

Development of Energy Management System for Microgrid in Chubu EPCO

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Abstract

In order to realize a decarbonized and recycling-oriented society, there is a global need for the effective use of renewable energy sources such as photovoltaic (PV) power generation and battery energy storage systems (BESS). There is also a need for resilience-enhancing methods to restore the power more quickly in the event of prolonged power outages caused by natural disasters such as typhoons, sudden thunderstorms, and earthquakes.

One of the solutions to meet these needs simultaneously is to employ microgrid. Microgrid that Chubu is aiming to introduce can supply power to the main grid while being connected to the mains at all times by effectively utilizing local renewable energy, and can supply power in islanding conditions in the event of a disaster accompanied with black outs in the main grid.

Microgrid is planned to be constructed in an area that has been damaged repeatedly by mudslides and floods caused by overflowing rivers in the past, where the need of resilience enhancement is relatively high among the residents. In addition, the area is blessed with abundant solar radiation, and there are already enough mega solar power plants in operation to meet the demand of the area. A new BESS is being established as an adjustable power resource within the microgrid, and the development of energy management system for microgrid (MGEMS) is underway.

The MGEMS under development aims to achieve optimal energy management of the microgrid by switching the operation plan of the BESS to be appropriate situation while forecasting and monitoring the demand in the microgrid and the power generation of the PV resources. Concretely, the MGEMS will derive the operation plans with the following five objectives and issue control commands to the BESS according to the objectives to perform energy management of the area. The MGEMS and BESS will be in operation by March 2025.

- (1) Local production and consumption within the microgrid minimizing electricity imports
- (2) Time shift of renewable energy generation to maximize power sales income
- (3) Demand management at the interconnection point to minimize distribution investments
- (4) Utilization by markets, etc. linked to the aggregation coordinator system to maximize income
- (5) Management of charging storage batteries preparing for emergency to meet the resilience needs

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