

## **Geothermal heating and cooling**

Contrary to what you might think at first, geothermal heating can be installed anywhere, and uses the heat stored in the ground to heat your home. All that's required is plastic piping buried at least six feet underground to circulate an antifreeze solution that carries the heat, and a geothermal heat pump in your home that extracts the heat out of the circulating antifreeze during the winter. *In addition, a full 30% of the installation cost can be recovered as a tax credit on your Federal Tax return until 2016, making this the perfect time to invest in a geothermal system.*

## **Geothermal heating and cooling demystified**

A geothermal heating and cooling system uses the relatively constant temperature of the earth below the frost line as a source of heat in the winter and a place to discharge heat from your home in the summer. The heat exchange takes place between an antifreeze mixture running through a long pipe and the earth. The antifreeze mixture is pumped into a geothermal heat pump that operates exactly like a refrigerator except in the winter the heat contained in the antifreeze solution is used to evaporate a refrigerant that is then compressed by a compressor to raise the temperature of the refrigerant from the starting temperature of ~50°F to ~95°F. The heated refrigerant is then circulated through a heat exchanger, warming the surrounding air that is then circulated throughout the ductwork in your home with a fan. This process is reversed in the summer to provide air conditioning.

*Geothermal heat pumps are 3-4 times more efficient than conventional gas- or coal-fired furnaces and are much less expensive to operate.* Geothermal heat pumps have been manufactured for decades and represent a proven technology. Although the upfront installation costs are higher, the payback period is generally only 5-10 years due to the energy efficiency of these systems.

Geothermal heat pumps generally come equipped with a desuperheater that uses waste heat to aid in hot water production. This is particularly advantageous during the summer months when air conditioning generates enough waste heat to make your hot water essentially free.

A very informative article on the fundamentals of geothermal heat appeared in Popular Mechanics several years ago (<http://www.popularmechanics.com/home/improvement/energy-efficient/1274631>).

## **Geothermal heat pump manufacturers**

Several manufacturers have been making geothermal systems for decades and the following is a list of some of the larger manufacturers.

Econar (<http://www.econar.com/>)

GeoComfort (<http://www.geocomfort.com/>)

HydronModule (<http://www.hydronmodule.com/>)

WaterFurnace (<http://www.waterfurnace.com/>)

## **Geothermal installers**

There are several area firms that specialize in the installation of geothermal systems including East Coast Geothermal (<http://www.eastcoastgeothermal.com>) and Adros Energy

<http://www.adrosenergy.com>). As with any large project, the best approach is to obtain several bids prior to selecting an installer.