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Grid Forming Inverters Market By Type (Micro Inverters, Central Inverters, String Inverters) , By Power Rating (Below 50 KW, 50-100 KW, Above 100 KW) By Application (Wind Power Plants, Solar PV Plants, Electric Vehicles, Energy Storage System) : Global Opportunity Analysis and Industry Forecast, 2024-2033

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Abstracts

The grid forming inverters market was valued at $0.7 billion in 2023, and is projected to reach $1.5 billion by 2033, growing at a CAGR of 8.2% from 2024 to 2033.

Grid-forming inverter is a power electronic device used in renewable energy systems, designed to stabilize and support the electric grid by creating and regulating voltage and frequency. Unlike traditional grid-following inverters, which rely on the existing grid to maintain these parameters, grid-forming inverters can operate autonomously or in weak grid conditions, enabling them to contribute to grid stability during disruptions or blackouts. Their ability to mimic the behavior of conventional synchronous generators makes them a crucial technology for integrating more renewable energy sources, like solar and wind, into modern power grids.

Rise in penetration of renewable energy, such as solar and wind power, fosters the demand for advanced technologies like grid-forming inverters to stabilize voltage and frequency, especially in weak grids. Furthermore, with the increasing adoption of intermittent renewable energy sources, there is a growing need for advanced solutions to ensure grid stability, which acts as the key driving force of the global market. This is attributed to the fact that grid-forming inverters provide the capability to operate in weak grids or even blackouts, enhancing system reliability. According to a study published by

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the U.S. Department of Energy (DOE) in 2022, regions in the U.S. with high renewable energy penetration, such as California, are expected to face increased grid reliability challenges. The report highlights that grid-forming inverters can reduce blackout risks in areas with over 60% renewable energy integration. Moreover, rise in deployment of microgrids, especially in remote areas or for critical infrastructure, augments the demand for grid-forming inverters, which can operate independently or in isolated grid conditions. The market growth is further driven by increase in focus of many countries to meet carbon neutrality and energy transition targets. This can be achieved by grid-forming inverters, as they facilitate the integration of renewable energy into the grid, thereby reducing dependency on fossil fuels. For instance, the European Union’s 2020 report on 'Energy Transition and Climate Targets' noted that Europe plans to achieve a 55% reduction in greenhouse gas emissions by 2030 and carbon neutrality by 2050. This will require at least a 40% share of renewable energy in electricity consumption by 2030, necessitating enhanced grid support technologies like grid-forming inverters to stabilize the increasingly renewable-dominated grid. However, high cost associated with advanced technology and components used in grid-forming inverters, such as specialized control systems and power electronics, restrains the market growth. In addition, limited awareness of the benefits and capabilities of grid-forming inverters acts as the key deterrent factor of the global market. On the contrary, ongoing developments in power electronics and inverter technology are improving the efficiency, flexibility, and cost-effectiveness of grid-forming inverters. Such developments are expected to offer lucrative opportunities for the expansion of the global market during the forecast period.

The global grid forming inverters market is segmented into type, power rating, application, and region. By type, the market is classified into micro inverters, central inverters, and string inverters. On the basis of power rating, the market is categorized into below 50 KW, 50-100 KW, above 100 KW. Depending on application, it is fragmented into wind power plants, solar PV plants, electric vehicles, and energy storage system. Region wise, the market is studied across North America, Europe, Asia-Pacific, and LAMEA.

Key Findings

By type, the central inverters segment is expected to exhibit fastest growth from 2024 to 2033.

On the basis of power rating, the 50-100 KW segment is anticipated to lead throughout the forecast period.

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Depending on application, the energy storage systems segment is projected to dominate the grid forming inverters market by 2033.

Region wise, Asia-Pacific is likely to emerge as the most lucrative market for grid forming inverters during the forecast period.

Competition Analysis

Competitive analysis and profiles of the major players in the global grid forming inverters market include ABB, Schneider Electric, Siemens, GENERAL ELECTRIC, SMA Solar Technology AG, Huawei Technologies Co., Ltd., Delta Electronics, Inc., Enphase Energy, Hitachi Energy Ltd., and Eaton. These major players have adopted various key development strategies such as business expansion, new product launches, and partnerships to sustain the intense competition and gain a strong foothold in the global market.

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Installed Base analysis

Investment Opportunities

Product Life Cycles

Upcoming/New Entrant by Regions

Technology Trend Analysis

Consumer Preference and Product Specifications

New Product Development/ Product Matrix of Key Players

Patient/epidemiology data at country, region, global level

Surgical procedures data- specific or multiple surgery types

Additional company profiles with specific to client's interest

Additional country or region analysis- market size and forecast

Expanded list for Company Profiles

Historic market data

Key player details (including location, contact details, supplier/vendor network etc. in excel format)

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List of customers/consumers/raw material suppliers- value chain analysis

Market share analysis of players at global/region/country level

Product Consumption Analysis

SWOT Analysis

Key Market Segments

By Type

Micro Inverters

Central Inverters

String Inverters

By Power Rating

Below 50 KW

50-100 KW

Above 100 KW

By Application

Wind Power Plants

Solar PV Plants

Electric Vehicles

Energy Storage System

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By Region

- North America
- U.S.
- Canada
- Mexico
- Europe
- France
- Germany
- Italy
- Spain
- UK
- Rest of Europe
- Asia-Pacific
- China
- Japan
- India
- South Korea
- Australia
- Rest of Asia-Pacific
- LAMEA

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Brazil

South Africa

Saudi Arabia

Rest of LAMEA

Key Market Players

ABB

Schneider Electric

Siemens

GENERAL ELECTRIC

SMA Solar Technology AG

Huawei Technologies Co., Ltd.

Delta Electronics, Inc.

Enphase Energy

Hitachi Energy Ltd.

Eaton

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