Institute for Energy Economics and Financial Analysis

Fact Sheet

Recommendations for Pakistan's Continued and Resilient Solar Growth

Solar energy is a cost-competitive, clean energy source for Asian national grids. Pakistan is experiencing a solar boom, with over 20 gigawatts (GW) of solar-based distributed and utility-scale capacity installed by mid-2025.

Rapid solarization offers numerous benefits such as energy independence, reliability, and cost-savings, leading to a more consumer-driven, decentralized energy model.

Existing system inefficiencies pose technical and financial challenges, including reduced minimum demand and rising capacity payments as centralized generation declines.

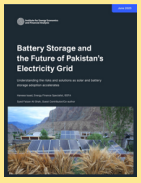
Pakistan imported around 1.25 gigawatt-hours (GWh) of lithium-ion battery packs in 2024 and another 400 megawatt-hours (MWh) in the first two months of 2025 – a trend that is likely to continue.

There is an estimated 3–6 year payback period for solar plus Battery Energy Storage System (BESS) configurations in Pakistan. As BESS becomes more competitive, grid defection could reshape the country's energy landscape.

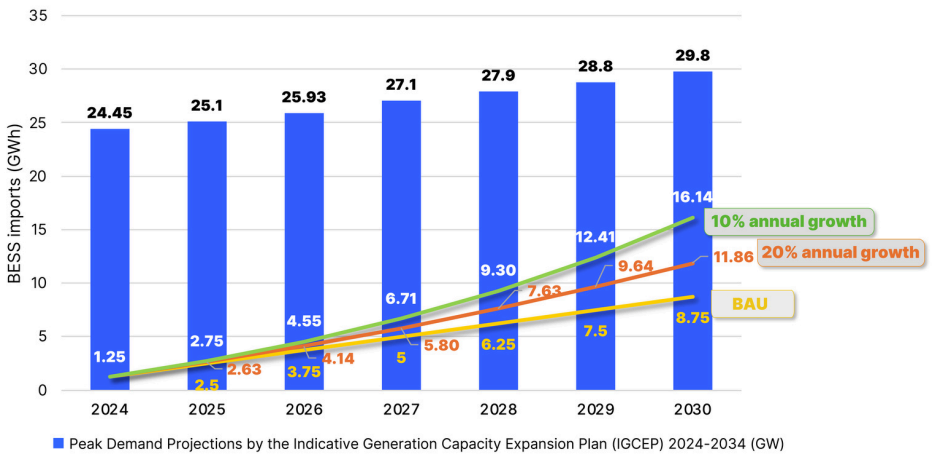
IEEFA Recommendations

1 **Timely investments in grid modernization and regulatory updates to enable integration of decentralized solar plus BESS configurations into the existing grid and market infrastructure**

Report: Battery storage and the future of Pakistan's electricity grid



Projections for Battery Imports in Pakistan (2025-2030)



Source: Author analysis.

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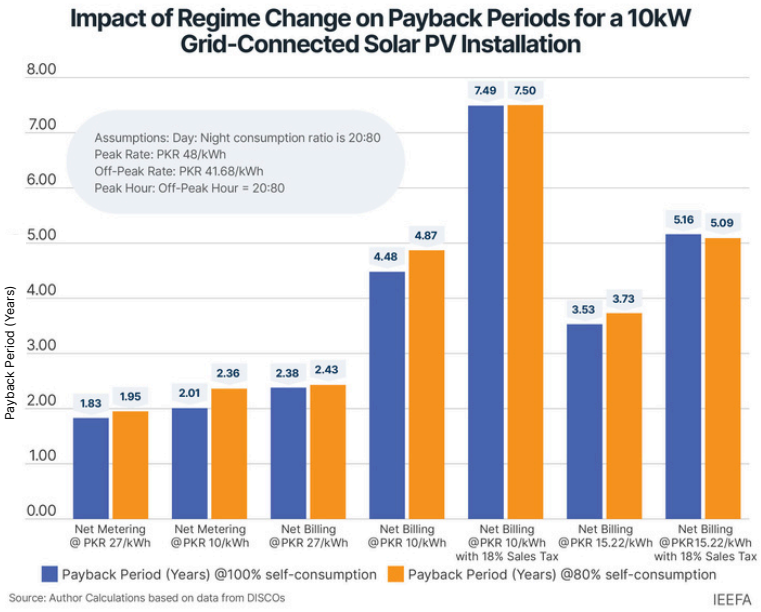
"BESS stores cheap electricity produced during the day and discharges it during the evening peak. Its inherent peak shaving capabilities help flatten the evening peak demand, thereby reducing the need to ramp up fossil fuel-based plants.

Haneea Isaad
Energy Finance Specialist, Pakistan, IEEFA

2 Widespread adoption of smart meters, consumer and transformer monitoring systems, and feeder-level automation and modernization to support solar plus BESS integration

- **Smart meters and advanced monitoring systems can more accurately reflect localized demand dynamics, allowing for an improved estimation of future capacity requirements and helping to avoid over-procurement or underutilized infrastructure investments**
- **A cohesive Information and Communications Technology (ICT) strategy to enhance data collection and communications can improve distribution system planning with a bottom-up load forecasting approach**

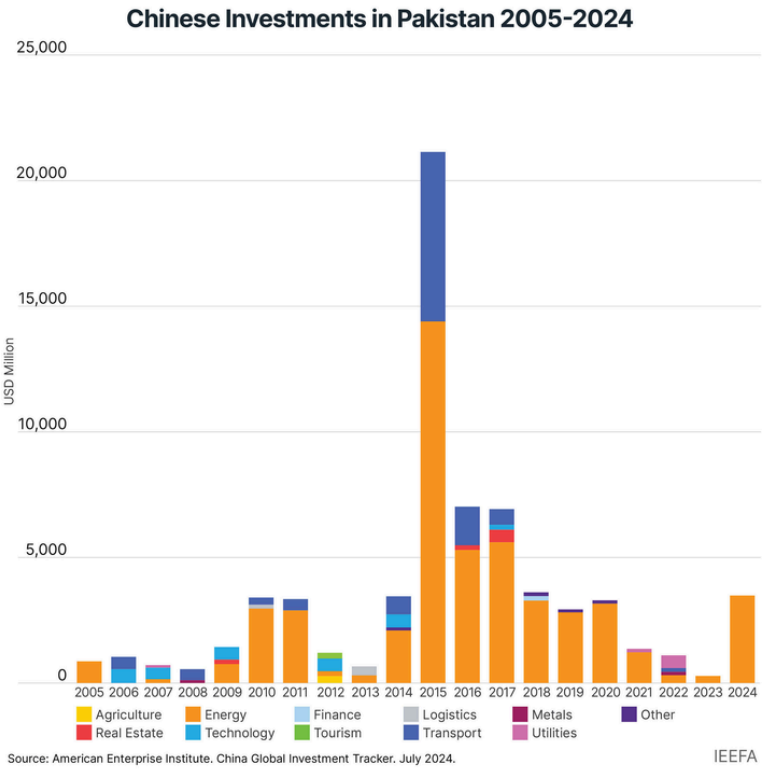
Briefing note: Net metering reforms and grid challenges amid Pakistan's solar rise



3 Resolving security concerns, ensuring policy stability, and upholding contractual commitments to encourage foreign direct investment in local manufacturing and assembly of solar photovoltaic (PV) modules, lithium-ion batteries, and electric vehicles

- **China is Pakistan's largest investor in the energy sector**
- **Between 2005 and 2024, China invested almost USD68 billion in the country's economy, with energy dominating 74% of the investment portfolio under the China-Pakistan Economic Corridor (CPEC) project**

Commentary: Pakistan must rebuild Chinese investor confidence in its energy transition



The government can prepare for technical and financial challenges by avoiding expensive generation expansion and supporting strategic power planning that addresses the grid's shortcomings.

About IEEFA

The Institute for Energy Economics and Financial Analysis (IEEFA) examines issues related to energy markets, trends and policies. The Institute's mission is to accelerate the transition to a diverse, sustainable and profitable energy economy.

www.ieefa.org

More on Pakistan's solar boom:

https://ieefa.org/region/pakistan