central* biomass boiler or furnace as a resiliency measure to supplement or back up a primary heat pump system. The Trust's review of this suggestion notes a number of challenges. First and foremost, the combined upfront cost of installing two central systems (one being the whole-home heat pump, the other being the central biomass boiler or furnace) would be very high and impractical for most budgets; the customer would not experience a positive return on their investment. Second, central biomass boilers and furnaces require electricity to run. As such, they are not a viable heating source during a power outage unless they have access to some form of emergency backup generator. Third, the Trust's program evaluations and ongoing analysis indicate that a heat pump system will not operate to its full capacity when it is run concurrently with another central heating system (any kind of central furnace or boiler). This would be true if heat pumps were operated

[36] Of note, Maine statute (at 35-A MRSA §10309) has established a target of reducing oil consumption, from all sectors, from 2007 levels by at least 30 percent by 2030, and at least 50 percent by 2050.

concurrently with a pellet boiler. The result of running a primary heat pump system concurrently with any other central heating system is that the homeowner will realize less energy savings than anticipated and seriously compromise the heat pumps' cost-effectiveness.

A second option for consideration is promoting biomass *stoves* to supplement or back up a whole-home heat pump system. While stoves (i.e., designed to heat a room or zone of a home, not connected to a heating distribution system of ductwork or forced hot water radiators) fall outside the scope of modern wood heating as defined in this report, it is worth noting that the Trust sees an opportunity to promote them alongside residential whole-home heat pump systems. This equipment is available throughout the state. For many Maine households, especially in rural areas, stoves may be fueled using cord wood that is produced locally at low-cost. The Trust's research indicates that a significant number of homes that have switched to whole-home heat pump systems in Maine are also using stoves, both pellet and cord wood, as a supplemental or emergency backup heat source. Such stoves are less likely to interfere with the efficient operation of a heat pump system across an entire heating season, and in the case of cord wood stoves, require no electricity for operation. This is a recommendation of the report that the Trust should consider.

5. Resources

- Charlie Niebling, Modern Wood Heat: Local Renewable Energy for C&I Building Owners – Benefits to Maine in 2017.
- ME Department of Agriculture, Conservation and Forestry, Fuels for Public Buildings – American Recovery and Reinvestment Act (ARRA) Annual Program Report to USDA Forest Service, 2013.
- SIG-NAL Economic Impact Assessment of Wood Chip Heat in Maine, prepared for Natural Resources Council of Maine (NRCM), 2017.
- Vermont Department of Forests, Parks, and Recreation, Vermont Forest Future Strategic Roadmap – Final Report, January 2024.
- Vermont Department of Public Service, 2022 Vermont Comprehensive Energy Plan.
- SIG-NAL Greenhouse Gas Emissions of Wood Pellet Heat in the Northern Forest study commissioned by Northern Forest Center.
- Evaluation of CEDF's Advanced Wood Heating Programs. Completed by the Cadmus Group, October, 2019 https://publicservice.vermont.gov/renewables/clean-energy-development-fund-cedf/reports-documents
- Vermont Energy Investment Corporation, 2022 Update: Wood Heat Use in Vermont, Prepared for Clean Energy Development Fund at Vermont Department of Public Service, March 19, 2024.
- Vermont Energy Investment Corporation, 2022 Update: Advanced Wood Heat Sector in Vermont, Prepared for Clean Energy Development Fund at Vermont Department of Public Service, March 19, 2024.
- Biomass Energy Resource Center at Vermont Energy Investment Corporation, Wood Heating In Vermont: A Baseline Assessment for 2016, Prepared for Vermont Department of Public Service Clean Energy Development Fund, July 2017.
- Maine Public Utilities Commission, Annual Report on New Renewable Resource Portfolio Requirement – Report for 2023 Activity, Submitted to the Joint Standing Committee on Energy, Utilities and Technology, March 31, 2025.

EXHIBIT A

PARTICPATING STAKEHOLDERS

Last Name	First Name	Affiliation
Bell	William (Bill)	Maine Pellet Fuels Association
Woods	Tony	Maine Pellet Fuels Association/Wood & Sons
Fogg	Robert	Maine Pellet Fuels Association
Mulliner	Jared	Maine Energy Systems (MESys)
Otten	Les	Maine Energy Systems (MESys)
Froling	Mark	Froling Energy
Grondin	Richard	Integrated Energy Systems, PLLC
Landry	Lee	True North Energy Services
Cassata	Mike	Biofine
Akers	Jeremy	Castlerock / Ensyn
Adams	Maura	Northern Forest Center
Gray	Kendall	Northern Forest Center
Short	Joe	Northern Forest Center
Parent	Ellen	Maine Forest Products Council
Strauch	Patrick	Maine Forest Products Council
Doran	Dana	Professional Logging Contractors of the Northeast
Kvietok	Frank	Lignetics, Inc.
Anthony	Ross	Governor's Energy Office
Colan	Caroline	Governor's Energy Office
Sturtevant	Ben	Department of Economic and Community Development (DECD)
Cormier	Patty	Department of Agriculture, Conservation and Forestry (DACF)
Crawford	Jeff	Department of Environmental Protection
Loyzim	Melanie	Department of Environmental Protection
Bliss	John	Howell Labs
Hoch	Rich	Howell Labs
Cote	Adam	Drummond Woodsum, representing Maine Pellet Fuels Association
Parrot	Jonathan	BioThermal Energy Council
Grant	Ben	Professional Logging Contractors of the Northeast
Gardner	Chris	MaineFlame and Player Design
Player	Tyler	MaineFlame and Player Design

EXHIBIT B

SAMPLE EFFICIENCY MAINE PROGRAM BROCHURES

- Heat Pump Rebate brochure
- Introduction to Heat Pump Water Heaters brochure
- Insulation Rebates brochure
- EV Vehicle and Charger Incentives brochure
- Multifamily Solutions one-pager:

- Variable Refrigerant Flow (VRF) handout:

Variable Refrigerant Flow Systems (VRFs)

What is a VRF system?

A VRF system is a highly efficient heating and cooling technology designed for larger buildings. One benefit of a VRF is that they can simultaneously heat and cool different parts of a building. These systems can be very efficient because they can take waste heat captured in one part of the building (e.g., a computer server room, or the face of the building exposed to the sun) and deliver it to spaces requiring heat. This function is called heat recovery. A VRF system without heat recovery can only heat **or** cool building spaces.

How VRF systems work?

The flow of refrigerant varies to each indoor unit based on its heating or cooling needs, meaning each room can be set to a different temperature. VRF systems have multiple indoor units (like those below) with an outdoor condensing unit (like those above).

Examples of VRF indoor units:

Learn more at:
efficiencymaine.com/at-work/variable-refrigerant-flow/

efficiency MAINE

VRFs or Heat Pumps?

VRF and Heat Pump systems offer lower operating costs, increased equipment reliability, and energy savings. Learn which heating system is best for your business and facilities.

VRF Systems	Mini-Split Heat Pumps
Simultaneous* heating and cooling available *for VRF systems with heat recovery	Simultaneous heating and cooling **NOT** available
Medium to large commercial projects (generally 1,800 to 21,600 sq. ft.)	Residential to light commercial projects (generally 300 to 3,000 sq. ft.)
Electrical service requirements: Single or three-phase service	Electrical service requirements: Single-phase
Example facilities include schools, assisted living facilities, office buildings, multifamily buildings with 5 or more units	Example facilities include small offices, hotel rooms, small restaurants, multifamily buildings with fewer than 5 units
8 or more indoor units on a single outdoor unit	Up to 6 indoor units on a large multisystem
Incentives for VRF with heat recovery: New Construction: $7.00/sq. ft. with* heat recovery *up to $5.00/sq. ft. available without heat recovery Retrofit: $15.00/sq. ft. with* heat recovery *up to $13.00/sq. ft. without heat recovery	Incentives for Mini-Split Heat Pumps: New Construction: 1 Zone - $500; 2 Zones - $750; 3+ Zones - 1,000 Retrofit: 1 Zone - $1,200; 2 Zones - $1,600; 3+ Zones - $2,000

Find a Qualified Partner at **efficiencymaine.com/at-work/qualified-partners/**.

Learn more at:
efficiencymaine.com/at-work/variable-refrigerant-flow/

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EXHIBIT C

SAMPLE CASE STUDIES

1. Sample Efficiency Maine C&I Custom Program Case Study – Backyard Farms
2. Sample Efficiency Maine C&I Prescriptive Initiatives Case study

Town of Norridgewock, Maine
An Efficiency Maine Case Study

The town of Norridgewock is a leading example of the types of projects Efficiency Maine is promoting through its small-town funding opportunities. In recent years, Norridgewock has completed nine projects that have received a total of $45,173 in efficiency incentives. The town's fire department, airport, library, municipal garage, wastewater facility, and town offices all completed lighting projects using $33,973 in financial incentives for an estimated total annual energy savings of 46,142 kWh.

Norridgewock also installed heat pumps in its fire station, airport terminal, and library using $11,200 in financial incentives for an estimated annual energy savings of 1,625 gallons of heating oil. This translates to approximately $6,250 saved per year.

"These incentives are too good to leave on the table," said Norridgewock Town Manager Richard LaBelle, a veteran of prior Efficiency Maine programs. "Like most municipalities, we face the ever-expanding pressure to keep taxes down. **We were able to upgrade our lighting and install heat pumps at a fraction of the cost. The new lighting literally transformed these buildings, making them more inviting for public visitors and more pleasant workspaces.** And the heat pumps enabled us to remove window air conditioners, dehumidifiers, and heaters under staff desks."

efficiency MAINE Learn more at **efficiencymaine.com**

In October 2022, the town of Norridgewock took advantage of the Trust's available funding opportunity for small Maine towns and **installed two additional heat pumps in the town airport. The funding for this project came from the American Rescue Plan Act (ARPA)/Maine Jobs and Recovery Plan (MJRP).**

3. Efficiency Vermont - Mettowee Mint – Case Study

Advanced Wood Heating
For agricultural businesses

The Mettowee Mint garden center is saving almost $9,000 a year in energy costs by switching to an advanced wood heating system.

Overview

Advanced wood heating systems are a proven and cost-effective way to heat your agricultural spaces. Your business could save a significant amount on annual energy costs by switching from fossil fuels like oil and natural gas to locally sourced wood. That's because wood is a cheaper fuel, and high-efficiency wood heating systems create very little wasted heat. Your space will be warmer, you'll reduce operating costs, and you'll be supporting the Vermont economy. What's not to love?

Key benefits

Save money. Your annual heating costs could decrease significantly compared to a traditional heating system.

Achieve energy independence. If you own forest land, actively managing for valuable forest products can result in a supply of wood for heating.

Support the local economy. When you buy local wood fuel, 80 cents of every dollar stays in Vermont, compared to 25 cents for fossil fuels. Using wood fuel is one way to support Vermont's working forested landscape.

Reduce climate impact. Burning local wood is more climate-friendly than burning fossil fuels.

Fuel options

There are three kinds of fuel used in advanced wood heating systems. Which fuel makes the most sense for you will depend on many factors, including space constraints and your desired level of fuel delivery automation.

Pellets. Wood pellets have the highest density of energy per pound, and the lowest moisture content. Pellets can be stored indoors or outdoors. They are the most highly processed form of wood fuel.

Woodchips. Woodchips are less processed than pellets. They can be green or dry. Dry wood chips have a lower moisture content and provide more energy per ton of fuel.

Cordwood. Cordwood is the least processed fuel option. It requires the most handling, and it must be well seasoned. For this reason, it is recommended to have two years of fuel on site.

Call Efficiency Vermont at **888-921-5990** or visit **www.efficiencyvermont.com**

Efficiency Vermont

Case Study
Mettowee Mint
Dorset, VT

METTOWEE MINT

Overview

Mettowee Mint is a garden center that provides Dorset and the surrounding community with the tools to create healthy, biodiverse landscapes and timeless ornamental gardens. The garden center includes a large retail space with a coffee bar and multiple greenhouses, each of which were historically heated by separate systems using a mix of heating oil, propane, and kerosene.

Challenge

Mettowee Mint's owner, Sarah Linford, says her plants were in high demand during the colder months, but it was becoming financially unsustainable to heat the greenhouses. Her energy bills exceeded the revenue generated by greenhouse plant sales, threatening to shut down that portion of the business. She wanted to spend less on heating the greenhouses and streamline the number of fuel types being used on-site.

Solution

With expert guidance from several partners, Sarah chose to install two high-efficiency cordwood gasification boilers. The new setup was designed as a mini district system, with central boilers providing heat to multiple buildings via insulated underground piping and zone controls in each space. One of the district zones utilizes a radiant slab to efficiently heat a greenhouse. The boilers, thermal storage tanks, and hydronic distribution components are housed in a new boiler house.

Heating with cordwood is labor intensive. Sarah purchases local log-length wood, and her team bucks, splits, and stacks it on the property. This allows her to provide year-round employment to community members. With this advanced wood heating system, Mettowee Mint is saving money, supporting the local forest economy, and positioning itself for future expansion of heated spaces.

Partners

SunWood Biomass Systems installed the advanced wood heat system and integrated it with the existing heat distribution system. It also helped with grant applications to the USDA Rural Energy for America Program.

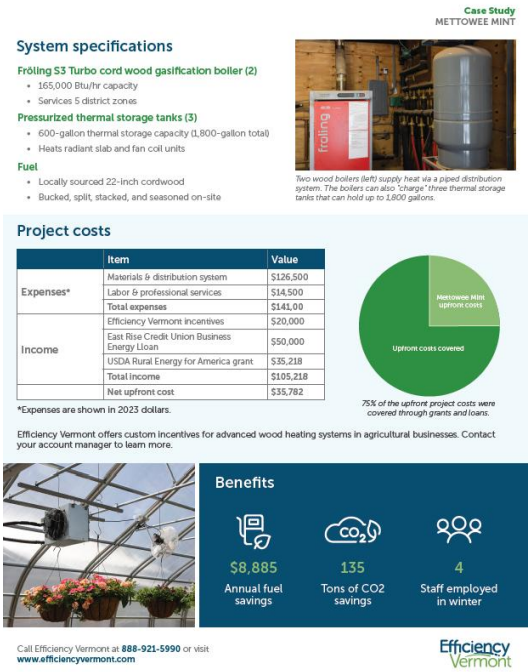
Efficiency Vermont provided free energy modeling, economic analysis, and system design support. It also provided financial incentives.

Vermont Dept. of Forests, Parks & Recreation provides wood energy financial and technical assistance for working lands businesses.

East Rise Credit Union provided a Business Energy Loan to support Mettowee Mint's capital investment.

SunWood Biomass · Efficiency Vermont · EastRise

"We could either pay members of our community that need employment, or we could pay fossil fuel companies."
– Sarah Linford, owner of Mettowee Mint garden center



Case Study
METTOWEE MINT

System specifications

Fröling S3 Turbo cord wood gasification boiler (2)
- 165,000 Btu/hr capacity
- Services 5 district zones

Pressurized thermal storage tanks (3)
- 600-gallon thermal storage capacity (1,800-gallon total)
- Heats radiant slab and fan coil units

Fuel
- Locally sourced 22-inch cordwood
- Bucked, split, stacked, and seasoned on-site

Two wood boilers (left) supply heat via a piped distribution system. The boilers can also "charge" three thermal storage tanks that can hold up to 1,800 gallons.

Project costs

	Item	Value
Expenses*	Materials & distribution system	$126,500
	Labor & professional services	$14,500
	Total expenses	$141,00
Income	Efficiency Vermont incentives	$20,000
	East Rise Credit Union Business Energy Lloan	$50,000
	USDA Rural Energy for America grant	$35,218
	Total income	$105,218
	Net upfront cost	$35,782

*Expenses are shown in 2023 dollars.

Mettowee Mint upfront costs
Upfront costs covered

75% of the upfront project costs were covered through grants and loans.

Efficiency Vermont offers custom incentives for advanced wood heating systems in agricultural businesses. Contact your account manager to learn more.

Benefits

$8,885 Annual fuel savings

135 Tons of CO2 savings

4 Staff employed in winter

Call Efficiency Vermont at 888-921-5990 or visit www.efficiencyvermont.com

Efficiency Vermont

4. Efficiency Vermont – VT Inn revitalized with efficiency upgrades – blog post
5. Efficiency Vermont – Low-carbon fuel keeps Hardwick family warm – blog post
6. Efficiency Vermont -- Renewable heat takes center stage at Berlin's Grange Hall – blog post
7. Feel Good Heat – Various case studies