TradeRES
New Markets Design & Models for 100% Renewable Power Systems

TradeRES Research Bulletin

The incluence of power tariff models on demand response potentials

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Summary

Controlling electrical loads in the course of demand response can contribute to balancing the fluctuations of renewable feed-in in the power system. Electricity tariff models, in turn, can have an influence on the utilization of demand reponse potentials, which has so far been insufficiently analyzed in the system context. Therefore, the agent-based electricity market model AMIRIS is used in a case study for the Federal Republic of Germany in 2019 to investigate precisely this influence. Load shedding, i.e. curtailment of loads, and load shifting, i.e. shifting energy consumption from one point in time to another, are considered in interaction with different electricity price models for end customers. The electricity price models differ in the degree of their temporal variability (dynamization). The result shows that the possibility of load shedding is excluded due to insufficient prices in the simulation period under the assumed (high) willingness to pay. Furthermore, the expectation is confirmed that with an increasing share of dynamization, there are stronger incentives to shift loads over time in order to reduce electricity price payments. The influence of capacity-based price components on load management ("peak load management") is to be examined in greater detail in subsequent analyses.

Highlights

- The interrelation between power tariffs and demand response potentials is studied for the Federal Republic of Germany in 2019 using the agent-based power market model AMIRIS.
- It is found that time-varying (dynamic) prices create incentives towards demand response while the costs for shifting have an influence on its utilization.
- Also, it is found that the required price levels for an activation of load shedding need to be comparatively high which were not realized in the simulation.

Info

The TradeRES project will develop and test innovative electricity market designs that can meet society's needs of a (near) 100% renewable power system. The market design will be tested in a sophisticated simulation environment in which real-world characteristics such as actors' limited foresight into the future and risk aversion are included.

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