EM-POWER EUROPE TREND PAPER: DIGITALIZING THE ENERGY TRANSITION – THE DAWN OF THE REAL-TIME ENERGY INDUSTRY

Munich/Pforzheim, May – The expansion of renewable energies requires an intelligent connection between energy production and consumption. Digitalization is key because it provides us with the necessary data sets. The new energy industry already has the know-how and the competence to entirely digitalize processes as well as to expand and operate smart renewable energies. New digital applications like artificial intelligence, big data or real-time communication are increasingly becoming integral parts of the energy industrial practice. Digital technologies revolutionize the manner in which we generate, distribute and use energy. EM-Power will feature the latest solutions for metering point operators as well as providers of energy management systems and integrated energy solutions.

1) Smart meters – efficient control of electricity feed-in and consumption

Smart meters are the first step towards a real-time energy industry. While adhering to strict data protection laws, intelligent metering systems record the feed-in and electricity consumption and provide this data to the market, making standard load profiles obsolete. Personalized data measurements rather than broad assumptions give costumers an actual incentive for timing their electricity consumption to when the price is low, for example at times of high wind energy or PV feed-in and provide grid operators with the necessary data to monitor grid capacity utilization. To protect sensitive data, legislators have passed detailed provisions for storage, deletion and anonymization.

Germany is currently working on facilitating and accelerating the digitalization of the energy transition. The Act on the Digitization of the Energy Transition, which is about to be passed by the German parliament, defines a binding roadmap for the rollout of smart meters by 2030. The rollout is to start with households with an annual energy consumption of over 6,000 kilowatt hours or a PV system with more than seven kilowatt of installed capacity, as well as consumers with controllable consumers like heat pumps or wallboxes. The goal is to equip all of these users with smart meters by 2030. Households that use less than 6,000 kilowatt hours per year also have the right to install an intelligent meter. The new, lower fees that customers are charged for these meters are a real game changer, making downstream business models – like variable-rate energy plans – attractive.

2) Digitalization of the grids – mind over matter

In the old energy world, the power grid's primary task was to transport electricity from a central large-scale power plants to the consumers. A smart grid also works as a platform that connects the increasingly decentralized generation systems with flexible electricity consumers and allows a bidirectional flow of data and electricity between consumers and producers. Smart grids monitor, analyze and react in real time to changing patterns on both sides, making the power grids transparent – even at the level of distribution grids, where capacities have often been completely unknown until now. Grid operators can detect, or even anticipate, grid congestion in real time and react timely and appropriately. As the data

is digitally available to grid operators, the grid can be expanded in precisely those grid areas which quickly require higher connected loads.

3) Artificial intelligence spurs the energy transition

Artificial intelligence (AI) is currently a megatrend – also in connection with the energy transition. Its largest potential lies in forecasts, the processing of large amounts of data as well as operation and inventory optimization. For the generation and trade of electricity, AI can be used to make early and accurate predictions of the production and demand for wind and solar power. A wider distribution of sensor data in particular will make this technology increasingly useful for optimized network operation in the future.

When it comes to sales and consumer services, AI is predominantly used for individualized products and automated meter readings and billings. So far, this field of application is mostly about improving services and customer relations. What's more, AI facilitates energy management to increase the self-consumption of PV battery systems in homes, and helps to identify efficiency potentials. It allows minor consumers to access established processes of the energy industry.

When it comes to electricity trading, AI helps optimize forecasts. Several AI algorithms have become intelligent enough to autonomously run trades (algorithmic trading).

EM-Power Europe Conference:

- [The Power of Digitalization to Address System Efficiency and Net Zero Grid](#), June 13, 04:30 pm - 06:00 pm
- [Digital Innovation](#), June 14, 01:00 pm - 02:00 pm
- [Forecasting & Monitoring: Always One Step Ahead](#), June 14, 02:30 pm - 03:30 pm
- [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
- [Smart Grid Evolution: The Future of Energy Management and Smart Meter Integration](#), June 16, 01:00 pm - 02:00 pm

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