

A concentrated solar power plant in China

China tops the world's carbon emission ranking, but the country has made a strong commitment to take climate action. It has set itself the target of lowering its carbon intensity – CO₂ emissions per unit of gross domestic product – by 60–65% from the 2005 level and to “lifting the share of non-fossil energy in primary energy consumption to around 20%” by 2030. The number of initiatives being taken is gaining pace. They include the concentrated solar power plant project developed by the Chinese Academy of Sciences, with which EDF has been collaborating since 2011.



In Badaling, the site of the most visited section of the Great Wall of China, a 108 metre tower rises into the sky. It is equipped with a receiver on which the sun's rays converge. A hundred reflector mirrors, each 100 metres square, are arranged in a semi-circle at its base. They capture the sun's rays and direct them to the receiver at the top of the tower. The concentrated heat raises water in the circuit to 400 degrees Celsius. **The power plant is also equipped with an energy storage system** using oil or steam that has an autonomy of one hour. EDF and the Chinese Academy of Sciences will study the power plant's operation using other heat transfer fluids, such as molten salt and compressed air. The project's aim is to **smooth electricity generation** by providing a solution to the intermittent nature of solar energy. As such, it is particularly well suited to regions with long hours of sunlight.



KEY FIGURES

100 reflector mirrors each 100 m²

108 metre: high tower

400°C: temperature of the steam produced by the system

1 hour energy storage capacity

INTERESTING FACTS



EDF R&D has created a “virtual power plant” to optimise Badaling's operation and anticipate any difficulties that may occur.

A highly digitised project

Computer systems were used right from the concept phase as the design was fully created using digital technology. The orientation of the reflector mirrors is computer controlled; the operator simply has to correct any system drift and trigger maintenance operations.

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