

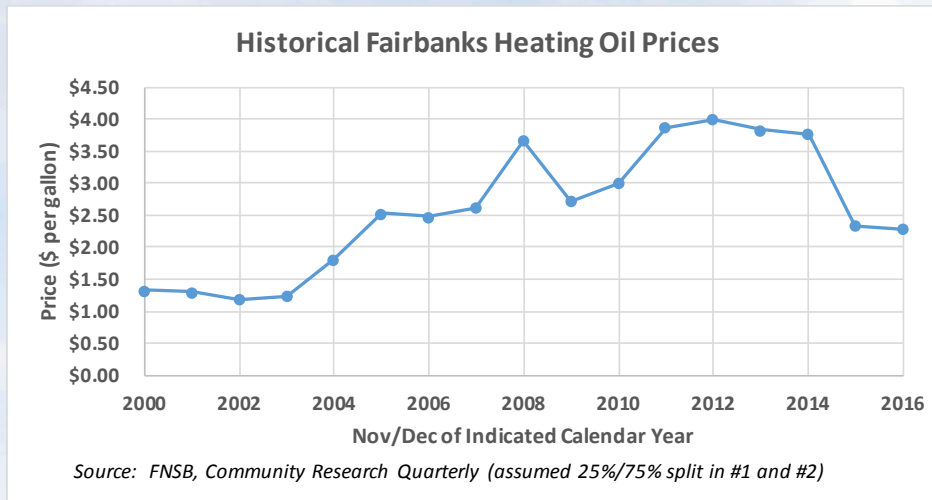
Fairbanks Residential Heating Fuel Cost Comparisons

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Introduction - Space Heating Costs in Fairbanks are Significant and Varying

- > Wintertime heating costs in Fairbanks are substantial compared to milder climates
- > Space heating is the primary contributor to ambient PM_{2.5}
- > Historical fuel prices (especially heating oil) have varied significantly



- > Given these variations, residents need access to current heating cost comparisons - not just fuel price comparisons

Which Cost More - Heating with Oil or Wood?

- > Assuming you purchase wood (rather than cut your own) which is the cheaper fuel to heat with, heating oil or wood?
- > Example #1: Central oil furnace vs. EPA-Certified non-catalytic stove (average 1,950 square foot home, winter 2016 prices)

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- > Example #1: Central oil furnace vs. EPA-Certified non-catalytic stove (average 1,950 square foot home, winter 2016 prices)
- > Answer -- Essentially the same:
 - ❖ Central oil furnace = \$11.86 per winter day
 - ❖ Certified non-catalytic stove = \$11.87 per winter day

Which Cost More - Heating with Oil or Wood?

- > Assuming you purchase wood (rather than cut your own) which is the cheaper fuel to heat with, heating oil or wood?
- > Example #2: Central oil furnace vs. Uncertified wood stove

Which Cost More - Heating with Oil or Wood?

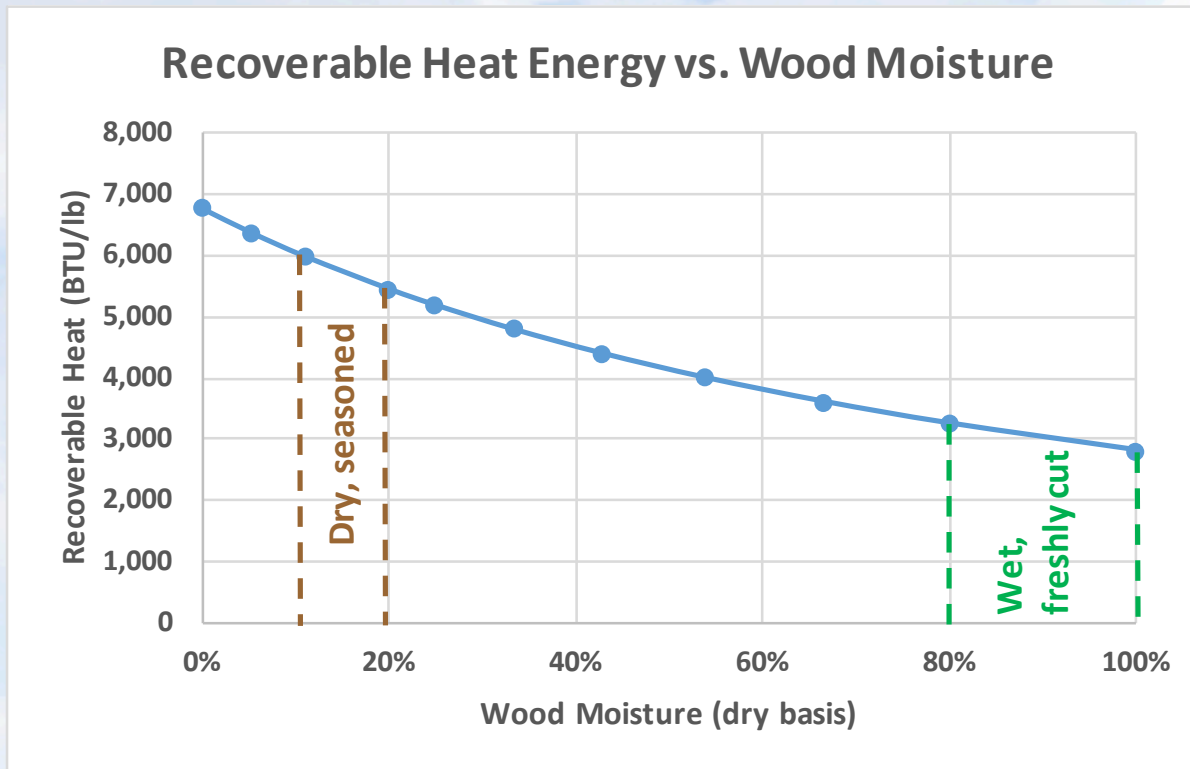
- > Assuming you purchase wood (rather than cut your own) which is the cheaper fuel to heat with, heating oil or wood?
- > Example #2: Central oil furnace vs. Uncertified wood stove
- > Answer:
 - ❖ Central oil furnace = \$11.86 per winter day
 - ❖ Uncertified stove (avg. wood moisture) = \$17.18 per winter day
 - ❖ Uncertified stove (dry wood) = \$15.11 per winter day

Space Heating Fuel Costs not Easily Comparable

- > Reported units differ by fuel:
 - ❖ Wood - \$ per cord
 - ❖ Oil - \$ per gallon
 - ❖ Natural Gas - \$ per ccf (100 cubic feet)
 - ❖ Coal - \$ per ton
 - ❖ Electricity \$ per kilowatt-hour
- > Many on-line calculators do not reflect current Fairbanks prices, or the ability to evaluate future prices
- > Other important factors include device efficiency and wood moisture

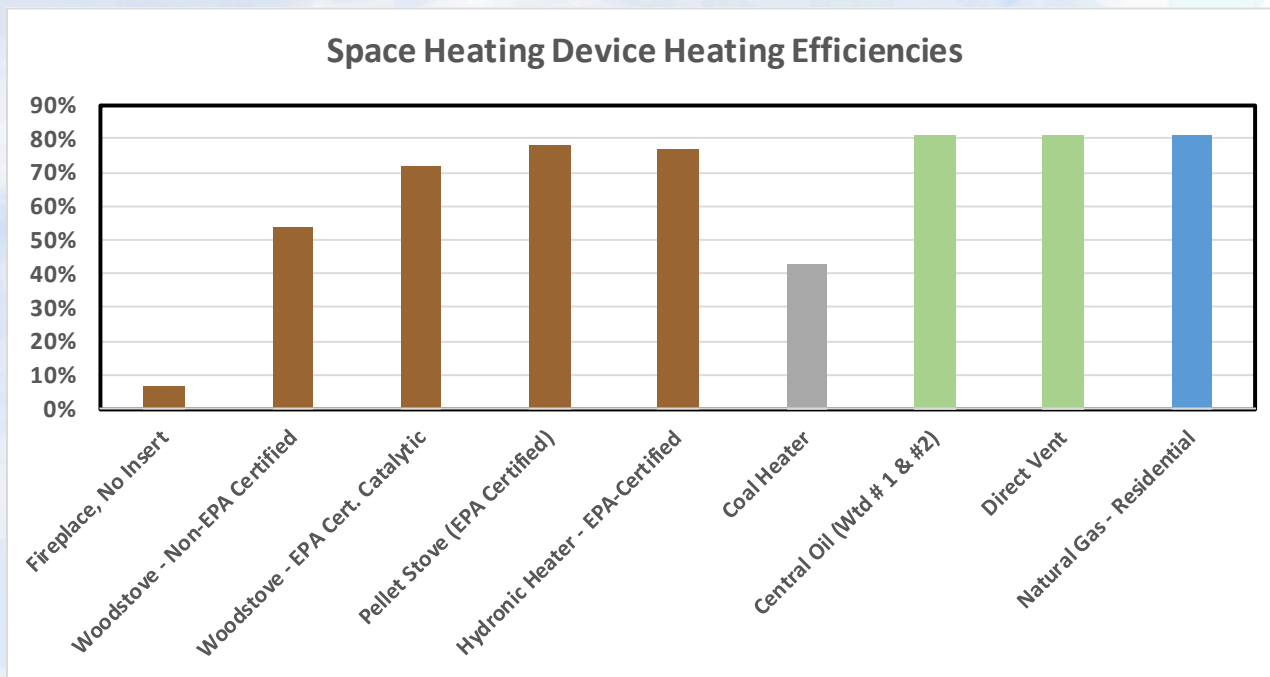
Wood Heating Energy Affected by Moisture Content

- > Wet wood has roughly half the heating energy of dry wood per pound



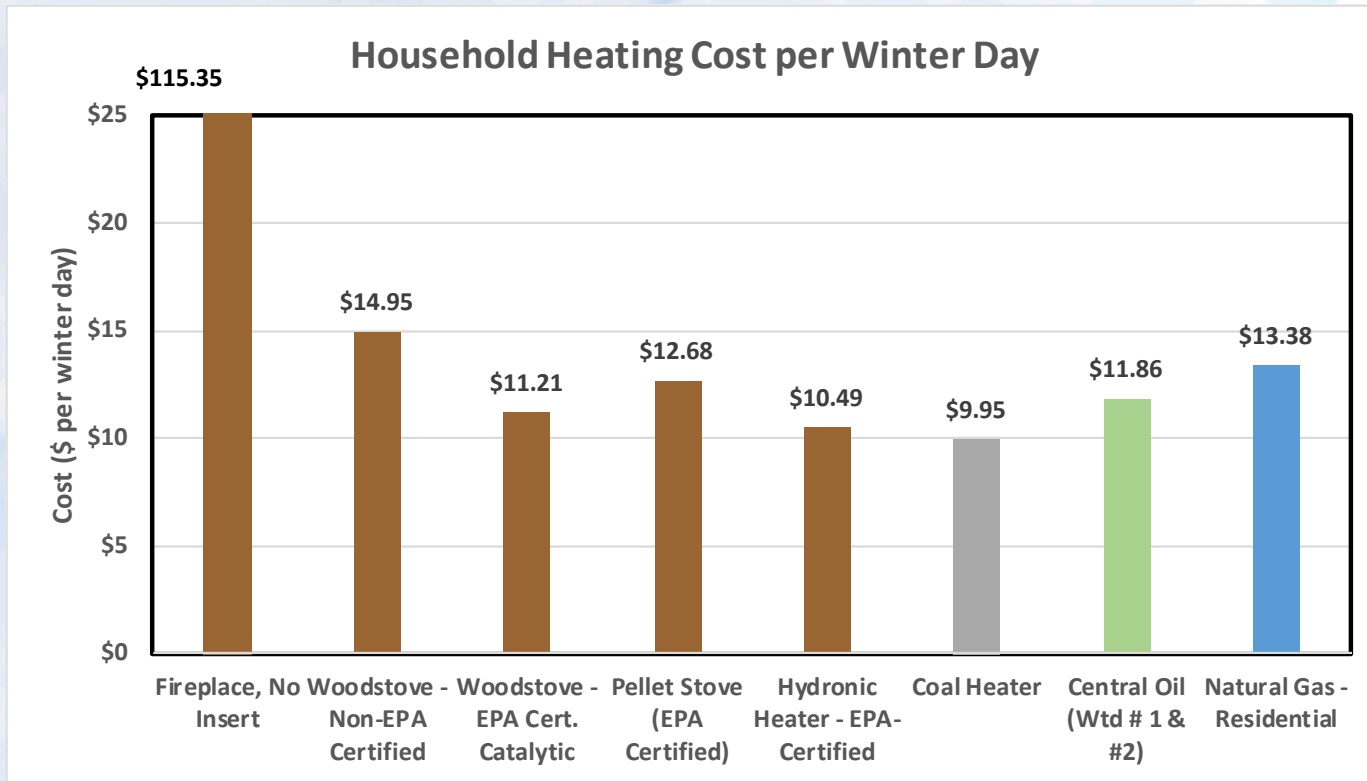
Device Heating Efficiency Differences are Important

- > The amount of energy from each fuel that supplies heat (heating efficiency) varies significantly by device, especially solid fuel devices



- > This factor not always considered when comparing energy costs across fuels and devices

Need to Compare Heating Fuel Cost by Heating Energy, Device and Wood Moisture



Fuel	Price	Gross Energy Content (BTU)	Units
Wood, 36% MC	\$266.99	17,913,034	/cord
Pellets	\$292.00	16,000,000	/ton
Coal	\$120.00	15,200,000	/ton
Heating Oil	\$2.39	135,000	/gallon
Natural Gas	\$2.02	101,000	/ccf
Propane	\$3.88	91,333	/gallon

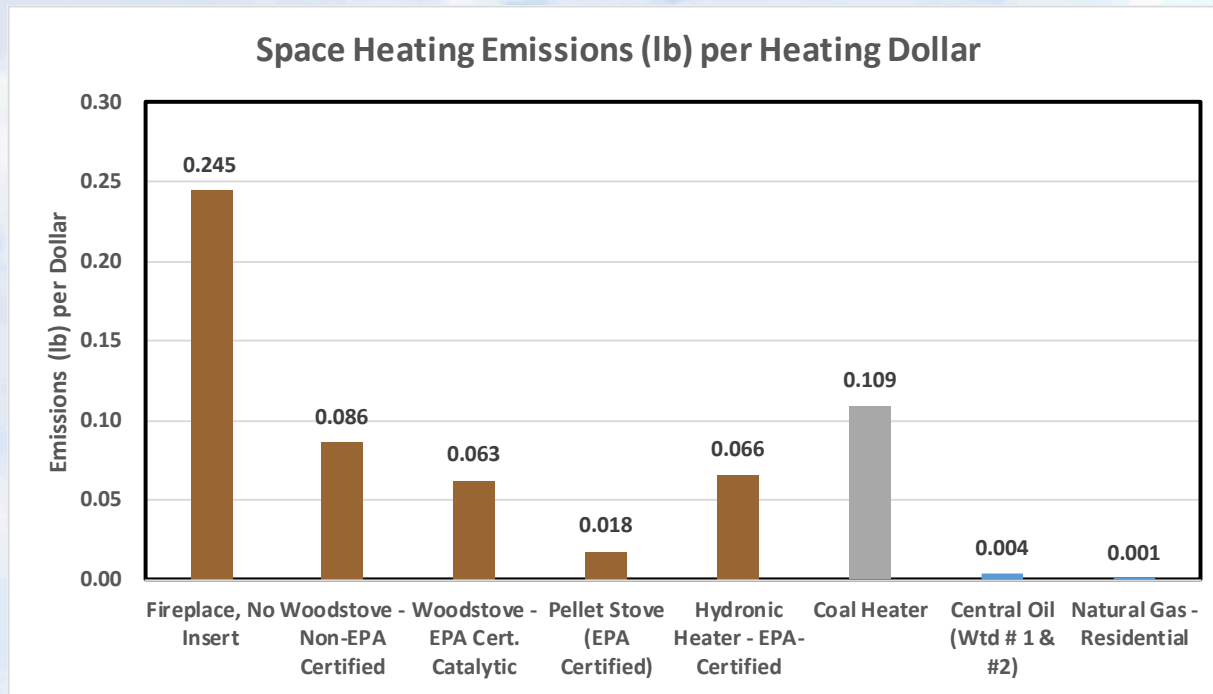
Source: Fairbanks Research Community Quarterly, 2016

“Break-Even” Prices

- > Wood prices historically more stable than oil
- > Can calculate “break-even” price for oil (and other fuels) relative to more stable wood prices
- > Example:
 - ❖ Average Wood Device costs \$13.24 per winter day
 - ❖ Oil heating relative to the average wood device is cheaper up to \$2.68 per gallon (the break-even price for oil)
- > Break-even oil price will be higher for less efficient wood devices and lower for more efficient devices
- > Can do more refined break-even estimate for any wood device

Valuation of Pollutant Emissions

- > It is also useful to compare pollutant emissions per heating dollar - informs residents seeking to reduce emissions in NA area



- > Coal heaters and most wood device emit much more per heating dollar than heating oil or natural gas

Solution: Borough-Based Cost Comparison Calculator

- > Recommend development of on-line Fairbanks specific heating fuel cost calculator for use by residents in making informed heating fuel choices
- > Functions/features could include:
 - ❖ Cost comparisons by fuel/device that account for efficiency and wood moisture (\$ per heating BTU)
 - ❖ Cost/Emissions comparisons by fuel and device
 - ❖ Easily updated with current prices over time
 - ❖ Provides “break even” prices of solid vs. liquid/gaseous fuel
 - ❖ Optional monetization of “ease of use” issues (e.g., wood sweat equity)
- > Goals: Easy-to-use, regularly updated, provide comparative true heating fuel costs (and pollutant impacts)

Questions?

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