

# Global Photovoltaic Panel Cleaning Intelligent Robot Supply, Demand and Key Producers, 2026-2032

<https://marketpublishers.com/r/GC277F004F88EN.html>

Date: February 2026

Pages: 163

Price: US\$ 4,480.00 (Single User License)

ID: GC277F004F88EN

## Abstracts

The global Photovoltaic Panel Cleaning Intelligent Robot market size is expected to reach \$ 440 million by 2032, rising at a market growth of 13.7% CAGR during the forecast period (2026-2032).

The intelligent photovoltaic panel cleaning robot is a photovoltaic operation and maintenance equipment integrating sensors, control algorithms, and automated actuators. It is used to automatically identify and clean contaminants such as dust, sand, and bird droppings from the surface of photovoltaic modules, and autonomously plan its work path and cleaning strategy according to environmental conditions. These robots typically possess positioning and navigation, remote monitoring, and data feedback capabilities, enabling continuous and highly consistent cleaning operations without shutdown. This significantly reduces manual operation and maintenance costs and improves the overall power generation efficiency of the power plant, making it crucial equipment for achieving intelligent and refined operation and maintenance of large-scale photovoltaic power plants. Sales in 2025 were 36,000 units, with an average price of US\$4,900, total production capacity of 40,000 units, and a gross profit margin of 41%.

From the demand and value perspective, the core market driver for intelligent photovoltaic panel cleaning robots is shifting from 'saving labor' to 'ensuring power generation revenue and asset return.' In large-scale ground-mounted power plants, the impact of module contamination on average annual power generation has been incorporated into the power plant revenue calculation model, and the frequency and timing of cleaning directly affect IRR and levelized cost of electricity (LCOE). Intelligent robots, through on-demand cleaning, differentiated scheduling, and stable operation, can avoid the coexistence of over-cleaning and under-cleaning, linking maintenance

behavior to actual power generation losses, and gradually transforming from maintenance tools into an important component of power plant revenue management.

From the supply and industry evolution perspective, the intelligent photovoltaic panel cleaning robot market is transitioning from 'single-unit equipment competition' to 'system-level solution competition.' Leading manufacturers are integrating robots with power plant monitoring systems, meteorological data, and power generation analysis platforms to create scalable and replicable intelligent operation and maintenance solutions. Simultaneously, they are lowering the initial investment threshold for power plant owners through equipment leasing, service outsourcing, or 'pay-per-cleaning' models. As industry standards and the level of digitalization in operation and maintenance increase, manufacturers with algorithmic capabilities, system integration capabilities, and long-term service capabilities will occupy a more advantageous position during market consolidation.

This report studies the global Photovoltaic Panel Cleaning Intelligent Robot production, demand, key manufacturers, and key regions.

This report is a detailed and comprehensive analysis of the world market for Photovoltaic Panel Cleaning Intelligent Robot and provides market size (US\$ million) and Year-over-Year (YoY) Growth, considering 2025 as the base year. This report explores demand trends and competition, as well as details the characteristics of Photovoltaic Panel Cleaning Intelligent Robot that contribute to its increasing demand across many markets.

### **Highlights and key features of the study**

Global Photovoltaic Panel Cleaning Intelligent Robot total production and demand, 2021-2032, (K Units)

Global Photovoltaic Panel Cleaning Intelligent Robot total production value, 2021-2032, (USD Million)

Global Photovoltaic Panel Cleaning Intelligent Robot production by region & country, production, value, CAGR, 2021-2032, (USD Million) & (K Units), (based on production site)

Global Photovoltaic Panel Cleaning Intelligent Robot consumption by region & country, CAGR, 2021-2032 & (K Units)

U.S. VS China: Photovoltaic Panel Cleaning Intelligent Robot domestic production, consumption, key domestic manufacturers and share

Global Photovoltaic Panel Cleaning Intelligent Robot production by manufacturer, production, price, value and market share 2021-2026, (USD Million) & (K Units)

Global Photovoltaic Panel Cleaning Intelligent Robot production by Type, production, value, CAGR, 2021-2032, (USD Million) & (K Units)

Global Photovoltaic Panel Cleaning Intelligent Robot production by Application, production, value, CAGR, 2021-2032, (USD Million) & (K Units)

This report profiles key players in the global Photovoltaic Panel Cleaning Intelligent Robot market based on the following parameters - company overview, production, value, price, gross margin, product portfolio, geographical presence, and key developments. Key companies covered as a part of this study include SunPower, Innovpower, BOSON, Westrong, SUNPURE, Alion Energy, Ecoppia, SolarCleanso, SERBOT AG, Airtouch Solar, etc.

This report also provides key insights about market drivers, restraints, opportunities, new product launches or approvals.

Stakeholders would have ease in decision-making through various strategy matrices used in analyzing the World Photovoltaic Panel Cleaning Intelligent Robot market

### **Detailed Segmentation:**

Each section contains quantitative market data including market by value (US\$ Millions), volume (production, consumption) & (K Units) and average price (US\$/Unit) by manufacturer, by Type, and by Application. Data is given for the years 2021-2032 by year with 2025 as the base year, 2026 as the estimate year, and 2027-2032 as the forecast year.

Global Photovoltaic Panel Cleaning Intelligent Robot Market, By Region:

United States

China

Europe

Japan

South Korea

ASEAN

India

Rest of World

Global Photovoltaic Panel Cleaning Intelligent Robot Market, Segmentation by Type:

Fixed

Mobile

Global Photovoltaic Panel Cleaning Intelligent Robot Market, Segmentation by Clean Form:

Dry Brush PV Cleaning Robot

Water-based PV Cleaning Robot

Global Photovoltaic Panel Cleaning Intelligent Robot Market, Segmentation by Automation:

Fully Automatic PV Cleaning Robot

Semi-automatic PV Cleaning Robot

Global Photovoltaic Panel Cleaning Intelligent Robot Market, Segmentation by Application:

Distributed Photovoltaic Power Station

Centralized Photovoltaic Power Station

Companies Profiled:

SunPower

Innovpower

BOSON

Westrong

SUNPURE

Alion Energy

Ecoppia

SolarCleano

SERBOT AG

Airtouch Solar

HyCLEANER

Tetraelc

Solenergy

Cooperwind

louluo

Washpanel

Clean Solar Solutions Ltd

Derui Intelligent

Ecobright

Xiamen Lanxu Intelligent Technology

Lingdu (Guangdong) Intelligent

Xingluo Smart Technology(Suzhou) Co., Ltd.

**Key Questions Answered:**

1. How big is the global Photovoltaic Panel Cleaning Intelligent Robot market?
2. What is the demand of the global Photovoltaic Panel Cleaning Intelligent Robot market?
3. What is the year over year growth of the global Photovoltaic Panel Cleaning Intelligent Robot market?
4. What is the production and production value of the global Photovoltaic Panel Cleaning Intelligent Robot market?
5. Who are the key producers in the global Photovoltaic Panel Cleaning Intelligent Robot market?
6. What are the growth factors driving the market demand?

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