Renewable Energy: Geothermal Energy

Factsheet 08

Facts and Figures

About Geothermal Energy

Beneath our feet it is hot, very hot. Every day, the Earth radiates four times more energy into space than we humans currently consume in energy. This is energy from the Earth's hot core (30%) and from the decay of natural radioactive elements (70%) in the Earth's mantle and crust. This is referred to as geothermal energy and this geothermal energy is an inexhaustible source of energy. Basically, geothermal energy can be used to generate heat, and at higher temperatures (90° C and above) it can also be used to generate electricity.

3 Methods of Geothermal Energy Use

1. **Near-surface geothermal energy (up to 400 m depth)**
   The ground temperature in the first 100 m is about 10° C. With increasing depth, the temperature in the ground rises, about 3° C per 100 m. This heat is used, for example, in heat pump technology to heat and cool houses and to supply them with hot water. This technology can also be used by private individuals.
2. **Use of warm deep water**
   Water from depths of up to 4,500 m (thermal water) is used to heat greenhouses, or to feed into heating grids to heat entire city districts.
3. **Deep geothermal energy**
   Deep geothermal energy, up to 5.00 metres deep, uses the heat from the rock to generate electricity. Traditionally, the heat is used to generate steam that drives turbines. The electricity generated in this way is fed into the power grid.

Professions & Competence Profiles

Depending on the process, the use of geothermal energy is relevant for many professions in the fields of engineering technology, power plant construction. Using near-surface geothermal energy, there are heating engineers, electricians, refrigeration engineers for heat pump installation and also planners and architects for sustainable building concepts.

Special Risks of Deep Geothermal Energy

- The risk of development itself: is the field big and hot enough?
- The development of deep geothermal energy means mining intervention in the soil and rock strata, associated with corresponding risks:
- Danger of triggering earthquakes, e.g. if water is forced into the depths at too high pressure - induced seismicity.
- Risk of drinking water supply being impaired if aquifers are drilled into or contaminated.

- Danger of rock swelling if, during drilling or operation, water penetrates rock layers that react with water with corresponding faults at the earth's surface.

Good Reasons for Using Geothermal Energy

- Geothermal energy is an inexhaustible energy source that can contribute to solving the world's energy hunger
- Geothermal energy is always available, weather-independent, safe and reliable.
- Geothermal energy does not cause any CO_2 emissions when used and is therefore climate-friendly.
- Geothermal energy means independence from fossil fuels.

Renewable Energy: Geothermal Energy in Europe

Factsheet 04

Facts and Figures

3 Country Check on Deep Geothermal Energy

Spain

In Campo de Níjar (Almería), Spain's first geothermal plant for heating greenhouses was commissioned in 2022. A natural thermal water reservoir at a depth of 1,600 m is used.

Greece

In Greece, as of 2019, 30 geothermal fields with a minimum temperature of 30° C have been identified for the use of deep geothermal energy. Some islands in particular, e.g. the island of Milos, offer a high potential with areas of up to 325° C. So far, deep geothermal energy has only been used thermally: heating of greenhouses, thermal baths and SPAs. An electricity project on Milos failed in 1988 due to opposition from the population.

Slovakia

In Slovakia, deep geothermal energy has not yet been used in domestic electricity generation. As of 2022, Slovakia wants to rely on geothermal energy (as a whole) in the future to reduce its dependence on Russia. Geothermal energy is not only seen from an environmental point of view, but also from a security and strategic decision-making point of view.

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