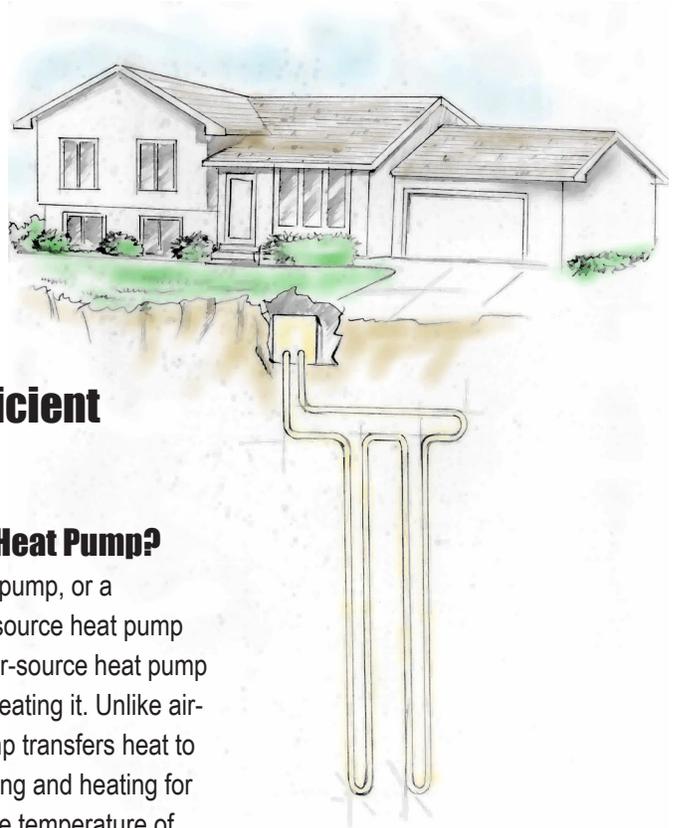


# Ground-Source Heat Pumps



## The Most Energy-Efficient Choice

### What Is A Ground-Source Heat Pump?

Also called an earth-coupled heat pump, or a geothermal heat pump, a ground-source heat pump operates much like the common air-source heat pump by transferring heat, rather than creating it. Unlike air-source, a ground-source heat pump transfers heat to and from the earth to provide cooling and heating for your home. Below the frost line, the temperature of the earth in Nebraska stays fairly constant 50 - 55°F. In summer, the soil temperature is cooler than the outside air. In winter, it's warmer. A ground-source heat pump uses this constant temperature to heat and cool your home very efficiently.

### At Home With The Environment

Geothermal is the most earth-friendly home heating and cooling system available today. When you install a geothermal system, you're investing in a home that uses less energy, consumes fewer natural resources and keeps the air clean and fresh. There's no flame, no flue, no odor and no pollutants, in your home.

### Cost-Effective Heating

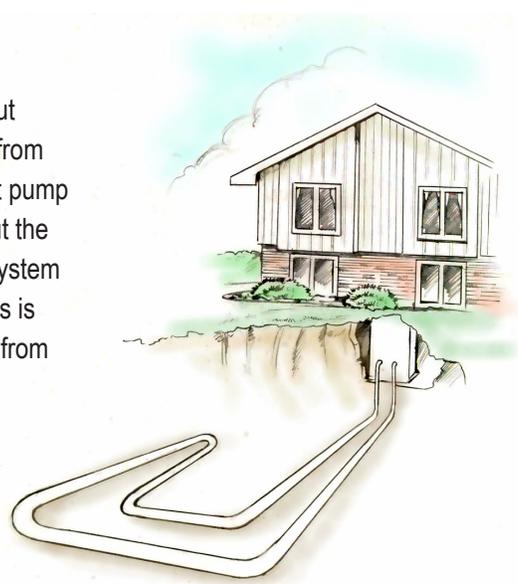
In the heating season, a ground-source heat pump supplies three to four units of heat to your home for every unit of electrical energy required to operate the system. So you get two to three kilowatt hours (kWh) of free energy for every one kWh of electrical energy you pay for. In other words, a ground-source heat pump is 300% to 400% efficient.

### Vertical Closed – Loop

In a vertical closed-loop ground heat exchanger, a water/ antifreeze mixture is circulated through sealed pipe loops buried in vertical bore holes. The bore holes are typically 150 to 200 feet deep. As with a horizontal closed-loop system, heat is transferred by the heat pump system, from the ground during the winter and to the ground during the summer. A vertical heat exchanger can be installed on smaller lots rather than a horizontal system.

## Horizontal Closed-Loop

In a horizontal closed-loop ground heat exchanger, a water/antifreeze mixture is circulated through sealed pipe loops buried horizontally, about six feet underground. During cold weather, the pipe loops absorb heat from the earth and deliver it to the heat pump located in the house. The heat pump transfers heat from the loop to warm the air that is circulated throughout the house by ductwork. The special, nontoxic antifreeze ensures that the system will not freeze during severe winter weather. In the summer, the process is reversed for air conditioning, and the heat pump system transfers heat from the house to the ground.



## Well Water System

As its name suggests, this system utilizes two wells and underground water. Water from one well is pumped through the heat pump, then returned to a second well or discharged into a pond. This system requires two – four gallons of water per minute, per ton, to operate.

Because water is returned to the earth, the underground water supply is not depleted by the heat pump's operation.

## Next Steps To Installing A Ground-Source Heat Pump

- Pick a qualified heating/cooling contractor that has experience installing heat pumps. North American Technician Excellence (NATE) contractors are recommended.
- Ask your heating/cooling contractor to accurately evaluate your home for the installation and capacity requirements of a heat pump system. This evaluation should consist of a computer generated analysis showing the amount of heating and cooling needed to condition your home for winter and summer.
- When requesting bids from qualified dealers, consider options such as: variable speed air handler; duct sealing; programmable thermostats; mechanical ventilation and air filtration.
- Once you receive the bids, have your contractor explain the EFFICIENCY of the heat pump. The efficiency rating for the heat pump air conditioning cycle is called the Energy Efficiency Ratio or EER. The EER rating can range from 13 to 28. The efficiency rating for the heat pump heating cycle is called Coefficient of Performance or COP. The COP rating can range from 3.1 to 4.5 COP.
- The important thing to remember is: the larger the EER and COP rating, the more efficient your heat pump will be. It is recommended that you purchase the most efficient system that you can afford. As time goes on, the more efficient heating system that you buy today will save you money tomorrow.

## For More Information

To find out more about the advantages of a ground-source heat pump, contact your local heating/cooling contractor.

If You Have Questions, Contact Your Local Dealer, Power Supplier or Your Local  
Nebraska Public Power District Office.



Polk County RPPD

