



Frequently Asked Questions

General questions about geothermal

What is geothermal?

A geothermal system (also known as geo-exchange, or ground source heating & cooling) uses renewable energy from the earth to provide homes, commercial buildings and even industrial plants with year round heating, cooling and hot water. Geothermal systems do not burn fossil fuels and are therefore extremely clean, safe and very efficient. Geothermal is classified as being "the most energy-efficient, environmentally clean and cost effective" way to heat and cool buildings.

How energy-efficient are geothermal systems?

Very! Approximately 80% of the energy needed to heat your house comes from the ground, with only 20% needed from the electrical grid to run the geothermal pumps and compressor. Our geothermal systems achieve efficiencies of 400% or higher. As a comparison, a 92% "high"- efficient gas burning furnace uses roughly 5 TIMES MORE energy to heat your home!

How does it work?

Beneath the frost line (approximately 10ft deep in Alberta) the temperature of the earth remains relatively constant, regardless of the season. In Alberta, this temperature averages at around 6-8° Celcius. By circulating fluid (water + antifreeze) through a set of pipes buried deep in the ground (commonly known as the "ground loop") the geothermal system is able to extract energy from the ground in heating mode, and reject energy to the ground when cooling the home.

Is the ground temperature hot enough to heat my home?

Quite often, geothermal heating systems are mistakenly confused with Geyser type installations we find in countries with underground volcano activity like Iceland. The constant ground temperatures (6-8° C) we find below the frost line are not hot enough to heat your home directly, which is why you will have a geothermal heat pump inside your house. The geothermal heat pump is able to convert this 6-8°C to 40-50°C through a refrigeration process.

Sounds like magic? Think of a geothermal system like a giant refrigerator. Your fridge is able to cool by extracting heat from the air inside the fridge and 'dumping' that heat in the back (notice how your fridge is very warm on the backside?). Even when your freezer section is already below 0° C, the refrigerant is still able to extract heat from the air.

A geothermal system works based on the same scientific principles. The ground loop pipes are run into the home's mechanical room where a geothermal heat pump with environmentally friendly refrigerant is able to extract energy from the ground loop fluid. In this extracting process, the refrigerant in the heat pump turns from liquid state into a vapor state. This refrigerant vapor is injected into a compressor, where it is compressed. The compression of the vapor drastically increases the temperature of the vapor, making it hot enough to heat your home. Through either an Air or Water heat exchanger in the heat pump, the hot vapor refrigerant is able to release its heat to your home.

By extracting energy from the ground loop fluid, the temperature of the fluid drops to values typically below 0° C, making it much cooler than the surrounding ground temperature. This colder ground loop fluid is pumped back into the much warmer ground where it will absorb heat from the ground again to make the cycle complete.

The neat aspect of a geothermal heat pump is that it can also work in reverse for cooling purposes. In this process, heat is extracted from the warm air inside the house and 'dumped' back into the much cooler ground.

Does the ground ever run out of energy and becomes too cold to heat my house?

No. Everyday the earth absorbs energy from the sun. It is said that the daily amount of energy absorbed by the earth from the sun is 500 times greater than what we as mankind consume in energy on a daily basis. A properly designed geothermal ground loop will have enough pipe installed into the ground that the temperature of the ground will not become too cold. Larger homes require more heating energy over the course of a year, which is why they also require more pipe in the ground.

Thermal Creek uses state of the art software to perform a 20-year simulation of ground temperatures when designing each ground loop to ensure that enough geothermal pipe will be installed for each home.

With geothermal, do I still need a regular furnace, boiler or air conditioner?

No. A geothermal system replaces conventional heating and cooling equipment. You will no longer need a furnace, boiler and air conditioner. In certain cases (typically larger homes), hybrid systems can be designed with boilers functioning as back up heat, but technically geothermal has the capacity to provide 100% of heating and cooling needs.

I heard geothermal also heats my domestic hot water (DHW), is this true?

Yes, depending on the type of geothermal heat pump you have. Our heat pumps come standard with DHW heating. This means that whenever the geothermal system is either heating or cooling your home, it will also produce a portion of your DHW. Over the course of a year, you can expect to get around 50% of your DHW needs from geothermal. The other 50% will come from conventional means (either electric or gas, depending on your hot water tank).

What kind of maintenance is required?

Geothermal systems require little to no maintenance. In fact, geothermal has been rated as the most reliable space conditioning system requiring the least amount of maintenance compared to ANY other heating or cooling system. Because the system operates without combustion, there is no risk of common furnace problems such as pilot-lights going out, gas-burners getting dirty, and more seriously Carbon Monoxide poisoning. All geothermal components are either buried deep in the ground or sheltered inside the house which eliminates exposure from the harsh elements.

Forced air geothermal heat pumps require an air filter change, preferably twice a year. Water-to-water heat pumps (for in-floor type application) require no maintenance.

What kind of warranties can I expect?

If you are a rental customer, then your geothermal system will be covered for any servicing needed. Otherwise, Thermal Creek offers a one-year full parts and labour warranty. In addition, the heat pump and all accessories come with a minimum limited five-year warranty. Major refrigeration components inside the heat pump come standard with 10-year limited warranty.

Questions about the Ground Loop

How deep do you drill?

Our typical residential boreholes are between 200-300ft deep. Exact depth and number of boreholes is determined by the energy needs of the home (how much heating the house needs over the course of a year) and lot size.

How far apart do the boreholes need to be?

Where possible, we like to separate by 20ft to allow each borehole with optimum amount of landmass available to extract energy from. Minimum spacing we do is 15ft. If we go closer, the boreholes will start to rob energy from each other, causing sub-optimal ground loop designs and potential freezing of the ground.

I have a big acreage, can I do a horizontal system?

Technically speaking: Yes. However, there is a reason why 99% of our installations are vertical borehole. The ground temperatures in this part of the world are such, that to tap into real consistent temperatures below the frost line (required for efficient operation of the geothermal system), your horizontal trench would have to be around 10-12ft deep. Even at 12ft, you're still looking to add about 25% extra length to your loop field. As an example, a 200ft deep vertical borehole is equivalent to a 250ft long trench at 12ft depth. Unless you have access to very cheap excavation, the cost difference between a vertical and horizontal system becomes negligible when you have to move that much dirt. In milder climates (parts of BC, and in the States), horizontal systems are a lot more common as ground temperatures & climate allow for more shallow trenches. From our experience in the industry, a lot of the 'nightmare' stories around geothermal involve horizontal systems that were not buried deep enough or simply undersized.

What material are the ground loop lines made of?

The pipe material that is used in the geothermal industry is High Density PolyEthylene (HDPE). This is same material that is used in the natural gas industry for transport of gas. The pipe is extremely durable and is warranted by the manufacturer for 50 years, however technically it can last for 700 years. HDPE is inert with ground materials and has good heat transfer properties.

How do you ensure there are no leaks in the system?

Thermal Creek has all of its borehole loops pre-manufactured and pressure tested before installing them in the ground. All the header connections we make on-site are thermally fused (no mechanical connections). The fusion process binds molecules of the connecting parts together which results in that the connection is technically stronger than the pipe itself. We pressure test the entire loop field before backfill to 100psi to ensure the system has no leaks. In regular operation, the system pressures should typically not exceed 40psi. Most cities inspect these pressure tests nowadays.

What size are the boreholes?

A typical residential borehole is 3-4" in diameter.

Do I need separate ground loops for heating and cooling?

No. The same ground loop is used for heating and cooling. Even the fluid is pumped in the same direction. All that happens when switching from heating to cooling is a change in direction of circulation of the refrigerant inside the heat pump. This all happens automatically when you switch from heating to cooling (or vice-versa) on your room thermostat.

Will the ground loop affect my lawn or landscape?

No. Research has proven that loops have no adverse effect on grass, trees or shrubs. Most horizontal loop installations use trenches about six inches wide. This, of course, will leave temporary bare areas that can be restored with grass seed or sod. Vertical loops require little space and result in minimal lawn damage.

Questions about the Rental Program

If I am accepted as a rental customer, what can I expect to happen next?

Once you have received the Letter of Acceptance, someone from Thermal Creek will contact you to discuss the installation process and see if you have any remaining questions at that point. Thermal Creek will start coordinating the installation of the geothermal system with your builder.

What kind of modifications will be made to my home if I decide to go with geothermal?

Not many. Apart from the ground loop, which will be buried outside of your home, you will have a geothermal heat pump instead of a regular furnace and air conditioner in your mechanical room. Inside your house, you will have a state-of-the-art touchscreen programmable thermostat to control the temperature in your house.

When can I expect my first rental bill?

We will start charging you rent once you take possession of the house. However, in most cases you will receive a credit from your builder towards your rental account, which will typically cover the first year of rental fees. If you also decide to use your Alberta Government grant as rental account credit (qualifying you for an extra 10% bonus account credit) your first rental bill could easily be more than 4 years in the future from the day you take possession of the house.

How long is the rental contract for?

Essentially the rental program is a rent-to-own program. You will own the entire geothermal installation after 25 years. The minimum term for the rental contract is two years. After the minimum rental period, you can buy the system from us at any time at discounted rates.

What happens if I move?

If you decide to sell your home, you have two options. The first, and most common, is to use the proceeds of your home to buy out the system from us. The second option is to transfer the contract to the new homeowner. If we approve the new renters, and they approve the rental terms, we will transfer the contract to them.

Can I cancel my geothermal rental?

After the minimum rental period of two years, you have the option to cancel your geothermal rental. Cancellation fees will apply depending on how long you have rented the system for.

What kind of permits do I need for a geothermal system?

The installation of the geothermal system is part of our rental offering. As such, we will take care of any geothermal permitting requirements.

Who takes care of maintenance to my geothermal system?

Our rental program includes service or repairs necessary to the system. We do require the homeowners to change the airfilters once every 6 months. Filters will be provided by us free of charge. We may contact you periodically to schedule a general inspection of the geothermal system.



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