

ENERGIZE MISSOURI HOMES

MISSOURI DEPARTMENT OF NATURAL RESOURCES



HOMEOWNER UPGRADES and GEOTHERMAL

GEOTHERMAL SYSTEMS FACT SHEET

What is a geothermal heat pump?

A geothermal heat pump uses the thermal energy of the ground or groundwater to provide residential space conditioning and/or domestic water heating. During the winter, fluid is circulated through pipes in the ground, draws heat stored in the earth and carries it into the residence. In the summer, the system reverses, takes heat from the building and deposits it to the cooler ground.

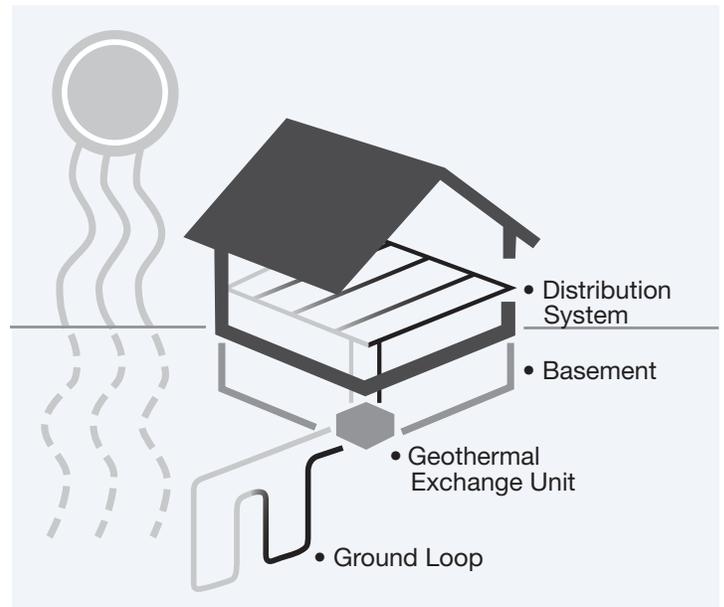
What are the benefits of a geothermal heat pump?

- Geothermal heat pumps typically use 25 to 50 percent less electricity than conventional heating or cooling systems.
- Geothermal heat pumps save money in operating and maintenance costs.
- Provide excellent "zone" space conditioning if installed, allowing different parts of a home to be heated or cooled to different temperatures.
- Geothermal heat pumps do not generate noticeable noise.
- Equipment sheltered inside a building or underground is highly reliable and durable with lifetimes spanning from 25 to 50 years.

What are the types of geothermal heat pump systems?

There are four basic types of geothermal heat pump systems. Three of these types – horizontal, vertical and pond/lake – are closed-loop systems. Closed-loop systems use a continuous loop of special buried plastic pipe as a heat exchanger. Horizontal and vertical systems are installed in the ground; pond/lake systems are installed in bodies of water. The fourth type of geothermal system is open-loop and uses groundwater from a conventional well as a heat source in winter and a heat sink in summer. There is no significant difference in operating cost and efficiency between open- and closed-loop systems.

For more information about geothermal heat pump systems and how they work, please visit the U.S. Department of Energy website at http://www.energysavers.gov/your_home/space_heating_cooling/index.cfm/mytopic=12640.



GEOTHERMAL HEAT EXCHANGE SYSTEM

What rebates are available through the Homeowner Upgrades and Geothermal program?

The Homeowner Upgrades and Geothermal Program will provide rebates to Missouri homeowners of 50 percent of eligible project costs up to \$10,000 for the installation of a geothermal heat pump system. To receive this rebate, homeowners must first have an audit performed by an *Energize Missouri Homes* qualified auditor. A list of these auditors is available at <http://www.dnr.mo.gov/transform/energizemissourihomes.htm>.

To realize the most benefit from the installation of a geothermal heat pump system, a homeowner is encouraged to first make the home as energy efficient as possible by performing other energy efficiency upgrades such as air sealing, adding insulation, retrofitting mechanical equipment, and weatherizing the home. Making these upgrades first will allow homeowners to install smaller geothermal systems that are less expensive and therefore a better investment for the homeowner.

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What are the Homeowner Upgrades and Geothermal program requirements for a geothermal system?

The heating efficiency of geothermal heat pumps is indicated by the coefficient of performance (COP), cooling efficiency is indicated by the Energy Efficiency Ratio (EER). The Homeowner Upgrades and Geothermal Program requires geothermal heat pump systems to satisfy the ENERGY STAR® tier two requirements for energy efficiency. These requirements are available at: http://www.energystar.gov/index.cfm?c=geo_heat.pr_crit_geo_heat_pumps.

PRODUCT TYPE	EER	COP
Water-to-Air		
Closed Loop Water-to-Air	16.1	3.5
Open Loop Water-to-Air	18.2	3.8
Water-to-Water		
Closed Loop Water-to-Water	15.1	3.0
Open Loop Water-to-Water	19.1	3.4
Direct Geexchange (DGX)		
Direct Geexchange (DGX)	16.0	3.6

GEOTHERMAL SYSTEM REQUIREMENTS

Source: ENERGY STAR® Tier Two requirements
http://www.energystar.gov/index.cfm?c=geo_heat.pr_crit_geo_heat_pumps

What size of a geothermal heat pump system is appropriate for my home?

To identify the size of a system for the home, a homeowner should ask their contractor for heating and cooling load calculations. Oversized units may cause dehumidification problems during cooling, resulting in reduced comfort during the summer.

How do I select a geothermal heat pump installer?

Homeowners should research qualified and experienced installers in the state and ask for referrals. Homeowners should insure that the selected installer inspects the home as well as the homeowner's current heating and cooling systems to assess the homeowner's needs. In addition, installers can help homeowners understand the various heat pump options available on the market and the most appropriate configuration for the specific conditions of the homeowner.

Additional Resources

U.S. Department of Energy – Energy Savers
http://www.energysavers.gov/your_home/space_heating_cooling/index.cfm/mytopic=12640

ENERGY STAR®
http://www.energystar.gov/index.cfm?c=geo_heat.pr_crit_geo_heat_pumps

Geothermal Exchange Organization
<http://www.geoexchange.org/>

International Ground Source Heat Pump Association (IGSHPA)
<http://www.igshpa.okstate.edu/>

