

Retrofit Case Study #1 - 3 year payback and \$ 7,000 installation cost, after 30% federal tax credit

ELCO Geothermal recently retrofitted a 10 year old Cape style home located in Hampden, ME. The home's former heating system consisted of an oil fired New Yorker furnace with perimeter hot water baseboard fin tube radiation. The 2 acre lot has shallow ledge, so installing a new horizontal closed loop heat exchanger on the lot was not practical. The home has a 345' domestic water well, rated for only 1 GPM of continuous water flow. The heating conversion budget would not allow for the cost of a vertical closed loop heat exchanger (bore hole).

The customer was adamant about re-fitting the house with a geothermal heating system, due to the wildly escalating cost of oil, while also recognizing that a geothermal heating system was superior to all of the other heating alternatives that were available. So, the decision was made to downsize the new ground source heat pump to the capacity of the existing well, and utilize the existing 345' well as a standing column well.

A return water line was installed from the new heat pump in the basement to the existing 345' deep well. This return line was extended down the well to a depth that would remain below the well's water level after sustained pumping. A new ducted heat delivery system was installed from the new water-to-air heat pump located in the basement to new air registers in the floors above. The new air duct system with variable speed blower delivers heat in the winter and air conditioning in the summer to the basement and first floor of the existing home. The oil furnace was left in service to provide supplemental heat (when necessary) to the 2nd floor, and to provide domestic hot water.

Formerly, the home consumed an average of 760 gallons of heating oil annually, plus 3 chords of hardwood through a wood stove in the basement, for heating and domestic hot water production. In the year following the retrofit, the home used less than 150 gallons of heating oil (nearly all for domestic hot water production in the oil furnace), no firewood, and \$400.00 worth of electricity to operate the geothermal ground source water-to-air heat pump. So, the combined cost of heating and domestic hot water production totals \$950.00, for the year following the geothermal retrofit.

The geothermal heating system cost \$7,000.00 to install, after considering the 30% federal income tax credit rebate, and the \$800.00 Bangor Hydro Electric Co. rebate for installing 2 tons of new heat pump capacity. The geothermal heating investment described above saved the homeowner \$ 2,425.00 in the first year of service alone. The return on investment in the geothermal heating system is 2.9 years!

The customer has the added benefit of central air conditioning, a more evenly heated home, and the prospect of 22 more years (after the new heating system has paid for itself) of savings to spend over the expected useful life of the new heating system, savings that the customer can spend elsewhere, or deposit in the bank. No other heating system alternatives offered the potential to yield these benefits.