

SV Home Heating Costs Revisited – February 2016

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One of our homeowners inquired whether, given the recent price reduction in propane, I'd revisited the comparative heating cost of heat pump vs propane furnace. Good question!

The quick answer is that heat pumps are still more cost effective for heating, even at today's propane prices of under \$2.00/gallon.

You may recall that those homes that have heat pumps have the ability to switch from heat pump to propane backup either automatically or manually.

Automatic switchover is under control of ambient (outside) temperature, with an adjustable switchover temperature. The system switches to propane if the ambient temperature falls below the preset temperature. The systems also switchover to propane if more than about a 2F rise is dialed into the inside thermostat. (See my Winter Energy Saving Tips posted on the SV website resources page.)

Manual switchover is accomplished by selecting "Emergency Heat" on the inside thermostat.

The following analysis compares the cost per therm (100,000 BTU) of the alternatives:

- 80% efficient propane furnaces (older SV homes) (Note 1)
- 93% efficient propane furnaces (newer SV homes, both heat pump and propane-only)
- Heat pump at 30F ambient and coefficient of performance (COP) = 2.95 (COP per Goodman specs for my unit)
- Heat pump at 40F ambient and COP = 3.25

Assumed fuel costs are "all-in", including taxes and charges:

- Propane = \$1.90/gallon
- Electric = \$.145/kWh

Source	Cost/Therm	Cost vs HP @ 30F	Cost vs HP @ 40F	Cost vs 80% Furnace	Cost vs HP 93% Furnace
80% Furnace	\$2.596	+80%	+92%	N/A	+16%
93% Furnace	\$2.233	+55%	+70%	-14%	N/A
Heat Pump @ 30F	\$1.440	N/A	+10%	-44%	-35%
Heat Pump @ 40F	\$1.308	-9%	N/A	-50%	-41%

The chart shows that:

- At 30F ambient, an 80% furnace costs 80% more than the heat pump for the same amount of heat.
- At 40F ambient, an 80% furnace costs 92% more than the heat pump for the same amount of heat.
- At 30F ambient, a 93% furnace costs 55% more than the heat pump for the same amount of heat.
- At 40F ambient, a 93% furnace costs 70% more than the heat pump for the same amount of heat.

Conversely:

- At 30F ambient, the heat pump costs 44% less than 80% furnace for the same amount of heat.
- At 30F ambient, the heat pump costs 35% less than 93% furnace for the same amount of heat.
- At 40F ambient, the heat pump costs 50% less than 80% furnace for the same amount of heat.
- At 40F ambient, the heat pump costs 41% less than 93% furnace for the same amount of heat.

The table also shows that the heat pump is more efficient at warmer ambient temperatures:

- At 30F ambient, the heat pump costs 10% more than the heat pump running at 40F, for the same amount of heat.
- At 40F ambient, the heat pump costs 9% less than the heat pump running at 30F, for the same amount of heat.

We also see cost savings of a 93% furnace over an older 80% furnace:

- An 80% furnace costs 16% more than an 80% furnace, and
- A 93% furnace costs 14% less than an 80% furnace.

Conclusion

The main take away is that it is still more cost efficient to heat your house with a heat pump vs propane furnace. At 30F ambient, a 93% furnace will cost 55% more than running the heat pump, and an 80% furnace will cost 80% more. The differences increase substantially as ambient temperature increases.

However, for folks who really prefer the warmer feel of propane heat (warmer air coming out of ducts), the additional cost is not as high as a couple of years ago and may be acceptable.

Notes:

Note 1: You can identify the efficiency of your Goodman furnace by its model number. If it begins with GMS8... it's 80% efficient. If begins with GMS9... it's over 90% efficient.