

Photovoltaic Module Materials Market Forecasts to 2034 - Global Analysis By Component (Encapsulation Materials, Front Sheet Materials, Back Sheet Materials, Conductive Materials, Junction Box & Connectors and Adhesives & Sealants), Material Type, Module Technology, Application and By Geography

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Abstracts

According to Statistics MRC, the Global Photovoltaic Module Materials Market is accounted for \$9.3 billion in 2026 and is expected to reach \$25.6 billion by 2034 growing at a CAGR of 13.5% during the forecast period. Photovoltaic module materials represent the key building blocks required for manufacturing solar panels and play a crucial role in determining their operational efficiency, lifespan, and performance. These materials consist of photovoltaic cells, protective glass, encapsulation layers, backsheets, metal conductors, and specialized coatings designed to improve module strength and functionality. Increasing renewable energy deployment and continuous solar technology improvements are encouraging the development of advanced materials with better efficiency and sustainability. Companies are investing in innovative solutions such as lightweight structures, recyclable components, and next-generation solar materials.

According to the International Energy Agency (IEA), solar PV additions reached around 550 GW in 2024, increasing global installed solar PV capacity to approximately 2.2 TW. This rapid expansion of solar installations supports rising demand for photovoltaic module materials such as silicon, glass, encapsulants, backsheets, conductive materials, and protective components required for module manufacturing.

Market Dynamics:

Driver:**Increasing adoption of solar energy systems**

The increasing implementation of solar power systems across various sectors is significantly contributing to the growth of the photovoltaic module materials market. As governments, businesses, and households shift toward clean energy alternatives, the demand for efficient and reliable solar panels continues to rise. This growing solar deployment requires advanced materials, including photovoltaic cells, protective layers, conductive components, and durable module structures. Expansion of residential, commercial, and large-scale solar installations is motivating manufacturers to improve material performance, reduce costs, and enhance product longevity. The global transition toward renewable energy is therefore accelerating technological advancements and strengthening growth opportunities for photovoltaic module material producers.

Restraint:**High production costs of advanced materials**

The elevated manufacturing expenses of advanced photovoltaic materials represent a significant challenge for the expansion of the photovoltaic module materials market. Producing high-performance components, including next-generation silicon technologies, perovskite materials, protective coatings, and enhanced encapsulation systems, involves considerable investment in technology development and specialized manufacturing processes. Increased material costs can raise solar module prices and reduce accessibility, particularly in cost-sensitive regions. Furthermore, raw material price volatility, complex production requirements, and supply chain uncertainties contribute to higher operational expenses.

Opportunity:**Development of next-generation photovoltaic materials**

Advancements in innovative photovoltaic materials are creating new opportunities for growth within the photovoltaic module materials industry. Technologies including perovskite-based solutions, tandem solar cells, enhanced semiconductor materials, and lightweight module designs are improving solar panel efficiency and reliability. These

developments are motivating companies to focus on advanced material research that can deliver higher performance, longer service life, and reduced manufacturing costs. Rising demand for efficient solar modules in various applications is increasing the need for improved material solutions. Ongoing innovation in photovoltaic technology is expected to expand opportunities for manufacturers and suppliers while supporting the future growth of the photovoltaic module materials market.

Threat:

Competition from alternative solar technologies

The emergence of competing solar technologies creates challenges for the growth of the photovoltaic module materials market. New approaches, including thin-film solar systems, organic photovoltaic solutions, and advanced energy conversion technologies, have the potential to provide alternatives to conventional solar materials. These technologies may attract adoption due to benefits such as reduced weight, flexibility, lower material requirements, and broader installation possibilities. Manufacturers must focus on improving material performance, lowering production costs, and introducing innovative solutions to remain competitive in the evolving renewable energy landscape.

Covid-19 Impact:

The COVID-19 outbreak created challenges for the photovoltaic module materials industry by affecting supply networks, production facilities, and renewable energy project timelines worldwide. Factory closures, transportation limitations, workforce shortages, and logistical disruptions influenced the availability of essential materials used in solar modules, including silicon, glass, metals, and protective components. Despite these difficulties, recovery measures and government initiatives promoting renewable energy helped the industry regain momentum. Post-pandemic efforts toward sustainable energy development increased demand for solar solutions, enabling the photovoltaic module materials market to recover and continue its expansion.

The front sheet materials segment is expected to be the largest during the forecast period

The front sheet materials segment is expected to account for the largest market share during the forecast period because they are essential for shielding solar panels and improving their overall performance. These materials offer protection against harsh environmental conditions, including moisture, temperature variations, and physical

damage, while allowing effective sunlight transmission to photovoltaic cells. Their ability to enhance module durability and maintain long-term efficiency makes them a vital component in solar panel production. Growing demand for reliable and high-quality photovoltaic systems is encouraging the development of improved front sheet technologies.

The building-integrated photovoltaics (BIPV) segment is expected to have the highest CAGR during the forecast period

Over the forecast period, the building-integrated photovoltaics (BIPV) segment is predicted to witness the highest growth rate as solar technology becomes increasingly incorporated into building designs. BIPV systems enable structures to generate renewable energy while serving as functional architectural components, including roofs, walls, glass panels, and facades. The growing demand for sustainable construction, energy-efficient buildings, and environmentally responsible infrastructure is driving interest in advanced photovoltaic materials designed for aesthetic appeal and performance. Innovations in flexible materials, transparent solar technologies, and customized module solutions are enhancing BIPV adoption.

Region with largest share:

During the forecast period, the Asia-Pacific region is expected to hold the largest market share, supported by its extensive solar manufacturing capabilities, growing renewable energy initiatives, and rising deployment of photovoltaic systems. The region has developed a strong solar industry network covering material suppliers, cell producers, and module manufacturers. Increasing efforts toward reducing carbon emissions, improving energy security, and expanding clean power generation are contributing to higher demand for photovoltaic materials. Supportive government policies and investments in solar infrastructure are encouraging technological advancements and production expansion.

Region with highest CAGR:

Over the forecast period, the North America region is anticipated to exhibit the highest CAGR, supported by increasing renewable energy investments, growing solar power deployment, and favourable clean energy policies. The region is experiencing rising demand for innovative photovoltaic materials that enhance solar module reliability, efficiency, and lifespan. Efforts to strengthen local solar manufacturing capabilities and reduce dependence on external supply chains are encouraging industry development.

Expanding applications across residential, commercial, and large-scale solar projects are creating significant growth opportunities for photovoltaic material producers.

Key players in the market

Some of the key players in Photovoltaic Module Materials Market include GCL Group, WACKER CHEMIE, AGC Inc., NSG Group, Jolywood (Suzhou) Sunwatt, RenewSys, Novanext Energies, KCC, DuPont, Heraeus, 3M, Saint-Gobain and Eastman Chemical.

Key Developments:

In January 2026, Eastman and Kolmar Korea signed a memorandum of understanding aimed at advancing innovative, biodegradable and high-performing personal care solutions that can help customers meet sustainability goals. The collaboration will focus on expanding access to Eastman's groundbreaking Esmeri technology, which includes Esmeri CC1N10, an advanced cellulose ester micropowder for color cosmetics.

In August 2025, Saint-Gobain has signed a definitive agreement with the German group Kster for the sale of Bröggemann, a specialist in the production and installation of prefabricated solutions. Bröggemann operates one plant in Neuenkirchen in North Rhine-Westphalia (Germany), employs 190 people and generated revenues of around €55 million in 2024. The Kster group is a leading general contractor in building and civil engineering in Germany. Its range of services extends from customized planning to turnkey construction.

Components Covered:

Encapsulation Materials

Front Sheet Materials

Back Sheet Materials

Conductive Materials

Junction Box & Connectors

Adhesives & Sealants

Material Types Covered:

Silicon

Thin Film Materials

Perovskite Materials

Organic Photovoltaic Materials

Other Material Types

Module Technologies Covered:

Crystalline Silicon Modules

Thin Film Modules

Tandem & Hybrid Modules

Emerging Next-Gen Modules

Applications Covered:

Residential Rooftop

Commercial & Industrial

Utility-Scale Power Plants

Building-Integrated Photovoltaics (BIPV)

Portable & Specialty Applications

Regions Covered:

North America

United States

Canada

Mexico

Europe

United Kingdom

Germany

France

Italy

Spain

Netherlands

Belgium

Sweden

Switzerland

Poland

Rest of Europe

Asia Pacific

China

Japan

India

South Korea

Australia

Indonesia

Thailand

Malaysia

Singapore

Vietnam

Rest of Asia Pacific

South America

Brazil

Argentina

Colombia

Chile

Peru

Rest of South America

Rest of the World (RoW)

Middle East

Saudi Arabia

United Arab Emirates

Qatar

Israel

Rest of Middle East

Africa

South Africa

Egypt

Morocco

Rest of Africa

What our report offers:

Market share assessments for the regional and country-level segments

Strategic recommendations for the new entrants

Covers Market data for the years 2023, 2024, 2025, 2026, 2027, 2028, 2030, 2032 and 2034

Market Trends (Drivers, Constraints, Opportunities, Threats, Challenges, Investment Opportunities, and recommendations)

Strategic recommendations in key business segments based on the market estimations

Competitive landscaping mapping the key common trends

Company profiling with detailed strategies, financials, and recent developments

Supply chain trends mapping the latest technological advancements

Free Customization Offerings:

All the customers of this report will be entitled to receive one of the following free customization options:

Company Profiling

Comprehensive profiling of additional market players (up to 3)

SWOT Analysis of key players (up to 3)

Regional Segmentation

Market estimations, Forecasts and CAGR of any prominent country as per the client's interest (Note: Depends on feasibility check)

Competitive Benchmarking

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