

A photograph of a geothermal power plant in a rural, mountainous landscape. Several tall chimneys are emitting thick white steam that rises into the sky. The ground is covered in green and brown vegetation, and there are some industrial structures and pipes visible. In the background, there are blue mountains under a clear sky.

Geothermal Energy

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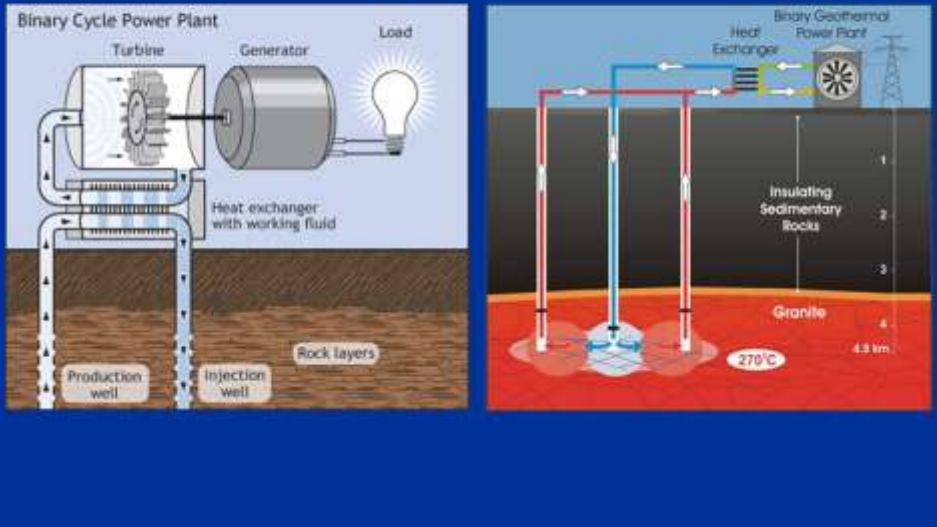
Harnessing Geothermal Energy

- The Earth's core transfers heat to the mantle (crust of rock surrounding core)
- Rock liquefies due to extreme heat. Water collects in columns / reserves. The water can be heated to temperatures around 700 degrees Fahrenheit.

Harnessing Geothermal Energy

- Engineers use the resulting hot water and steam to turn turbines
- The turbines spin producing electricity
- Works almost in same way hydropower creates electricity, however, the water comes from underneath the Earth's surface, usually in form of steam

Harnessing Geothermal Energy



Benefits of Geothermal Energy

- Continuous, Reliable, and Renewable
- Uses relatively little land
- Only releases 120kg of CO₂ per MWh
- Geothermal fluids (with toxins and stuff) can be injected back into the earth
- 4% of worlds renewable energy source
- 1.2% total energy
- Hydrothermal electric plants working 97% of the time.

Where to Find Geothermal Power?

- Good for areas with the high underground temperatures
 - Regions with active or geologically young volcanoes.
 - The Pacific Rim, often called the Ring of Fire for its many volcanoes, has many hot spots, including some in Alaska, California, and Oregon.



Who uses geothermal power?

- Iceland: more than 50%
- United States: 28%
- New Zealand
- Italy
- Russia
- Japan
- France



Energy Efficiency

- Efficiency depends on amount of heat.
- The average thermal efficiency of geothermal electric plants is low, around 10-23%.
- According to the Energy Information Agency, the average efficiency of American geothermal power plants is about 16%.

Cost Efficiency

- It is cost efficient.
- High initial costs (\$2500 per installed kW) but low maintenance costs (\$0.01 - \$0.03 per kWh.)
- Only cost \$0.05 per kWh to generate energy.
- Greater availability than other power plants, such as coal.
- Can run at more than 90% availability, while coal power plants run at 70%.

Disadvantages

- Low number of possible drilling locations for geothermal sites
- Geothermal energy is not as easily transported as oil
- Hazardous material may be released along with the steam
- Geothermal site may just run out of steam

Fun Facts

- Geothermal energy is Iceland's main source of energy
- The lifespan of geothermal energy is so long, that it is considered a renewable resource
- The “Ring of Fire” is an excellent source of geothermal drilling spots

Explanation of Geothermal Power (Video)

- <http://www.nextenergynews.com/geothermal/geothermal14.html>

How a Geothermal Power Plant Works (Animation)

- http://www1.eere.energy.gov/geothermal/gpp_animation.html

Geothermal Power Questions

- T/F: Geothermal Energy relies on a very unreliable source?
- T/F: Geothermal power plants use a lot of land?
- T/F: A good place to use geothermal energy is in areas with the high underground temperatures?
- T/F: Geothermal Energy is 86% efficient?
- T/F: Geothermal power plants run at a lower availability than other energy power plants?
- T/F: One does not have to dig very far underneath the surface to find geothermal energy sources

Citations

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