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

TradeRES Research Bulletin

Market Designs, Actor Decisions and Market Values: Assessment of Remuneration Mechanisms for Future Electricity System Scenarios

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Summary

Future energy systems will likely have high shares of variable Renewable Energy Sources (vRES). However, it is not clear if the corresponding investments will recover their costs – or if financial support instruments will be necessary to compensate investment risks. We employ the agent-based electricity market model AMIRIS and analyse different scenarios for future energy systems with a share of 100% RES in Germany. We compare multiple indicators to assess the market performance of different financial support instruments and compare them to an energy-only market. The investigated instruments are fixed market premia, 1-way and 2-way Contracts for Difference (CfD), capacity premia, and financial CfD. Our results for energy-only markets show that cost recovery for some technologies, especially small-scale PV, can be significantly below or above 100% – depending on the scenario. Production-dependent instruments can change the dispatch behaviour of vRES and thus impact market prices and curtailment. Especially 2-way CfDs can cause higher market prices and increased curtailment of vRES. However, this effect is small compared to the differences caused by the different investigated scenarios.

Highlights

- Agent-based electricity market model AMIRIS was used to assess future market dynamics as well as refinancing of vRES investments for a power system with 100% RES.
- Four scenarios with significantly different market dynamics were investigated.
- Some scenarios show investment risks for small-scale photovoltaics and offshore wind turbines.
- Support instruments can mitigate investment risks, but have impact onto the market dynamics.

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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