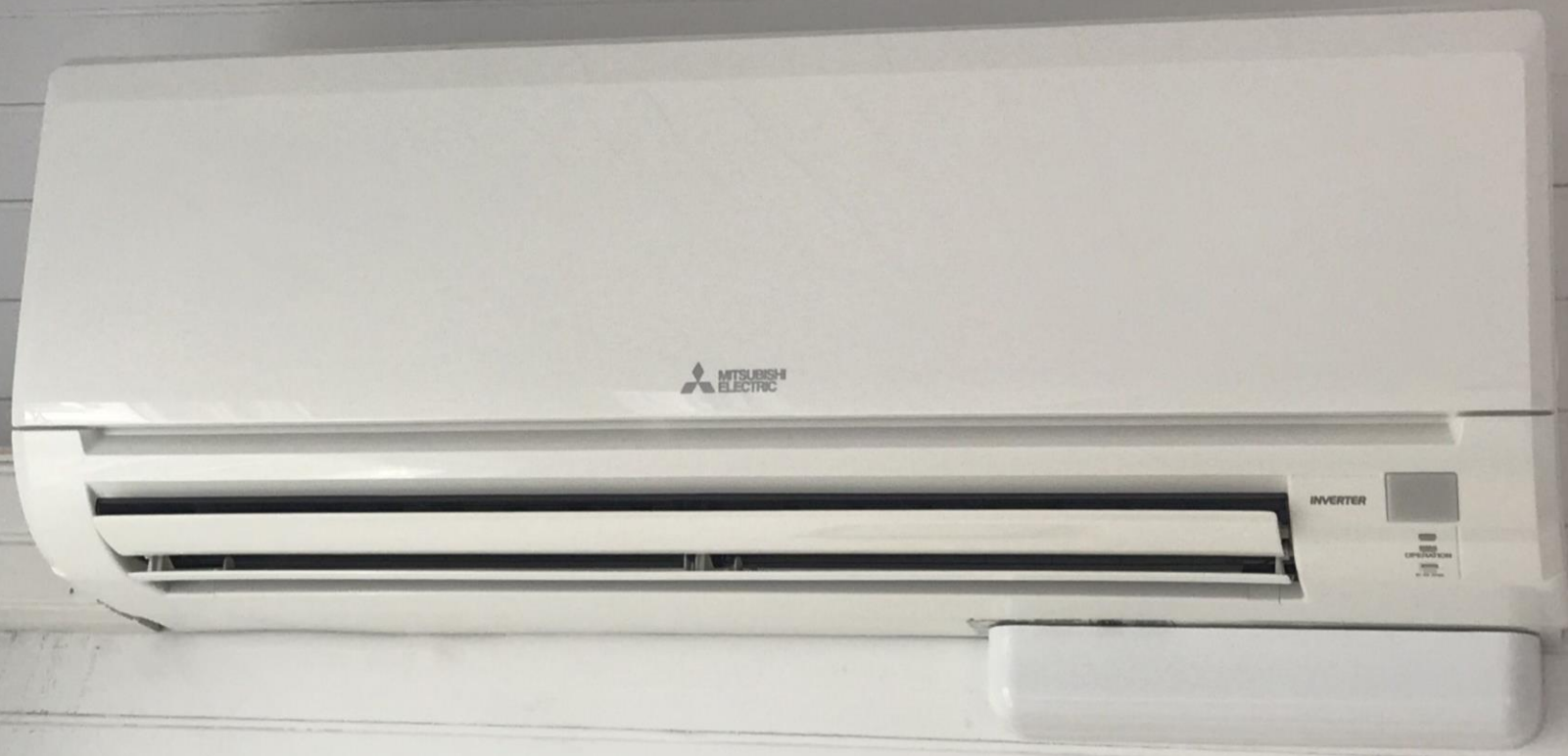




FIREPLACE

REALTIME

4K
UHD



MITSUBISHI
ELECTRIC

INVERTER



MODE
ON/OFF
TIMER
FAN







Pellet Stoves – The Hygge Solution to Space Heating

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- Vermont Department of Forests,
Parks & Recreation





feelgoodheat.org

What is advanced wood heat?

- Highly efficient wood burning appliances
- New wood stoves all the way to wood chip boilers
- *Automated* wood heat is programmable with a thermostat



It's about the forest.

- Vermont is 76% forested, 80% of which is privately owned
- Currently harvesting less than half the net growth
- Markets for low grade wood are evolving
- Vermont is losing 2,123 acres of forest each year to rural and suburban development

Support Our Local Economy

- **78 cents of every fossil fuel heating dollar leaves Vermont**
- Most wood fuel in Vermont is grown within 50 miles of where it is used
- Energy dollars support loggers, truckers & landowners in Vermont
- An estimated 350 jobs in Vermont are directly attributed to wood energy





Goals

- 90% Renewable Energy by 2050 – State Clean Energy Plan
- Obtain 35% of Vermont's thermal energy needs from wood heat by 2030

Why 35%?

- Based on the 2010 Vermont Wood Fuel Supply Study
- A conservative estimate of net available low-grade wood (NALG) that could be used for fuel without compromising forest health
- 2019 update calculated that there's 5% more NALG now than reported in 2010

If we reach our goal...

- Displace 40 millions gallons of fossil of fuel annually
- Vermonters save \$120,000,000.00/year



Where are we now?

- 21% of thermal energy needs comes from wood
- 43% of Vermonters heat in full or in part with wood



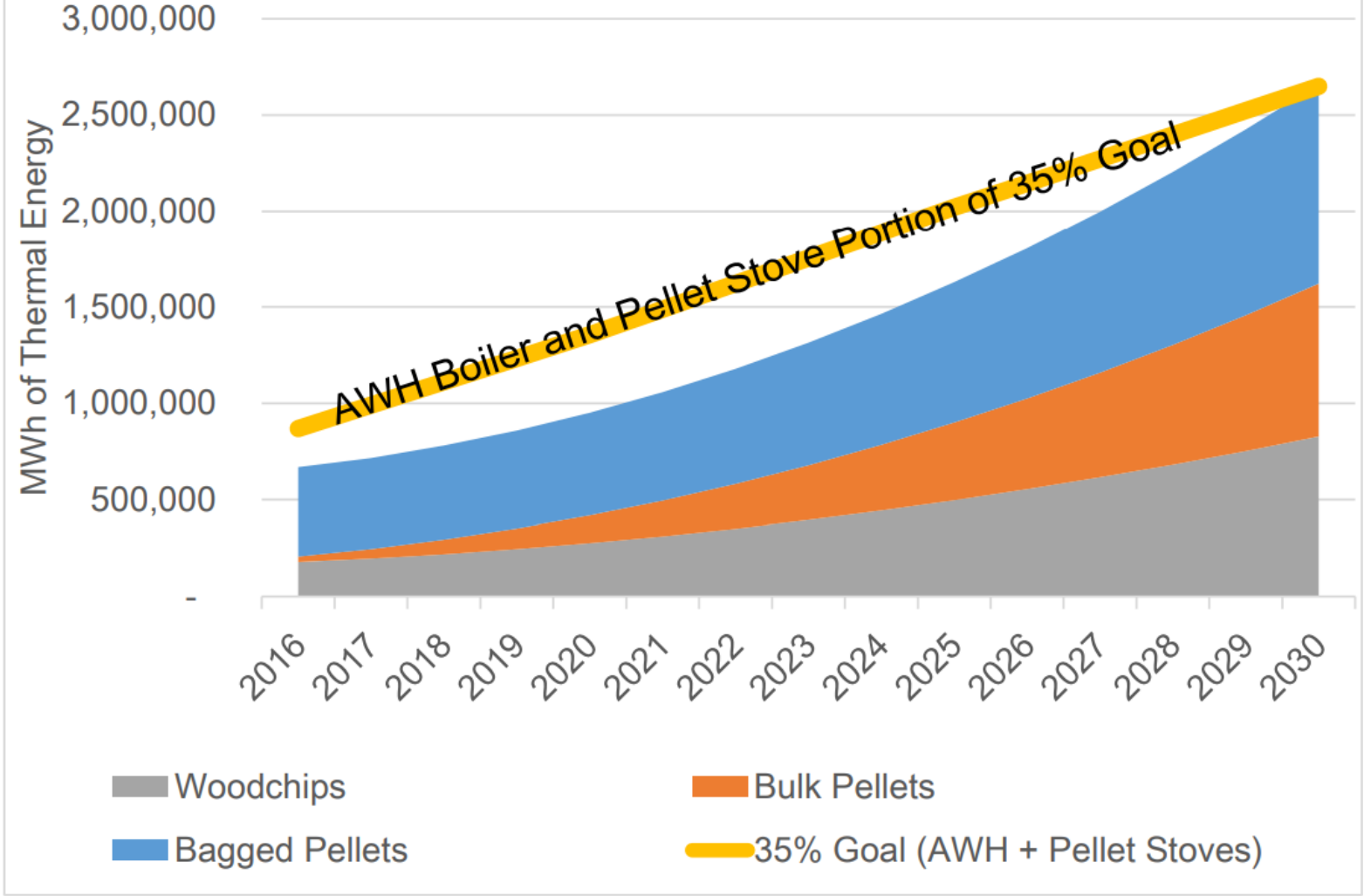
What does 35% look like?

Install an *additional*:

- 38,905 Pellet stoves
- 10,519 Residential pellet boilers
- 2,574 Commercial pellet boilers
- 221 Commercial woodchip systems



Projected Thermal Energy from AWH and Pellet Stoves *(Increased AWH Boilers and Pellet Stoves Scenario)*



Pellet Boilers & Furnaces

- Make sense at end of life or new construction
- ~\$20,000 installed before rebates
- \$6 - \$7k in rebates currently available



So what to do
when you want to
switch to
renewables but
your boiler still
has many years of
useful life left?

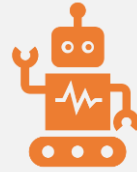


Which space heater is right for my client?

	Pellet Stoves	Wood Stoves	Heat Pumps
Renewable	✓	✓	Depends...
Automated	✓		✓
Requires Electricity	✓		✓
Chimney Needed		✓	
Hygge	✓	✓	



Focus on Pellet Stoves



Easier to automate



Remove user error



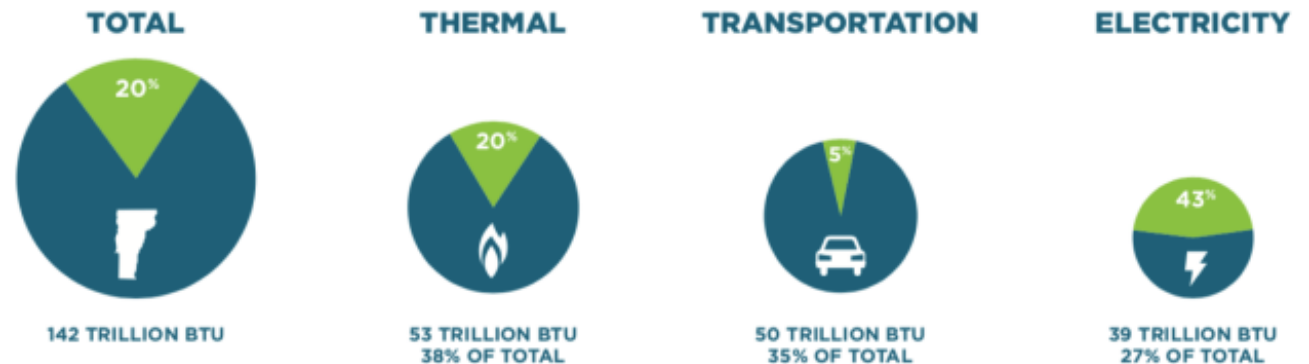
Better for users who leave to go to work

Heat pumps ARE great, BUT...

- Heat pumps are only renewable so long as they're powered by renewable electricity.
- Wood heat is renewable all the time.
- They don't have hygge.

Vermont's energy is not as renewable as you might think.

Although Vermont's electricity sector is becoming significantly more renewable (43%), electricity is only 27% of Vermont's total energy use. Vermont is only 20% renewable overall. It is clear that in order to reach our goals, we need to focus on the transportation and thermal sectors.⁷ Even if Vermont meets its statutory requirements for renewable **electricity** (67% renewable in 2025, as mandated by the Renewable Energy Standard), it will not be sufficient to meet the 2025 **total energy** targets without significant efforts in thermal energy and transportation.

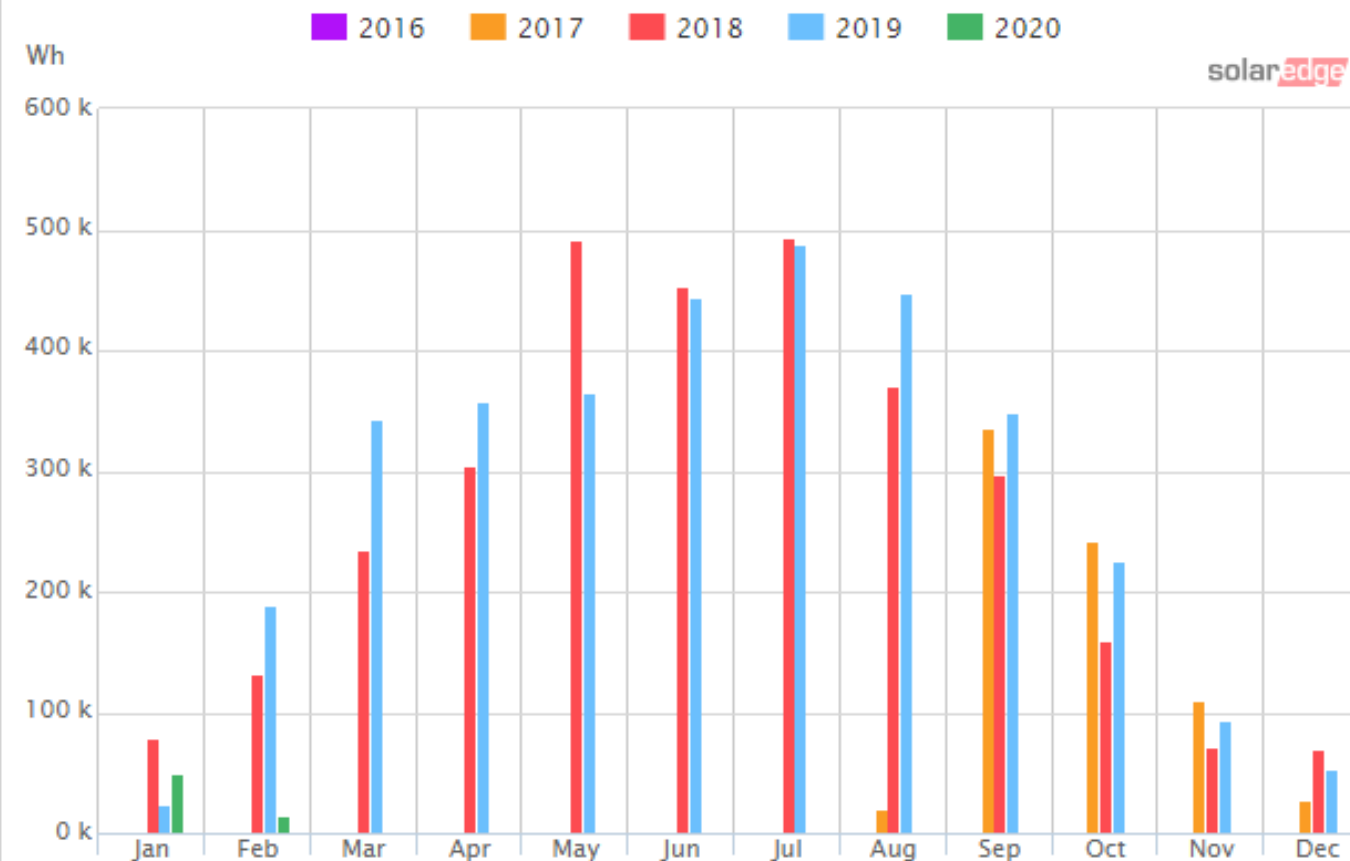


PV and Pellets – A Love Story

- Heat pumps increase demand when solar PV is doing the least

Comparative Energy

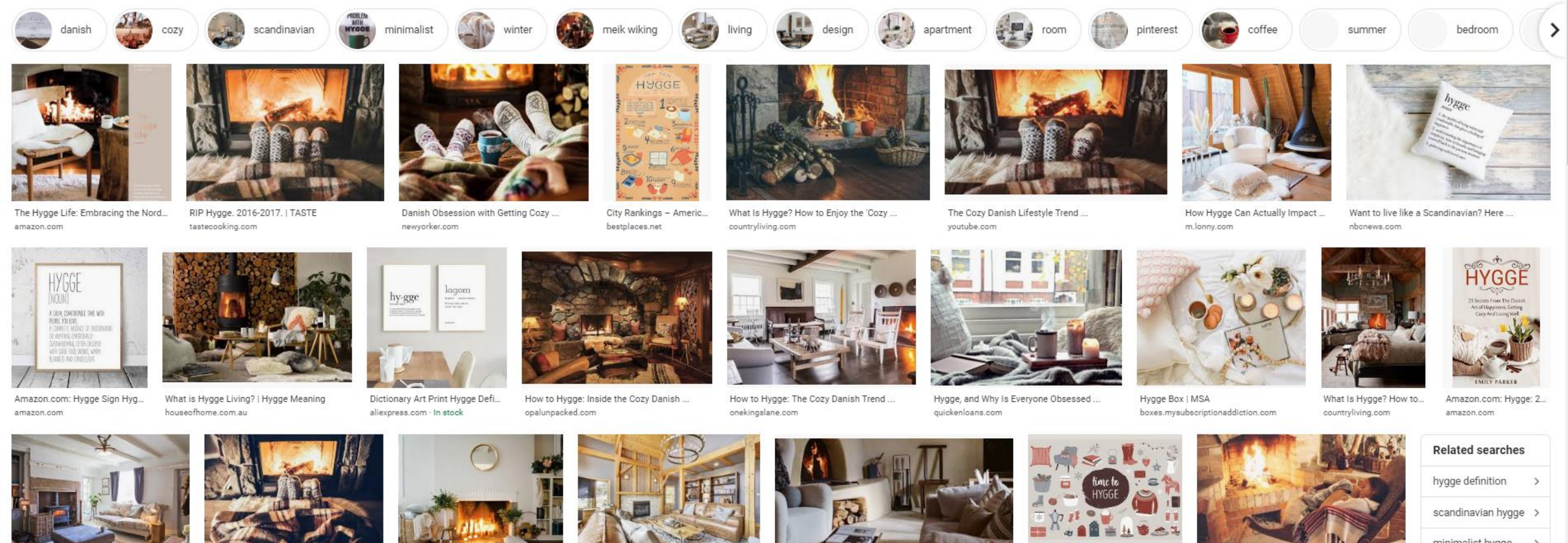
Month Quarter Year



Wood IS Battery Storage

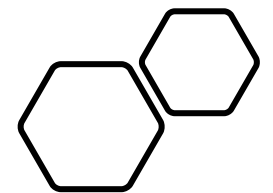
Wood stores energy from
the sun until we're ready to
use it





Hygge

- Pronounced “hoo-guh”
- Danish and Norwegian origins
- “a quality of cosines and comfortable conviviality that engenders a feeling of contentment and well-being.”



Things no one ever said:

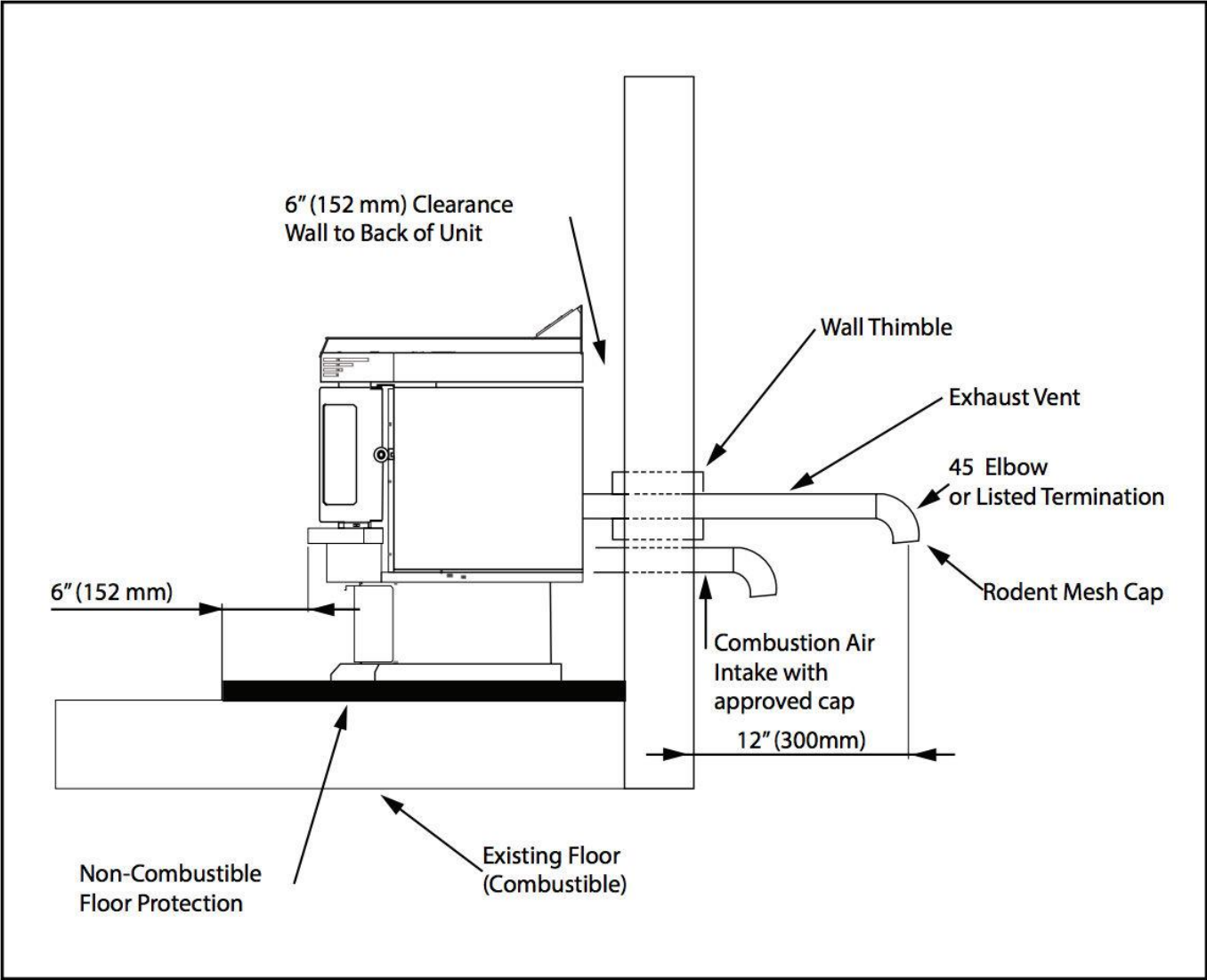
- “I love to cozy up by the forced hot air return with a cup of tea.”
- “Let’s request a table by the mini split.”
- “I’ve always wanted a house with an oil boiler!”



What is a pellet exactly?

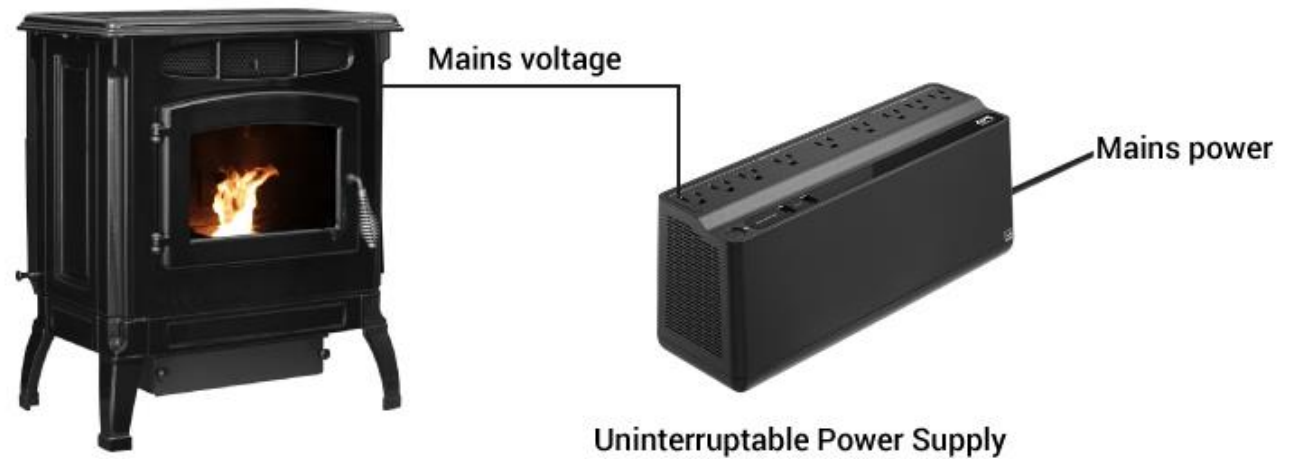
- Made of 100% compressed sawdust
- Burn clean with very little ash
- Softwood is preferred
- Vermont has one pellet mill, Vermont Wood Pellet in Clarendon
- High quality pellets also made regionally in NY, NH, ME and Canada
- Sold in bags and in bulk

Direct Vent



Power Outage

- Pellet stoves require electricity to power the auger, fan, and vent
- Back up system options:
 - Tesla Powerwall (or other home battery)
 - Battery + Inverter
 - Uninterruptable Power Supply (UPS)





Wiseway Non-Electric Stove

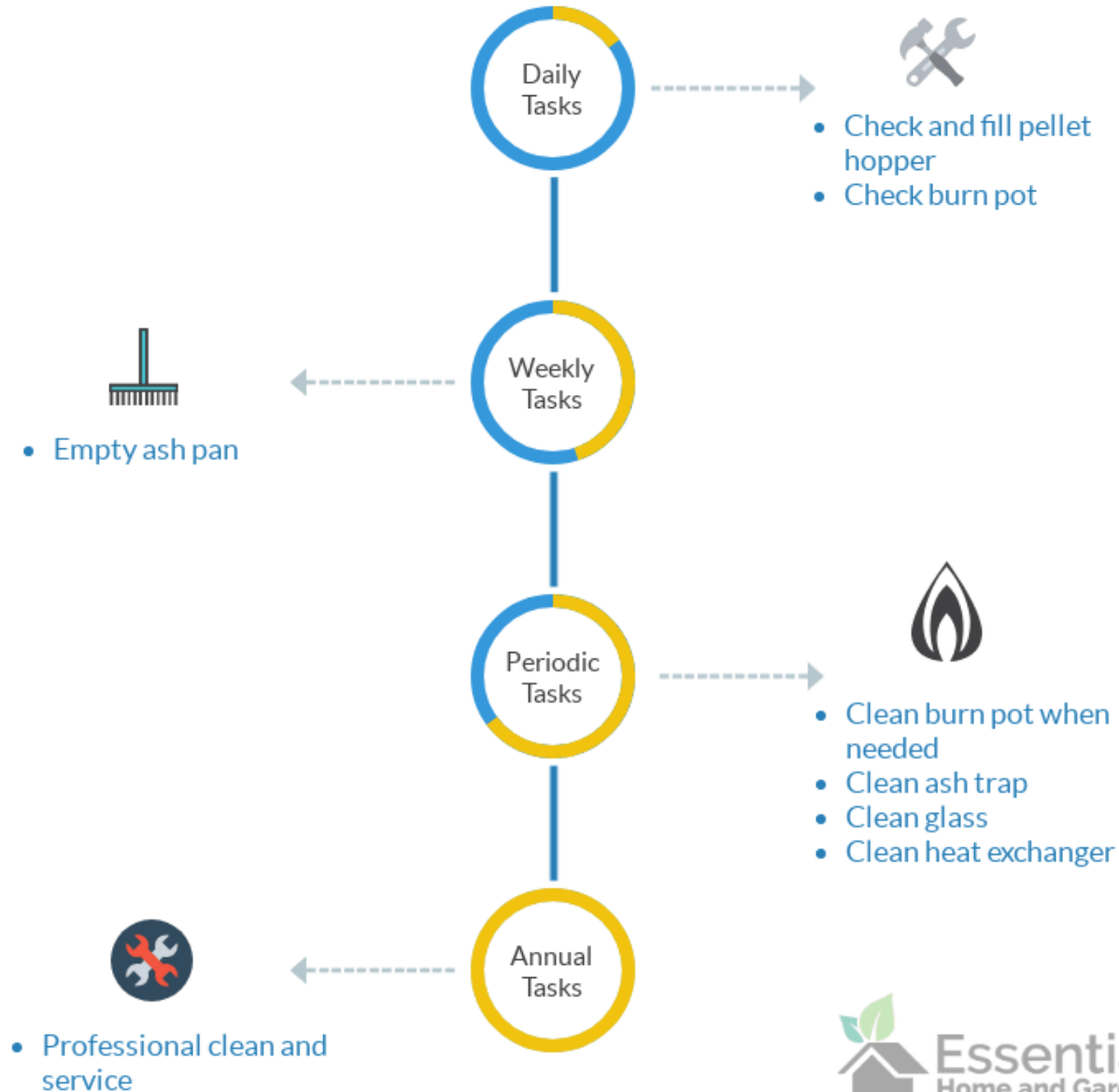


Pellet Storage - Bags




Pellet Storage - Bulk

Pellet Stove Maintenance



Current Incentives

- \$650 rebate on new wood or pellet stove - Efficiency Vermont
 - Extra \$100 if you turn in a non-EPA certified stove
- \$250 Bill Credit – Washington Electric Coop Members
- \$150 Bill Credit – Vermont Electric Coop Members
- Financing as low as 0% with Heat Saver Loan

A woman is lying in a large white bag filled with wood pellets. She is wearing a brown jacket, a dark patterned top, a colorful striped skirt, orange tights, and brown boots. She has her eyes closed and a peaceful expression. The background shows several other similar bags of pellets stacked on wooden pallets in a warehouse setting.

You can feel
good about
heating with a
pellet stove!

Takeaways

- Wood heat helps to:
 - Displace fossil fuels
 - Keep forests as forests
- Pellet stoves can offset 70-99% of home fossil fuel heating needs
- Always renewable
- Hygge!

