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Swedish battery maker Northvolt has developed its first sodium-ion battery in partnership with Uppsala University spinoff Altris. The cell has been validated for an energy density of more than 160 Wh/kg and is designed primarily for energy storage applications.

Its sodium-ion technology has been validated at more than 160 Wh/kg at its R& D and industrialization campus, Northvolt Labs, in V?ster?s, Sweden. This level of performance makes the technology competitive with today"s dominant energy storage chemistry - lithium iron phosphate (LFP) batteries.

"Thanks to the global abundance of ingoing materials as well as the robustness and sustainability of the sodium-ion technology, Northvolt sees sodium-ion technology as a key part of the company"s product portfolio in the long term," Wilhelm L?wenhielm, Northvolt senior director of business development ESS, told pv magazine. "With its first-generation sodium-ion product, Northvolt will bring to market a solution at scale that is competitive with LFP solutions. Over time, the technology is expected to surpass LFP significantly in terms of cost-competitiveness."

However, Northvolt has said that its sodium-ion cell is based on a hard carbon anode and a Prussian White-based cathode, which makes it similar to the first generation of sodium-ion cells unveiled by Chinese battery industry heavyweight CATL in 2021.

At the time of the launch, CATL said it had been dedicated to the research and development of sodium-ion battery electrode materials for many years. It also revealed plans to establish a basic industrial chain by 2023.

It said its first generation of sodium-ion battery cells could achieve energy densities of up to 160Wh/kg and promised an increase to 200 Wh/kg for the next generation. Earlier this year, it confirmed that China"s Chery will become the the first automaker to use its sodium-ion battery tech.

"At the surface level, it should be the same technology as announced by CATL in 2021, but the Chinese manufacturer is also pursuing layered oxide cathodes as well - both with similar performances (160 Wh/kg)," Max Reid, principal electric vehicle and battery analyst at Wood Mackenzie, told pv magazine. "In the early days of sodium-ion, it makes sense for a company like CATL to keep developing several technologies and attempt to overcome the challenges of each to hedge its bets."

Northvolt, on the other hand, has adhered to nickel-manganese-cobalt (NMC) battery chemistry, which is favored by electric-vehicle customers. The company"s ESS platform is based on the same chemistry, which is seen as less sustainable than LFP due to cobalt and nickel content. The Swedish startup, which has secured the backing of big investors such as Volkswagen, BlackRock, and Goldman Sachs since its establishment in 2016, has however always claimed that it is building the world"s greenest lithium-ion batteries with a minimal CO2

footprint.

The company has managed to reduce its lithium-ion cell carbon footprint to 33 kg CO2/kWh -- a two-thirds reduction compared to an industry reference. Its goal, however, is to establish 150 GWh of annual cell production by 2030 at 10 kg CO2/kWh with 50% of material for its lithium-ion cells coming from recycling.

In December 2021, Northvolt bacame the first manufacturer to produce battery cells fully designed, developed and assembled by a homegrown European battery company. Those first cells rolled off its manufacturing lines at Northvolt Ett - its first gigafactory, in northern Sweden, which has an installed capacity of 16 GWh. In the meantime, the company has revealed plans for three more plants in Germany, Canada and Sweden.

Northvolt has also been engaged in development of energy-dense lithium-metal battery technology for aviation and high-performance vehicles at its subsidiary Cuberg based in San Leandro, California. The Stanford University spinoff has developed a 20 Ah commercial-format lithium metal pouch cell with an energy density of 405 Wh/kg and integrated those cells into an aviation-specific battery module offering gravimetric and volumetric energy density of 280 Wh/kg and 320 Wh/L respectively.

Around a year ago, Northvolt announced an investment in Altris, a Swedish tech company that has developed a proprietary technology to produce Fennac (Prussian White), a key component in sodium-ion batteries that consists of sodium, iron carbon and nitrogen.