

**EM-Power Europe
EM-Power Europe Conference
Munich, June 14–16 2023**

EM-POWER EUROPE TREND PAPER: FLEXIBILITY OF THE POWER SYSTEM: THREE APPLICATION TRENDS

Munich/Pforzheim, April – To operate our power grid safely and stably, we have to create a balance between the growing proportion of weather-dependent power generation and fluctuating consumption. For a swift response to fluctuations in demand and production, flexibility is becoming increasingly important because it prevents expensive interventions in case of bottlenecks and ensures a safe supply with volatile photovoltaics and wind energy. This can reduce the demand for additional, expensive controllable power plants for securing supply. As a result, the costs of the electricity system can fall significantly compared to a system with inflexible consumers. Especially the flexibility of private and industrial consumers can be activated quickly and cost-effectively. Here are three application trends:

1) Reducing grid interventions: power apps warn in case of bottlenecks

There are apps being used around the world that urge consumers to save electricity when grid congestion or production bottlenecks occur. Some apps even reward users if they save energy, others simply inform them. Either way, when consumption is changed in response to grid usage or generation, this can prevent expensive interventions and save both costs and CO₂ emissions. Power apps are used in the US, the UK and other countries. Germany, for example, has recently introduced the [StromGedacht app](#) provided by TransnetBW, a transmission grid operator from Baden-Württemberg. The app uses a simple traffic-light system. When a tense situation is predicted for Baden-Württemberg (and the traffic light is on red), the app sends a push notification to users, asking for their help. When taken in summary, even seemingly minor actions, such as postponing doing the laundry or charging a battery sooner than planned can help reduce the need for grid intervention. In Germany, private households account for around a quarter of electricity consumption, so their potential for helping to stabilize the grid is immense. Thanks to a text message urging people to reduce their power consumption for three hours, grid operator in the US state of California managed to avert a power outage [in September 2022](#).

2) Load flexibility: Industry postpones energy consumption

Industrial consumers in particular have great potential to provide flexibility. They already have energy management systems and can use them to adjust their consumption flexibly to the situation in the energy market, particularly to short-term markets. This means that the electricity consumption for industrial processes is adjusted depending on the requirements of grid operators or price signals, without this impairing productivity. By way of an example, when operating reserve is needed, a paper mill can shut down production, postponing it to a later time. Or an aluminum factory can be switched off for up to one hour without incurring damage. These examples are no longer just isolated cases. Aggregators bundle the flexibility capacities of different companies: They integrate individual pumps, machines or plants into a virtual power plant using hardware and software. Paper mills as well as aluminum and chemical industries have been early adopters. Providing flexibility is financially worthwhile for these companies, provided the regulatory framework conditions are right.

3) Bidirectional Charging: Electric cars as gigantic storage devices on wheels

The growing number of electric cars is generating huge potential for flexibility. Bidirectional charging, the transmission of electricity in both directions, allows for the energy stored in a car's battery to be

transferred to a building or into the grid, if needed. Vehicle2Home means that the electricity stored in a vehicle battery is fed into a building or an energy management system. Households that own an electric vehicle and a PV installation are easy on the environment and on their budget. Via a wallbox, the electric car can be charged with solar electricity generated on-site. Vehicle2Grid means that the electricity is fed from the electric vehicle back into the distribution grid via the wallbox. This does not make consumers' life less comfortable, and actually increases their independence from their utility company. Feeding energy back to where it is needed when it is needed makes electric vehicles an integral part of the overall energy system. Soon, mobile storage systems will be playing an important role in minimizing price leaps and in reducing the need for expensive, controllable power plants. On-target charging of excess power is already tapping into this potential today.

Outlook: Flexibility becomes the key currency in the energy system

Concurrently with the accelerated expansion of renewables, the energy system needs to be more flexible to be able to cushion solar and wind energy peaks in the short term. Flexibility will become the key currency in the energy system of tomorrow as e-mobility and the increased use of heat pumps will boost the potential of households in the coming years. Just to name a few examples: According to the plans of the German government, six million heat pumps are to be installed by 2030. In combination with a smart digitalization strategy, this is a great opportunity for the energy system. If these new facilities are able to respond flexibly to the production volume of wind or solar power this will allow the optimal use of renewable energies and reduce energy prices for consumers. Additionally, new players such as storage system operators and hydrogen electrolyzers are entering the market, so that overall, there will be great potential for flexibility in the very near future. We need a legal framework that allows us to tap into flexibility options that support the system. After all, the flexibility potential will be used most efficiently when it is exploited to meet market demand and when regulatory requirements enable flexibility.

Flexibility of the power system at EM-Power Europe

EM-Power Europe from June 14-16 in Munich offers extensive information about the flexibility of power systems. With numerous exhibitors as well as sessions within the EM-Power Europe Conference and the EM-Power Forum, trade visitors will get a comprehensive insight into new market concepts, innovations and solution approaches in terms of designing of flexible energy systems. Click [here](#) for the complete exhibitor list of EM-Power Europe.

Exhibitors at EM-Power Europe 2023:

- BaxEnergy, B5.239
- be.storaged GmbH, B5.411
- BeChained Artificial Intelligence Technologies S.L., B5.171K
- Cleanwatts, B5.456
- coneva GmbH; B5.551
- decarbon1ze GmbH, B5.109
- Entrix, B5.662
- Exnaton, B5.170J
- Hive Power, B5.136
- i-EM Srl, B5.452
- NET2GRID BV, B5.132
- NODES AS; B5.258
- Olmatic GmbH; B5.432

EM-Power Europe Conference:

- [Innovation, New Market Designs and Flexibility Needs to Integrate Large-Scale Renewables](#), June 13, 02:30 pm - 04:00 pm
- [Distributed Energy Resources & Consumer Empowering](#), June 14, 09:00 am - 10:30 am

EM-Power Forum:

- [Making Demand More Flexible, Balancing the Energy System](#), June 14, 04:00 pm – 05:00 pm
- [Distributed Flexibility: Towards an Integrated District Approach](#), June 16, 11:30 am – 12:30 pm

For further information, please visit:

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