Electric Construction Equipment Market by Equipment Type, Battery Capacity, Battery Type, Power Output, Application, Propulsion, Electric Tractor Market, Electric Construction & Mining Equipment Market and Region - Global Forecast to 2027

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Report description:

The electric off-highway equipment market is estimated to grow from USD 9.2 billion in 2022 to USD 24.8 billion by 2027 at a CAGR of 22.0% over the forecast period. All key countries have established programs/regulations to deal with GHG emissions in the transportation industry. Most countries follow Euro equivalent Standards, such as Stage IV or V. The PM limit of the Stage V standard is 97% lower than that of the Stage I Standard, and the hydrocarbon (HC) + Nitrogen Oxides (NOx) limit is 94% lower. China, Japan, South Korea, and India also follow the Euro Equivalent regulations. The Emission Control Technologies (ECT) such as Selective Catalytic Reduction (SCR), Gasoline Particulate Filter (GPF), Exhaust Gas Recirculation (EGR), Diesel Particulate Filter (DPF), various sensors including oxygen sensor, NOx sensors, and thermal management technologies - are used to control and reduce the emissions from the off-highway equipment. Some ECTs also lead to loss of power and other downfalls such as reduced fuel economy, reduced back pressure in prolonged use, more maintenance activities, etc. All these expenses, including the vehicle's increased capital, resulted in the customers' extended return on investment (ROI) duration.
To overcome these difficulties and the associated costs, the manufacturers and customers opt for an alternative sustainable mode of mobility. This greatly aided the development of the hybrid and electric off-highway equipment and equipment, which are more efficient, emission-free, and noise-free than their IC engine counterparts.
Moreover, the initial cost of electric off-highway equipment is around 140%-170% higher than conventional equipment because of the high cost of the batteries. However, with advancements in battery technology, the cost of the battery and overall equipment is expected to decrease. Due to the high cost of electric equipment, the demand is expected to be steady in the near future; the market would showcase a promising growth in the long run. In the near future, OEMs are expected to prefer hybrid or alternate fuel engines to balance the equipment's limits and cost.
The underground mining activities produce harmful dust and gases and usually have a hot to very hot temperature. The

diesel-powered mining vehicles and equipment are one of the major producers of the underground mines' heat, nitrogen dioxide, and other toxic gases. These emissions also increase the heat generated in underground mines, which demands a crucial ventilation system with huge capital maintenance expenses. According to the International Council on Mining and Metals (ICMM), 40% of an underground mine's energy outlay is spent on operating ventilation systems to remove pollutants and heat from mining tunnels. Such factors increase the overall operational cost of the mine while decreasing its production efficiency.

The regulations also mandate that the air reaching each mine's working faces must travel with a velocity to cover at least 60 feet in a minute. These air velocities are controlled by various ventilation systems and balance the airflow with the correct ratio. The diesel engine vehicles not only produce emissions and heat but also produce high sounds within the narrow mining channels. For these reasons and to achieve sustainability goals, manufacturers and mine owners have started to prefer the electrification of these mining vehicles. Especially in designing a new mining site, incorporating an electric fleet of vehicles and equipment can drastically reduce capital and maintenance costs. Though the ventilation system cannot be eliminated, the electric mining vehicles reduce the system's load as it produces zero emissions and less heat. In such cases, the capacity of the ventilation systems can be reduced, thereby reducing the capital investment.

Therefore, the miners find the electric mining vehicles more profitable and apt for their large underground mining operations. Moreover, many leading miners, including Anglo American (AAL.L), Rio Tinto (RIO.L), and BHP (BHPB.L), have already committed to net zero emissions by the year 2050, and these companies prefer the electric mining fleet to reach their sustainability goals.

"The battery electric off-highway equipment would lead the market due to the stringent noise and emission regulations."

The demand for sustainable equipment in the mining industry to decrease ventilation costs is expected to drive the electrification of mining equipment during the forecast period. However, the stringent noise and emission regulations within the city limits would drive the market for such battery electric and hybrid construction equipment. Though these electric equipment would face challenges such as higher cost than their ICE counterparts or longer charging time, the advancements in the battery technology would make the electric equipment popular in the long run.

Americas is projected to be the second largest market for electric off-highway equipment

The leading countries such as US, Canada, Mexico, Brazil, and Argentina are considered under the Americas region. The electric off-highway equipment demand in Americas is rapidly increasing because of the environmental protection measures adopted in these key countries. In addition, with the upcoming stringent emission norms for fuel economy in the region, companies are making efforts to manufacture electric and hybrid equipment for the domestic market. Recent electric equipment launches from the leading off-highway equipment manufacturers has promised the growth of electric off-highway equipment market in this region. Some of the leading companies that are present in this region are Caterpillar Inc. (US), Deere & Company (US), Soletrac Inc. (US), Dana Limited (US) and others.

Moreover, the region has large deposits of coal, iron, zinc, copper, cement, lithium, and precious metals. The mining industry in this region is large and many leading players that hold a significant share of the mining equipment market are present in this region. The Americas electric off-highway equipment market is estimated to be the second largest market, globally. High demand for mini construction equipment, including mini excavators, loaders, and dozers, is driving the growth of the electric off-highway equipment market in Americas.

The US is projected to dominate the Americas electric off-highway equipment market with a value of USD 6,793.0 Million by 2027. This is mainly because of increasing demand for electrification in construction, mining, and agriculture vehicles, because of its various advantages including emission free and noiseless operation. The presence of major electric off-highway equipment manufacturers in US and their increasing investments in electric off-highway equipment, subsystems, and battery developments are some other key reasons for the growth of electric off-highway equipment market in US.

For instance, in 2021, The Caterpillar Inc. along with another venture, invested USD 16 Million as Series B funding for BrightVolt, Inc, a global leader in the design, development, and manufacturing of safe, high energy and low-cost solid-state lithium-ion batteries. This funding is aimed to be used for the development of larger form factor products aiming industrial electrification and e-mobility markets.

Such developments of the leading companies with the aim to minimize drawbacks of the conventional battery types in electric loaders and excavators are further expected to drive the growth for the electric off-highway equipment in the US.

In-depth interviews were conducted with CEOs, marketing directors, other innovation and strategy directors, and executives from

various key organizations operating in this market.
-□By Company Type: Electric off-highway equipment OEM - 40%, Tier 1 - 20%, Tier 2 - 40%
-□By Designation: C Level - 30%, Directors- 20%, and Others - 50%
-□By Region: Asia Pacific - 50%, Europe - 20%, North America -30% RoW - 10%
The electric off-highway equipment market is dominated by a few globally established companies such as Hitachi Construction Machinery (Japan), Caterpillar Inc. (US), Komatsu Ltd. (Japan), JCB (UK), Volvo Construction Equipment (Volvo CE) (Sweden).
Research Coverage:
The study segments the electric off-highway equipment market and forecasts the market size based on equipment type (electric excavator, electric motor grader, electric dozer, electric loader, electric dump truck, electric load-haul-dump loader, electric lawnmower, electric sprayer, and electric tractor), battery capacity (<50 kWh, 50-200 kWh, 200-500 kWh, and >500 kWh), battery type (lithium-ion, lead-acid, and other batteries), power output (<50 hp, 50-150 hp, 150-300 hp, and >300 hp), application (construction, mining, agriculture, and gardening), propulsion (hybrid-electric and battery-electric), Electric tractor market, by propulsion type (hybrid electric & battery electric), Electric construction & mining equipment market, by propulsion type (hybrid electric & battery electric), and region (Asia-Pacific, Europe, and Americas)
The study also includes an in-depth competitive analysis of the major electric off-highway equipment manufacturers in the market, along with their company profiles, key observations related to product and business offerings, recent developments, and key market strategies.
Key Benefits of Buying the Report:
The report will help the market leaders/new entrants in this market with the information on the closest approximations of the revenue numbers for the overall electric off-highway equipment market and the sub-segments. This report will help stakeholders understand the competitive landscape and gain more insights to better position their businesses and plan suitable go-to-market strategies. The report also helps stakeholders understand the market's pulse and provides them information on key market drivers, restraints, challenges, and opportunities.

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