

The mobility rEvolution: New tech cuts risk of electrocution from EVs

UK researchers have found a way to reduce the risk of electrocution with electric vehicles, while US utility Duke Energy said it is exploring how the Ford F-150 Lightning can serve as a grid resource. Chinese carmaker Geely posted disappointing first-half results, while IHS Markit said it expects strong uptake of battery electric vehicles in Europe through to 2030.

AUGUST 22, 2022 **MARIJA MAISCH**

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Image: University of York

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University of York researchers have developed a new technology that has proven successful in reducing the risk of electrocution with electric vehicles in major road accidents. Presently, the main safety issue in EVs is the high voltage of the DC 'bus' – electrical conductors that store power at high voltage and distribute power to other circuits in the car. To reduce power surges during a collision, a circuit breaker is installed to interrupt the connection between the battery and boost converters, which would normally act to lift the voltage to high levels. But while the circuit breaker will prevent power surges, it does not reduce the voltage stored in the DC bus. "The bus voltage in most electric car models is 400 V, which is much higher than the voltage in our home systems at 230 V, as well as industry levels at 380 V," said Yihua Hu, from the University of York's School of Physics, Engineering, and Technology. "To significantly reduce the risk of a fatal electric shock in the case of a car crash, we need the voltage to be 60 V or less and to reduce to that level in under five seconds." [New research](#) in *IEEE Transactions of Power Electronics* involved designing a hybrid model of the DC bus that used both the internal mechanisms of the car and the external pathways that allow safe passage of energy. The team developed a system that in the case of circuitry damage, would consume any remaining voltage so energy does not build up, increasing the risk of electrocution. The team also devised an energy discharge algorithm that would mean that even in the event of an electrical failure, the DC bus would still be able to reduce the voltage output and protect other circuitry in the vehicle. The technology has now been trialed in a car powertrain testing system and the team showed that voltage is reduced to 60 V in under five seconds in the event of damage to circuits.

Duke Energy said it will explore the vehicle-to-grid capabilities of Ford F-150 Lightning all-electric trucks to learn how they can serve as a grid resource in Florida. The US utility will launch an R&D pilot program in the state to evaluate the viability of the new truck's high-capacity batteries, which serve as backup power supply for homes and small businesses for up to 10 days during a power outage. It will add approximately five Ford F-150 Lightning trucks to its Florida fleet and perform additional testing of the tech, with a focus on homes that have solar and storage. The pilot will focus on real-world use cases with the Ford F-150 Lightning to benefit the grid, such as how the vehicles interact with other customer-owned distributed energy resources, how the batteries power homes during outages, how the vehicles will be used to feed the grid during peak periods, and how such usage might affect the batteries over time.

Geely said it plans to boost the sale of EVs and exports in the wake of pandemic lockdowns and supply-chain hiccups. Shipments of EVs will account for more than 30% of overall sales by the end of 2022 and will continue the upward trend in 2023, Geely CEO Gan Jiayue said. The Chinese automaker will also work to bolster exports to Europe, Middle East, Asia Pacific and Latin America, he added. The company's export sales volume increased by 64%, but it posted lower-than-expected profit for the first half of the year. It delivered 613,842 vehicles in the first

half – just more than one-third of its annual target of 1.65 million. “The group’s sales performance in the first half of 2022 was below management’s expectations, primarily attributable to the disruption to production and sales caused by the pandemic prevention and controls in some cities in China and global shortage of chips,” said the company.

IHS Markit has published a new white paper predicting that the market share of battery electric vehicles (BEVs) among EU passenger cars will increase from 9.8% in 2021 to 67.9% in 2030. This will result in a yearly capacity of 592 GWh battery demand, from just 56 GWh in 2021. The EU passenger vehicle market for lithium-ion batteries is expected to reach nearly 3,000 GWh by 2030. However, [battery raw material prices](#) will peak in 2022 and then decline from 2023 to 2024. Nickel prices will continue to see significant volatility before easing in 2021, while lithium spot price movements will stay inflated over the short term due to logistical challenges in China. “The tight supply and demand balance is likely to remain in the future, but the current spot prices are at their very peak and they are expected to ease out from such high levels,” said the research firm. It expects the NCM811 battery chemistry to dominate the EU passenger vehicle market in 2030.

CareEdge said in a new report that EV demand in India over the next three years will grow more slowly than previously estimated. It expects domestic EV sales volume to grow moderately at 75% per year over the next three years. “The large-scale transition to EVs across various categories, which was earlier expected to happen post-2023, is likely to be delayed by at least three years. Two-wheeler EVs will continue to account for over 90% of demand in the interim [given their cost parity with ICE vehicles in this segment],” said the research firm. The analysts said that the switchover to EVs in the car segment will continue to be hampered by relatively high car prices, as well as the lack of charging infrastructure across India. EV demand will suffer due to higher prices of key battery raw materials, including nickel, lithium, and cobalt, arising from supply constraints, they said.

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Volkswagen and **Mahindra & Mahindra** have announced **plans** to expand their business relationship and help India's auto market transition to electric vehicles. The companies signed a term sheet regarding the supply of MEB electric components for Mahindra's new INGLO electric platform, which builds on a partnering agreement from earlier this year. The cooperation intends to have a volume of more than 1 million units over lifetime and includes the equipment of five all-electric SUVs with MEB components. The two companies will also explore opportunities for collaboration, hinting at a broader strategic partnership to speed up the electrification of India's automobile industry.

The Australian government will seek to introduce fuel-efficiency standards to help push more EVs into the domestic market and improve their affordability. EVs now account for just 2% of new cars sales in Australia – a rate nearly five times lower than the global average. Minister for Climate Change and Energy Chris Bowen said expanding Australia's EV market and improving fuel-efficiency standards will be the focus of a new national electric vehicle strategy. Bowen said a discussion paper on it will be released for consultation in September. The government will also look to set a low-emissions vehicle target for the commonwealth fleet of 75% of new leases and purchases by 2025, in a bid to encourage more EV model introductions and to expand the resale market.

Bank of Australia is looking to ditch fossil fuel car loans from 2025 to encourage more people to go electric. The bank's chief impact officer, Sasha Courville, said the announcement would send a message that "if you're considering buying a new car you should think seriously about an electric vehicle, both for its impact on the climate and for its lifetime cost savings." Courville said the bank chose 2025 because the change to electric vehicles needs to happen quickly. "We believe it can with the right supporting policies in place to bring a greater range of more affordable electric vehicles to Australia," she said.

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