



Battery storage systems for electric charging stations

# RAPID CHARGING MADE EASY

The automotive industry is making the switch. From Audi and Volvo to Fiat and Vauxhall, ever more manufacturers are committing themselves to a date for saying goodbye to internal combustion engine technology. However, there are still a number of obstacles to overcome on the path to **electromobility**. One of these is rapid charging. **Commeo, Schulz Systemtechnik and Rittal** are demonstrating how **battery storage systems** are the answer.

Text: Dr Jörg Lantzsch and Hans-Robert Koch

It takes just a few minutes at a conventional filling station. Your car soon has a full tank again and can cover several hundred more miles before it needs to be refuelled. Electric vehicles now have an acceptable range, and progress is also being made with high-speed charging technology. With the current battery technology, charging equipment and cables, around half an hour's rapid charging is sufficient for a range of a few hundred miles. However, major challenges still exist when it comes to building the charging infrastructure. In many cases, for example, distribution grids are not designed to provide the capacity required for rapid charging.

**MAINS CONNECTIONS ARE OFTEN INADEQUATE**

Domestic power outlets provide charging capacities of between 10 kW and 35 kW per residential unit, which means typical garage wallboxes for charging electric vehicles have a maximum capacity of 11 kW. That may work for a single vehicle sitting

in the garage of a family home overnight, but if several vehicles need to be charged at the same time in a larger residential complex – in an underground car park, for instance – the available capacity is inadequate in most cases. Rapid charging in particular is impossible with conventional mains connections. Even industrial properties have their limits. Unless they have their own medium-voltage connection, the available capacity is barely adequate for rapid charging.

**BATTERY STORAGE SYSTEMS ARE THE ANSWER**

Expanding distribution grids is an extremely costly and time-consuming business, but one solution to this problem is to use battery storage systems that are installed along with charging columns. These can store power from the grid to make the charging process much faster. Provided there is no electric vehicle at the charging station, the batteries store the electrical power from the grid. If a vehicle then needs to be charged quickly, the battery system can boost the capacity.

Schulz Systemtechnik GmbH has set up a charging station based on this principle at its headquarters in Wallenhorst. The company develops automation solutions, adopting a multidisciplinary approach that encompasses everything from mechanical and electrical engineering to IT expertise. Besides covering the entire charging infrastructure, it also skilfully combines different energy solutions to

create one efficient system. In Wallenhorst, the plant specialist has developed a charging station with a charging capacity of 150 kW that is available to visitors and the public for rapid charging. "Given that our mains connection at the site has a reserve of just 110 kW and expanding the grid with a new medium-voltage transformer would have required a huge investment, we decided on the alternative of a battery storage system," explains Tobias Schulz, CEO of Schulz Systemtechnik GmbH.

The project was successfully implemented in collaboration with Commeo and Rittal. Commeo GmbH supplied the battery storage system and Rittal the necessary outdoor enclosures and system technology. Commeo and Rittal have been working together on energy storage projects for a number of years now. "Our battery storage systems are based on lithium-ion technology. They need ambient conditions to stay within an optimum range, especially when a permanent discharge capacity of over 4C is required, as is possible with our power systems," says Michael Schnakenberg, CEO of Commeo. If batteries are forced to operate at excessively low or excessively high temperatures, the storage system suffers. System technology from Rittal creates the basis for compact storage systems where the batteries can work under optimum ambient conditions.

These batteries are housed in a double-walled outdoor enclosure with a ▶



*"Our energy storage systems are a benchmark with the 'Made in Germany' hallmark."*

Michael Schnakenberg  
CEO of Commeo GmbH



**Making life easy is the answer:** Charging works just like refuelling at a conventional filling station. Commeo's battery storage solution is located right next to the electric charging column, securely housed in an outdoor enclosure from Rittal (right).



**365,300** electric cars were licenced in Germany in April 2021



Germany currently has **23,300** charging stations



**Dream team:** The charging infrastructure consists of an electric charging column and a battery system in an outdoor enclosure from Rittal (at the rear).

robust surface that is resistant to sunlight, rain and corrosion. The equipment inside is also protected against vandalism and slight knocks when cars are parking up.

**PERFECT CONDITIONS FOR THE BATTERIES**

The system is equipped with enclosure heating and an energy-efficient cooling unit from the Blue e+ series. Whatever the weather, this means the temperature of the batteries always stays within the optimum operating range of between +5 °C and +35 °C. The outdoor enclosure also reliably protects against moisture, because the double-walled design means there is virtually no internal condensation. "Unlike other suppliers, we don't use water to cool the energy storage blocks, meaning they require absolutely no maintenance and can be used far more flexibly," explains Schnakenberg. The individual blocks themselves have cooling fins on the side of their casing only, with thermal management taken care of by the enclosure's climate control. "The availability of four different cell chemistries, systematic modularisation and the currently unparalleled level of safety make our energy storage systems a benchmark for industrial



*"Clever combinations can create an ideal and, most importantly, reliable charging infrastructure."*

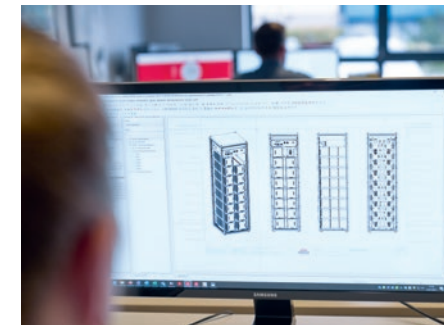
**Tobias Schulz**  
CEO of Schulz Systemtechnik

and commercial applications – all with the 'Made in Germany' hallmark," continues Schnakenberg. Using industry-proven components such as plug-in connectors and enclosures makes the Commeo systems far, far easier to build and extend.

**VX25 – THE PLATFORM FOR BATTERY STORAGE SYSTEMS**

The VX25 framework from Rittal serves as the mechanical basis for the systems. Commeo sees this solution's suitability for industrial use as a key advantage. Excellent frame stability thanks to a load-carrying capacity of 1,500 N means heavy battery systems can be installed without any problems – even in a flexible arrangement between enclosures. A total of 45 battery blocks, each with a capacity of 1.5 kWh, are snugly housed in a single rack in the battery storage system enclosure, which is only around 70 cm wide. The remaining space can be used for control technology from Commeo, climate control and further installed equipment.

The modular system from Rittal includes all necessary components – from enclosure lighting and climate control to monitoring systems for temperature and humidity. At the engineering stage, Schulz



**Reliable protection:** The climate-controlled outdoor enclosure keeps the battery storage systems working to optimum effect (above).  
**Efficient planning:** 3D design planning with Eplan Pro Panel generates the system's digital twin.



**Easy as anything:** The VX25 enclosure system accommodates Commeo's heavy battery systems without any problem.

Systemtechnik also benefited from the Eplan Data Portal, which includes all relevant data for electrical and design planning – not just for Rittal modular system components, but also for the Commeo battery blocks. Using this data simplifies both electrical planning in Eplan Electric P8 and 3D design planning in Eplan Pro Panel, during which a digital twin of the system is generated. Commeo also supplies the charging station's energy management system, which monitors and controls all components – from grid feed-in and the battery storage system to the actual charging technology, including the billing system. The enclosure monitoring technology is connected, too, along with the activation system for climate control.

**RAPID CHARGING IS POSSIBLE**

The charging system built by Schulz Systemtechnik demonstrates how battery technology enables rapid charging, even if the capacity of the mains connection is actually inadequate. "Combining energy storage technology from Commeo with system technology and outdoor enclosures from Rittal creates an ideal and, most importantly, reliable charging infrastructure," says Schulz with conviction. ■

**1,000,000**

public charging points  
is the European Green Deal  
target for 2025

**287,000**

public charging points are  
currently available in Europe



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