New molten salt solar plant starts operation

CSP

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(http://www.sunwindenergy.com/sites/default/files/field/image/csp_fresnel-molten_salt_0.jpg)
Novatec uses Fresnel collectors for quite some time now. Now for the first time molten salt will be used as heat transfer medium.
(Photo: Novatec)

Novatec Solar and BASF have commissioned a solar thermal demonstration plant based on a new type of molten salt technology, known as direct molten salt or DMS technology. The plant is located on the site of the solar thermal power plant PE1 in southern Spain. The plant uses inorganic molten salt as heat transfer fluid. Most solar thermal power plants currently use heat transfer oils, which have a limited qualification temperature near 400 °C. Using inorganic salts as heat transfer fluid allows temperatures above 500 °C, resulting in a significant increase in power yield.

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 times when production is low, for example when the sky is overcast. This kind of storage is already used by many CSP-power plants. However those plants typically use thermal oil as heat transfer fluid in the collectors and have to use heat exchangers to load the storage.

Over the coming months, the demonstration collector will be used to experimentally simulate a large number of different operating conditions and study the impacts on long-term operability. The results will be used 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. We are delighted that we can now offer solar thermal power plants with molten salt technology and thermal storage on a commercial basis," says Andreas Wittke, CEO of Novatec Solar.

At the joint test plant, BASF and Novatec Solar use the molten salt as heat transfer medium in a Fresnel collector plant. This type of collector, an alternative to the most common parabolic trough plants uses flat glass reflectors. 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.

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 over 30 years of 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, inorganic 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," says 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."

The integration of Novatec Solar DMS technology with molten salt storage can increase the annual operating hours of solar thermal power plants up to base load capacity. As a result, power generation costs for solar thermal plants based on Novatec Solar DMS technology are significantly reduced. The successful demonstration underlines the leading role played by Novatec Solar as a provider of Fresnel collector technology and BASF as preferred supplier of inorganic salts and technology concepts for process control.

The DMS demonstration collector project is supported by the German Federal Ministry for Economic Affairs and Energy (BMWi) following a decision by the German parliament.

Jan Gesthuizen / Novatec / BASF

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