

Solar PV Inverter Market Report by Technology (Central Inverters, String Inverters, Microinverters, and Others), Voltage (1500 V), Application (Utility Scale, Residential Scale, Small Commercial Scale, Large Commercial Scale, Industrial Scale), and Region 2024-2032

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Abstracts

The global solar PV inverter market size reached US\$ 8.3 Billion in 2023. Looking forward, IMARC Group expects the market to reach US\$ 12.3 Billion by 2032, exhibiting a growth rate (CAGR) of 4.4% during 2024-2032. The implementation of government initiatives and policies, declining costs of solar PV inverters, increasing energy demand across the globe, and rapid technological advancements are some of the major factors propelling the market.

A solar photovoltaic (PV) inverter is a vital component of solar energy systems, transforming direct current produced by solar panels into alternating current (AC). It comprises key components, such as power transistors, transformers, and complex software controls. Solar PV inverter finds applications across diverse fields, including residential housing, commercial buildings, agricultural operations, transportation, urban planning, space technology, remote power systems, grid support, and environmental conservation initiatives. It enables the practical utilization of solar energy, promotes energy independence, provides a renewable energy source, offers potential income through feed-in tariffs, and reduces carbon footprints.

The recent technological advancements, which continuously refine efficiency and reliability, improve thermal management, and increase the capacity of solar PV inverters, are propelling the market growth. Along with this, the introduction of smart inverters, which provide grid support features and advanced monitoring capabilities, ensuring optimal system operation and maintenance, is acting as another growth-inducing factor. Furthermore, escalating environmental awareness among the masses is propelling the shift towards renewable energy sources, such as solar power, which is contributing to the market growth. Apart from this, the advent and growth of energy storage systems, which can store excess solar power for use when sunlight is not available, is positively influencing the market growth. Other factors, including rapid electrification of the transportation sector, extensive research and development (R&D) activities, and increasing demand for electrification of rural areas, are anticipated to drive the market growth.

Solar PV Inverter Market Trends/Drivers:

The implementation of government initiatives and policies

Government initiatives and policies are instrumental in fostering the market growth. Governments across the globe have recognized the imminent threat owing to climate change and the need to transition towards clean, renewable energy sources, such as solar power. To incentivize this transition, they have introduced an array of support mechanisms, such as feed-in tariffs, tax credits, and direct subsidies, which reduces the financial burden on homeowners and businesses for installing solar panels. Along with this, numerous countries have also enacted aggressive renewable energy targets backed by supportive legislation, which is further driving the demand for solar PV inverters. These policies not only lower the upfront costs of solar installations but also enhance their economic viability over the long term. Such decisive actions from governments signal a robust commitment to renewable energy, thereby instilling confidence among consumers and investors and driving the market growth.

The rapid decline in product costs

The declining cost of solar PV inverters is another significant driver of market growth. As technology advances, the efficiencies of manufacturing processes improve, contributing to a reduction in the cost of raw materials and components. The rise of automation in manufacturing has also reduced labor costs and minimized human error, enhancing product reliability. Furthermore, the expanding scale of production due to increasing demand leads to economies of scale, which reduces the per-unit cost of solar PV

inverters. Moreover, solar energy is now becoming increasingly affordable for a wide array of consumers, from homeowners wanting to offset their electricity bills to businesses aiming to achieve sustainability goals. Lower costs are driving the widespread adoption of solar power systems and, by extension, the demand for solar PV inverters.

The increasing energy demand across the globe

The energy demand across the globe is surging due to rapid industrialization and urbanization activities. Traditional energy sources are limited and environmentally damaging, making it essential to find sustainable alternatives. Solar power, facilitated by solar PV inverters, provides a viable solution. Solar energy harnesses the sun's power, an abundant and renewable resource, to generate electricity. With the global shift towards electrification in sectors such as transport, heating, and cooling, the demand for electricity is set to grow exponentially. Solar power systems using PV inverters can meet this increased demand in a sustainable manner. From residential rooftops to commercial installations and utility-scale solar farms, the application of solar energy is expanding across the board. Thus, rising global energy demand is a key driver propelling the growth of the solar PV inverter market.

Solar PV Inverter Industry Segmentation:

IMARC Group provides an analysis of the key trends in each segment of the global solar PV inverter market report, along with forecasts at the global and regional levels from 2024-2032. Our report has categorized the market based on technology, voltage and application.

Breakup by Technology:

Central Inverters

String Inverters

Microinverters

Others

String inverters dominate the market

The report has provided a detailed breakup and analysis of the market based on the technology. This includes central inverters, string inverters, microinverters, and others. According to the report, string inverters represented the largest market segment.

String inverters are currently dominating the market as they have been the standard in the solar industry for many years, and their long-standing presence in the market has led to wide acceptance and trust in their technology. Furthermore, they offer a significant cost advantage over other types of inverters, such as microinverters and power optimizers. String inverters also have lower upfront costs, making them an attractive option for cost-conscious consumers. Apart from this, string inverters are incredibly efficient for larger, unshaded installations. They perform exceptionally well in conditions where solar panels receive uniform sunlight, making them a preferred choice for large residential, commercial, or utility-scale installations. Additionally, the recent development of multi-string inverters, which provide more flexibility and efficiency, is contributing to the market growth.

Breakup by Voltage:

1,000 – 1,499 V

> 1,500 V

> 1500 V dominates the market

The report has provided a detailed breakup and analysis of the market based on the voltage. This includes 1500 V. According to the report, > 1500 V represented the largest market segment.

The >1500V segment is dominating the market as it allows more solar modules to be connected in series in a string, reducing the number of strings needed. This reduction leads to fewer combiner boxes, fewer cables, and fewer connections, thereby resulting in significant balance of system (BOS) cost savings. Furthermore, it results in a lower current for the same power output, which reduces resistive losses in the system, leading to an overall increase in system efficiency. Additionally, the recent technological advancements in components, such as inverters, transformers, and switchgears, have made it safer and more reliable to operate at these higher voltages, such as > 1500V. Moreover, the implementation of favorable regulations and grid codes in many regions supports the adoption of higher voltage levels, further driving the trend towards >1500V systems.

Breakup by Application:

Utility Scale

Residential Scale

Small Commercial Scale
Large Commercial Scale
Industrial Scale

Utility scale dominate the market

The report has provided a detailed breakup and analysis of the market based on the application. This includes utility scale, residential scale, small commercial scale, large commercial scale and industrial scale. According to the report, utility scale represented the largest market segment.

Utility-scale solar projects are dominating the market as they outsize residential and commercial installations in terms of power generation capacity. Given their large scale, even a single utility-scale project can require hundreds or even thousands of inverters, thereby driving up demand in the inverter market. Furthermore, many countries are aggressively expanding their renewable energy capacity to meet climate goals by establishing utility-scale solar farms, which is further boosting the market growth. Apart from this, utility-scale projects offer economies of scale, as the per-unit cost of components, including solar PV inverters, decreases significantly with the scale of the project. This cost advantage makes utility-scale projects more financially attractive, thereby driving their prevalence. Moreover, recent advancements in technology have resulted in more efficient and reliable solar PV inverters that can handle the high power output of utility-scale projects.

Breakup by Region:

Asia Pacific
Europe
North America
Middle East and Africa
Latin America

Asia Pacific exhibits a clear dominance in the market, accounting for the largest solar PV inverter market share

The report has also provided a comprehensive analysis of all the major regional markets, which includes Asia Pacific, Europe, North America, Middle East and Africa, and Latin America. According to the report, Asia Pacific represented the largest market segment. According to the report, Asia Pacific represented the largest market.

The Asia Pacific region is dominating the solar PV inverter market due to the implementation of ambitious renewable energy targets and supportive government policies, driving large-scale installations of solar power systems. Furthermore, the region has a substantial and growing demand for electricity due to rapid industrialization, urbanization, and population growth. Solar power, facilitated by solar PV inverters, is viewed as a sustainable solution to meet this escalating energy demand. Additionally, the Asia Pacific region has a significant need for rural electrification. Countries with remote areas lacking grid infrastructure are turning towards solar power as a practical solution for electrification, thereby driving the demand for solar PV inverters. Moreover, the region's abundant sunshine provides excellent conditions for solar power generation, making solar energy a naturally preferred choice.

Competitive Landscape:

The key market players are significantly heavily in research and development (R&D) to introduce innovative products that offer higher efficiency, reliability, and better integration with energy storage systems. They are also developing smart inverters equipped with advanced features, such as predictive maintenance, remote monitoring and control, and grid support functions. Furthermore, companies are entering partnerships and collaborations with other industry players, research institutions, and technology firms to leverage shared resources and expertise. Additionally, they are pursuing mergers and acquisitions (M&A) strategies to increase their market share, expand their product portfolios, and strengthen their technological capabilities. Moreover, many leading companies are expanding their manufacturing capacities by setting up new production facilities or enhancing existing ones to meet the rising demand for solar PV inverters.

The report has provided a comprehensive analysis of the competitive landscape in the market. Detailed profiles of all major companies have also been provided. Some of the key players in the market include:

ABB Ltd
Schneider Electric SE
Siemens AG
Mitsubishi Electric Corporation
Omron Corporation
General Electric Company
SMA Solar Technology AG

Delta Energy Systems Inc.
Enphase Energy Inc.
SolarEdge Technologies Inc.
Huawei Technologies Co. Ltd
Kstar New Energy Co. Ltd
Sineng Electric Co. Ltd
Sungrow Power Supply Co Ltd
Tabuchi Electric Co. Ltd
TBEA Sunoasis Co. Ltd
Toshiba Corporation

Recent Developments:

In March 2022, ABB Ltd. concluded the sale of its solar inverter business to Italian inverter manufacturer FIMER SpA. With this move, ABB Ltd. intends to create new business opportunities for the solar inverter business under FIMER.

In June 2022, Schneider Electric SE launched two new solar power solutions, namely the Homaya Pro Solar-Hybrid Inverter and the Mobyia Original Solar Lantern, for communities that have little or no access to energy.

In April 2023, Siemens AG signed a deal with Lightsource bp to supply solar inverter stations.

Key Questions Answered in This Report

1. How big is the global solar PV inverter market?
2. What is the expected growth rate of the global solar PV inverter market during 2024-2032?
3. What are the key factors driving the global solar PV inverter market?
4. What has been the impact of COVID-19 on the global solar PV inverter market?
5. What is the breakup of the global solar PV inverter market based on the technology?
6. What is the breakup of the global solar PV inverter market based on the voltage?
7. What is the breakup of the global solar PV inverter market based on the application?
8. What are the key regions in the global solar PV inverter market?
9. Who are the key players/companies in the global solar PV inverter market?

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