Deep Geothermal Resources: Estimated Temperatures on Top of the Red River Formation

Dickinson 100K Sheet, North Dakota

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Estimated energy (in calories) is a calculated parameter that is used to assess the potential of geothermal energy as a source of power for a given location. The energy is estimated based on the temperature measurements on the top of the Red River Formation and is calculated using the following formula: E = Q * C * T, where E is the estimated energy, Q is the heat flow, C is the thermal capacity, and T is the temperature. The estimated energy is then converted to a percentage of the possible energy that could be generated by the geothermal resource.

The thermal capacity of the earth's crust (C) is estimated using the thermal conductivity (K) and the thickness of the crust (H), which is calculated using the equation: C = K * H. The thermal conductivity is estimated using the equation: K = (T1/T2) * (H1/H2), where T1 and H1 are the temperature and thickness at one depth, and T2 and H2 are the temperature and thickness at another depth.

Hydrothermal conditions are characterized by high temperatures, high pressures, and high fluid flow. The presence of hydrothermal conditions can be detected by the presence of hot springs, geysers, fumaroles, and other geothermal features. The presence of hydrothermal conditions can also be detected by the presence of hot water and steam vents, which are often associated with geothermal fields.

Deep geothermal resources are located at depths greater than 3,000 feet (900 m) and are generally found in rift zones, volcanic areas, and areas with a history of geothermal activity. Deep geothermal resources can be classified as high-temperature resources, low-temperature resources, and intermediate-temperature resources, depending on the temperature at the wellhead. High-temperature resources have temperatures greater than 250°C, low-temperature resources have temperatures between 100°C and 250°C, and intermediate-temperature resources have temperatures between 50°C and 100°C.

The use of geothermal energy as a source of power is increasing worldwide due to its potential to provide a sustainable and reliable source of energy. Geothermal energy is also considered to be a clean source of energy, as it does not emit greenhouse gases or other pollutants.

The disposal of geothermal fluids is a potential environmental concern, as it can lead to the release of contaminants into the environment. The disposal of geothermal fluids is typically done by injecting the fluids into deep geothermal fields, where they are naturally heated by the earth's heat.

Geothermal resources are currently being developed in many parts of the world, including the United States, Mexico, Japan, and Iceland. The development of geothermal resources is typically done through the use of geothermal fields, which are areas of geothermal activity that are characterized by the presence of hot water and steam vents, geysers, and other geothermal features.