

Enhanced Geothermal Fracking

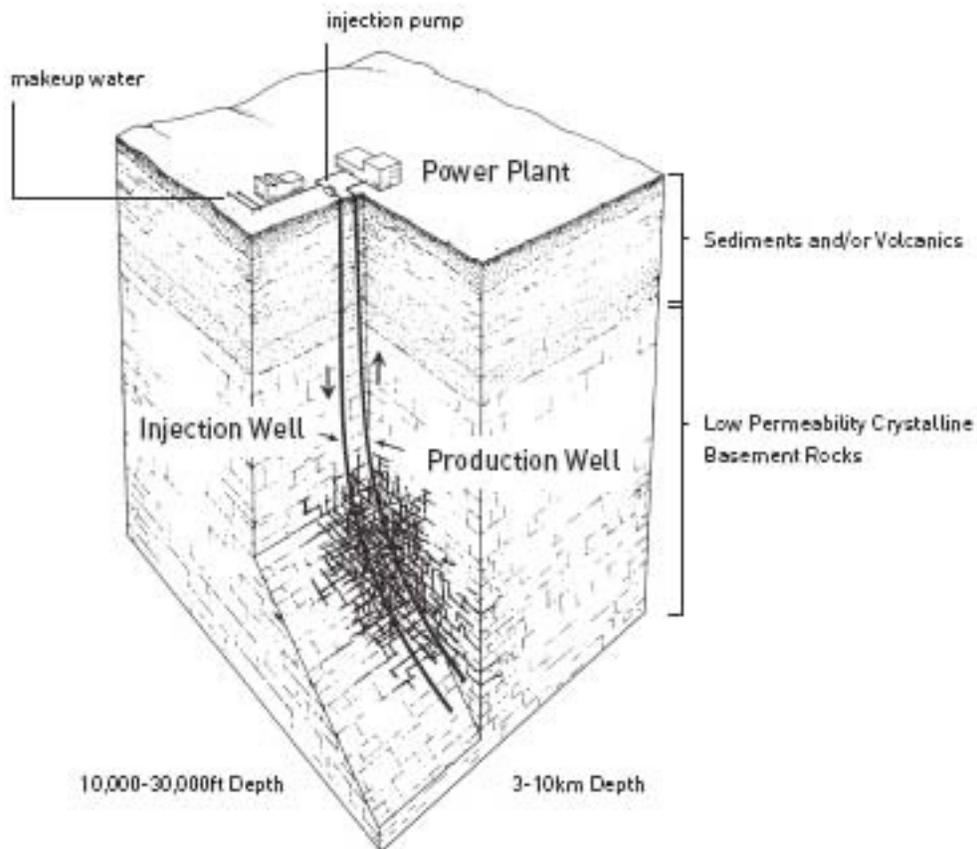
The heat of rocks thousands of feet underground is a source of future energy being considered by many countries where geysers are unavailable for "clean steam" geothermal. The "Hot Dry Rock Technology" or "Hot Fractured Rock" (HFR) or "Enhanced Geothermal System" (EGS) is similar to "fracking," which may cause environmental damage including earthquakes and water pollution. Three crucial factors are needed: water, permeability of the rocks, and heat. Power generation is critically dependent on massive amounts of surface water injected into fractured rock circulating freely to become superheated.

Scientists attempt to select a location with an underground large mass of horizontal hot rocks with adequate permeability--then enhancing permeability with controversial "fracking" (Hydraulic Fracturing). Surface water is injected into well, under pressure, hoping that it will travel through cracks and fissures to form an underground reservoir. More production wells are drilled around the perimeter of the underground reservoir to recover the superheated water and steam to power either a conventional or "binary" power plant. [PGV is a binary power plant.]

Limitations:

- Geothermal plants have been abandoned in Switzerland and California due to the earthquakes they triggered. The U.S. Geological Survey concluded that geothermal power production induces seismicity.
- Substantial liability may be incurred by the state, due to property damage and economic losses.
- Locating a large mass of sub-horizontal rocks with enough permeability to provide adequate water flow through hot rocks is a challenge. Many wells are dug without success.
- Enhancing permeability with controversial fracking (hydraulic fracturing), using high-pressured water and/or chemicals may be expensive and environmentally damaging.
- Pumping superheated water back up thousands of feet to the surface through relatively cold rocks can result in heat loss.
- Forming a large artificial reservoir thousands of feet underground where water has never been naturally accumulated is challenging, and the water can flow in a direction away from production wells.
- The enormous amount of surface water needed to form an artificial reservoir of about one cubic kilometer, deep underground, diverts water from other uses. There is a constant loss of precious water.

Sources: <http://www.geothermalworldwide.com/egs.html>, <http://www.buzzle.com/articles/geothermal-energy-disadvantages.html>, <http://www.nytimes.com/interactive/2009/06/23/us/Geothermal.html>
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