

## *MN Geothermal Association*

The Minnesota Geothermal Heat Pump Association (MNGHPA) is the unified, professional, non-profit, consortium of contractors, manufacturers, design engineers, utilities, educators and others dedicated to the promotion and growth of Minnesota's geothermal heating and cooling industry. The MNGHPA encourages consumer and contractor education, and fosters a paradigm of responsible business practices by all its members.

The MNGHPA welcomes all businesses and individuals that have an interest in the geothermal heat pump industry. The association maintains a list of members with qualifications that are recognized by the industry and is the one source where consumers can find those professionals and know they are qualified for the job. Within the association you will find contractors with IGSHPA (International Ground Source Heat Pump Association) certifications and a desire to be leaders in helping consumers save energy.

The education opportunities that are available through the association keep MNGHPA members aware of new methods and the correct procedures for installation.

At **[www.mnghpa.org](http://www.mnghpa.org)** you will find:

- list of professional geothermal dealers and contractors
- upcoming geothermal training and events
- geothermal success stories
- online membership application

## *What About Commercial Buildings?*

In large commercial buildings such as schools and high-rise offices, the use of multiple geothermal systems allows commercial users to control the climate of each indoor area or zone of a building individually. Each classroom of a school, guest room of a hotel or room of an office building may have its own geothermal unit.

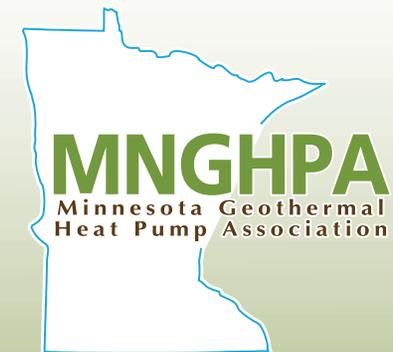
### *Advantages:*

- Lower operating costs
- High efficiency
- Less mechanical equipment space
- Reduced floor to floor height requirements
- Lowest life cycle cost
- Minimal maintenance
- Long-lasting and reliable

*Learn more about geothermal and the  
Minnesota Geothermal  
Heat Pump Association  
at  
[www.mnghpa.org](http://www.mnghpa.org)*



# *Geothermal Extreme Efficiency in Home Heating & Cooling*



**888-782-6815**

6066 Shingle Creek Parkway  
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**[www.mnghpa.org](http://www.mnghpa.org)**

# What is Geothermal?

Originally taken from the Greek words “geo”, meaning earth, and “therme”, meaning heat, geothermal energy is heat from within the earth. A geothermal heat system is literally heat from the earth.

The key piece of the geothermal system is the ground loop. This is made of conventional polyethylene pipe, with thermally fused joints for reliability – most carry 50-year warranties! A fluid, often including a non-toxic antifreeze (propylene glycol) is pumped through the ground loop by a small circulating pump. Fluid used in the loop is environmentally friendly in the rare case of a leak. It is this fluid that transfers the heat to/from the ground and your building.

A compressor in the geothermal heat pump unit absorbs heat from the ground loop, compresses it and transfers it into the air in your building at a much higher temperature. A fan then circulates this hot air just like a typical heating system. Or, if it is a radiant floor system, the heat pump transfers this energy to the fluid that is circulating in the floor.

In the summer, the compressor operates in the reverse direction and absorbs heat from your building’s air, transferring it to the ground loop. Conventional air conditioners operate similarly, but must reject the heat to the hot summer air, lowering their efficiency considerably.

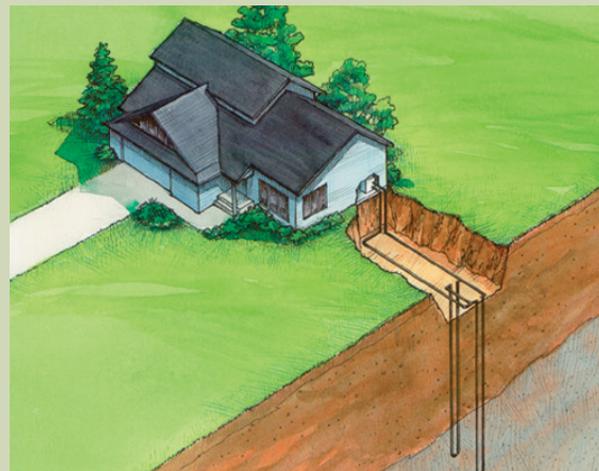
# It's All About the Loop

The ground loop can come in several different configurations.

Closed loop systems have a continuous ground loop; the fluid inside never comes in contact with the environment. Open loop systems use well water that is discharged to the environment. Closed loop systems are more common than open loop systems because they can be installed at almost any site.

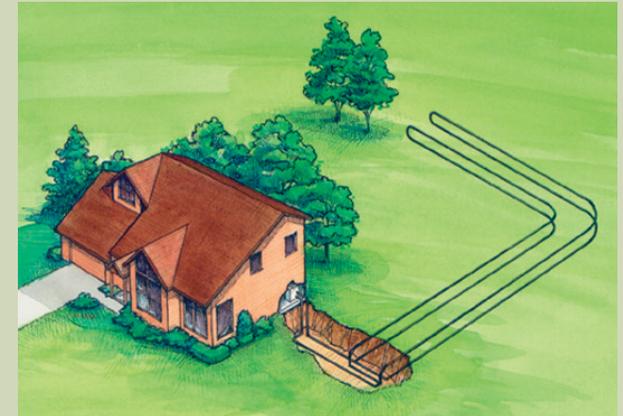
## Vertical Loop

A vertical loop system uses wells drilled deep into the ground as the ground loop. The depth depends on the site but is typically between one hundred and three hundred feet. A u-shaped pipe is placed in each trench so that fluid can go down the well, transfer heat, and come back to the surface without ever contacting the rock or soil. These wells take up significantly less space than other configurations.



## Horizontal Loop

It is also possible to place the ground loop in a horizontal configuration, in which the piping is simply laid in one or many trenches in the ground. There are many different layouts for horizontal systems. In some cases 2-6 pipes are distributed in each trench; in some cases a ‘slinky’ formation is used. If a large amount of earth can be moved to create one very wide trench, rows of pipe can all be laid in this trench in a ‘racetrack’ formation. All are successful heat transfer devices.



## Pond Loop

If a pond (or lake) is available on the building site, it is often convenient to simply sink the loop into the pond and transfer heat to and from the water of the pond. This can be just as efficient as a ground loop if care is taken in choosing a large enough body of water.

