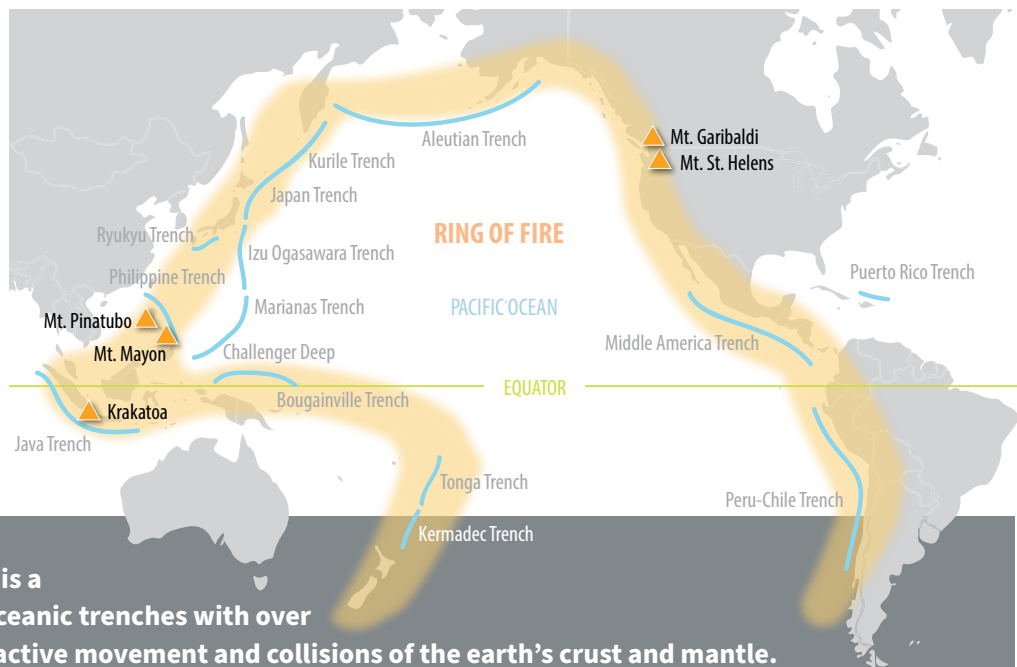


Geothermal Energy in B.C.

What is Geothermal Energy?

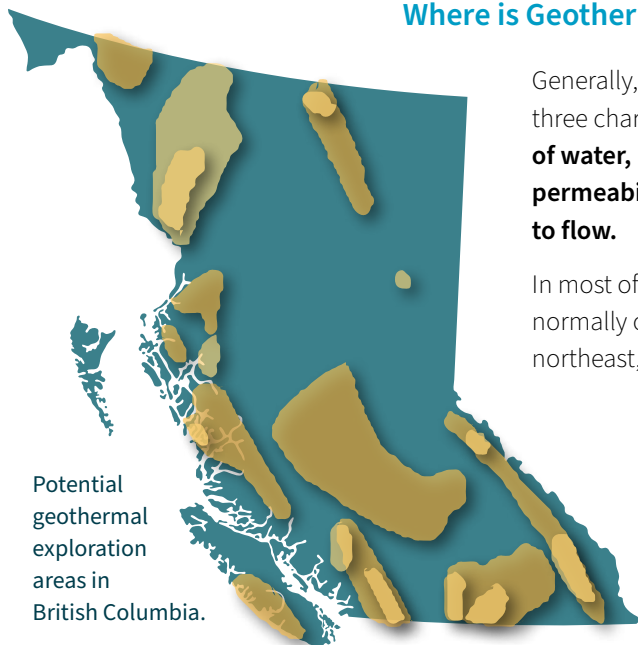
In the simplest terms, geothermal means 'heat from the earth'. Volcanic activity in the Pacific basin means deep underground water aquifers are heated by magma rising from the earth's core. This heat can be captured and used to produce electricity or for other commercial purposes such as heating buildings, warming greenhouses or used for recreation such as hot springs.



The horseshoe shaped Ring of Fire is a nearly continuous series of deep oceanic trenches with over 450 volcanoes, resulting from the active movement and collisions of the earth's crust and mantle.

Underneath these tectonic layers, temperatures can range from 500 to 3,800 degrees Celsius. Having active plates, the crust on the Ring of Fire allows water to move through the earth as it heats and rises to the surface.

Where is Geothermal Energy Found in B.C.?



Potential geothermal exploration areas in British Columbia.

Generally, for a geothermal resource to be viable, three characteristics are required: **the presence of water, high temperatures and sufficient permeability in the reservoir for the water to flow.**

In most of British Columbia, this permeability normally occurs in fractured rocks, and in the northeast, in porous rock formations.

Why Use Geothermal?

Since geothermal heat is continuously replenished from the earth's core, it is essentially an inexhaustible, predictable and reliable supply of energy. When geothermal can be utilized instead of burning fossil fuels such as natural gas or oil, greenhouse gas emissions that contribute to climate change can be significantly reduced.

Geothermal reservoirs can range from **80°C to over 200°C.**

When greater than 140°C, they produce mostly steam and are ideal for electricity generation.

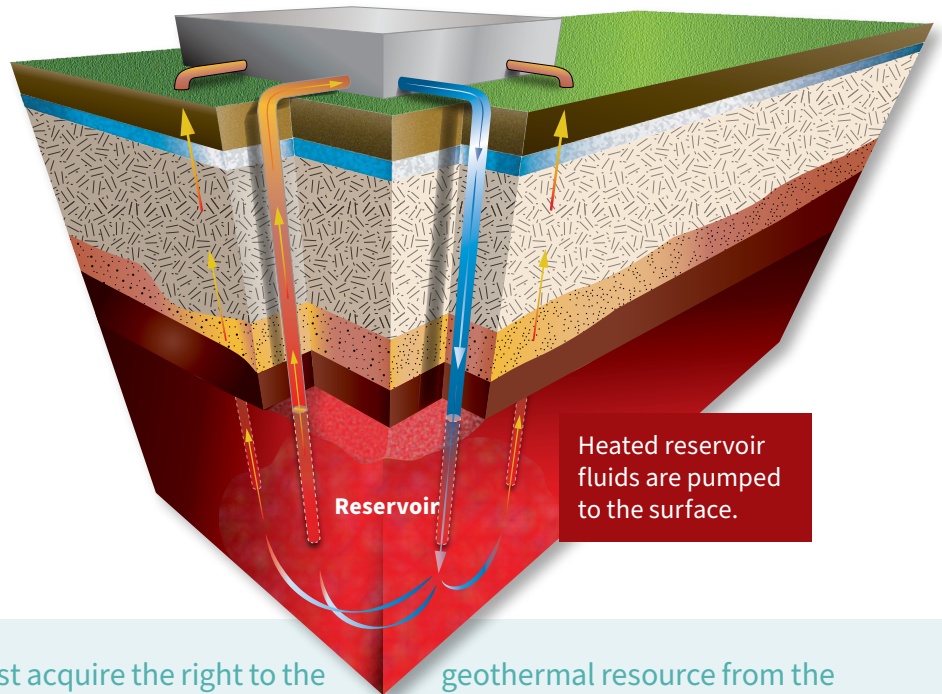
Geothermal is a renewable energy source, available 24 hours a day, 365 days a year.

How is Geothermal Energy Harnessed?

A production well is drilled down into a reservoir and the hot water (and in some cases steam) is moved to a surface facility where the heat is extracted from the produced water. The temperature of the water determines its use; very hot water (or steam) can be used to run a turbine for electrical generation. Cooler water (or the water after electricity has been generated) can be used for area heating.

Once the heat has been extracted from the produced water, it is pumped down an injection well, back into the same reservoir to maintain the pressure. Over time, the cooler water is reheated by the reservoir rock and eventually reaches the production wells and is recirculated.

Facility for converting geothermal resources to a commercial commodity.



To drill a geothermal well, a company must acquire the right to the geothermal resource from the [Ministry of Energy, Mines and Low Carbon Innovation](#), and obtain authorization to drill a well from the [BCER](#).

Who Regulates Geothermal Energy?

Since pipelines used for geothermal purposes fall within the definition of 'pipeline' under the [Energy Resource Activities Act](#) (ERAA), they are regulated as such and are the responsibility of the BC Energy Regulator (BCER). We are also responsible for overseeing other aspects of geothermal resources:

- Under the [Geothermal Resources Act](#) (GRA), we have authority to issue authorizations for geothermal resource activities where the water is equal to or greater than 80°C at the point where it reaches the surface from preliminary exploration.
- We have the authority to regulate the full lifecycle of a well and wellsite surface equipment, including any enforcement matters related to geothermal authorizations.
- The Ministry of Energy, Mines and Low Carbon Innovation manages sub-surface tenures, royalties, legislation and policy for geothermal resources.

Key Dates



- **May 29, 2018:** We issued the first well authorizations for a geothermal energy project under the GRA, allowing the operator to begin drilling. Geotechnical information was collected on the earth's temperature, how much it increased with depth and the degree of heat flowing to the surface.
- **July 14, 2020:** Land Act and Forest Act delegations related to geothermal activities were granted to the BCER, consolidating the regulatory process and allowing applicants to create a single application for land access and to harvest Crown timber.

The first geothermal exploration well was drilled in 1974. As of 2023, a total of 137 exploration wells have been drilled in B.C.

This information is published by the BC Energy Regulator and is available online at www.bc-er.ca.