Northvolt in new sodium-ion battery breakthrough

Swedish start-up has developed an energy storage technology with no critical minerals including lithium which could minimise reliance on China

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Richard Milne in Stockholm 15 HOURS AGO 227

Northvolt has made a breakthrough in a new battery technology used for energy storage that the Swedish industrial start-up claims could minimise dependence on China for the green transition.

The Swedish group, backed by Volkswagen, BlackRock and Goldman Sachs, has developed a sodium-ion battery that has no lithium, cobalt or nickel — critical metals that manufacturers have scrambled to obtain, leading to volatility in prices.

Peter Carlsson, Northvolt's chief executive and co-founder, told the Financial Times that the new technology could be worth tens of billions of dollars as it opens up regions such as the Middle East, Africa and India for battery-powered energy storage for the Swedish group.

He estimated that in 10 years' time the order book for energy storage could be "as big or potentially bigger than the current portfolio" of batteries for electric vehicles, for which Northvolt has received orders of $55bn.

"We are not that dependent on a number of these strategic supply chains that China has created in a very efficient way," he added.

Northvolt is Europe's current biggest hope to compete against the dominant Chinese, Korean and Japanese battery players. It has started manufacturing lithium-ion batteries for cars and trucks in a factory just below the Arctic Circle in Sweden, and has plans to have three more plants in Canada, Germany and Sweden.

Sodium-ion batteries are seen as a cheaper and safer alternative to the lithium-based batteries widely used for energy storage because they work better at both very high and low temperatures. But the amount of energy they can produce relative to their size has long lagged behind lithium batteries, making sodium cells currently impractical for most electric vehicles where space is at a premium.

Northvolt said on Tuesday that it had now validated a sodium-ion battery at the critical level of 160 watt hours per kilogramme, an energy density close to that of the type of lithium batteries typically used in energy storage. Lithium batteries used in electric cars have an energy density of up to about 250-300Wh per kg while those typically deployed in energy storage have about 180Wh per kg.

Outside experts said that Northvolt had gone further than many Chinese competitors such as CATL, the world's largest battery maker, which used oxides containing metals such as nickel, cobalt or manganese in their sodium-ion batteries. The use of the metals makes them more expensive and less safe, as they could catch fire at lower temperatures.

Northvolt's sodium-ion batteries instead use Prussian blue, a pigment first used in the 18th century to make blue paint and whose potential for batteries was first spotted by Nobel chemistry prize winner John Goodenough.

It is hoping to provide the first samples to customers next year, and would reach full-scale production by the end of the decade. It would need new factories alongside the four factories it has currently planned to produce lithium-ion batteries for vehicles.

"It is quite key to be the first ex-China player to have a sodium-ion product validated for energy storage," said Iola Hughes, research manager at battery consultancy Rho Motion.

But she said that the potential success of sodium-ion batteries would depend on the price of lithium batteries, which have fallen in recent months, and on how quickly manufacturers such as Northvolt could scale the new technology.

"Investors are less enthusiastic than last year and some of the future development of the sodium-ion supply chain may be delayed or even cancelled," she said of the Chinese groups producing sodium-ion batteries.

"The low lithium price has made the cost-benefit for sodium ion less evident," she added.

The Swedish group believes the price of lithium is an unreliable benchmark owing to the constant price fluctuation.

Carlsson said he thought sodium-ion batteries would be about a quarter cheaper than the lithium batteries typically used in energy storage, which are themselves cheaper than those used in electric cars. He added that replacing graphite with hard carbon would also reduce the carbon footprint of the new sodium-ion battery while it would be able to withstand up to three times the heat exposure of lithium batteries.

"The combination of thermal capability, cost, and the sustainability aspect makes us very bullish about the possibility of the technology . . . This is a really large opportunity for areas like the Middle East, Africa and India," Northvolt's chief executive said.

Northvolt has invited bankers to pitch for roles on a stock market listing that could value it at about $20bn as early as next year.

Carlsson said Northvolt was making sure it was ready to become a public company but that it was also ensuring it had sufficient financing should market conditions not improve.

"We are making sure that we are not dependent on an IPO window opening up or not," he added. People familiar with Northvolt's fundraising have said it is preparing debt financing of more than $5bn for its current Swedish factory.