

Solar Photovoltaic (PV) - Market Share Analysis, Industry Trends & Statistics, Growth Forecasts (2025 - 2030)

Market Report | 2025-07-01 | 300 pages | Mordor Intelligence

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Report description:

Solar Photovoltaic (PV) Market Analysis

The Solar Photovoltaic Market size in terms of installed base is expected to grow from 2.72 Terawatt in 2025 to 6.51 Terawatt by 2030, at a CAGR of 19.05% during the forecast period (2025-2030).

Module cost declines, record-high cell efficiencies, and supportive policies have enabled the technology to undercut conventional generation across diverse geographies. Manufacturing capacity has climbed to 1.8 TW, underpinning robust supply even as demand accelerates. Monocrystalline cells remain the benchmark, though tandem and perovskite innovations are poised to disrupt the status quo. Strategic supply-chain reshoring-driven by the US Inflation Reduction Act, the EU Net-Zero Industry Act, and similar initiatives-introduces new regional growth vectors while tempering dependence on single-region production. Grid-integration hurdles, price volatility in polysilicon, and shifting trade regimes pose near-term risks, yet rising corporate 24/7 clean-power contracts and green-hydrogen ambitions anchor long-term demand. Across segments, utility-scale assets dominate today's solar photovoltaic market, but residential and floating systems capture an expanding share as land constraints and energy-autonomy preferences intensify.

Global Solar Photovoltaic (PV) Market Trends and Insights

Falling Module ASPs Widen Grid-Parity Zones

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tel. 0048 603 394 346 e-mail: support@scotts-international.com

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Module prices fell 51.8% year-over-year in 2024, pushing several Chinese producers below break-even and prompting supply reductions that stabilize the trajectory of further declines. Grid parity is now achieved in 70% of global electricity markets, unlocking solar photovoltaic market penetration in regions once considered uneconomic. Saudi Arabia recorded a levelized cost of electricity of USD 10.4/MWh, illustrating cost leadership under strong irradiance. Sub-Saharan Africa stands to gain as cost reductions converge with rising mini-grid demand. Trade actions and localized content rules may introduce regional price spreads, yet global median prices trend lower through 2026 as efficiencies climb.

IRA-Driven On-Shoring of PV Manufacturing in the US

Announced commitments exceeding USD 100 billion will quadruple US cell and module output and realign global supply networks. Hanwha Qcells is building an integrated ingot-to-module complex, and First Solar's new thin-film line in Alabama boosts domestic capacity to 11 GW. Domestic content bonuses shave 10-20% from project costs, neutralizing historic Asian cost advantages. The initiative mitigates geopolitical risk but hinges on sustained policy continuity and incremental scale-driven learning curves.

Grid Congestion and Curtailment in High-Penetration Regions

California curtailed 3.4 million MWh in 2024, a 29% jump that spotlights the mismatch between generation growth and transmission expansion. Texas could see solar curtailment rates rise to 19% by 2035 without major grid upgrades. Europe's redispatch volumes may increase sixfold by 2040, costing operators and consumers alike. Regional coordination frameworks-such as the Western Energy Imbalance Market-demonstrate curtailment-reduction potential, yet typical lead times of seven to ten years for new lines keep the constraint front-of-mind for investors.

Other drivers and restraints analyzed in the detailed report include:

AI-Enabled Solar Forecasting Cuts Balancing Costs / Demand from Green-Hydrogen Electrolyzer Projects / Rapid Polysilicon Price Swings Squeeze Producer Margins /

For complete list of drivers and restraints, kindly check the Table Of Contents.

Segment Analysis

Monocrystalline-Si modules supplied 87% of 2024 capacity and delivered system-level learning-curve gains that reinforce their cost leadership. This technology sits at the heart of the solar photovoltaic market size for the technology segment, which is projected to grow at a 19.05% CAGR to 2030. TOPCon cells captured 70% of new production lines because they raise efficiency without large capital retooling. Thin-film solutions like CdTe and CIGS retain niches in space-constrained or high-temperature applications. Tandem and perovskite architectures, with LONGi's 30.1% lab-scale efficiency and Qcells' 28.6% module milestone, attract venture funding that accelerates pilot lines and pushes theoretical yield ceilings higher. Heterojunction offers high open-circuit voltages but encounters metallization cost hurdles, while back-contact cells target aesthetics for building-integrated photovoltaics. Technology competition thus pivots on efficiency advancements, material availability, and production scalability-factors that collectively steer procurement decisions across the solar photovoltaic market.

Continued R&D ensures performance gains translate to lower balance-of-system costs, reinforcing monocrystalline leadership in the near term. Yet every 1 percentage-point efficiency jump trims active area by roughly 2%, a saving critical in urban or agrivoltaic settings. Investment momentum behind tandem cells indicates disruption potential, and first commercial shipments are plausible before 2027. The eventual diffusion pace will hinge on durability proofs and capex intensity. Until then, incremental upgrades-such as metallization pastes with higher silver fraction efficiency or bifacial enhancements-keep current lines competitive.

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The Solar Photovoltaic (PV) Market Report is Segmented by Technology (Monocrystalline-Si, Multicrystalline-Si, Thin-Film, and Tandem/Perovskite), End-User (Residential, Commercial and Industrial, and Utility-Scale IPPs), Deployment Type (Ground-Mounted, Rooftop/Building-Integrated, and Floating PV), and Geography (North America, Asia-Pacific, Europe, South America, and Middle East and Africa).

Geography Analysis

Asia-Pacific contributed 64% of global installations in 2024, driven by China's integrated supply chain and sustained policy support. Domestic Chinese additions, plus exports into Southeast Asian assembly hubs, kept the global module supply abundant. India's production-linked incentive program draws gigawatt-scale fabs as firms hedge against US and EU trade barriers. Japan pilots floating PV arrays atop irrigation ponds, while Australia intensifies rooftop adoption, boosting distributed capacity. These developments anchor Asia-Pacific's role as the historical and ongoing nucleus of the solar photovoltaic market.

The Middle East and Africa region is growing at a 22% CAGR through 2030, propelled by Vision 2030 frameworks and green-hydrogen strategies. Saudi Arabia's 58 GW target, the UAE's 14 GW ambition, and Omani green-ammonia projects illustrate the shift from pilot programs to gigawatt build-outs. Africa exceeded 16 GW cumulative capacity in 2023; investment pipelines exceed 100 GW for 2030, contingent on concessional finance. Local module-assembly lines and bilateral power-purchase contracts with mining firms mitigate currency-risk exposure and strengthen bankability.

North America leverages IRA incentives to restore domestic production and attract downstream investment. Corporate procurement remains the region's prime demand driver, with hyperscaler data-center growth elevating baseload renewable requirements. Europe intensifies focus on energy security and de-risking Chinese dependency; coordinated tenders accelerate rooftop adoption and hybrid plants that blend storage with PV. South America capitalizes on stellar irradiation; Chile's Atacama Desert records capacity factors above 30%, enabling record-low tariffs. Across regions, policymaking, resource endowments, and financing ecosystems collectively sculpt uptake trajectories in the solar photovoltaic market.

List of Companies Covered in this Report:

LONGi Green Energy Technology Co. Ltd. / Trina Solar Co. Ltd. / JinkoSolar Holding Co. Ltd. / JA Solar Technology Co. Ltd. / First Solar Inc. / Canadian Solar Inc. / Hanwha Q Cells Co. Ltd. / SunPower Corporation / Risen Energy Co. Ltd. / Sharp Corporation / Suntech Power Co. Ltd. / REC Solar Holdings AS / GCL System Integration Technology / Maxison Solar Technologies / Yingli Solar / Adani Solar / Axitec Energy GmbH / FuturaSun Srl / Waaree Energies Ltd. / Meyer Burger Technology AG /

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