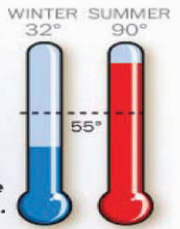


Digging deep to unearth cheap energy

No matter what climate chaos occurs above ground, the temperature a few feet below the surface is always in the mid- to upper 50s. Geothermal heating and cooling saves energy by tapping that constant temperature to warm a house in winter and cool it in summer.

How geothermal heating works



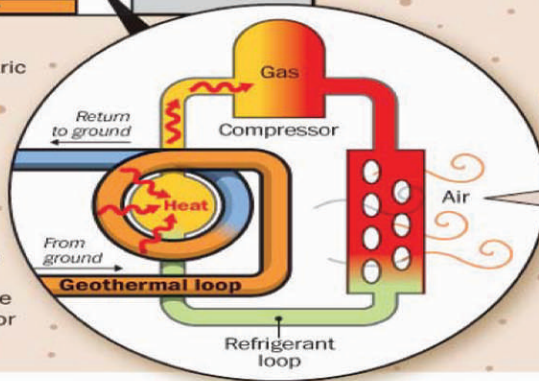
No matter what the temperature aboveground ...

... the temperature below ground stays a constant 55°-58°



1 Fluid (usually water and antifreeze) circulates through underground pipes. There it warms or cools to the ground temperature of about 55 degrees.

2 Fluid enters the electric geothermal heat pump inside the house. Refrigerant absorbs heat from the fluid and evaporates into a gas. A compressor concentrates the heat, which raises its temperature to well over 100 degrees. The process is reversed for cooling.



3 A conventional forced-air or radiator-type system then sends the desired amount of heat through the house. This system uses 25 to 50 percent less electricity than a conventional HVAC system.

A typical system has 200' holes, each containing two connected polyethylene pipes that loop into the house.

The number and depth of holes required depends on factors such as house size, lot space available, soil conditions and geology of the area.

Types of geothermal systems

- 1 Vertical closed loop:** This type requires digging deep holes (100-400 feet) in a relatively small area and works for people who don't have a lot of land.
- 2 Horizontal closed loop:** Pipes, straight or coiled, are buried in trenches at least four feet deep over a large space. Don't consider this unless you have a lot of space and budget for landscaping.
- 3 Pond closed loop:** If you happen to have a large enough body of water nearby, pipes can be submerged there, at least eight feet under the surface to prevent freezing.
- 4 Open loop:** If groundwater is plentiful and clean, it can be used directly from a well (with no antifreeze) and be discharged back into the aquifer after it has circulated through the pipes. This type may bump up against local codes.

