

Space-Based Solar Power & Energy Transmission Market Forecasts to 2034 - Global Analysis By Solar Power Collection Method (Photovoltaic (PV) Arrays and Concentrated Solar Power (CSP) Collectors), Transmission Architecture, Technology, Application, End User and By Geography

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Abstracts

According to Statistics MRC, the Global Space-Based Solar Power & Energy Transmission Market is accounted for \$0.9 billion in 2026 and is expected to reach \$3.3 billion by 2034 growing at a CAGR of 17.1% during the forecast period. Space-Based Solar Power & Energy Transmission involves deploying solar power satellites that capture sunlight beyond Earth's atmosphere and deliver electricity to ground-based receiving stations through wireless transmission methods, primarily microwaves or lasers. Since space-based systems can receive sunlight with fewer atmospheric and weather-related interruptions, they could offer a continuous source of renewable power. Growing progress in reusable launch vehicles, lightweight photovoltaic technologies, satellite systems, wireless energy transfer, and autonomous spacecraft operations is strengthening development efforts. The technology is being explored as a potential solution for expanding dependable, low-carbon electricity generation on a large scale. According to the International Energy Agency (IEA), global renewable power capacity is projected to increase by almost 4,600 GW between 2025 and 2030, with solar PV expected to account for nearly 80% of worldwide renewable electricity capacity expansion. This expanding renewable-energy base supports the broader technological and infrastructure ecosystem relevant to advanced solar-power technologies.

Market Dynamics:

Driver:

Increasing demand for clean and continuous energy

The rising need for dependable, environmentally sustainable electricity is encouraging development of Space-Based Solar Power & Energy Transmission. Ground-based renewable systems, particularly solar and wind, are affected by weather, daylight availability, and seasonal fluctuations. Solar power satellites could overcome some of these limitations by collecting sunlight in space and transmitting energy wirelessly to receiving stations on Earth. Their potential to provide a more consistent renewable electricity supply may help reduce reliance on conventional fossil-fuel generation. Consequently, the pursuit of stable, diversified, and low-emission energy systems is supporting technological advancement and investment in space-based power solutions.

Restraint:

High initial capital and launch costs

The substantial capital requirements associated with space-based solar systems can limit market development. Building and deploying orbital solar platforms involves considerable spending on spacecraft manufacturing, advanced solar technologies, transmission equipment, launch services, and long-term maintenance. Establishing extensive orbital infrastructure may require multiple launches, increasing overall project expenditure. Such financial challenges can discourage smaller companies from entering the industry and make large projects dependent on government support or major institutional investment. Furthermore, uncertain revenue prospects and extended payback periods can increase investment risks, causing potential investors to adopt a cautious approach toward commercial space-based power initiatives.

Opportunity:

Development of large-scale renewable energy infrastructure

Growing investment in large renewable energy infrastructure can create substantial opportunities for space-based solar power technologies. Orbital solar systems may provide electricity to areas where land constraints, inadequate transmission networks, or increasing power requirements limit conventional renewable development. By gathering sunlight in space and transmitting electricity to selected receiving facilities, these systems could complement existing solar and wind resources. Government-backed initiatives and energy-sector investments focused on sustainable, dependable electricity may accelerate pilot projects and infrastructure development. Consequently, aerospace manufacturers, energy companies, utilities, and wireless transmission specialists could find new opportunities within this emerging energy ecosystem.

Threat:

Competition from advancing terrestrial energy technologies

The continued advancement of conventional renewable energy technologies may create strong competitive pressure on space-based power systems. Terrestrial solar, wind, battery storage, and modern grid infrastructure are becoming more efficient, scalable, and economically attractive. Improvements in energy storage and transmission networks can further address intermittency challenges associated with ground-based renewable generation. If these established technologies maintain faster cost reductions and commercial development than orbital solar systems, governments, utilities, and investors may favor solutions with existing infrastructure and demonstrated performance. This competition could reduce funding opportunities, slow market adoption, and make commercial deployment of space-based energy more difficult.

Covid-19 Impact:

The COVID-19 outbreak created short-term challenges for the Space-Based Solar Power & Energy Transmission Market, particularly through supply-chain disruptions, restricted industrial operations, and reduced financial availability. Limitations on workforce activity affected aerospace manufacturing, research programs, technology testing, and launch schedules, while emerging space companies faced greater difficulties securing capital. Nevertheless, institutional space initiatives and research investments continued supporting the sector's longer-term development. The pandemic ultimately delayed some technological and commercial activities but also emphasized the importance of strengthening supply-chain resilience, financial stability, and operational preparedness across the space-based energy ecosystem.

The photovoltaic (PV) arrays segment is expected to be the largest during the forecast period

The photovoltaic (PV) arrays segment is expected to account for the largest market share during the forecast period due to their proven capability to transform solar radiation into electrical power in space. These arrays can incorporate lightweight, scalable, modular, and deployable designs that support extensive orbital energy platforms. High-efficiency multi-junction cells can enhance electricity generation in demanding space environments. Their established role in spacecraft power systems, integration with wireless energy transmission technologies, and continuous technological improvements in efficiency, durability, and reduced mass make PV arrays particularly well suited for developing future space-based solar power infrastructure.

The aerospace & defense segment is expected to have the highest CAGR during the forecast period

Over the forecast period, the aerospace & defense segment is predicted to witness the highest growth rate because space-based energy technologies can support reliable

power delivery for remote, strategically significant, and logistics-constrained operations. Their potential to reduce dependence on conventional fuel transportation and vulnerable ground-based infrastructure is attracting attention from defense organizations. Continued development of orbital systems, wireless energy beaming, autonomous technologies, and large-scale space structures is strengthening this opportunity. Government-supported demonstrations and military-focused research are further encouraging innovation, collaboration, and future deployment of space-based power solutions throughout aerospace and defense applications.

Region with largest share:

During the forecast period, the Asia-Pacific region is expected to hold the largest market share because of its expanding space capabilities, technological expertise, and growing focus on innovative energy technologies. Japan, China, India, and South Korea are advancing research and development involving orbital solar generation, wireless power transmission, and demonstration activities. The region's strong aerospace, semiconductor, and electronics industries further support technological development. Rising electricity requirements and public-sector involvement in advanced space programs are also creating favorable conditions for investment, innovation, and future deployment of space-based solar power infrastructure across Asia-Pacific.

Region with highest CAGR:

Over the forecast period, the Asia-Pacific region is anticipated to exhibit the highest CAGR because of strengthening space capabilities, increasing concerns over energy security, and substantial investments in next-generation orbital systems. Countries including Japan, China, and India are advancing research, technology demonstrations, and wireless energy transmission initiatives. Strong satellite manufacturing and aerospace ecosystems provide additional support for market development. Furthermore, rising requirements for dependable low-carbon electricity and greater involvement of private space companies are creating favorable conditions for technological advancement, investment, and future deployment throughout the Asia-Pacific region.

Key players in the market

Some of the key players in Space-Based Solar Power & Energy Transmission Market include Airbus, Blue Origin, Boeing, China Academy of Space Technology (CAST), Emrod, Japan Aerospace Exploration Agency (JAXA), Lockheed Martin, Mitsubishi Electric Corporation, Northrop Grumman, OHB SE, Overview Energy, Solaren Corporation, Space Solar Ltd, SpaceX, Thales Alenia Space, TerraSpark, Star Catcher and Virtus Solis.

Key Developments:

In July 2026, Blue Origin and NASA signed an agreement to use the historic Thad Cochran Test Stand "B-Test Complex" at NASA Stennis Space Center in Mississippi for New Glenn second stage hotfire testing. This facility provides an additional testbed for validating our upper stage performance before flight. The B-Test Complex is part of Blue Origin's comprehensive infrastructure expansion to add more test stands to hotfire our second stages to deconflict LC-36 launch operations.

In July 2026, Lockheed Martin and Rheinmetall announced the signing of a memorandum of understanding (MOU) that addresses the immediate demand for locally produced munitions in Europe. With the support of the United States and German governments, the agreement marks the next step toward establishing a joint venture to create the first European centre of excellence for the manufacturing, integration and distribution of ATACMS across NATO and allied European forces.

Solar Power Collection Methods Covered:

Photovoltaic (PV) Arrays

Concentrated Solar Power (CSP) Collectors

Transmission Architectures Covered:

Geostationary Satellite Systems

Low Earth Orbit (LEO) Satellite Systems

Medium Earth Orbit (MEO) Satellite Systems

Technologies Covered:

Microwave Power Transmission (MPT)

Laser Power Transmission (LPT)

Hybrid Transmission Systems

Applications Covered:

Utility-Scale Power Supply

Defense & Military Power Systems

Remote & Islanded Communities

Industrial Power Supply

End Users Covered:

Energy & Utilities

Aerospace & Defense

Telecommunications

Industrial & Commercial Enterprises

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

Benchmarking of key players based on product portfolio, geographical presence, and strategic alliances

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