Executive Summary

Renewable Electricity and Backup Capacities: An (Un-) Resolvable Problem?

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Public support for renewable electricity generation has led to an unexpected investment momentum in many countries. In Germany, the share of renewable power generation increased from just 5 percent to more than 30 percent within a time frame of only 15 years. In liberalized electricity markets, all power is indiscriminately sold on a single market. Having almost no marginal cost, wind and PV power generation is prioritized in the merit order over conventional power generation. The results are reduced operation hours for conventional generators and thus reduced wholesale electricity prices. This effect is called merit order effect of renewables.

In our manuscript, we estimate the merit order effect from the retrospective for 2014 to give a quantitative overview of the current financial situation of conventional generators using an econometric approach. The results indicate that in average, renewable power generation led to a discount in wholesale prices of approximately 12 Euro/MWh in 2014 (about 36 percent of the observed baseload price). With a merit order effect of this magnitude, contribution margins of conventional power plants are insufficient to incentivize new investments in conventional generation capacities.

Even though society wants to promote renewables, conventional generators are still essential as backup capacities to reliably secure electricity supply especially in times of little wind and sun. With the current market design and further increases in shares of renewables, this situation is going to have impacts on supply security at least in the long run. A rather popular approach to address this issue is the introduction of additional public support for conventional power plants. However, we strongly believe that subsidizing almost all (renewable and conventional) generation capacities would obviously contradict the idea of a liberal electricity market.

We present two alternative concepts that may solve the described dilemma. The first is state control of renewable generation investments through auctions as proposed in the guidelines of the European Commission on renewable energy state aid. We propose a second

alternative that consists of a monthly premium paid to power retailers and other representatives of the demand side in dependence of the share of fluctuating renewables in their sales portfolio. In our opinion, the advantage of our proposal would be a higher flexibility and degree of competition. By allowing the market to find an optimal solution for the integration of renewables on its own, the idea of liberal markets in the electricity sector would be valued.