

Solar energy storage and release

What is energy storage?

Energy storage is a system that can help more effectively integrate solar into the energy landscape. Sometimes it is co-located with, or placed next to, a solar energy system, and sometimes the storage system stands alone.

Can solar energy be stored based on a reversible chemical reaction?

A device for solar energy storage and release based on a reversible chemical reaction is demonstrated. A highly soluble derivative of a (fulvalene)diruthenium (FvRu 2) system is synthesized, capable of storing solar energy (110 J g^{-1}) in the form of chemical bonds and then releasing it "on demand", when excited thermally or catalytically.

Why is solar storage important?

Solar storage is important because it allows solar energy to contribute to the electricity supply even when the sun isn't shining. It also helps smooth out variations in solar energy flow on the grid, which are caused by changes in sunlight.

What is molecular solar thermal energy storage?

One approach is the development of energy storage systems based on molecular photoswitches, so-called molecular solar thermal energy storage (MOST). Here we present a novel norbornadiene derivative for this purpose, with a good solar spectral match, high robustness and an energy density of 0.4 MJ kg⁻¹.

Who can benefit from solar-plus-storage systems?

Residential and commercial solar customers, utilities, and large-scale solar operators can all benefit from solar-plus-storage systems. As research continues and costs decrease, solar and storage solutions will become more accessible to all Americans.

How long can solar storage last?

Solar storage can last for different durations, depending on the need. Short-term storage lasts just a few minutes to ensure a solar plant operates smoothly during output fluctuations due to passing clouds. Longer-term storage can help provide supply over days or weeks when solar energy production is low or during major weather events.

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