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Outdoor Solar LED Market - Global Industry Size, Share, Trends, Opportunity, and Forecast Segmented By Product Type (Street Lights, Garden Lights, Floodlights, Spot Lights, Others), By Voltage (Low Voltage, Medium Voltage, High Voltage), By End Use (Residential, Commercial, Industrial), By Region & Competition, 2021-2031F

https://marketpublishers.com/r/OAD4BEE2AFE5EN.html
Date: January 2026
Pages: 185
Price: US$ 4,500.00 (Single User License)
ID: OAD4BEE2AFE5EN

Abstracts

The Global Outdoor Solar LED Market is projected to expand from USD 7.74 Billion in 2025 to USD 13.62 Billion by 2031, registering a CAGR of 9.88%. These standalone lighting systems integrate photovoltaic panels, rechargeable batteries, and light-emitting diodes to operate independently of central utility grids. The market's growth is primarily underpinned by legislative mandates for energy efficiency, the economic necessity to lower municipal operational costs, and the demand for infrastructure in off-grid areas. These structural drivers promote long-term adoption for perimeter security and roadway applications, distinguishing this growth from transient trends such as smart-feature integration or aesthetic preferences.

However, the sector faces substantial challenges regarding the high initial capital expenditure needed for high-quality components and the technical constraints of battery storage during extended periods of low sunlight. According to GOGLA, global sales of off-grid solar energy kits reached 4.4 million units in the first half of 2024, validating the scale of demand despite these hurdles. While this volume reflects significant market activity, the volatility in component and battery costs remains a major obstacle to universal implementation across cost-sensitive regions.

Market Driver

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The expansion of rural electrification and off-grid projects serves as a primary catalyst for market growth, particularly in developing regions where extending the central utility grid is cost-prohibitive. International development agencies and governments are deploying standalone solar LED systems to bridge the energy access gap, prioritizing these units for their minimal maintenance requirements and rapid deployment capabilities compared to traditional infrastructure. This institutional momentum is highlighted by large-scale initiatives designed to electrify underserved populations; for instance, the World Bank's 'Off-Grid Solar **Market Trends** Report 2024' notes a partnership with the African Development Bank aiming to connect 300 million people across Africa to electricity by 2030, leveraging off-grid solar technologies as a critical mechanism.

Simultaneously, the integration with IoT ecosystems and Smart City initiatives is reshaping demand in mature markets, driving the uptake of intelligent solar LED streetlights. Municipalities are transitioning from passive illumination to connected infrastructure that allows for adaptive dimming, remote monitoring, and data collection to lower carbon footprints and optimize efficiency. According to Signify's 'Annual Report 2023' from February 2024, the company's installed base of connected light points increased to 124 million units, reflecting the accelerating shift toward digitized public assets. Validating the sector's resilience, GOGLA reported that global sales of solar energy kits reached 8.96 million units for the full year of 2023, underscoring the sustained global demand for autonomous lighting solutions.

Market Challenge

The substantial initial capital expenditure required for high-quality solar LED systems constitutes a formidable barrier to market expansion, especially in cost-sensitive regions. While these systems offer long-term operational savings, the significant upfront costs for robust battery storage and advanced photovoltaic panels often exceed the budgetary limits of commercial entities and municipalities. This financial hurdle creates a difficult trade-off where buyers may prioritize lower costs over quality, leading to the installation of inferior units that fail during prolonged periods of low solar irradiance, which in turn erodes consumer confidence and deters future investment in standalone infrastructure.

The severity of this affordability crisis is highlighted by recent industry data. According to GOGLA's 'Off-Grid Solar **Market Trends** Report 2024', only 22% of households currently without electricity access can afford the monthly payments for a basic Tier 1

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solar energy kit. This profound disparity between consumer purchasing power and component costs directly hampers the industry's ability to achieve universal implementation, restricting market growth to heavily subsidized projects rather than fostering organic commercial demand.

Market Trends

The market is significantly shifting toward the adoption of Lithium Iron Phosphate (LiFePO4) battery technology, moving away from traditional gel and lead-acid configurations. This transition is driven by the critical need for higher thermal stability and longer lifecycles in outdoor environments, addressing historical technical limitations related to battery degradation in high-temperature zones. Unlike legacy storage solutions that require frequent replacement, LiFePO4 chemistries provide improved depth-of-discharge capabilities, ensuring consistent luminance over extended periods. Validating this surge in advanced storage availability, the International Energy Agency (IEA) reported in its April 2024 'Batteries and Secure Energy Transitions' report that battery deployment in the power sector increased by over 130% in 2023, creating the economies of scale necessary for integrating these durable batteries into street lighting.

Concurrently, there is a distinct expansion into high-wattage commercial and industrial applications, marking a departure from low-lumen residential or pathway fixtures. Manufacturers are increasingly engineering robust systems capable of illuminating industrial perimeters, parking complexes, and highway interchanges?areas previously dominated by grid-tied infrastructure. This trend requires substantial financial backing to develop high-performance units that can sustain high luminous flux without utility support. The sector's success in attracting capital for these heavy-duty solutions is evident in GOGLA's '2024 Off-Grid Solar Investment Trends Report' from October 2024, which states that the off-grid solar sector attracted USD 425 million in investment during 2023, funding the innovation required to scale these commercial-grade applications.

Key Market Players

CREE Lighting

Gamasonic

Ligman Lighting

Sokoyo Solar Lighting Co. Ltd.

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Signify Holding

Sunna Design SA

Greenshine New Energy

Jiawei Renewable Energy

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Report Scope

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

Outdoor Solar LED Market, By Product Type

Street Lights

Garden Lights

Floodlights

Spot Lights

Others

Outdoor Solar LED Market, By Voltage

Low Voltage

Medium Voltage

High Voltage

Outdoor Solar LED Market, By End Use

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South Korea

South America

Brazil

Argentina

Colombia

Middle East & Africa

South Africa

Saudi Arabia

UAE

Competitive Landscape

Company Profiles: Detailed analysis of the major companies present in the Global Outdoor Solar LED Market.

Available Customizations:

Global Outdoor Solar LED 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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