

Agent-based modeling for a consumer-centric energy transition

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Dear NTRANS partners,

We are organizing a workshop within RA3 on modelling methods targeting consumer-centric energy transition on 6 December 2021 from 10:00 to 13:00. The workshop will be on Teams platform. The theme and agenda of the workshop are as follows.

Theme

This workshop will explore the scope and opportunities for agent-based modeling approaches for a clean and sustainable energy transition. One of the central aspects of the energy transition is the renewed role of a consumer. In this transition, a consumer can manage the demand locally, produce energy and interact with the market. The challenges however emerge on organizing the electric power system and market to facilitate this transition. Simultaneously, the power system is undergoing a transition wherein a decentralized structure is solidifying with multiple agents.

An agent can be defined in multiple ways depending on the environment and operations. Flexibility in design, autonomy, adaptive to complex structures are among the key advantages of using agent-based modeling (ABM). For instance, the complex distributed control system to manage the distributed renewable energy resources can be represented through agents. If more than one agent is operating in one system, forming a network, then it is referred to as a multi-agent system (MAS). MAS is robust in design, therefore, resilient, secure, and enables real-time operations.

Demand response is often motivated through price signals to offset peak consumption. Electric vehicles apart from providing electric storage solutions can also enable grid stability through frequency regulations. A consumer has a flexible and responsive position in the system that can be functionality symmetric to an agent. Consumer behavior to a signal might differ depending on preferences. Regulations to advocate a certain behavior require a thorough understanding of the consumers.

Best regards,

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