

Solar Microinverter Market Report by Connectivity (Standalone, On-Grid), Component (Hardware, Software), Communication Channel (Wired, Wireless), Type (Single Phase, Three Phase), Application (Residential, Commercial, and Others), and Region 2024-2032

<https://marketpublishers.com/r/SA92FC242877EN.html>

Date: March 2024

Pages: 143

Price: US\$ 3,899.00 (Single User License)

ID: SA92FC242877EN

Abstracts

The global solar microinverter market size reached US\$ 311.9 Million in 2023. Looking forward, IMARC Group expects the market to reach US\$ 988.9 Million by 2032, exhibiting a growth rate (CAGR) of 13.3% during 2024-2032. The growing demand for enhanced efficiency and reliability, rising adoption of solar energy to reduce carbon footprint and maintain sustainability, and increasing popularity of individual panel optimization are some of the major factors propelling the market.

A solar microinverter is a compact electronic device that operates within a photovoltaic (PV) system. It converts the direct current (DC) generated by individual solar panels into alternating current (AC), which can be readily used for powering residential or commercial electrical systems. It can handle the output of multiple panels as compared to traditional string inverters. As it assists in providing monitoring capabilities and enabling real-time performance tracking of individual panels, the demand for solar microinverters is increasing around the world.

At present, the rising need to maximize energy yield and simplify maintenance processes in the solar energy industry is contributing to the growth of the market. In line with this, the increasing deployment of solar microgrids, along with the rising energy demand across various sectors across, is strengthening the growth of the market. Moreover, the growing demand for safe microinverters is positively influencing the

market. In addition, the rising awareness about environmental concerns and a desire to reduce carbon emissions among individuals around the world is offering lucrative growth opportunities to industry investors. Furthermore, governing agencies of various countries are encouraging the installation of renewable energy sources by offering several incentives and subsidies, which is supporting the growth of the market. Besides this, the rising focus on energy resilience and security is bolstering the growth of the market.

Solar Microinverter Market Trends/Drivers:

Rising adoption of solar energy

The rising adoption of solar energy due to the increasing demand for energy among the masses across the globe is contributing to the growth of the market. In line with this, there is a rise in the popularity of renewable energy sources, particularly solar power. Various industries are seeking cleaner and more sustainable energy alternatives that lower the environmental impact. Apart from this, solar microinverters play a crucial role in maximizing the energy output of solar panels by mitigating issues like shading or panel mismatches and ensuring optimal efficiency. Furthermore, this increased energy yield directly translates to higher returns on investment (ROI) for solar installations.

Increasing demand for enhanced efficiency and reliability

The rising demand for enhanced efficiency and reliability is supporting the growth of the market. Apart from this, various manufacturers are rapidly advancing in solar microinverter designs to enhance their efficiency and reliability. They are also creating microinverters that offer higher conversion efficiencies and enhance thermal management, that ultimately improves overall system performance. The reliability of microinverter systems is also enhanced as they operate independently and reduce the impact of a single point of failure. Besides this, people are rapidly installing these microinverters in residential places due to their reliability. In addition, the increasing demand for improved energy production and reduced maintenance costs is contributing to the growth of the market.

Growing popularity of individual panel optimization

Solar microinverters offer a distinct advantage as compared to traditional string inverters by enabling individual panel optimization. In line with this, these microinverters optimize the performance of each panel independently as compared to string inverters, which treat all panels in a string as a single unit. This ensures that even if one panel is

shaded, it does not affect the overall output of the system. In addition, this assists in providing higher energy production and increased return on investment (ROI). Furthermore, the rising adoption of solar microinverters, particularly in scenarios where shading or panel variability is a concern, is bolstering the growth of the market.

Solar Microinverter Industry Segmentation:

IMARC Group provides an analysis of the key trends in each segment of the global solar microinverter market report, along with forecasts at the global and regional levels from 2024-2032. Our report has categorized the market based on connectivity, component, communication channel, type and application.

Breakup by Connectivity:

Standalone

On-Grid

Standalone represents the largest market segment

The report has provided a detailed breakup and analysis of the market based on the connectivity. This includes standalone and on-grid. According to the report, standalone represented the largest segment. Standalone microinverters are directly attached to solar panels of individuals and enable each panel to function autonomously. They offer greater flexibility in system design and installation, which makes them suitable for various applications, from residential rooftops to complex commercial installations. They can provide real-time monitoring and optimization for each panel and enhance overall system efficiency and simplify maintenance. This connectivity approach aligns well with the trend toward decentralized energy solutions.

Breakup by Component:

Hardware

Software

Hardware accounts for the majority of the market share

The report has provided a detailed breakup and analysis of the market based on the component. This includes hardware and software. According to the report, hardware represented the largest segment. Hardware components comprise the physical elements that involve a microinverter unit, such as semiconductor devices, capacitors,

transformers, and thermal management systems. These components work cohesively to convert direct current (DC) generated by solar panels into usable alternating current (AC) for consumption. Hardware directly impacts the efficiency, reliability, and longevity of microinverter systems. High-quality hardware offers high stable energy production, reduces maintenance requirements, and increases customer satisfaction.

Manufacturers are continuously innovating in hardware design to enhance energy conversion efficiency, optimize thermal performance, and ensure long-term durability.

Breakup by Communication Channel:

Wired

Wireless

Wired dominates the market share

The report has provided a detailed breakup and analysis of the market based on the communication channel. This includes wired and wireless. According to the report, wired represented the largest segment. Wired communication involves the usage of physical cables, such as Ethernet or powerline communication, to transmit data between microinverters and monitoring systems. This method ensures reliable and real-time data exchange and enables comprehensive monitoring of the performance and overall system health of each panel. Wired communication offers greater stability and security as compared to wireless alternatives, as it is less susceptible to interference or signal loss. This reliability is essential for ensuring optimal energy production and addressing potential issues promptly.

Breakup by Type:

Single Phase

Three Phase

Single phase holds the biggest market share

The report has provided a detailed breakup and analysis of the market based on the type. This includes single phase and three phase. According to the report, single phase represented the largest segment. Single phase microinverters are designed to handle the power generated by a single-phase electrical system, which is commonly used in households and smaller businesses. These microinverters convert the direct current (DC) produced by individual solar panels into alternating current (AC) suitable for

immediate consumption or grid connection. In addition, they offer simplicity in installation and are well-suited for systems with a limited number of panels. They allow for easier integration into existing electrical setups and provide a cost-effective solution for those seeking to use solar energy.

Breakup by Application:

- Residential
- Commercial
- Others

Residential accounts for largest the market share

The report has provided a detailed breakup and analysis of the market based on the application. This includes residential, commercial, and others. According to the report, residential represented the largest segment. In residential applications, microinverters are integrated with solar panels of individuals to optimize energy production by mitigating shading and panel mismatch issues. This ensures that each panel operates independently and maximizes the overall system output. Residential users benefit from real-time monitoring capabilities offered by microinverters. These inverters allow individuals to track the performance of the system and identify any anomalies promptly. The modular design of microinverter systems makes them well-suited for residential installations of varying sizes. Additionally, the safety, scalability, and simplified maintenance offered by microinverters attract homeowners.

Breakup by Region:

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

Asia Pacific exhibits a clear dominance, accounting for the largest solar microinverter market share

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

share.

Asia Pacific held the biggest market share due to the increasing demand for energy to perform various tasks. In addition, favorable government initiatives and policies are bolstering the growth of the market in the region. Besides this, the growing environmental concerns, along with the decreasing solar panel costs, are offering a positive market outlook. In line with this, the rising adoption of solar energy solutions across various industries is supporting the growth of the market in the Asia Pacific region.

Competitive Landscape:

Various companies are investing in research and development (R&D) activities to innovate and develop advanced microinverter technologies. This includes improving energy conversion efficiencies, enhancing thermal management systems, and integrating smart features for better monitoring and control. In line with this, manufacturers are expanding their product portfolios to cater to different customer segments and applications. This includes offering microinverters of varying capacities and specifications to suit residential, commercial, and utility-scale installations. Besides this, key players are focusing on integrating advanced technologies, such as power optimizers, energy storage solutions, and data analytics, into their microinverter systems. These innovations enhance system performance, energy management, and user experience.

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 Asea Brown Boveri Ltd.
Chilicon Power, LLC
Enphase Energy Inc.
Altenergy Power System Inc.
SunPower Corporation
Darfon Electronics Corporation
Delta Energy Systems
Siemens AG
Delta Energy Systems (Germany) GmbH
Alencon Systems LLC
ReneSola Ltd.
Omnik New Energy Co. Ltd.

EnluxSolar Co. Ltd.
Sungrow Deutschland GmbH
Sensata Technologies, Inc.

Recent Developments:

In 2021, Enphase Energy, Inc, a global energy technology company and the world's leading supplier of microinverter-based solar and battery systems, launched the all-new, all-in-one Enphase Energy System with IQ8™ solar microinverters for customers in North America.

In 2023, Altenergy Power System Inc., the global leader in multi-platform solar MLPE technology, and OSW, Australian's largest Solar Distributor, announced a global distribution agreement, to positively impact the solar market and bring more products to customers across Europe and the United States.

In 2020, SunPower Corporation, a leading global solar technology and energy services provider, and Enphase Energy, Inc., a global energy technology company and the world's leading supplier of solar microinverters, announced a strategic partnership to produce the new Enphase Energized™ Maxeon AC Module, featuring a factory-integrated seventh-generation Enphase IQ™ microinverter.

Key Questions Answered in This Report

1. What was the size of the global solar microinverter market in 2023?
2. What is the expected growth rate of the global solar microinverter market during 2024-2032?
3. What are the key factors driving the global solar microinverter market?
4. What has been the impact of COVID-19 on the global solar microinverter market?
5. What is the breakup of the global solar microinverter market based on the connectivity?
6. What is the breakup of the global solar microinverter market based on the component?
7. What is the breakup of the global solar microinverter market based on communication channel?
8. What is the breakup of the global solar microinverter market based on the type?
9. What is the breakup of the global solar microinverter market based on the application?
10. What are the key regions in the global solar microinverter market?
11. Who are the key players/companies in the global solar microinverter market?

Contents

1 PREFACE

2 SCOPE AND METHODOLOGY

- 2.1 Objectives of the Study
- 2.2 Stakeholders
- 2.3 Data Sources
 - 2.3.1 Primary Sources
 - 2.3.2 Secondary Sources
- 2.4 Market Estimation
 - 2.4.1 Bottom-Up Approach
 - 2.4.2 Top-Down Approach
- 2.5 Forecasting Methodology

3 EXECUTIVE SUMMARY

4 INTRODUCTION

- 4.1 Overview
- 4.2 Key Industry Trends

5 GLOBAL SOLAR MICROINVERTER MARKET

- 5.1 Market Overview
- 5.2 Market Performance
- 5.3 Impact of COVID-19
- 5.4 Market Breakup by Connectivity
- 5.5 Market Breakup by Component
- 5.6 Market Breakup by Communication Channel
- 5.7 Market Breakup by Type
- 5.8 Market Breakup by Application
- 5.9 Market Breakup by Region
- 5.10 Market Forecast

6 SWOT ANALYSIS

- 6.1 Overview

- 6.2 Strengths
- 6.3 Weaknesses
- 6.4 Opportunities
- 6.5 Threats

7 VALUE CHAIN ANALYSIS

8 PORTER'S FIVE FORCES ANALYSIS

- 8.1 Overview
- 8.2 Bargaining Power of Buyers
- 8.3 Bargaining Power of Suppliers
- 8.4 Degree of Competition
- 8.5 Threat of New Entrants
- 8.6 Threat of Substitutes

9 MARKET BREAKUP BY CONNECTIVITY

- 9.1 Standalone
 - 9.1.1 Market Trends
 - 9.1.2 Market Forecast
- 9.2 On-Grid
 - 9.2.1 Market Trends
 - 9.2.2 Market Forecast

10 MARKET BREAKUP BY COMPONENT

- 10.1 Hardware
 - 10.1.1 Market Trends
 - 10.1.2 Market Forecast
- 10.2 Software
 - 10.2.1 Market Trends
 - 10.2.2 Market Forecast

11 MARKET BREAKUP BY COMMUNICATION CHANNEL

- 11.1 Wired
 - 11.1.1 Market Trends
 - 11.1.2 Market Forecast

11.2 Wireless

11.2.1 Market Trends

11.2.2 Market Forecast

12 MARKET BREAKUP BY TYPE

12.1 Single Phase

12.1.1 Market Trends

12.1.2 Market Forecast

12.2 Three Phase

12.2.1 Market Trends

12.2.2 Market Forecast

13 MARKET BREAKUP BY APPLICATION

13.1 Residential

13.1.1 Market Trends

13.1.2 Market Forecast

13.2 Commercial

13.2.1 Market Trends

13.2.2 Market Forecast

13.3 Others

13.3.1 Market Trends

13.3.2 Market Forecast

14 MARKET BREAKUP BY REGION

14.1 North America

14.1.1 Market Trends

14.1.2 Market Forecast

14.2 Europe

14.2.1 Market Trends

14.2.2 Market Forecast

14.3 Asia Pacific

14.3.1 Market Trends

14.3.2 Market Forecast

14.4 Middle East and Africa

14.4.1 Market Trends

14.4.2 Market Forecast

14.5 Latin America

14.5.1 Market Trends

14.5.2 Market Forecast

15 PRICE ANALYSIS

16 COMPETITIVE LANDSCAPE

16.1 Market Structure

16.2 Key Players

16.3 Profiles of Key Players

16.3.1 ABB Asea Brown Boveri Ltd.

16.3.2 Chilicon Power, LLC

16.3.3 Enphase Energy Inc.

16.3.4 Altenergy Power System Inc.

16.3.5 SunPower Corporation

16.3.6 Darfon Electronics Corporation

16.3.7 Delta Energy Systems

16.3.8 Siemens AG

16.3.9 Delta Energy Systems (Germany) GmbH

16.3.10 Alencon Systems LLC

16.3.11 ReneSola Ltd.

16.3.12 Omnik New Energy Co. Ltd.

16.3.13 EnluxSolar Co. Ltd.

16.3.14 Sungrow Deutschland GmbH

16.3.15 Sensata Technologies, Inc.

List Of Tables

LIST OF TABLES

Table 1: Global: Solar Microinverter Market: Key Industry Highlights, 2023 and 2032

Table 2: Global: Solar Microinverter Market Forecast: Breakup by Connectivity (in Million US\$), 2024-2032

Table 3: Global: Solar Microinverter Market Forecast: Breakup by Component (in Million US\$), 2024-2032

Table 4: Global: Solar Microinverter Market Forecast: Breakup by Communication Channel (in Million US\$), 2024-2032

Table 5: Global: Solar Microinverter Market Forecast: Breakup by Type (in Million US\$), 2024-2032

Table 6: Global: Solar Microinverter Market Forecast: Breakup by Application (in Million US\$), 2024-2032

Table 7: Global: Solar Microinverter Market Forecast: Breakup by Region (in Million US\$), 2024-2032

Table 8: Global: Solar Microinverter Market: Competitive Structure

Table 9: Global: Solar Microinverter Market: Key Players

List Of Figures

LIST OF FIGURES

Figure 1: Global: Solar Microinverter Market: Major Drivers and Challenges

Figure 2: Global: Solar Microinverter Market: Sales Value (in Million US\$), 2018-2023

Figure 3: Global: Solar Microinverter Market: Breakup by Connectivity (in %), 2023

Figure 4: Global: Solar Microinverter Market: Breakup by Component (in %), 2023

Figure 5: Global: Solar Microinverter Market: Breakup by Communication Channel (in %), 2023

Figure 6: Global: Solar Microinverter Market: Breakup by Type (in %), 2023

Figure 7: Global: Solar Microinverter Market: Breakup by Application (in %), 2023

Figure 8: Global: Solar Microinverter Market: Breakup by Region (in %), 2023

Figure 9: Global: Solar Microinverter Market Forecast: Sales Value (in Million US\$), 2024-2032

Figure 10: Global: Solar Microinverter Industry: SWOT Analysis

Figure 11: Global: Solar Microinverter Industry: Value Chain Analysis

Figure 12: Global: Solar Microinverter Industry: Porter's Five Forces Analysis

Figure 13: Global: Solar Microinverter (Standalone) Market: Sales Value (in Million US\$), 2018 & 2023

Figure 14: Global: Solar Microinverter (Standalone) Market Forecast: Sales Value (in Million US\$), 2024-2032

Figure 15: Global: Solar Microinverter (On-Grid) Market: Sales Value (in Million US\$), 2018 & 2023

Figure 16: Global: Solar Microinverter (On-Grid) Market Forecast: Sales Value (in Million US\$), 2024-2032

Figure 17: Global: Solar Microinverter (Hardware) Market: Sales Value (in Million US\$), 2018 & 2023

Figure 18: Global: Solar Microinverter (Hardware) Market Forecast: Sales Value (in Million US\$), 2024-2032

Figure 19: Global: Solar Microinverter (Software) Market: Sales Value (in Million US\$), 2018 & 2023

Figure 20: Global: Solar Microinverter (Software) Market Forecast: Sales Value (in Million US\$), 2024-2032

Figure 21: Global: Solar Microinverter (Wired) Market: Sales Value (in Million US\$), 2018 & 2023

Figure 22: Global: Solar Microinverter (Wired) Market Forecast: Sales Value (in Million US\$), 2024-2032

Figure 23: Global: Solar Microinverter (Wireless) Market: Sales Value (in Million US\$),

2018 & 2023

Figure 24: Global: Solar Microinverter (Wireless) Market Forecast: Sales Value (in Million US\$), 2024-2032

Figure 25: Global: Solar Microinverter (Single Phase) Market: Sales Value (in Million US\$), 2018 & 2023

Figure 26: Global: Solar Microinverter (Single Phase) Market Forecast: Sales Value (in Million US\$), 2024-2032

Figure 27: Global: Solar Microinverter (Three Phase) Market: Sales Value (in Million US\$), 2018 & 2023

Figure 28: Global: Solar Microinverter (Three Phase) Market Forecast: Sales Value (in Million US\$), 2024-2032

Figure 29: Global: Solar Microinverter (Residential) Market: Sales Value (in Million US\$), 2018 & 2023

Figure 30: Global: Solar Microinverter (Residential) Market Forecast: Sales Value (in Million US\$), 2024-2032

Figure 31: Global: Solar Microinverter (Commercial) Market: Sales Value (in Million US\$), 2018 & 2023

Figure 32: Global: Solar Microinverter (Commercial) Market Forecast: Sales Value (in Million US\$), 2024-2032

Figure 33: Global: Solar Microinverter (Other Applications) Market: Sales Value (in Million US\$), 2018 & 2023

Figure 34: Global: Solar Microinverter (Other Applications) Market Forecast: Sales Value (in Million US\$), 2024-2032

Figure 35: North America: Solar Microinverter Market: Sales Value (in Million US\$), 2018 & 2023

Figure 36: North America: Solar Microinverter Market Forecast: Sales Value (in Million US\$), 2024-2032

Figure 37: Europe: Solar Microinverter Market: Sales Value (in Million US\$), 2018 & 2023

Figure 38: Europe: Solar Microinverter Market Forecast: Sales Value (in Million US\$), 2024-2032

Figure 39: Asia Pacific: Solar Microinverter Market: Sales Value (in Million US\$), 2018 & 2023

Figure 40: Asia Pacific: Solar Microinverter Market Forecast: Sales Value (in Million US\$), 2024-2032

Figure 41: Middle East and Africa: Solar Microinverter Market: Sales Value (in Million US\$), 2018 & 2023

Figure 42: Middle East and Africa: Solar Microinverter Market Forecast: Sales Value (in Million US\$), 2024-2032

Figure 43: Latin America: Solar Microinverter Market: Sales Value (in Million US\$), 2018 & 2023

Figure 44: Latin America: Solar Microinverter Market Forecast: Sales Value (in Million US\$), 2024-2032

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