

The Current State of the Balancing Services Market in Japan and Our Pilot Projects to Integrate DSR into the Grid

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Abstract

A large amount of renewable energy is expected to be introduced toward carbon neutrality of electric power supply in Japan. To maintain the stability of the power system in such a future, ensuring power system flexibility is indispensable and important.

In this presentation, we first present the status of the balancing service market in Japan. We conducted a comparison analysis of the regulations of the Japanese balancing service market with National Grid in the UK, PJM in the US, Regelleistung in Germany from the perspective of demand-side resources (DSRs)' participation. We addressed some issues that need to be addressed to integrate DSRs to the balancing service market.

Then, we will introduce some of the pilot projects that we are working on to integrate DSRs to the grid. The first project is energy management for commercial EVs. Commercial vehicles can take advantage of the benefits of EVs because of their high vehicle utilization rate and lower running costs compared to internal combustion vehicles, and because their driving routes are relatively fixed, there is little risk of a shortage of charging locations. We are researching energy management methods that do not interfere with existing delivery operations when replacing delivery trucks with EVs.

The second is a project to utilize renewable energy and green hydrogen on remote islands. Remote islands face the problem of instability caused by the increase of renewable energy faster than large-scale power grids because of the small scale of electricity supply and demand. Therefore, we are conducting a feasibility study of a local production local consumption type hydrogen utilization model that combines green hydrogen production using renewable energy and water electrolysis with hydrogen conversion of consumer energy demand.

The third one is the construction of plant factories that can respond to demand response. In this project, we aim to realize a zero-emission plant factory with artificial lighting that uses renewable energy to cover all the power consumption by leveraging solar panels and battery storages. Our aim in the future is to contribute to a stable operation of the power network on remote islands by developing the plant factory's energy management system which can respond "demand response request" from the power network operator by controlling the amount of electricity consumption such as lighting and air conditioning within a range that does not adversely affect the vegetables' growth.

note: This document will be opened to the participants on IERE website before the Forum and opened to the public afterward.