



Deep drilling

The Iceland Deep Drilling Project (IDDP) intends to evaluate the practicality and economics of extracting energy from deep geothermal resources at supercritical conditions by drilling to about 5 km depths. An Icelandic energy consortium, the Sudurnes Heating Company (HS), the National Power Company (LV), the Reykjavik Energy (OR) and the National Energy Authority (OS) initiated the project in 2000. A feasibility study that was concluded in 2003. At the same time an international scientific collaboration was established, sponsored by the International Scientific Continental Drilling Program

A typical high-temperature geothermal well worldwide produces sufficient steam to generate about 4-5 MW of electric power. On the other hand, the IDDP feasibility study suggests, that in favourable conditions, the power output from deep supercritical fluids could increase 10-fold. Although drilling such deep wells will be more expensive, one deep supercritical well could replace ten average wells.



Reykjanes

Iceland is a particularly favourable location for research on supercritical fluids as repeated seismicity and volcanic activity create high permeability and high temperatures at shallow depths. These conditions are produced by the coincidence of a mantle plume with the divergent plate boundary of the Mid-Atlantic Ridge. In 2004 the Sudurnes Heating Company offered one of its production wells at Reykjanes to be deepened by the IDDP.

The main objective of IDDP is to find out whether more energy can be extracted economically from deep high-temperature geothermal fields by applying a new extraction technique that increases the efficiency of geothermal utilization.

Drilling technology

In drilling the IDDP wells, conventional drilling techniques will be used adjusted for higher temperatures and pressures, as necessary.

Production tests

The current plan for production testing is to insert a specially designed, 4 km long, retrievable liner into the well. The first production test is scheduled for 2008-2009.

Geoscience

The science part of the project involves the collection of drill cores from selected intervals at 3-4 km depths and a continuous drill cores at 4-5 km depths. The fluid expected to be produced is superheated dry steam at 400-600°C. As yet, its chemical composition is uncertain, but more concentrated fluids are likely from the seawater-like geothermal systems in Reykjanes compared to the dilute geothermal systems further inland.

Reservoir at supercritical conditions

