Master thesis advisor: Professor Pascalis K. Gotsis.

Subject: Geothermal energy.

Purpose of the above thesis is to use the literature and to write an article about the 'Geothermal energy'.

One or two graduate students can work for this subject.

A brief summary about the Geothermal energy.

Geothermal energy is thermal energy generated and stored in the Earth. Thermal energy is the energy that determines the temperature of matter. The geothermal energy of the Earth's crust originates from the original formation of the planet (20%) and from radioactive decay of minerals (80%). The geothermal gradient, which is the difference in temperature between the core of the planet and its surface, drives a continuous conduction of thermal energy in the form of heat from the core to the surface. The adjective *geothermal* originates from the Greek roots *γη (ge)*, meaning earth, and *θερμος (thermos)*, meaning hot.

Earth's internal heat is thermal energy generated from radioactive decay and continual heat loss from Earth's formation. Temperatures at the core–mantle boundary may reach over 4000 °C (7,200 °F). The high temperature and pressure in Earth's interior cause some rock to melt and solid mantle to behave plastically, resulting in portions of mantle convecting upward since it is lighter than the surrounding rock. Rock and water is heated in the crust, sometimes up to 370 °C (700 °F).

Geothermal power is cost effective, reliable, sustainable, and environmentally friendly, but has historically been limited to areas near tectonic plate boundaries. Recent technological advances have dramatically expanded the range and size of viable resources, especially for applications such as home heating, opening a potential for widespread exploitation. Geothermal wells release greenhouse gases trapped deep within the earth, but these emissions are much lower per energy unit than those of fossil fuels. As a result, geothermal power has the potential to help mitigate global warming if widely deployed in place of fossil fuels.

The Earth's geothermal resources are theoretically more than adequate to supply humanity's energy needs, but only a very small fraction may be profitably exploited. Drilling and exploration for deep resources is very expensive. Forecasts for the future of geothermal power depend on assumptions about technology, energy prices, subsidies, and interest rates.

Application of Geothermal energy.

Geothermal electricity is electricity generated from geothermal energy. Technologies in use include dry steam power plants, flash steam power plants and binary cycle power plants. Geothermal electricity generation is currently used in 24 countries, while geothermal heating is in use in 70 countries.

Thermal energy
Geothermal heating is the direct use of geothermal energy for heating applications. Humans have taken advantage of geothermal heat this way since the Paleolithic era.

References

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2) Turcotte, D. L.; Schubert, G. (2002), "4", *Geodynamics* (2 ed.), Cambridge, England, UK: Cambridge University Press, ISBN 978-0-521-66624-4