

# Western carmakers renew push into solid-state batteries

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Some of the world's largest carmakers outside China have renewed their push into solid-state batteries, signalling a move toward a new generation of lithium-ion technology.

Last week, Nissan, Renault and Mitsubishi announced a €23bn (\$25.9bn) investment in EVs over the next five years as part of a pre-existing alliance. Alongside investing in current technologies, the alliance aims for mass commercial production of all-solid-state batteries (ASSBs) by mid-2028.

A move to ASSBs by mid-2028 will bring the price of EVs down to parity with internal combustion engine (ICE) vehicles, at around \$65/kWh, according to the alliance. ASSBs offer increased capacity and no risk of explosion, meaning expensive and weighty battery management systems can be removed. They can

also be charged quickly and last for thousands more charging cycles than conventional lithium-ion cells.

US-based battery maker QuantumScape last week said its new cells completed 400 consecutive 15-minute charging cycles from 10pc to 80pc of capacity and retained well above 80pc battery health — a first in the solid state market. The typical life of a current lithium-ion battery is 2,000-3,000 cycles, before significant deterioration, but solid state batteries could reach 10,000 cycles at a high density. A 15-minute charging time also brings EVs much closer to ICE vehicles in terms of refuelling time.

"We believe innovations like this are crucial to narrowing the performance gap between EVs and combustion-engine based vehicles and represent the future of the electrified transportation sector," Jagdeep Singh, co-founder and chief executive of QuantumScape, said. QuantumScape is backed by Volkswagen, which invested \$100mn in the firm in 2018.

Elsewhere, Germany's Mercedes has entered into a partnership with ProLogium, a Taiwanese solid-state battery start-up, providing an undisclosed double digit-million euro investment and taking a seat on the board. Prologium expects to ramp up its first commercial cell plant by the end of 2022 and reach mass production later in the decade.

# US solid-state market charges up

US-based General Motors last week announced a further \$7bn in EV supply chain investment, to be shared among four of its factories, including one that produces GM's Ultium energy storage platform. While not a solid-state battery, Ultium is being developed with South Korean firm Posco,

which is developing solid-state cells. GM has previously stated its intention to move into the technology.

Other US start-ups are well on the way to delivering commercial mass production of solid-state cells. California-based Sparkz, supported by the California Energy Commission, recently announced the opening of a pilot plant in Livermore. And Massachusetts-based Factorial Energy has announced a \$200mn investment from carmakers Stellantis and Mercedes Benz. Construction of its facility will begin early this year. "This funding will enable us to not only advance core research and development, but also scale our team and invest in manufacturing facilities to drive commercial production," Factorial Energy's chief executive Siyu Huang said.

Solid state will reduce the need for costly metals, such as nickel and cobalt. Both minerals feature on the US government's critical raw materials list and involve supply chain risks, particularly as consumers and governments have limited control over global reserves. Reducing reliance on these raw materials has emerged as a priority for US and European companies, which are also mindful of supply chain sustainability.

By Thomas Kavanagh