

News-Archiv Stuttgart

Solar energy even at night: DLR breakthrough with new heat accumulator

7 November 2007



Parabolic trough concentrator on Solar de Almería platform

DLR begins operation of solar-generated steam energy accumulators at temperatures of more than 200 degrees Celsius.

Power from solar energy will in future play a key role in providing a sustainable energy supply. Solar power stations with direct solar steam generation are regarded as having the greatest potential in this field. But the solar energy produced in this way is not always available without interruption.

So-called *heat accumulators* are needed so that power generation can be extended to the night hours or times when there is heavy cloud cover. Thanks to scientists at the German Aerospace Center (DLR), it has now been possible for the first time for just such an accumulator to go into operation successfully.

Security of supply is also an important feature in the case of renewable energies. This means making energy generation independent of the variations in solar radiation. The heat accumulator developed at DLR can store the generated steam for many hours, and release it to the power station as required - at night, for example. It operates at the largest European test centre for solar energy, the Solar de Almería platform in Spain. The accumulator provides 100 kilowatts at temperatures of more than 200 degrees Celsius.

Breakthrough with latent storage principle



Latent heat accumulator in Almería

The steam accumulator is the result of the EU DISTOR (Energy Storage for Direct Steam) project started in February 2004. Solar Power Stations under the overall control of the DLR Institute for Technical Thermodynamics, a total of 13 partners from industry and research from five countries are working on the development of innovative storage systems for solar-powered steam generators. These storage systems will be designed to take the 200-300 degree Celsius steam generated by solar power, store it and release it again as required with a minimum of loss. So-called latent storage materials are used for this application. They are characterised by the fact that energy can be transported at an almost constant temperature from a solid to a liquid state and vice versa - a principle that has long been used in the low-temperature area with pocket hand-warmers, for example.

Until now however, no economically-attractive system has been devised for the kinds of temperatures encountered in solar-heat power stations. The reason has been the requirement for the scientists to achieve a sufficiently high energy density in the accumulator. The experimental results are now pointing to a sandwich concept with alternating layers of graphite foil and storage material. The concept has been submitted for a patent in collaboration with industry partner SGL and will form the basis for further development work..



Solar energy research in Almería (Southern Spain)

Also of interest for industrial applications

In an associated project, researchers will extend their storage concept to a 1 megawatt facility. Temperatures of more than 300 degrees Celsius should be achievable, making the use of solar energy more attractive for some power station applications.

The concept of a latent heat accumulator also forms the basis for the use of solar heat in manufacturing industry. This is because industry needs a constant supply of energy to meet specific requirements. For example, solar-generated steam is suitable for use with processes in the construction materials and food industries.

Contact details for image and video enquiries as well as information regarding DLR's terms of use can be found on the DLR portal imprint.