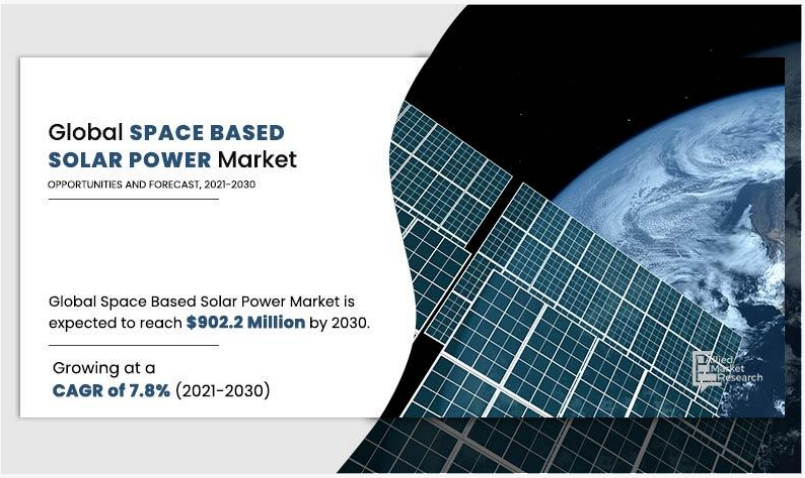
Space-Based Solar Power Market to Hit $902.2 Million by 2030 | Growing at a CAGR of 7.8%

 Laser Transmitting Solar Satellites Drive Innovation and Clean Energy Generation from Space



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According to a new report published by Allied Market Research, the global space-based solar power market size was valued at $425.7 million in 2020 and is projected to reach $902.2 million by 2030, growing at a CAGR of 7.8% from 2021 to 2030.

Space-based solar power (SBSP) represents a revolutionary approach to renewable energy generation. It involves placing solar panels in outer space to capture solar energy and transmit it back to Earth using microwave and laser technologies. This method provides a clean, consistent, and reliable source of power — unaffected by weather or night cycles — offering immense potential for future global energy security.

> Global space-based solar power market to hit $902.2 million by 2030, driven by clean energy demand and satellite power innovations. ”
>
> *Allied Market Research*

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 Driving Forces Behind Market Growth

The demand for clean and renewable energy is surging globally, and the concept of harnessing solar power directly from space is gaining momentum. Industries such as mining, chemical, construction, and automotive are consuming vast amounts of electricity, increasing the demand for sustainable power sources.

Additionally, satellite and space vehicle applications are increasingly dependent on space-based

power systems, driving significant investments in SBSP technology. These systems ensure uninterrupted power supply for orbital operations, deep-space missions, and communication satellites.

However, despite the immense potential, challenges remain. The high cost of launching, installing, and maintaining space-based solar systems continues to be a major restraint for market expansion. Technological complexity and capital intensity are also key hurdles for large-scale deployment.

 Segment Insights

 By Solar Satellite Type

The laser transmitting solar satellite segment accounted for nearly 54% of the market share in 2020, emerging as the leading technology. Its dominance is attributed to its ability to transmit power efficiently and its increasing use in orbital transfer vehicles, lunar solar arrays, and satellite power supply during eclipses.

Meanwhile, the microwave transmitting solar satellite segment is expected to maintain steady growth, owing to ongoing research focused on improving transmission efficiency and cost-effectiveness.

 By Application

The electricity generation segment holds the largest revenue share in the global space-based solar power market. As global energy demand continues to rise, SBSP offers an eco-friendly and consistent alternative to terrestrial energy sources. The space applications segment, on the other hand, is projected to grow at the highest CAGR of 8.8%, driven by increasing use of space vehicles and the growing number of satellite constellations.

 Regional Analysis

Regionally, Asia-Pacific dominated the global market in 2020, capturing more than 37.9% of total revenue. The region's growth is driven by strong investments in space technology, renewable energy adoption, and rising R&D activities, particularly in China, India, and Japan.

Both China and India are emerging as global leaders in space missions and solar power development, contributing significantly to the commercialization of SBSP technology. Moreover, increasing awareness about the efficiency of space-based solar systems over traditional ground-based solar setups further fuels the regional market.

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In contrast, North America is expected to record the highest CAGR of 9.1% through 2030, supported by technological innovation, advanced infrastructure, and major players like Boeing, Northrop Grumman, and SpaceTech GmbH actively developing SBSP solutions.

□□□ Key Market Players and Developments

Prominent players shaping the space-based solar power industry include:

Airborne

Azur Space Solar Power GmbH

CESI SpA

Fralock Innovative Materials Manufacturing & Automation

Japan Aerospace Exploration Agency (JAXA)

Northrop Grumman Corporation

Solaero Technologies Corporation

Solaren Corporation

SpaceTech GmbH

The Boeing Company

These companies are focusing on strategic collaborations, product launches, and technological partnerships to strengthen their presence.

For example:

In May 2021, Northrop Grumman Corporation partnered with Airbus Defense and Space to design and produce solar arrays for the OneSat communication satellites.

In January 2021, Boeing signed an agreement with NASA to supply advanced solar arrays for the International Space Station (ISS), enhancing its energy generation capabilities.

□ Impact of COVID-19 on the Market

The COVID-19 pandemic temporarily disrupted the global space-based solar power market in

2020. Lockdowns led to the suspension of R&D activities, halted space missions, and delayed manufacturing due to supply chain disruptions.

However, as global economies recover and governments focus on net-zero carbon goals, investment in renewable technologies — including SBSP — is accelerating. The resumption of space programs and renewed interest in sustainable power generation are expected to restore growth momentum post-pandemic.

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 Conclusion

The space-based solar power market is poised to revolutionize the future of clean energy generation. By capturing solar energy beyond Earth's atmosphere, SBSP eliminates the limitations of terrestrial solar systems, ensuring round-the-clock energy supply. With strong investments from Asia-Pacific and North America, and active participation from leading aerospace corporations, the industry is on track to become a critical component of the global renewable energy mix.

As the world strives toward sustainability and energy independence, space-based solar power stands as a beacon of innovation — merging renewable energy with space technology for a greener, more advanced future.

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Pawan Kumar, the CEO of Allied Market Research, is leading the organization toward providing high-quality data and insights. We are in professional corporate relations with various companies and this helps us in digging out market data that helps us generate accurate research data tables and confirms utmost accuracy in our market forecasting. Each and every data presented in the reports published by us is extracted through primary interviews with top officials from leading companies of domain concerned. Our secondary data procurement methodology includes deep online and offline research and discussion with knowledgeable professionals and analysts in the industry.

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