



Assessing support instruments for renewable energies: Insights from the European research project TradeRES

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Summary

In Germany and Europe, there is an ongoing policy debate on how to best design support instruments for variable renewable energy sources (vRES). Against this background, in the German case study of TradeRES, different support instruments have been compared to each other. These comprise a fixed market premium, 1- and 2-way Contracts for Difference (CfD) with a monthly reference period, a capacity premium as well as financial CfD. All of those and the resulting financial flows are simulated using the agent-based power market model AMIRIS. The effects towards market-based curtailment and recovery are studied. We find production-dependent support instruments to influence market-based curtailment rates because of the opportunity cost introduced by premia respectively support payments that incentivize bidding below or above (in case of a clawback) marginal costs. This results in more wind onshore and solar PV curtailments compared to wind offshore curtailments. 2-way CfD are found to lead to the highest absolute curtailment volumes. Regarding market-based cost recovery of vRES, we find that this is largely influenced by the studied scenario and to a lesser extent by the support instrument considered. Especially the hydrogen price as well as the degree of demand-side flexibility influence the market prices and thus the cost recovery rates for a given scenario. In terms of total cost recovery, we find that all support instruments can contribute to a full cost recovery under the assumed nearly perfect parameterization. However, we find some cases where support exceeds total costs. This can be traced back to one-sided hedging for premia instruments as well as monthly variations of market values and an anticipation of clawback periods for 2-way CfD.

Highlights

- Different support instruments for variable renewable energy sources are compared.
- For the support instruments, effects towards curtailment rates and cost recovery are analyzed.
- The effect of the scenario on cost recovery is found to outweigh those of support instruments.
- Challenges in appropriately designing support instruments are identified.



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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