News

Novatec Solar, BASF successfully commission solar thermal demonstration plant in Spain

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Clean energy-generating plant is based on a new type of molten salt technology, known as direct molten salt or 'DMS'

The CSP plant is located on the site of the solar-thermal power plant PE1 in southern Spain. The innovative feature of the new plant design is that the solar collector uses inorganic molten salt as heat transfer fluid.[1] (Using inorganic salts as heat transfer fluid allows operating temperatures above 500°C, resulting in a significant increase in power yield.)

How it works: The thermal energy can either be directly converted into electrical power or be stored in large molten salt tanks during periods of low demand. This stored energy can be kept in reserve for periods when production is low — for example, when the sky is overcast. Solar thermal power plants with storage systems can supply electricity as and when required, which helps to ensure grid stability.

Over the coming months, the demonstration collector will be used to experimentally simulate a large number of different operating conditions. BASF and Novatec will study the impacts on long-term operability, utilizing the results to develop the next generation of solar thermal power plants.

"The successful commissioning and the initial results of the DMS demo plant have confirmed our expectations of the technology," said Andreas Wittke, CEO of Novatec Solar. "We are delighted that we can now offer solar thermal power plants with molten salt technology and thermal storage on a commercial basis."

At the joint test plant, BASF and Novatec Solar use molten salt as heat transfer and storage medium in a Fresnel collector. This type of collector, an alternative to parabolic trough or solar power tower technology, uses flat glass reflectors.[2]

For several years, BASF has been researching and developing heat transfer fluids based on inorganic salts and process control concepts for solar thermal power plants. The company also has more than 30 years' experience in the operation of so-called salt bath reactors, chemical plants that also use molten salt as a heat transfer fluid for process control. Besides the use in chemical plants, anorganic salts can be used reasonably in any application that requires the transport or storage of heat.

"Our knowledge of salt chemistry and the new technology concepts are contributing to a significant improvement in the efficiency of solar thermal power plants," noted Kerstin Dünnwald, head of business management for inorganic chemicals at BASF. "With our portfolio of high-purity inorganic salts and our expertise in their application, we help our customers operate this type of plant safely and efficiently."

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REFERENCES

1. Most solar thermal power plants currently use heat transfer oils, which have a limited qualification temperature, according to Novatec.
2. A Fresnel collector consists of almost flat reflectors mounted in rows on a steel structure. The reflectors concentrate direct sunlight onto a receiver, through which the molten salt is pumped. This has the effect of heating the salt to temperatures in excess of 500°C

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