

# Geothermal heat pumps offer efficiency from the ground up

BY JAMES DULLEY

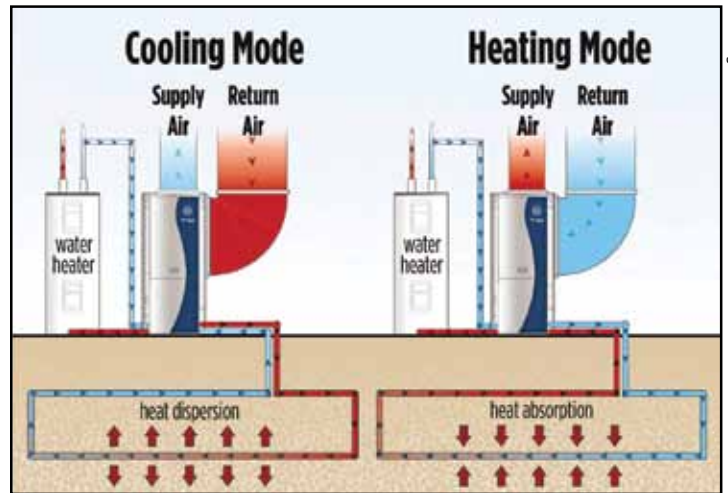
A geothermal heat pump operates similarly to a standard heat pump, except it exchanges heat with the ground instead of the outdoor air – essentially using renewable energy from the sun’s rays that are stored as heat in the ground. In Iowa, the temperature of the outdoor air can vary 40 degrees or more from day to night and more than 100 degrees from the coldest winter night to the hottest summer day, but the temperature several feet below the ground’s surface doesn’t vary nearly as much.

In order to capture the heat energy from the ground in the winter or exhaust the heat during the summer, a long pipe – the ground loop – is buried in the ground. The ground loop also can run through a pond or deep wells drilled on your property.

An antifreeze/water solution running through the pipe acts as the heat transfer medium to the heat exchanger in the heat pump inside your home. All of the latest models use earth-friendly R410A refrigerant, instead of freon.

Since no outdoor condenser coils and fans are needed, the entire heat

pump and all mechanical components are located in the indoor unit. It operates quietly and, with no outdoor fan or compressor, there’s no noise to bother neighbors or your family at night. This also reduces wear and tear from constant exposure to weather.



Drawing: WaterFurnace

**This drawing shows how a geothermal heat pump works during both summer and winter months.**

## You’ll get year-round energy savings

During winter in the heating mode, a geothermal heat pump can produce up to five dollars worth of heat for each dollar on your electric bill. Unlike a standard heat pump – which loses efficiency and maximum heat output as the outdoor temperature drops – the efficiency and heat output from a geothermal heat pump remains relatively constant. The most efficient models use a two-stage compressor and variable-speed indoor blower for the best comfort.

During the summer months, a regular heat pump or central air conditioner loses efficiency and cooling output when the outdoor temperature goes up. Cooling efficiencies for geothermal units run as high as 30 EER, which is more than twice as efficient as a standard heat pump or central air conditioner.

Another summertime advantage is free hot water that’s a byproduct of a geothermal heat pump cooling your home. Instead of exhausting waste heat to the outdoor air like a standard heat pump, the heat is diverted to your water heater using a built-in (or sometimes optional) device called a **desuperheater**.

## The tax credit runs through 2016

The initial cost of installing a geothermal heat pump is significantly more expensive than a standard air-to-air heat pump, and the final cost depends upon the topography of your land and the type of ground loop needed. But the federal energy tax credit, which provides a 30 percent tax credit on the entire cost of installing a geothermal heat pump, makes the initial expense more reasonable.

To qualify for the credit, the efficiency of the unit must meet or exceed Energy Star™ requirements and be installed after Dec. 31, 2007, and before Dec. 31, 2016. File for the credit by completing the Renewable Energy Credits subsection on your tax return. No proof of purchase is required; however, in case of an audit, you should keep detailed paperwork substantiating your purchase. The contractor who sold and installed the system should list the purchase as a “geothermal heat pump” on the invoice and state that it “exceeds the requirements of the Energy Star program currently in effect.”

Have a question? Send inquiries to James Dulley, *Living with Energy in Iowa* magazine, 6906 Royalgreen Dr., Cincinnati, OH 45244 – or visit [www.dulley.com](http://www.dulley.com).

### FOR MORE INFORMATION

#### Climate Master

PHONE: 800-299-9747

WEB SITE: [www.climatemaster.com](http://www.climatemaster.com)

#### Econar GeoSystems

PHONE: 800-432-6627

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#### Florida Heat Pump

PHONE: 954-776-5471

WEB SITE: [www.fhp-mfg.com](http://www.fhp-mfg.com)

#### Hydro-Temp

PHONE: 800-382-3113

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