

# Solar Panel Operation & Maintenance Market Set to Achieve US\$ 16.4 Bn by 2034, Growing at a 10.1% CAGR

*The global solar panel operation & maintenance market, valued at \$5.7 billion in 2023, is projected to grow at a 10.1% CAGR, reaching \$16.4 billion by 2034*

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EINPresswire.com/ -- The global [solar panel operation and maintenance market](#) was valued at US\$ 5.7 billion in 2023 and is projected to expand at a CAGR of 10.1% from 2024 to 2034, reaching US\$ 16.4 billion by the end of 2034. This growth is primarily driven by the increasing adoption of solar energy and innovations in technology that enhance the efficiency and longevity of photovoltaic (PV) systems.



Solar Panel Operation & Maintenance

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## Analyst Viewpoint: Driving Forces Behind Market Growth

The rapid expansion of solar energy installations worldwide is propelling the demand for effective solar panel operation and maintenance (O&M) services. The declining cost of solar energy, improved energy storage solutions, and advancements in the grid infrastructure are expanding the use of PV panels, thereby increasing the need for regular servicing and maintenance.

Moreover, the rise of Artificial Intelligence (AI)-powered predictive maintenance is transforming

the O&M market. AI technologies can predict potential equipment failures before they occur, allowing for timely interventions that improve system reliability and efficiency.

The market is also benefiting from the global push for sustainability, with numerous countries and organizations promoting solar energy as a means to achieve climate goals and reduce carbon emissions. For example, Malaysia's 'Solar BOLEH!' initiative launched in May 2024 is designed to make solar panel installations more affordable, stimulating market growth.

## Market Overview: Solar Panel O&M Essentials

Solar panel O&M is critical for ensuring that photovoltaic systems operate optimally throughout their lifecycle. The primary goal of O&M is to maximize energy production, prevent system failures, and extend the operational life of the panels. Solar panels degrade over time, with an average annual degradation rate of about 0.5%, meaning their efficiency decreases slightly each year.

Another challenge is Potential-induced degradation (PID), a phenomenon that occurs when solar panels experience prolonged high voltage, leading to decreased power output. Regular maintenance, such as cleaning and inspection, helps mitigate PID and ensures that panels remain efficient.

## Key Drivers of Market Growth

### 1. Increase in Adoption of Solar Energy

As global awareness of climate change and the importance of renewable energy grows, the adoption of solar energy is surging. Countries like the United States, which reached 177 GW of installed solar capacity in 2023, are rapidly expanding solar infrastructure. This growth in capacity directly increases the demand for solar panel O&M services to ensure optimal performance.

In addition, governmental initiatives, such as Malaysia's 'Solar BOLEH!' program, aim to make solar energy more accessible for homes, further expanding the market for solar panel maintenance services.

### 2. Surge in Usage of AI-Powered Predictive Maintenance

The integration of AI into solar panel systems is transforming the O&M landscape. AI-enabled predictive maintenance uses data analytics, machine learning, and real-time monitoring to foresee potential failures, allowing for preemptive repairs that reduce downtime and extend system life. AI-powered tools like drones and thermal imaging cameras are being used to identify issues such as malfunctioning cells or connectors, enhancing the efficiency of the maintenance process.

One example is Loggma Digital Energy Solutions, a software company that developed an AI-based platform capable of analyzing data to detect performance issues in solar plants. This technology is expected to significantly boost the O&M market by improving the accuracy of system monitoring and repair.

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### Regional Outlook: Asia Pacific Leading the Market

Asia Pacific dominated the solar panel O&M market in 2023, primarily due to China's substantial role in global solar production. China accounted for 83% of the world's solar panel production and had approximately 430 GW of solar capacity by 2023. This positions China as the world's largest producer of solar energy and a key player in the O&M market.

Additionally, the Middle East and Africa (MEA) region is experiencing rapid growth in solar energy capacity. The MENA region is projected to reach 40 GW of solar capacity by 2024 and 180 GW by 2030, which will further contribute to the demand for O&M services in these areas.

### Key Players in the Solar Panel O&M Market

Several major companies are shaping the solar panel O&M market by providing innovative solutions for maintenance and energy efficiency. Some key players include:

- First Solar
- SunPower Corporation
- Enel Green Power S.p.A.
- Siemens
- SMA Solar Technology AG
- Trina Solar
- Canadian Solar
- JinkoSolar Holding Co., Ltd.
- NextEra Energy, Inc.
- Vivint, Inc.

These companies are incorporating robotics, AI, and other advanced technologies to optimize the O&M process. For example, Sleepwalkers in India introduced an automated robotic device, the Zero Dirt-BOLT, which is designed for waterless cleaning of solar panels without the need for rails, making it highly effective for both ground-mounted and rooftop systems.

### Market Segmentation

- By Service Type: Monitoring, Inspection, Cleaning, Repair & Maintenance, Asset Management
- By Technology: Monocrystalline, Polycrystalline, Thin Film, Others
- By Application: Residential, Commercial, Industrial, Utility-Scale

#### Regional Breakdown:

- North America
- Europe
- Asia Pacific
- Latin America
- Middle East & Africa

#### Key Developments

- May 2024: SunPower expanded its portfolio with the addition of Tesla Powerwall 3, a high-quality storage solution for residential solar systems.
- 2023: SMA Solar Technology AG announced plans to expand manufacturing into the U.S., with production expected to start in 2025.

#### Conclusion

The global solar panel operation and maintenance market is set for significant growth, driven by the increasing adoption of solar energy, advancements in AI-powered predictive maintenance, and the global push for sustainable energy solutions. As the solar energy industry continues to expand, the demand for efficient and reliable O&M services will remain crucial, offering substantial opportunities for businesses in the sector.

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Contact:

Transparency Market Research Inc.

CORPORATE HEADQUARTER DOWNTOWN,

1000 N. West Street,

Suite 1200, Wilmington, Delaware 19801 USA

Tel: +1-518-618-1030

USA – Canada Toll Free: 866-552-3453

Website: <https://www.transparencymarketresearch.com>

Email: [sales@transparencymarketresearch.com](mailto:sales@transparencymarketresearch.com)

Follow Us: [LinkedIn](#) | [Twitter](#) | [Blog](#) | [YouTube](#)

Atil Chaudhari

Transparency Market Research Inc.

+1 518-618-1030

[email us here](#)

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