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Global Next-Generation Solar Cell Market Size Study & Forecast, by Material Type (Cadmium Telluride (CdTe), Copper Indium Gallium Selenide (CIGS), Amorphous Silicon, Gallium-Arsenide, and Others), by Installation (On-Grid and Off-Grid), by End User, and Regional Forecasts 2025–2035

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Abstracts

The Global Next-Generation Solar Cell Market is valued at approximately USD 3.59 billion in 2024 and is anticipated to grow at a remarkable compound annual growth rate (CAGR) of 19.50% over the forecast period 2025–2035. Next-generation solar cells represent the forefront of renewable energy innovation, engineered to surpass the limitations of traditional photovoltaic technologies. These cells integrate advanced materials such as perovskites, cadmium telluride (CdTe), and copper indium gallium selenide (CIGS), which enhance light absorption efficiency, reduce production costs, and allow for flexible and lightweight module construction. The global transition toward sustainable energy, coupled with policy-driven decarbonization efforts, has significantly accelerated demand for next-generation solar technologies. Moreover, increased investments in R&D and government subsidies for clean energy infrastructure are catalyzing the expansion of this market across both developed and developing economies.

The market’s momentum is further reinforced by surging electricity consumption and the global shift toward renewable energy grids. As nations race to achieve net-zero emission targets, solar energy has emerged as a critical pillar in national energy strategies. Technological breakthroughs in quantum dot cells, tandem solar cells, and bifacial module designs are reshaping performance metrics and cost structures. According to the International Renewable Energy Agency (IRENA), solar PV capacity is

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projected to reach over 5,000 GW globally by 2035, with next-generation technologies driving a substantial share of new installations. The proliferation of smart grids and energy storage systems is also complementing the adoption of advanced solar cells, providing a robust ecosystem for long-term market expansion. However, high initial investment and complex manufacturing processes may restrain smaller producers. Despite these challenges, partnerships between technology firms and energy conglomerates are expected to unlock new commercial pathways, enhancing efficiency and scalability in production.

The detailed segments and sub-segments included in the report are:

By Material Type:

Cadmium Telluride (CdTe)

Copper Indium Gallium Selenide (CIGS)

Amorphous Silicon

Gallium-Arsenide

Others

By Installation:

On-Grid

Off-Grid

By End User:

Residential

Commercial

Industrial

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Utility

By Region:

North America

U.S.

Canada

Europe

UK

Germany

France

Spain

Italy

Rest of Europe

Asia Pacific

China

India

Japan

Australia

South Korea

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Rest of Asia Pacific

Latin America

Brazil

Mexico

Middle East & Africa

UAE

Saudi Arabia

South Africa

Rest of Middle East & Africa

Cadmium Telluride (CdTe) Expected to Dominate the Market

Among material types, Cadmium Telluride (CdTe) solar cells are expected to hold the dominant market position throughout the forecast period. CdTe's unique semiconductor properties allow for superior absorption of sunlight and high conversion efficiency at a fraction of the cost of traditional silicon cells. Moreover, the ability to produce CdTe modules using scalable thin-film manufacturing processes enhances their competitiveness in large-scale applications. Their durability and temperature resilience make them particularly suitable for utility-scale power generation in harsh environmental conditions. The ongoing technological refinements aimed at improving cell efficiency and reducing material wastage are poised to sustain the dominance of CdTe technology in the coming decade.

On-Grid Installations Lead in Revenue Contribution

On-grid installations currently command the largest revenue share in the next-generation solar cell market. The steady expansion of grid-connected solar power plants, combined with favorable government incentives, has made on-grid systems the

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backbone of solar infrastructure in most countries. These installations not only facilitate efficient energy distribution but also allow surplus power to be transmitted back into the main grid, optimizing energy utilization. Rapid urbanization, rising electricity demand, and supportive policy frameworks such as feed-in tariffs and renewable energy credits continue to strengthen the financial viability of grid-connected solar systems. Conversely, off-grid applications are witnessing accelerated adoption in remote areas and developing regions where grid access remains limited—highlighting a dual growth dynamic that underpins the global energy transition.

The key regions considered for the Global Next-Generation Solar Cell Market study include Asia Pacific, North America, Europe, Latin America, and the Middle East & Africa. Asia Pacific dominates the market and is anticipated to maintain its leadership throughout the forecast period. This dominance can be attributed to strong governmental commitments toward renewable energy adoption, large-scale solar installations in China and India, and the presence of cost-effective manufacturing hubs. North America is also expected to witness substantial growth, propelled by tax credits, research investments, and a surge in residential and commercial solar adoption. Meanwhile, Europe continues to remain a mature yet innovative market, driven by stringent carbon neutrality targets and widespread rooftop solar integration. The Middle East, with its abundant solar irradiance and strategic energy diversification policies, is also emerging as a potential growth hotspot for next-generation solar technologies.

Major market players included in this report are:

First Solar, Inc.

JA Solar Holdings Co., Ltd.

Trina Solar Limited

Tata Power Solar Systems Limited

Hanwha Q Cells Co., Ltd.

Panasonic Corporation

SunPower Corporation

Canadian Solar Inc.

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REC Solar Holdings AS

Sharp Corporation

NextEra Energy, Inc.

JinkoSolar Holding Co., Ltd.

Mitsubishi Electric Corporation

Hitachi, Ltd.

Oxford PV

Global Next-Generation Solar Cell Market Report Scope:

Historical Data – 2023, 2024

Base Year for Estimation – 2024

Forecast period – 2025–2035

Report Coverage – Revenue forecast, Company Ranking, Competitive Landscape, Growth factors, and Trends

Regional Scope – North America; Europe; Asia Pacific; Latin America; Middle East & Africa

Customization Scope – Free report customization (equivalent to up to 8 analysts' working hours) with purchase. Addition or alteration to country, regional & segment scope*

The objective of the study is to define market sizes of different segments & countries in recent years and to forecast the values for the coming years. The report is designed to incorporate both qualitative and quantitative aspects of the industry within the countries involved in the study. The report also provides detailed information about crucial

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aspects such as driving factors and challenges that will define future market growth. Additionally, it incorporates potential opportunities in micro-markets for stakeholders to invest, along with a detailed analysis of the competitive landscape and product offerings of key players. The detailed segments and sub-segments of the market are explained above.

Key Takeaways:

- Market Estimates & Forecast for 10 years from 2025 to 2035.
- Annualized revenues and regional-level analysis for each market segment.
- Detailed analysis of the geographical landscape with country-level analysis of major regions.
- Competitive landscape with information on major players in the market.
- Analysis of key business strategies and recommendations on future market approach.
- Analysis of the competitive structure of the market.
- Demand side and supply side analysis of the market.

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