

Development of Analysis Tool of Distribution System in Local Energy Community

Hiroyuki Hatta

**Senior Research Scientist, Energy Innovation Center, CRIEPI
Kanagawa, Japan**

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Abstract

In near future, large number of distributed energy resources (DERs) such as photovoltaic systems (PVs) and battery energy storage systems (BESSs) will be installed in the customer side, because of the needs of self-consumption of electricity generated by PV. Then, smart communities may appear to realize efficient use of energy in demand areas using DERs around the demand area.

If the DERs are operated to optimize the local objectives (cost minimization, etc.), the demand fluctuations will be complicated, and the power quality such as voltage fluctuations and overcurrent of the distribution system will be problems. Therefore, it is necessary to evaluate the impacts of economical operation of the community on the distribution system operation and to develop the countermeasure is also necessary.

CRIEPI developed an analysis tool to evaluate mutual influence between community and distribution system using previously developed programs, such as the demand simulation program and distribution system analyses program. Using the developed analysis tool, the simulation analyses of economical operation of BESSs by the community operator and the operation by the customers were carried out.