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Multilevel Electricity Trading Simulation considering Energy Communities Participation

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Summary

The EU is encouraging the creation of local energy communities (LECs) for electricity trading, promoting local balance and a self-sustained community while reducing electricity bills. Local electricity markets (LEMs) ease the electricity trading of distributed energy resources while incentivizing the integration of renewable energy sources into the grid. However, presently, LEMs have low liquidity, and the demand is significantly higher than the supply. One possible solution to address this issue is participation in the wholesale market, assessing lower prices, and providing additional savings. This work proposes a multilevel electricity trading framework for LECs' participation. The simulation framework comprises different LEM models for electricity trading at different levels, culminating in wholesale market participation through a LEC aggregator. Results show the benefits of LECs' participation in the multilevel trading platform with significant savings.

Highlights

- This work proposes a multilevel electricity trading simulation framework for LEC.
- The proposed framework considers 3 trading levels: trading within the LEC, trading between LECs, and wholesale trading.
- Results show the advantage of the proposed framework from the perspective of the LECs.
- Being able to trade in wholesale, allows for acquiring electricity at the lowest price.

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