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Solar Cell and Module Market By Type (Polycrystalline, Monocrystalline, Bificial, Thin Film, Others), By Product Type (N-Type, P-Type) By Module Efficiency (13-16%, 16-20%, 20-22%, 22-23.5%) By Application (Residential, Commercial, Others) : Global Opportunity Analysis and Industry Forecast, 2024-2033

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Abstracts

According t%li%a new report published The global solar cell and modules market was valued at $166.6 billion in 2023, and is projected t%li%reach $373.6 billion by 2033, growing at a CAGR of 8.3% from 2024 t%li%2033.

Solar cell—als%li%referred t%li%as photovoltaic cell—is a device that converts light directly int%li%electricity by the photovoltaic effect. Solar cells and modules reduce the cost of solar electricity by improving the efficiency of photovoltaic cell, thereby lowering manufacturing costs while increasing the service life of module.

The growth of the global solar cell and modules market is majorly driven by increase in demand for electricity coupled with rise in awareness and adoption of renewable energy. According t%li%a report published by the International Renewable Energy Agency (IRENA), solar power is estimated t%li%contribute t%li%86% of global power demand by 2050. In addition, the goal of many countries t%li%achieve net-zer%li%emissions has shifted their preference toward cleaner and more sustainable energy sources, which significantly fuels the demand for solar cell and modules. This is attributed t%li%the fact that solar energy significantly reduces carbon dioxide and other greenhouse gas emission. For instance, according t%li%the U.S. Energy Information Administration, North Carolina is the second highest solar-producing state in the U.S.

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that generated 5.4% of its electricity from solar power in 2019. However, high installation cost of solar modules and efficiency issues of solar cells hinder the growth of the market. For instance, solar module exhibits efficiency ranging from 15% t%li%22%, which implies that merely 15–22% of the sunlight that falls on the modules gets converted int%li%electricity and utilized as a power source. On the contrary, increase in government initiatives t%li%promote the use of solar cells and modules is expected t%li%offer remunerative opportunities for the expansion of the global market during the forecast period. For instance, the U.S. Department of Energy (DOE) Solar Energy Technologies Office (SETO) Small Innovative Projects in Solar (SIPS) 2022 Funding Program funds innovative R&D projects, which focus on accelerating the development and deployment of photovoltaics and concentrating solar-thermal power technologies. Furthermore, technological developments are expected t%li%open new avenues for the growth of the market. Although perovskite solar cells are highly efficient, cost-effective, and lightweight, they have demonstrated durability issues that reduce the technology’s usefulness in solar energy production. Thus, researchers from Monash University, the University of Oxford, and the City University of Hong Kong have developed perovskite solar cells with enhanced stability and performance by applying a material engineering strategy, called “self-healing.” This property enables the solar cells t%li%repair minute defects caused by exposure t%li%heat and moisture.

The global solar cell and modules market is segmented on the basis by type, product type, module efficiency, application, and region. By type, the market is classified polycrystalline, monocrystalline, bifacial, thin film, and others. On the basis of product type, it is bifurcated int%li%N-Type and P-Type. Depending on module efficiency, it is categorized int%li%13-16%, 16-20%, 20-22%, and 22-23.5%. By application, it is fragmented int%li%residential, commercial, and utility scale. Region wise, the market is studied across areas such as North America, Europe, Asia-Pacific, and LAMEA.

Key Findings

By type, the mono-crystalline segment is expected t%li%maintain its lead position by 2023.

Depending on product type, the P-Type segment is projected t%li%lead the market in the coming future.

On the basis of module efficiency, the 20-22% segment is anticipated t%li%gain high prominence in the coming future.

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As per application, the commercial segment is expected t%li%exhibit the highest CAGR during the forecast period.

Region wise, Asia-Pacific t%li%maintain its dominance by 2033.

Competitive Analysis

The major players operating in the solar cell and modules include Novasys, Saatvik Solar, Insolation Energy Ltd., SunGarner Energies Ltd., Allesun, AIKO, Centr%li%Energy Co., Ltd, aolisolar, DAS Solar, and AIDU ENERGY. Other players include Rhine Solar Ltd., VIKRAM SOLAR LTD., EMMVEE SOLAR, RenewSys India Pvt. Ltd., and Photon Energy Systems. These players have adopted different strategies such as new product launches, collaborations, expansion, joint ventures, and agreements t%li%maintain their dominance in the market and sustain the intense competition.

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Product Life Cycles

Technology Trend Analysis

Patient/epidemiology data at country, region, global level

Regulatory Guidelines

Additional company profiles with specific t%li%client's interest

Additional country or region analysis- market size and forecast

Average Selling Price Analysis / Price Point Analysis

Expanded list for Company Profiles

Historic market data

List of customers/consumers/raw material suppliers- value chain analysis

SWOT Analysis

Key Market Segments

By Type

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Polycrystalline

Monocrystalline

Bificial

Thin Film

Others

By Product Type

N-Type

P-Type

By Module Efficiency

13-16%

16-20%

20-22%

22-23.5%

By Application

Residential

Commercial

Others

By Region

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North America

U.S.

Canada

Mexico

Europe

Germany

UK

France

Spain

Italy

Rest of Europe

Asia-Pacific

China

India

Japan

South Korea

Australia

Rest of Asia-Pacific

LAMEA

Brazil

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Saudi Arabia

South Africa

Rest of LAMEA

Key Market Players

Novasys

Saatvik Solar

Insolation Energy Ltd.

SunGarner Energies Ltd

Allesun

AIKO

Centr%li%Energy Co., Ltd

aolisolar

DAS Solar

AIDU ENERGY

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