



Flexibility is key for the next energy phase

As wind and solar capacity continues to grow across Europe, the energy transition is entering a new phase where generation alone is no longer enough. The focus is shifting toward flexibility, making renewable electricity available when it is needed. Large-scale storage and hybrid PV systems are emerging as key solutions to balance supply and demand, reduce grid congestion and unlock new value across the energy system.

The energy transition has entered a new phase. While the expansion of wind and solar energy is progressing rapidly, as we add more gigawatts, we are realizing that generation alone is no longer enough.

What Europe's energy system needs at this point is flexibility; in other words, the ability to make renewable electricity available when it is needed. Two key components of the next

expansion phase are moving into focus: large-scale storage and the intelligent combination of photovoltaics (PV) and battery storage in hybrid systems.

These technologies can help align generation and consumption, decongest the grids and open up new opportunities for investment in the solar and storage industries. This is why this year's The smarter E Europe is putting

the spotlight on large-scale storage and PV hybrid systems.

When generation itself is no longer enough

The German market marks the start of this new phase of flexibility. Renewable energy, and wind and solar power in particular, now covers a large share of the country's electricity supply.

At the same time, periods during which extremely large volumes of cost-effective PV electricity flow into the grid, often around midday and especially during sunny months, are becoming more commonplace. Prices then drop sharply, sometimes into negative territory, forcing the system to curtail renewable power. In the evenings, however, when consumption goes up and PV generation goes down, there is a lack of electricity.

Clearly, the key problem is not an 'excess' of solar power, but a lack of flexibility in the system.

Large-scale storage as part of a flexible overall system

Large-scale storage systems are crucial components of the next market phase because they store electricity during times when there is abundant renewable generation and feed it back when the grid and market need it.

This not only stabilizes the market but also facilitates the integration of renewable energy into the overall system. Alongside applications such as electrolysis, flexible tariffs, smart charging and vehicle-to-grid, large-scale storage systems are key components of a flexible energy system. Their main strengths are rapid responsiveness, precise control and their ability to provide highly effective system flexibility.

As conventional power plants are being phased out, renewable systems and BESS are taking over the job of ensuring system stability. With modern power electronics, both battery storage systems and renewable generation plants can provide important system services in the future, such as voltage and frequency control, grid support or system restoration.

This is precisely why the next challenge lies in operating different technologies in tandem to enable a climate-neutral yet robust energy system.

Economic viability acts as an accelerator

Large-scale storage systems are receiving significantly more attention than in the past, which is partly because they have become financially viable. The price of lithium-ion batteries has fallen by around 90% over the past 15 years. This has transformed battery storage from a niche solution into a relevant infrastructure component.

Growing price differences in the electricity market are also opening up new revenue potential. Storage systems can charge and store electricity during periods of low or negative prices and discharge during hours with higher price levels.

Balancing power and other energy related applications provides additional revenues. In this environment, large-scale energy storage

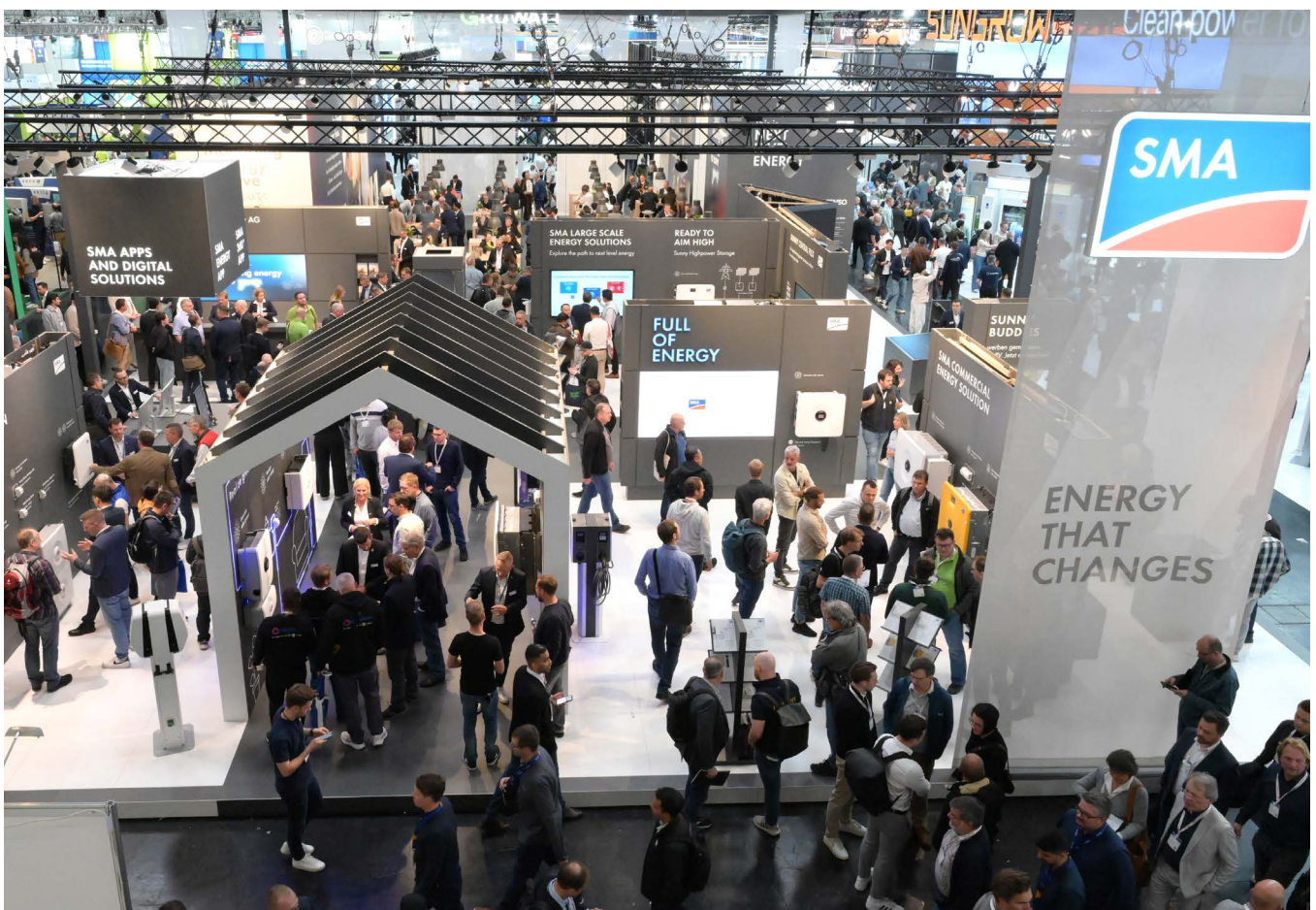
systems do not just make technical sense; they are also becoming increasingly commercially attractive.

It is interesting to note that many large-scale storage projects are now profitable in the market. Investors are no longer interested in storage solely because it is a future technology; they see it as an asset class based on real business models. Storage can boost the utilization of renewable energies, reduce curtailment and cushion price spikes in the electricity market. This creates major opportunities for the coming years. Rather than just being seen as a system requirement, flexibility is a value driver in its own right.

Practical examples show where the market is heading

Current projects in Germany clearly show how far this development has already progressed. Schoenergie's Föhren battery storage park combines a large-scale storage facility with a PV park, providing both grid-supporting functions and temporary renewable energy storage.

Another project by ECO STOR in the German municipality of Bollingstedt has 100 megawatts (MW) of output and 238 megawatt-hours (MWh) of capacity, demonstrating how the smart coordination of operations and grid conditions ensures the grid-friendly systems.



Projects like these show that large-scale storage systems are no longer merely being discussed as a theoretical option; they are emerging as real infrastructure solutions for the energy transition.

The Bad Wörishofen thermal baths are an example of the level of integration already being achieved today. The facility's parking lot was covered with a combination of a 1.34 MW PV system and three battery storage units, which provide a combined storage capacity of 3.864 MWh.

The project also features charging points for electric vehicles and a transformer station. This exemplifies a development that goes far beyond conventional individual solutions. PV, storage and charging infrastructure are converging into a joint energy platform that creates local value and makes solar power usage significantly more flexible.

Hybrid systems: from individual assets to an integrated concept

PV-BESS hybrid systems are an even more coherent way of putting this idea into practice because they combine PV and battery storage at a joint grid connection point, often connecting them via shared infrastructure such as a transformer station, substation, cabling and control systems.

The advantage is obvious: depending on the level of demand, solar power can be fed into

the grid directly, temporarily stored or sold at a later point. This transforms intermittent generation into a significantly more flexible overall system that can store electricity as needed and feed it into the grid later, allowing a more cost-effective response to grid and market requirements.

Rather than serving as a mere technical add-on, hybridization represents a new plant concept for the utility-scale market.

As conventional large-scale PV plants are coming under increasing pressure, hybridization is gaining ground. Negative and low-price hours are undermining the profitability of many solar parks.

In Germany alone, significant amounts of renewable electricity were curtailed in 2025 in response to negative or low prices. Grid congestion in distribution systems is also on the rise. This is precisely where hybrid power plants come in. They shift excess solar energy to hours when the demand and prices are higher, reducing curtailment losses and improving the utilization rate of scarce grid connections.

This creates more marketing options for operators and leads to greater system flexibility.

New business models for a new market phase

While hybridization makes planning, operation and financing more complex, it also opens up

new revenue opportunities. The battery storage system within a hybrid plant enables arbitrage transactions, supports participation in capacity and balancing markets and enhances the appeal of hybrid electricity supply contracts. As a result, conventional solar parks are turned into assets capable of combining multiple revenue streams.

This kind of diversification makes hybrid systems particularly attractive to investors, developers and operators because it makes projects more resilient to market price fluctuations and more bankable in an environment that is shifting away from rigid feed-in and toward flexible supply.

Hybrid power plants also tap into significant efficiency potential. They make better use of land, relieve pressure on scarce grid connections and enable an integrated project setup rather than planning generation and storage separately. This makes them attractive to plant and grid operators, EPCs, investors and industrial electricity customers.

Whereas in the past, individual technologies were considered in isolation, the emerging integrated power plant approach aligns technological and economic logic.

The UK: a pioneer in PV-BESS hybrid power plants

A look at the European market shows how much momentum this development has





already gained. The UK, in particular, is considered a pioneer for PV-BESS hybrid systems. More straightforward market mechanisms, capacity markets, long-term contracts and a rather pragmatic regulatory framework are helping hybrid projects along.

Although the European market remains relatively concentrated, the general direction is clear. As soon as regulations pave the way for flexibility options and flexibility is financially rewarded, investment appetite and market dynamics will follow.

This is an important signal for other countries because the continued expansion of renewables will not be decided solely by how many megawatts can be added, but by how easily they can be integrated into the system.

Hybrid PV systems in practice

Projects such as Zerbst and Cleve Hill demonstrate just how tangible this development is already becoming. In Zerbst, Statkraft has built a plant that combines 46.4 MW of PV with a 16 MW / 57 MWh battery storage system.

The project illustrates how the sale of solar power can be strategically shifted to hours where it can fetch a higher price in the German market. This is particularly relevant because it demonstrates how generation, storage and marketing can be combined in a hybrid plant concept within the German regulatory

framework Cleve Hill in the UK takes this a step further by combining 373 MW of PV with 150 MV of battery storage.

The project's financial structure is particularly interesting. Multiple revenue streams are combined into a single asset, including a long-term Contract for Difference for the solar component, a capacity market contract for storage as well as a PPA.

Both projects exemplify the development of the European market, where hybrid plants are no longer viewed merely as technical add-ons to solar parks, but as integrated power plant concepts that combine flexibility, economic efficiency and system benefits.

The next phase of expansion is integration

All of this shows that the energy transition is evolving from merely adding more energy generation to the integration of different technologies. Large-scale storage systems help make renewable energy systems compatible, economical and beneficial to the grid.

Hybrid systems combine generation and flexibility from the outset, thereby creating a new standard of quality for solar projects. Flexibility combined with quality defines an energy future where we generate as much green electricity as possible while providing this electricity reliably, intelligently and competitively.

The smarter E Europe will be showcasing the solutions and products to make this happen.

The smarter E Europe 2026

The smarter E Europe provides a key platform for dialogue, collaboration and knowledge sharing. More than 100,000 visitors are expected to meet 2,800 exhibitors across 19 exhibition halls and the outdoor area at Messe München.

The event brings together four exhibitions: Intersolar Europe, ees Europe, Power2Drive Europe and EM-Power Europe. It will take place from June 23rd to 25th 2026, running from Tuesday to Thursday for the first time.

Across 200,000 square meters of exhibition space, the latest innovations in photovoltaics, energy storage, electric mobility, charging infrastructure and integrated energy solutions will be showcased. Seven exhibition forums will host conference sessions on topics including large-scale storage and hybrid photovoltaic systems.

Four parallel conferences will take place from June 22nd to 23rd June at the International Congress Center Messe München. A single ticket provides access to all four events. The Midsummer BBQ on June 22nd will offer additional networking opportunities.

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