CALL FOR PAPERS

IEEE TRANSACTIONS ON POWER SYSTEMS

Special Issue on:

Transactive Approaches to Integration of Flexible Demand and Distributed Generation

Electricity as a sustainable energy carrier plays a central role in the most effective transition scenarios towards a sustainable energy system. To harness this potential, the current electricity infrastructure needs to be rigorously re-engineered into an integrated and intelligent electricity system: the smart grid. In the future grid, demand response and response from distributed generation and storage is expected to be used on a large scale to perform active management of distribution grids and to balance the fluctuating power generation of renewable power generation. Key elements of the smart grid vision are the coordination mechanisms. Through these, vast numbers of devices, currently just passively connected to the grid, will become actively involved in system-wide and local coordination tasks. In this light, market-based, transactive approaches are emerging as strong contenders for orchestrating the coordinated operation of so many devices. In a transactive energy system, one is using value as a key operational parameter, i.e. operational decisions are made through an exchange of value-based information captured in transactions between participants. Whereas transactive or market-based coordination mechanisms are already used on the level of bulk power production, trade and transmission across the globe, the use of these mechanisms at the distribution level, integrating numerous flexible devices into the power system, is still a topic needing scientific advancement.

Research into transactive energy is strongly interdisciplinary, involving the state of the art in power engineering, computer science, (micro-) economics and control engineering. This Special Issue will bring together researchers and practitioners from industry, research laboratories, academia and government to present and discuss challenges and opportunities related to market-based and transactive approaches to the integration of flexible demand and distributed generation and storage. The particular topics of interest include, but are not limited to:

- Novel market models integrating energy flexibility from small and mid-sized devices and systems into power operations (distribution management, balancing renewable energy, ancillary service provision, etc.), under changing roles of existing and new players in the value chain (especially the distribution system operator and aggregator roles).
- Transactive approaches to distribution management / transmission-level ancillary services / micro-grid operation.
- Field demonstrations and pilots using market-based or transactive control: results and lessons learned.
- Architectural alignment/integration of energy markets at the retail and wholesale levels.
- Distributed computing and multi-agent systems techniques for market-based/transactive control.
- Automated market algorithms: mechanism design, computational complexity, stability, robustness, reasoning under uncertainty, etc. Bidding strategies for flexible demand and distributed generation, also on the aggregation level.
- Information technology issues related to transactive energy systems: e.g., resilience to latency, incomplete information and uncertainty. Standardization needs at different levels in the value & technology chain.
- Valuation use cases and/or business cases for transactive energy.
- Test and Benchmark systems for smart grid coordination.
- Literature studies, e.g. analyzing the concept and technology development of market-based and transactive control, and/or identifying future research topics.

Important Dates

- March 1, 2017: Deadline for extended abstract submission
- May 1, 2017: Notification for full paper submission
- September 1, 2017: Deadline for full paper submission
- April 1, 2018: Final decision notification
- June 1, 2018: Publication material due
- Target publication: Q3 2018

Submission Guidelines

This special section solicits original work that is not under consideration for publication in other venues. Two-page extended abstracts are solicited for the first round of reviews. Please submit a PDF version of the abstracts including a cover letter with authors' contact information via e-mail to koen.kok@ieee.org with the subject line **'Special Issue on Transactive Approaches'** before the deadline. Authors of selected abstracts will be invited to submit the full papers in the second round. Authors must refer to the IEEE PES authors' guide at www.ieee-pes.org/publications/information-for-authors for information on content and formatting of submissions. All papers will be rigorously reviewed as any IEEE PES transactions paper.

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