

Photovoltaic Power Module Industry Analysis



Overview

Solar Supply Chain and Industry Analysis The lab's quarterly solar industry updates provide information on trends within the solar industry. These quarterl.

Key Takeaways

The global photovoltaic (PV) power module industry is experiencing rapid growth, driven by technological advancements, declining costs, and strong policy support, with China dominating manufacturing and Asia-Pacific leading market value. Market Size and Growth

The global solar PV module market is projected to grow from USD 328.4 billion in 2025 to USD 722.2 billion by 2035, reflecting a CAGR of 8.2%. Installed PV capacity worldwide surpassed 2,260 GW by the end of 2024, with annual installations between 553 GW and 601 GW, marking a 29% year-on-year increase. The market is expected to exceed 6.3 TW of installed capacity within the next decade, highlighting the sector's rapid expansion and central role in the global energy transition .

Regional Dynamics



China remains the dominant manufacturing hub, accounting for over 80% of global PV production across all stages, from polysilicon to modules. The country has invested more than USD 50 billion in PV supply capacity since 2011, creating over 300,000 manufacturing jobs and driving down global module costs . In 2024, China installed 309–357 GW, nearly 60% of all new global installations. Other significant markets include the European Union (66 GW), the United States (47 GW), and India (32 GW) .

Key Players

Leading PV module manufacturers include Jinko Solar, Trina Solar, LONGi Green Energy, JA Solar, and Canadian Solar, collectively holding 55% of the market share in 2024. Jinko Solar alone led with over 15% market share . These companies focus on crystalline silicon modules, with monocrystalline technology dominating the product segment due to higher efficiency and reliability .

Technology Trends

Crystalline silicon modules, including monocrystalline and polycrystalline, remain the most widely deployed technologies. Continuous R&D investments are improving conversion efficiency, reliability, and lifespan, while thin-film technologies are emerging in niche applications. Advances in materials science, cell design, and manufacturing processes are reducing costs and enhancing performance .

Supply Chain and Policy Impacts

The PV module supply chain is highly concentrated in China, which also hosts the top 10 global suppliers of PV manufacturing equipment. While this concentration has lowered costs and accelerated innovation, it poses geopolitical and supply risk challenges. Chinese industrial policies have strategically supported domestic demand, economies of scale, and continuous innovation, shaping global supply, demand, and pricing . Manufacturing remains electricity-intensive, with coal powering over 60% of production, though emissions intensity has halved since 2011 due to efficiency improvements .

Market Drivers

Key growth drivers include:

- Declining module costs and improved affordability for residential, commercial, and utility-scale projects.
- Government incentives and policies, such as financial assistance schemes and renewable energy targets.
- Rising electricity demand and energy transition goals, particularly in emerging economies.

- Environmental awareness and corporate sustainability initiatives, driving adoption of clean energy solutions .

Outlook

The PV module industry is expected to maintain strong growth through 2035, with Asia-Pacific continuing to lead in market value, followed by Europe, the Middle East, Africa, and the Americas. The sector will benefit from increased commercial investments, utility-scale solar farms, and residential adoption, reinforcing solar PV as a cornerstone of global electricity generation . Overall, the photovoltaic power module industry is poised for sustained expansion, underpinned by technological innovation, policy support, and global decarbonization efforts.

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