



Local Energy Markets: Structural elements and the effects of upscaling

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Summary

Local energy markets (LEM) have attracted a lot of interest in recent years, as an innovative approach for enabling the direct trading of energy between peers within localized areas. The optimal usage of locally produced energy and the cost-effectiveness that can be achieved by avoiding suppliers and aggregators markups are among the benefits the LEM are expected to bring together with the further incentivisation of investments in flexible distributed energy resources (DER) and the reduction of transmission losses. Although the wide adoption of the concept is in its early stage, the interactions of the newly established LEM with the existing market structures that govern the energy and balancing service provision have not been sufficiently studied. This work reviews structural elements of local interaction schemes, introduces coordination styles, and by modelling centrally operated LEM and simulating the wholesale market (WSM) operation, investigates the coupling between prices and focuses on the effects that the different levels of LEM concept adoption may have on WSM. Through a benchmarking case study, scenarios that differ in the mix of DER and the market share of LEM are considered, with the results revealing the effects on WSM outcome and the underlying dependencies in terms of market volume and price trends.

Highlights

- Local energy markets (LEM) enable peer-to-peer trading, optimize local energy use, and reduce transmission losses.
- This study models LEM interactions with energy markets and introduces coordination styles.
- Case studies reveal how DER mixes and LEM adoption affect market volumes and prices.



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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