

# CleanEnergy States Alliance

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## A Summary Guide to Wood Biomass Heating Programs of CESA Members

## About this Report

This summary document was developed by the Clean Energy States Alliance (CESA) and covers wood biomass heating programs in CESA-member states. The heating and cooling sector accounts for over forty percent of the nation's energy use. CESA's renewable thermal project works with member states to evaluate renewable heating and cooling technologies and develop policies and programs that support best practices to further develop the market for renewable thermal technologies.

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More information on CESA's renewable thermal initiatives can be found at <http://www.cesa.org/projects/renewable-heating-and-cooling/>.



[www.cesa.org](http://www.cesa.org)

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## Introduction

Advanced wood biomass heaters (also known as hydronic heaters or biomass boilers) are becoming more commonplace in the U.S. market. The emission profiles and efficiency (performance) of these systems are of particular importance, especially if the technology is replacing or displacing fossil fuel (natural gas, propane) use. Biomass heaters have advanced significantly in terms of performance, emission reduction, and efficiency over the last twenty years, mainly due to tightening regulations in Europe where policies support an advanced biomass heating sector. Current advanced biomass heaters operate and start/shut down automatically, with low emissions and efficiencies of up to 85 percent. By controlling combustion, metering air intake, modulating heat output, including a buffer tank, and integrating low-temperature distribution systems, modern biomass heaters are more clean and efficient.

Several state clean energy programs provide incentives for advanced biomass heaters; most of the programs are in the Northeast and the northern tier of the west coast. The cost of a typical residential system ranges from \$18,000 to \$25,000, and a 1.7 MMBtu commercial system has an average installed cost of \$378,000. This document surveys current and planned activities of Clean Energy States Alliance (CESA) member states that are focused on the deployment of modern, high-efficiency, wood heating systems.

## Alaska

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### Alaska Energy Authority (AEA)

AEA's Renewable Energy Grant Fund (REF) provides funding for commercial-scale wood biomass heating systems to electric utilities, independent power producers, local governments, and government entities. The grants are available for feasibility studies, energy resource monitoring, final design, and project construction. AEA publishes a "biomass best practices checklist" that details items critical for a successful grant application, including a wood harvesting plan and design considerations such as the integration of thermal storage, system sizing, and energy efficiency.

The REF grants program has funded 48 biomass projects. Currently there are 14 biomass systems in construction and six are in design. Numerous projects are in the development phase. AEA was recently awarded a USDA grant to develop a best practices handbook for Alaska schools to implement biomass wood heating systems in greenhouses.

#### Links and More Information

- <http://www.akenergyauthority.org/Programs/Renewable-Energy-Fund/Rounds#Round9>

## Massachusetts

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### Massachusetts Clean Energy Center (MassCEC)

Massachusetts Clean Energy Center's Clean Heating and Cooling Program provides rebates for residential central wood heating systems. Rebates are 45 percent of the project cost or \$10,000, whichever is less. There is also a thermal storage adder for up to \$2,000. The rebate applies to Massachusetts homeowners who install (with the use of qualified installers) eligible central wood-pellet boilers or furnaces. There are several requirements for eligibility, including:

- System must have a bulk pellet storage unit sized between three and five tons that can supply the boiler/furnace with pellets by pneumatic hose or auger
- Must be a centralized heating system capable of automated startup and turn down/off in response to heat demand
- Central heater must be designed to meet at least 80 percent of the building's annual heating load and may not be sized with a peak heating capacity greater than 120 percent of the Manual J heat load calculation<sup>1</sup>
- Must have thermal efficiency of 80 percent HHV or greater
- Particulate matter emissions rating no greater than 0.10 lb PM2.5/MMBtu output at 80% thermal efficiency, which is equivalent to no greater than 0.08 lb/MMBtu at nominal output

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<sup>1</sup> Manual J is the Air Conditioner Contractors of America approved method for calculating the total amount of heat lost and gained in a home. It considers a variety of factors to calculate whole house heat loads.

- Thermal storage is required unless the system meets certain requirements
- Required use of premium quality pellets certified to Pellet Fuels Institute

#### Links and More Information

<http://www.masscec.com/residential/clean-heating-and-cooling>

## MassSave HEAT Loan Program

The MassSave HEAT Loan Program has been expanded for a limited time to offer a no-interest loan of up to \$25,000 that can be applied to high-efficiency wood pellet boilers. The loan is available to residential customers of certain utilities; customers must also obtain a home energy assessment through the MassSave program. Wood pellet boilers must be installed in a 1-4 unit residential building as a central heating system, and the system must have a thermal efficiency rating of at least 80 percent and emissions rating must be no greater than 0.15 lb/million Btu. Systems must also include at least two tons of bulk pellet storage.

#### Links and More Information

- <http://www.masssave.com/en/residential/expanded-heat-loan>

## New Hampshire

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### New Hampshire Public Utilities Commission (NHPUC)

NHPUC offers financial incentives in the form of rebate programs for residential and small commercial/institutional wood pellet heating systems.

For New Hampshire residents, the Residential Bulk-Fed Wood Pellet Central Boilers and Furnace Rebate Program offers 30 percent of the purchase and installation cost or \$6,000, whichever is less, for bulk fuel-fed wood pellet central boilers and furnaces that become operational on or after May 1, 2012. The system must be new, with a combustion efficiency of 80 percent or greater; it must include bulk fuel feed and must meet specified air quality standards.

The rebate for non-residential systems applies to boilers and furnaces up to 2.5 million Btu per hour. The rebate is 30 percent of the purchase and installation cost up to a maximum of \$50,000 for bulk fuel-fed wood pellet boilers and furnaces. An additional rebate is available to these projects of 30 percent up to \$5,000 for thermal storage and related components.

#### Links and More Information

- NHPUC Rebate Pre-Approval Application for Non-Residential Systems:  
<http://www.puc.nh.gov/Sustainable%20Energy/Renewable%20Energy%20Rebates/Commercial%20and%20Industrial%20BFWP/STEP%201%20CI%20pellet%20rebate%20application%2003-07-14.pdf>
- NHPUC Non-Residential Renewable Energy Rebates Program Website:  
<http://www.puc.nh.gov/Sustainable%20Energy/RenewableEnergyRebates-CI-BFWP.html>

## Renewable Portfolio Standard

New Hampshire was the first state to include renewable thermal provisions in its Renewable Portfolio Standard (RPS). The state aims to procure two percent of its thermal energy by 2023 from renewable sources including biomass (as well as solar thermal and ground source heat pumps). Thermal Renewable Energy Credits (RECs) are calculated based on the thermal output and converted to wattage (3.412 million Btu per MW). Systems larger than 150,000 Btu/hr are required to install thermal meters; however, systems smaller than this can either install a thermal meter, or choose to meter another parameter than can be used to calculate the thermal output (for example, operating hours or fuel input).

Advanced biomass heating systems qualify for thermal RECs based on the amount of usable heat generated from the wood. To help finance the capital costs of advanced biomass heating systems, the U.S. Endowment for Forestry and Communities, a non-profit organization, created an innovative method for financing these systems. The T-RECs Enterprise Fund purchases T-RECs from system owners, *in advance* for up to five years of projected heat output, and pays the system owner a lump, upfront sum.

### Links and More Information

- NH Class I Thermal Renewable Energy Certificate Program  
<http://www.puc.state.nh.us/Sustainable%20Energy/Class%20I%20Thermal%20Renewable%20Energy.html>
- NH T-RECs Enterprise Fund <http://www.t-recsfund.org/>

## New York

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### New York State Energy Research and Development Authority (NYSERDA)

The Renewable Heat New York (RHNY) program provides incentives toward the costs of high-efficiency, low-emissions wood heating systems. Both residential and commercial systems are eligible; and the incentive applies to residential wood pellet stoves, advanced cordwood boilers, and wood pellet boilers. There are a total of seven incentive programs for residential, small commercial, and large commercial projects (see <http://www.nyserda.ny.gov/All-Programs/Programs/Renewable-Heat-NY>), ranging from \$1,500 for a residential wood pellet stove to 45 percent of the total project cost (maximum \$270,000) for a commercial-scale tandem pellet boiler with thermal storage.

To receive an incentive for an advanced biomass pellet heating system, the system must be a qualified technology under the RHNY program and listed on NYSERDA's website. The wood pellet hydronic heater must have a minimum thermal efficiency of 85 percent rated using the higher heating value of the pellets.<sup>2</sup> In addition, the system must be sized based on the heat load of the building using a Manual J calculation and must be installed by a contractor who has demonstrated

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<sup>2</sup> In other words, using the total amount of energy available from the wood pellets' complete combustion, including the energy it took from condensing the water vapor that resulted from combusting the pellets.

technical competence in the design and installation of high-efficiency, low-emission wood heating equipment. Installers must have at least two years of relevant experience and have completed manufacturer's training for the boiler brand they are installing. At least one individual from the firm must have successfully completed training with the RHHY biomass training, or other NYSERDA-approved training. The heating system must include thermal storage to maintain high efficiency and low emissions performance, minimize boiler cycling, and meet intermittent calls for heat. Pellets must be stored outdoors.

#### **Links and More Information**

- Renewable Heat New York Program Website: <http://www.nyserda.ny.gov/All-Programs/Programs/Renewable-Heat-NY>

## **Oregon**

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### **Oregon Department of Energy (ODOE)**

The Oregon Department of Energy oversees a business tax credit that applies to several renewable thermal technologies, including biomass thermal, solar thermal, and direct-use ground source heat pumps. A tax credit of up to 35 percent may be earned for investments in these technologies, but there is an application for the incentive with a review process that is similar to that for a grant application.

Biomass thermal systems must be designed to provide 70 percent of the base heat-load of the building and must have a minimum efficiency of 85 percent. Biomass boilers must be connected in parallel with an existing or back-up boiler, and must be the primary heat source for the building. While no turn-down ratio is specified, the range should match winter and summer demands. There are several requirements: the applicant must be the owner, contract purchaser or lessee of the project; the applicant is a trade, business or rental property owner or an Oregon non-profit organization, tribe or public entity; and the project must be located in Oregon.

The program is highly staff-intensive, with application evaluation, ranking, selection, and technical review of proposals.

#### **Links and More Information**

- OR Energy Incentives Program  
<http://www.oregon.gov/energy/BUSINESS/Incentives/Pages/EIP-Conservation.aspx>

## **Vermont**

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### **Vermont Clean Energy Development Fund (CEDF)**

The Vermont Clean Energy Development Fund (CEDF), within the Vermont Department of Public Service, is currently accepting proposals for Advanced Wood Heating Systems in Schools and Low-Income Housing, in the second round of funding within CEDF's Clean Heat Community Challenge



Initiative. Maximum awards are \$75,000 toward the direct installed costs of new advanced wood heating systems with an awardee cost share of 65 percent of the project cost; there is a total of \$300,000 available. Grants can cover the costs of boilers, thermal storage, wood fuel storage, and connections and controls.

#### **Links and More Information**

- Vermont Clean Energy Development Fund  
[http://publicservice.vermont.gov/topics/renewable\\_energy/cedf#funding](http://publicservice.vermont.gov/topics/renewable_energy/cedf#funding)

## **Vermont Renewable Energy Standard**

In June 2015, Vermont Governor Peter Shumlin signed H.40, Vermont's Renewable Energy Standard (RES). The RES is similar to other states' RPS programs in that it sets a minimum amount of renewable energy that must be in utility portfolios. The Vermont Public Service Department projects that the law will lead to nearly 400 MW of renewable energy projects in Vermont, including through an "energy transformation" tier that includes biomass thermal. Two percent of sales in 2017 are to be met in this tier, increasing to 12 percent in 2032. Utilities may meet this requirement through transformation projects that result in a net reduction in a customer's fossil fuel consumption and related GHG emissions

Industrial scale distributed generation biomass projects are eligible if the majority of the energy recovered from the plant is thermal energy. A retail electricity provider may be eligible for meeting its requirement through the energy transformation tier by converting the net reduction in fossil fuel consumption from the energy transformation project to a MWH equivalent using a conversion rate adopted by the Public Service Board. And the project must comply with sustainability standards adopted by the Commissioner of Forests, Parks and Recreation (VT FPR). VT FPR must adopt initial rules by July 1, 2016.

#### **Links and More Information**

- Vermont H.40  
<http://legislature.vermont.gov/assets/Documents/2016/Docs/ACTS/ACT056/ACT056%20As%20Enacted.pdf>

## **Small Scale Renewable Energy Incentive Program (SSREIP)**

The SSREIP provides incentives for Advanced Wood Pellet Heating Systems of \$2,500 per unit and up to \$6,000 per customer, which includes a \$500 Pellet Storage Upgrade Adder and a \$500 thermal efficiency adder. The incentive applies to residential and non-residential heating systems.

To be eligible for the incentive, all systems must meet certain requirements, including:

- All Systems must be listed on the SSREIP Advanced Wood Pellet Eligible Equipment Inventory. To be included, systems must meet one of the following criteria:
  - Included on the NYSERDA list of approved systems for the Renewable Heat New York small commercial wood pellet boiler incentive program; or

- For systems not on the NYSERDA list, manufacturer must demonstrate compliance with the 85% efficiency and 0.08lbs/MMBtu for PM 2.5 requirements. Evidence must be submitted to the RERC for evaluation and possible addition to the SSREIP Advanced Wood Pellet Eligible Equipment Inventory
- Base thermal efficiency of 85 percent HHV
- Base particulates emissions below 0.08 lbs/MMBtu for PM2.5 and comply with all applicable Environmental Protection Agency and Vermont standards for particulate matter emissions
- Fuel storage capacity such that the system may continuously operate for a period of at least 14 days under peak load conditions, or for a period of at least 20 days to be eligible for the \$500 Pellet Storage Upgrade Adder. Bulk fuel storage container systems must be able to receive automated bulk delivery of pellets
- Automated fuel feed from a bulk storage container/area to the burn chamber in an integrated path
- Automated on/off fuel feed control based on a demand for heat

#### **Links and More Information**

- Renewable Energy Resource Center: Eligibility <http://www.rerc-vt.org/incentives-program/eligibility>

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The Clean Energy States Alliance (CESA) is a national, nonprofit coalition of public agencies and organizations working together to advance clean energy. CESA members—mostly state agencies—include many of the most innovative, successful, and influential public funders of clean energy initiatives in the country.

CESA works with state leaders, federal agencies, industry representatives, and other stakeholders to develop and promote clean energy technologies and markets. It supports effective state and local policies, programs, and innovation in the clean energy sector, with emphasis on renewable energy, power generation, financing strategies, and economic development. CESA facilitates information sharing, provides technical assistance, coordinates multi-state collaborative projects, and communicates the positions and achievements of its members.

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