

## Virtual Power Plant ? It's More Than Just Connecting | Kerstin Pienisch, International Business Development, Next Kraftwerke



It is important to provide small and medium-sized energy producers and consumers the opportunity to participate in the energy market ? a market which usually is inaccessible for them due to minimum thresholds of megawatt production. In addition to gaining access to the market, these power producers and consumers are also contributing to grid stabilization.

### Together Means Stronger

Next Kraftwerke digitally links assets from renewable sources such as biogas, wind, and solar with commercial and industrial power consumers and power-storage systems to their central control system. Once these assets are connected to the system, the aggregated power is sold on electricity markets and fed into the energy system to stabilize the grid.

Next Kraftwerke has a non-asset ownership strategy, which means that their our Virtual Power Plant (VPP) serves as a platform for asset owners. In effect, Next Kraftwerke is a large and continually-expanding power plant that does not own a single asset.



Virtual power plant | Source: Next Kraftwerke

With the consent of the owners, the technology can be used to ramp the individual units up and down as if it was a real power plant. Currently, there are about 6,400 units in the Next Pool with an overall capacity of 5,400 MW. This is equivalent to the capacity of two large coal-fired power stations.

### Future means Flexibility

Within the total capacity, roughly 1,000 MW are highly flexible, meaning power can be fed in very quickly, for instance if a shortage of wind and solar power occurs, but also, if heavy winds occur during a storm, and the system needs to be relieved. Thus, this system provides flexibility to the energy system ? just like a huge battery would do.



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It is crucial for the energy system of the future to not simply follow the load, but to consider production and consumption as variable and let them play off each other. Think about it: would you want to sell your wind power at a low price when a storm brings in heavy winds? Or would you prefer to sell when there is no wind and prices are higher? Next Kraftwerke's approach shifts production or consumption to times when flexibility is needed. It makes more economic sense and contributes to more efficiency in the system.

This approach can be taken because units, that are flexible to certain degrees, are connected. For example, every Combined Heat and Power (CHP) unit has flexibility, as have most run-of-river hydropower stations. Also, many power consumers can provide flexibility to the system if they are flexible when to consume power.

Batteries are one of the most flexible assets in Next Kraftwerke's portfolio. Just recently, a 2 MW battery was integrated into the company's Virtual Power Plant that provides frequency control reserve (FCR) to the Belgian grid. It is the first battery connected to the distribution grid that offers frequency control reserve to Belgium's national grid. Providing FCR is a very promising way to optimize revenues for batteries. The battery reacts instantly to grid frequency: charging when the frequency rises, and discharging when the frequency falls to help stabilize frequency at 50 hertz.

### **Connecting Adds Value**

By combining a battery with other assets, the battery's value can be enhanced even further. In the case of the 2 MW battery, it is combined with Power to Heat assets, biogas units, and flexible consumers in our VPP. The battery constantly levels out the smaller deviations of the other assets, and vice versa.

Since batteries are still rather expensive, it is important to create options to refinance the investment. In addition to offering the battery's flexibility on the market for FCR, Next Kraftwerke is one of few Virtual Power Plants that also trade the power on the Day-Ahead- and Intraday-Market spot markets. This allows a contribution to the return on investment for the battery. This is an attractive option for smaller storage options as well: In a 2-year pilot project, tendered by Transmission System Operator TenneT, Next Kraftwerke and Jedlix, an electric vehicle (EV) aggregator and smart charging platform provider, are providing secondary control reserve (aFRR) through the batteries of electric cars. To level out any potential unavailability of the EVs, Next Kraftwerke and Jedlix pool the EVs with other assets in the Next Pool such as greenhouse lighting, wind and solar plants, and biogas- as well as greenhouse CHPs.

This is an excellent example of how storage solutions and flexible renewable energy sources can work together to help stabilize the grid. This is especially important for the future of the energy system. Flexibility ? wherever it comes from ? is the biggest challenge and the biggest asset for the energy system of the future.

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