

E2Tech: HEAT OF THE MOMENT

Plans from State Officials, Energy Companies, and Maine's Next Governor

Seizing the Opportunities of Today to Address an Underlying Challenge

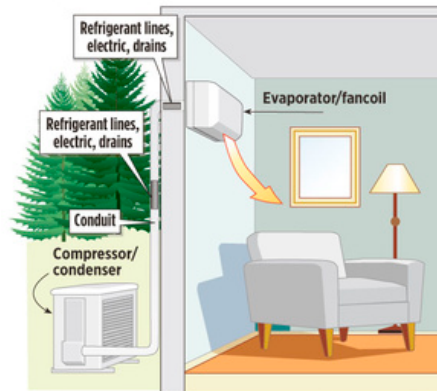
September 12, 2014

Governor's Energy Office
Director Patrick Woodcock



Mini-Split heat pump

A heat pump circulates a super-cold refrigerant that absorbs enough heat from outside winter air to heat a home. In the summer, the pump functions in reverse, transferring hot, inside air to the outdoors. Because the pump moves heat rather than produces it, electricity is used only to circulate the refrigerant. So the pump is very efficient, delivering roughly three times the energy it consumes.



SOURCE: Telegram research

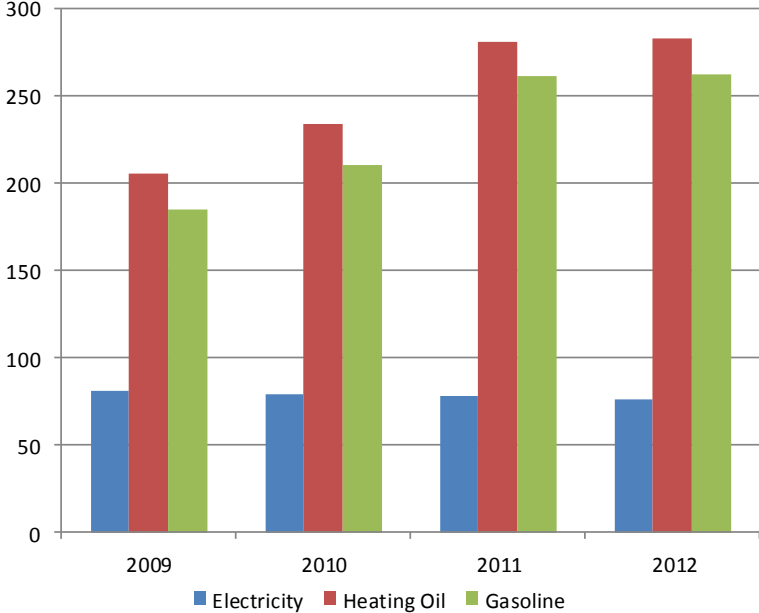
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Maine's Residential Energy Challenges

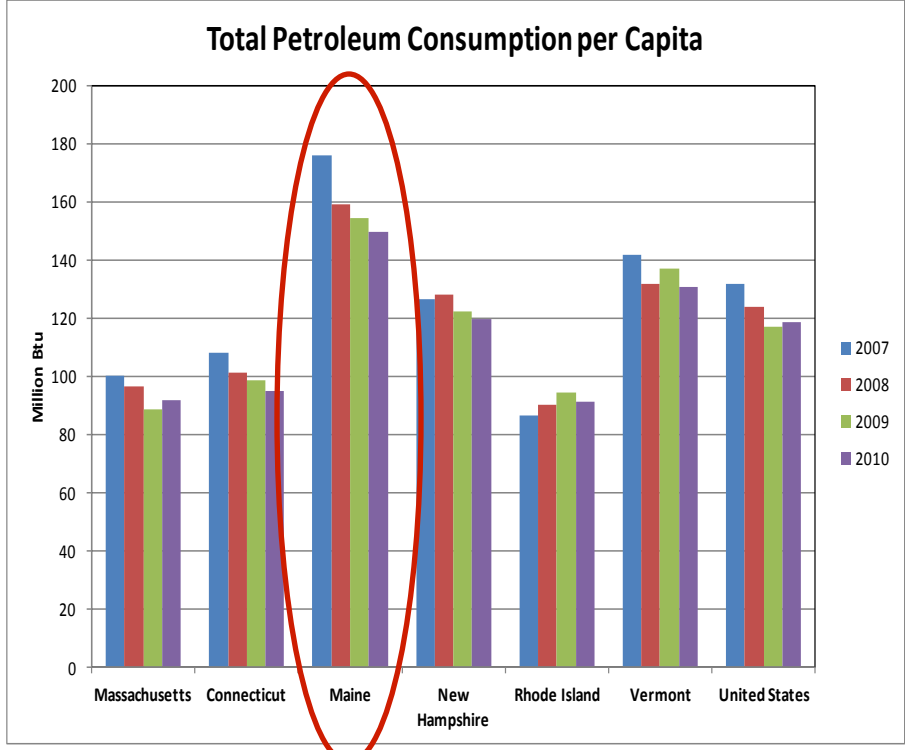
Maine experiences some of the highest residential energy costs in the country.

Residential Energy Costs



Year	Monthly Electricity Cost	Monthly Heating Oil Cost	Monthly Motor Gasoline Cost
2009	\$80.70	\$205.62	\$184.94
2010	\$79.27	\$234.35	\$210.97
2011	\$78.35	\$281.12	\$261.15
2012	\$75.69	\$282.76	\$262.44

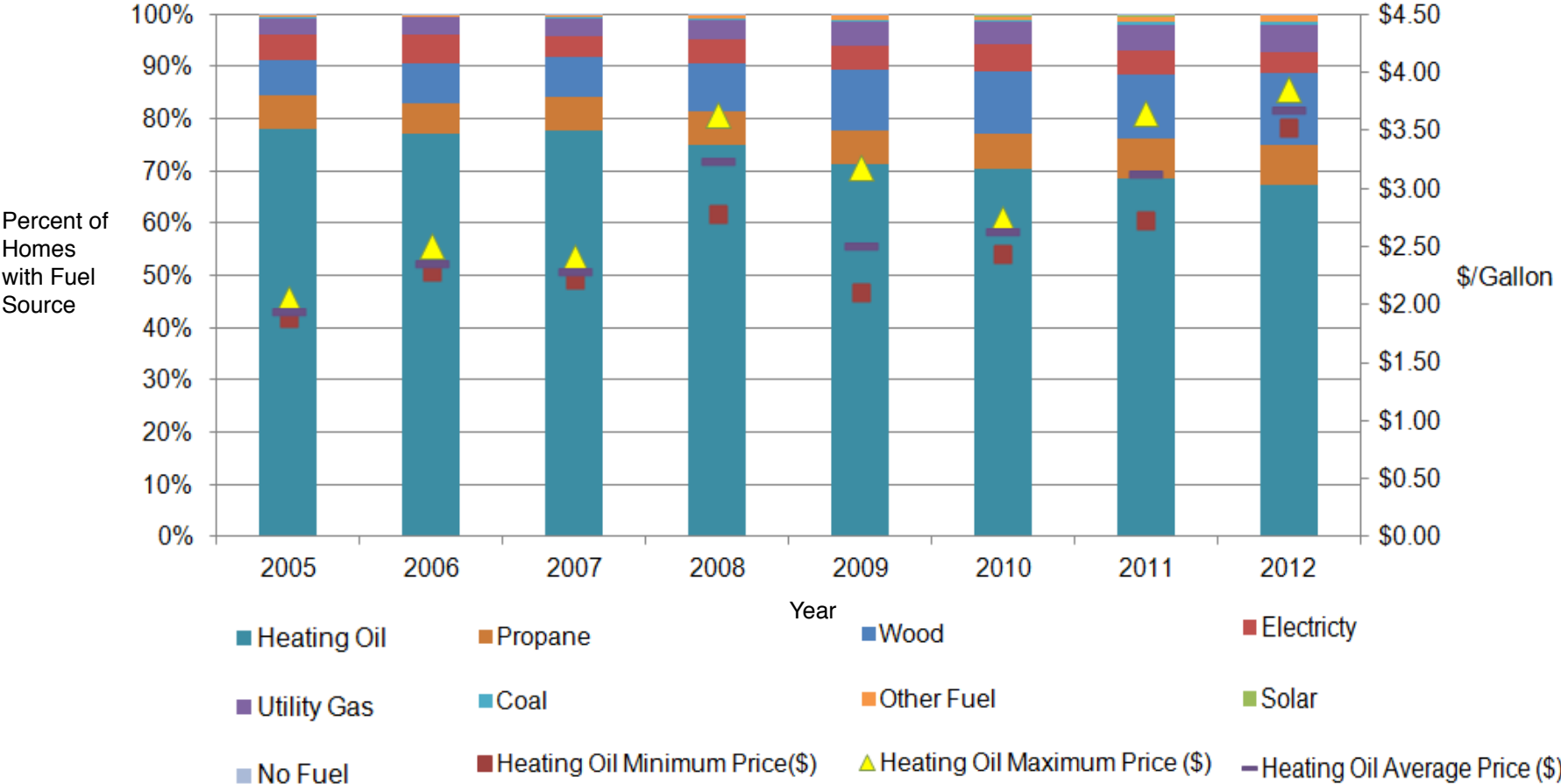
Exposure to Oil



Maine has the highest oil consumption per capita in New England.

Maine's Primary Residential Heating Systems

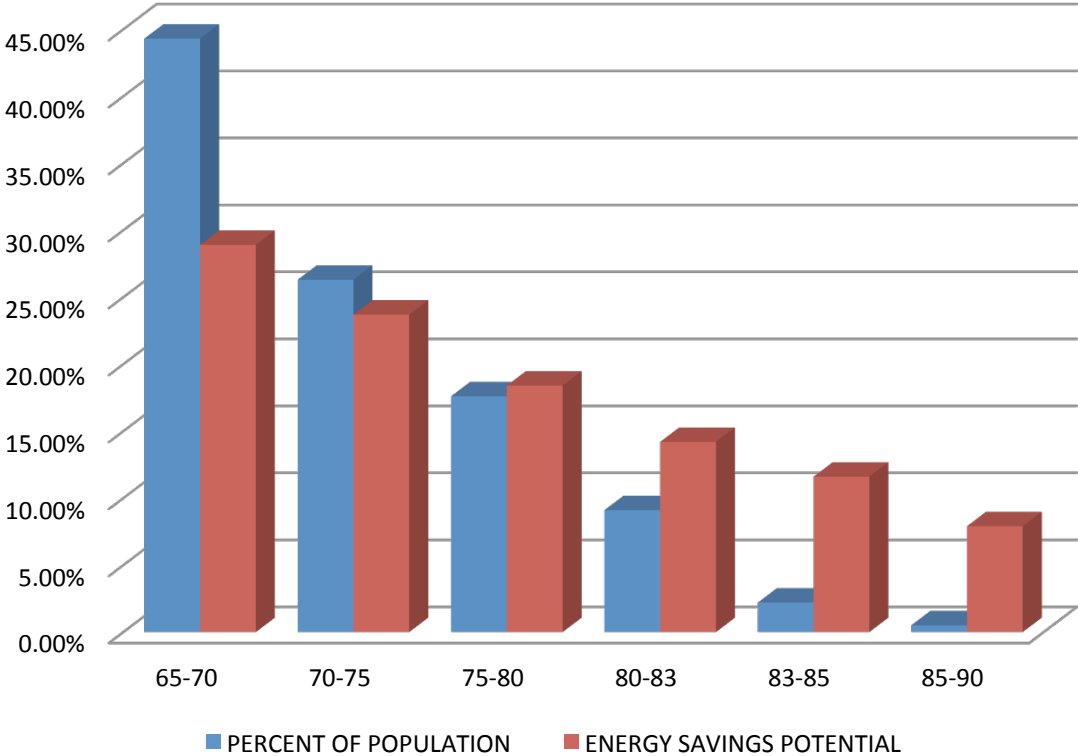
Since 2005, heating oil as a primary fuel has reduced from 80% to 67.5% and the use of wood has doubled.



Source: Governor's Energy Office and US Census Bureau American Community Survey

Barrier 1: Maine's Existing Inefficient Heating Systems

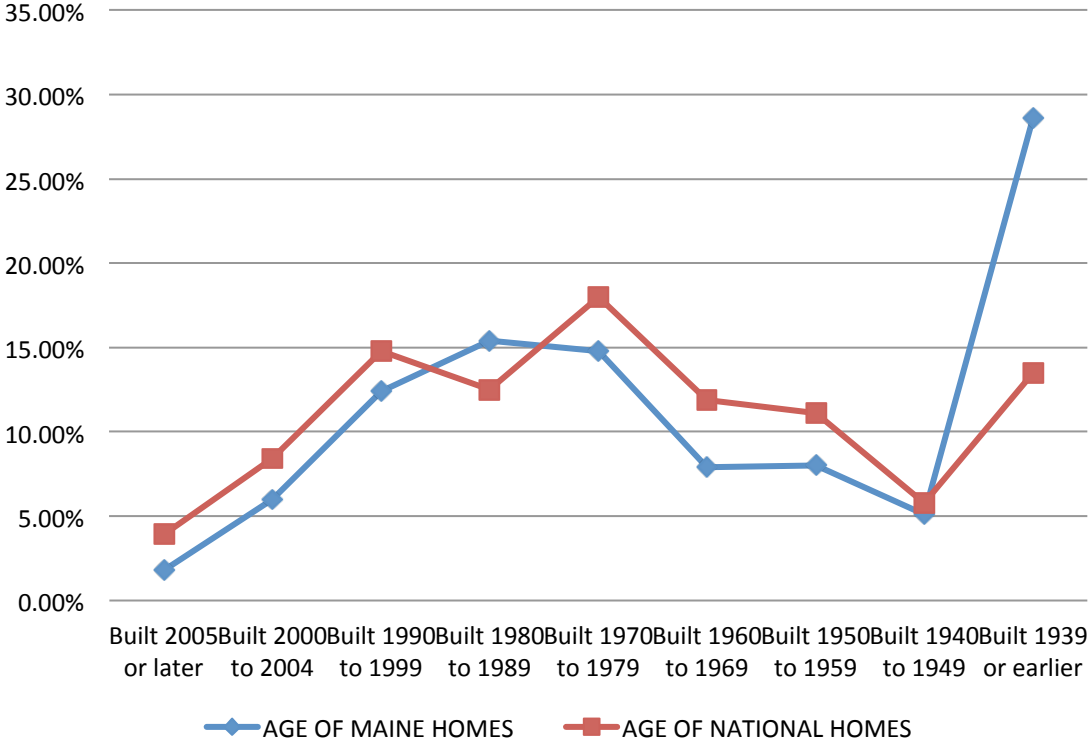
Oil Furnaces In The United States AFUE Ratings



Source: Brookhaven National Laboratory

Barrier 2: Inefficient Housing Stock

Age Of Homes In Maine And The United States



Source: US Government Accountability Office and US Census Bureau American Community Survey

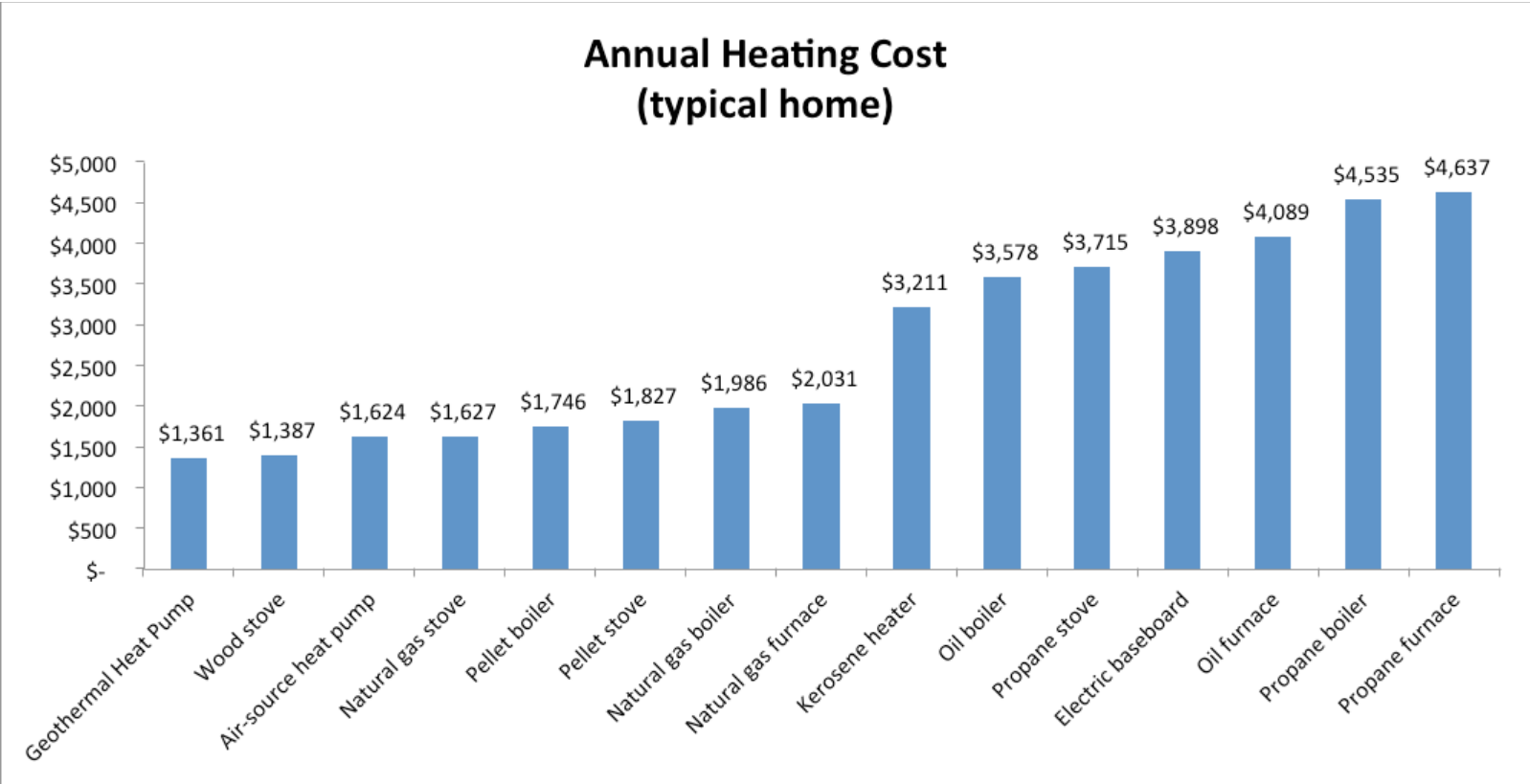
Benefit to Cost Ratio by Heating Cost Reduction Measure

Measure	Benefit-to-Cost Ratio
Basic Air Sealing	5.99
Heat pump (single zone, 50% of load)	5.48
Pellet Stove (50% of load)	4.15
ES Propane	4.15
Heat Pump (whole home)	3.92
Attic Insulation	3.63
Natural Gas Direct Vent Room Furnace	2.84
Wall Insulation	2.81
Basement Insulation	2.04
Heat Pump Water Heater	1.70
EPA Pellet Boiler 83% AFUE	1.46
ES Oil Boiler 87% AFUE	0.78
Solar PV/thermal 3kw	0.63
Electric Resistance	(1.42)



Opportunities in Heating Choices

A significant number of diverse, affordable heating options exist.



The Financial Challenge of the Upgrade

Paybacks are attractive, but Mainers to not have the upfront capital.

	Installed Equipment Cost (\$)	Annual Fuel Cost	Payback Period (years)
Gas Conversion Burner	\$2,500 - \$4,500	\$897	1.0 – 1.8
Air Sealing	\$600	N/A	2
New Natural Gas Furnace	\$5,000 - \$10,000	\$803	2.0 – 3.9
Wood Stove - Supplemental	\$3,500 - \$6,500	\$1,960	2.5 – 4.6
Solar Hot Water - Supplemental	\$8,300 - \$12,900	\$329	2.7 – 4.3
Wood Pellet Furnace	\$10,000 - \$22,000	\$1,618	5.7 – 12.6
Insulation (Attic or Basement)	\$4,000	N/A	5.3
Geothermal Heat Pump	\$11,000 - \$45,000	\$1,292	5.3 – 21.8
Air Source Electric Heat Pump	\$5,000 - \$12,000	\$2,423	5.3 – 12.8
Air Source Heat Pump – Supplemental	\$3,000 - \$4,000	\$1,645	3.6
Solar Photovoltaic - Supplemental	\$18,000 - \$30,000	n/a	5.4 -8.9
Propane Oil Furnace	\$1,000 - \$5,000	\$3,279	12.7-63.1
More Efficient Oil Furnace	\$2,000 - \$5,000	\$3,081	7.2 -18.1

Residential Heating Progress with Natural Gas in 2013 and Plans for 2014

2013: 3,200 customers converted

2014: More than 5,000 residential conversions



- 2013 - 1,800 customers converted in 2013 saving \$2.7 million annually.
- 2014 – More than 2,000 conversions



- 2013 - 800 customers signed up saving \$1.2 million annually.
- 2014 – 1400 customers converted and new service in Lincoln.



- 2013 - 600 customers converted saving \$900K annually.
- 2014 – Up to 1,000 will be converted including state facilities in Augusta.



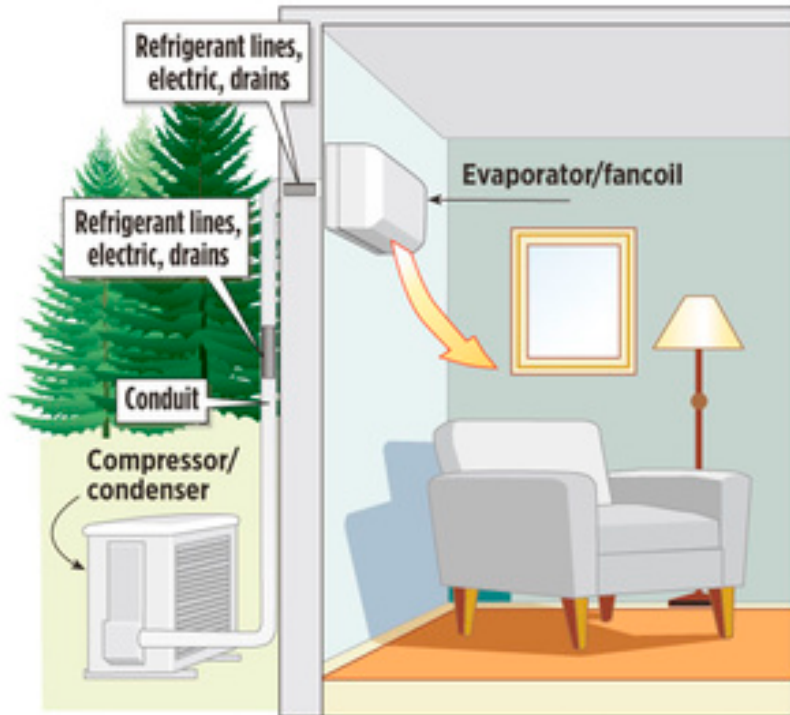
- 2013 - 66 miles of steel pipeline installed from Pittston to Madison.
- 2014 – Residential customers and new service in Yarmouth, Cumberland, and Falmouth. State facilities in Augusta.

Governor's Heat Pump Initiative

Pilot program launched October 2012

Mini-Split heat pump

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The entire program was subscribed with 1,000 customers signing up by spring 2013.

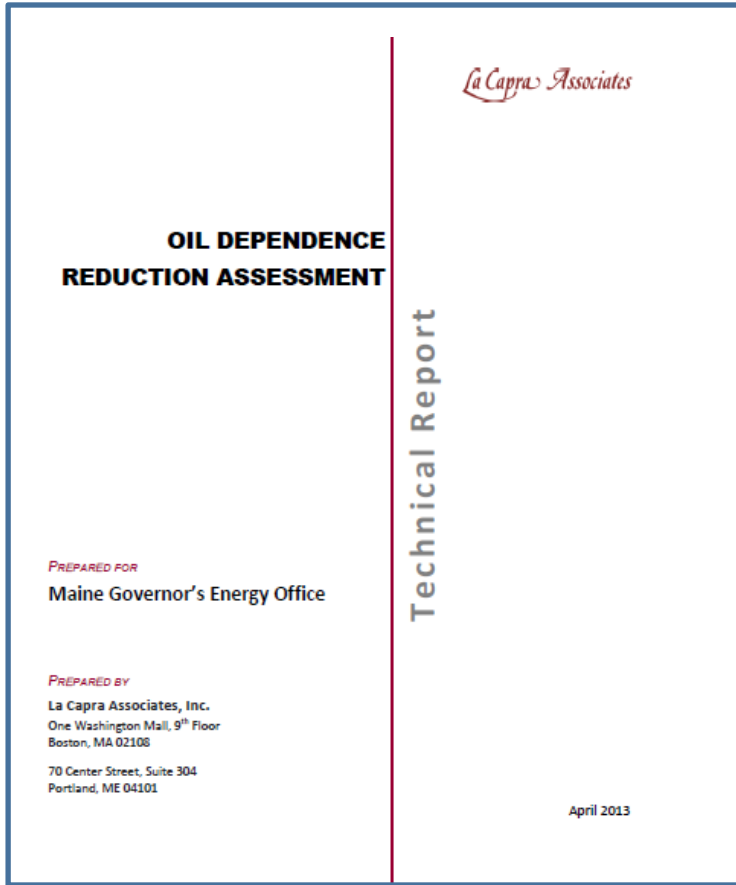
FY14 projections estimate more than 3,000 pumps were installed.

Savings equal an estimated \$900 per household annually.



How to Deliver Affordable Heat to Every Mainer

Programs were historically not focused on our most significant energy challenges.



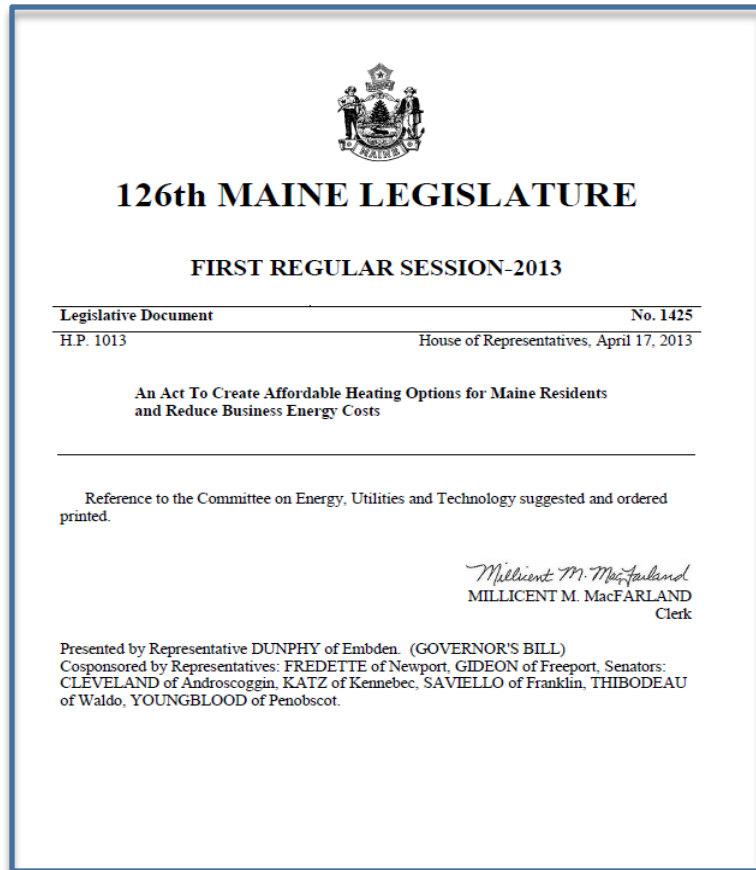
2011 State Law:

- 30 Percent Reduction of Oil Usage by 2030 over 2007 Baseline.
- 50 Percent Reduction by 2050.
- Requires regular progress reports to Legislature.

January 2013 Oil Reduction Report:

“Programs are not focused on reducing residential heating costs where there is significant oil usage.”

Devoted Funding Focused on Maine's Heating Challenges



Redirected Efficiency
Maine Trust funding to
develop new program
to reduce heating
demand and reduce
greenhouse gas
emissions.

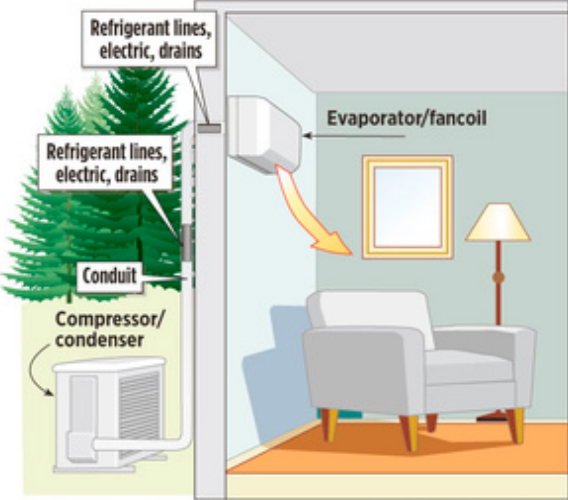
Results:

- **FY2014: \$7 million**
- **FY2015: \$7.1 million**

Next: HESP Program Implementation Update

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