TradeRES

New Markets Design & Models for 100% Renewable Power Systems

NEWSLETTER #3

TradeRES 3rd semester achievements

With more than one year into the project, TradeRES is starting to deliver the first market models through an integrated toolbox. This newsletter, focused on the achievements during the project's 3rd semestrer, overviews the first integrated models, and relevant dissemination and organized events.

The iterative nature of the project is necessary due to the design character of the Work Packages (WP). While most of the efforts concern modelling and analysis, at the end of the day, this results in insights into the strengths and weaknesses of a certain market design. We are using these insights to improve the market design, as compared to an optimally performing system as determined in WP2 and using an objective evaluation framework (based on MPIs - Market Performance Indicators) based on the general policy objectives of a clean, affordable, and reliable power system.

The new and improved market design is then tested again in WP4/WP5 and discussed with the relevant stakeholders in WP6 until no more improvements can be made. Subsequently, these results are disseminated in WP7. To support the iterative nature of the work, we are using a modelling toolbox that allows us to exchange information more effectively between different models, e.g. co-simulation. The modelling toolbox that is being used within WP4 is the SPINE toolbox.

Market Models Design and Simulation

As the reference market scenarios and basis data are being defined in WP2 and the market designs refined in WP3, the main advances of the project during its 3rd semester are being accomplished in the development of a toolbox of models to handle the collected data and deliver the results to the end-users, in the scope of WP4.

The developed models consider:

- Adaptation of market models to enhance temporal, spatial and sectoral flexibility
- Implementation of new actors, markets, and policy options in market models
- Creation of an open-access linked market-model toolbox
- Development of advanced forecasting tools.

Although there is still a significant effort to be realized, a substantial breakthrough has already been made with the representation of many of these models in SPINE and with the integration among several of these models.

The next picture shows an example of the first integration of model capabilities from MASCEM and RESTrade, namely by integrating MASCEM's wholesale day-ahead market models with RESTrade's secondary and tertiary energy markets.

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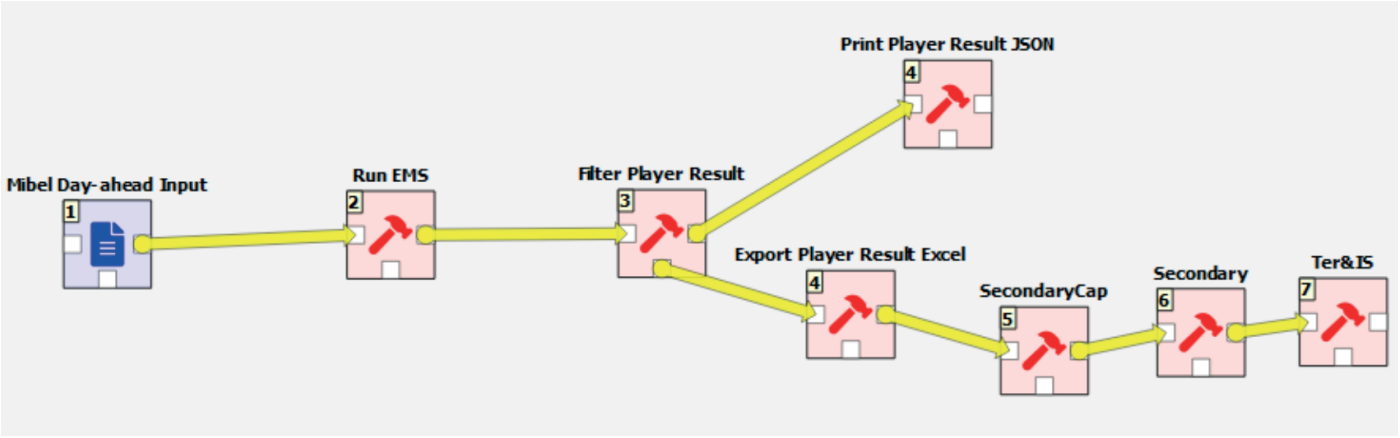

Figure 1. MASCEM and RESTrade integration in SPINE

Dissemination of the project

TradeRES dissemination and communication strategy is enabling bringing important results to the community and end-users. These actions are available in the project's web & social media pages. Check out our most recent publications:

• Helistö, Niina, Juha Kiviluoma, Germán Morales-España, Ciara O'Dwyer. "Impact of Operational Details and Temporal Representations on Investment Planning in Energy Systems Dominated by Wind and Solar." Applied Energy 290, 116712, May, 2021.
• Hugo Algarvio, "The Role of Local Citizen Energy Communities in the Road to Carbon-Neutral Power Systems: Outcomes from a Case Study in Portugal." Smart Cities, MDPI AG, 4(2), 840–863, May 2021.
• Gabriel Santos, Tiago Pinto, Zita Vale, "Ontologies to enable Interoperability of Multi-Agent Electricity Markets Simulation and Decision Support", Electronics 2021, 10(11), 26 May 2021.
• Ricardo Faia, Tiago Pinto, Zita Vale, Juan Corchado, "Prosumer Community Portfolio Optimization via Aggregator: The case of the Iberian Electricity Market and Portuguese Retail Market", Energies, 14(13), 22 June 2021.
• Md. Nasimul Islam Maruf, German Morales-Espana, Jos Sijm, Niina Helistö, Juha Kiviluoma, "Classification, Potential Role, and Modeling of Power-to--Heat and Thermal Energy Storage in Energy Systems", ArXiv Preprint ArXiv:2107.03960, July 2021.
• Germán Morales, Elis Nycander, Jos Sijm, "Too Much of a Good Thing: Reducing Emissions by Curtailing Renewables in Power Systems Operation", to the 39th International Energy Workshop (IEW, 14-17 June), 2021.
More information at: https://traderes.eu/papers

And Public Deliverables:
• D3.1 Performance specs for a ~ 100% RES system
• D7.4 Dissemination Activity Report I
• D3.2 Characterization of new flexible players
• D3.3 Design of ancillary service markets and products
More information at: https://traderes.eu/documents

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Project Management Board and Steering Committee Meetings

During the days of 9 and 10 March 2021, two important meetings took place – the third Project Management Board meeting and the second Steering Committee Meeting. Still under a difficult pandemic situation, these meetings took place remotely using the available platforms.

These meetings were essential to discuss the ongoing work and strategy for the activities to follow, including the assignment of reviewers for the following deliverables and the format of the first TradeRES workshop, scheduled to 20 and 21 October 2021. This last topic was thoroughly discussed to find a suitable format, especially, since in the actual context no presential events were yet foreseen to occur in any of the involved countries.

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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1 February 2020

End date
31 January 2024

Overall budget: € 3 988 713,75

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