

## 30% Tax Credit

Homeowners receive a 30% tax credit for geothermal equipment installed within the home.

## Energy Cost Savings

Homeowners save up to 50% on annual energy cost compared to that for an existing conventional gas-heated home.

## Protection Against Energy Cost Inflation

Homeowners enjoy peace of mind knowing that future energy price increases will not affect their monthly payments, since the geothermal portion of HOA fees are fixed for 25 years.

### Buy a home at Columbia Reserve, and you get:

- Improved comfort and consistent temperatures; no hot or cold areas
- Reliable operation, low maintenance, no outdoor equipment
- Environmentally sustainable; does not contribute to global warming
- Renewable (self-replenishing) natural resource
- No carbon monoxide fumes, no flames, virtually no noise, zero emissions from the geothermal system
- Protection from large energy cost increases
- Underground piping system warranted for 50 years
- Geothermal Heat Pump with average life of 20+ years
- Local availability (no fuel or transportation expenses)
- Home will have higher resale and appraised values



### About Geo Solutions, Inc.

To help bring you a quality-built home with an energy-smart, zero-emission, low-cost, and reliable source of heating and cooling, Geo Solutions has formed a partnership with a supplier of geothermal heat pumps, creating economies of scale. We make possible what most people couldn't afford on their own.

Geo Solutions is compensated for the investment we have made in the community of Columbia Reserve by the geothermal fee you pay to your HOA.

### Learn More About Geothermal Heating and Cooling

Geo Solutions, Inc

<http://www.geosolutions-us.com>

U.S. Department of Energy, *Energy Savers*

<http://www.energysavers.gov>

U.S. Department of Energy, *Geothermal Technologies Program*

<http://www1.eere.energy.gov/geothermal/heatpumps.html>

The International Ground Source Heat Pump Association

<http://www.igshpa.okstate.edu/index.htm>

U.S. Environmental Protection Agency, *Benefits of Geothermal Heat Pump Systems*

[http://www.energysavers.gov/your\\_home/space\\_heating\\_cooling/index.cfm/mytopic=12660](http://www.energysavers.gov/your_home/space_heating_cooling/index.cfm/mytopic=12660)

U.S. Environmental Protection Agency, *Space Conditioning: the Next Frontier - the Potential of Advanced Residential Space Conditioning Technologies for Reducing Pollution and Saving Consumers Money*

<http://www.epa.gov/nscep/index.html>

### Geo Solutions, Inc.

- Member GeoExchange, Geothermal Heat Pump Consortium

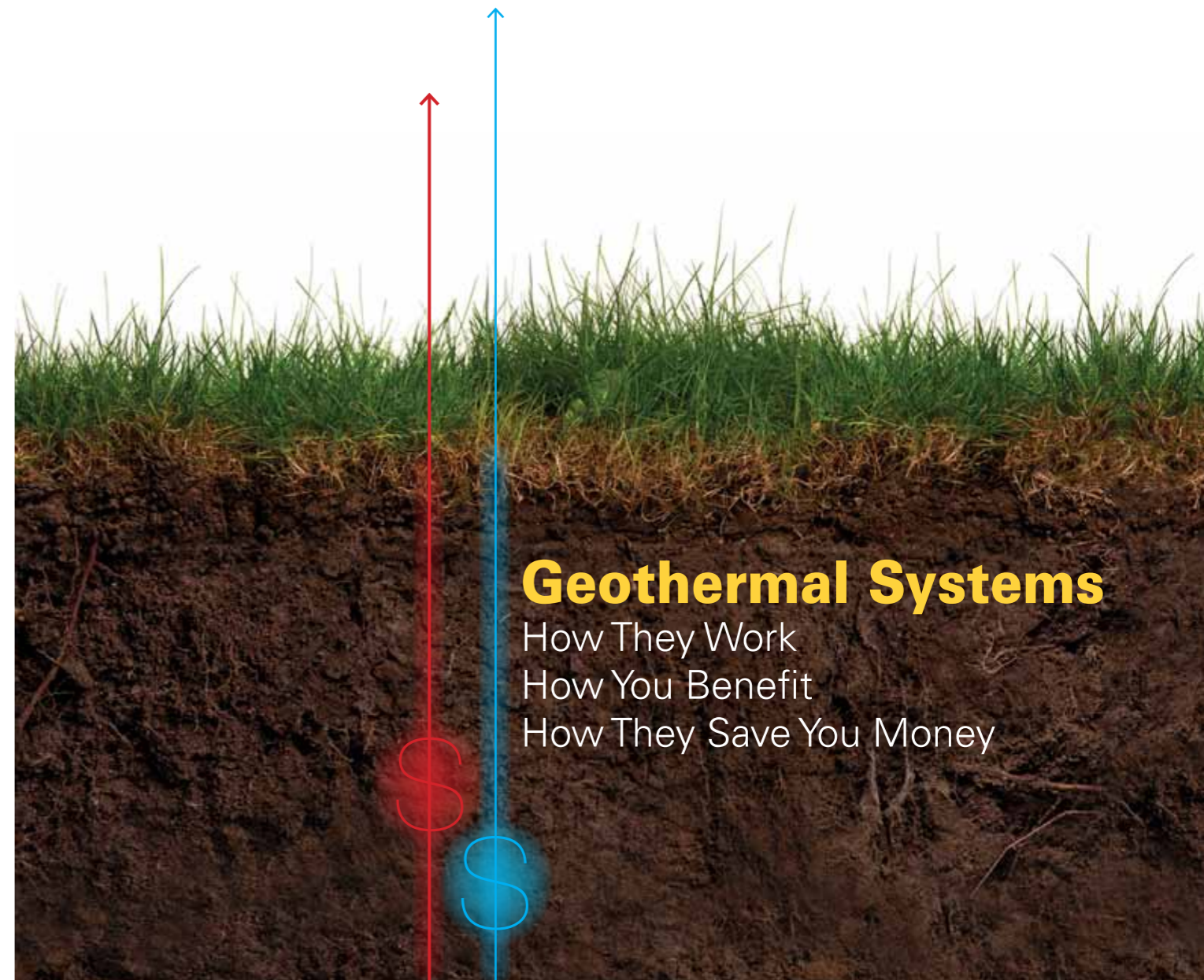
### Geo Technologies, Inc.

(Subsidiary of Geo Solutions)

- **American Ground Water Trust Certifications**
  - Residential & Commercial Ground Source Heating & Cooling
  - Geothermal Vertical Loop Installer
- **ClimateMaster - Certifications**
  - Geothermal Designer
  - Geothermal Polyethylene Piping System - Heat Fusion
  - ClimateMaster Geo Farm
- **Halliburton - Certification**
  - Baroid - Geothermal Applications



Geo Solutions, Inc. • 371 Darbys Run • Bay Village, Ohio 44140 • [www.geosolutions-us.com](http://www.geosolutions-us.com)



Your Guide to Geothermal Heating and Cooling Systems  
at **Columbia Reserve**



# Geothermal Systems

How They Work • How You Benefit • How They Save You Money

## Geothermal Energy: an overview

Have you ever been inside a cave? The air feels cooler in the summer and warmer in the winter.

That's because the earth underground is a constant moderate temperature; in northeastern Ohio, it's approximately 55 degrees. Wine cellars or the food cellars of our grandparents worked on the same principle. Dug to below the frost line, they maintained the steady moderate temperature of the earth around them.

This constant temperature is the result of solar energy absorbed by the earth and stored as thermal energy; the U.S. Department of Energy has calculated that 47 percent of all solar energy is absorbed by the earth—much more than we could ever use.

**What if there was a way to capture and use that stored energy and use it to heat our homes and buildings with a readily available, zero-emission, low-cost, and reliable source? There is, and it's called a geothermal heat pump.**

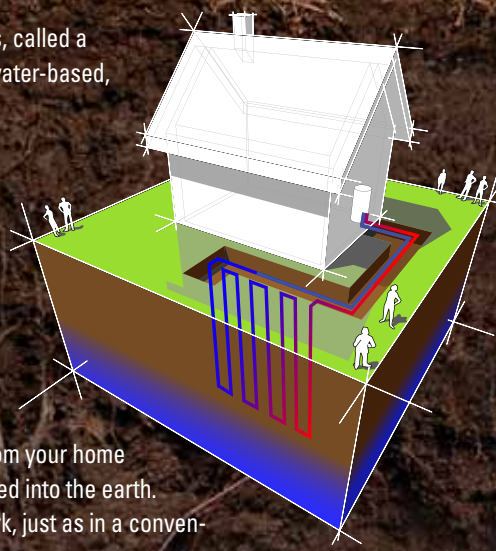
## How do we harvest geothermal energy?

Let's review the components of geothermal energy systems first; then we'll explain how they work.

- 1) The geothermal heat pump is a heating and cooling system (HVAC) installed in the home and is the heart of the system.
- 2) The heat pump is connected to a system of installed underground pipes, called a loop field. The pipes in the loop field contain an environmentally safe, water-based, freeze-protected solution.
- 3) The heat pump is also tied to your home's traditional furnace and duct heating system.

The solution running through the loops takes on the temperature of the earth that surrounds it.

- In winter, the heat pump system draws the earth's natural heat into the loop. A heat exchanger in your house distributes the warm air to different rooms. Then the solution is piped back into the loop field and the cycle is repeated.
- In summer, the process is reversed. The heat pump pulls excess heat from your home and carries it into the pipes and away from the house where it is absorbed into the earth.
- Both the warm and cool air are distributed through your home's ductwork, just as in a conventional heating and cooling system.
- The heat pump can also help heat your household water. A heat exchanger called a "desuperheater" can efficiently transfer the heat from the geothermal heat pump to your regular water heater tank. When providing heating or cooling, the geothermal heat pump will help reduce your water-heating cost by about 50 percent.

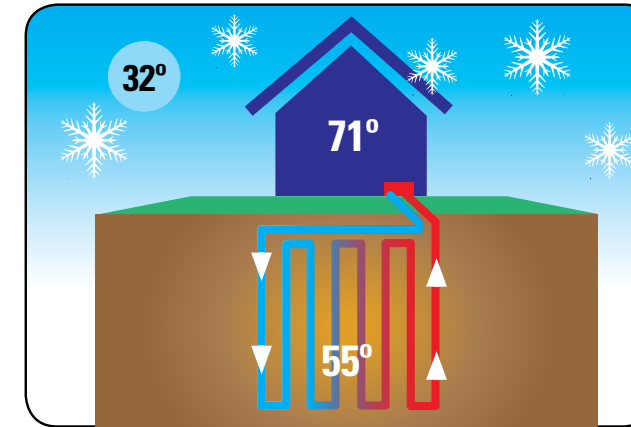
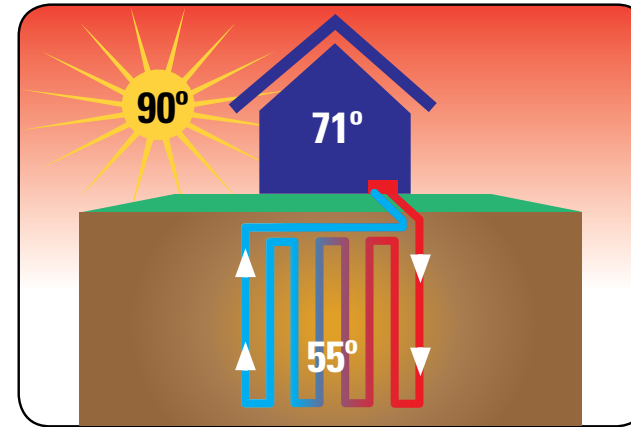


## How does the system save me money?

Geothermal energy uses no combustible fuels or petroleum products, so it's better for the environment, and **geothermal systems use 25 percent to 50 percent less electricity or natural gas than conventional heating or cooling systems**, which is better for your budget.

Let's assume you want to keep your house at a constant 71 degrees all year:

- Geothermal begins with the 55-degree energy stored in the earth and converts it — your furnace is still engaged in the process — to the 71-degree temperature more efficiently because 55 degrees is closer to the desired result. A conventional system tries to heat using cold air (say, 32 degrees in winter) or to cool using warm air (say, 90 degrees in summer) and bring it to that same 71 degrees.
- The bigger the temperature difference between indoors and outdoors, the greater the savings on your utility bills when you have a geothermal system.



## Why is the geothermal solution at Columbia Reserve unique?

The only thing stopping such a clean and accessible alternative energy from sweeping the globe has been the upfront cost, which can easily exceed \$20,000 per home. New government tax credits help, but geothermal heat pumps, the buried loop, ductwork, and other system components do not compare easily with conventional heating and cooling systems. Therefore, the cost doesn't compare either. But that's if you buy one yourself and have it installed in an existing home.

**At Columbia Reserve, they are installed and paid for by Geo Solutions, Inc. when the homes are built, at no extra cost to buyers.**

## Our promise and your benefits:

- Because geothermal heat pumps are so efficient, they are less expensive to operate and maintain than conventional HVAC systems. **Your utility bills will be approximately 30 percent to 60 percent lower** than with a conventional HVAC system, according to estimates from the U.S. Environmental Protection Agency.
- There is no up-front investment by either you, the buyer, or the builder. And, no, the cost is absolutely not rolled into the cost of the home.

- You, the buyer, receive a **30 percent tax credit** on the installed price the first year you own your home, just as if you had installed the system yourself. This translates into thousands of dollars.
- Geo Solutions provides geothermal heat pump systems at no additional cost to the buyers of Columbia Reserve homes. For this initial investment, we are compensated by a fixed portion of your homeowner's association (HOA) maintenance fee — easily paid for by the savings on your utility bills.
  - ▶ The geothermal fee is approximately \$60 to \$80 per month — **and that number won't change.** That fixed amount is incorporated into your regular HOA maintenance fee. Even as electric and natural gas prices rise, you'll be protected from these utility rate increases thanks to your geothermal system.
  - ▶ Your HOA maintenance fee will be slightly higher than it would with a conventional HVAC system, but overall, you'll actually save nearly \$500 in total expenditures every year. See our *comparison calculation chart on the flap of this brochure.*

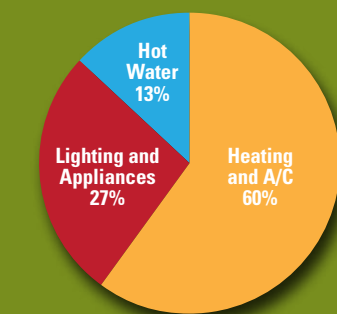
## Make the Right Choice

### Compare and Calculate Your Savings

The following calculations are for illustration purposes only. Your results will depend on your specific utility usage, future utility prices, home design and size.

2,200 Sq. Ft.	2,200 Sq. Ft.
House A Conventional HVAC	House B Geo Solutions Geothermal System
Conventional gas heating and air conditioning	Geothermal heating and cooling plus hot water heating
<b>\$2,400</b> yearly utility costs	<b>\$1,200</b> yearly utility costs (based on yearly average savings of 50%)
<b>0</b> yearly utility savings	<b>\$400</b> yearly utility savings \$1,200 – \$780 (included in HOA fee)
<b>0</b> first year utility savings	<b>\$4,300</b> first year utility savings Based on avg. installation cost, \$13,000 x 30% tax credit = \$3,900 + \$400 yearly savings
<b>0</b> total utility savings over the first five years	<b>\$5,900</b> total utility savings over the first five years

## Conventional Energy Use



## Geothermal Energy Use

