

Vermont Clean Energy Development Fund

ADVANCED WOOD HEAT PROGRAM EVALUATION

OCTOBER 2019

Over the years, CEDF’s Advanced Wood Heat Program delivered hundreds of residential systems and dozens of nonresidential systems that have reduced the use of fossil fuels and bolstered Vermont’s local wood and pellet economy. An evaluation helped CEDF to quantify the energy and emissions impacts of these units.

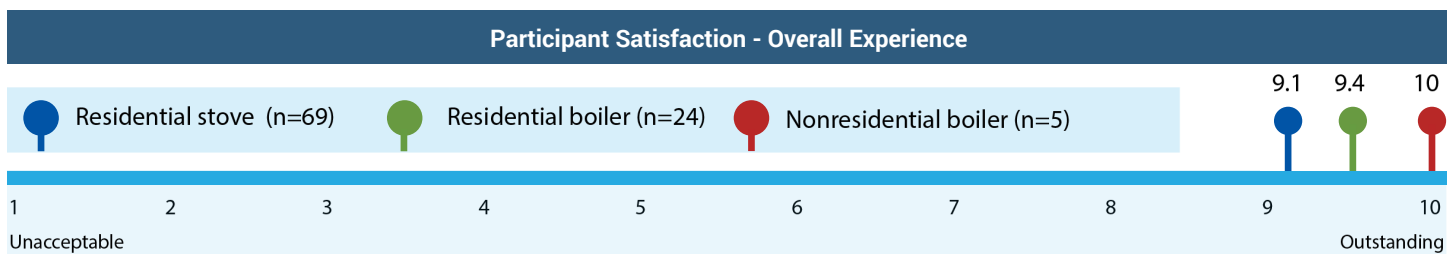
“CEDF has promoted market growth of best-in-class systems.”

“This has been an extraordinary investment! Thank you!”

-Nonresidential Customer

Total Advanced Wood Heating Program Summary (Program Years 2015-2018)		
Sector/Measure	Number of Systems	Total Incentives
Residential Cord Wood Stoves	219	\$266,000
Residential Pellet Stoves	28	\$40,500
Residential Pellet Boilers	82	\$257,345
Nonresidential	45	\$1,494,574
Total	374	\$2,058,419

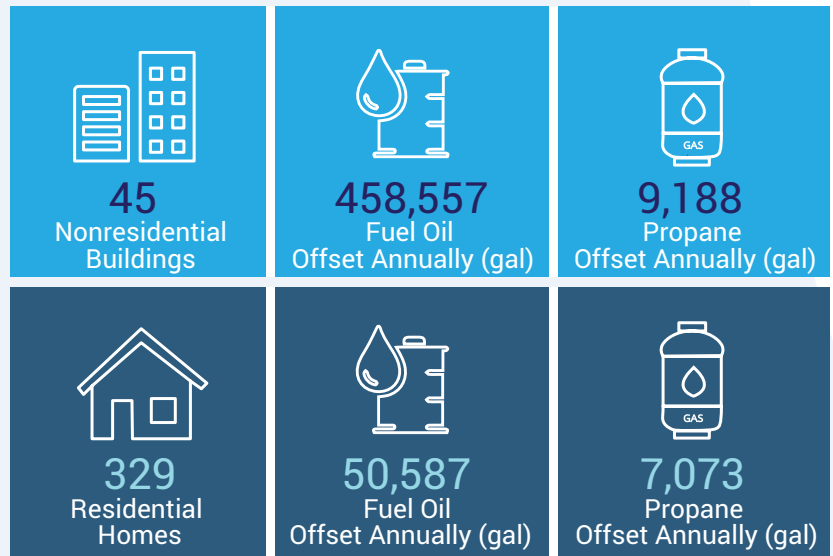
CEDF’s Advanced Wood Heat Program evaluation found satisfied customers who increased the comfort of their homes, upgraded heating technology at their businesses, and reduced their environmental impacts. Three suppliers of advanced wood heating equipment and services described a market of evolving technology and customer awareness, but whose sales are dependent on CEDF program incentives.



Participants were highly satisfied with the program experience and their equipment selections, and the majority would recommend the program to others.

The Advanced Wood Heat program offset heating oil and propane use from residential and nonresidential boilers and furnaces, by incentivizing equipment that instead burned cord wood and locally made pellets in wood stoves, pellet stoves and pellet boilers. This equipment now results in over 500,000 gallons of fuel oil and 16,000 gallons of propane saved every year.

Residential stoves and boilers, exhibited varied degrees of savings across a range of metrics, with generally the pellet boilers offsetting the greatest amount of fossil fuels and greenhouse gas emissions, and the cord wood stoves showing the fastest payback and greatest particulate pollution reductions from previous fuel usage.



“It [CEDF] has had an effect. Without funding we would have seen the market evaporate. It is very rare to sell without a rebate.”

-Equipment and Service Provider

Comparison of Residential Advanced Wood Heat Systems

Measure	Fossil Fuel Gallons/ \$1,000 Incentive	Net MMBTU/ \$1,000 Incentive	Fossil Fuel Metric Tons CO ₂ e/\$1,000 Incentive	Net Metric Tons CO ₂ e/ \$1,000 Incentive	Payback	PM 2.5 (lbs)	CO (lbs)	NO _x (lbs)	SO ₂ (lbs)	VOC (lbs)
Wood Stove	23.5	19.2	0.290	0.512	7.0	194	1,387	7	2	338
Pellet Stove	N/A	26.4	N/A	0.227	14.5	175	1,294	(25)	1	335
Pellet Boiler	199.8	3.7	2.325	1.858	41.7	59	374	(86)	26	72

Higher Performing ■ ■ ■ Lower Performing

Overall, the evaluation yielded substantial reductions in carbon dioxide equivalent annually and small particulate and sulfur pollution. A net increase of nitrogen dioxide occurred from replacing fossil fuel burning with pellets.

Annual Emissions Reduction for Residential and Nonresidential Systems (2015-2018 Program Years)

Sector	PM 2.5 (lbs)	NO _x (lbs)	SO ₂ (lbs)	Fossil Fuel Metric Tons CO ₂ e Savings (Annual)	Net Metric Tons CO ₂ e Savings (Annual)
Residential	52,178	-6,365	2,553	675	623
Nonresidential	-8,952	-15,064	17,408	5,740	4,200
Total	43,226	-21,429	19,961	6,416	4,824