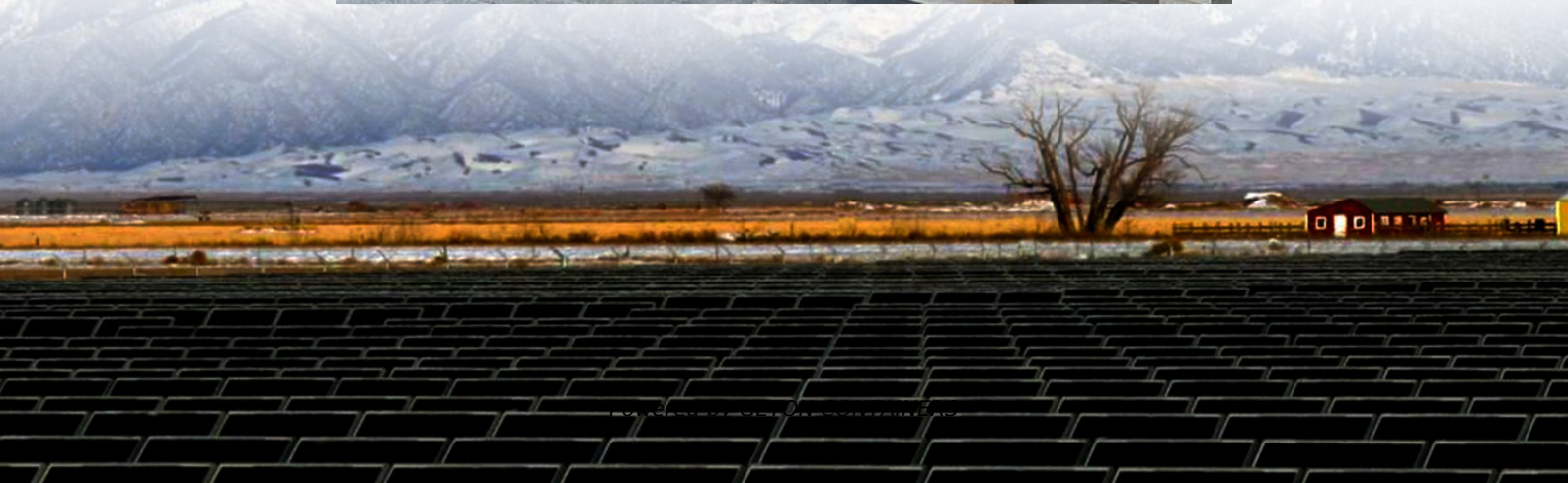


Yemeni schools use 100kWh smart photovoltaic energy storage containers





Overview

Can solar power be used in schools and hospitals?

Although extensively studied in the context of larger distribution grids (Boonluk et al., 2020, Pompern et al., 2023), research on smaller-scale PV applications for individual buildings, such as schools, homes, and hospitals, remains limited (Tostado-Véliz, Icaza-Alvarez, & Jurado, 2021).

How much power does a low-to-middle-income school need?

Balanced solution: 15–19 kWp & 6 kWh for low-demand, 32–40 kWp & 12 kWh for high-demand. Energy reliability and cost efficiency are critical challenges for lower-to-middle-income schools in developing regions, where frequent power outages hinder academic activities and strain finances.

How much energy does a school use?

During school operating hours, the energy consumption was 22 MWh and 20 MWh for stable and intermittent supply scenarios, respectively. The optimal solar and battery sizes for the stable TOU and intermittent TOU scenarios were 12 kWp and 3 kWh, while 15 kWp and 3 kWh were found to be optimal for the intermittent flat rate scenario.

What percentage of school energy is renewable?

The system achieves a renewable fraction of 27.88%, which indicates that nearly one-third of the total school energy demand is met through renewable sources. This is comparable to the intermittent but highest among all scenarios, further underscoring the system's capacity to maximize solar generation even under stable conditions.



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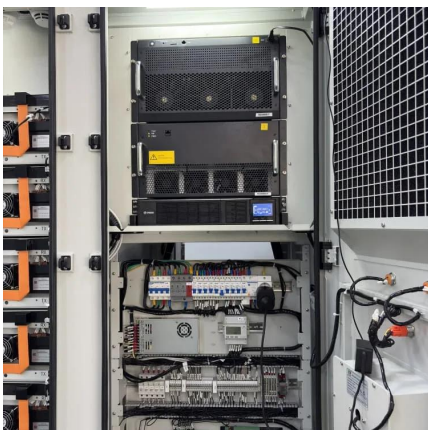
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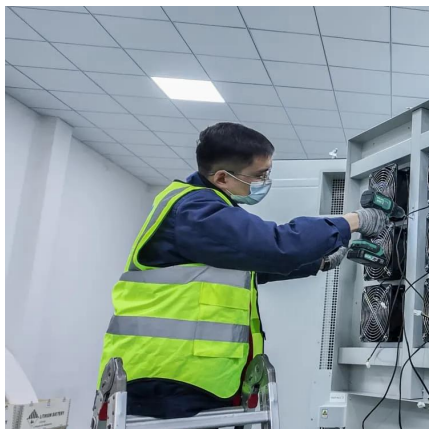
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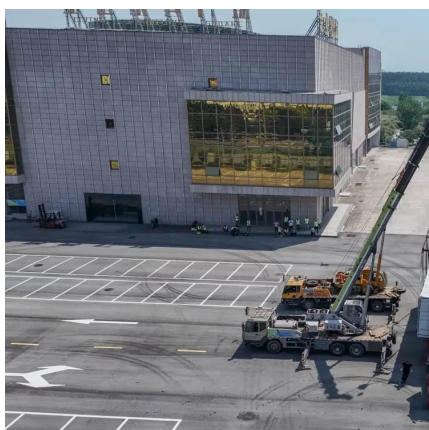
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