Intersolar Europe
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INTERSOLAR EUROPE TREND PAPER: PHOTOVOLTAIC MARKET AND TRENDS

Munich/Pforzheim, March 2023 - Climate change, energy transition, decarbonization: Photovoltaics is currently experiencing the greatest momentum in its history globally and has been growing continuously for years. Within a few decades, a space technology in the kilowatt range has become a main pillar of our energy generation in megawatt power plant format. As well in Germany, the solar industry is finally achieving the relevance it deserves as a result of the recent energy and raw materials crisis. However, for a successful energy transition, ambitions must keep growing: the energy system and power grid need a renewal, and the rate of photovoltaic expansion should also be rethought. And it should be on the order of gigawatts per month.

2022 was an excellent year for photovoltaics (PV). The industry grew by more than 50 percent worldwide compared to the previous year, and by around 47 percent in Europe – despite inflation and supply chain problems. As these are progressively resolved, inflation is curbed and purchasing power increases again, experts expect a further strong growth in 2023. Global additions will soon reach one terawatt (TW) per year and grow to more than three TW in the near future.

The country needs visions
In Germany, the federal government has formulated ambitious goals for transforming the energy market: By 2030, installed solar capacity is expected to increase to 215 gigawatts (GW), and a phased plan calls for an annual increase of 7 GW in 2022 and up to 22 GW in 2026. According to the Federal Network Agency, PV systems with the capacity of 5.5 GW were built last year under the EEG support program. Overall, additional PV capacity in Germany in 2022 is estimated at 7.9 GW – a growth by 31 percent.

However, in the opinion of many experts the ambitions can hardly be high enough. Photovoltaics should be thought of on a terawatt scale in Germany – this is the conclusion made by the PV Think Tank in its impulse paper "From Megawatt to Terawatt - New Standards for Photovoltaics". In this paper, the authors call for significantly more ambitious expansion targets than in the past. Nonetheless, official forecasts often lag behind this vision and in many cases seem too conservative. According to experts, the German government should also substantially raise its PV targets. The shortage of raw materials, the climate crisis and the paradigm shift would act as push factors for a significant increase in the number of new installations. At the same time, the module design of the latest module generation and further falling costs are decisive factors for the transition to the solar age. For more energy security, production capacities of at least 600 GW must also be built in Europe in order to reduce dependence on China. Solar experts from business and science work in the PV Think Tank.

Photovoltaics in Europe
Germany currently continues to maintain its top position – both as the largest solar market in Europe and as the biggest PV operator. But PV additions are making progress throughout Europe: PV installations with the capacity of 41 GW were newly built last year. In addition to Germany, Spain, Poland and the Netherlands are currently the most important markets.

Two of the four nations are also ahead in terms of installations per capita across Europe: with 1,044 watts per capita (W p.c.), the Netherlands ranks first, followed by Germany (816 W p.c.) and Denmark (675 W p.c.). Conservative expert estimates assume a PV addition in Europe of 54 GW in 2023, rising to 85 GW by 2026. Optimistically estimated installed capacity could increase from around

200 GW today to one terawatt by the end of the decade. Researchers put the growth rate for the EU in 2023 at 29 percent.

At the top of the EU agenda is ending Europe's dependence on fossil fuels from Russia. With the so-called "REPowerEU" plan, the European Commission is pursuing the goal of a quota of 45 percent alternative energy by 2030. In addition, a package of actions to facilitate approval procedures for solar projects has been launched. And the current price increases on the energy market are not only having negative effects: As prices for alternatively generated energy continue to rise, so do the chances of success for solar projects – and thus the likelihood of zero-emission companies dominating the market in the near future.

The global number one

Photovoltaics is becoming the world's most important energy technology. In 2021 already, half of all newly built energy capacities consisted of PV systems, and in 2022, according to expert estimates, this figure was as high as two-thirds. This means that PV has overtaken wind energy for the first time and is demonstrably the number one renewable energy source worldwide. Besides other reasons, this is caused by drastically falling costs worldwide. PV power plants have been priced at less than 1.5 US cents/kWh in tenders in Saudi Arabia and Chile. There is no technology in the world that generates electricity more cheaply.

With global installed capacity exceeded the terawatt mark for the first time in 2022, it is only a matter of a few years before the second terawatt is reached. New installations totaled 268 GW worldwide in 2022 and are expected to grow from 300 GW to 400 GW in 2023. Analysts expect annual installed PV production capacity to reach the 1-TW mark in the second half of the decade. By the mid-2030s at the latest, researchers forecast annual additions of three TW.

The industry leader is clearly China. New PV addition records were set in 2021 with 55 GW and in 2022 with 87 GW. The capacity of Chinese cell production is expected to rise to 600 GW this year. The U.S. is also seeing record additions, with 23 GW in 2021, though at 19 GW, additions in 2022 were slightly lower. PV is thus responsible for 45 percent of capacity additions in the U.S. electricity market. From 2024, annual additions of 30 to 40 GW are expected.

Industry trends: land, water and storage

The abolition of the EEG apportionment in Germany makes the use of self-generated solar power on a large scale interesting for agricultural businesses, especially for self-consumption. In addition, the dual use of agricultural land for food and solar power production is increasingly becoming a trend. More and more farmers are opting for ground-mounted solar systems with trackers on fields and meadows. These follow the path of the sun and can thus deliver around 20 percent more yield than conventional fixed-mounted modules.

Another trend in the future-oriented solar energy sector is offshore PV: High-performance solar modules are anchored floating off the coast. A promising pilot project started in the Netherlands in 2018. German utilities are currently investing large sums in Scandinavian companies' installations, which promise 100 MW of power in the near future.

Another technology trend and future gamechanger of the energy transition: storage infrastructure. The expansion, interconnection of existing systems and upgrading with artificial intelligence will give electricity storage systems an important role. Solar and wind power plants can optimally complement each other in power generation through additional storage capacity, as one technology usually delivers the highest yield when the other reaches its minimum: when there is no wind and the sun is shining, or at night and the wind is strong. Private PV users also have the opportunity to become prosumers through storage capacity, as the technology makes it possible to feed surplus electricity into the grid, store it and make it available at the right place at the desired time.

The forecast: sunny
2022 was an impressive year for the solar industry. Experts continue to forecast strong growth for the years from 2023 to 2026. Module prices were generally high in 2022 but have settled at a stable level due to improved availability in Europe. The shortage of polysilicon production capacity is coming to an end, while there continues to be some shortage of inverters.

Nevertheless, the solar industry in the EU is set for another record year in 2023, with a growth of 29 percent. Germany and Spain will reach the magic 10 GW mark for the first time, setting new European records. In 2024, a medium scenario expects growth to 62 GW in the EU. The growth rates of the medium scenario remain in a similar range in the following two years – 19 percent in 2025 and 15 percent in 2026, resulting in an annual solar power expansion volume of 74.1 GW in 2025 and 85.2 GW in 2026.

Intersolar Europe 2023 and conference
Trends and innovations in the industry will be presented at Intersolar Europe 2023, the world's leading exhibition for the solar industry, which will be held at Messe München, German from June 14-16, 2023, as part of The smarter E Europe. The industry will also receive new impetus at the accompanying Intersolar Europe Conference on June 13 and 14, 2023, at the International Congress Center Munich (ICM). Numerous companies will be participating in Intersolar Europe. It is worth taking a look at the exhibitor list.

For more information, please visit:
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