SolarCabinet Energy

PV energy storage dispatch costs

Overview

Can a utility-scale PV plus storage system provide reliable capacity?

Declining photovoltaic (PV) and energy storage costs could enable “PV plus storage” systems to provide dispatchable energy and reliable capacity. This study explores the technical and economic performance of utility-scale PV plus storage systems. Co-Located?

AC = alternating current, DC = direct current.

How does a DC-coupled storage system affect PV output?

DC-coupled system (right figure)—with shared 50-MW inverter—must shift storage output to lower-price periods to accommodate PV output. DC-coupled system value decreases by about 1% relative to independent PV + storage system. Impacts of DC tightly coupled storage systems are more significant.

Why do solar power plants need to be dispatchable?

It is found that increasing the dispatchability of solar power plants will necessarily lead to the emergence of additional energy losses and important LCOE increase, either because of low round-trip efficiency of the storage system, or because of its high cost of energy capacity.

How does independent PV + storage increase value?

Increases value by about 1% relative to independent PV + storage. In other periods (July 1 shown here), storage plant cannot be fully utilized because of the operation of the PV system. Combined output of independent PV + storage plant (left figure) is as high as 70 MW, which is possible because of the separate inverters.

What happens if PV production exceeds electrical demand?

If the PV production exceeds the electrical demand, then the remaining PV electricity is stored as heat using resistive heating; If the sum of the plant’s

production and the energy available in the storage is not sufficient to satisfy P P B, min (minimum power required to start the power block), then the energy generated is entirely stored. 2.

How does DC-coupling affect PV capacity value?

Result is a total capacity value of $7.5 million/year. DC-coupling causes no decline in capacity value, because the PV capacity credit (20 MW) plus the storage capacity (30 MW) equals the inverter capacity of 50 MW. Independent, AC-coupled, and DC-coupled (flexible charging) storage receives 7-year MACRS (Modified Accelerated Cost Recovery System).

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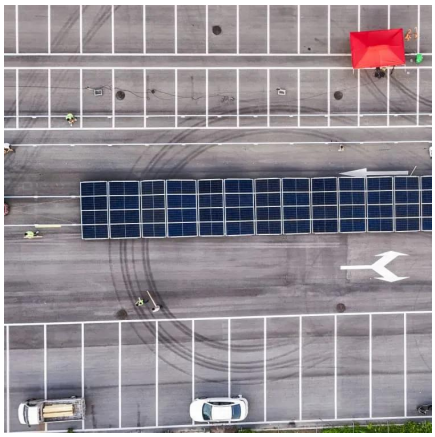

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