NOTHING COMPARES

...TO THE EFFICIENCY OF A GEOTHERMAL HEAT PUMP

...from Comfort-Aire

Glossary of Terms

GEOTHERMAL—Refers to a geothermal heat pump which uses the thermal energy of the ground or ground water to provide heating and cooling; primarily residential

WATER SOURCE—Refers to water source heat pumps used in commercial installations; generally involves boiler/cooling tower and/or water loop installation

BTUH—British thermal units per hour, used to indicate heat output

CLOSED LOOP—Another name for ground loop geothermal systems

COP—Coefficient of Performance, a measurement of efficiency in heating; the higher the number, the more efficient the equipment

DESUPERHEATER—A partial heat recovery system that captures heat from hot refrigerant as it leaves the heat pump compressor and transfers the heat to domestic hot water

EER—Energy Efficiency Ratio, a measurement of efficiency in cooling; the higher the number, the more efficient the equipment

ENERGY STAR®—Signifies an energy efficient product, designation first developed by United States government and now recognized by Canada and a number of other countries

EWT—Entering water temperature which is the temperature of the water or water/antifreeze solution when it enters the coaxial coil of the unit where the heat exchange process with the refrigerant cycle begins

HVAC—Refers to heating, ventilation and air conditioning equipment and systems

GROUND LOOP—Geothermal system with heat transfer liquid permanently contained in piping buried in the ground or submerged in a pond or lake

GROUND WATER—Geothermal system in which water is pulled from an aquifer and used for heat transfer, then released to another well, a ditch or other approved water source

OPEN LOOP—Another name for ground water geothermal installations

R-410A—The environmentally friendly refrigerant now used in all HVAC equipment; all Comfort-Aire geothermal units shown in this brochure are charged with R-410A

SINGLE STAGE—Heat pump that operates at one stage and one capacity

TAX CREDITS—The American Recovery and Reinvestment Act of 2009 allows a tax credit of 30% for installations of new qualifying geothermal equipment, with no dollar cap

TWO STAGE—Heat pump that operates at two stages, depending on demand, and at different speeds through the use of multi-stage compressors and multi-speed blower motors; exceptionally efficient at low speeds but capable of supplying more heat or cooling when required

WATER LOOP—Installation used in many commercial applications, includes boiler/cooling tower

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TODAY'S GEOTHERMAL:
Energy Efficient *and* Earth Friendly

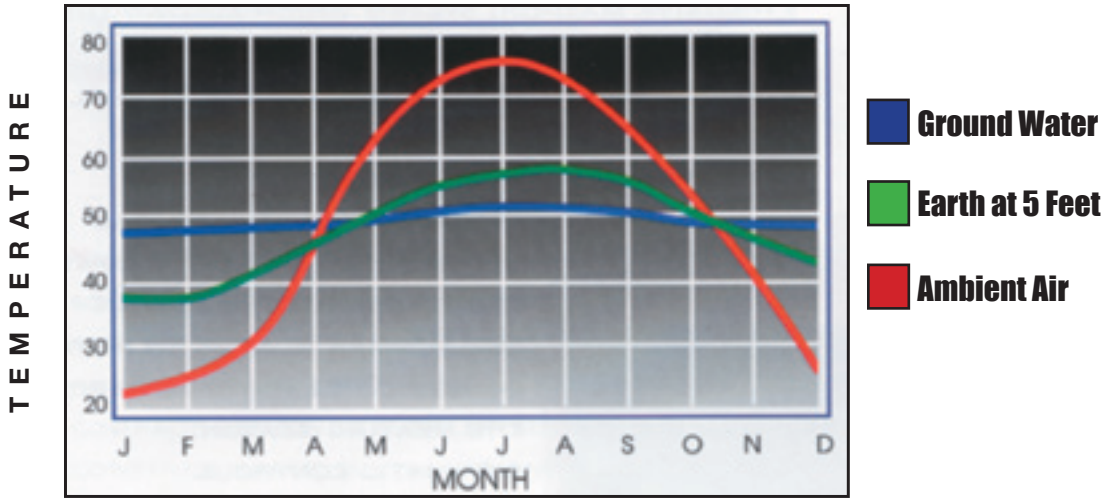
Rising energy costs have made us all aware of the need for energy efficiency. At the same time, we are becoming conscious of the cost to the earth's environment for the ever-expanding use of fossil fuels. While there are many approaches to saving energy, lowering utility costs, and conserving natural resources, geothermal systems offer a proven solution that's not only practical, but readily available today. Nothing compares to the efficiency of geothermal systems.

A geothermal heat pump can save half the cost of heating and cooling the average home. In fact, for every unit of energy used to run a geothermal pump and blower, four units of heat energy are produced.

Because geothermal systems rely on the relatively stable temperatures of the earth for heat transfer, they aren't burning fossil fuels to create energy for heat or cooling. The systems are extraordinarily efficient because in most geographical areas, the temperature of the earth at five feet below the surface remains fairly consistent, no matter what the season. Similarly, ground water temperatures are constant over the course of the year.

The basic concept is simple: piping or tubing is buried in the ground or submerged in a pond or lake. In the winter, heat is absorbed from the water or ground (depending on the type of system) and transferred to the heat pump where it is distributed through the home's ductwork. In the summer, hot air in the home is extracted and

USING THE EARTH ITSELF FOR HEAT TRANSFER



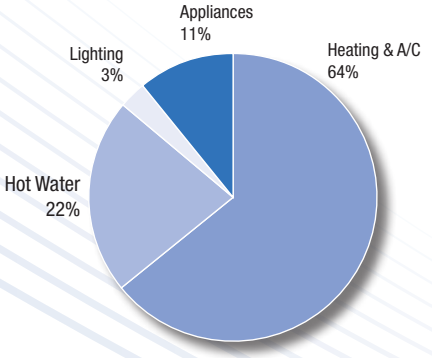
The year 'round stable temperatures of ground water and the earth itself make it possible for the energy exchange to occur in geothermal systems.

transferred to the cooler ground or water. It is this consistency of earth or water temperature that allows heat transfer to occur—keeping you cool in summer and warm in winter.

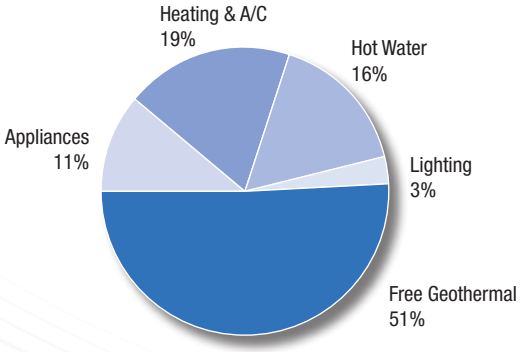
Energy efficiency is the primary advantage of a geothermal system. Energy is needed only to run the compressor and to pump a water solution through the buried piping and then to run the system's blower to distribute the conditioned air. Not only is it possible to heat and cool your home with a geothermal heat pumps, but several of our systems come with a hot water generator that supplements heating of domestic hot water (in both the heating and cooling modes) for further savings.

With a geothermal system, over half your home's energy is free!

RESIDENTIAL ENERGY USE



Conventional System



Geothermal System

Our geothermal systems can work in virtually every climate. With an extended operating range of 20° to 120° F for entering water temperature, they provide a comfortable indoor environment all year long, although some northern locations may require a supplemental heat source.

Other advantages include exceptionally quiet operation. Multiple sound attenuation features are built into the design, including a special compressor mounting system that reduces vibration and interior cabinet insulation. Also, there are fewer moving parts to wear out than with a conventional heating/cooling system.

Many people appreciate the safety that is inherent in a geothermal system. No gas or oil is used, there's no standing pilot light, no fumes and no odors to worry about.

Finally, there's the confidence that comes from having technology that's been proven over many years and recognized by the EPA and the U.S. Department of Energy.

Exceptional efficiency means fast payback...

Although the initial cost of a geothermal system is higher than a conventional heat pump or furnace/condenser combination, you can quickly recoup these costs through energy savings and potential Federal tax credits.

On average, geothermal heat pumps provide:

- 40% greater efficiency than air-to-air heat pumps
- 48% greater efficiency than gas furnaces
- 75% greater efficiency than oil furnaces

(Source: Geothermal Heat Pump Consortium)

Ask your dealer to prepare a cost savings analysis for you to determine just how much you can save over the life of the system. Our LoopLogix® software makes it easy to compare operating costs of various systems based on your home's requirements and historical weather data.

Geothermal... the logical choice

Installation Flexibility

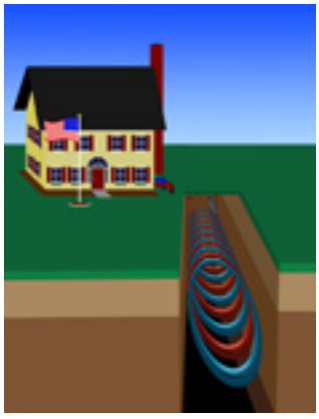
Which type of system and which type of installation you choose is determined by your preference, your geographic area, and the availability of ground water or adequate land for burying loop pipes. Designed properly, all systems work equally well.

GROUND LOOP

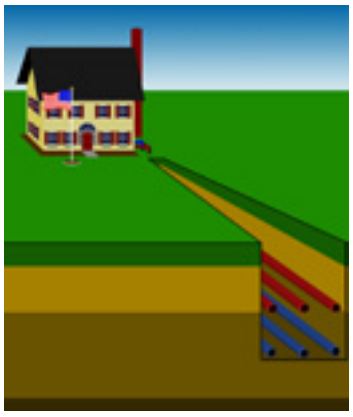
In this heat exchange method, the heat transfer fluid is permanently contained in a closed piping system. This piping, typically made of polyethylene tubing, is buried in the earth or submerged in a pond or lake. The heat transfer fluid—a solution of antifreeze and water—is pumped through the piping. In the winter, it absorbs heat from the earth or water. This relatively warm solution is then pulled back to the heat pump which extracts heat and circulates warm air throughout the house.

During hot weather, heat in the home is extracted by the heat pump and transferred to the liquid circulating through the closed loop piping. The cooler earth or water then absorbs this heat, and the cooled water is circulated back to the heat pump and used to cool the house.

Ground loop systems can have piping buried in horizontal trenches or in vertical bores—some types of installations are shown below. The number, length and diameter of the pipes are determined by the heating/cooling load of the house, as well as the amount of land or the availability of a pond or lake.

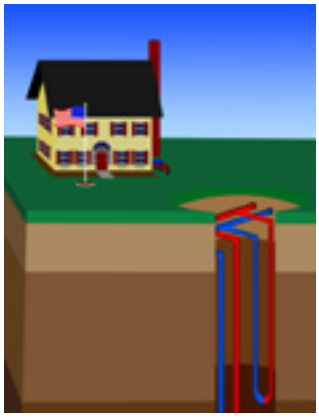


Slinky-type piping can be buried in a horizontal trench.



This backhoe trench shows six pipes—three outgoing, three incoming.

Coils of piping can be submerged in a pond, as can slinky piping.



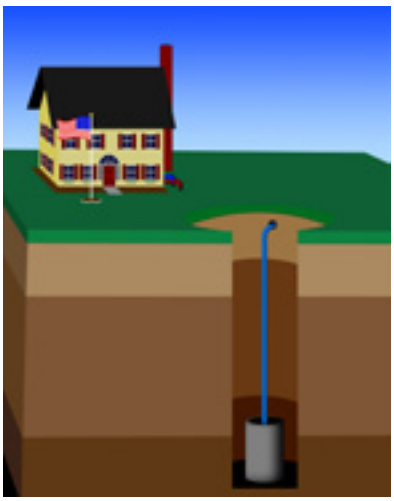
For a limited space, a vertcal hole is used; this one shows two u-tubes.

GROUND WATER

In this type of system, there is no heat exchange fluid enclosed in piping. Water is removed from an aquifer and is circulated through the heat pump. This water is then discharged to a pond or lake, or into another well—unchanged except for temperature.

The heat exchange process works the same as in a Ground Loop system: in the heating mode, heat is extracted from the water and transferred to the air being circulated in the home. In the cooling mode, the process is reversed and heat from the home is extracted by the heat pump and transferred to the cooler ground water.

The illustration shows how water is pulled from a well into the heat pump inside the house, before being discharged into another well, pond or approved location.



A typical ground water well installation