

How They Work

Heat pumps work on the same principle as refrigerators, transferring heat rather than creating it. A ground-source heat pump uses the year-round temperature stability of the earth to heat and cool the home. It moves heat from the ground into the home in the wintertime and from the home into the ground in the summertime.

Picture a long pipe that loops underground. Pour ice water into one end of the pipe, and warmer water comes out the other end. The earth's stable temperature is warmer than the water and gives some of its heat to it. Likewise, warm water going in would come out cooler. This simple physics principle is what makes the geothermal system work.



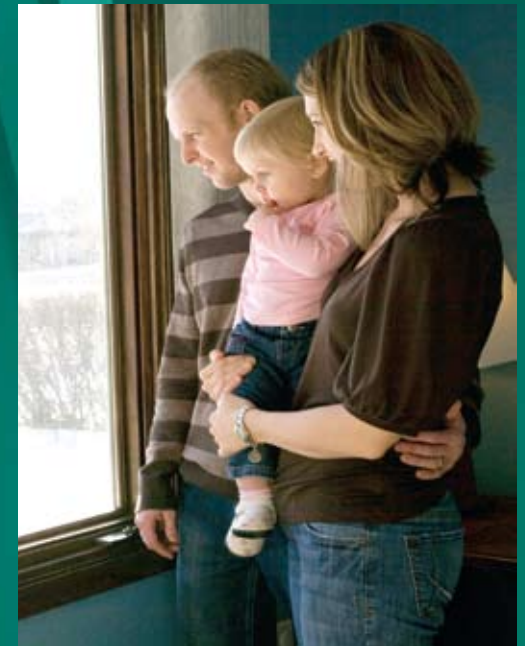
The Power of Today

Ground-source heat pumps are just one example of why electricity is the clean power of the future. People are discovering electric technologies are more efficient and cleaner than combustion energy sources. Electric technologies simply do more with less energy.

But the story doesn't end there. A broad spectrum of electric home heating and cooling options, from easily installed baseboard units to high-tech radiant heating, are available. Electric air conditioners, water heaters, dryers and ranges make your home more efficient, cleaner and more convenient. Electric water distillers and high-efficiency lighting save energy while reducing emissions. Talk to your electric cooperative about the clean power of the future.

Ground-source Heat Pump

*One system for heating,
cooling and ... water heating*



Your Touchstone Energy® Cooperative 
The power of human connections

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To learn more about your heating and cooling options,
talk to your local electric cooperative.

The Simple Solution



Year-round home comfort from a single system? With an advanced geothermal system, it's a reality.

It's simple: people need to heat their homes in the winter. And most people choose to cool their homes in the summer. But it can seem like that's where the simplicity ends. Different equipment, different energy sources, different needs. It can be hard to sort it all out.

Fortunately, there is a simple solution: a single system for heating, cooling and even water heating that uses the abundant, natural energy the earth stores beneath us. It's the ground-source heat pump, or "geothermal system." And it's simply your best home comfort solution. Nothing on the market can compare with the efficiencies of a ground-source heat pump. **They have documented heating efficiencies of up to 400 percent, which means for every dollar of energy spent a ground-source heat pump supplies \$4 worth of heating.**

Flexible Options

Ground-source heat pumps come in many styles to fit different needs.

Vertical loops use bore holes to sink tubing deep into the ground and require very little land. The number of loops is varied to precisely match the needs of the installation.

When more land is available, horizontal loops can be trenched in four to eight feet beneath the surface. Other innovative options, such as the 'slinky' loop, make geothermal systems flexible and adaptable. Your cooperative can help you decide which is best and put you in touch with qualified installers.

When a ground-source heat pump is in use, excess heat energy can be routed to your water heater. The result: you save two-thirds of your water heating costs year-round.



Vertical loops



Horizontal loops



Slinky loops

Down-to-Earth Savings

A ground-source heat pump might cost more to install than a separate forced-air furnace and central air conditioner, but because of the high operating efficiencies, the payback period can be as little as two to six years. And you will see additional savings from the free hot water a ground-source heat pump supplies. Comparing actual annual costs tells the whole story.

Annual costs	Heating	Cooling	TOTAL
90% efficient propane furnace with 13.5 SEER central air	\$ 2,076	\$ 213	\$ 2,289
90% efficient natural gas furnace with 13.5 SEER central air	\$ 1,439	\$ 213	\$ 1,652
Ground-source heat pump with electric backup	\$ 419	\$ 82	\$ 501

Comparison based on 2,300 ft.² home in the upper Midwest. Actual operating costs may vary due to weather, operating conditions and construction. Calculations based on the following costs. Propane: \$1.60/gal. Natural gas: \$1.20/therm. Electric: \$0.045/kWh.