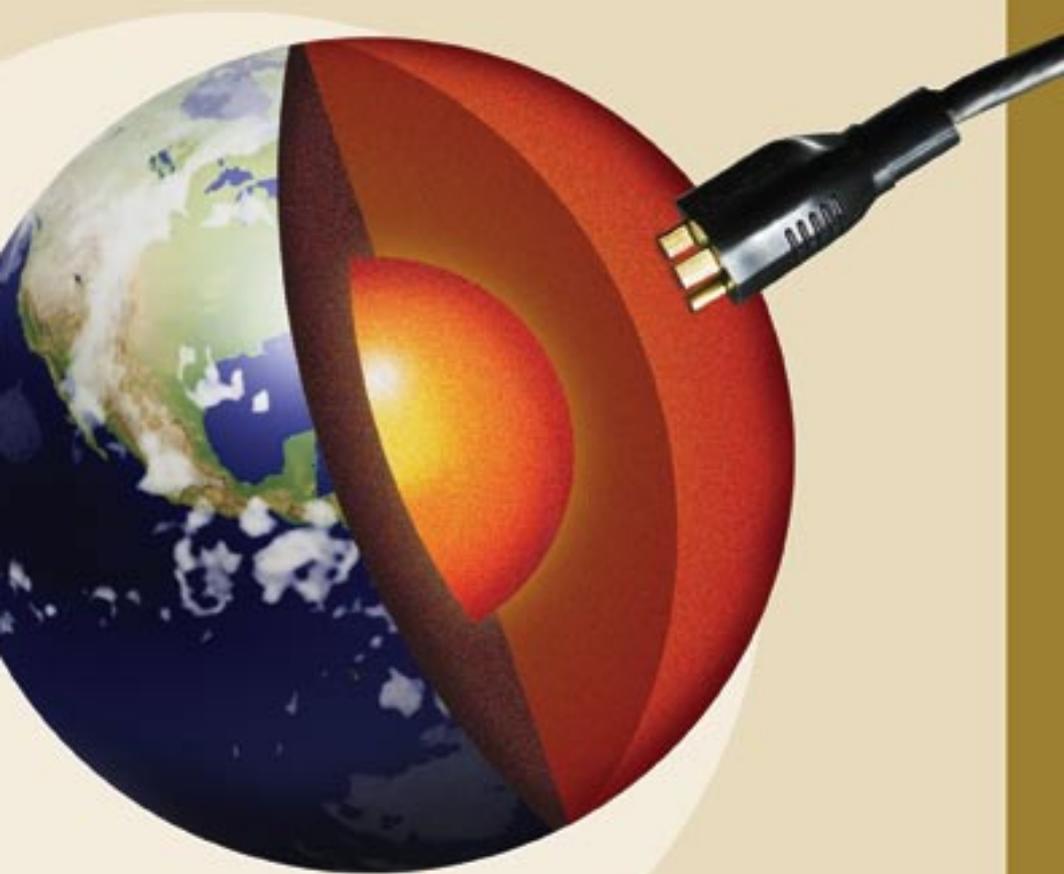


GeoThermal

Bringing comfort to your world

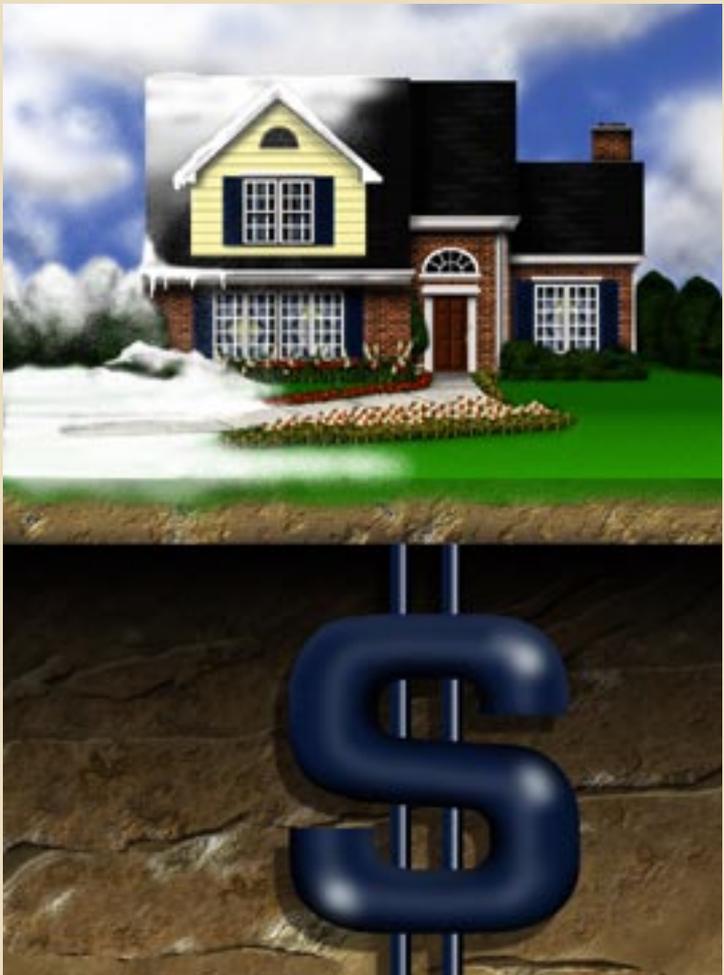


**ALLIANT
ENERGY**

We're on for you.™

GeoThermal

Welcome to the new era of home comfort—otherwise known as GeoThermal heating and cooling. While the name may sound space-age, the technology is very well, down-to-earth. Read on to find out more about how you can heat and cool your home using the natural heat-storing ability of the earth—and significantly lower your energy costs!



How does it work?

A geothermal heating and cooling system, sometimes called a ground-source heat pump, works on a simple premise: the earth below the “frost line” (usually about four feet down) is a constant temperature of about 50 degrees year round. Heat can be taken from the ground and transferred through a heat pump to the air in your home during the winter. Heat can also be transferred back into the ground during summer to cool your home.

The basic elements of the system include:

- Buried loops of piping (the ground loop);
- A biodegradable liquid antifreeze;
- A pump module to circulate the antifreeze; and
- A heat pump.

The loops of piping are buried in the ground, either vertically or horizontally (more about that later) and are connected to the circulating pump inside your home. The pump module circulates a mixture of water and biodegradable antifreeze through the buried pipe loops, and the liquid mixture absorbs heat from the ground as it flows through the loop. The heat pump takes heat from the liquid mixture and transfers it to the air, which is circulated in your home. To cool your home in the summer, the system simply works in reverse.

Benefits

What are the benefits?

Because the heat pump is self-contained and installed indoors, geothermal systems have low maintenance and are very reliable. And there's more:

- The ground loop piping is designed for very long life, and some manufacturers warrant their piping for 50 years.
- The ground loops are joined by thermal fusion (melting them together), so there's virtually no chance of the liquid leaking out.
- There are no noisy "on" cycles with blasts of hot or cold air, and there are no fluctuations in temperature.
- There are no flues or chimneys and no carbon monoxide concerns.
- There are no unsightly or noisy outdoor (condenser) units.

Safe, reliable and easy to maintain—what more could a homeowner want?

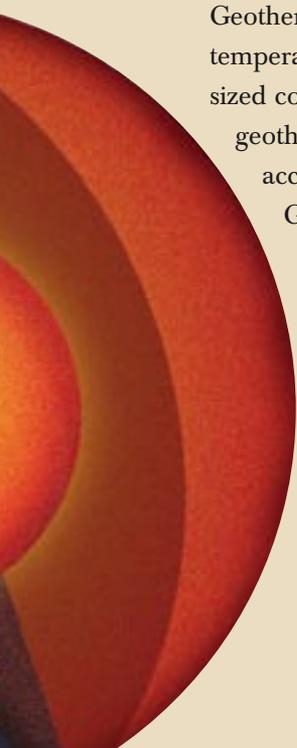


How about lower energy bills? Heat from the ground is free, and the only electricity needed is for moving that heat between your home and the ground. According to the Geothermal Heat Pump Consortium, a geothermal system can lower your heating bills up to 50 percent and lower your cooling bills up to 30 percent. This could mean a payback in as little as two to seven years! Ground-source heat is a naturally renewable energy source and friendly to the environment.

And for extra energy savings, you can add an attachment called a “desuperheater” that connects your heat pump to your water heater. When the energy from the heat pump isn’t needed, it’s diverted to your water heater. For most of the summer, you’ll be getting virtually free hot water!

Geothermal systems work very well in below zero temperatures; and when the equipment and loop field are sized correctly, electric resistance back up is not needed. The geothermal system in your home is specifically designed to account for the climate and your home's heating load.

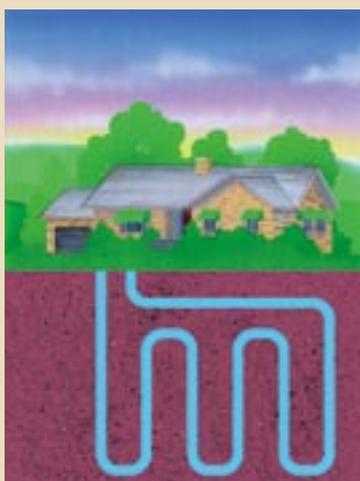
Geothermal systems are very efficient in northern climates and work just as efficiently as those in southern zones. As with any home heating and cooling system, adequate insulation and overall weatherization are key factors in lowering energy consumption.



Installation

Vertical or Horizontal?

The loops of plastic piping can be installed either vertically or horizontally, depending on the size and shape of your yard, the amount of existing landscaping and soil conditions. The amount of piping needed depends on the size of your home and the loop configuration. Your contractor or builder can advise you which option is better for your home.



To install a vertical loop:

a bore hole about four inches in diameter is drilled near your home. The depth of the hole is usually between 50 and 200 feet, depending on what the contractor encounters along the way. Two U-shaped loops of pipe are inserted into the hole, followed by a special grout sealing material.



For a horizontal loop:

the contractor will excavate a trench about three feet wide and between four and six feet deep. There are a variety of techniques for placing the piping in the ground: some contractors utilize a “slinky-style” technique by tying the coils together; others might loop the pipe back over itself, covering each length with soil.

Commercial and Industrial Buildings

In large commercial buildings, such as schools and high-rise offices, the use of multiple geothermal systems allows commercial users to control the climate of each indoor area or zone of a building individually. Each guest room of a hotel or room of an office building may have its own geothermal unit.

The design means extraordinary savings because the heat removed from the sunny side of a building is transferred to the geothermal unit heating the shady side, reducing the demand on the earth loop. With a geothermal system, you can completely diversify the heating and cooling load and reduce demand on energy needs.

School Buildings

School systems face many concerns and challenges. Administrators face the problems of upgrading old schools and constructing new facilities that meet today's standards.

The life-cycle cost of the heating and cooling system is an important economic consideration. Schools must plan for long-term efficiency to maximize their resources. Geothermal systems have been shown to have competitive initial investment costs, lower operating and maintenance costs, as well as the lowest life-cycle costs compared to other systems. These savings make geothermal ideal for schools of all sizes and locations.