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# Train Battery Market by Type & Technology (Lead-acid Tubular, VRLA, Conventional; Ni-Cd Sinter, Fiber, Pocket, & Li-ion; LFP, LTO), Advanced Train (Fully Battery-Operated and Hybrid), Rolling Stock Type, Application and Region - Global Forecast to 2030

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## Abstracts

The train battery market is projected to grow from USD 277 Million in 2023 to USD 378 Million by 2030, at a CAGR of 4.6% from 2023 to 2030. The train battery market is primarily driven by factors such as rapid urbanization and the growing expansion of railway networks. Along with these factors, the swiftness of rail travel and low operational cost compared to other modes of transport are driving governments all over the globe to invest in urban rail infrastructure. The growing expansion of rail networks is expected to create a demand for energy storage systems.

As of 2021, Urban Transport Trends and Prospects (UTTP) indicates that there is a total operational network of light rails and trams spanning 15,824 kilometers. Most of these networks are situated in Europe, accounting for 58% of the total, while Eurasia constitutes 22%. Notably, several European countries, including Finland, the UK, and Switzerland, are actively focusing on expanding their light rail networks. For instance, in 2021, the UK government approved the extension of the Blackpool Tram. Additionally, the increasing development of metro projects is contributing to the rising demand for batteries in metro systems. As an example, in December 2022, the Russian government initiated the construction of the 70-km Moscow Big Circle Line metro project, with a total cost of USD 6.8 billion. Consequently, the growth of light rail and tram networks, coupled with the growing adoption of metro systems for urban transit, is expected to fuel the utilization of batteries in these modes of transportation in the upcoming years.

“The Auxiliary Batteries are expected to account for the largest market share in 2023.”

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The auxiliary battery systems provide backup to all essential train systems, such as emergency lighting and ventilation. Auxiliary batteries also offer safety to the train without output failure and train separation incidents. Additionally, the increase in the demand for high-speed trains is leading to the high demand for advanced features such as emergency braking, tilting systems, etc. VRLA technology holds the largest share in the train battery market due to its technical benefits such as maintenance-free operation, no periodic water filling requirement, fast charging capability, and heat & shock resistance, and is mainly preferred for auxiliary functions in railways. However, the high energy density, good low-temperature performance, and good cycle life means can be recharged more times than VRLA batteries. Hence, considering these benefits of Ni-cd batteries, the demand for VRLA batteries in railways will be impacted gradually. Moreover, the latest rolling stocks have been implementing advanced technologies such as the Internet of Things (IoT), artificial intelligence (AI), deep learning, and driver advisory systems (DAS) to improve efficiency and enhance the passenger experience. Improvements in resource planning, passenger experience, and decision-making, along with the optimization of field equipment such as ACs, heaters, braking systems, and other onboard appliances, are expected to increase the adoption rate of train batteries for these auxiliary systems.

“Passenger Coaches will dominate the train battery market during the forecast period.”

Passenger coaches are railroad cars designed to carry passengers. Modern passenger coaches require auxiliary batteries for functions such as reading lights, bathroom lights, vestibule lights, door lights, emergency lights, HVACs, fans, screens, Wi-Fi, and ceiling lights. These functions depend upon the types of coaches, such as AC and non-AC coaches. In developed countries, coaches have automated doors, infotainment systems, and passenger information systems. These added features are powered through battery power packs. The battery capacity for AC coaches is higher compared to non-AC passenger coaches. Typically, the voltage capacity requirement for passenger capacity is 108V to 120V. Batteries installed in passenger coaches are used for auxiliary power backup. Based on the capacity and power output of the passenger coach, the manufacturer decides the battery chemistry. With increased travel demand, environmental concerns, government investments, improved passenger amenities, safety and reliability, high-speed rail development, intermodal connectivity, and reduced congestion, the need for passenger coaches and train batteries would grow parallelly in the coming years.

“Asia Pacific is expected to account for the largest aftermarket share in 2022.”

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The Asia Pacific region has the world's most extensive railway network and holds the top spot in the global count of rolling stock. Furthermore, it stands as the world's largest producer of rolling stock. This geographical concentration of major rolling stock manufacturers has notably driven the demand for train batteries.

Moreover, with the widespread urban rail network expansion and the presence of international train battery manufacturers in the region, an anticipated rise in demand is foreseen. This is further compounded by the escalating number of passengers, which will necessitate increased utilization of train batteries to enhance the overall travel experience. Rail network electrification, emission regulations, and advancements in battery technologies are expected to drive train battery aftermarket in Asia Pacific. The growing diesel engine retrofitting and refurbishment at a year-on-year rate of 5%. Further, trains operating in the Asia Pacific region are at high temperatures compared to Europe and North America due to which battery lifespan in the Asia Pacific region is less, thus the demand for battery replacement is high.

Breakdown of Primaries

In-depth interviews were conducted with CXOs, marketing directors, other innovation and technology directors, and executives from various key organizations operating in this market.

By Company Type: Supply Side- 60%, Demand -Side- 20%, and Others - 20%

By Designation: C Level Executives - 20%, Directors/ Vice Presidents-30%, and Others -50%

By Region: North America - 20%, Asia Pacific- 40%, Europe - 30%, and Rest of the World – 10%

The train battery market comprises major manufacturers such as EnerSys (US), Exide Industries (India), Saft (France), Amara Raja Batteries (India), GS Yuasa Corporation (Japan), and HOPPECKE Batterien GmbH & Co.KG.

Reasearch Coverage

The study segments the train battery market and forecasts the market size based on by

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Application & by Battery type Starter (Lead-Acid, Nickel-Cadmium, Lithium-ion) and Auxiliary (Lead-Acid, Nickel-Cadmium, Lithium-ion, By Battery Type & Battery Technology Lead-Acid Battery (Conventional Lead Acid Battery, Valve Regulated Lead Acid Battery, Gel Tubular Lead Acid Battery) Nickel-Cadmium Battery (Sinter/PNE Ni-Cd Battery, Pocket Plate Ni-Cd Battery, Fiber/PNE Ni-Cd Battery) Lithium-ion Battery (Lithium Iron Phosphate (LFP), Lithium Titanate Oxide (LTO), and Others), By Engines/Head (Diesel Locomotives, Diesel Multiple Units (DMUs), Electric Locomotives, and Electric Multiple Units (EMUs), By Application (Metros, High-speed Trains, Light Trains/Trams/ Monorails, Passenger Coaches), By Advanced Train Type (Battery-Powered Train, and Hybrid Trains), Aftermarket by Rolling Stock (Locomotives, Multiple Units, Passenger Coaches), Aftermarket By Battery Type (lead-Acid, Nickel-Cadmium, Lithium-Ion), Aftermarket by application (starter battery, and auxiliary function battery), Aftermarket by region (Asia Pacific, Europe, and North America), and OE by region (Asia Pacific, Europe, North America and Rest of the World).

Key Benefits of Buying the Report:

This report provides insights concerning the following points:

Country-level battery type-wise market: The report offers in-depth market sizing and forecasts for 2030 by battery types, such as lead-acid, nickel-cadmium, and lithium-ion. The market sizing for the train battery market is covered at the country and regional levels considered in this study.

By Application & battery type: The report offers in-depth market sizing and forecasts up to 2030 by applications, such as starter and auxiliary—in-depth analysis of different battery types used in Starter and Auxiliary Applications at the regional level.

Battery Type, by Battery Technology: The report offers in-depth market sizing and forecasts up to 2030 by battery type, such as lead-acid, nickel-cadmium, and lithium-ion. The report provides market sizing and forecasting till 2030 by battery technology under different battery types such as lead acid battery type (conventional lead-acid, Valve regulated lead-acid, and gel tubular lead-acid battery), Nickel-cadmium (Sinter/PNE Ni-Cd, Pocket Plate Ni-Cd, and Fiber/Pne Ni-Cd), and Lithium-ion (lithium iron phosphate (LFP), Lithium Titanate Oxide)

The report provides the “Market Share” of the leading train battery market players.

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Market Development: The report provides comprehensive information about lucrative emerging markets across regions for the train battery market.

Product Development/Innovation: The report gives detailed insights into R&D activities, upcoming technologies, and new product launches in the train battery market.

Market Diversification: The report offers detailed information about untapped markets, investments, new products, and recent developments in the train battery market.

The report provides insights on the following pointers:

Analysis of key drivers (Growth in adoption of autonomous and high-speed railways, Emission regulations to increase demand for energy-efficient transportation systems, and Expansion of railway networks), Restraints (High capital investment and operating cost of high-speed rail networks), Opportunities (Expansion of IOT, AI, and DAS Technologies, Improvements in Battery Technology, Retrofitting of Diesel-electric trains), Challenges (Technical Challenges related to lead-acid and lithium-ion batteries, High cost of charging infrastructure and replacement).

Product Development/Innovation: Detailed insights on upcoming technologies, research & development activities, and new product launches in the train battery market.

Market Development: Comprehensive information about lucrative markets – the report analyses the train battery market across different regions.

Market Diversification: Exhaustive information about new products & services, untapped geographies, recent developments, and investments in the train battery market.

Competitive Assessment: In-depth assessment of market shares, growth strategies, and service offerings of leading players like EnerSys (US), Exide Industries (India), Saft (France), Amara Raja Batteries (India), GS Yuasa Corporation (Japan), and HOPPECKE Batterien GmbH & Co.KG. in the train

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