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Automotive DC-DC Converter Market Assessment, By Propulsion [Battery Electric Vehicle, Fuel Cell Electric Vehicle, Plug-in Hybrid Electric Vehicle, Others], By Product Type [Isolated, Non-Isolated], By Vehicle [Passenger Cars, Commercial Vehicle, Others], By Voltage [3V-14V, 15V-35V, 36V-75V, >75V], By Sales Channel [OEM, Aftermarket], By Region, Opportunities and Forecast, 2017-2031F

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Abstracts

The global automotive DC-DC converter market is projected to witness a CAGR of 9.64% during the forecast period 2024-2031, growing from USD 7.1 billion in 2023 to USD 14.83 billion in 2031. The market has experienced significant growth in recent years and is expected to maintain a strong pace of expansion in the coming years.

The rapid electrification of the automotive industry is adding new elements to the market dynamics. It includes chargers, batteries, and converters. The DC-DC converter is a crucial part of EV functioning and hence grows with the increased adoption of electric and hybrid vehicles all around the world. The leading EV brands are constantly upgrading their power converter technology. Whether it's increasing the voltage levels or transferring a specific amount of power to several automotive applications, the DC-DC converter plays its part in various applications. An ideal DC-DC converter converts power according to the auxiliary loads with different power needs. The growth of electric vehicles has also transformed power-converting technology with different voltage and power supply segments. Hence, the EV equipment and component manufacturers are also scaling up their production to decrease the gap between them and EV production units.

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For instance, in May 2023, Delta-Q Technologies Corporation announced that the company reached its absolute production level of a mid-power electric vehicle charger along with a 500 W DC-DC converter. XV3300, a 3.3kW battery charger powers the vehicle's auxiliary loads. These include ignition, power steering, ABS, lamps, infotainment, and air conditioning.

Energy Efficient Converters and Usage of Advanced Material to Trend in Global Market

The latest technological advancements in global automotive DC-DC converter drive the market growth. These technology-based upgrades involve boosting the power conversion rate while delivering power supply as required. EV component manufacturers are shifting from silicon-based solutions to power-semiconductor technologies to utilize wide bandgap (WBG) materials. These involve silicon carbide (SiC) and gallium nitride (GaN). While SiC enhances the power density of an electronic system, it also lowers the overall weight, size, and cost. Hence, SiC is being used in converters at a strict size. Furthermore, GaN boosts the overall efficiency during power conversion. Integration of these elements makes the converters fast, efficient, and highly functional. Hence, it is adopted as a silicon substitute in high-efficiency voltage converters.

For instance, in September 2023, Vanner Inc. launched serial production of a new DC-DC converter with SiC (Silicon Carbide) technology. The company has launched this new range of DC-DC converters with silicon carbine-solid state switching, delivering improved electrical efficiency.

Higher Adoption of Hybrid and Electric Vehicles to Transform the Market

The rising fuel prices, increasing EV range and enhanced efficiency increase demand for EVs and HEVs. Government authorities are also trying to limit vehicular emission to the minimum and are subsidizing and promoting the usage of electric vehicles. These factors positively impact the overall electric vehicle industry and the component markets. With new EV technologies developing, the power chargers and converters are also becoming highly efficient with very little power consumption. Some developments in DC-DC converters include a wider input range, ultra-low power consumption, and low maintenance. These converters offer functions like remote and battery-free operations, asset monitoring, and IoT integration.

For instance, in January 2024, Onsemi (ON Semiconductor Corporation) introduced the

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DC SiC power modules to speed up EV charging. It includes a high-power one-way DC-DC converter with the new SiC PIMs. The converter reduces wasted energy and increases overall vehicle charging efficiency.

Government Supporting EV Manufacturers to Further Drive the Market Growth

The government's focus on transitioning transportation measures allows it to invest and collaborate with private companies. Public-private partnerships (PPP) between the government and EV component manufacturers also help drive market growth. Furthermore, the government's subsidies, tax cuts, and technological support are also garnering industrial expansion. New companies with advanced DC-DC converters that support faster charging and lower energy waste benefit from these government schemes. The increased production line and strong supply chain are some outcomes of government aid to the respected industry.

In February 2023, the White House announced the implementation of President Biden's Build America, buy America requirements, which will encourage companies to invest domestically in EV charging component manufacturing, putting American workers and businesses ahead of the competition and ahead of the world in a critical sector while providing a sensible transitional period for companies transitioning to onshore, complex supply chains.

Higher Efficiency and Safety Dynamics put Isolated DC-DC Converter on the Top

Based on power supply, isolated DC-DC converters perform significantly better than non-isolated converters. Better power supply, streamlined delivery, and multifunctional application make isolated DC-DC converters a better option for electric vehicles. Electric vehicles include different auxiliary loads that need to be powered with a specific power supply. The converter also provides stability and independence to the input voltage. The converter also enhances safety and limits the risk of electric shocks while protecting the vehicle's crucial electronics. Furthermore, popular electric vehicle manufacturers are adopting isolated DC-DC converters for their multifunctional applications.

For instance, in November 2023, CUI Inc, a Bel group company introduced a series of isolated DC-DC converters named PGNM-S and PGNP-S, specialized for EV charging and industrial electronics applications. The series offers 6000 VAC isolation with 1:1 input voltage and is EN/BS EN / UL 60601-1 certified.

Asia-Pacific Dominates Automotive DC-DC Converter Market

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Electric vehicle manufacturing along with EV sales are growing in the Asia-Pacific region. While China expands its EV manufacturing space, Indian automotive giants upgrade their vehicles with hybrid and electric technology. The rising economic activities in India and China are increasing the purchasing power and hence higher EV adoption can be witnessed in the region. New startups and EV component industries are also building the base for the expansion of the overall EV industry. Supportive government policies including subsidies and financial incentives are also helping the market growth in the region. The authorities also help the native brands in their research and development programs.

For instance, in October 2023, Toyota Motor Corporation announced the launch of its bZ4X BEV in India. The launch is expected to be in 2024 with the advanced DC-DC converter. By combining the on-board charger with the necessary DC-DC converter for BEV. It is 23% smaller and 17% lighter than mounting the two separately.

Future Market Scenario (2024 – 2031F)

The increasing demand for electric and hybrid vehicles is expected to drive the automotive DC-DC converter market.

The transition from ICE propulsion to efficient electric propulsion is anticipated to transform the DC-power conversion technology.

EV manufacturers are adding safety and security layers to the power chargers and converters. This is expected to propel the market expansion.

The application of silicon-based materials such as SiC and GaN at a specific rate helps the market grow exponentially.

Key Players Landscape and Outlook

The competitive landscape for automotive DC-DC converters involves OEMs and aftermarket players. Major players focus on improving their technology, making the converter flexible enough to integrate with technologies like IoT and machine learning. Furthermore, partnerships and tenders with leading EV manufacturers are also factors that major players focus on. Brands also work on high power density while delivering flexibility and performance. It also includes an increased number of auxiliary power

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connecter options such as fusing for ELAC.

In November 2023, Borg-Warner Automotive Inc. extended its combined inverter and DC/DC converter (CIDD) supply contract with a major European OEM. The technology is used for managing electric drive and accessory systems. Furthermore, the technology is also used in OEM's all-wheel drive B and C segment hybrid applications.

In February 2023 TDK Corporation introduced TDK-Lambda PH1200A280 full-brick DC-DC converter with a 200-425V input and 94% efficiency. The multipurpose converter can be used for industrial usage as well.

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