MARYLAND: THE CASE FOR SCALING UP RESIDENTIAL PELLET HEATING

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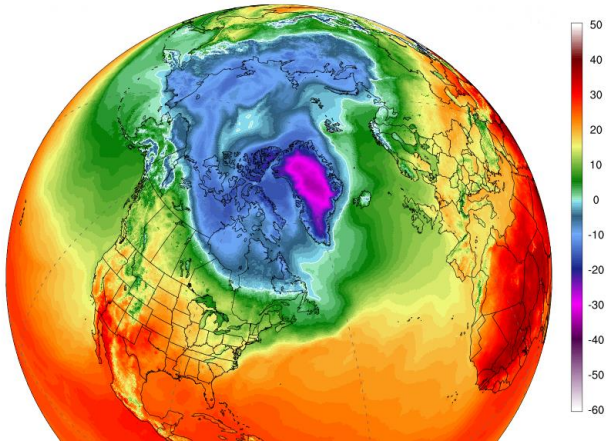
President

ALLIANCE
FOR GREEN HEAT
low carbon, renewable and local

WHY SCALE RESIDENTIAL PELLET HEATING?

- The United States is facing a climate emergency as temperatures rise.
- Maryland and many states are making progress to expand the supply of renewable electricity. The Maryland Clean Energy Jobs Act sets a target of 50% renewable electricity by 2030.
- Nearly half of Maryland's energy use is from heating and it's largely dependent on fossil fuels.
- We must accelerate the replacement of old, polluting heat technologies with modern, efficient renewable ones.
- Our power grid will be under growing pressure from the increasing integration of electrification (including electric vehicles) and pellet heating is one of the best ways to free up the grid to provide renewable heating for all the other demands.



PELLETS ARE MADE MOSTLY FROM BIPRODUCTS OF LUMBER INDUSTRY

- Heating pellets are NOT made from trees cut down to make into pellets. They are made mostly from wood waste. A peer reviewed study found pellets in the northeast made from:
  - 44% sawdust and other byproducts of forest product manufacturing—mainly sawdust from sawmills, lumberyards, furniture factories, etc.
  - 56% low-quality pulpwood and small trees, usually the byproduct of harvesting for higher value timber;
  - Less than 1% from other sources, such as landscaping and municipalities.

HEATING PELLETS CANNOT CONTAIN BARK OR LEAVES

- Pellets must be made from clean wood – and not contain bark, twigs or leaves.
- This makes sourcing sawdust the cheapest way to make a pellet.
- The Pellet Fuel Institute standard for pellet quality allows only up to 1% of ash in pellets. Bark is very high in ash content, preventing pellet plants from using it.
- Industrial wood pellets, used in electricity plants, can have up to the 3% ash content, allowing them to grind more small diameter wood with bark into chips for pellets.
- Most heating pellet plants do not even have this equipment and could not afford to compete in the pellet marketplace if they had to debark trees.

Pellet Fuels Institute PFI GRADED FUEL®

PFI Densified Fuel Grade: Premium
Mill Registration #
Grade Requirements:

Bulk Density:	40–48 lbs/ft³
Diameter:	.230–.285 in/5.84–7.25 mm
Durability:	≥96.5
Fines:	≤0.50%
Ash Content (as received):	≤1%
Length:	≤1% >1.5 in.
Moisture:	≤8.0%
Chlorides:	≤300 ppm

Manufacturers Guaranteed Analysis:

Type of Material:	
Additives:	
Minimum Higher Heating Value (as received):	
Other Manufacturers Guarantees:	

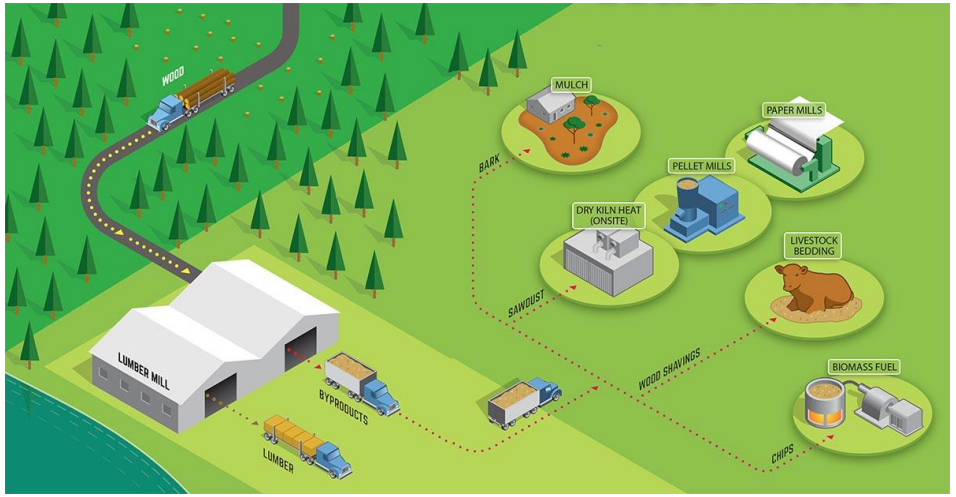
Approved Auditing Agency Logo Displayed Here

© For more information, please visit the PFI website at www.pelletheat.org.

MOST CARBON ANALYSES OF PELLETS ARE FLAWED

- Two key assumptions are rarely disclosed in media friendly articles:

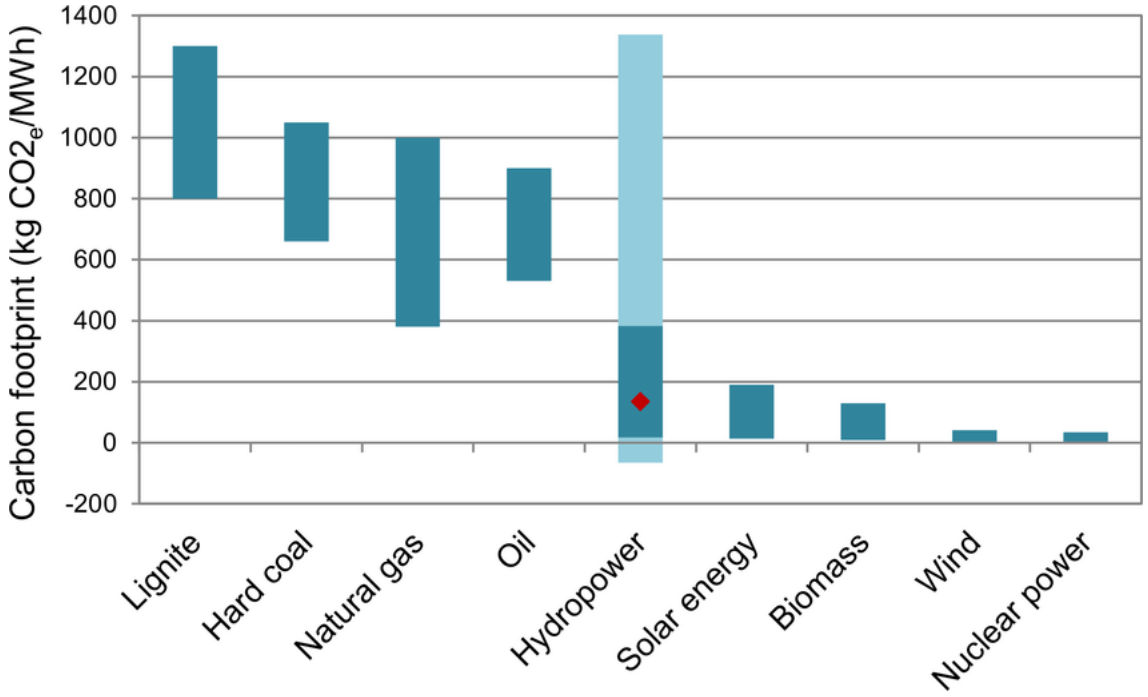
1. Is the sawdust or chips a byproduct of the lumber industry, or was it from trees cut for pellets – or any kind of biomass?
2. Are the pellets used to make heat or electricity? Biomass is burned for electricity at 25 – 35% efficiency. For heat, its 70 – 90% efficiency.

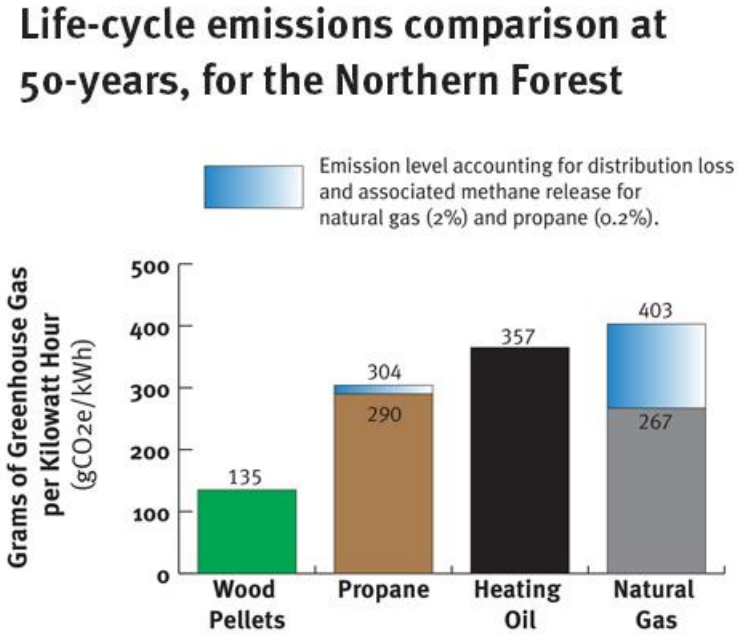


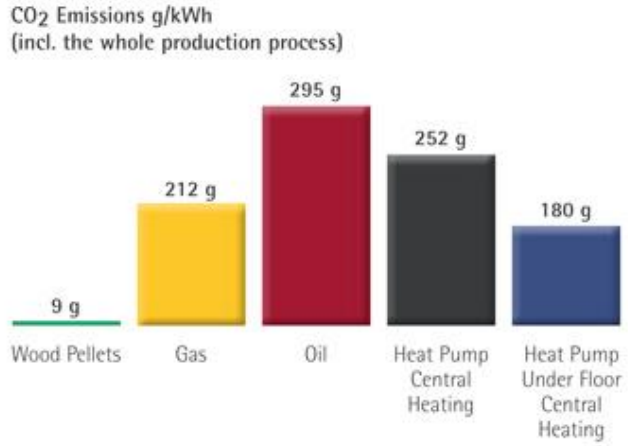
* Conclusion: It is imperative to understand where the feedstock comes from and what is being used for.

CARBON COMPARISONS

You can find carbon charts that show anything you want, depending on what your assumptions are about the source of the wood, what its combusted for, and how long the life cycle is for.







CARBON REDUCTION COST: SOLAR VS PELLET

	Solar	Pellet stove
Cost:	$13,000	$3,500
Carbon displaced /yr:	4 - 6 tons	3 tons
Fuel displaced:	electricity	gas, oil, propane or electricity
Payback:	7 – 20 yrs	4 – 8 years
Annual avg. fuel cost	$0 - $1,000	$500 - $1,000
% of home energy	50 – 100%	50 – 100%

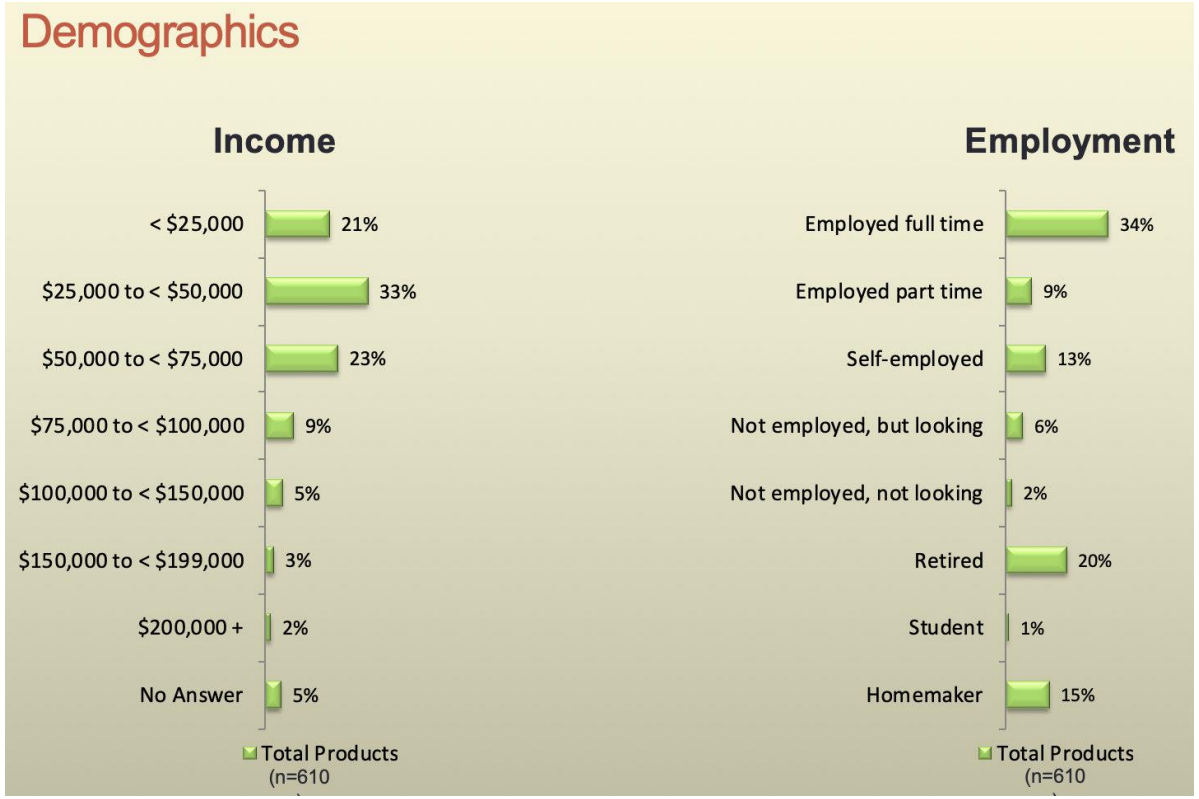
Reason to adopt

	Solar PV	Pellet heat
Low upfront costs	X	XXX
Low annual cost	XXX	X
Reduce utility bill	XXX	X
Reduce foreign oil	X	XX
Increase property value	XX	X
Help local economy	XX	XXX
Reduce carbon footprint	XXX	XX
Ambience in home	n/a	XX
Low maintenance	XXX	X
Self–sufficiency in power outage	X	X
Reduce burden on local grid	XXX	XX

EQUITY & THE RENEWABLE ENERGY TRANSITION

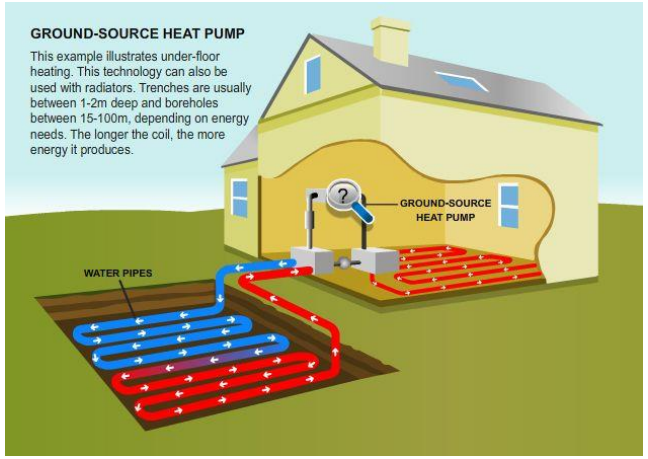
- There is a lot of talk about equity in the renewable energy movement but rebates continue to flow primarily to higher income households.
- Wood stoves, not pellet stoves, are favored by lower income families but many families trade up from wood to pellet stoves.
- Pellets are a culturally known and accepted technology in many non-urban middle income communities.
- Extending the pellet rebates to more households would help reach more middle income households.

Income of homes with wood or pellet stoves



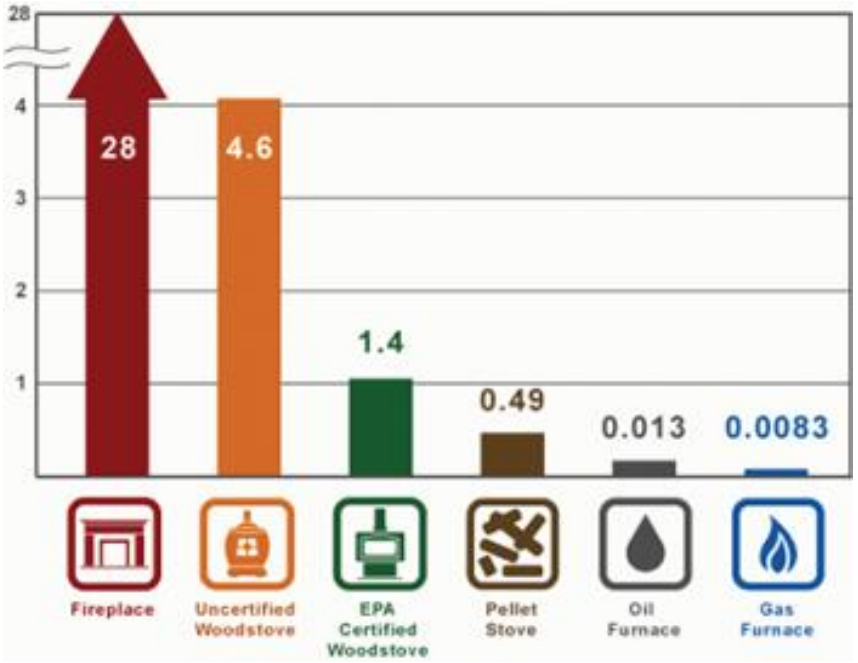
HOW QUICK CAN WE ELECTRIFY HEAT?

- Q. Can the pellet stove compete in a world moving towards electric heat pumps?
- A. Yes for now, but pellet stoves and boilers may be a bridge technology to complete electrification of heat as solar & wind get cheaper and more abundant.
- Q. Why even keep promoting pellet heat?
- A. We simply won't have enough renewable electricity for at least 10 years in Maryland to cover heat and transportation.
- Q. How about ground source heat pumps?
- A. Geothermal or ground source heat is another great technology and should stay high on policy priority list.



WHAT ABOUT EMISSIONS?

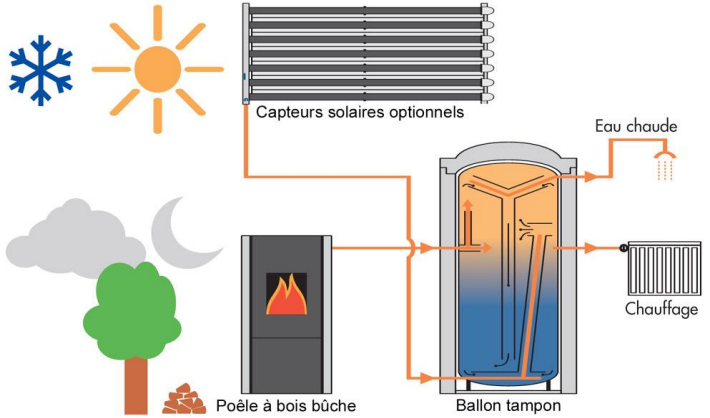
- Pellet stove emissions are predictable, consistent, modest and not visible to the eye.
- Wood stove emissions are unpredictable, inconsistent and often very high and very visible.
- The EPA currently allows pellet stoves to emit up to 4.5 grams an hour. As of May 2020 that will do down to 2 grams an hour. State incentive programs could decide to only give incentives to models up to 1 gram an hour.
- Neighbors can rarely tell that a pellet stove is operating nearby, but like cars, there is some PM present.



BENEFITS OF NON-ELECTRIC HEAT

1. Avoided transmission investment

- Electric grid: it has enough issues already as we transition to renewables
- Gas grid: we don't want to expand it; we need to begin to stop new hook ups.



2. Non-electric heat complement to solar

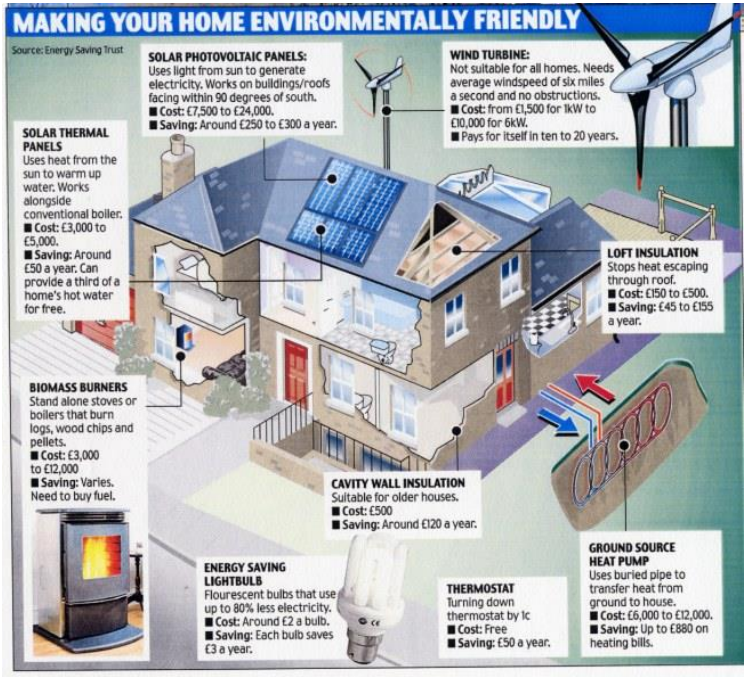
- With solar for electricity and pellets for heat, a home can drastically reduce its carbon footprint immediately. Solar usually can't cover a home's heat load in most of US.

3. Complements air source heat pumps (ASHP)

- When you have a single, multi-one or whole home ASHP, having a pellet stove to keep the main living area extra warm is highly valued by many.

4. Helps avoid winter peak electric loads

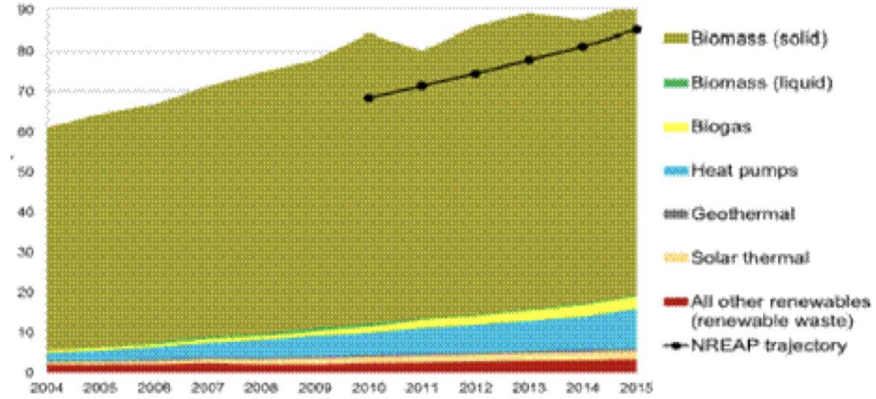
- ASHP and EVs will contribute to more winter-peaking and widespread use of pellet heat, like in Europe, avoids this.



EUROPE: DECARBONIZING HEAT WITH PELLETS AT SCALE

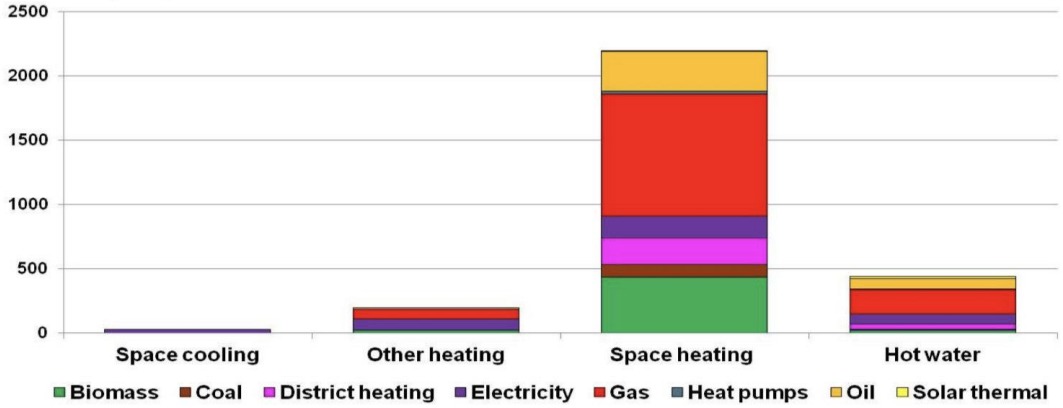
- European example shows that pellet heat can be deployed at scale in heating sector to complement other renewables.
- Austria is leader of whole house pellet boiler technology.
- Italy is a leader in pellet stove manufacturer and deployment. They install more pellet stoves every year than US and Canada combined.
- The United Kingdom made mistake of incentivizing wood stoves, leading to excess PM concerns.

Figure 8: Final energy demand for heating and cooling from renewable energies by source in the EU, 2004-2015 (Mtoe)



Source: European Commission (2017), p.5

Figure 13: Final energy demand for heating and cooling in the residential sector by fuel in the EU, 2015 (TWh)



Source: Heat Roadmap Europe, a low carbon heating and cooling strategy 2050 (2017)

MARYLAND'S CHALLENGE

- Like in Europe renewable heat in Maryland is dominated by wood and pellets
- Most electric heating is Maryland is either resistance heating or inefficient, first generation heat pumps
- Pellet heating can expand modestly in all sectors.

2010 US Census primary residential household heating

Heating sources	United States	Maryland	Garrett	Frederick	Montgomery
Gas	50%	44%	11%	28%	60%
Electricity	34%	39%	21%	50%	34%
Oil	8%	11%	37%	15%	5%
Propane	6%	3%	11%	4%	1%
Wood & pellets	2%	1%	12%	3%	1%
Solar	0%	0%	0%	0%	0%

MARYLAND HAS A SUCCESSFUL PELLET STOVE PROGRAM – BUT ONLY FOR RURAL RESIDENTS

- Solar and geothermal apply to households across all of Maryland
- Pellet stove rebate only applies to rural areas, if its enforced to MEA
- The Maryland Energy Administration already has the entire grant infrastructure up and running, so its just a matter of extended eligible households.

Maryland Residential Renewable Energy Grants in FY 2014

Technology	Indiv'l Award	# of Awards	% of Awards	Total Amount	% of total
Geothermal	$3,000	463	18.56%	$ 1,388,000	44.52%
Solar PV	$1,000	638	25.58%	$ 654,121	20.98%
Solar Water Heat	$500	178	7.14%	$ 102,300	3.28%
Leased PV	cancelled	510	20.45%	$ 510,000	16.36%
Wood stove	$500	136	5.45%	$ 67,600	2.17%
Pellet stove	$700	569	22.81%	$ 395,800	12.69%
Grand Total		**2494**	**100%**	**$ 3,117,821**	**100%**

POTENTIAL FOR RESIDENTIAL SOLAR & PELLET HEATING IS LARGE IN MARYLAND

- Getting 5% of homes in MD to heat with pellets is achievable
- A 5% goal gives MEA and stakeholders a target.
- Reducing fossil fuel heating with pellets should not be restricted to rural areas who do not have access to gas.

Pellet deployment in VT

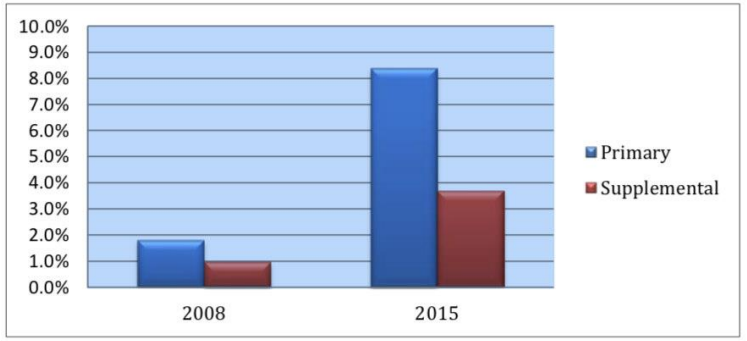


Figure 6: Percent of VT Households Using Pellets for Space Heat 2007-2008 and 2014-2015

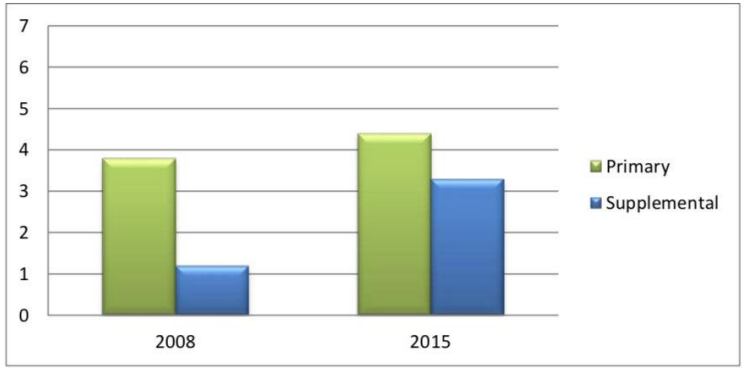


Figure 7: Tons of Pellets Burned per Household, 2007-2008 and 2014-2015

Solar potential in MD

	Residential Suitable Small Buildings (count)
BGE	1,384,266
DPL	98,854
PEPCO	215,392
PE	133,675
Total	**1,832,187**

INCENTIVE PROGRAMS

Pellet appliance incentives

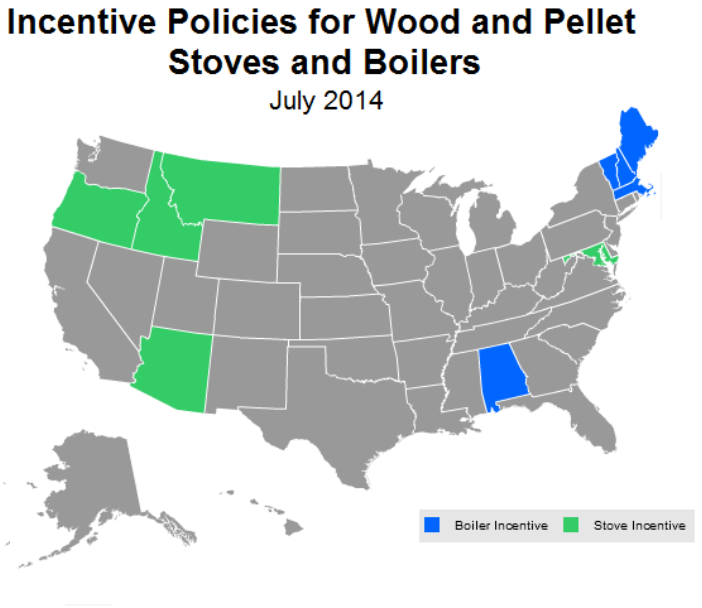
- Almost all northeastern provide incentives for pellet boilers and/or pellet stoves. States require different efficiency minimums minimum.

Change out programs

- Many are seasonal and funding levels change from year to year
- Require trading in old stoves and professional installation

Table 4. Northeast State Clean Unit Purchase Incentives

State	Stove Rebate/Incentive	Boiler Rebate/Incentive
Maine	$500	Up to $3,000[6]
Massachusetts	$1,000-$1,500	Up to $12,000[7]
New Hampshire	None	Up to $10,000[8]
New York	$1,500	Up to $21,000[9]
Vermont	$800-$1,000	Up to $7,000[10]



THANK YOU

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NEXT GENERATION Woodstove DesignChallenge