Flexible Assets Bid Across Markets

Publieke samenvatting / Public summary

Aanleiding

In order to accommodate the increasing share of renewable energy, innovative energy services are needed that efficiently exploit and incentivise local and distributed flexibility of storage and demand response assets, e.g. for arbitrage and to compensate forecasting inaccuracies. The flexibility aggregator Senfal already established such a service and is bringing individual asset flexibilities to individual markets. However, to realise the full potential of flexibility at the most cost-efficient price-points, energy services should compute schedules that exploit portfolio effects across multiple types of assets (e.g. batteries and cold stores) and multiple markets (e.g. intraday trading and frequency containment reserve).

Doelstelling

This project aims to 1) mature the anytime online planning approach to optimize intertwined market commitments and real-time control decisions, 2) implement the modular FABAM system to apply the approach to allocate energy flexibilities efficiently ('ontsluiting van flexibiliteit'), and 3) test the performance with real data in laboratory and operational conditions. In line with TKI Urban Energy program line 5, “Energieregelsystemen en -diensten”, the resulting FABAM system is a self-learning intelligent energy management system, validated within the existing aggregated flexibility service portfolio of Senfal ('optimaliseren van energiediensten').

Korte omschrijving

The consortium develops, implements and

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Algemene informatie / General information

Penvoerder / Secretariat
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Publicaties en materialen / Publications and attachments

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evaluates the FABAM system, publishing on anytime online planning and validating its efficacy to solve current and emerging challenges of flexibility aggregators. CWI performs applied research on energy market models, and on integrating planning and control approaches into anytime online planning . State-of-the-art sample-based planning algorithms will be fitted and improved, such that they perform well (w.r.t. to results and runtime) and are usable with diverse asset and market models. Senfal performs industrial research on asset and market models and does experimental development on system integration and validation. Senfal's expertise assures a fit-to-purpose, deployable system, including real-time adaptations to schedules, a modular model plugin-mechanism, cloud deployment and market connectors. Finally, Senfal performs FABAM's pilot validation with physical assets and real markets.

Resultaat

This project results in the FABAM system, and performance evaluations thereof in Senfal's business context of energy flexibility aggregation. FABAM is a deployable and modular system with “Anytime Online Planning” capabilities. Deployable: A software system which performs critical functionality needs to be deployed with high availability and stability in a multi-computer setting (e.g. cloud environments). Furthermore, the setup should be documented, such that other parties with access to the code can start their own version of FABAM. Modular: A plug-in mechanism makes it possible to replace asset and market models without changing the core of the system. Anytime Online: The planning of different kinds of flexible capacity ahead of time is complex and therefore time-consuming, but the algorithm running in this system can be stopped at any time to get the best solution so far. In real time, asset schedules are adapted according to the latest outcomes of the flexibility bids on markets.

De data in deze applicatie is afkomstig van de Rijksdienst voor Ondernemend Nederland (RVO) en wordt in samenwerking met de Topsector Energie ontsloten.
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