The smarter E Europe
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THE SMARTER E TREND PAPER: PV, STORAGE AND E-MOBILITY THE LATEST TRENDS AND DEVELOPMENTS AT THE SMARTER E EUROPE 2022

Munich/Pforzheim, July 2022: As we move towards decarbonization and greater sector coupling, the worlds of photovoltaics, battery storage and e-mobility are becoming increasingly intertwined. As a result, we are seeing new opportunities emerge to make cost-effective and climate-friendly use of solar power (including on-site consumption) and to increase the resilience of our energy supply system, including improving both supply security and grid stability. This trend was clear to see at The smarter E Europe 2022.

The big focus is on efficient, versatile and modular products which score highly on user-friendliness and easy installation, such as smart wallboxes complete with energy management systems, scalable battery storage solutions, multifunctional inverters and high-efficiency modules. An ever growing number of these technologies are being supplied as complete solutions from a single provider. New business models are also emerging, such as companies that operate and manage commercial charging infrastructure, partnerships between EV carsharing and EV charging providers, opportunities to trade in greenhouse gas reduction quotas (GHG quotas) and businesses transforming second-life EV batteries into battery storage solutions. Last but not least, we're seeing advances in bidirectional charging – i.e. Vehicle2Home (V2H) and Vehicle2Grid (V2G) systems – and vehicle-integrated photovoltaics are increasingly coming to the fore. Artificial intelligence (AI) plays a vital role in making many of these technologies and business models a reality.

Today's manufacturers are increasingly looking to provide their customers with a complete solution – i.e. not just solar modules, inverters and battery storage, but also wallboxes, EV charging points and other products such as solar carports. As self-generated solar power becomes a more attractive option, we're seeing PV systems and battery storage solutions get bigger and more powerful, as well as being more versatile and easier to install. Complete PV solutions from a single supplier offer wide-ranging advantages for installers and end customers, not least simplified servicing arrangements and warranty agreements.

The very latest state of the art solutions are based on scalable and modular inverters/battery inverters and battery storage, which can be adapted to different applications. In fact, the distinction between private and commercial applications is gradually disappearing as a range of different power classes and sizes come onto the market. Storage solutions with integrated inverters, which can be connected directly to the PV system and offer coupling options for both direct current (DC) and alternating current (AC), are becoming increasingly popular. Many solutions now include a back-up power function in case power from the grid is lost.

The big-name producers of inverters and battery storage solutions have all expanded their ranges to include wallboxes with various features and charging modes, which can be integrated into energy management and smart home systems. Most of these technologies make use of artificial intelligence (AI). For instance, The smarter E Award 2022 was awarded to an Austrian manufacturer for its AC charging solution that enables users to charge their electric vehicles and at the same time optimize consumption of their own self-generated solar power. The wallbox can automatically switch between a single-phase and three-phase electricity supply, offering optimized charging of electric vehicles

from 1.38 to 22 kilowatts. This wide range ensures that even small amounts of self-generated excess energy are put to use. The wallbox also has a built-in connection to electricity suppliers with variable tariffs, so that – if there is insufficient self-generated solar power available – vehicles can be charged when the electricity price is low.

Another solution showcased at The smarter E Europe 2022 was an app that enables users to optimize the solar power usage of their wallbox. The app uses historical weather reports and other data such as the size of the PV system and individual patterns of consumption to generate a yield forecast, which it then uses to manage the wallbox charging process. This smart solution is compatible with all PV systems.

Most of the latest generation of wallboxes offer a networking option, either using a wireless WIFI or Bluetooth connection, in-built LTE cellular module or LAN cable. The operating mode and state of charge are shown on the wallbox display and the charging process can be adjusted using the touchscreen or via a smartphone app or computer browser. Voice control options are also available. An in-built MID meter automatically calculates the amount of electricity used to charge individual vehicles, e.g. company cars or vehicles belonging to different staff members. Employees and those who are self-employed can therefore easily keep a separate record of any electricity they use for business travel. PIN code, RFID card or app-based options are also available to verify users' identity before allowing them to use the wallbox.

Also on display at The smarter E Europe were some bidirectional DC chargers for home use. These chargers allow electricity to flow from the charger into the electric vehicle and vice versa. This means electric vehicles can be used to store energy and then feed it back into the grid/home network to reduce energy consumption (Vehicle2Home and Vehicle2Grid). In other words, electric vehicles become both storage devices and charge boosters. A prominent German automotive supplier also presented an interesting solution for commercial EV car parks aimed at all-day parking and fleet operators, with 18 to 100 charging points and single phase AC charging up to 7.2 kilowatts. Their flexible phase-specific charge management solution distributes the available charging power between the parked EVs and uses the vehicles as an adjustable load, thus saving costly investment in work to expand the grid connection.

Another big trend are AC charging solutions for company EV fleets that reduce demand on the grid by using self-generated solar power from modules on the company roof or large solar carports. A key component of these solutions is the charge management software, which forecasts how much energy the PV system is expected to produce and then charges the EVs when the sun shines. Companies offering these solutions, including many start-ups, are also developing new business models, which go beyond the basic installation of the commercial charging infrastructure and include services such as accounting, maintenance and operation. Equally exciting (and not just from a business perspective) is the prospect of EV carsharing and EV charging providers teaming up to install customized AC and DC charging infrastructure. Similarly, The smarter E Europe showcased some potential solutions to the questions around installing and managing charging infrastructure in existing buildings such as hotels and industrial premises.

Another area that is looking extremely promising is the idea of using second-life (or second-use) EV batteries for stationary storage. This year, a German manufacturer of storage systems was awarded the The smarter E AWARD 2022 for its innovative, large-scale stationary storage system which uses a combination of new, zero-use car batteries and second-life batteries from a well-known car manufacturer. The system therefore also serves as a replacement battery store. It is housed in a container, inside which 72 EV batteries – each with a capacity of 40 kilowatt hours – are connected together to create a storage capacity of 2.88 megawatt hours. Together the batteries provide a primary balancing reserve for grid stabilization. Similarly, the ees AWARD 2022 was awarded to a

start-up in North Rhine-Westphalia, Germany, which builds battery storage systems exclusively from second-life lithium-ion EV batteries, which it sources from a range of different automotive manufacturers.

Vehicle-integrated photovoltaics for electric cars and refrigerated trucks are also emerging as a solution for the future. The area is still in its infancy, but the conference program at The smarter E Europe provided an opportunity to showcase and discuss the latest developments.

Finally, the opportunity to use your electric vehicle to earn some extra income by trading greenhouse gas reduction quotas is no longer merely a vision. Germany's emissions quota trading system has been up and running since January 1, 2022, and GHG quotas can now be sold on to businesses. Owners of purely battery powered cars, motorbikes and scooters can register their vehicle with service providers or electricity suppliers. These companies will then sell the carbon emission savings on to fuel producers following verification and certification by the German Federal Environmental Agency. Fuel producers across the EU are required to reduce their greenhouse gas emissions and are permitted to offset them using the electricity consumed by electric vehicles. Vehicle owners can receive up to 350 euros a year under this scheme.

For further information, please visit:

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