Tesla megapack battery production

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Most of the world"s electric car batteries are now made in China. Accounting for more than 70 per cent of market share by shipments, that concentration also puts global automakers at risk of supply chain disruptions amid escalating geopolitical tensions between the US and China. But Tesla"s new batteries are set to upend the hierarchy of the industry for good.

Panasonic and LG Energy Solution have long been the leading suppliers. But in recent years, Chinese makers such as CATL and BYD have steadily won market share away from Korean and Japanese rivals and have grown to dominate the world"s supply.

Electric car batteries have undergone rapid technological change in recent years. Until now, the priority has been on improving energy density -- for longer driving range -- by changing the composition of battery materials. The shape of the battery cells has been less of a focus.

Currently, most electric car batteries are designed and moulded in the shape and form that ensures the most efficient use of space. That has meant batteries that are shaped like flat pouches or stackable rectangular boxes have been the leading standards for electric cars until now.

Cylindrical battery cells, the third type on the market, have long been considered the less attractive option because empty gaps between the round cells when stacked together was seen as wasted space. These made up just a fifth of the global market last year.

Yet Tesla is betting big that these will become the future industry standard. Its cylindrical 4680 battery cells, named after their size, with a diameter of 46mm and length of 80mm, have been developed to supply energy up to five times that of the batteries currently used in most Tesla cars.

For both electric car buyers and for Tesla, the cost advantage is clear. The new cells are cheaper to produce than previous versions. They use new material which includes aluminium, a relatively abundant and lower cost metal, and less raw materials overall. Upgraded technology means the batteries are made using fewer parts -- also meaning less weight. They are easier to mass produce as they do not have to be customised to fit different car shapes and designs.

The timing is opportune. US president Joe Biden"s Inflation Reduction Act has raised the stakes for global electric-car makers that have Chinese battery makers in their supplier list. The new law includes a consumer tax credit for buyers of electric cars if the final assembly location was in the US and production did not involve "foreign entities of concern".

An electric car using a battery fully manufactured in Tesla"s Austin and Nevada plants would enable Tesla to

qualify for subsidies as well as a sales boost from the thousands of dollars in tax credits for its US buyers.

Tesla has ramped up battery production in the US in recent months. Its $2.9bn order to South Korea"s L& F to supply it with battery materials -- instead of fully made batteries -- underscores its plan to include batteries in its model of vertical integration. That will mean more affordable batteries and higher margins on its cars sold.

That is unfortunate for companies such as Panasonic and LG Energy Solution which have bet heavily that Tesla will continue to rely on their technology and production lines for batteries. Billions have gone into building capacity and supply of many parts customised for Tesla. Market expectations are correspondingly high for battery makers. LG Energy shares, for example, are valued at a steep 83 times forward earnings.

It is true that as sales volumes of electric cars rise globally, demand for batteries will remain high amid a continuing shortage of manufacturing capacity. And until Tesla ramps up its production to match its car sales, it remains reliant on suppliers.

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Web: https://www.hollanddutchtours.nl/contact-us/
Email: energystorage2000@gmail.com
WhatsApp: 8613816583346