



5 Year Action Plan

Increasing Advanced Wood Heating in Vermont

2017



Endorsements:

*The following organizations and agencies endorse the 5 Year Action Plan:
Increasing Advanced Wood Heating in Vermont*

Biomass Energy Resource Center	Pellergy
Bourne's Energy	Renewable Energy Vermont
Calfee Woodland Management LLC	Sunwood Biomass
Cutting Edge Energy Systems	Tarm Biomass
Forward Thinking Consultants LLC	USDA Forest Service
Gagnon Lumber	Vermont Agency of Commerce and Community Development
Green Mountain Club	Vermont Conservation Voters
Hardwood Forestry Services, Inc.	Vermont Department of Buildings & General Services
Housing Vermont	Vermont Department of Forests Parks & Recreation
Innovative Natural Resource Solutions LLC	Vermont Energy Investment Corporation
LandVest Timberland	Vermont Natural Resources Council
Long Meadow Resource Management LLC	Vermont Renewable Fuels
Lyme Green Heat Inc.	Vermont Sustainable Jobs Fund
New England Wood Pellet LLC	Vermont Woodlands Association
North Woods Forestry	Watson Research
Northern Forest Center	
Maine Energy Systems	
Meadowsend Timberlands, LTD	

About REV:

Renewable Energy Vermont represents businesses, non-profits, utilities, and individuals committed to reducing our reliance on dirty fossil fuels by increasing clean renewable energy and energy efficiency in Vermont. Vermont's clean energy economy supports at least 19,080 jobs at 3,751 businesses, representing approximately 6% of Vermont's workforce. Together, we will achieve 90% total renewable energy (electric, thermal, transportation) by 2050.

Acknowledgements:

This plan was prepared as part of the Vermont Statewide Wood Energy Team (SWET) partnership. The partnership provides outreach and technical support to schools and providers of affordable housing, for the successful conversion to advanced wood heating systems as a strategy to help lower energy costs, boost the Vermont economy, sustain the forested working landscape, and reduce net carbon emissions.



Disclaimer:

The views expressed and recommendations made in this report are those of the authors and stakeholder group, consistent with the commissioning of this plan. While the plan includes actions that require legislation, no federal funds will support any lobbying actions to implement the plan's recommendations.

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Governor Phil Scott and Ribbon Cutting at People's Academy, Morrisville, Vermont

Introduction:

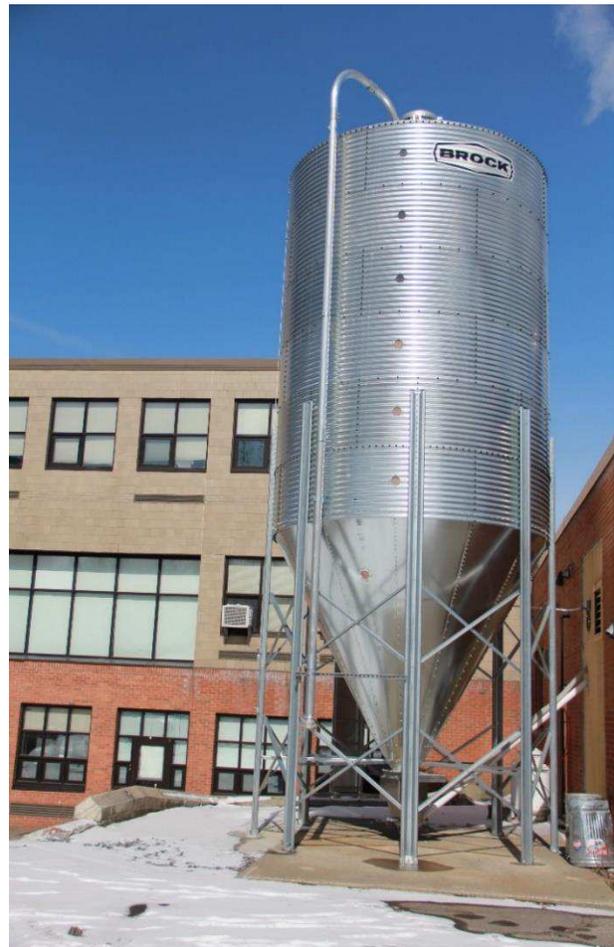
“Wood fuel is an affordable option that stimulates the economy by supporting local businesses.”

Governor Phil Scott | Northeast Biomass Heating Expo 2017

Vermont is committed to supporting working landscapes, revitalizing our economy, and achieving total renewable energy and climate pollution reduction. Vermont’s leadership to advance local wood heating is a key component to meeting these commitments. The recommendations presented in this action plan, when adopted, strengthen our economy by: 1) maintaining and growing our wood energy and forest products industries at a time of otherwise declining markets; and 2) adding jobs by keeping more our heating dollars in the state. The action plan will further position Vermont as a leader in climate change mitigation.

The action plan is a deliverable of Vermont Statewide Wood Energy Team (SWET) grant. Vermont’s Wood Energy Team was created to support the installation of high efficiency wood energy systems to help achieve Vermont’s Comprehensive Energy Plan goal of obtaining 90% of our total energy from renewable sources by 2050. The Vermont SWET team is a collaborative group of stakeholders with expertise in wood energy utilization. Renewable Energy Vermont (REV) convenes quarterly industry stakeholder roundtables. The team met five times on the following dates: March 10, 2017, September 12, 2016, April 8, 2016, January 15, 2016 and October 9, 2015. The actions within this plan reflect from recommendations of the industry stakeholder group.

The group met to discuss obstacles and opportunities and created a list of actions. From those discussions, the workgroup established an overarching goal and milestone: **Obtaining 35% of Vermont’s thermal energy needs from wood heat by 2030, through increased adoption of advanced wood heating systems.**

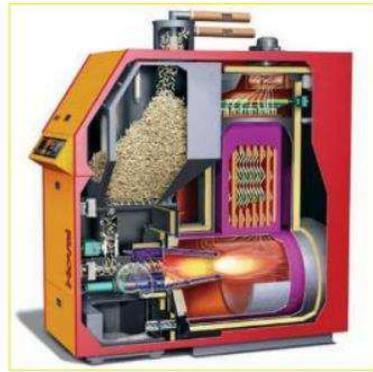


People’s Academy, Morrisville, Vermont

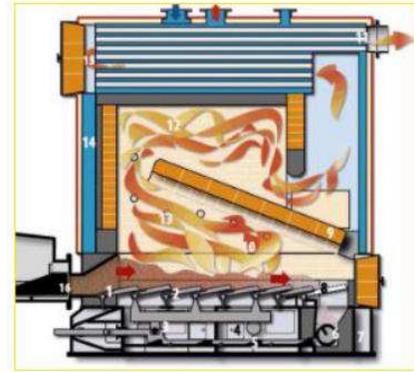
Advanced wood heating: 1) utilizes highly efficient combustion technology, 2) produces low levels of emissions, 3) supports healthy forest ecosystems, and 4) consumes local wood.¹



Cordwood system



Pellet system



Woodchip system

Of note, two other terms also used synonymously with advanced wood heat, which are modern wood heat and automated wood heating.

To obtain 35% of Vermont's thermal energy needs from wood heat by 2030, through increased adoption of advanced wood heating systems, and to achieve the goals of the Comprehensive Energy Plan, the following guiding principles, as outlined in the Northern Forest Biomass Energy Action Plan, are to be regarded in each of the actions addressed in this plan:

Sustainable Forestry - to keep the forest healthy and ensure that harvest management supports the overall ecological function and integrity of the forest ecosystem.

Maximized Efficiency - to ensure the energy value of wood harvested for fuel is utilized as fully and cleanly as possible.

Local Energy - to use local wood resources for community and regional needs at the appropriate scale.

Energy Security - to provide communities and businesses with a stable, uninterrupted, affordable, clean energy supply using local resources.

Climate Change Mitigation - to reduce net carbon emissions over time and increase carbon sequestration.²

The timing of an action plan is critical not only in light of the climate change impacts already negatively affecting the agricultural, skiing, and wildlife sectors of our economy, but also with Vermont's goal of reaching 90% total energy by renewables by 2050. With the milestone of achieving 35% thermal heating with wood heat by 2030, we have less than 15 years to get from point A to point B. The purpose of the roadmap is to create a shared vision, and to develop concrete

¹Clean Energy Development Fund Annual Report, FY 2015

² Northern Forest Biomass Energy Action Plan, 2007

and specific strategies and tactics for the state and industry to follow right now, with benchmarks throughout the next 5 years. We estimate that if we achieve 35% by 2030:

- ✓ Displace **40** million gallons of fossil fuel, saving **\$120,000,000** on fuel a year
- ✓ Create **580** new jobs in Vermont³
- ✓ Achieve measureable progress towards State Energy Goal of **90%** total energy from renewables
- ✓ Instead of sending **\$131 million** out of state every year on heating oil, delivery, and jobs, we will be reinvesting **\$70 million** annually back into our local economy with local jobs and local fuel sources⁴
- ✓ Maintain and expand jobs in forestry, logging, pellet manufacturing and trucking

35% X 2030

Moving toward 35% of our thermal heating needs from wood heating will not only displace fossil fuel, but will help our local economy by using local fuel sources. The majority of wood harvested from Vermont's forests today (two-thirds, according to the latest state harvest study⁵) is considered low grade, which traditionally found healthy regional markets at pulp mills, electric biomass facilities, and to a lesser degree, with pellet and chip producers for thermal heating systems. A sharp decline in the region's pulp industry, combined with a move away from new electric biomass in the region has contributed to a significant decline in markets for low grade wood. The low price of oil has also contributed to a lack of demand for pellet and chip heating systems and fuel, another prime consumer of low grade wood.

Without healthy markets for low grade wood, Vermont is likely to see continued decline in the industry's in-state infrastructure such as logging contractors and sawmills, as well as the local jobs they sustained. The environmental and economic viability of Vermont's working landscape depends on a healthy forest products industry to sustainably manage, harvest and utilize Vermont's forests.

³ Biomass Energy Resource Center

⁴ Biomass Energy Resource Center analysis using EIA and regional fuel price 2016 data

⁵ 2015 Vermont Forest Resource Harvest Summary

Expanded use of advanced wood heat is the single most efficient way to simultaneously meet our renewable energy goals, mitigate carbon emissions, stimulate economic development and enhance the working landscape.

Thermal biomass from cordwood, chips and pellets is a critical ingredient in Vermont's renewable energy strategy, and the sustainability of Vermont's environment and economy.

Local, renewable wood heat cuts the economic drain of energy dollars leaving the state and reinvests in the local Vermont economy with direct connection back to sustaining and enhancing Vermont's forested working landscape (forests account for 75% of Vermont's land area). Since approximately 80% of Vermont's forests are privately owned, it is imperative that there are markets to enable landowners to realize some economic value from their forest stewardship. Without markets for low-grade wood, not only does healthy forest management become more difficult, but some landowners will be pushed into having to sell the land for development.

To get to 35%, it is important to have a baseline to measure and define current conditions. Mapping out the path forward with measures will create a more viable future for the advanced wood heating industry in Vermont. Today in Vermont, there are approximately:

1,550 Employees⁶ **300** Pellet systems installed **120** Woodchip systems installed



By late 2017, the Biomass Energy Resource Center (BERC) will issue a report detailing the current adoption of wood heat in Vermont. Preliminary results of this study indicate an abundant amount of wood fuel supply, established infrastructure and current optimal technology to achieve the goal. Unfortunately, other hurdles are growing. Competing technologies, current market conditions, warm winters, and low fossil fuel prices are all forces stifling thermal renewable energy progress and utilization of advanced wood heating. Setting an achievable benchmark and clear actions will help to achieve Vermont's commitments. To help guide us to 35%, the workgroup established objectives.

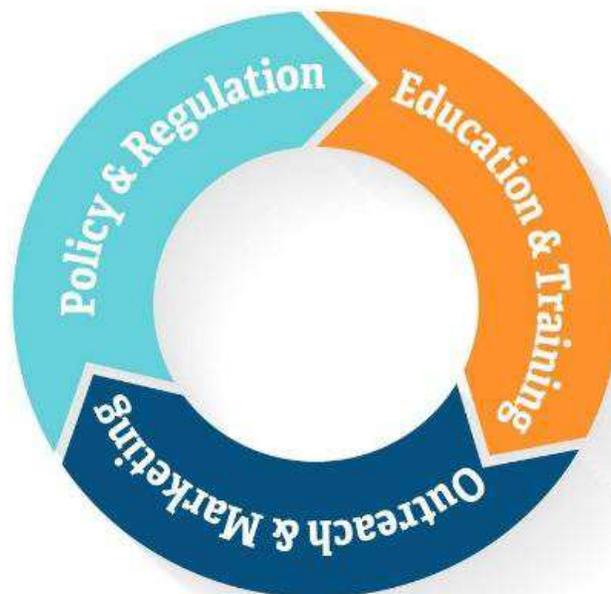
⁶ Vermont Department of Public Service, Vermont Clean Energy Industry Report, 2016

Objectives:

- Develop and identify solutions to overcome current challenges and hurdles
- Outline a clear path with measurable progress
- Create solutions that reflect the needs of the industry
- Define strategies to catalyze the market and accelerate adoption
- Provide context for where we stand today
- Set the stage for a larger, more in depth roadmap

Recommended Actions:

The following recommended actions are the top ranked ideas evaluated by the workgroup. The “who” for each action reflects the decision-making authority(s). Additionally, for each action, there is a problem statement, how it can be achieved, and a deadline by which the action should be achieved. Using the very successful Upper Austrian support mechanisms model, the recommendations fall into three tranches: policy & regulation, outreach & marketing, and education & training.



Policy & Regulation

***Action:* Codify goal of achieving 35% of Vermont’s thermal energy needs through wood heat by 2030, with increased adoption of advanced wood heating systems. The state should incorporate plans to achieve the goal through the comprehensive energy plan, carbon mitigation efforts, working landscape, and economic development plans and strategies.**

Problem Statement: Codifying the measureable goal creates accountability and increases likelihood of progress. It also increases support for inclusion within the State, regional, and local energy plans, and health plans, etc.

How: Create a diverse coalition of supporting organizations and stakeholders to advocate for the benefits of local, renewable wood heating to government officials.

Who: Vermont State Legislature, Agency of Commerce and Community Development, Building and General Services, Department of Public Service, Green Mountain Care Board, Health Department, Regional Planning Commissions, Towns, Vermont Department of Forests Parks and Recreation

When: By the end of the 2018



Bourne’s Energy, North Hyde Park, Vermont

Action: Align Efficiency Vermont’s thermal energy performance metrics to account for both fossil fuel displacement and energy savings.

Problem Statement: Efficiency Vermont offers incentives on fossil fuel equipment. With the current metrics used, there are “thermal energy savings” when an older boiler is replaced with a new, more efficient fossil fuel boiler, and Efficiency Vermont incentivizes the fossil fuel boiler. State goals are to dramatically reduce the use of fossil heating fuels. There needs to be better policy alignment with State law governing greenhouse gas pollution, (reduction of 75% by 2050⁷) and to reduce fossil fuels consumed by their customers and the emission of greenhouse gases attributable to that consumption.⁸ There needs to be alignment of indicators from Efficiency Vermont, Public Service Department, and Public Service Board. Also, these metrics need to be incorporated into the Energy Excellence Network.

How: The Efficiency Vermont Quantitative Performance Indicator (QPI) needs to account for fossil fuel displacement. Conduct meetings with Efficiency Vermont to discuss recommendations. And participate in the EEU 2016-03 DRP proceeding at the Public Service Board to advocate for this action.

Who: Efficiency Vermont, Public Service Board, Public Service Department

When: Before the end of 2018 – corresponding with Efficiency Vermont’s 3 Year Planning process



⁷ 10 V.S.A. § 578

⁸ 30 V.S.A. § 8002

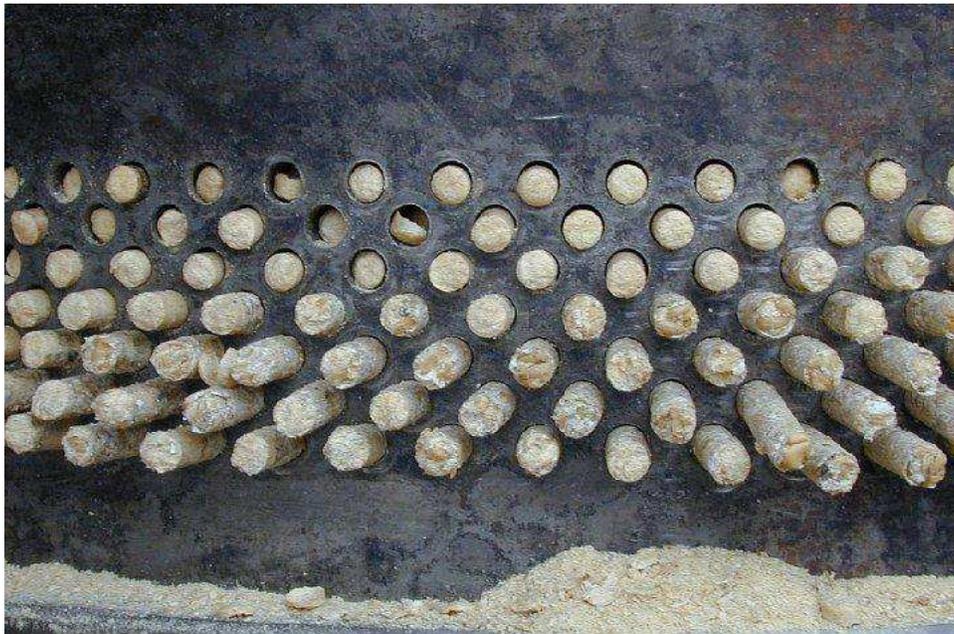
Action: Implement a state sales tax exemption on the purchase of qualifying advanced wood heating equipment and fuel.

Problem Statement: Short term low fossil fuel prices discourage Vermont homeowners, businesses, and institutions from utilizing local, renewable wood heat. Reducing the capital costs of an advanced wood boiler and commercial wood fuels assists customers with overcoming these cost and market barriers. Every dollar in reductions will be reinvested in the Vermont economy instead of leaving the state.

How: Enact Legislation.

Who: Vermont State Legislature

When: By the end of the 2020 biennium



Wood Pellet Fuel

Outreach & Marketing

Action: Create a coordinated marketing team focused on aligned communications and messaging.

Problem Statement: A lack of awareness about advanced wood heating impedes market growth. Current efforts to increase awareness are not aligned. These problems result in missed opportunities to maximize marketing efforts. Additionally, there needs to be greater investment into marketing advanced wood heating in Vermont and the region.

How: Create a coordinated marketing workgroup to evaluate all of the efforts currently underway and look for areas of collaboration to make sure efforts are complimentary. This team will help coordinate wood heat marketing efforts in Vermont and ensure regional consistency and leveraging. The group should map out all current activities, devise a plan for coordination (where coordination is possible), and meet regularly.

Who: Agency of Commerce and Community Development, Biomass Energy Resource Center, Clean Energy Development Fund, Efficiency Vermont, Industry Members, Non-profit supporters, Northern Forest Center, Renewable Energy Vermont, Renewable Energy Resource Center, Jeff Rubin, Vermont Energy Investment Corporation, Vermont Sustainable Jobs Fund and marketing professionals.

When: 2017 and ongoing

Status Update: In February of 2017, the Vermont Wood Heat Marketing Action Team was created. The purpose of the group is to:

- Provide a forum for marketers, businesses and other organizations involved in wood heat consumer education and outreach to share information, pool resources and collaborate where appropriate; and
- Provide a structure for collaborative marketing efforts, such as message testing, outreach to target markets or other marketing activities.

The goal is for the action team to be comprised of business representatives, non-profits, agencies and others involved in marketing wood heat to consumers. They should include people with expertise in a particular wood heat market segment (residential, commercial, institutional, municipal) and/or marketing experts with background or knowledge of the industry or the target demographics.



Photo Credit: Biomass Energy Resource Center

Education & Training

***Action:* Increase the number of HVAC installers that can install and maintain advanced wood heating systems. Create a more robust training program, and advanced wood heat needs to be included in HVAC vocational curriculum. Additionally, promote businesses that are practicing a high quality of work.**

Problem Statement: There is a shortage of HVAC installers trained on advanced wood heat - Efficiency Vermont estimates a total of 30 trained advanced wood heating HVAC installers in Vermont. No benchmarks or standards for the quality of work exist.

How: Establish a working group/coalition to encourage advanced wood heating be included in HVAC training programs. The coalition will confer directly with trade schools and other institutions that offer HVAC training programs.

Renewable Energy Vermont will utilize its Vermont Renewable Energy Business Listing (VREBL) to track trainings/workshops that installers attend with advanced wood heat in the curriculum. This will act as the second genesis of Renewable Energy Vermont's Partnership Program. The Partnership Program helped create a standard for work. A panel of experts reviewed projects, and then businesses were approved to be a part of the program. The Partnership Program has transitioned into a listing of qualifications and is now called the Vermont Renewable Energy Business Listing.

Vermont Renewable Energy Business Listing

Show 10 entries

Search:

Business Name	Technology Type	Type of Installer	County, State	REV Member	Former "Partnership Program Participant"	Number of years in Business	Number of systems installed	Amount of MW, kW, BTU's Installed	Business Structure (LLC, S-Corp etc.)	Credentials
Bourne's Energy	Wood Pellet Boilers	Commercial	Washington, VT	Yes	No					
Cutting Edge Energy	Wood Pellet Boilers	Residential	Caledonia, VT	Yes	No	5	100		LLC	
Sunwood Systems	Wood Pellet Boilers	Residential	Washington, VT	Yes	Yes					
TARM USA VT	Wood Pellet Boilers	Commercial, Residential	New Hampshire	Yes	No					
Renewable Fuels	Wood Pellet Boilers	Commercial, Residential	Washington, VT	Yes	No					
Watson Research	Wood Pellet Boilers	Residential	Franklin	Yes	No	12	43	7,012,000 BTU's	Sole Proprietor	

www.revermont.org/vrebl

As the number of installers increases, the number of workshops and trainings should increase in frequency and/or in the number of attendees. Success will be measured on the percentage increase of installations, number of trainings, and number of installers attending the trainings.

Who: Agency of Commerce and Community Development, Clean Energy Development Fund, Efficiency Vermont, Renewable Energy Vermont, Vermont Fuel Dealers Association, Vermont Technical College

When: 2017 and continuing growth over the course of the next 5 years

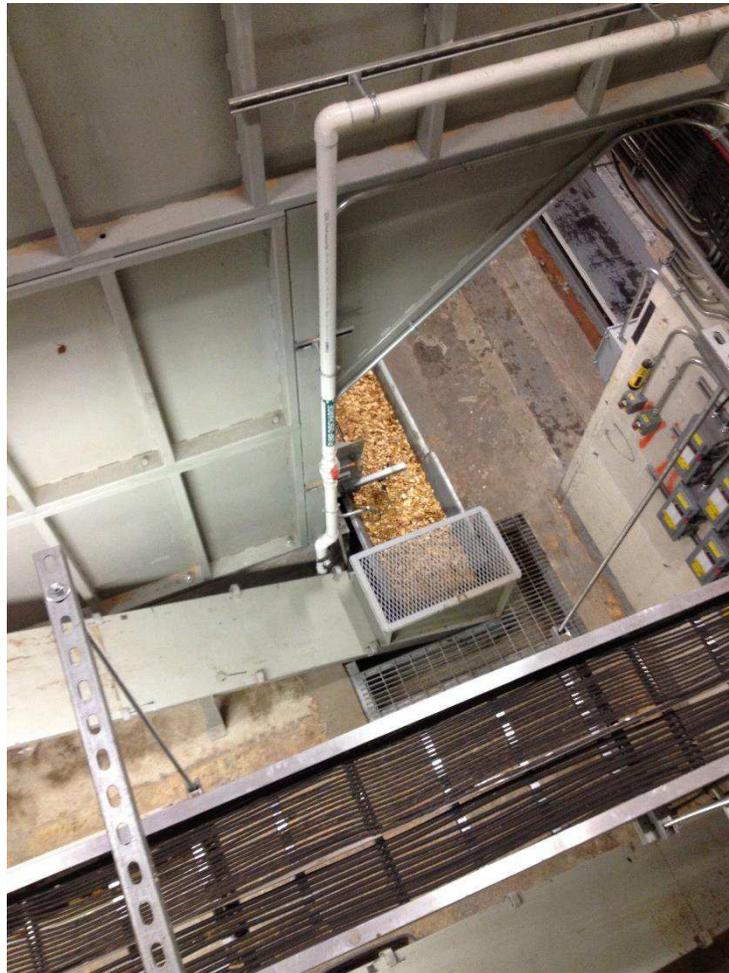
Action: Streamline financing and incentives.

Problem Statement: Improved and expanded financing for advanced wood heating and streamlined incentives are needed so potential customers and providers can more easily access and utilize them. Incentives need to be competitive to encourage adoption. Additionally, there needs to be a hub of this information for consumers. Maintaining funding for the Clean Energy Development Fund is also necessary.

How: Identify a lead who can oversee coordination and strategy. Identify all of the financing options and programs currently available. Work with the Clean Energy Development Fund and Efficiency Vermont to make sure the incentives available are competitive and promoted appropriately. Look for gaps and overlap in current resources. Identify where/how this information should be displayed, and create a one-stop-shop that outlines all of the resource for consumers.

Who: Public Service Department, Efficiency Vermont, Financiers, Non-profit supporters/advocacy organizations, Renewable Energy Vermont, Thermal Heating Taskforce, Clean Energy Development Fund

When: 2017 and continuing growth over the course of the next 5 years



Montpelier District Heating Plant, Montpelier, Vermont

Next Steps:

In addition to the actions of this plan, there were a number of other recommendations discussed by the stakeholder group which are represented as Appendix A. Additionally, there will be a review of the Vermont Renewable Energy Standard Tier III requirements – at which time, the possibility of Thermal Renewable Energy Credits should be evaluated. Ongoing evaluation of the 35% benchmark should occur to ensure that this metric is still accurate and proceeding progressively.

Vermont needs a plan to achieve the goal of obtaining 35% of Vermont’s thermal energy needs from wood heat by 2030, through increased adoption of advanced wood heating systems. A guide that will help provide policy and regulatory framework for state agencies to ensure measurable progress. The importance of a local, good paying market for low grade wood is essential for good forest management and will enhance the working landscape. With actionable items in all three key areas: policy & regulation; outreach & marketing; and training & education; positive environmental and economic impacts will result, including reducing our carbon footprint while scaling up the industry and increasing local jobs.

“Modern wood heating is vital strategy that can help us make measurable progress toward our renewable energy, working landscape, and economic development goals in Vermont. But with a few consecutive years of low fossil heating fuel prices and warm winters, our home-grown modern wood heating industry in Vermont is struggling. There are numerous programs and policies that are working to expand the use of modern wood heating, but now is the time to put together all of the pieces – we need a coherent strategy that lays out a roadmap to guide us in the years ahead.”

Adam Sherman | Biomass Energy Resource Center

REV and the BEREC will be working on a longer, more in depth roadmap in 2017: Achieving 35% of Vermont’s thermal energy needs from wood heat by 2030, through increased adoption of advanced wood heating systems. Embedded in that plan will be the action items from this plan, and a more robust guide mapping out all of the steps of the next 13 years.

Appendices:

Appendix A – 5 Year Industry Action Plan Recommendations List

5 Year Industry Action Plan Recommendations List

The group was asked to independently rank each item from 1 to 10 (10 being highest/most important). Group Rank Average is the score from each participant, divided by total responses (average score). The group then was asked to score their top 3 recommendations (the higher the score, the more votes). The outcome of the top recommendations is the Final Ranking.

Final Ranking	Action Item	Group Rank Average Ranking 1 - 10	Group Score (3 most important)
1	Officially adopt/incorporate the goal of reaching 35% Modern Wood heating by 2030 into State energy, carbon mitigation, working landscape, and economic development plans and strategies.	9.20	6
2	More trained installers and robust training program.	8.22	5
3	Realign Efficiency Vermont thermal energy performance metrics to count as fossil fuel displacement in addition to energy savings. Under the current metrics used, there are “thermal energy savings” when an older boiler is replaced with a new, more efficient oil boiler – so they offer incentives on fossil fuel boilers. State goals are to dramatically reduce the use of fossil heating fuels so there needs to be better policy alignment.	9.11	4
4	Implement a state sales tax exemption on the purchase of qualifying modern wood heating equipment.	8.78	3
5	Streamlined financing and incentives.	9.4	2
6	Naming conventions/messaging alignment and a marketing campaign.	6.89	2
7	Reconsider Act 56 and the Tier 3 program. The current program design will result in 100% compliance by the utilities installing electric powered heat pumps to displace fossil fuels. This is not the intent of the original legislation.	6.80	2
8	Creation of a heating fuel tax that only kicks in when oil prices drop below a certain level.	5.63	2
9	Increased incentives and programs that incentivize adoption.	7.63	1
10	Legislative Package	9.25	
11	Certification program for installers/code of conduct.	7.78	
12	Seek out more government investment grants/grant programs.	7.38	
13	More supporting partners (banks, financiers, environmental groups etc.).	7.13	
14	Request Vermont Department of Public Service to track and report cordwood, woodchip, and bulk wood pellet prices in the same way they do with fossil heating fuels in the monthly fuel price report.	7.00	
15	Residential building code adopt some standards.	7	
16	State school construction aid program for modern wood heat.	7	
17	Develop Act 250 review criteria requiring commercial/institutional developments to consider energy efficiency and renewable energy – not just automatically install fossil heating systems.	6.30	
18	Establish grades/standards for pellets.	6.29	
19	Introducing renewable energy targets with building efficiency benchmarks. (i.e. all new construction after 2020 will have 90% renewable energy heating and electric).	6.20	
20	Develop a state building mandate of 90% renewable heating by 2040.	5.89	
21	Green Mountain Care Board to consider modern wood heat in all Certificate of Need (CON) processes.	5.5	
22	Use x% of air pollution permit fees from Department of Energy Conservation (DEC) Air Pollution Control Division (APCD) toward funding a low-income focused woodstove change out program.	5.44	
23	Recognize European boiler safety standards in addition to American Society of Mechanical Engineers (ASME) standards for boilers under 1.0 million Btu/hr.	5.44	
24	Redirect more LHEAP funding away from directly subsidizing heating oil and put a portion of those funds toward installing modern wood heating systems.	5.22	
25	Expand Regional Greenhouse Gas Initiative (RGGI)	5	
26	Integrate biomass retention guidelines into Accepted Management Practices – (develop the pie wheel like used in Austria).	4.89	
27	Support a carbon tax.	3.67	
28	Funding for research and development.	2.80	
29	Develop lower cost, higher performance appliances.	2.78	

*10 highest/most important

Glossary:

Advanced Wood Heat: 1) utilizes highly efficient combustion technology, 2) produces low levels of emissions, 3) supports healthy forest ecosystems, and 4) consumes local wood.

Boiler: a fuel-burning apparatus or container for heating

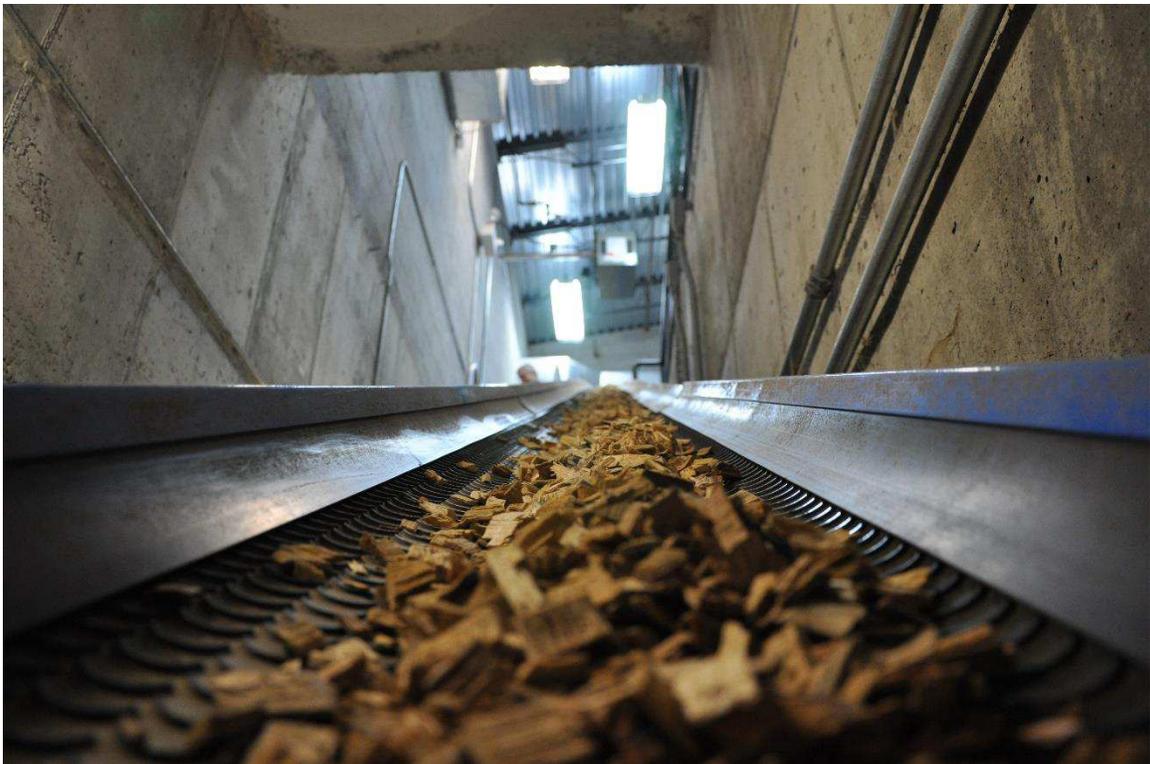
Cordwood: wood that is cut into short lengths, usually measured in cords and commonly used for pulp or fuel

Quality Performance Indicator: performance measurement for an organization to gauge success

Thermal: relating to heat

Wood Chips: medium-sized solid material made by cutting, or chipping, larger pieces of wood for fuel

Wood Pellets: biofuels made from compressed organic matter or biomass



Milton Elementary School, Milton, Vermont

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