

## PROS OF GEOTHERMAL ENERGY



### Basic Principles of Geothermal Energy:

While outdoor air temperatures vary throughout the year, ground temperatures within the Earth tend to remain relatively constant year-round. That's because the Earth absorbs almost 50% of the heat energy it receives from the sun. Geothermal home heating and cooling systems take advantage of this stored heat within the Earth by means of an underground pipe network, a heat pump unit, and a distribution system.

**Heating:** A water-based fluid is circulated through an underground closed pipe loop where it extracts natural heat from the ground. This heat is transferred to a heat pump where it is compressed, thus raising the temperature. The resulting hot air is then distributed throughout the home by means of a HVAC of radiant heating system.

**Cooling:** During hotter periods the process simply gets reversed. Excessive indoor heat is delivered to the heat pump, which is equipped with an expansion device that expands the heat, thus lowering the temperature. The cool air is then distributed throughout the home.

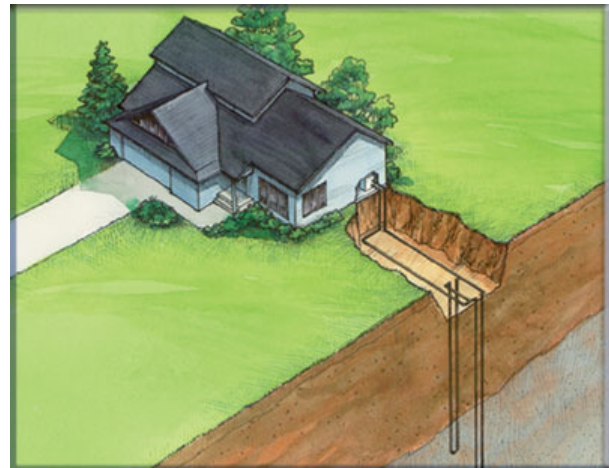
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### Types of Loop Systems

There are three types of pipe loop systems that will work for a home geothermal operation: vertical loop, horizontal loop, and pond loop. Which option you choose depends on (a) your home's location, and (b) the advice of your site-engineer or local geothermal dealer.

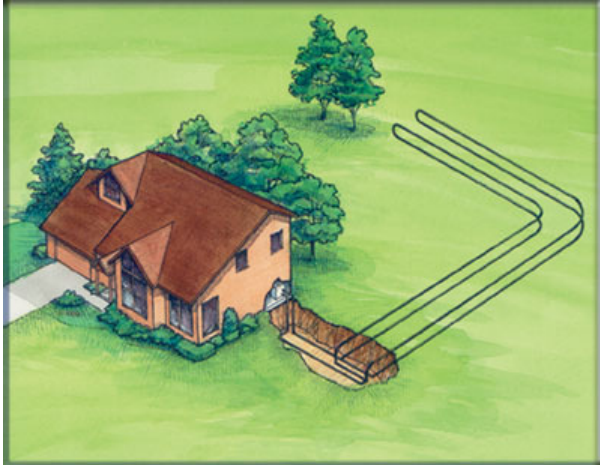
- **Vertical Loop System**

- Commonly used where land area is limited. Holes are drilled to a depth of 150-200 ft. U-shaped pipes are then inserted into each hole and are backfilled with a sealing solution. The incoming and outgoing pipe ends are then connected to the geothermal unit inside the home.



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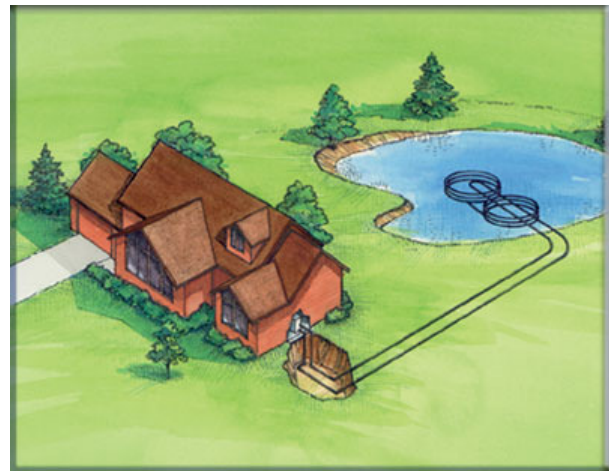


- **Horizontal Loop System**

- Commonly used where adequate land area is available. A series of trenches are dug about 6-8 ft. deep and 100-300 ft. in length. Pipes loops are laid in each trench, connected to the home, and are then backfilled.

- **Pond Loop System**

- Available if a large body of water is within 200 ft. of the home. This system works by anchoring coils of pipe on the bottom of the pond or lake, 8-10 ft. below the surface. Since water at this depth will not freeze, the water stays warmer than the air during cool months, and vice-versa in hotter months. Heat from the water is absorbed through the pipes and delivered to the home.



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**Pros of Using Geothermal Energy**

- Quiet operation; no need for noisy furnaces or boilers.
- Renewable energy; your heat source is essentially nothing more than absorbed solar energy.
- While more expensive initially, there is no fuel cost related to the heating process, thus conserving fossil fuels.
- Zero pollution generated.
- Low maintenance.



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