



SPECIAL INCENTIVES

Qualifying ground and air-source heat pumps can receive a 3 cents per kilowatt-hour discount and rebates up to \$500 are also available.

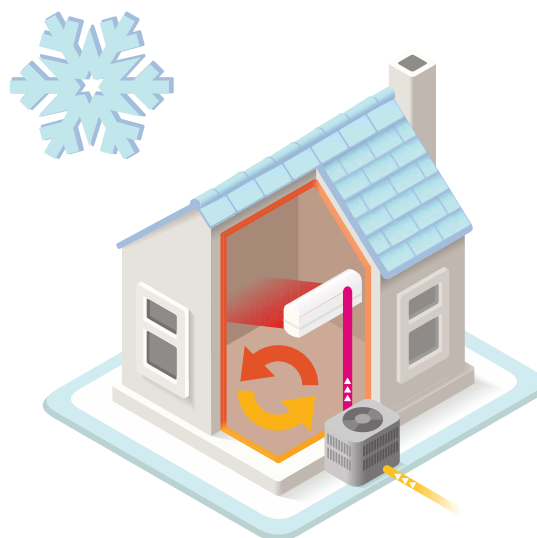
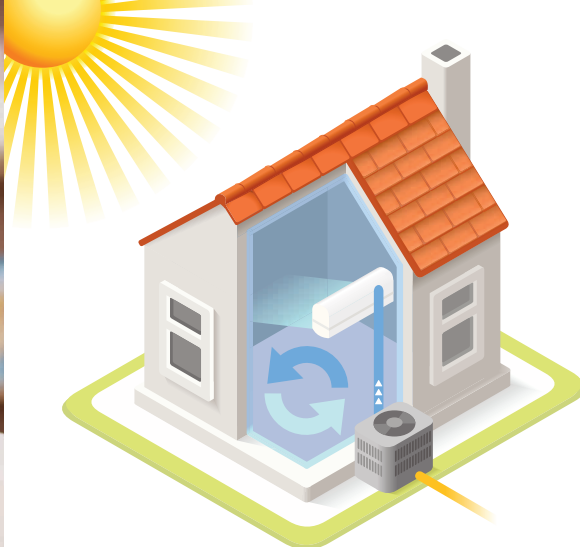
Contact us at 888-485-2537, extension 8957, for more information.

Additional rebates up to \$750 are available through our Energy Optimization program.

Visit michigan-energy.org or call 877-296-4319.

Great Lakes Energy does not sell or install heat pumps.

Visit earthcomfort.com sponsored by the Michigan Geothermal Energy Association for more information about heat pumps and dealers in your area.



1323 Boyne Avenue, P.O. Box 70
Boyne City, MI 49712

WEB: gtlakes.com

TEL: 888-GT-LAKES



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HEAT PUMP GUIDE

What Is A Heat Pump?

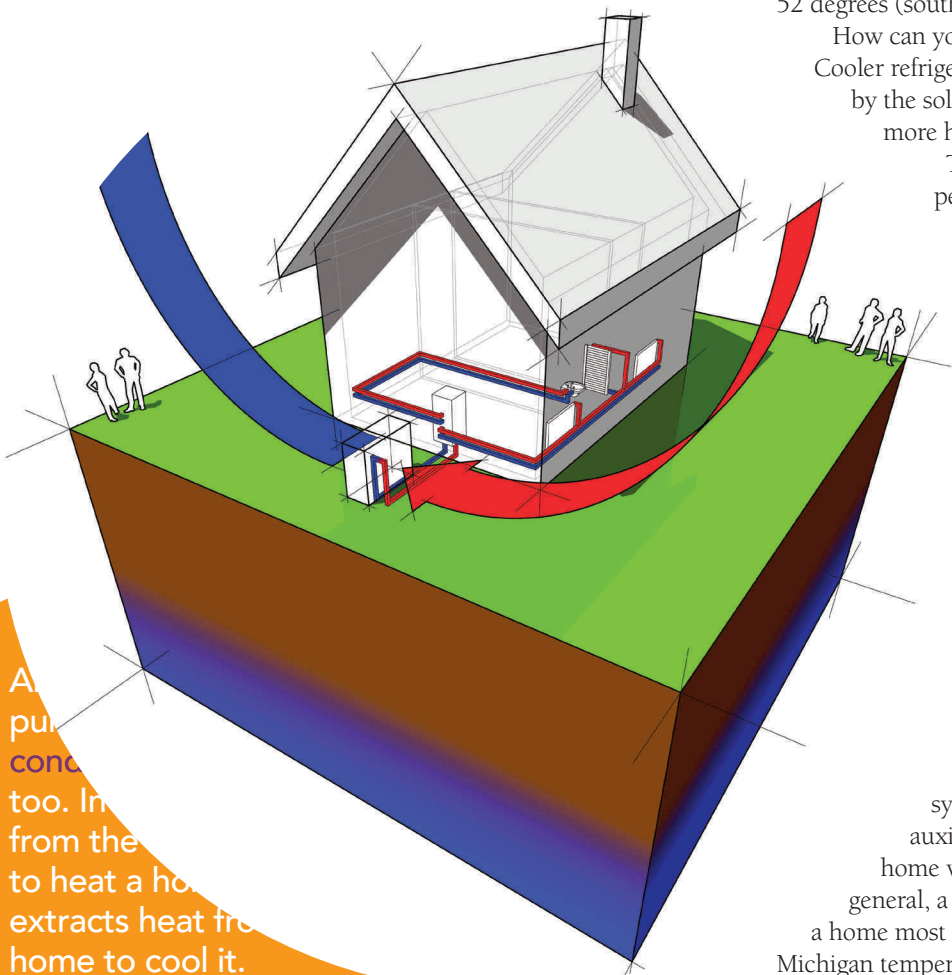
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WHAT IS A HEAT PUMP?

A heat pump is equipment that uses a refrigerant to move heat from one place to another. Your refrigerator is a heat pump. Heat inside is moved outside to keep food cold.

In similar fashion, a heat pump removes heat within your home to cool it. When cold weather arrives, it moves heat back into the home again.

Heat pumps require less energy and money to operate because the solar energy that provides the heat is free. Heat naturally present in the earth and air can be pumped into the home for heating or returned to the ground or air for cooling.



GROUND AND AIR-SOURCE SYSTEMS

Nearly half of the sun's energy is absorbed by the earth. A ground-source heat pump taps into the earth's heat by circulating a water solution through underground pipes (closed loop) or by extracting it from well water (open loop). Heat within the ground remains at a constant temperature year-round. In Michigan's lower peninsula, it ranges from about 42 degrees (north) to 52 degrees (south).

How can you warm a home at those temperatures? Cooler refrigerant within the heat pump is warmed by the solar heat and then compressed to generate more heat, enough to keep you comfortable.

The ground-source heating system is 400 percent efficient, delivering five units of geothermal energy for every single unit of electric energy.

Whether a homeowner's property is big or small, there are different types of ground-source systems (see illustration) to fit their space and land features.

An air-source heat pump extracts heat from the outside air in the heating mode and dumps it back outside in the cooling cycle. An air-source unit delivers up to three times more heat than the electrical energy it consumes.

However, the efficiency drops as it gets colder outside. More energy is required to extract heat from the air as external temperatures fall. A standard system needs to be installed with an

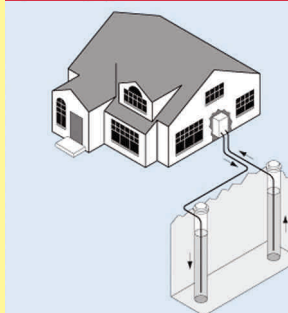
auxiliary source of heat to keep a Michigan home warm during colder winter days. In

general, a standard air-source heat pump can heat a home most efficiently in the fall and spring when Michigan temperatures generally are above freezing.

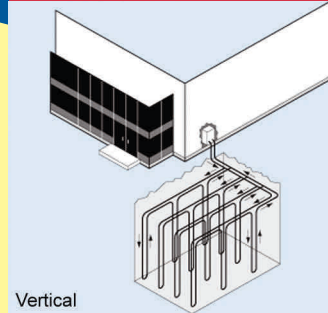
Types of Geothermal Heat Pump Systems

There are four basic configurations for geothermal heat pump ground loops. Three are "closed-loop systems," where a water and antifreeze solution is continually moved through pipes; the fourth is an "open-loop system," where groundwater or well water is used.

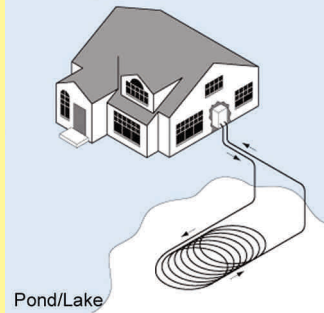
Open Loop Systems



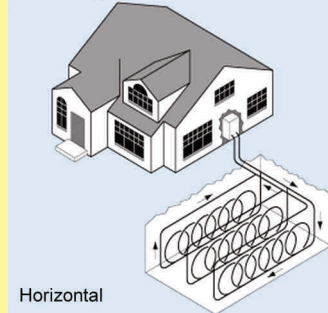
Closed Loop Systems



Closed Loop Systems



Closed Loop Systems



Source: U.S. Department of Energy,
Office of Energy Efficiency and Renewable Energy

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