

**The smarter E Europe
The smarter E Europe Conferences
Munich, June 14–16, 2023**

THE SMARTER E TREND PAPER: SOLAR HYBRID POWER PLANTS

Munich/Pforzheim, November 2022: There is a growing trend to combine large-scale photovoltaic installations with wind power and battery storage systems. By including the variable energy sources wind and sun and storing generated electricity, this set-up enables a more stable power generation and supply, while also having other advantages – such as a more efficient grid utilization.

In addition, this paves the way for new business models such as 24/7 power purchase agreements. Germany is subsidizing the use of several, combined technologies with the aim of guaranteeing supply security within the framework of so-called innovation tenders with specified tender volumes.

Optimized generation profiles and demand-based feed-in

For several decades, critics of the expansion of renewable energies have been citing the volatility of solar and wind energy when voicing their concerns. Hybrid power plant projects are now being developed at an increasing rate and their large-scale storage systems are supplementing the generation capacity of photovoltaics and wind, whether as separate energy sources or both combined. These current market developments mean this argument is becoming less and less credible. In fact, photovoltaics and wind energy generation profiles are generally very compatible. While wind farms mainly generate large amounts of electricity on fall or winter days and at night, the same is true on sunny spring or summer days and in the daytime for solar farms. Batteries can smooth power generation peaks and store the electricity for a certain period of time before feeding it into the grid in line with demand. This makes it possible to optimize the use of available grid capacity. What's more, batteries can be used to prevent electricity bottlenecks and to shift generation in good time.

Logistic advantages and efficient land use

Other benefits of solar hybrid power plants is efficient land use thanks to the ability to make use of the same infrastructure – such as transformer stations, grid connections or roads – for all technologies, thus lowering project development costs. The different technologies are pooled in one area and don't take up much space in relation to the amount of electricity they generate. This will be an important factor moving forward, especially in countries such as the Netherlands and Germany, which are densely populated, have strict planning regulations in place and where land is scarce. Combining different, complementary technologies also aids diversification, lowering the overall financial risk of an installation.

Hybrid power plants enable lucrative business models

Next to more cost-effective and stable power generation, solar hybrid power plants (with storage) also open up additional business models that facilitate financing via power purchase agreements (PPA), for example grid services such as providing an operating reserve to stabilize the grid, or peak shaving.

Pioneering hybrid power plant projects in Europe

We have lately seen the sharp rise of solar farms in combination with large battery storage systems. In Germany for example – partially incentivized by innovation tenders – numerous projects are underway or have been completed. This includes a 5.1-megawatts photovoltaics plant combined with a 1.7-MW battery storage system that was connected to the grid close to Freiberg (Saxony) in the summer of 2022. It is being financed by a 10-year PPA. A 34-MW PV power plant combined with an 11.7-MW battery storage system is scheduled to be completed in the spring in Merseburg (Saxony-Anhalt). Another technology with great potential for the future is the repowering of PV power plants in combination with the installation of a battery storage system. One example of this is a 55-MW solar farm in Israel that is being fitted with PV modules with a higher output (88 MW) and a battery storage system.

Combining large-scale PV installations with wind power – either in new installations or by retrofitting existing ones – has also risen in popularity. For example, a 15.9-MW wind farm in Einöllen (Rhineland-Palatinate) was retrofitted and its capacity boosted by 3 MW. In Turkey, a 26 MW solar farm is being added to a 103.2-MW wind farm near Konya, and 16 MW solar farm to a 52.8-MW wind farm near Kayseri, with the partially rugged terrain posing a particular challenge for the installation of the ground-mounted systems. Some projects are also underway in the Netherlands, including the construction of a combination power plant in the form of a 50-MW solar farm and a 50-MW wind farm that will share the same grid connection.

This is topped by the 30-hectare energy park Haringvliet in South Holland (around 50 kilometers south-west of Rotterdam), which was opened in March 2022. It consists of six wind turbines with an output of 22 MW, a free-standing PV system with 115,000 solar modules (38 MW) and a 12-MW battery storage system made up of 288 batteries housed in 12 standard sea containers. The individual components share a grid connection and a transformer station, while a control unit ensures maximum efficiency and the smooth interaction of the different technologies. Control units also play a crucial role for the other combination power plants, for example with regard to the optimized use of grid connection capacity.

Hybrid power plants will be one of the key topics under discussion at both the ees and Intersolar Europe Conferences in 2023.

Industry meeting point – The smarter E Europe 2023

The smarter E Europe 2022 will be held from June 14 to 16 at Messe München under the motto “Creating a new energy world”. With its four energy exhibitions – Intersolar Europe, ees Europe, Power2Drive Europe and EM-Power Europe – Europe’s largest platform for the energy industry provides the ideal opportunity to gain the latest information about the rapidly growing photovoltaics, energy storage and e-mobility market in Germany and in Europe as well as to make new business contacts.

The smarter E Europe conferences and exhibition forums:

At the specialist conferences and exhibition forums held as part of The smarter E Europe, visitors can learn about all aspects of the new energy world and engage in discussions with leading industry experts. Examples include decentralization, digitalization and sector coupling of the energy supply, technological trends in photovoltaics and energy storage as well as the latest charging technologies for electric vehicles.

The smarter E Europe 2023

Date: June 14–16, 2023
Venue: Messe München (Halls A1–A6, B1–B6, C1–C3)
Exhibition space: 162.000 m²
Exhibitors: 1.600
Visitors: 85.000+ (expected)

For further information, please visit the following websites:

www.thesmartere.de
www.intersolar.de
www.powertodrive.de
www.ees-europe.de

Last updated: November 28, 2022