Automotive Thermal System Market Assessment, By Vehicle Type [Passenger Car, Commercial Vehicles], By Propulsion [Internal Combustion Engine, BEV], By Application [HVAC, Powertrain Cooling, Battery Thermal Management System, Others], By Region, Opportunities and Forecast, 2018-2032F

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Report description:

Global automotive thermal system market is projected to witness a CAGR of 3.43% during the forecast period 2025-2032, growing from USD 41.94 billion in 2024 to USD 54.95 billion in 2032F. The automotive thermal system industry is growing steadily with extensive demand for electric and hybrid vehicles to advanced thermal management for battery performance and safety. Strict emissions regulations are compelling original equipment manufacturers to create efficient thermal solutions, with increasing customer demands for advanced comfort features such as intelligent climate control systems contributing to industry growth.
As a key element in contemporary vehicles, the systems provide optimum temperature control for engines, batteries, and cabin climate under various operating conditions. Technological innovation is remapping the market with intelligent thermal management systems, lightweight materials, and green refrigerants. Autonomous and connected mobility is launching new prospects where such platforms require accurate thermal management for performance electronics and sensor arrays. Sustainability remains a primary focus, with car manufacturers investing in energy-efficient technology and future-generation thermal solutions to address global environmental targets. Industry growth is also spurred by a growing emphasis on vehicle electrification and digitalization, which highlights the central role of thermal management in automotive innovation.
Companies in the auto thermal system market are collaborating to embed technological innovation and are considering shifting consumer behavior for next-generation mobility solutions.
For instance, in April 2024, Vitesco Technologies Group AG, a leading electrification solutions provider spun off from Continental, teamed up with Sanden Corporation (Sanden International (Europe) GmbH) to develop an Integrated Thermal Management System for BEVs. Showcased at the 45th Vienna Motor Symposium, the system combines Sanden's compact propane-based refrigerant unit with Vitesco's coolant distribution system, featuring pumps, multi-port valves, and sensors. The building blocks of

the coolant unit are the coolant pumps and Coolant Flow Control Valves (CFCV) plus sensors. Depending on the application, the coolant valve can have between 5 and 13 ports to connect heat sinks and heat sources.

Growing Demand for New Systems Boosts the Market

The automotive thermal systems industry is growing as the demand for sophisticated temperature control in next-generation vehicles grows. The transition to electric and hybrid vehicles is a major driver of growth since these cars require high-tech thermal management in terms of battery efficiency and cabin. Stricter emissions regulations force manufacturers to implement new cooling technology, with customers demanding premium climate control capability.

Trends like autonomous driving and vehicle connectivity are creating new opportunities, with thermal systems playing a critical part in maintaining sensitive electronics at their best state. Car manufacturers are responding with innovative, energy-savvy solutions that align with the sustainability agenda. This growing demand for next-generation thermal management drives strong market growth throughout the automotive supply chain.

For instance, in January 2023, Grayson Thermal Systems disrupted car efficiency with its Vehicle Thermal Management System (VTMS). This cutting-edge technology combines battery thermal management, heat pump, and air conditioning into one efficient compact system with substantial weight savings and maximized driving range. Engineered for two years across R&D centers in Birmingham and the Czech Republic, VTMS also features waste heat recycling and electric motor cooling for improved performance. Two models have been introduced: double-decker electric buses and commercial vehicles, including off-highway usage. As the demand for cleaner transportation options continues to rise, VTMS is expected to draw significant sales while changing thermal management benchmarks in electric vehicles.

For instance, in September 2023, Mitsubishi Heavy Industries, Ltd. Thermal Systems introduced the TEJ35GAM, an electrically powered transport refrigeration unit for small and medium-sized trucks in Japan. Ryoju Coldchain (RCC) distributes the unit, which comes equipped with a heat-pump heating system to utilize ambient heat for energy efficiency and a multi-zone temperature control system to support varied cargo requirements.

Innovative Thermal Systems Drive Demand

The vehicle thermal system industry is experiencing revolutionary growth as innovative technologies redefine vehicle temperature control. Sophisticated thermal solutions are proving to be critical, especially for electric and hybrid vehicles, where thermally precise battery management enables best-in-class performance and life. Car manufacturers are making intelligent climate control systems a top priority to respond to increasing consumer expectations for comfort and convenience.

Advances in smart thermal management, such as predictive cooling algorithms and lightweight materials, are making energy more efficient while enabling sustainability goals. The integration of innovations is important as vehicles become automated with autonomous capabilities and connected features, necessitating strong thermal protection for sensitive electronic components. With ongoing advances in technology revolutionizing the sector, next-generation thermal systems are becoming a major differentiator in contemporary auto design.

For instance, in June 2023, ZF Friedrichshafen AG revealed an advanced thermal management system for electric vehicles, one that promises to dramatically boost range and efficiency, especially under cold weather conditions. The advanced system maximizes the electric drivetrain, including such components as power electronics, a motor, and a reduction gearbox based on leading-edge 800-volt silicon carbide technology. By maximizing thermal management, ZF's technology has the potential to increase the range of electric vehicles by as much as one-third under winter conditions.

Passenger Vehicles Acquire the Highest Market Share

The passenger car market leads the auto thermal system industry, fueled by growing consumer preference for improved performance and comfort. As personal mobility needs change, automakers add advanced climate control technologies and optimized thermal management solutions to help their products stand out. The growth of electric passenger vehicles has additionally spurred demand, with advanced battery cooling systems being a key factor in purchase decision-making.

Advanced features such as zone temperature control and energy-saving heat pumps are becoming more commonplace in contemporary passenger cars, mirroring consumer demands for better cabin climates. Tightening emissions standards keep manufacturers continuing to maximize thermal efficiency across gasoline, hybrid, and electric vehicles. Since passenger cars are the biggest addressable market, thermal system development focuses on satisfying the varied demands of personal mobility consumers globally.

For instance, in July 2023, Marelli Holdings Co., Ltd. introduced an industry-leading integrated Thermal Management Module (iTMM) for electric vehicles, consolidating several thermal circuits into one high-efficiency module. The technology elevates the overall thermal management system to improve energy efficiency, safety, and range by up to 20%. By optimizing temperature control across battery, motor, and cabin systems, the iTMM helps extend EV range while improving performance and reliability. This breakthrough highlights how integrated thermal solutions can address key challenges in electric mobility.

Asia-Pacific Dominates the Market

The Asia-Pacific automobile thermal system market dominates the market growth, due to rapid car electrification and the expansion of manufacturing bases. Chinese mainstream adoption of electric vehicles and Japanese advanced competence in thermal management technologies provide an effective growth accelerator, supported by increasing Southeast Asia markets churning out swelling demands.

Suppliers are placing primary emphasis on top-of-the-range thermal systems due to varied climates and demanding pollution standards. Government policies supporting clean mobility and regional production of thermal components further solidify Asia-Pacific's market dominance. The region's focus on global battery suppliers and auto OEMs reduces innovation cycles, placing them at the forefront of next-generation thermal system innovation. With its concurrent manufacturing scale and technological capability, Asia-Pacific leads the global automotive thermal management market.

For instance, in 2023, MIND Electric Appliances Co., Ltd. secured two global HVAC platform projects from BMW AG, becoming the first Chinese supplier awarded BMW's international air conditioning business. MIND will establish production bases in Shenyang, China, and Dingolfing, Germany, to support this expansion, enhancing its global supply chain. Additionally, the company is investing USD 27.6 million in a 55-acre automotive components facility in Shenbei New District, expected to generate USD 48.3 million annual revenue post-SOP and USD 138 million within three years. The project will create 200+ jobs, boosting local automotive manufacturing and reinforcing MIND's leadership in thermal systems.

Future Market Scenario (2025 – 2032F)

- EV proliferation will demand advanced battery thermal systems. Solid-state battery adoption will revolutionize thermal management requirements.
- AI-driven predictive systems will optimize energy use dynamically. Vehicle-to-cloud integration will enable remote thermal management.
- Bio-based refrigerants will replace traditional coolants industry-wide. Lightweight composites will enhance efficiency without compromising performance.
- Localized production will rise to meet regional EV adoption rates. Emerging markets will develop indigenous thermal solution ecosystems.

Key Players Landscape and Outlook

The automotive thermal system market features intense competition among established players and agile innovators. Leading suppliers are investing heavily in R&D to develop next-generation thermal management solutions, particularly for electric vehicles. Strategic partnerships between automotive OEMs and thermal system specialists are becoming commonplace, enabling technology sharing and faster commercialization.

Differentiation centers on energy-efficient designs, lightweight materials, and smart thermal controls with predictive capabilities. Suppliers are expanding their global footprints through acquisitions and local production facilities to better serve regional markets. The competitive environment rewards those who balance cost optimization with cutting-edge performance, as automakers demand increasingly sophisticated yet affordable solutions. Intellectual property protection and sustainability certifications are emerging as key competitive advantages in this rapidly evolving sector.

For instance, in April 2024, MAHLE GmbH secured two major contracts for its thermal management modules, signaling a strategic push into the EV market. One deal comes from a leading global automaker, while the other is with a fast-growing Asian EV manufacturer. Together, these orders represent nearly USD 1.65 billion in business, with one marking the largest single order in Mahle's history. The agreements highlight Mahle's growing influence on electric vehicle thermal systems, reinforcing its position as a key supplier in the industry's shift toward electrification.

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*Companies mentioned above DO NOT hold any order as per market share and can be changed as per information available during research work.

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