

# Modern Wood Heat Forum - November 2, 2016

## DISCUSSION NOTES

All charts, resources, reports, etc. from this discussion are available online at [VitalCommunities.org/Energy/ModernWoodHeat](http://VitalCommunities.org/Energy/ModernWoodHeat)

### Topics Addressed

1. What is Modern Wood Heat?
2. Maintenance
3. Where do pellets come from?
4. Forest Health and the Economics of Forest Management
5. Local Economic Impact and Infrastructure
6. Carbon Impact and Emissions/Particulates
7. Pellet Shortages
8. Scale and Cost
9. Where do Modern Wood Heat systems make sense?
10. Lingering Questions
11. Additional Resources

### Experts in the Room

- **Maura Adams, Northern Forest Center, [madams@northernforest.org](mailto:madams@northernforest.org)**  
The Northern Forest Center coordinates modern wood heat programs and commissions relevant research across the Northern Forest of Maine, New Hampshire, Vermont, and New York. Maura is interested in helping Upper Valley energy committees bring more modern wood heat to our region.
- **Morton Bailey, Lyme Green Heat, [morton@lymegreenheat.com](mailto:morton@lymegreenheat.com)**  
Lyme Green Heat is a full service wood pellet fuel company servicing both residential and commercial customers throughout NH and VT. Morton's expertise lies in the installation of biomass boilers and associated storage and conveyance systems along with the bulk delivery of wood pellet fuel.
- **Scott Nichols, TARM Biomass, [scott@tarmusa.com](mailto:scott@tarmusa.com)**  
TARM Biomass is an importer, distributor, and installer of wood, wood pellet, and wood chip boilers. Scott has a wealth of experience in the many applications of wood heat from residential to commercial settings.
- **Christine McGowan, Vermont Sustainable Jobs Fund, [christine@vsjf.org](mailto:christine@vsjf.org)**  
The Vermont Sustainable Jobs Fund is another great resource for research about wood heat and information about funding and implementing wood heat projects.

### 1. What is Modern Wood Heat?

- Smart, automated, and efficient – A modern wood heat system continually optimizes its fuel consumption, exhaust, temperature, and other variables for clean and efficient heat production – adjusting as needed to meet real-time heating demand.

- Scalable – Residential, commercial, institutional, municipal...
- Most commonly pellet burning – but there are also modern wood heating systems that burn cord wood and wood chips.

## **2. Maintenance (referring here to residential wood pellet boilers)**

- Pellets are delivered by truck and pumped into a storage container. The system feeds automatically. The owner never touches the fuel.
- Residential systems have an ash bucket. Empty 2-3 times a season. Great for gardens, trees, driveways.
- Annual service recommended. Very low maintenance – not so different from what we're all used to with oil/propane boilers
- If the power goes down, so does your system. Same as your oil/propane boiler.

## **3. Where do the pellets come from?**

- Wood pellets are made from low grade wood – the stuff you can't turn into lumber or furniture.
- Almost all wood pellets in the Northeast are “premium pellets”: low ash (<1%) and moisture content. This means pellets are made from low grade stem wood (not treetops or branches). Does NOT have to be hardwood.
- There are many pellet mills in Vermont, New Hampshire, and Maine that can take low grade wood and create wood pellets.
- Post industrial waste such as sawmill residue (sawdust and cut offs) , manufacturing byproduct (saw dust, cut offs and planer shavings)

## **4. Forest Health and the Economics of Forest Management**

- When a logging job is done, 75% of trees are low grade. The 25% can be made into lumber or furniture, that's where the value is. But unless there is a market for the low grade/value wood, you can't make the rest of the economics work.
- Pellets are made from the trunk of low grade wood. In many forest management plans, the branches and treetops are left behind to provide habitat and decompose. This is good for the forest.
- Vermont currently has a forest growth to harvest ratio of 1.7 to 1; NH is 1.4 to 1.
- Timberland has an essential water retention and filtration function. When timberland is lost, freshwater resources are diminished. Adding economic value to timberland, by having markets for low grade wood encourages sustainable timberland management instead of land conversion.

## **5. Local Economic Impact and Infrastructure**

- **Our Northern economy NEEDS a market for low grade wood**
  - There is currently a significant oversupply of low grade wood due to paper mill closures in Maine. [vtdigger.org/2016/11/02/vermonts-forestry-industry-crisis/](http://vtdigger.org/2016/11/02/vermonts-forestry-industry-crisis/)
- **Modern Wood Heat is a significant economic driver**
  - New Hampshire and Vermont together spend about \$1.5 Billion per year on heating oil, much of leaves the state. Using wood helps retain that wealth.
  - Timberland owners currently have little income potential for large proportions of their forest land due to collapsed low grade wood markets. The lost value of that wood diminishes timberland value and makes conversion to non-timber uses more likely.

- **The Upper Valley is the HUB of the Northeast when it comes to modern wood heat infrastructure and pellet production.**
  - Lyme Green Heat, TARM, Vermont Renewable Fuels (Windsor)
  - There is competition and choice with respect to supply of boilers, pellets, and service

## 6. Carbon Impact and Emissions/Particulates

- Graph shared shows particulate emissions from burning the fuel on site - not a life cycle particulates analysis.
- Carbon Impact chart shared from recent study
  - This is a recent, independent life-cycle analysis of wood pellet heat compared to the life cycle of other fuels
  - The analysis does not look at wood chips. Wood chips are less efficient to curn and heavier to transport, BUT less energy intensive to produce. Likely evens out somewhat. Likely still a positive carbon solution.

## 7. Pellet Shortages

- In 2008, the Northeast experienced a shortage in bagged pellets - highly unlikely to happen today. Pellet mill capacity has grown and continues to grow significantly. There are many more pellets available than before.
- Bulk pellet suppliers always prioritize their bulk customers. We don't see shortages in bulk pellet supply.

## 8. Scale and Cost

- **Residential** – complete cost (equipment and install) - \$15,000 to \$30,000. After rebates \$10,000 to \$20,000.
  - Installation process – pull out the old appliance AND look at current distribution method. Need to be updated? That work can increase cost.
- **Small Commercial** – similar to residential pricing.
- **Larger commercial**
  - Morrisville High School – 50,000 sqft - \$200,000 boiler plus \$100,000 installation cost.
  - Commercial scale varies dramatically based on size of the system and heat distribution infrastructure
  - **District Heat** – Centralized heating source to heat multiple places
    - Peterborough neighborhood with 20 dwellings heated with district wood heat
    - Northeast Kingdom home with boiler heating home and out building
    - Dartmouth College steam system
    - Two apartment buildings in Brattleboro heated with one system
  - **Co-Generation** (produce heat AND electricity) – possible with big systems (smallest commercial often are about 50 kW power/150 kW thermal). These systems must have significant year-round heating loads in order to make combined heat and power economically successful.

## 9. Where do Modern Wood Heat systems make sense?

- **Any conventional heating system can be replaced by a pellet boiler**
  - Example: Lyme School. Two oil boiler replaced by two pellet boilers. Now heating more square footage with less fuel and lower fuel cost, AND earning \$5,000/yr by selling

thermal renewable energy credits (allowed in NH, not VT). Lyme School replaced about 9,000 gallons of heating oil use/year with 80 tons of wood pellet use.

- **Generous Incentives** - for modern wood heat in Vermont and New Hampshire – for commercial, institutional, and residential systems.
- **Price Stability** - Simple Payback hinges on the difference in fuel cost between oil/propane and wood pellets. The difference is smaller at the moment due to low oil prices. A more important metric is price stability. The price of wood pellets has roughly tracked inflation over at least the past 15 years, while oil/propane prices have jumped around significantly. Price stability is particularly attractive to municipalities.
- **Often Shifting from Wood to Wood** – Many residential modern wood heat customers used to rely on a woodstove to offset their oil heat. Those stoves are dirty and inefficient. With pellet heat, they are still burning wood, but much more efficiently. Less wood, more heat, cleaner air.
- **Cord Wood vs. Pellets**
  - Wood stoves (not automated modern wood heat)
    - Clean burning cord wood stoves are expensive because EPA regulations are getting stricter on new stoves. Most people are using old, inefficient, dirty stoves.
    - Even the cleanest cord wood stoves or wood pellet stoves are less clean and efficient than a wood pellet boiler.
    - Vermont just announced a wood stove change out program that will require recycling of the old stove
  - There ARE cord wood boilers. When should you choose cord wood over pellets? If you buy your cord wood, consider a pellet boiler. If you cut your own cord wood and want to keep doing that, sticking with cord wood will likely make more sense (since your fuel is essentially free)

## 10. Lingering Questions

- Is one to one (harvest to growth) “sustainable”? What would it take for Vermont or New Hampshire to approach the one to one mark?
- How do you compare modern wood heat against heat pumps and other efficient heating options? When is wood heat the best choice? When are heat pumps the best choice?
- What’s better ... manage the forest (harvesting low grade wood for pellet fuel) or leave the forest alone entirely?

## 11. Additional Resources

- VT Digger article on the surplus of low grade wood and its impact on Vermont’s forest economy: [vtdigger.org/2016/11/02/vermonts-forestry-industry-crisis/](http://vtdigger.org/2016/11/02/vermonts-forestry-industry-crisis/)
- Robert Malmshemer from Syracuse University has done a lot of research about forest management and climate change. [www.esf.edu/faculty/malmshemer](http://www.esf.edu/faculty/malmshemer)