

Batteries for electric vehicles: What fits the broader market?

Conventional passenger cars are increasingly being substituted for battery electric vehicles. For battery producers, the rapid growth in demand for electric vehicles is creating a new market to cater to – the broad mid-class vehicle market. On this promising market, car manufacturers demand reduced prices, but can accept lessened battery performance. However, for producers in Europe, such as Northvolt, large challenges exist in the competition with Asian producers with better prices and more experience.

In recent years the automotive industry has been subject to major changes as traditional combustion engines are being replaced by electric cars. This research has targeted the mid-market of electric vehicles. This means not the fastest, largest SUVs or sports cars – neither the smallest, short-ranged city cars – but the mid-sized cars that constitute the majority of sold passenger vehicles.

The study found that car manufacturers within in the mid-class segment expect lower prices, while accepting reduced range and fast charging capabilities of the batteries compared to batteries placed in premium cars. To obtain such a lower cost battery, three alternatives to the cathode chemistry used in today's premium batteries were found: (1) using an iron-based cathode popular in Asia, (2) eliminating cobalt from nickel-based cathodes or (3) using older generations of nickel-based cathodes. However, through further examination, a European producer will not be able to compete with Asian producers on the first alternative as no

supply chain exists in Europe today. The third alternative was found too expensive – leaving the second option of reducing cobalt as most suitable for a sustainable European battery producer.

The market for batteries to mid-class vehicles was found attractive, with no threat from substitutes, suppliers, or new entrants. Although, being competitive in relation to existing Asian alternatives was found crucial. For a premium producer based in Europe moving into the mid-class market, keeping the unique selling points across offerings is important to be competitive. Since a European producer will have a hard time competing on price, being differentiated – such as valuing sustainability – is key.

For all battery producers, understanding the customers' needs and requirements is valuable before developing a new product. Additionally, this study provides guidance and advice for premium producers, such as the battery producer Northvolt, looking to enter the mid-class market.

Lastly, accelerating the adoption of sustainable battery electric vehicles is critical to reach the climate goals set in Agenda 2030. Therefore, if battery producers in Europe are successful in providing an affordable, climate-smart alternative to both conventional engines and unsustainable batteries from China, the climate goals may be reached faster.

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