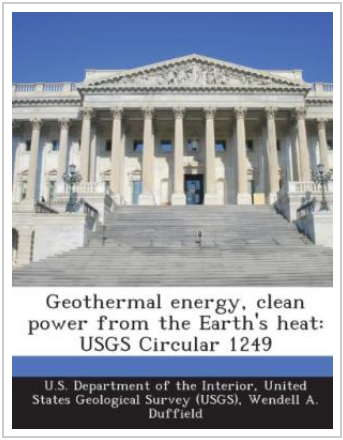

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By Wendell A Duffield, John H Sass

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Geothermal power is already an important energy resource for our nation and the world. Hydrothermal plants in the western states now provide about 2,500 megawatts of constant, reliable electricity, which meets the residential power needs for a city of 6 million people. Over 8,000 megawatts are currently being produced worldwide. A variety of industries, including food processing, aquaculture farming, lumber drying, and greenhouse operations, now benefit from direct geothermal heating. The alligators in the following picture are grown in geothermally heated water in Idaho. Hydrothermal systems ...Â Duffield, W. A. Geothermal Energy â€“ Clean Power From the Earthâ€™s Heat. Reston, Virginia: United States Geological Survey, 2003. Geothermal Today. Development of geothermal energy provides an attractive opportunity to address greenhouse gas emissions and decrease reliance on nonrenewable resources (Murphy & Niitsuma 1999;Fridleifsson 2001). Recovery of even a small percentage of the heat contained within the upper 10 km of the Earth's crust could provide an amount of energy equivalent to several hundred times that contained within the world's oil and gas reserves (Duffield & Sass 2003). A recent study by Tester et al. (2006) estimates that geothermal energy could meet a significant percentage of the electricity dema Geothermal energy is the heat emanating from underneath the surface of the earth.Â The term geothermal originates from the Greek words; Geo, which means earth and Thermal, which means heat. This derivation quickly points to the definition of geothermal energy, which is heat emanating from underneath the surface of the earth. The energy inside the earth was formed by the decay of minerals and forests several years ago.Â The power plant harnesses the steam from the hot water beneath the earthâ€™s surface to turn turbines, which later activates a generator to produce electricity. Some geothermal power plants utilize steam to directly turn the turbine. Others utilize the steam to heat a liquid that is used to turn the turbine. Geological Survey Geothermal Energy Earth's Heat.Â Circular 1249. U.S. Department of the Interior U.S. Geological Survey. Geothermal Energyâ€”Clean Power From the Earthâ€™s Heat. By Wendell A. Duffield and John H. Sass. C1249. U.S. Department of the Interior U.S. Geological Survey. ii.Â Geothermal energy is present everywhere beneath the Earthâ€™s surface, although the highest temperature, and thus the most desirable, resources are concentrated in regions of active or geologically young volcanoes.

Geothermal energy is the heat emanating from underneath the surface of the earth.Â Underneath the earthâ€™s surface, the water and rocks absorb heat from the magma. READ What is Hydroelectric Power and Types of Hydropower Turbines. As the depth increases, so do the temperatures of the underground water and rocks.Â The power plant enables cooler geothermal reservoirs to be utilized than is necessary for the flash steam and dry steam power plants. We have learned that the flash steam and dry steam use water at temperatures higher than 182 Â°C (455 K; 360 Â°F), which is pumped up under extremely high pressure to the electricity generation plant at the surface. Heat from the earth can be used as an energy source in many ways, from large and complex power stations to small and relatively simple pumping systems. This heat energy, known as geothermal energy, can be found almost anywhereâ€”as far away as remote deep wells in Indonesia and as close as the dirt in our backyards.Â Geothermal springs for power plants. Currently, the most common way of capturing the energy from geothermal sources is to tap into naturally occurring "hydrothermal convection" systems, where cooler water seeps into Earth's crust, is heated up, and then rises to the surface. Once this heated water is forced to the surface, it is a relatively simple matter to capture that steam and use it to drive electric generators. Geothermal power is generated from the high temperatures that can be found in various parts of the Earth's crust such as volcanoes, hot springs, and geysers . The high temperatures range from 225Âº F to 600Âº F and occur in these areas due primarily to the decay of radio-active isotopes that occur within the rocks of the earth's crust . The water that surrounds and fills the gaps between the rocks in the crust is raised in temperature by these natural processes. This hot water is then pumped to the