Efficiency Vermont

S.202 and Heat Pump Economics

House Committee on Natural Resources and Energy

April 23, 2014

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Policy Context

§ 202a. State energy policy

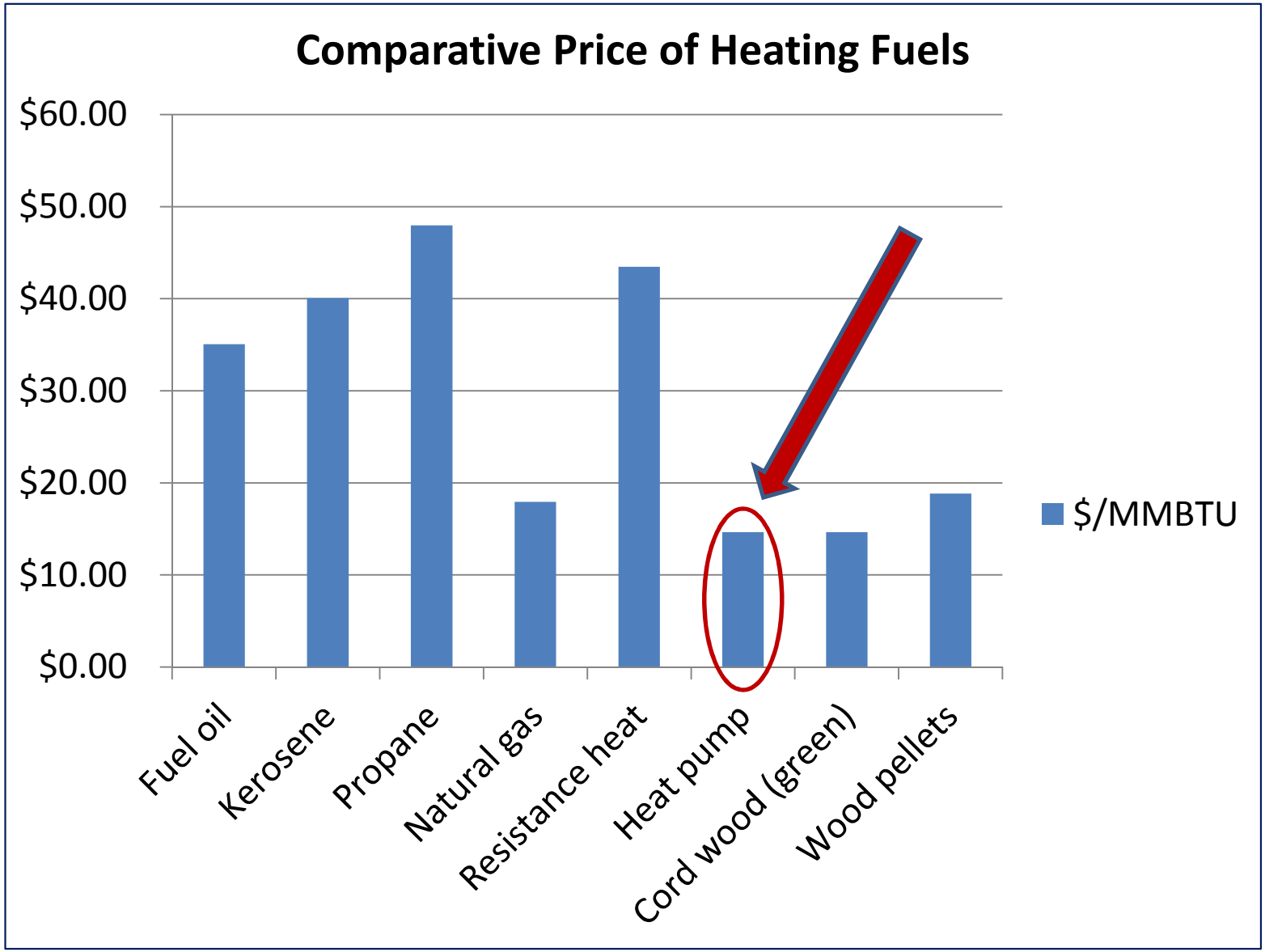
It is the general policy of the state of Vermont:

(1) To assure, to the greatest extent practicable, that Vermont can meet its energy service needs in a manner that is adequate, reliable, secure and sustainable; that assures affordability and encourages the state's economic vitality, the efficient use of energy resources and cost effective demand side management; and that is environmentally sound.

(2) To identify and evaluate on an ongoing basis, resources that will meet Vermont's energy service needs in accordance with the principles of least cost integrated planning; including efficiency, conservation and load management alternatives, wise use of renewable resources and environmentally sound energy supply.

2011 Comprehensive Energy Plan

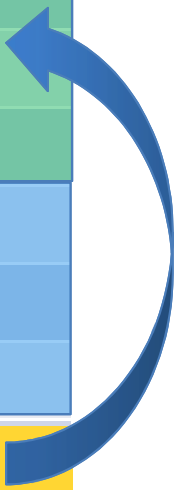
90% renewable energy by the year 2050



Source: *Vermont Fuel Price Report* (April, 2014)

The Northeast's Heating Fuel Competition (Retail)

Energy Type	Unit	Btu/Unit	Efficiency	$/Unit	$/MMBtu
Wood	Cord	22,000,000	60%	$193.33	**$14.65**
Natural Gas	Therm	100,000	90%	$1.44	**$17.94**
Pellets	Ton	16,400,000	80%	$247.00	**$18.83**
Fuel Oil	Gallon	138,200	90%	$3.88	**$35.07**
Kerosene	Gallon	136,600	90%	$4.38	**$40.07**
Propane	Gallon	91,600	90%	$3.51	**$47.96**
Electricity	**kWh**	**3,412**	**300%**	**$0.15**	**$14.65**



Fuel prices compete within 3 bands.
With heat pumps, electricity falls into the 1st band.

Heating Fuel Cost Savings with an ASHP (COP 3.0)

Type of Energy	Unit	50 MMBtu/Yr	75 MMBtu/Yr	100 MMBtu/Yr
Wood (green)	Cord	$0	$0	$0
Natural Gas	Therm	$(148)	$(222)	$(296)
Pellets	Ton	$(193)	$(282)	$(376)
Fuel Oil	Gallon	$(919)	$(1,378)	$(1,838)
Kerosene	Gallon	$(1,144)	$(1,716)	$(2,288)
Electricity	kWh	$(1,296)	$(1,945)	$(2,593)
Propane	Gallon	$(1,499)	$(2,248)	$(2,998)

Many residents can save $1,000 - $2,000 year.

Assumptions:

- Offset 90% of heating fuel use.
- No cooling savings in the summer.

Theoretical Maximum Efficiency (COP)

	Technology	
	Combustion & Resistive	**Heat Pump**
Present Technology	0.95	2.0 - 4.0
Theoretical Maximum	1.0	6.0 - 17.0

The efficiency gains for combustion technology have arrived.

There is still room for improvement in heat pump technology.