



TradeRES

New Markets Design & Models for
100% Renewable Power Systems

NEWSLETTER

#4

TradeRES 2nd year achievements

The TradeRES project has reached its second year of activity. During this period, and according to the activities foreseen in the workplan, monthly meetings took place within the work packages. These meetings fostered a wide discussion of the strategies to develop the activities towards the goals of each task.

In this fourth semester, advances were made regarding the adaption of market models to enhance temporal, spatial and sectoral flexibility, as well as the implementation of new actors, market types, and policies, enabling the study of different approaches in our market models. Building upon the analysis that had been carried out in WP3 and identified the intensity of relations between market actors and i) technologies, ii) operational attributes and iii) behavioral aspects, we allocated the modelling priorities to the ABMs. Figure 1 presents one of the three heatmaps that supported this process, namely the “Relational table between actors and operational attributes with ABM coverage” of D4.4. Additionally, we’ve started the development of our open-access linked market-model toolbox that will allow the linkage of our several models, to create more holistic and robust simulation results. To enhance the value of variable renewable energy producers in electricity

markets by minimizing market imbalances, advanced forecasting tools are also being developed considering weather-based features, small changes in the electricity market designs, and advanced power ramping detection techniques to . These developments resulted in the production of various deliverables (see deliverables section below) regarding the work package (WP) 4 of the project.

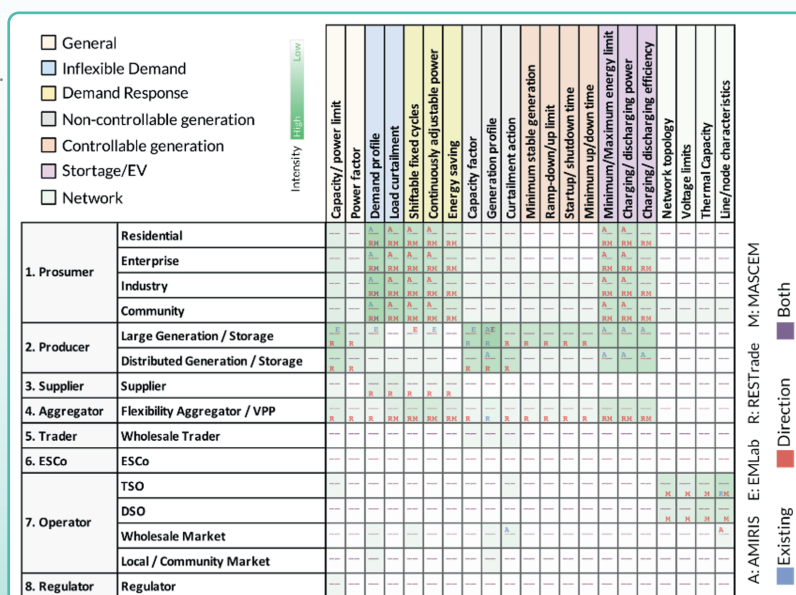


Figure 1: Relational table between actors and operational attributes with ABM coverage



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Concerning WP5, the models and simulation scenarios developed in WP4, and the products obtained in WP3, allowed us to start assessing the performance of the newly designed market models. In addition, it helped demonstrate how these new designs and models affect the market's efficiency and respective players. This ongoing study will disclose the likely technology mixes of future energy systems, giving hints on the long-term cost-efficiency of the European energy system. The first deliverable resulting from the advances of this WP is already available and focuses on the definition of market performance indicators (MPIs) used in TradeRES. The MPIs were classified using four domains: technical, economic, environmental, and social (Figure 2). Figure 3 presents an example of the expected outcome for each MPI. If you have interest in this topic contacts us!

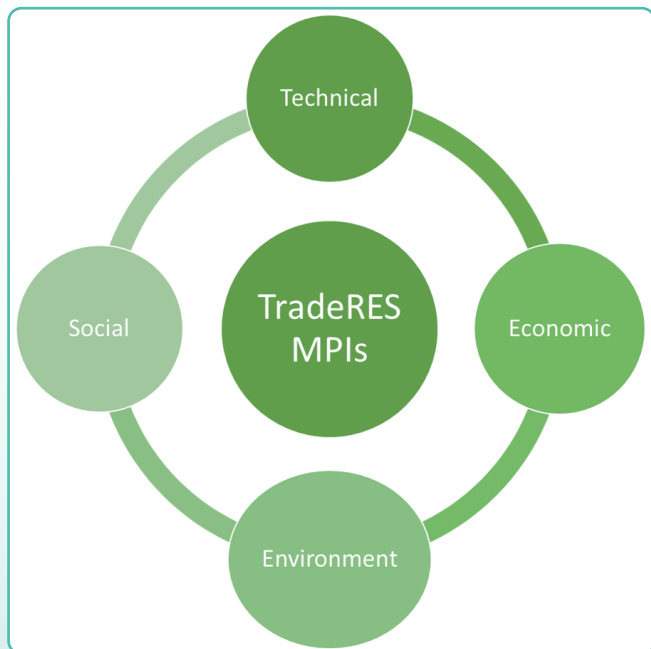


Figure 2: Dimensions considered in the MPIs defined in TradeRES project.

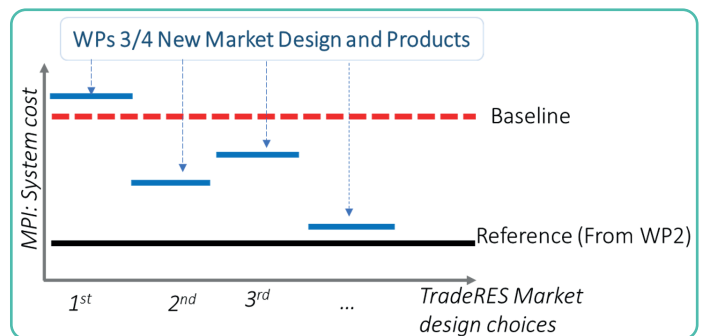


Figure 3: Identification of the potential benefits from TradeRES solutions for the exemplary MPI "system cost".

The work developed during this fourth semester resulted in the publication of various conference and journal scientific articles.

The TradeRES consortium participated in several events to disseminate the project's results and outcomes, namely in: ENTSO-E 2030 Market Design; Special Session CEC 2021; CEC2021; SEEP 2021, INREC 2021, International Conference on Energy and Environment Research; Strommarkttreffen PhD Seminar; EMP-E 2021; Task 25 workshop; Spine toolbox conference; EEEIC 2021, International Conference on Environment and Electrical Engineering; International Conference on Environment and Electrical Engineering and AAEE PhD Day.

Recordings of TradeRES's 1st public workshop

The TradeRES's first public workshop was held on October 20th and 21st, 2021. This workshop aimed to bring together different views on some of the main research & development questions related to the project. It included discussions on wholesale market design, retail markets, ancillary services, system adequacy, and sector coupling. The valuable



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insights gathered were used to complement and improve the project's ideas and vision and will consequently be reflected in the market designs currently under development. And, in this way, incorporate different perspectives and needs in TradeRES's comprehensive market designs.

Look on the recordings of the two days free of charge:



Day 1 | <https://www.youtube.com/watch?v=8L3eshjNrSw>



Day 2 | <https://www.youtube.com/watch?v=Dc7sEdTLywk>

Dissemination and other activities

TradeRES's dissemination and communication strategy is supporting the demonstration of important results to the community and end-users. We are making big improvements! Check them out on our project's web page and social media pages. Check out our most recent publications:

Book chapter

1. Fernando Lopes, "From Wholesale Energy Markets to Local Flexibility Markets: Structure and Operation", Local electricity market, (3), 1st Edition, Book Chapter, Academic Press, 37-61, 2021.
2. Ana Estanqueiro, António Couto, "New electricity markets. The challenges of variable renewable energy", Local Electricity Markets (1), 1st Edition, Book Chapter, Academic Press, 3-20, 2021.

Journal

1. Md. Nasimul Islam Maruf, German Morales-España, 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.
2. Hugo Algarvio, "Management of Local Citizen Energy Communities and Bilateral Contracting in Multi-Agent Electricity Markets", Smart Cities, 4(4):1437-1453, November 2021.
3. Meysam Khojasteh, Pedro Faria, Zita Vale, "Energy-Constrained Model for Scheduling of Battery Storage Systems in Joint Energy and Ancillary Service Markets based on the Energy Throughput Concept", International Journal of Electrical Power & Energy Systems, 133, December 2021.



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4. Laurens de Vries, Ingrid Sanchez Jimenez, "Market signals as adequacy indicators for future flexible power systems", Oxford Open Energy, 1, 1, January 2022.

Conference

1. Nuno Teixeira, Luis Gomes, Zita Vale, "Data Access Mechanism to Allow Multiple Level Permissions in Energy Management Solutions Supported by IoT devices", IEEEIC 2021 International Conference on Environment and Electrical Engineering, Bari, Italy, 7 -10 September 2021.

2. Fernando Lezama, Zita Vale, "Bidding in Local Energy Markets Considering Uncertainty from Renewables and Demand", IEEEIC 2021 International Conference on Environment and Electrical Engineering, Bari, Italy, 7 -10 September 2021.

3. Bruno Veiga, Gabriel Santos, Tiago Pinto, Ricardo Faia, Carlos Ramos, Zita Vale, "Electricity market and power flow services for dynamic market simulations", SEEP 2021 - 13th International Conference on Sustainable Energy & Environmental Protection, Vienna, Austria, 13 - 16 September 2021.

4. Johannes Kochems, Christoph Schimeczek, "Agentenbasierte Modellierung von Lastmanagement im deutschen Stromsektor", IEWT Internatio-

nale Energiewirtschaftstagung, Wien, Österreich, 08 - 10 September 2021.

5. Meysam Khojasteh, Pedro Faria, Fernando Lezama, Zita Vale, "Optimal Strategy of Energy Storage Aggregators in Ancillary Service Markets: Stochastic Programming Approach," 2021 International Conference on Smart Energy Systems and Technologies (SEST), 6 - 8 September 2021.

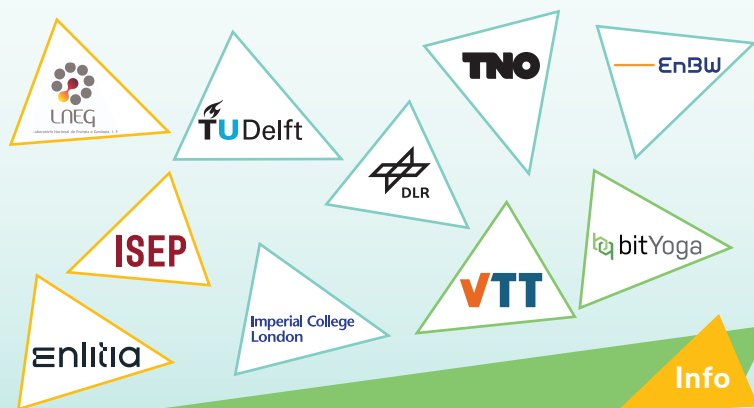
More information at: <https://traderes.eu/papers>

And some public deliverables from WP4:

- D4.1: Temporal flexibility options in electricity market simulation models
- D4.2: Sectoral flexibility options in electricity market simulation models
- D4.3: Spatial flexibility options in electricity market simulation models
- D4.4: New actor types in electricity market simulation models
- D4.5: New market designs in electricity market simulation models
- D4.8: Open-access tool of linked electricity market model
- D4.9: New forecast tools to enhance the value of VRE on the electricity markets

More information at:

<https://traderes.eu/documents>



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

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