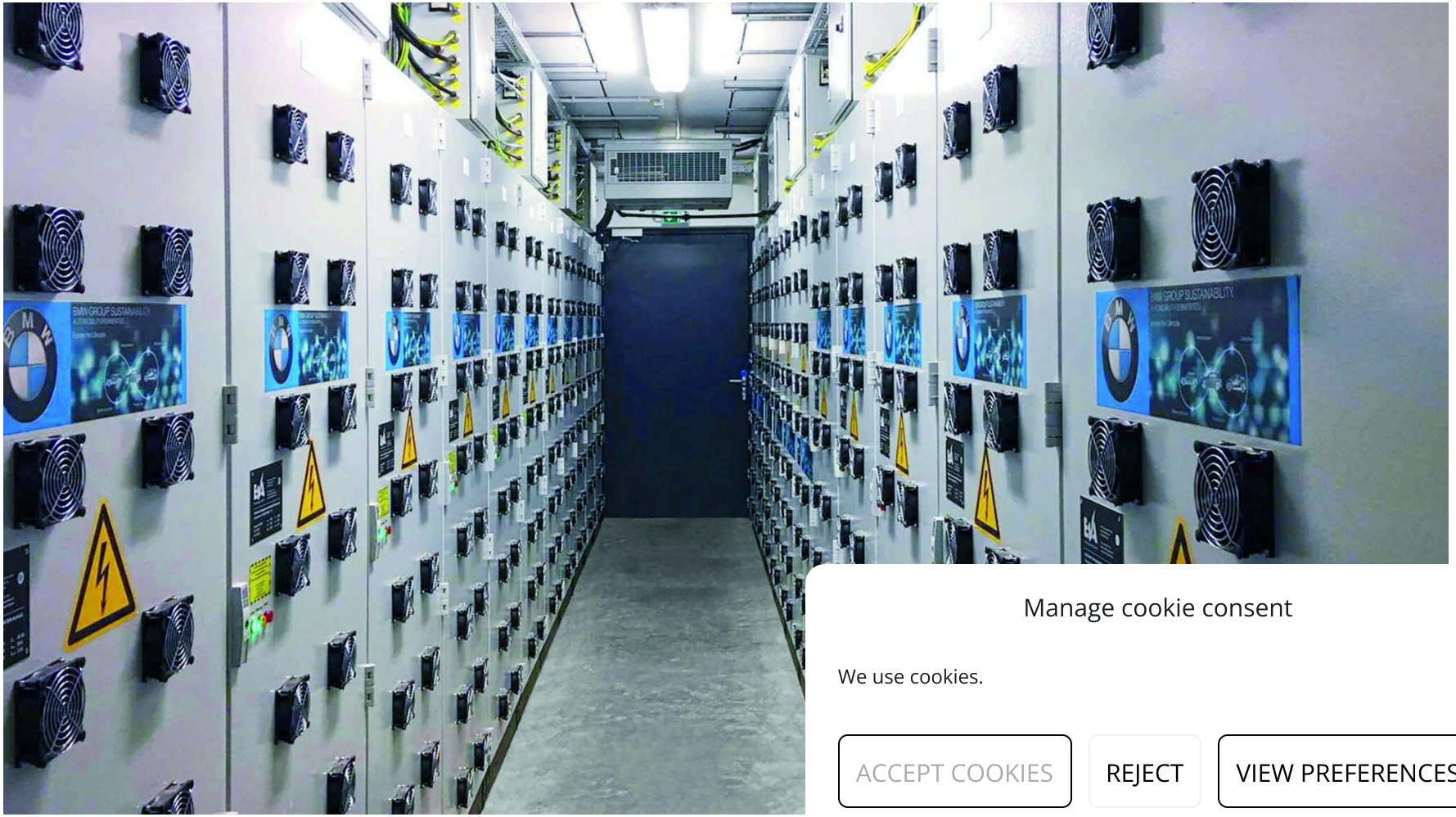
E-CAR BATTERIES: TOO GOOD TO RECYCLE

04.06.2025 | Sustainability



Discarded electric batteries from the BMW 3i act as grid storage in Hamburg

What happens to electric car batteries when they are no longer suitable for use in the car? They are usually much too good for the shredder, so it's worth giving them a second life.

Despite the end of their mobility life cycle, electric car batteries usually still have around 80 percent of their original capacity. This offers potential for a "second career" as stationary energy storage systems, for example to buffer solar or wind power – a promising way to support the energy transition and at the same time use valuable raw materials more efficiently.

After about eight to 15 years of use in vehicles, batteries are considered "used up" for road traffic. The fact that the requirements in car use are very high plays a role here: High performance and resistance to weather influences such as extreme heat or cold are crucial to maintaining traffic. But different rules apply to stationary use. "With a capacity loss of 20 percent, e-car batteries can still act as excellent storage systems for electricity from renewable energies," explains Gregor Glanz, battery researcher at the Austrian Institute of Technology (AIT).

E-CAR BATTERIES AND THEIR SECOND LIFE

As part of the EU-funded "Battery2Life" project, AIT is researching how used electric car batteries can be used primarily as home storage systems and how their life cycles can be extended. Another possible use is that of modular grid storage systems. In large storage facilities, for example, modules from e-car batteries can be combined to form massive energy storage systems and buffer fluctuations in the power grid. These grid storage systems support stability by storing surpluses of solar and wind power and feeding them back into the grid when needed. They play an important role in covering peak loads and can also serve as a reserve in the event of a blackout.

Individual modules made of e-car batteries, on the other hand, are well suited as home storage systems. These storage systems are able to cover the daily electricity needs of a household and make it possible to make solar power available from one's own roof around the clock. A discarded battery from an electric car could be used for five to ten commercially available home storage systems and thus represent a cost-effective alternative to new battery storage systems.

Used batteries from electric cars (here Nissan Leaf) are reuse

TECHNICAL ADAPTATIONS AND CHALLENGES

E-car batteries are less stressed in stationary use than in mobile use, which means that the loss of capacity of around 20 percent is unproblematic. A battery bank is simply larger in size to counteract the loss of performance. The limiting factor is rather the remaining service life of the batteries, which is optimized by special management systems.

"A fine-meshed battery management system (BMS) can significantly extend the life of a used battery by preventing the storage systems from being completely discharged," says Glanz. In order to integrate only the most powerful modules into stationary energy storage systems, researchers in the "Battery2Life" project are working on methods to detect weak battery cells at an early stage. The "state of health" is assessed by charging cycles, voltage and temperature behaviour, which are monitored via the BMS. In the long term, pressure sensors and strain gauges could enable more precise statements about the battery condition.

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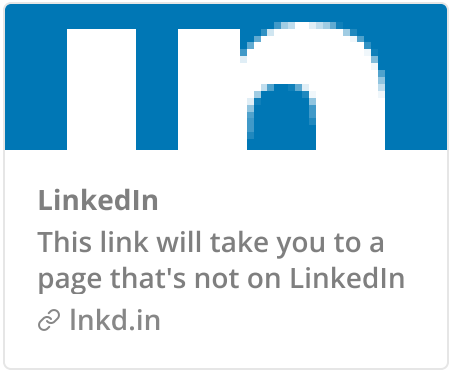

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