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Automotive HVAC Market Assessment, By Components [Compressors, Condensers, Dryer, Expansion Valve, Evaporator, Others], By Vehicle Type [Passenger Vehicles, Commercial Vehicles], By Technology [Automatic, Manual], By Distribution Channel [OEMs, Aftermarket], By Region, Opportunities and Forecast, 2017-2031F

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Abstracts

Global automotive HVAC market size was valued at USD 55.65 billion in 2023, expected to reach USD 97.06 billion in 2031, with a CAGR of 7.2% for the forecast period between 2024 and 2031. The global automotive HVAC (heating, ventilation, and air conditioning) market is witnessing dynamic growth propelled by key drivers and transformative trends. The increasing demand for comfort and personalized climate control within vehicles is a primary driver, with consumers prioritizing advanced HVAC systems. Moreover, stringent regulations addressing vehicle emissions and fuel efficiency are encouraging the integration of energy-efficient HVAC technologies. The rising trend of electric vehicles further accentuates the importance of efficient HVAC systems to optimize electric vehicle range and performance. Innovative features such as automatic climate control, air purification systems, and smart connectivity shape consumer preferences. Additionally, the market is witnessing advancements in refrigerants and materials, contributing to eco-friendly and sustainable HVAC solutions.

With the automotive industry's continued focus on connectivity and autonomous driving, the integration of intelligent HVAC systems capable of adapting to occupants' preferences is becoming a notable trend. As the global automotive HVAC market evolves, the intersection of comfort, energy efficiency, and technological innovation defines its trajectory, promising a future where vehicle climate control is seamlessly

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integrated and environmentally conscious. For example, Sanden has developed compact HVAC units that are highly efficient and quiet by utilizing in-house developed high-performance heat exchangers and high-efficiency blowers. These HVAC units are designed to provide high capacity and quiet operation, and are suitable for various types of vehicles, including passenger cars, heavy-duty trucks, and construction equipment vehicles. The compact design of Sanden's HVAC units contribute to improving fuel consumption and reducing CO2 emissions, making them an environmentally friendly option.

For example, in October 2023, Eberspaecher unveiled the AC135, a new air-conditioning system designed for hybrid, battery-electric, and conventional buses. The system is expected to cater to the increasing demand for sustainable public transport solutions in smart cities. The AC135 offers comfort in buses with all drive types and contribute to clean urban mobility.

Technological Advancements

The automotive HVAC market is undergoing significant technological advancements to meet the evolving demands of consumers and regulatory requirements. Advanced HVAC systems now integrate intelligent sensors for real-time monitoring, enabling precise temperature control and energy efficiency. Moreover, the emergence of smart climate control systems, often linked with vehicle connectivity features, allows for personalized and adaptive thermal comfort. Integration of eco-friendly refrigerants and materials reflects a commitment to sustainability. Additionally, innovations in air purification technologies contribute to improved interior air quality. These technological strides enhance the driving experience by providing optimal comfort and align the automotive industry with global trends focused on energy efficiency, environmental sustainability, and intelligent connectivity.

For example, in October 2022, Gentherm announced to supply ClimateSense on the 2024 Cadillac CELESTIQ. Gentherm will supply its ClimateSense system for the 2024 Cadillac CELESTIQ, making it the first vehicle to feature this advanced four-zone microclimate system as standard equipment. The system includes 33 unique microclimate devices, advanced airflow technologies, and rapid heating and cooling, allowing each occupant to personalize their comfort while conserving electrical energy and increasing driving range.

Growing Demand for Premium Vehicles

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The market is experiencing a growing demand propelled by the increasing popularity of premium vehicles. Consumers opting for luxury and high-performance vehicles prioritize advanced features, including sophisticated HVAC systems that offer superior comfort and cutting-edge technology. Premium vehicles often come equipped with automatic climate control, air quality sensors, and advanced ventilation systems, setting higher expectations for the HVAC capabilities. The surge in demand for premium vehicles, driven by rising disposable incomes and aspirational purchasing, contributes significantly to the growth of the automotive HVAC market. Manufacturers are responding by incorporating innovative technologies to meet the discerning needs of consumers seeking an elevated and luxurious driving experience.

For example, in April 2023, the Kia EV9 introduced an advanced thermal system, including a heat pump, climate control, and defrost or deicing features. It features a user-friendly climate control panel, improved roof vents, and two independent climate control systems, allowing separate climate zones for the driver, front passenger, and rear passengers. The front and first-row seats are standardly ventilated, heated, and more efficient due to new wiring. The system aims to enhance comfort and convenience for all occupants.

Adoption of Eco-Friendly Refrigerants

The global automotive HVAC market is experiencing a notable shift towards the adoption of eco-friendly refrigerants, driven by environmental concerns and regulatory initiatives. Traditional refrigerants, such as hydrofluorocarbons (HFCs), contribute to greenhouse gas emissions and ozone depletion. In response, the HVAC industry is transitioning to more sustainable alternatives, including hydrofluoroolefins (HFOs) and natural refrigerants like carbon dioxide and hydrocarbons. These eco-friendly refrigerants align with international efforts to combat climate change and comply with stringent environmental regulations. The shift represents a commitment by automotive HVAC manufacturers to reduce the carbon footprint of their systems, offering consumers energy-efficient and environmentally responsible solutions for heating, ventilation, and air conditioning in both automotive and residential applications.

Rising Demand for Thermal Comfort

The global automotive HVAC market is witnessing a rising demand driven by the growing emphasis on thermal comfort within vehicles. Consumers increasingly prioritize vehicles equipped with advanced heating, ventilation, and air conditioning (HVAC) systems to create a comfortable and personalized interior climate. The demand is

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fueled by factors such as longer commuting times, road trips, and a general dezire for a pleasant driving experience. Manufacturers are responding by incorporating innovative features like dual-zone climate control, seat heating and cooling, and efficient air distribution systems. As the automotive industry places a premium on occupant well-being, the surge in demand for thermal comfort solutions underscores the pivotal role that HVAC systems play in enhancing the overall driving experience globally.

For example, in July 2023, Marelli introduced its new integrated Thermal Management Module (iTMM) for electric vehicles, aiming to enhance efficiency, safety, and driving range. This innovative module enables the consolidation of the vehicle's various thermal circuits into a single component, leading to a more effective thermal management system. Specifically, it focuses on optimizing the management of e-powertrain thermal system, battery thermal system, and cabin thermal system, which are crucial for reducing energy consumption and improving overall efficiency.

Government Regulations

Government regulations play a crucial role in shaping the global automotive HVAC market. Stringent emission standards and fuel efficiency requirements imposed by various governments drive the integration of energy-efficient HVAC technologies in vehicles. Regulatory bodies worldwide are increasingly focusing on minimizing the environmental impact of automotive HVAC systems by promoting the use of eco-friendly refrigerants and materials. Additionally, safety standards encompassing thermal comfort within vehicles contribute to the development of advanced HVAC features. As governments continue to prioritize environmental sustainability and occupant well-being, automakers are compelled to adhere to these regulations, fostering innovation and advancements in the automotive HVAC market to meet evolving standards and compliance requirements.

For instance, the Ministry of Road Transport and Highways (MoRTH) has directed that air conditioning systems must be installed in the cabins of N2, and N3 category motor vehicles manufactured from January 1, 2025. The draft notification, dated July 10, specify that the performance testing of the air-conditioned cabins should adhere to the IS 14618:2022 standard, as amended from time to time.

Impact of COVID-19

The global automotive HVAC market faced significant challenges due to the impact of the COVID-19 pandemic. The widespread disruptions in supply chains, labor shortages,

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and a temporary halt in construction activities resulted in a slowdown in HVAC installations across various sectors. With economic uncertainties leading to reduced consumer spending, both residential and commercial demand for HVAC systems experienced a downturn. Additionally, the pandemic-induced focus on indoor air quality prompting a reassessment of HVAC system requirements. However, as economies gradually recover and businesses adapt to new norms, the automotive HVAC market is showing resilience. The increased awareness of indoor air quality and the drive for energy-efficient solutions are expected to shape the post-pandemic recovery of the global automotive HVAC market.

Key Player Landscape and Outlook

The global automotive HVAC market features a competitive landscape with key players influencing its outlook. Renowned companies such as Johnson Electric and Denso Corporation hold significant market shares, leveraging their expertise to innovate and offer advanced HVAC solutions. Continuous research and development, strategic partnerships, and a focus on sustainability characterize the outlook. As the industry evolves towards energy-efficient and environmentally friendly solutions, these key players play a pivotal role in shaping the future of HVAC technology. The increasing emphasis on smart and connected systems aligns with their commitment to meeting the diverse demands of consumers, contributing to a dynamic and competitive global HVAC market.

For instance, in September 2023, Denso Corporation unveiled 'Everycool,' an advanced cooling system for commercial vehicles, which was available for purchase from December in Japan through Denso Solution Corporation. The product is designed to improve cooling efficiency, reduce environmental impact, and enhance driver comfort and energy efficiency, especially when the vehicle's engine is not running.

For instance, in August 2023, MAHLE, an automotive supplier, announced its intention to sell its thermostat business to the industrial and investment holding company ADMETOS. The two companies have signed a contract to this effect at the beginning of August. ADMETOS plans to take over the development and production of thermostats, which involves approximately 600 employees across six countries. MAHLE's decision to sell the thermostat business is part of its new strategy, which focuses on electrification, thermal management systems, and cost leadership in components for efficient, environmentally friendly combustion engines.

For instance, in July 2022, Wabtec Corporation secured a deal to furnish 56 new

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Stadler trains, operated by the Metropolitan Atlanta Rapid Transit Authority (MARTA), with cutting-edge heating, ventilation, and air conditioning (HVAC) units. These state-of-the-art systems are set to ensure a comfortable commute for passengers, particularly during the hot and humid summers in Atlanta.

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