CenterPoint® Energy

GEOTHERMAL HEAT PUMPS KNOW THE FACTS

When it comes to home heating, homeowners need to know the facts – about operating costs savings, return on investment and environmental impact. At CenterPoint Energy, we want to be sure you have the information you need to select the best heating option for your home.

There are many conflicting claims regarding heat pump performance, operating costs, payback and environmental benefits. Some heat pump manufacturers do not compare apples to apples, and compare a very old, inefficient natural gas furnace and central air conditioner to a new, high-efficiency heat pump, with comparative energy prices that are inaccurate and unrealistic.

Operating costs comparison

The charts below clearly illustrate that a conventional high-efficiency natural gas furnace and central air conditioner are the most economical option for home heating and cooling. The facts on geothermal heat pumps just don't add up for Minnesota customers:

- $15,000 to $30,000 – expected cost to install a geothermal heat pump – not including significant re-landscaping costs
- 46 years – expected payback for installing a geothermal heat pump
- $183 – all customers can expect to save in operating costs each year by using a geothermal heat pump on a 4,000 sq. ft. house

Natural gas furnace and central AC vs. geothermal heat pump

Operating cost comparison: Save by choosing natural gas		
	Conventional natural gas furnace 95% AFUE & 16 SEER	Geothermal heat pump 3.5 COP & 16.3 SEER
Annual heating and cooling energy required	210 mm Btu	210 mm Btu
Annual operating cost*	$1,972	$1,789
Annual savings using geothermal heat pump		$183

* *Using $0.80/Therm residential natural gas and $0.09/kWh residential electricity prices.*

Expected payback of geothermal heat pump		
	Conventional natural gas furnace and central AC 95% AFUE & 16 SEER	Geothermal Heat Pump 3.5 COP & 16.3 SEER
Equipment costs	$9,000	$25,000
Lifetime federal tax credit		- $1,500
Federal stimulus energy incentive	-$1,500	- $7,500
Net cost to homeowner	$7,500	$16,000
Incremental cost to purchase geothermal heat pump	$8,500	
Annual savings using geothermal heat pump	$183	
Payback on geothermal heat pump	46 years	

Heat Pump Basics

A geothermal, or ground-source, heat pump is a device that uses electricity to pump heat from the ground into the home during winter and pump heat from the home and into the ground during summer using a compressor, coils, refrigerant and a blower fan.

A heat pump's efficiency is labeled as its COP (Co-efficient of Performance), or ratio of the amount of BTUs (or kWh) of heat provided compared to the amount of BTUs (or kWh) used to run the heat pump. This number varies based on the pump's efficiency, type of soil and temperature difference of the soil and home. A typical COP rating ranges from 3.0 to 4.0.

Continued on back

Installation matters

Minnesota is a cold climate state, requiring more energy to heat a home in the winter than energy needed to cool one in the summer. The Twin Cities metro area requires on average about 2,200 hours of actual heating, compared to only 600 hours of cooling. It is not possible to properly size one piece of equipment to adequately handle both needs.

If the heat pump is sized properly for the home's heating needs, it will be dramatically oversized for summer cooling. If sized properly for the summer cooling load, it will be undersized for the heating load. If oversized, the heat pump will cycle on and off too frequently, shortening the equipment life. If undersized, it will run too much and never meet the needs of the home.

Supplemental heating, through an integrated electric resistance heater is needed to adequately supply heat during the very cold winter months, **adding about five to 10 percent more** to the operating costs and pollution.

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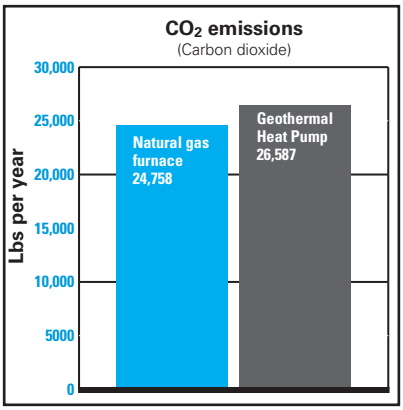
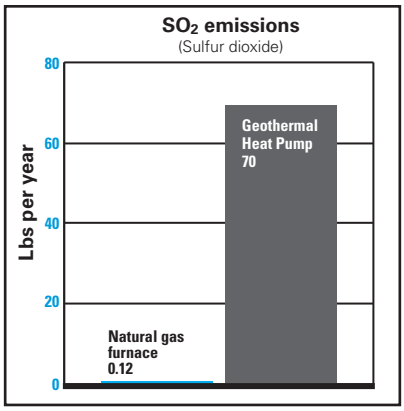
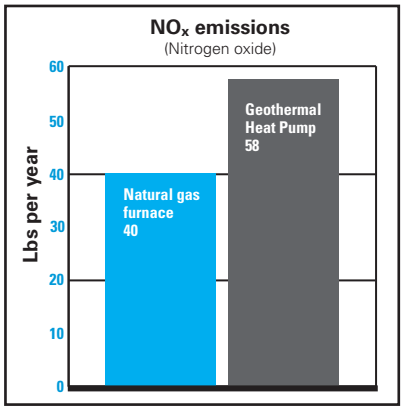
Environmental factors

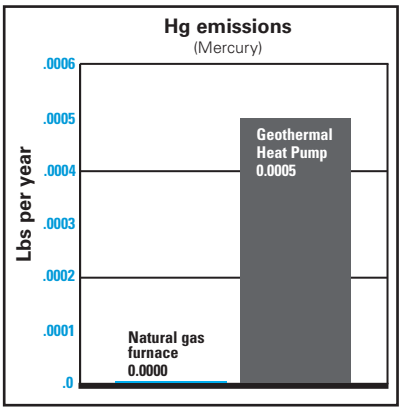
Ground-source heat pumps are less environmentally friendly than natural gas furnaces because they require electricity to operate. Electricity is a secondary fuel that must be produced from another energy source. In Minnesota specifically, more than half of the electricity is produced by burning coal, the biggest source of carbon dioxide pollution in this area. Also, if a heat pump is run at an off-peak electricity rate, emissions released are most likely higher, as off-peak electricity is primarily coal-based.

A natural gas furnace is the most efficient and clean-burning option for home heating. The charts below detail the levels of various pollution-causing emissions released by geothermal heat pumps versus natural gas furnaces, using the same equivalent heating output example as described in the cost comparison chart (front).









Clean burning natural gas releases far fewer harmful emissions into the environment:

- Less carbon dioxide -- a major greenhouse gas
- Almost no sulfur dioxide -- a major cause of acid rain and haze
- Less nitrogen oxides -- the primary cause of smog
- Zero mercury emissions -- which can make some fish unsafe to eat

When comparing a natural gas furnace to a geothermal heat pump, the natural gas furnace is more economical to install and operate; more environmentally friendly; and is your best choice for heating your home.

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