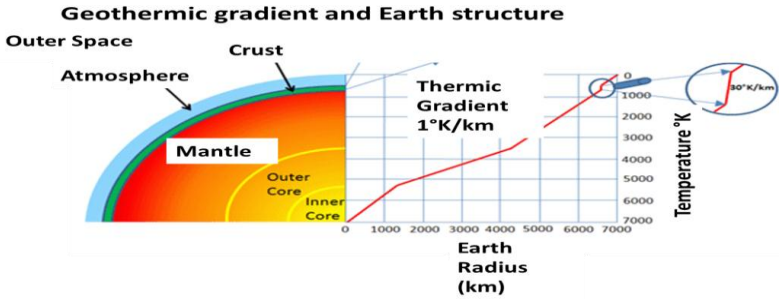
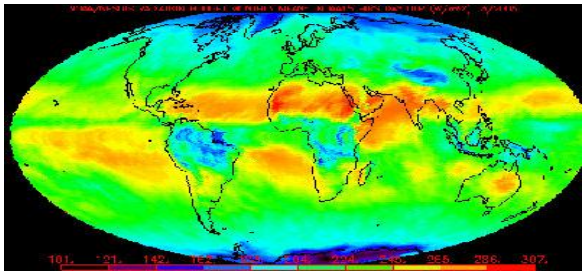
GEOTHERMAL ENERGY

The heat and electromagnetic energy from the core of the Earth can be harnessed as an energy source for humanity. It is considered renewable because the heat generated from Earth has been continuous and constant for more than 3,500 million years.

As an example, only the heat contained within 10 km of the lithosphere beneath Earth's surface contains 50,000 times more energy than all the resources of oil and natural gas in the world together.



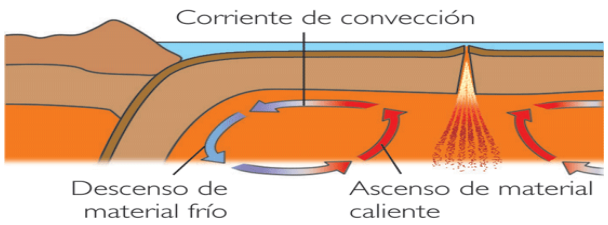
The heat emission of the Earth flows continuously from the core of the Earth to the atmosphere by conduction and convection. Due to the nature of rotation of the spherical core of the Earth (solid inner core inside a molten outer core), heat is greatest near the Ecuador and less near the poles.



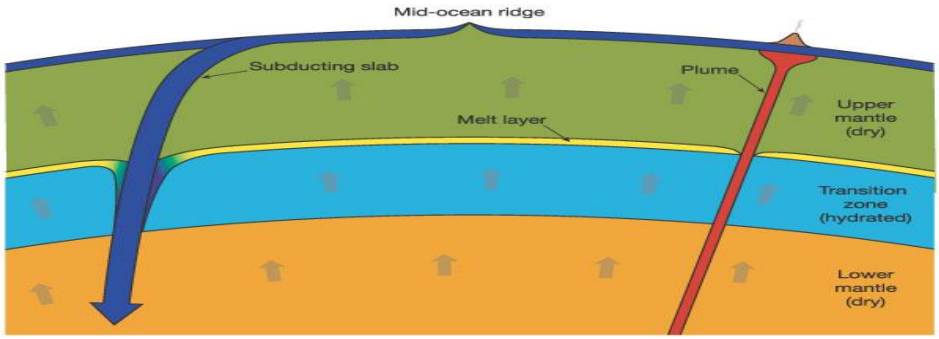
The vast majority of geothermal energy that humans currently harness comes from the upper mantle where temperatures are 500 ° C and 1000 ° C and where magma forms rocks that melt at these temperatures.

Most of the magma is in the upper mantle. Because magma is more dense than the rocks but more energized, it tends to emerge slowly to the surface by convection through cracks in the crust or volcanic eruptions, although often be trapped below the surface, heating underground water from aquifers, which comes from rainwater

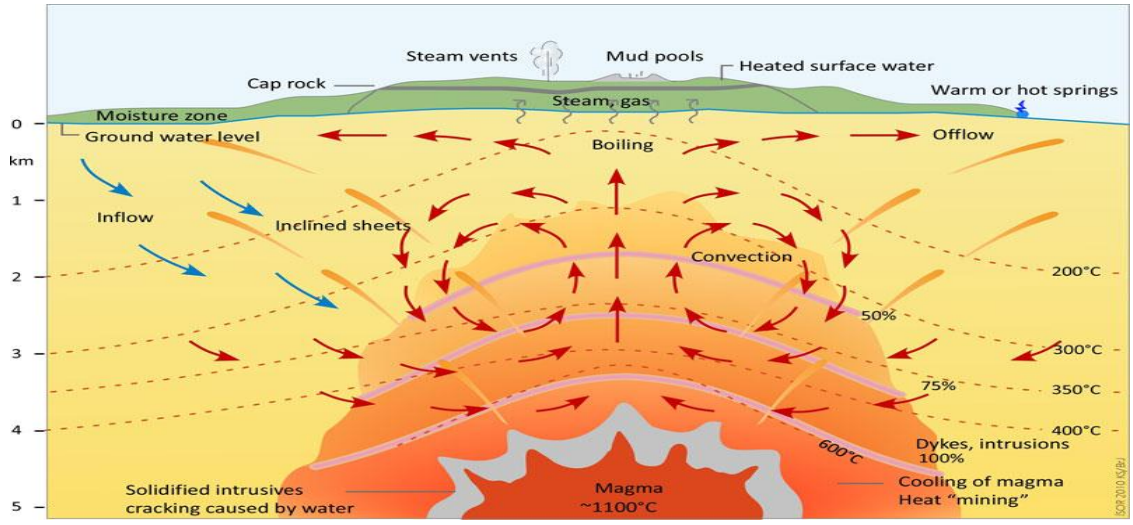
that infiltrated through faults and cracks in massive rocks or sediments through the Earth's Crust to the Mantle.



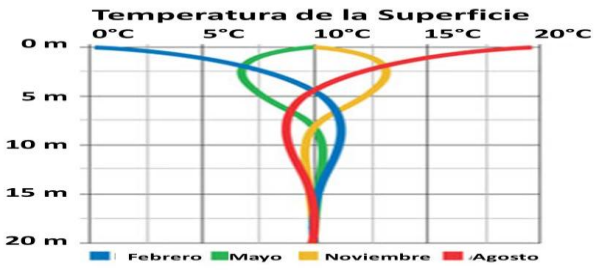
Liquid water can reach temperatures exceeding 148 ° C as long as it's not in contact with air. Magma rock can even heat water up to 370 ° C which will try to escape towards the surface by convection through cracks in the crust forming pools of hot water (hot springs) or leave abruptly (as geysers with water up to 200 ° C temperature). The rest remains in hot water under surface water tables called geothermal reservoirs.



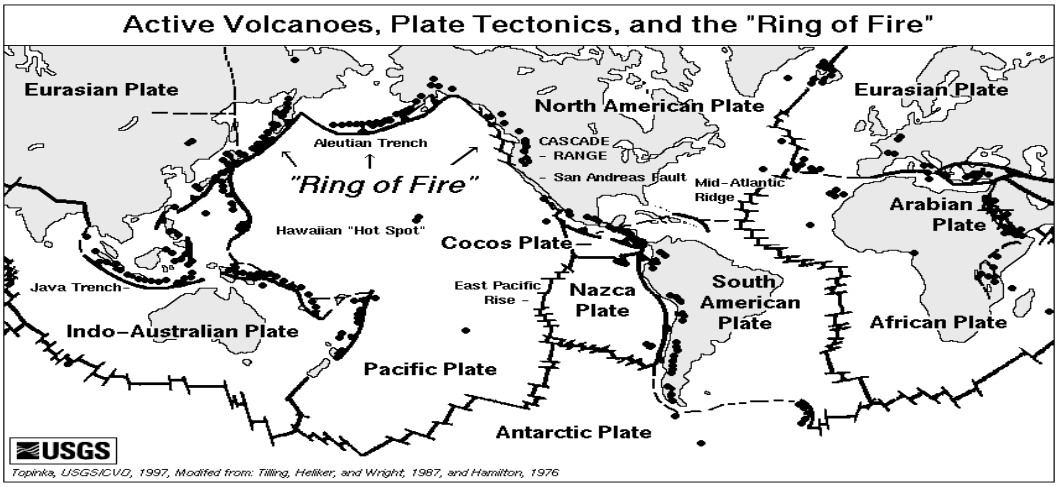
Geologists use several methods to find geothermal bodies but the most reliable is to drill a well and measure the temperature of groundwater for clues of geothermal reserves which are classified according to their temperature to “High” (400 ° C to 150 ° C), “Medium” (150 ° C to 70 ° C), “Low” (70 ° C to 50 ° C) and “Very Low” (50 ° C to 20 ° C).



As discussed earlier, between 3 and 10 meters deep, the Earth’s average temperature is between 10 and 15 ° C being a source of geothermal energy “very low” but available anywhere in the world.

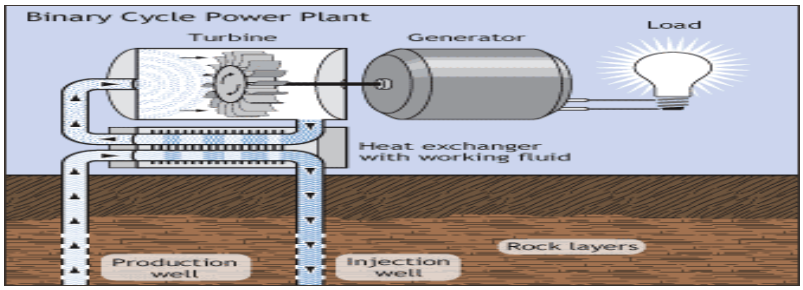


The surface areas with higher temperature are in active volcanic regions that are geologically “younger” or where there are shocks of plate tectonics and the crust is thin enough to let this heat release. It is very important to note that these are very seismically active regions as well, so evidence of thermal reserves could be in the presence of volcanoes, hot springs and geysers.

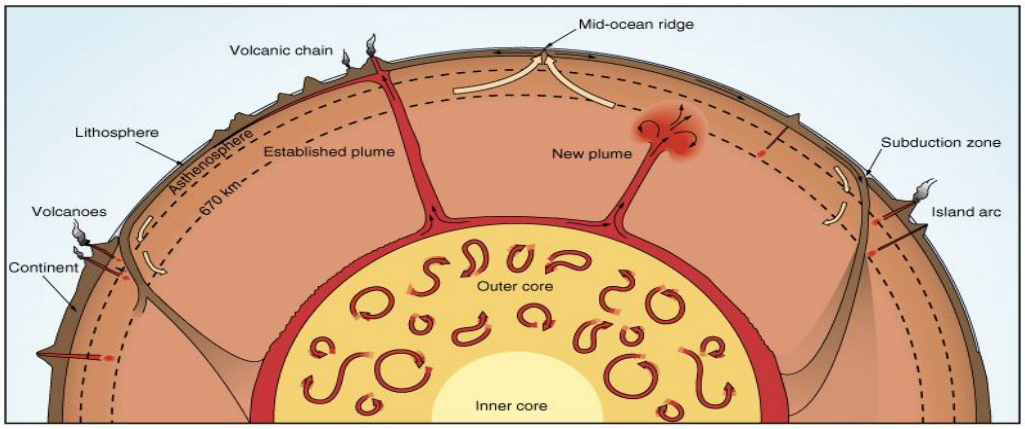


Since these phenomena occur naturally, human beings have used this resource since antiquity including geothermal heating homes, and places of rest.

To date, this geothermal energy is used worldwide to power heating and cooling systems (using a system that uses the heat flow dynamics) and electricity generation (using steam as kinetic energy).

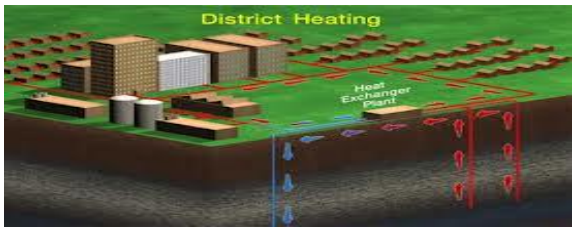


The promoters of this type of energy claim that the use of this energy source is cleaner and cost effective than fossil fuel combustion, which could reduce its dependence both coal and oil in modern life.

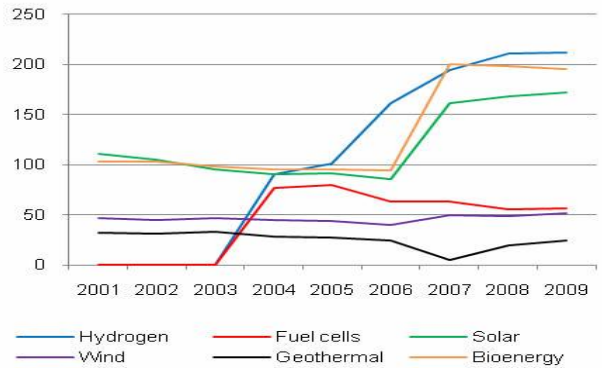


Certainly geothermal plants release a fraction of the carbon dioxide produced by fossil power plants and create very little nitrogen oxide or sulfur gases.

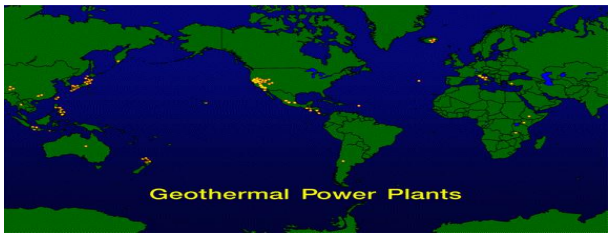
Another advantage is that power generation is done in the power supply, so no transportation costs or carbon emissions in this line and can operate 24 hours a day, 365 days a year.



The main costs of this type of energy are mainly in exploration to find “geothermal reserves” through the drilling of wells (which can cost between 1 and 4 million) which is currently limited in depth (to just over 1 km) ..



Another disadvantage is that it is limited by geography (physical location of the reserve), as being geothermal reservoirs in seismically active regions requires that infrastructure to be designed and built with special attention.



Besides extracting geothermal energy must be monitored to avoid local depletion by cooling, so is not strictly renewable. With proper management of the reserves, extraction rates of energy can be balanced with a natural rate of recharge of heat energy.

Fluids deep underground can bring various mixtures of gases like carbon dioxide, natural gas, hydrogen sulfide, ammonia, sulfur, and heavy metals, so special care must be taken in the process of identifying and exploiting the reserves to avoid the potential release of “hydrogen sulfide”, pollution of nearby waters with substances such as arsenic, ammonia, and thermal pollution.

Source: http://www.artinaid.com/2013/04/geothermal-energy/