

Digital integration of multi-energy flexibility assets in Regional Energy Systems

Publieke samenvatting / Public summary

Aanleiding

Increasing flexibility of the energy system via customers' assets is essential to accelerate the ongoing energy transition to achieve renewable and climate targets. Innovation solutions have been implemented for various flexibility assets, e.g., battery energy storage system (BESS), electric vehicles (EVs), or heat pumps (HPs), via market actors, including energy suppliers and service providers/aggregators, e.g., Balancing Service Provider (BSP) and Congestion Service Provider (CSP). However, these solutions were mostly designed for a particular group of customers with specific types of flexibility, e.g., time shifting or volume changing. There is still a need for a holistic solution which can integrate various groups of not only large-scale but also medium- and small-scale customers, e.g. residential households, commercial buildings, or industrial sites. This kind of solutions is expected to unlock fully flexibility potential from multiple energy vectors, thus enabling the concept of Flexibility-as-a-Service (FaaS) for relevant market products.

Doelstelling

As a part of the CETPartnership initiative DigiRES, this project focuses on validating FaaS's business propositions and technical innovations needed to integrate a wide range of multi-energy flexibility assets from various types of customers. We will develop and validate innovation solutions in five pilot sites, including (i) an office building in Den Haag; (ii) an industrial site in Almelo; and (iii) three

Projectinformatie / Project information

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Algemene informatie / General information

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households in Den Haag, Rotterdam, and Groningen. These pilot sites with their distinct contexts allow us to test exhaustively the Internet-of-Energy (IoE) solution to connect any multi-energy flexibility assets in a layered market structure, using a number of connectivity methods, e.g., with an on-site gateway or via a cloud-based integration. In addition, their locations in both net-congested and non-congested areas provide a thorough setting to verify the market values of multi-energy flexibility, not only for spot markets, imbalance services but also for congestion management. To increase self-utilization and energy efficiency, we will implement a set of AI models to support prediction and optimisation tasks, depending on the user preferences from the pilot sites.

Korte omschrijving

The activities of this project are arranged in the same workflow as defined in the CETPartnership's DigiRES project, including (i) exploring business models and commercial propositions for FaaS; (ii) developing technological innovations, and (iii) validating in the pilot sites. With the support of Befo, Innova will lead the activities to define viable business and financial models for FaaS and implementation guidance to enhance stakeholder involvement and user engagement. With the support of TU/e, Innova will implement the Innova IoE-FaaS, an IoE-based multi-FaaS platform, for the Dutch regional market. The implemented platform will be tested and validated with the pilot sites of Innova and Befo buildings, as well as three other households. From a technological point of view, the actual implementation and validation concerns (i) a suitable and operable hardware integration platform for the assets of (active) customers (Befo, households), (ii) the asset management platform for the operator (Innova), and (iii) the flexibility trading platform for BSP and CSP (Innova).

Resultaat

The intended concrete results of experimental development in this pilot project are: 1) A real-life tested complete software package for flexibility service provider, collectively controlling flexibility

assets via a field gateway at the customer sites and the Innova IoE-FaaS platform; and 2) An investment toolbox, including bankable business models and implementation & operation guidance, as blueprint for a flexibility service provider, including the role of a BSP and CSP. These are applicable specifically for the Dutch flexibility market.

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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