NOOR – Concentrated solar power for Morocco
The most ambitious solar power project in the world.

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Morocco is a country undergoing profound changes: The population is growing, and prosperity is rising, companies are adding locations here and rural areas are getting connected to the power grid. Therefore the demand for energy is expanding, especially for electricity. However the North African country has few fossil fuel resources of its own, and until now has largely had to depend on importing fossil energy. That is now supposed to change.

The solution is to expand the energy generated from sun, wind and water to a total of six gigawatts, and thus to become less dependent on global price fluctuations. The showcase project is the Ouarzazate solar complex. But for the country to be able to convert the sun’s energy efficiently into electricity, it needs specially designed products, like especially robust steam turbines and generators. Siemens is supplying a total of three turbogenerator sets, each comprising two steam turbines and one generator.

Customer benefits

- Total power output of 580 MW
- Thanks to high-capacity molten salt storage system power generation into the night after sundown is enabled
- Steam turbines designed to start and stop quickly
- Reducing CO2 emissions by 800,000 tons per year compared to fossil-fired power generation

Morocco has a lot to offer: a rich culture, rugged mountains, traditional crafts – but almost no fossil fuel resources. It was time to use the sun as filling station: Turning solar energy into electricity. The NOOR projects – the name comes from the Arabic word for 'light' – combine a variety of mutually complementary solar-thermal technologies.
Parabolic trough technology

NOOR I and II focus the sun's rays and direct them onto pipes that contain a circulating heat-absorbent medium, in this case heat transfer oil. The oil then serves to heat a steam loop. The steam generated in a heat exchanger drives a steam turbine, which in turn drives a generator that generates electricity.

Solar power tower

In the NOOR III solar tower power plant, an array of a very large number of flat individual mirrors reflect the sun's rays to a receiver module at the top of a tower more than 240 meters high. Temperatures can reach as much as 1,000° Celsius. The absorber medium here is a molten salt mixture that heats to 555°C. The absorbed thermal energy is then transmitted to the associated power plant unit by way of a steam loop.

Turning sunlight into electricity

Concentrated solar thermal power is worldwide becoming a more and more important source for power generation. The reasons for this are obvious: The sun is an inexhaustible source for power production. And it is not only a free fuel source but also a complete emissions-free source.

Catching the sun: Thousands of parabolic mirrors like these focus the sun's rays in the desert near Ouarzazate and direct it to pipes containing heat transfer oil.