The smarter E Europe
The smarter E Europe Conferences
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THE SMARTER E EUROPE TREND PAPER: PARKING LOT PV

Munich/Pforzheim, March 2023 – The rate of expansion within the photovoltaics (PV) sector in Germany is set to triple over the next few years to reach 22 gigawatts (GW) per year, which will contribute to the decarbonization of both the economy and society. This is leading to a shift away from the more "traditional" open spaces and roof surfaces of private homes, with other available areas now also being targeted. Parking lot PV, which includes PV installations on carports as well as roofing over vehicle parking lots, represents an application for photovoltaics that has recently gained political support. The benefits of this application are manifold. Twice as much use can be made out of developed parking lot areas, the roofing provides sun and weather protection and, in conjunction with wallboxes and charging stations, the electricity can be used right where it is generated.

Boost reputations and reduce carbon emissions with parking lot PV

Nowadays, parking lot PV systems offer supply solutions that go way beyond individual solar carports installed at private homes. On a large scale, companies in the industrial sector and properties used for commercial purposes are able to secure their own electricity supply with solar power, while large parking lot facilities can contribute to the development of a comprehensive charging infrastructure for e-mobility and, in turn, to the mobility transition as a whole. As a positive side-effect, operators gain a considerable boost to their reputation and implement effective measures to reduce carbon emissions in order to fulfill their climate protection obligations, as well asgenerating added value from parking lot areas. In addition, the roofing protects the surface of the parking lot.

In spite of all this, parking lot PV still has several hurdles to overcome. Owing to regulatory building specifications, both planning times and standards are currently higher in comparison with traditional roof-mounted systems. Investment costs are also higher, as special roofing structures are included in the calculations.

Huge untapped potential for parking lot PV

At the 38th PV-Symposium 2023, held in the German town of Bad Staffelstein, Fritz Haider from the *Fraunhofer Institute for Solar Energy Systems* ISE demonstrated the incredible, and as yet untapped, potential of parking lot PV in Germany. According to his calculations based on OpenStreetMap data, parking lots cover a total area amounting to 47,060 hectares with around 360,555 parking spaces. If, in accordance with these figures, calculations are based on a technical surface area potential of 284 km² (square kilometers), this results in a specific yield of 930 kWh (kilowatt hours) per year, assuming PV is applied to the entire surface of these spaces. This would correspond to a technical capacity potential of 59 GW_p (gigawatt peak). Making full use of this simulated potential would mean that just under a quarter of the 215 GW of installed PV capacity – which is the target that the German government is aiming to reach by 2030 – could come from parking lot PV.

Parking lot PV mandatory in six German federal states

The problem, however, lies in the fact that the obligations adopted in different German states relating to parking lot PV currently only apply to new buildings, and not to existing parking lots. In the German states of Baden-Württemberg and North Rhine-Westphalia, PV has been mandatory for new parking lots with more than 35 spaces since early 2022. Rhineland-Palatinate, Lower Saxony and Schleswig-Holstein followed suit at the start of 2023, with mandatory PV applying to parking lots with a

minimum number of spaces ranging from 50 to 100. In November 2023, a similar rule will come into force in Hessen for those with more than 35 or 50 spaces. Incentives aimed at existing parking lots are needed to increase the potential of areas that have already been developed.

EEG: deficits in parking lot PV subsidies
The current handling of parking lot PV under the Renewable Energy Sources Act (EEG) reveals a clear need for regulatory improvement. Parking spaces with PV roofing are considered to be other structural installations, which makes them subject to base remuneration. This does not currently reflect the fact that investment costs are up to 50 percent higher in comparison with classic rooftop installations and leads to parking lot PV only being considered economically viable in conjunction with self-consumption and e-mobility integration solutions.

Growing market: innovation and development
According to Market Data Forecast statistics, in 2022 the global solar carport market reached a record high of 524 million US dollars and is predicted to grow to 685 million US dollars by 2028. The installation of parking lot PV systems still has a lot to offer in the way of creative scope. There is a distinction between completely roofing an entire parking lot and covering just the parking space area.

Carports: slimline structures made from natural materials
Aesthetically pleasing carport structures are possible thanks to developments aimed at keeping steel frames and roofs as slim as possible, as well as promoting the use of natural materials such as wood. A good example of this is the photovoltaic carport located on the premises of utility company EnergieDienst in Rheinfelden, Germany. The 504 PV modules have been installed to form a semi-transparent roof covering. A hybrid structure comprised of wood and steel was used to construct the roof. The installation also features 14 wallboxes, each with a charging power of 22 kW AC, and a 110 kWh (kilowatt hour) battery storage system.

Pioneering projects in parking lot PV
There are many projects, both in Germany and worldwide, that are setting new standards when it comes to parking lot PV. The largest PV parking lot in Germany is currently located at the MOSOLF Group’s logistics center in Rackwitz, Saxony. The installation spans an area of nine hectares and consists of 35,000 solar modules. Upon completion, it will reach a peak capacity of 16 MW and cover approximately 6,000 parking spaces. The green energy produced is fed into the grid and the installation generates 40 times more electricity than the company itself consumes. Another large-scale project was carried out in Germany at Düsseldorf Weeze Airport. A four MW solar installation is mounted over 66 carports, which covers 1,350 parking spaces, and the electricity produced is used directly by the airport.

The largest parking lot PV system in the world is currently located in Biddinghuizen in the Netherlands. This 35 MW solar carport has 90,000 solar panels and covers 15,000 parking spaces connected to an events venue, where several large music festivals are held every year. The electricity produced there replaces the previously used generators that were causing pollution. Just one percent of the electricity generated is used to operate the festivals and the rest is fed into the grid. During the periods when no festivals are taking place, sheep graze on the 35-hectare site.

At the Silverton Assembly Plant production site, which is located in Pretoria, South Africa and owned by car manufacturer Ford, a 13.5 MW parking lot PV installation with 30,226 solar modules now meets 35 percent of the plant’s electricity demand. This contributes to the company's goal to only produce with climate-neutral electricity by 2035.

The smarter E Europe 2023 and accompanying conferences

The smarter E Europe will be held under the motto "Creating a new energy world" this year from June 14 to 16 at Messe München. With the four energy exhibitions Intersolar Europe, ees Europe, Power2Drive Europe and EM-Power Europe, Europe's largest platform for the energy industry offers an ideal opportunity to find out about the dynamically growing market for photovoltaics, energy storage and e-mobility in Germany and Europe as well as to make new business contacts. The industry will also receive new impetus at the four accompanying conferences on June 13 and 14, 2023 at the International Congress Center Munich (ICM). Numerous companies will be participating in The smarter E Europe. It is worth taking a look at the exhibitor list and the conference program.

For further information, please visit:
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www.intersolar.de
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