



GETON CONTAINERS

Relationship between solar container storage capacity and power generation





Overview

Ensuring power system reliability under high penetrations of variable renewable energy is a critical task for system operators. In this study, we use a loss of load probability model to estimate the capacity credit.

Does energy storage provide more capacity value under higher penetrations of solar PV?

We found that energy storage provides more capacity value under higher penetrations of solar PV because the solar generation shortens the duration of peak net load, allowing the energy-limited storage to better reduce the remaining peak.

Can solar PV and energy storage be used together?

When used concurrently on a power system, we found that the total capacity value provided by solar PV and energy storage consistently exceeds the sum of the capacity values for the two technologies when used separately.

What is the relationship between solar PV and storage?

When solar PV and storage are considered simultaneously, the concurrent shift in the net load profile suggests a symbiotic relationship: storage can be dispatched during hours when solar exhibits diminished output, and solar helps to shorten the durations of peak load that must be shaved by energy-limited storage systems.

How do solar and energy storage work together?

Used in tandem, solar and energy storage can provide more capacity value than the sum of the two technologies used separately. These technologies work symbiotically to provide essential grid service. On many days, solar shortens the net load peak, while two- or 4-h duration storage effectively shifts the remaining peak load.



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Relationship between generation capacity and storage power capacity ...

Figure 7 the relationship between generating and storage capacities. Figure 7a shows the strong correlation between aggregated generation capacity and aggregated storage capacity ($R=0.92$,



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[The symbiotic relationship of solar power and energy ...](#)

However, the presence of solar PV decreases the duration of daily peak demands, thereby allowing energy-limited storage capacity to dispatch electricity during peak demand ...

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[Relationship between generation capacity ...](#)

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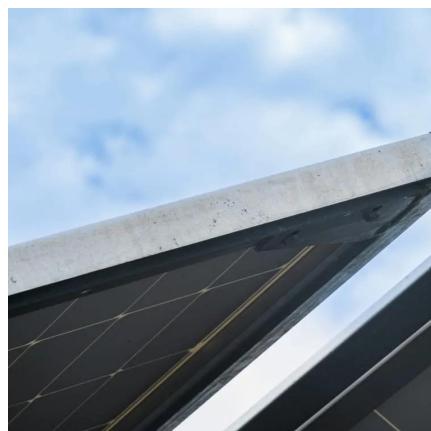
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The symbiotic relationship of solar power and energy storage ...

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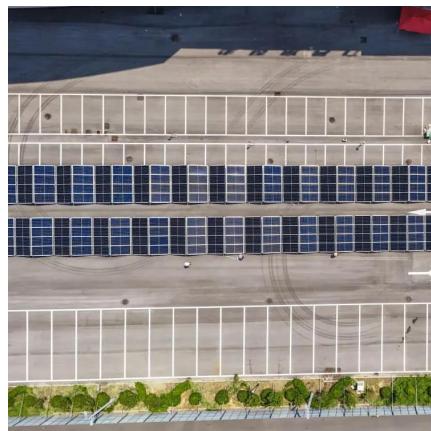
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Combined solar power and storage as cost-competitive ...

The power generation and storage capacity potential data used in the grid optimization model were aggregated from the grid cell to the regional power grid level with the ...

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