
Swiss consortium builds “mega charging station”

Battery-backed charging container to make commercial vehicles capable of long-distance travel and reduce the pressure on electricity grids

19.12.2022 – Winterthur-based Designwerk Technologies AG is building a new type of megawatt charging system. It has been designed to enable rapid charging of e-trucks within 45 minutes. The aim of the partnership-based pilot project is to make e-trucks capable of long-distance travel and alleviate the strain on power networks. The technological basis is a new charging standard for heavy commercial vehicles.

Designwerk Technologies AG is currently building one of the world’s first megawatt charging stations. The container-sized charging station is scheduled to start charging e-trucks in spring 2023. It is expected to be up to six times faster than conventional high-capacity charging stations with a 350 kW output. Integrated battery buffers are designed to cope with peak demand. Another aim is for the charging stations to operate in a way that is beneficial to the energy grid. Scientific support for these technical innovations is provided by the Swiss Federal Office of Energy (SFOE) and prominent industrial partners. The research side of the project involves the Bern University of Applied Sciences (BFH) and the University of Applied Sciences of Eastern Switzerland (OST).

Good charging infrastructure for commercial vehicles is essential

Heavy vehicle traffic is a key factor in the energy transition and the achievement of climate targets. Around 6.6 million trucks are at work on Europe’s roads. They transport 76.7% of all land-based freight. Consequently, it is also important to increase the proportion of low-emission or zero-emission means of transport in this sector. “A new kind of charging infrastructure is needed for long-distance trucks in particular, as well as for ships and aircraft. It is different from the infrastructure for electric cars and makes it possible to charge heavy commercial vehicles in a short time. This helps to ensure that zero-emission freight transport reaches every field of application,” explains Vivien Dettwiler, a member of the Designwerk management. In order for the system to find the necessary acceptance, it is based on the new charging standard called the Megawatt Charging System, or MCS for short. This was launched globally in June of this year.

Security of supply as a project element

The recognition that powerful charging stations require networks is an integral aspect of the project’s initial situation. The demonstration facility is therefore intended to highlight ways in which a high-capacity charging network and security of supply can go hand in hand. “We install Second Life e-truck batteries in our charging containers as a buffer to cope with peak demand. This not only eliminates the need to expand the grid, it also means that the battery system should be able to feed renewable electricity back into the grid,” Dettwiler says. Similar to bidirectional charging, electromobility can therefore be incorporated into supply solutions. Demonstration systems at Galliker Transport AG, Käppeli Logistik and Murg Flums Energie will prove that this works.

Key technical data for the Mega Charger demonstration system

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| Prototype construction location | Winterthur, Switzerland |
| Demonstration project | Megawatt battery charging system for heavy commercial vehicles |
| Product name | Stationary Battery Backed Mega Charger |
| Dimensions L×W×H | 8600×2550×3000mm |
| Weight | 25 t |
| AC input data | 88-400 kW, TN 3×125-580 A, 400 VAC +-10%, 50 Hz |
| AC connector type | CEE 125 and fixed connection, 3P+N+PE |
| Battery buffer | 1'800 kWh |
| Battery storage technology | NMC, Second Life use or new |
| DC output data | max. 3'000 A, 500-900 V, max. 2'100 kW |
| DC connector type | Liquid-cooled, CCS type 2, MCS |
| Efficiency | Network > Battery > Vehicle > approx. 0.9 |
| Operation | Status display, buttons |
| Connectivity | OCPP 1.6j, Modbus |
| Thermal management | Water / air: continuously variable, temperature-dependent |
| Transport | Transportable by container in accordance with UN38.3 |

Images

You can download the images from the website <https://www.designwerk.com/megacharger>.

You will also find the captions in the downloads section.

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Designwerk Technologies AG

Designwerk Technologies AG specialises in electromobility for commercial vehicles, with a particular focus on developing, driving, charging and storing.

Our founders' passion for electromobility grew during the 80-day, all-electric world record circumnavigation with the specially developed Zero-tracer fully-enclosed electric motorbike. Since being formed in 2008, Designwerk has been driving electromobility forward with innovative products and projects with the aim of spreading sustainable mobility.

Small-series electric trucks, mobile fast chargers, battery-backed megawatt fast charging stations and modular high-voltage battery systems are developed and manufactured under the Designwerk brand. The e-trucks include the first fully electric refuse collection vehicles on Swiss roads and the e-trucks with the largest battery capacities and ranges currently available on the market. The chargers are widely used by European vehicle manufacturers. Its modular traction batteries enable small and medium-sized vehicle manufacturers to make the successful transition to electric mobility.

The Volvo Group has held a stake in Designwerk since 2021. Today, the company employs 150 people at its headquarters in Winterthur and its facilities in Basel (Switzerland) and Lottstetten (Germany).

Further information

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