

Demonstration project Italy

Italy: Solar on Sicily

Perfect wind and solar conditions make the town of Priolo Gargallo (200.000 inhabitants), a town on the east coast of Sicily (Italy), a unique location for applying innovative sustainable technologies. One major innovation is a local solar power plant. The plant generates steam from solar radiation, which is then fed into the steam cycle of a gas-fired combined cycle power station next to it. The system combines several innovations that overcome the existing problems of solar power systems.



Nobel Prize winning physicist Carlo Rubbia, president of the alternative energy agency ENEA, has opened the pilot of the Archimedes solar power plant in 2004. The prototype on industrial scale, which will supply energy to the town of Priolo Gargallo and save 39.0000 tons of CO₂ emissions each year. The project is realised in collaboration with the Italian electricity supplier Enel

by a joint venture and is supported by some private banks.

The solar plant consists of a solar field of 40 acres, a storage system and a steam generator. In the modular solar field the solar energy is collected in 360 linear parabolic collectors with a surface of 200.000 m³. The movable collectors are arranged in parallel rows that each form a single string. The number of strings determines the thermal energy and thus the power of the plant. ENEA introduced a new fluid heat carrier (mixture of sodium and potassium) in order to increase the operating temperature and the possibility of storing heat. Another innovation of ENEA is the design of a new type of concentrator based on thinner mirrors that saves construction and installation costs.



The use of large scale heat storage is another innovation in the Archimedes project. Due to two storage tanks operating at different

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temperatures, the plant provides heat to the steam generator at a constant rate 24 hours a day, regardless of variations in solar energy availability. The steam generator consists of 'tube and shell' heat exchangers in which heat is transferred to water to produce superheated steam for use in a conventional thermoelectric plant.

The Archimedes project is the first of its kind in the world. Apart from disseminating new technologies, ENEA also wants to stimulate the creation of a self-sustained market. The sunlight, especially in the south of Italy, can make the country rely mainly on solar power. More general, solar power plants will increasingly play a key role in the energy development of Italy towards diversifying energy sources and reducing greenhouse gas emissions.

