

A Short Note on Geothermal Energy

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EDITORIAL NOTE

We have various types of renewable energy resources they are solar energy, wind energy, tidal energy, hydro energy, geothermal energy, biomass energy etc. These six are most popular in renewable energies. In these energies we are less utilizing the geothermal energy through worldwide. From the world's total production of electricity, possible percentage of geothermal energy from its resources is up to 8.3%, and this energy may supply 17% of world's population for a year. Geothermal energy is the heat energy that produced from Earth's crust. Our Earth has different layers they are inner core, outer core, mantel, upper mantel and crust. Crust consists only 1% of the Earth's total mass and its thickness is varies from 5 kilometers to 30 kilometers. The thickness beneath the oceans is minimum and thickness at hills and plain areas will be maximum. And the temperature is also varies in crust i.e, at deserts the temperature is maximum and at the Antarctica is minimum like freezing temperature. The average temperature of the crust is 14°C. But the average temperature at the core is 5200°C, at the base of mantle is around 3500°C because of hot molten rock and magma and at the base of the crust is 1000°C. Reason for this temperature is radioactive decay process, radioactive decay is an energy loss process of an unstable atomic nucleus in this decay process heat energy is emitted from nucleus in the form of radiation [1]. This radiation is called geothermal energy.

Geothermal energy is the potential production energy resource. Hot springs are example for geothermal energy, these hot springs are used for bathing since Paleolithic times. The oldest hot water bath pool is located in china. The hot water geysers are located California within the 117 square kilometers, where 22 geothermal power plants are installed with overall capacity of power production 1.5 GW. Geothermal energy is also used to warm homes and office buildings in cold countries. Geothermal heating is used in 70 countries.

By using this geothermal energy electricity is produced, the produced power is called geothermal power. In general thermal power plants coal is used to produce highly saturated steam to rotate turbines. This turbine shaft is connected to generator shaft and in generator electricity is produced by the principle of

electromagnetic induction [2]. Where in geothermal power processing system no need to use of coal or any fossil fuels to produce steam. Use of fossil fuels causes to environment pollution and global warming.

The geothermal power plants are working process is hot water is pumped form a deep well with high pressure to surface, when hot water with pressure reaches to surface, the pressure is dropped and water is converted into steam. This steam is heated up to reach its saturation state and projected directly on turbines with pressure to rotate. Turbine is connected to generator and where power is produced. Steam after hitting turbine blades is went into cooling tower where is condenser is presented the hot steam is cooled and condensed into water. The condensed water is pumped back to earth or for any other use [3].

Geothermal power production process is carbon free, renewable and sustainable form of energy. There is no interruption in supply of heat in this energy process. But in solar and wind energy interruption in supply is takes place. Geothermal energy produces only one-sixth of the CO₂ produced in natural gas power plants, and associated with emissions like hydrogen sulfide and sulfur dioxide.

In 1904 geothermal energy is first used in Italy, now it is used in over 26 countries in world. The largest producer in geothermal energy in the world is United States, and host to the largest geothermal field at California. And in 1907 Iceland started geothermal power, Iceland have 200 volcanoes and 600 hot springs. That's why Iceland describes itself pioneer of geothermal power. Iceland has six major geothermal power plants currently in working and only these six plants produce 30% of its energy.

Suitable location for installation of geothermal power plants is the edges of the tectonic plates. At the edges of the tectonic plates high temperatures are available near the surface. The initial cost to construct a geothermal power plant is high. It is the specific location energy source. Some of the geothermal power plants in Germany, France and Switzerland are at shutdown stage because of earthquakes. Earthquakes changes the position of tectonic plates, these changes in tectonic plates caused to close the power plants.

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In recent years worldwide total production of geothermal power is 15.4 Giga watts as per 2019 reports. Thousand years ago ancient Romans, Chinese and American peoples were used this geothermal energy for bathing and cooking. It is more important to adopt more technologies and pollution free energy sources to live human beings on earth.

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