

Electric energy storage based on heat

Why is thermal energy storage important?

The storage of thermal energy is a central component here, since the availability and use of thermal energy can be separated from each other in terms of both time and location. Thermal energy storage can be used to provide heat, but also for the important application areas of cooling and air conditioning.

How does a heat storage system work?

First, the storage system converts the electricity into heat. Then the heat is stored with the aid of molten salt or high-temperature ceramics and subsequently converted into electricity using a steam or gas turbine. The process is also known as Power-to-Heat-to-Power technology.

How is heat stored?

Heat can be stored purely physically in the form of sensible heat (temperature difference), latent heat (phase change energy) and through the use of reversible chemical reactions (reaction energy). The DLR Institute of Engineering Thermodynamics in particular is dedicated to these approaches.

Why are energy storage systems important?

Energy storage systems are a key element for the success of the energy transition. They enable the (partial) decoupling of energy production and energy consumption. Today, they are used in particular in the areas of mobility and heat supply, and their importance is steadily increasing.

What is high-temperature heat storage?

The focus is on the storage of high-temperature heat between 100 and 1000 degrees Celsius, which is needed for industrial and energy-sector applications. The aim is to develop cost-effective and durable technologies that can also be used on a large scale.

Why do we need efficient technologies for storing energy?

The high proportions of fluctuating energy sources in a future energy system based predominantly on renewable energies require the extensive use of efficient technologies for storing energy.

Thermal energy storage can be used to provide heat, but also for the important application areas of cooling and air conditioning. The focus of Fraunhofer IFAM in the field of thermal energy ...

This technology is based on thermal energy storage and a combination of thermodynamic cycles. During charging, electricity is used to drive a heat pump which heats up a thermal storage ...

The standalone ETES for electricity storage has advantages of greater flexibility in site selection than a CSP plant or other large-scale energy storage methods such as compressed air energy ...

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Pumped thermal electricity storage is a promising large-scale electricity storage technology that uses thermodynamic cycles and thermal energy storage to achieve electricity ...

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