

A Ground-Source Heat Pump is a central heating and cooling system that functions by pumping heat to or from the ground. Capable of saving homeowners up to 70% on energy costs associated with heating and cooling, it's the ultimate in home comfort efficiency. As put by The U.S. Department of Energy, it's "the most cost-effective, energy-efficient and environmentally friendly method of heating and cooling your home available today."

Saving up to 70% on home heating and cooling goes a long way — especially considering it's responsible for more than half of the total energy consumed by a typical household.

In short, a Ground-Source Heat Pump is a virtually maintenance-free system that works with the world instead of against it. And since it's environmentally friendly and can considerably reduce your utility bills for many years to come, it's great for the future in more ways than one.

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## HOW IT WORKS

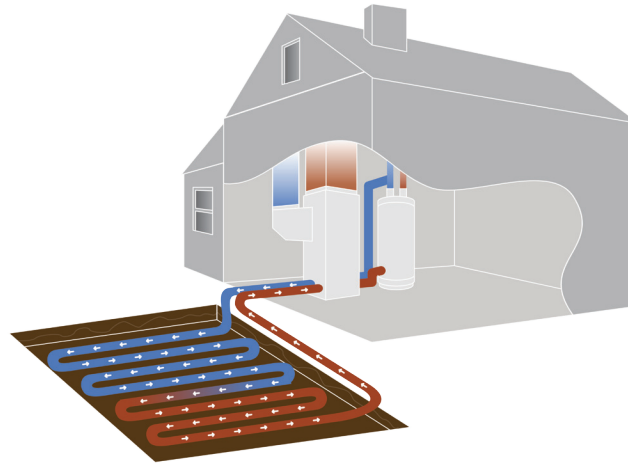
Outdoor temperatures rise and fall, but thanks to energy provided by the sun, the temperature 4 feet to 10 feet underground is around 50°F all year. Ground-Source Heat Pumps tap into the "free energy" potential this consistent temperature creates with a network of underground plastic piping called a "loop."

To warm a home, a non-toxic antifreeze solution circulates throughout the loop while absorbing heat from the ground. This heat is then directed to the indoor components of the unit, which compresses the heat to a higher temperature and distributes it throughout the home.

When the home needs to be cooled, the process is reversed. The liquid solution absorbs the heat within the home and transfers it underground where it's dispersed into the cool earth. The entire system and its materials are proven, reliable and safe. In fact, they're saving homeowners energy and money in all 50 states and around the world at this very moment.

Ground-Source Heat Pumps are unlike ordinary heating systems in that they don't burn fossil fuels or generate heat. They simply transfer heat to and from the earth while using only small amounts of electricity to operate the unit's fan, pump and compressor.

Setting a Ground-Source Heat Pump to heat or cool can be done from the thermostat.



## THE MAJOR PIECES

There are three main components of a Ground-Source Heat Pump. The indoor unit, which houses the heat exchanger, compressor and fan, the underground loop and the ductwork. A Ground-Source Heat Pump will most likely function properly with your current ductwork.

## LOOP VARIATIONS

A closed loop system is composed of a network of plastic piping that is buried in the ground and connected to the Ground-Source Heat Pump. A water and antifreeze mixture circulates through the closed loop system where it absorbs heat from the air (in the heating mode) or rejects heat to the earth (in the cooling mode). The closed loop can be installed either horizontally in trenches six to eight feet deep, or vertically, in bored holes spaced 12–15 feet apart and approximately 200 feet deep.

As a point of reference, a well insulated 2,000-square-foot home might need a four-ton Ground-Source Heat Pump system and a horizontal closed loop with approximately 3,000 feet of plastic piping, or a vertical closed loop of four bore holes with approximately 1,600 feet of plastic piping.



## ► COMPLETELY SAFE

By using electricity only, Ground-Source Heat Pumps require no open flame, flammable fuel or potentially dangerous fuel storage tanks. And in the very unlikely event of a leak, the system's non-toxic solution will not harm the environment in any way.

## ► NO AIR OR SOUND POLLUTION

Ground-Source Heat Pumps use the earth as a clean, unlimited resource and all their components are completely non-toxic. They emit zero greenhouse gases and create no buzzing, humming, blowing or other obnoxious noises often associated with conventional air conditioners.

## ► VIRTUALLY MAINTENANCE-FREE

Composed of highly durable, non-toxic polyethylene piping, the loop system lasts for generations. And all mechanical parts are housed indoors, away from weather, contamination and other potential sources of damage. Usually, the only required maintenance is periodic checks and filter changes.

There are models of Ground-Source Heat Pumps that can be installed 100% outdoors if a lack of sufficient interior space is an issue. These models are sealed within rugged housing so that no components are exposed to the elements.

## ► HOT WATER ASSIST

Not only are these systems capable of heating and cooling, they can also provide water heating with the same incredible efficiency. An optional Hot Water Assist can be added to most Ground-Source Heat Pumps to provide significant savings by heating water before it enters your hot water tank.

## ► FAR AND AWAY THE BEST

Ground-Source Heat Pumps heat five times more efficiently than the most efficient ordinary heating systems, and cool twice as efficiently as the most efficient ordinary cooling systems. Remember, that can equate to a reduction in your heating and cooling costs by up to 70%.

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