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Space Based Solar Power Market - Global Industry Size, Share, Trends, Competition, Opportunity and Forecast, Segmented By Satellite Design Type (Microwave Transmitting Satellite, Laser Transmitting Satellite), By Application (Residential, Industrial, Commercial), By Region & Competition, 2021-2031F

https://marketpublishers.com/r/SD8F1C2043E2EN.html
Date: January 2026
Pages: 180
Price: US$ 4,500.00 (Single User License)
ID: SD8F1C2043E2EN

Abstracts

The Global Space Based Solar Power Market is projected to expand from USD 1.14 Billion in 2025 to USD 2.22 Billion by 2031, reflecting a compound annual growth rate of 11.75%. This renewable energy system utilizes orbiting satellites to harvest solar energy and wirelessly transmit it to Earth for conversion into electricity, offering the distinct advantage of generating continuous baseload power regardless of atmospheric conditions or day-night cycles. Key drivers supporting the market include the urgent global mandate to achieve net-zero carbon emissions and the strategic need for enhanced energy security, as nations increasingly prioritize independent, reliable sources to stabilize grids and reduce reliance on intermittent terrestrial renewables.

In 2025, Japan Space Systems advanced its OHISAMA project, aiming to transmit 1 kilowatt of power from a satellite at an altitude of 400 kilometers to a receiver on Earth. Despite such technical milestones, the market faces substantial hurdles due to the immense financial and technical costs associated with in-orbit assembly. The complexity involved in constructing and maintaining the massive infrastructure required for commercial-scale power generation continues to impede rapid market expansion and economic viability.

Market Driver

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The significant reduction in orbital launch costs facilitated by reusable rockets serves as a foundational catalyst for the commercial viability of the Global Space Based Solar Power Market. By enabling the cost-effective transport of the massive modular hardware necessary for gigawatt-scale orbital constellations, heavy-lift reusable vehicles are fundamentally altering the economic structure of space energy. This drastic decrease in capital expenditure addresses the most significant barrier to entry, evolving space solar from a theoretical concept into a competitive energy solution; for instance, Fast Company reported in February 2024 that the startup Virtus Solis projects modern reusable infrastructure will allow for the construction of a commercial-scale station for less than $1.5 billion.

Concurrently, advancements in wireless power transmission and beaming technologies are critical for ensuring the efficient transfer of harvested energy from orbit to terrestrial grids. Research efforts are actively optimizing microwave and laser transmission efficiencies while improving the durability of photovoltaic materials against the high-radiation space environment, as seen in Caltech's January 2024 update on the ALBA experiment, which successfully tested 32 photovoltaic cell types for resilience. According to a January 2024 NASA report, such technological maturation could ultimately drive the levelized cost of electricity down to $0.03 per kilowatt-hour, rendering it competitive with terrestrial renewables.

Market Challenge

The Global Space Based Solar Power Market is significantly hindered by the exorbitant financial and technical costs associated with in-orbit assembly and the construction of massive infrastructure. Developing a functional commercial-scale system requires transporting thousands of tons of hardware, including solar arrays, transmitters, and robotic assembly units, into geostationary orbit. The logistical complexity of coordinating frequent heavy-lift launches, combined with the extreme difficulty of autonomous assembly in a harsh space environment, creates a capital expenditure barrier that far exceeds that of terrestrial renewable energy projects.

This formidable cost structure hampers market growth by deterring private investment and delaying commercial viability, as the economic risks associated with such large-scale, long-term projects make securing necessary funding difficult. Consequently, the levelized cost of electricity remains uncompetitive compared to ground-based alternatives. As noted by the National Space Society in 2024, cumulative direct investment in space solar power technologies stood at approximately $1.07 billion, a figure characterized as relatively modest compared to other mature energy sectors,

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highlighting how limited financial commitment relative to the massive requirements restricts the market's expansion.

Market Trends

The proliferation of strategic public-private partnerships is fundamentally reshaping the market ecosystem, as government agencies increasingly collaborate with commercial entities to de-risk high-capital development. Moving beyond early-stage theoretical research, these alliances are mobilizing substantial financial commitments to accelerate industrial maturity and integration with national energy strategies, a trend exemplified by renewed sovereign investment in dual-use space capabilities. According to Payload Space in November 2025, member states approved a record ?22.07 billion in contributions to the ESA, signaling a robust policy shift that supports the long-term financial stability required for large-scale infrastructure projects.

Simultaneously, the rise of specialized commercial startups is shifting the industry from monolithic agency-led concepts toward agile, hardware-rich development phases. New market entrants are successfully securing non-dilutive government funding to target specific technical bottlenecks, such as wireless power transmission efficiency, rather than attempting to fund entire constellations immediately; this granular approach allows companies to validate critical subsystems and attract further venture capital. As announced by the U.S. Department of Energy in January 2025, the agency awarded approximately $1.92 million to Virtus Solis Technologies to develop high-efficiency wireless power transfer systems, validating the commercial potential of component-level innovation within the broader space energy grid.

Key Market Players

Space Energy, Inc.

Solaren, Inc.

Northrop Grumman Corporation

Space Exploration Technologies Corp.

Blue Origin Federation, LLC

JAXA

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Lumos Solar

Seraphim Solar

Solar Electric America

SolarTech Universal

Report Scope

In this report, the Global Space Based Solar Power Market has been segmented into the following categories, in addition to the industry trends which have also been detailed below:

Space Based Solar Power Market, By Satellite Design Type

Microwave Transmitting Satellite

Laser Transmitting Satellite

Space Based Solar Power Market, By Application

Residential

Industrial

Commercial

Space Based Solar Power Market, By Region

North America

United States

Canada

Mexico

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- Europe
  - France
  - United Kingdom
  - Italy
  - Germany
  - Spain
- Asia Pacific
  - China
  - India
  - Japan
  - Australia
  - South Korea
- South America
  - Brazil
  - Argentina
  - Colombia
- Middle East & Africa
  - South Africa
  - Saudi Arabia

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UAE

Competitive Landscape

Company Profiles: Detailed analysis of the major companies present in the Global Space Based Solar Power Market.

Available Customizations:

Global Space Based Solar Power Market report with the given market data, TechSci Research offers customizations according to a company's specific needs. The following customization options are available for the report:

Company Information

Detailed analysis and profiling of additional market players (up to five).

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