



The Economic Sustainability of Variable Renewable Energy Considering the Negotiation of Different Support Schemes

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Summary

This article is devoted to the negotiation of support schemes based on bilateral contracts between variable renewable generation and governments considering the following models: i) bilateral negotiation; ii) trading tactics; iii) concession strategies; iv) risk management; v) support schemes.

Specifically, it describes ongoing work that uses the potential of agent-based technology for supporting bilateral contracting in electricity markets considering the bilateral negotiation of different support schemes. The support schemes compromise traditional feed-in tariffs, feed-in premiums and one-way contracts for differences, recent fixed and variable premiums, and prominent risk-sharing contracts. From the perspective of variable generation, it investigates how the different support schemes affect their future outcomes. From the point of view of governments, it investigates how the different support schemes can hedge against wholesale price “cannibalization” and the tariff deficit to reduce the difference between wholesale and retail prices of electrical energy. Results from the study prove the benefit of using risk-sharing contracts to avoid both price “cannibalization” and the tariff deficit by incentivizing bids higher than zero and hedging against the market price volatility. Furthermore, the study also proves that open proposals increase competition and reduce the strike prices of support schemes. The highlights comprise:

Highlights

- A model for bilateral negotiation of support schemes. The equipment of buyer and seller agents with concession strategies, trading tactics, and a risk management process;
- The mathematical formulation of all support schemes;
- The practical work of the article includes a case study to test the above models considering real data of: i) the Spanish traditional support schemes, ii) the Iberian market of electricity, and, iii) the variable generation investment, operational, and maintenance costs.



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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