

Energy from 5,000 Meters Beneath the Earth

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- Evonik is currently generating over 100 megawatts of geothermal-based power
- Heat for over 20,000 single-family houses
- Joint European project in France going to even greater depths

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Essen. Ninety-nine percent of the earth is hotter than 1,000° C. A vast, nearly inexhaustible energy potential is slumbering right below our feet. Unlike wind and solar energy, geothermal heat is reliably available around the clock. In the future, homes and apartments all over Germany could be heated and supplied with electricity based on geothermal heat.

Evonik uses geothermal heat by extracting hot deep-well water. As experts in the planning, construction and operation of geothermal plants, Evonik is participating in three projects in Erding, Simbach-Braunau and Unterschleißheim with a total installed thermal output of 100 megawatts. These plants produce 182,000 megawatt hours of heat per year—or enough to supply over 20,000 single-family households. This makes Evonik the market leader in this sector in Germany.

In Erding, Upper Bavaria, for example, Evonik has been operating a geothermal-based district heating system on behalf of the Erding Municipal Association for Geothermal Heat since 1998. The heating station uses heat pumps and heat exchangers to extract thermal energy from a thermal spring 2,350 meters underground and feed it into a district heating circuit. Evonik built a second heating station in Erding in 2007. When the final extension is completed, the heating stations will generate a combined 108,000 megawatt hours of heat, and Erding will have the largest geothermal-based district heating system in the world. The Erding project is unique in Europe for its three-way use of the thermal water: as a district-heat supply, as drinking water, and as a water supply for the thermal pools.

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Along with such partners as EDF and EnBW, Evonik has been a full, active member of the European Deep Geothermal Energy Programme Soultz-sous-Forêts since the end of 2006. The goal of the project is to gain experience in the management and long-term behavior of a heat exchanger deep below ground, and to generate electricity based on the hot dry rock process. What makes this project different from existing plants is that it uses this process at even greater depths and for the generation of electricity.

The hot dry rock process uses the high temperatures that can be found nearly everywhere at about 4,000 meters below ground. In the Soultz-sous-Forêts project, the first step was to expand existing fractures in the granite rock by applying high pressure and merge them. This created a wide network of fractures at a depth of more than 5,000 meters. Water is pumped into this geological "continuous flow heater," heated and, in another location, brought to the surface as steam. Eventually, this steam will be used to power a turbine for power generation.

Construction of a pilot power plant is nearly complete. The plant is scheduled to commence operation in 2008, and will have an output of 1.5 megawatts of electricity. Upon completion of the final extension, the plant should generate 25 megawatts of electricity. The temperature of the steam is 200°C. To date, about €24 million—€20 million of which represents government subsidies—has been invested in the project. Additional funding in the amount of about €21 million is planned.

As the process is useable on 95 percent of the land surface of Germany, it has enormous potential in the long run. According to a study by the Office of Technology Assessment at the German Parliament (TAB), geothermal heat has a yearly potential of about 300 terawatt hours in Germany when used sustainably. This corresponds to about half of the country's current gross power generation. For Evonik, entry into geothermal-based power generation means an investment in a futuristic technology that is as climate-friendly as it is reliable.

Company information

Evonik Industries is the creative industrial group from Germany which operates in three business areas: Chemicals, Energy and Real Estate. Evonik is a global leader in specialty chemicals, an expert in power generation from hard coal and renewable energies, and one of the largest private residential real estate

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companies in Germany. Our strengths are creativity, specialization, continuous self-renewal, and reliability. Evonik is active in over 100 countries around the world. In its fiscal year 2007 about 43,000 employees generated sales of about €14.4 billion and an operating profit (EBIT) of more than €1.3 billion (preliminary figures).

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