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info@marketpublishers.com

# Power Converter Market By Type (AC to DC Converter, DC to AC Converter, DC to DC Converter, AC to AC Convertor), By Application (Renewable Energy, Consumer Electronics, Medical Equipment, Electric Vehicle, Others), By End-Use Industry (Residential, Commercial, Industrial): Global Opportunity Analysis and Industry Forecast, 2022 - 2032

https://marketpublishers.com/r/P35C60AE0E3FEN.html
Date: January 2024
Pages: 300
Price: US$ 3,570.00 (Single User License)
ID: P35C60AE0E3FEN

## Abstracts

The global power converter market was valued at $20.9 billion in 2022, and is projected to reach $44.6 billion by 2032, growing at a CAGR of 7.8% from 2022 to 2032.

A power converter is a device designed to transform electrical energy from one form to another. These devices play a crucial role in various industries by facilitating the efficient transfer and utilization of electrical power. Power converters are integral components in modern technology, serving diverse applications in industries such as electronics, energy, transportation, and more.

The power converter changes the voltage level of electrical energy. Voltage conversion is essential due to different devices and systems operating at varying voltage levels. For instance, electronic devices often require low-voltage direct current (DC) power, while the power generated and distributed in electrical grids is typically high-voltage alternating current (AC). Power converters bridge this gap by adjusting the voltage to meet the specific requirements of the target system.

Devices such as laptops, smartphones, and other gadgets often rely on switched-mode power supplies (SMPS) to convert the incoming AC power from wall outlets to the DC power needed for their operation. SMPS are efficient and compact, making them ideal

for powering electronic devices across a wide range of applications.

Renewable energy sources, such as solar and wind, heavily depend on power converters. The electricity generated from these sources is often inconsistent and needs to be converted to a more stable and usable form before integration into the grid. Power inverters, a type of converter, are commonly employed in these scenarios to convert DC power from solar panels or wind turbines into AC power compatible with the existing electrical infrastructure.

In industrial applications, power converters are employed to control and regulate electrical motors. Variable frequency drives (VFDs), a type of power converter, allow for the adjustment of the speed and torque of electric motors. This enhances the efficiency of industrial processes and contributes to energy savings by matching the power consumption of motors to the actual requirements of the system.

Electric vehicles (EVs) rely on power electronics to convert energy between the battery and the electric motor. DC-DC converters are used to match the voltage levels between the high-voltage battery pack and the lower-voltage systems within the vehicle. Moreover, the charging infrastructure for EVs involves power converters to adapt the electrical characteristics of the grid to the requirements of the vehicle's battery.

In power distribution, high-voltage direct current (HVDC) converters are employed to transmit electrical power over long distances with minimal losses. HVDC technology is particularly advantageous for interconnecting power grids, enabling efficient transfer of electricity between regions. This is crucial for balancing power supply and demand on a large scale and integrating renewable energy sources into the grid.

The integration of digital control technologies drives the growth of the power converter market. The integration of digital control technologies, such as digital signal processors (DSPs) and microcontrollers, is a key driver for advancements in power converter design. Digital control technologies provide a higher level of precision in managing power conversion processes. This precision allows for more accurate regulation of output voltage, current, and frequency, enhancing the overall performance of power converters.

Digital controllers enable the implementation of adaptive control strategies. These strategies dynamically adjust the converter's operating parameters in response to changes in load conditions, input voltage, or other factors. This adaptability enhances the converter's efficiency across varying operating conditions. Digital technologies enable seamless communication and connectivity features in power converters. This facilitates integration with supervisory control systems, data logging, and remote monitoring. The ability to communicate enhances the converter's functionality in smart grid applications and industry 4.0 environments.

The cost of advanced technologies and materials is expected to restrain the growth of the power converter market. High-efficiency converters often require the use of specialized materials, such as advanced semiconductors, high-grade alloys, and heat-resistant components. The higher cost of these materials directly contributes to the overall production cost of the converters. Utilizing advanced manufacturing processes, which are often necessary for high-efficiency converters is expensive. Companies need to invest in expensive machinery and facilities to ensure the precision and quality required for these technologies.

Achieving economies of scale is challenging for high-efficiency converters, especially if initial production volumes are low. The cost per unit remains high until production reaches a level where the fixed costs are spread across a larger number of units. Transitioning from traditional to high-efficiency converter technologies involves costs related to retraining the workforce, updating facilities, and adapting existing manufacturing processes. These transitional costs pose financial challenges for companies.

The power converter market is segmented into type, application, end-use industry, and region. On the basis of type, the market is classified into AC to DC converter, DC to AC converter, DC to DC converter, and AC to AC converter. On the basis of the application, the market is divided into renewable energy, consumer electronics, medical equipment, electric vehicles, and others. On the basis of the end-use industry, the market is divided into residential, commercial, and industrial. Region-wise, the market is studied across North America, Europe, Asia-Pacific, and LAMEA.

On the basis of type DC to AC converter is the fastest growing segment in power converter market representing the CAGR of 8.5%. Renewable energy sources, such as solar panels and wind turbines, typically generate DC power. To use this energy for household appliances and grid integration, inverters are employed to convert the DC power into AC. These inverters often produce a pure sine wave output to ensure compatibility with sensitive electronic equipment.

By application consumer electronics segment was the highest revenue converter in power converter growing with the CAGR of 7.5% to the market. power converters also address variations in the frequency of the alternating current (AC) supplied by electrical outlets. While most consumer electronics are designed to operate at a frequency of 50 or 60 Hertz, discrepancies may exist in different regions. Power converters can harmonize the frequency to match the specifications of the electronic device, preventing potential issues related to the power supply frequency.

By region Aisa-Pacific is the fastest growing segment in the power converter market. Governments and regulatory bodies in the Asia-Pacific have also recognized the need for standardization to facilitate cross-border trade and technology exchange. Efforts are underway to align electrical standards in some cases, and regional collaborations aim to address the challenges posed by diverse power infrastructures. Harmonizing these standards can potentially reduce the reliance on power converters, promoting efficiency and sustainability.

India follows a 230-volt system with a frequency of 50 Hz. The country experiences a dynamic technology landscape, with a burgeoning market for consumer electronics and IT products. Power converters are widely used in India, not only to accommodate international devices but also to address voltage fluctuations in different regions. The government's initiatives for electrification and smart cities further contribute to the demand for reliable power solutions.

In addition, the report covers profiles of key industry participants such as ABB Group, Siemens, Schneider Electric, Delta Electronics, Inc, Emerson Electric, Eaton, General Electric (GE), Mitsubishi Electric Corporation, Texas Instruments, and Vicor Corporation.

**Key Market Trends:**

By type, the DC to DC converter segment dominated the power converter market and accounted for half of the market shares in 2022.

By application, the consumer electronics segment dominated the power converter market representing 7.5% of CAGR to the market.

By end-use industry, the industrial segment was the highest revenue contributor accounting for more than half of the market share in 2022.

By region, Asia-Pacific is the fastest growing region representing 8.3% of CAGR to the market.

## Key Benefits For Stakeholders

This report provides a quantitative analysis of the market segments, current trends, estimations, and dynamics of the power converter market analysis from 2022 to 2032 to identify the prevailing power converter market opportunities.

The market research is offered along with information related to key drivers, restraints, and opportunities.

Porter's five forces analysis highlights the potency of buyers and suppliers to enable stakeholders make profit-oriented business decisions and strengthen their supplier-buyer network.

In-depth analysis of the power converter market segmentation assists to determine the prevailing market opportunities.

Major countries in each region are mapped according to their revenue contribution to the global market.

Market player positioning facilitates benchmarking and provides a clear understanding of the present position of the market players.

The report includes the analysis of the regional as well as global power converter market trends, key players, market segments, application areas, and market growth strategies.

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Patient/epidemiology data at country, region, global level

Additional company profiles with specific to client's interest

Additional country or region analysis- market size and forecast

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Expanded list for Company Profiles

Historic market data

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

SWOT Analysis

Volume Market Size and Forecast

**Key Market Segments By Type AC to DC Converter**

DC to AC Converter

DC to DC Converter

AC to AC Convertor

By Application Renewable Energy

Consumer Electronics

Medical Equipment

Electric Vehicle

Others

By End-Use Industry Residential

Commercial

Industrial

By Region

North America U.S.

Canada

Mexico

Europe Germany

UK

France

Italy

Spain

Rest of Europe

Asia-Pacific China

Japan

India

South Korea

Australia

Rest of Asia-Pacific

LAMEA Latin America

Middle East

Africa

Key Market Players

ABB Group

Siemens AG

Schneider Electric

Delta Electronics

Emerson Electric

Eaton Corporation

General Electric

Mitsubishi Electric

Texas Instruments Inc.

Vicor Corporation

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