# Train Battery Market Assessment, By Battery Type [Lead Acid Battery, Nickel Cadmium Battery, Lithium Ion Battery], By Engine [Diesel Locomotive, Diesel Multiple Units, Electric Locomotive, Electric Multiple Units, Bullet Train, Metros, Light Monorail, Passenger Coaches, Freight Wagon], By Application [Starter Battery, Auxiliary Battery], By Region, Opportunities and Forecast, 2018-2032F

Market Report | 2025-02-19 | 228 pages | Market Xcel - Markets and Data

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**Report description:**

Global train battery market is projected to witness a CAGR of 5.02% during the forecast period 2025-2032, growing from USD 301.32 million in 2024 to USD 445.87 million in 2032. The market has experienced significant growth in recent years. It is expected to maintain an expansion in the coming years owing to the increasing electrification of railways, government investment in electric trains, and the shift towards sustainability. The rising electrification of railways is driven by investments from rail operators and governments for electric train systems to encourage cleaner mobility and diminish carbon emissions, as many countries prioritize rail transport as a sustainable alternative to road transport. This shift towards sustainability enhances the demand for battery solutions. Rapid urbanization in developing Asia-Pacific regions leads to significant investments, including high-speed train networks and metro systems, further increasing the need for reliable train batteries. Technological advancements, particularly in lithium-ion batteries, are also playing a crucial role by enhancing performance characteristics such as energy density, charging speed, and safety, making these batteries more suitable for modern trains. Also, integrating regenerative braking systems will allow energy recovery in terms of braking and reusing stored energy to enhance overall energy efficiency through reduced operational costs.
Moreover, the surging demand for high-speed and autonomous trains is another factor driving the requirement for high-tech battery solutions to operate within these trains. These factors create a robust environment for the train battery market's expansion worldwide.
For instance, in May 2024, Hitachi Rail Limited tested the very first trial in the UK to replace a diesel engine with a battery. Hitachi

Rail Limited manufactured a battery using the Northeast supply chain; with one battery unit, it is anticipated to cut emissions and fuel costs by up to 30%.

Electrification of Railways is Expanding the Overall Demand

The electrification of railways is significantly expanding the scope of the global train battery market. The growing demand for sustainable and efficient railway operations emphasizes increased investments in electrification, which is essential for reducing pollution and enhancing energy efficiency. As countries worldwide focus on transitioning to cleaner transportation methods, the adoption of electric and hybrid trains is rising, leading to a higher demand for advanced battery technologies. Lithium-ion batteries are gaining traction due to their high energy, rapid charging capabilities, and improved safety. As high-speed trains and metro systems develop, the demand for batteries will rise. Moreover, hybrid trains are anticipated to grow faster within the market, utilizing batteries for various functions such as emergency braking, lighting, and air conditioning, thereby enhancing operational efficiency. Government initiatives and funding aimed at supporting railway electrification further bolster market growth. Additionally, battery technology advancements enable longer ranges and improved performance of electric trains, making them more viable alternatives to diesel-powered locomotives.

For instance, in September 2024, Saft Groupe SAS provided lithium titanate oxide (LTO) traction batteries to Siemens AG Mobility for powering seven next-generation Mireo Plus H hydrogen trains operating in Germany. The lithium titanate oxide (LTO) technology provides notable benefits in terms of performance, safety, and lifespan.

Government Initiatives and Investments Propel the Global Train Battery Market Growth

Government initiatives and investments are playing a crucial role in propelling the growth of the global train battery market. Countries are investing funds into the electrification of rail networks to add sustainability to transport. This trend is particularly evident in regions like Asia-Pacific, where rapid urbanization and increasing high-speed rail networks are adding a vigorous pace to the electric battery solutions demand expansion.  For example, India's initiative to introduce semi-high-speed Vande Bharat Express trains clearly demonstrates how government backing can stimulate advancements in railway technology and infrastructure. Moreover, many governments are implementing policies that promote electric and hybrid trains, which rely heavily on advanced battery systems. For instance, Germany invests heavily in electric trains and non-electrified lines to facilitate battery-operated systems. Countries also focus on developing autonomous train technologies, which require substantial investments in battery systems to ensure reliable operations. In addition to direct funding for electrification projects, governments also encourage private sector participation through incentives and partnerships. This collaborative approach is expected to foster innovation in battery technologies.

For instance, in March 2024, Saft Groupe SAS provided batteries as a backup for essential safety systems in tunnels along a new expansion of the Udhampur-Srinagar-Baramula Rail Link (USBRL) that connects the towns of Banihal and Sangaldan in Kashmir, India.

Dominance of Lithium-ion Batteries in Global Train Battery Market

Lithium-ion batteries have established their dominance in the global train battery market. Lithium-ion batteries are favored for their superior energy and quick charging capability, allowing electric trains to cover great miles while addressing range constraints. Thus, lithium-ion batteries have become more electrified rail systems and are determined to be viable and efficient. The shift towards sustainable transportation further emphasizes the role of lithium-ion technology, as it aligns with initiatives aimed at reducing emissions and improving energy efficiency through features like regenerative braking. North America is expected to experience the fastest growth in adopting lithium-ion batteries, driven by substantial investments in technologies that promote their use in locomotives. As governments worldwide implement stricter environmental regulations and support green transportation initiatives, the trend towards replacing traditional diesel engines with battery-powered trains is gaining momentum. This transition is further supported by innovations in battery technology that enhance performance and reduce maintenance costs.

For instance, in June 2024, Jupiter Electric Mobility Private Limited (Jupiter Wagons Limited (JWL)) collaborated with Log9 Materials Private Limited and achieved a significant milestone in the development and certification of Lithium-Ion Phosphate (LFP) battery technology. This advancement promises to enhance the efficiency and sustainability of rail transport in India.

North America Dominates the Global Train Battery Market Share

North America is dominant in the global train battery market, primarily due to its advanced technological adoption and robust

infrastructure capabilities. This growth is supported by ongoing investments in high-speed train networks and the incorporation of data analytics into railway operations, enhancing overall efficiency. Moreover, government initiatives to modernize rail systems and promote electric trains further bolster North America's position in the train battery market. The U.S. and Canada are at the forefront of this growth, investing significantly in technologies that promote lithium-ion batteries in locomotives, which are favored for their efficiency and performance. As a result, North America is expected to continue leading the market, capitalizing on its technological advancements and infrastructure investments.

For instance, in November 2024, Norfolk Southern plans to convert two diesel prime movers to hybrid operations with the help of Alstom SA. The initiative will involve the development of hybrid powertrains by Alstom, which will be utilized on European rolling stock that is being deployed in North America.

Future Market Scenario (2025-2032F)

- As urbanization continues to rise in both developing and developed economies, there will be a growing demand for rail systems that require minimal maintenance and can support hybrid technologies.
- Developing autonomous and hybrid trains is expected to stimulate further demand for advanced battery solutions, especially lithium-ion batteries, which are popular for their energy density and speed of charging.
- Government support through incentives and private sector involvement will play a crucial role in expanding train battery networks.

Key Players Landscape and Outlook

The global train battery market is portrayed as a highly competitive landscape where various key players thrive, promoting innovation and growth within the industry. Leading players in this market continue to expand their market presence through strategic alliances, enhancing production capacities, acquisitions, and collaborating with rolling stock manufacturers to ensure a seamless supply of both starter and auxiliary train batteries. The ongoing trend towards electrification of railways, coupled with government initiatives to reduce carbon emissions, will further accelerate the adoption of advanced battery technologies. The emergence of a hybrid system and advanced lithium-ion batteries will certainly play a crucial role in making rail transport more effective and sustainable. In conclusion, the competitive landscape of the global train battery market is evolving, as key players are focused on strategic initiatives such as mergers and acquisitions, joint partnerships, and collaborations to build strong market positions.

For instance, in June 2023, EnerSys and Verkor SAS together signed a Memorandum of Understanding to explore the development of a lithium battery gigafactory in the United States. Under the agreement, the companies will work on developing plans, identifying the best location for the new factory, and assessing different funding and operational structures for this manufacturing facility.

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