Geoexchange Systems—

Outstanding home comfort through advanced technology

How would you like to have a heating and air conditioning system in your home that can:

- Save energy and slash electric bills,
- Cut greenhouse gas emissions,
- Rid your yard of unsightly outdoor equipment,
- Drastically reduce the cost of your hot water, and
- Reduce maintenance costs—

even as it improves the year-round comfort of your home?

Sound too good to be true?

In fact, such units, called geoexchange systems, offer such a lengthy list of benefits that at first glance they do seem too good to be true.

Their benefits, though, flow directly from the clever application of sound technology—what you can think of as good science.

Once you understand how geoexchange systems work, you'll understand how they can bring such an attractive list of benefits to your home.

What They Do

Geoexchange systems provide heat in the winter and cooling in the summer, at efficiencies that are far better than those for most alternative systems.

Like conventional heat pumps, they are essentially air conditioners that can also run in reverse to provide heat in the winter. The primary difference is that they rely on the nearly constant temperature of the earth for heat transfer instead of the widely fluctuating temperatures of the outside air.

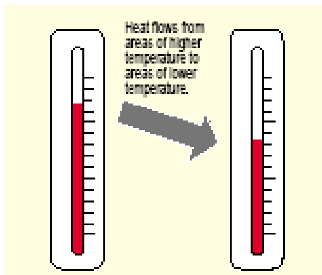
That is the key to the geoexchange unit's surprising efficiency.

How They Work

Geoexchange systems, like common heat pumps and air conditioners, make use of a refrigerant to help transfer (or pump) heat into and out of your home.

The refrigerant helps the geoexchange system take advantage of two primary principles of heat transfer:

1. Heat energy always flows from areas of higher temperature to areas of lower temperature.



2. The greater the difference in temperature between two adjacent areas, the higher the rate of heat transfer between them.

Refrigerators, air conditioners, and heat pumps all operate by pumping refrigerant through a closed loop in a way that creates two distinct temperature zones—a cold zone and a hot zone.

The simplest example of such a system is the universally familiar home refrigerator. In a refrigerator, a fan blows the air inside the box over tubes containing refrigerant that is very cold (typically below 0°F). Heat flows from the interior air to the cooler refrigerant.

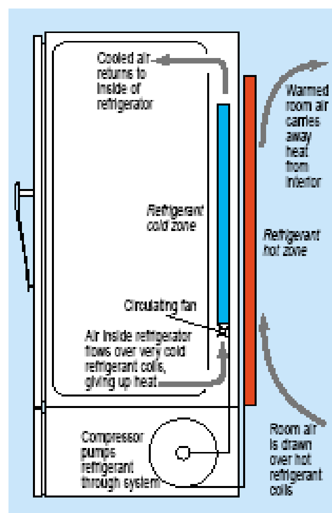
The refrigerant is then pumped to the high-temperature section, which is exposed to room air outside the refrigerator box. Because the refrigerant is hot in this zone, it gives up heat to the relatively cooler air in the room, before flowing back to the cold zone to begin the loop again.

An air conditioner works in exactly the same way, except that it extracts heat from the air inside a room or building and transfers it to the air outside the building.

A conventional heat pump adds a reversing capability, so the hot zone and the cold zone can be switched. With the zones reversed, it can extract heat from the outside air in the winter and transfer it inside.

Granted, being able to extract heat from frigid winter air seems like it shouldn't work. But it will if we can expose the cold air to refrigerant that's even colder than it is. And modern heat pumps can do that.

If the outside air gets extremely cold, though, a heat pump just can't make the temperature of the cold zone low enough. That's when supplemental electric heating elements kick in. Working much like a toaster, they supply warmth to the house, but at very high relative cost.



Typical home refrigerator