

Digital, flexible, sustainable: The power market of the future

Helen Steiniger^{1*}

¹*Advisor to the CEOs, Next Kraftwerke GmbH, Lichtstrasse 43g, 50825 Cologne, Germany*

Flexibility is the key to a successful energy transition where electricity generation is based on volatile renewables. In the future power market, flexible consumers and producers adapt their output and intake of electricity on short notice, depending on the availability of wind and solar power. By smoothly reacting to each other, demand and supply can prevent real scarcity and excess situations. This transition is nothing short of a revolution of the static perspective we used to have of energy demand.

The technology we need to master this transition is accurate weather forecasting tools, detailed maps of solar and wind power plant locations, smart meters and remote control units for all power generators and consumers as well as an intelligent dispatch system. Without this robust digital infrastructure, the millions of decentral power plants the future power market is made up of, will not be reliable and secure.

We also need significant investments in green flexibility options which are currently lacking due to base load overcapacities pushing average market prices down and thus reducing the value of flexibility. These overcapacities need to be gradually removed so that prices can move freely and create incentives to invest in decentral, green flexibility options for scarcity and excess situations as well as the short-term flexibility in-between.

The notion of base and peak load many power markets are currently organized on will then gradually vanish to make room for a dance of flexible biomass, small- and large-scale hydro, CHP, PtX, batteries used in EVs, homes and I&C applications, large-scale storage facilities and flexible power consumers. The rhythm of this dance will be set by the availability of solar and wind energy and the choreography will be designed by the central dispatcher.

Keywords: volatile renewables, solar and wind, green flexibility options, central dispatch, digital infrastructure