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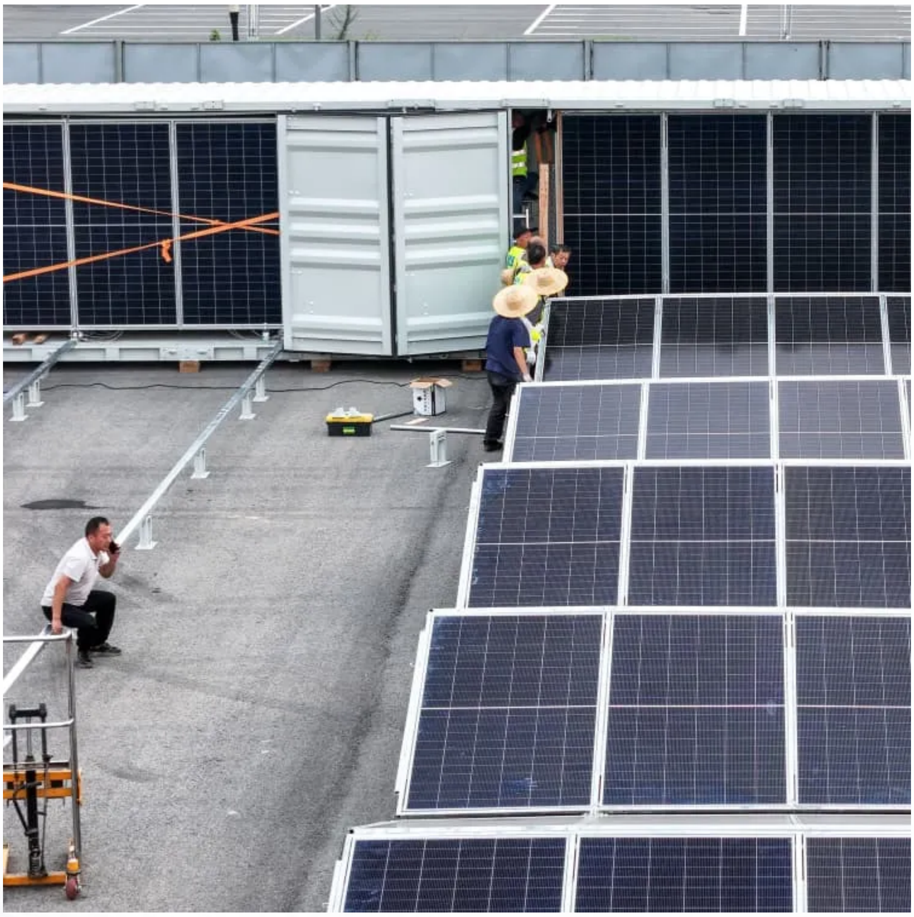
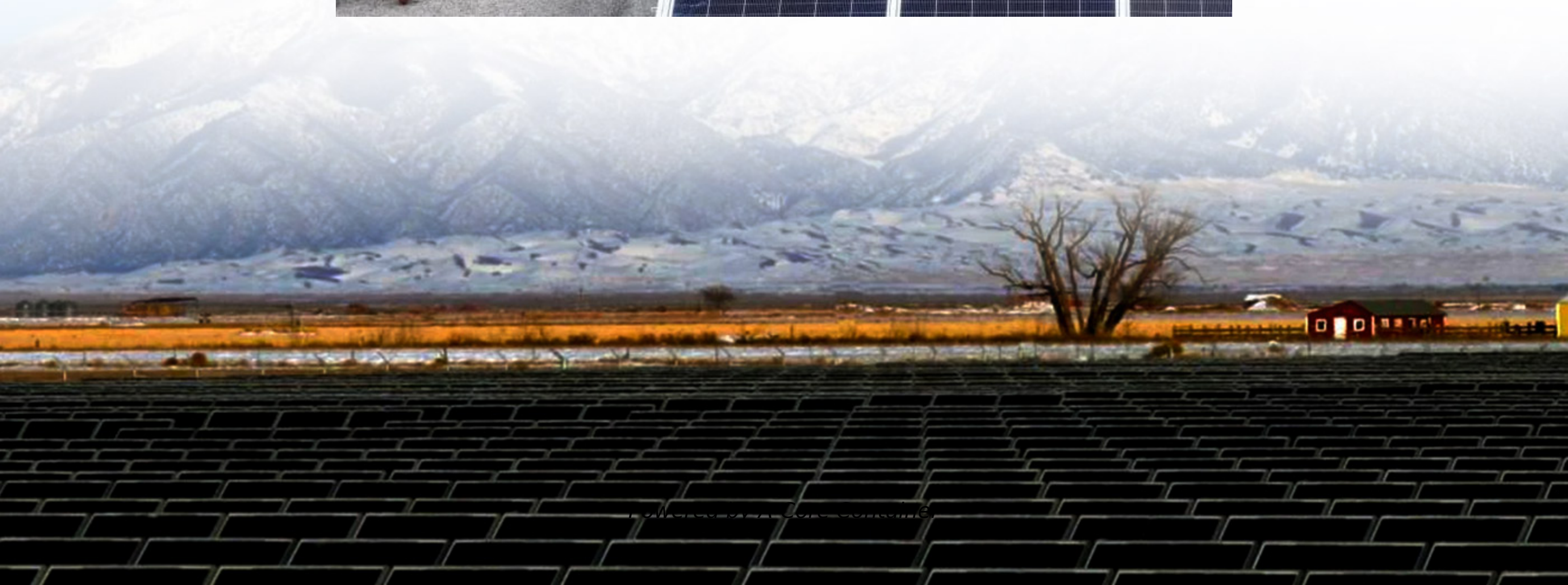
Solar power generation requires 10 energy storage





Overview

The Ministry of Power (MoP) has mandated that all Renewable Energy Implementing Agencies (REIAs) and state utilities to incorporate a minimum two-hour co-located energy storage system (ESS) equivalent to 10% of the installed solar capacity in all solar tenders.How much solar power does a solar energy store need?

The wind/solar mix that minimizes the size of the store required for a 100% overall renewable penetration is, as aforementioned, 84% wind +16% solar. This mix requires a storage capacity of 43.2 TWh. The overall renewable penetration and the generation mix also influence the rated power of the energy store.

When should solar power be stored in a storage unit?

If the electric supply relied entirely on solar power (Fig. 10 a), the storage unit has to store energy during warmer months (mid-April to end-of-September) to be able to meet the increased electricity demand during winters. This calls for a large storage capacity.

How much storage capacity does a solar PV system need?

For example, a storage capacity of 159.7 TWh would be required if the electric demand was supplied entirely by wind (15% over-generation allowed). Conversely, if the electric demand was supplied only by solar PV power, the storage capacity required would be 74 TWh.

Why are solar power projects integrating energy storage systems?

Photographer: Prashanth Vishwanathan/Bloomberg New Delhi: Upcoming solar power projects in the country are set to have energy storage systems integrated at the sites to ensure uninterrupted supply of renewable power and maintain grid stability.

How much storage capacity is needed for a renewable generation mix?

This generation mix requires a storage capacity of 115.1 TWh, considering an efficiency of 70%. Fig. 9 shows how the storage capacity for a renewable penetration of 100% (consisting of different percentages of wind and solar PV) changes as the efficiency of the energy store increases.

How does solar PV affect energy storage capacity?

As mentioned before, the capacity and rated power of the store increase very considerably when solar PV dominates the generation mix (see Fig. 8, Fig. 11). Depending on the specific mix of wind and solar PV, the storage capacity accounts for between 85% and 95% of the total cost of the energy store.

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