

# **Space Based Solar Power Market Forecasts to 2034 – Global Analysis By Component (Solar Panels & Arrays, Power Transmission Systems, Satellites & Platforms and Ground Receiving Stations (Rectennas)), Orbit Type, Technology, Application, End User and By Geography**

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## **Abstracts**

According to Statistics MRC, the Global Space Based Solar Power Market is accounted for \$1.2 billion in 2026 and is expected to reach \$2.6 billion by 2034 growing at a CAGR of 10.1% during the forecast period. Space based solar power refers to a concept and emerging technology system that generates electricity from solar energy collected by large photovoltaic arrays deployed in geostationary or other high Earth orbits, where sunlight is available continuously and without atmospheric attenuation, and transmits the collected power to Earth-based receiving stations through wireless microwave or laser beam transmission. System components include high-efficiency lightweight solar panel arrays, orbital platforms and satellite bus structures, phased array microwave or laser power transmission systems, and rectenna ground receiving stations that convert transmitted energy into grid-compatible electricity for delivery to energy consumers.

### **Market Dynamics:**

#### **Driver:**

Energy Security and Decarbonization Policy

Energy security imperatives and national net-zero electricity decarbonization

commitments are generating government investment in space based solar power research programs as a potential source of continuous, weather-independent, baseload-equivalent renewable electricity that complements intermittent terrestrial solar and wind generation. The UK Space Energy Initiative, ESA SOLARIS program, and multiple national space agency research investments are funding technology development programs that represent the primary near-term revenue base for space based solar power component developers. Growing recognition of space based solar power's ability to provide firm renewable power without storage requirements is strengthening policy investment rationale in energy security-conscious governments.

### **Restraint:**

#### Launch Cost and In-space Assembly Challenges

Prohibitive launch costs and the absence of demonstrated large-scale in-space assembly capabilities represent fundamental technology readiness barriers to space based solar power commercialization, as deploying the square kilometer-scale solar panel arrays required for commercially meaningful power generation requires either radical launch cost reduction beyond even current SpaceX Starship ambitions or sophisticated autonomous robotic in-orbit construction capabilities that do not yet exist. System mass reduction through ultralight solar panel and structural component development is a critical research priority, but achieving target areal density specifications while maintaining power conversion efficiency represents unresolved materials and systems engineering challenges within the commercial timeframe.

### **Opportunity:**

#### Remote and Island Grid Applications

Remote community and island grid electricity supply applications represent an early commercial niche opportunity for space based solar power systems that do not require full-scale multi-gigawatt deployment to deliver economic value in markets where conventional grid extension is prohibitively expensive and fossil fuel supply logistics are costly. Military forward operating base power supply and disaster recovery emergency electricity generation represent additional high-value niche applications where continuous, independent power delivery justifies substantial premium pricing over conventional alternatives. Demonstrating commercial viability in high-value niche applications creates technology validation and investor confidence that supports progression toward broader commercial deployment.

**Threat:****Terrestrial Renewable Energy Cost Decline**

Continuing terrestrial solar photovoltaic and wind energy cost declines combined with battery storage technology progress represent a competitive threat to space based solar power commercial viability, as the economic case for vastly more expensive space-based generation depends on value premium for firm, continuous power delivery that diminishing storage cost premiums are progressively reducing. If terrestrial renewable-plus-storage systems achieve cost parity with firm conventional generation within the forecast period, the economic justification for space based solar power narrows substantially to energy security premium markets. Long space based solar power development timelines create risk of technological disruption before commercial deployment milestones are achieved.

**Covid-19 Impact:**

COVID-19 had minimal direct impact on space based solar power development given the early-stage research nature of the sector during the pandemic period. Post-pandemic energy price shocks and supply chain disruptions highlighted energy security vulnerabilities in fossil fuel-dependent electricity systems, strengthening political support for long-duration energy security investment programs including space based solar power research. Renewed government attention to energy independence has generated incremental research funding increases for space based solar power feasibility programs in the UK, EU, Japan, and United States.

The ground receiving stations (Rectennas) segment is expected to be the largest during the forecast period

The ground receiving stations (Rectennas) segment is expected to account for the largest market share during the forecast period, due to the requirement for rectenna array construction as the first major infrastructure investment needed before any space based solar power system can deliver electricity, making ground station development a prerequisite investment category that precedes orbital deployment. Rectenna technology development programs are advancing microwave-to-electricity conversion efficiency and investigating land use minimization through high-frequency transmission optimization. Government demonstration program investments are focusing initial funding on ground station technology validation as the most accessible near-term

development milestone for national space based solar power programs.

The geostationary orbit (GEO) segment is expected to have the highest CAGR during the forecast period

Over the forecast period, the geostationary orbit (GEO) segment is predicted to witness the highest growth rate, driven by geostationary orbit's provision of continuous Earth coverage from fixed orbital positions that enables consistent power beam alignment with fixed ground receiving stations, eliminating the complex tracking requirements associated with low Earth orbit constellations. Government space based solar power programs in the UK, EU, and Japan are primarily targeting geostationary deployment architectures. Investment in GEO platform structural and power transmission technology is advancing through demonstration satellite programs that are building the technology readiness level required for commercial deployment decisions.

#### **Region with largest share:**

During the forecast period, the Europe region is expected to hold the largest market share, due to ESA's SOLARIS feasibility study outcomes generating member state government space based solar power program investment decisions, UK Space Energy Initiative progression toward demonstration missions, and European energy security concerns creating strong political motivation for government investment in long-term continuous renewable electricity sources. European aerospace consortium development programs involving Airbus Defence and Space and Thales Alenia Space are advancing technology readiness for European space based solar power commercial demonstration.

#### **Region with highest CAGR:**

Over the forecast period, the North America region is anticipated to exhibit the highest CAGR, due to leading U.S. defense and civilian space agency investment in space solar power research, established aerospace prime contractor ecosystem, and California Institute of Technology space solar power project advancing key technology demonstrations. U.S. Air Force Research Laboratory funding for space based solar power technology development has accelerated key component maturation. Major aerospace companies including Northrop Grumman and Boeing are engaged in space based solar power technology research programs that position North American suppliers advantageously for eventual procurement.

## Key players in the market

Some of the key players in Space Based Solar Power Market include Northrop Grumman, Airbus Defence and Space, Boeing, Lockheed Martin, Mitsubishi Electric, Thales Alenia Space, China Aerospace Science and Technology Corporation (CASC), ISRO (Antrix Corporation), JAXA (Japan Aerospace Exploration Agency), Caltech (Space Solar Power Project), Solaren Corporation, Azimuth Space, SpaceTech GmbH, Maxar Technologies, Blue Origin, SpaceX, Sierra Space, and OHB SE.

## Key Developments:

In March 2026, Northrop Grumman advanced its space solar power incremental demonstrations program with successful in-orbit microwave power transmission experiment achieving targeted conversion efficiency milestones.

In February 2026, Thales Alenia Space secured ESA contract funding for detailed engineering design of a European space based solar power technology demonstration satellite targeting late-2020s launch.

In January 2026, Airbus Defence and Space completed its SOLARIS demonstration module test campaign, validating microwave power transmission efficiency and lightweight deployable solar array structural performance in orbit.

## Components Covered:

Solar Panels & Arrays

Power Transmission Systems

Satellites & Platforms

Ground Receiving Stations (Rectennas)

## Orbit Types Covered:

Geostationary Orbit (GEO)

Low Earth Orbit (LEO)

Medium Earth Orbit (MEO)

Technologies Covered:

Microwave Power Transmission

Laser Power Transmission

Photovoltaic Conversion Systems

Wireless Power Transmission Systems

Energy Storage Systems

Applications Covered:

Grid Power Generation

Remote Power Supply

Military Power Applications

Disaster Recovery Power Systems

Other Applications

End Users Covered:

Government & Space Agencies

Defense Sector

Energy Utilities

Private Space Companies

Other End Users

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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