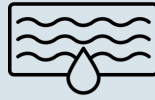




# What is Geothermal Energy?



Geothermal energy is the Earth's heat, which can be used to make electricity.



Magma heats the rock and water around it, making an underground pool or network of hot water called a geothermal reservoir.

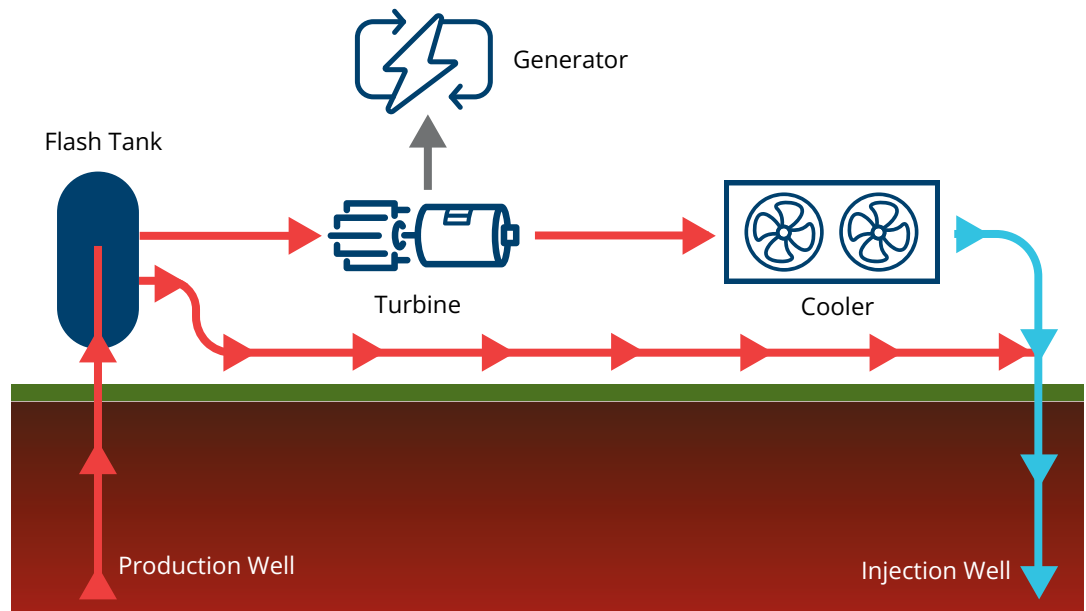


Geothermal power plants use wells to access steam and hot water in geothermal reservoirs to make electricity.

**In Hawai'i, three geothermal power plant designs may be used to make electricity.**

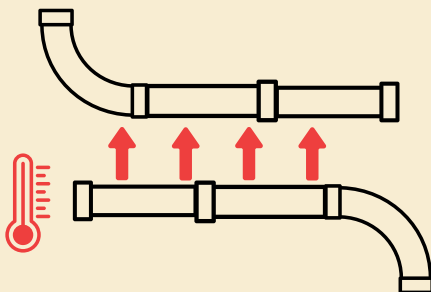
## 1 Flash Steam

Flash steam is the most common type of geothermal power plant. It uses changes in pressure to turn reservoir water into steam, which drives a generator and makes electricity. Leftover steam is cooled back down into water and returned to the reservoir.



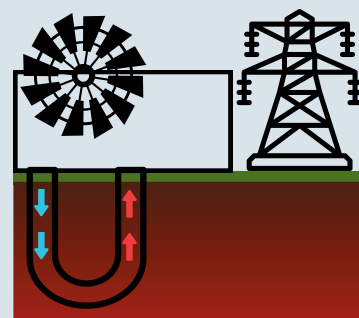
## 2 Binary Cycle

Hot water comes up from the reservoir to heat liquid in a neighboring pipe, creating steam, without the two ever mixing.



## 3 Closed-Loop

Instead of using reservoir water, completely sealed pipes circulate liquid deep underground to absorb the Earth's heat and make steam.



**Hawai'i's only geothermal power plant, Puna Geothermal Venture, is an advanced binary cycle system.**



19.1% of Hawai'i Island's electricity came from geothermal energy in 2024. Regions with volcanic activity, like Hawai'i Island, have the highest geothermal potential, but it can be used anywhere with enough underground heat. There is potential for heat on all the major Hawaiian Islands.



**Subsurface studies are needed to truly understand Hawai'i's geothermal potential. Geothermal is considered a public trust resource and must be approached accordingly.**

## How Else Can We Use Geothermal Energy?

Geothermal energy can be used for more than making electricity. Steam or heat from the ground can also be used directly for things like...



Heating and Cooling



Greenhouses or Drying Crops



Pasteurization

## Geothermal Energy: Key Takeaways



**Firm:** Produces reliable, consistent electricity available 24/7.



**Renewable:** The Earth constantly produces heat and always will. Properly maintained geothermal power plants can last 50 years or more, making them some of the lowest-cost options for electricity.



**Better for the Environment:** Unlike fossil fuels, newer geothermal power plants only release water vapor and trace amounts of hydrogen sulfide. They can also use completely sealed systems to prevent groundwater contamination.



**Expensive to Find:** Finding geothermal resources can come at a high cost, but production costs are low when spread out over a facility's lifetime.



**Compact:** Compared to other renewable energy technologies, geothermal power plants use less land to produce the same amount of energy.



Learn more about geothermal energy  
at [www.energy.hawaii.gov](http://www.energy.hawaii.gov)



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