Demonstration of Energy Management Using Three Types of Batteries

Conclusion of a partnership agreement for energy management demonstration with Kobe City toward the realization of a decarbonized city

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Osaka Gas Co., Ltd.

Osaka Gas Co., Ltd. (President: Masataka Fujiwara; hereinafter, “Osaka Gas”) concluded a partnership agreement on a semi-microgrid*1 demonstration with Kobe City (Mayor: Kizo Hisamoto) on February 28, 2022 with the aim of achieving the utmost local consumption of locally generated renewable energy in light of environmental friendliness and economic efficiency. Based on this agreement, in collaboration with Kobe City, Osaka Gas will conduct a semi-microgrid demonstration by city block to realize a decarbonized city with the use of three types of batteries: fuel cells for household use (hereinafter, “ENE-FARM”), residential solar cells, and storage batteries. This will be the first demonstration in Japan*2 to utilize three types of commercially available batteries.

Having issued the Kobe City 2050 Carbon Neutral Declaration, Kobe City is working toward the realization of a decarbonized city. In this demonstration, it is assumed that approximately 100 residential houses in Kobe compose a virtual city block. By controlling ENE-FARM and storage batteries both remotely from the server and locally in the customers’ houses, we will carry out technology verification for the purpose of achieving the utmost local consumption of locally generated renewable energy in the city block. By doing so, we strive to contribute to the further spread and expansion of renewable energy.

In addition, we will reduce the dependence on electric power systems by leveling electrical demand in the city block and enhance the resilience of the block. To reduce the dependence on electric power systems and enhance the resilience, it is essential to add easy-to-control ENE-FARM, which can generate stable power regardless of the season, time of day, and weather, to residential solar cells and storage batteries. We believe that the addition of ENE-FARM can help reduce social costs, including the maintenance costs of the distribution networks.

Based on the Daigas Group Carbon Neutral Vision announced in January 2021, Osaka Gas has been working on the development of technologies and services that contribute to a low-carbon and decarbonized society. Until now, to help stabilize electric power systems in a society where a large amount of renewable energy is introduced, we have been working on a virtual power plant (VPP)*3 construction demonstration project utilizing ENE-FARM and on demand response service*4 for commercial and industrial customers by utilizing, for example, cogeneration systems. In the future, we will work toward addressing challenges identified through this demonstration and aim to commercialize our energy management technologies.

The Daigas Group will promote the spread and expansion of energy networks combined with distributed power sources through the use of ENE-FARM and other distributed power sources. By doing so, we will help realize a low-carbon and decarbonized society and become a corporate group useful in the “further evolution” of life and business.

*1: In this demonstration, a semi-microgrid is defined as follows: a model of a distributed energy system that aims to minimize the dependence on power transmission and distribution systems by connecting to existing distribution lines without laying any private distribution lines while taking advantage of the enhanced efficiency of energy use, which is one of the features of a microgrid (an energy system that can effectively utilize local renewable energy power sources by grasping the power flow of the power systems in the relevant city block in normal times and that can supply power independently in the event of a large-scale power outage due, for example, to a disaster) .

*2: According to Osaka Gas’s research

*3: A virtual power plant that functions just like a single power generation facility through the integrated control of distributed power sources by an aggregator using information and communication technologies

*4: A service that helps stabilize the supply and demand in a power system through the Daigas Group's aggregation of the power provided by customers when the system faces tight power supply-demand situations

1. Partnership Agreement

(1) Purpose

To contribute to the safety and security of Kobe citizens by realizing Japan's first 3-battery semi-microgrid with commercially available products through the introduction and utilization of the 3-battery system with collaboration and cooperation between Kobe City and Osaka Gas in light of the advancement of renewable and distributed energy, which is a challenge for Kobe City, and the Daigas Group Carbon Neutral Vision espoused in Osaka Gas's business plan

(2) Items included in the partnership

① Public relations and promotional activities to be carried out through collaboration between Kobe City and Osaka Gas in order to recruit households who can cooperate with this demonstration

② Provision of equipment, including residential solar cells, ENE-FARM, storage batteries, and devices for measuring electric power demand and other data, by Osaka Gas to households who are cooperating in this demonstration

③ Verification of technologies by Osaka Gas to realize a semi-microgrid through remote control of the equipment described in ②

(3) Agreement period (including the demonstration period): February 28, 2022 to the end of March 2023

2. Demonstration Overview

Assumption about the introduction of distributed power sources	Residential solar cells, ENE-FARM, storage batteries It is assumed that a total of about 100 households who own one or more of the above equipment will participate in the demonstration.
Major objectives of demonstration	To verify the following items by controlling the three types of batteries through both remote control from the server and local control in the customers' houses: (a) Local consumption of locally generated renewable energy (b) Reduction of the dependence on electric power systems by leveling the local electrical demand

<Image of the demonstration>

We will conduct a demonstration as shown below by taking advantage of our knowledge acquired through our previous participation in VPP construction demonstrations.*5

① Collect real-time data on the power demand and the operating status of the equipment in the customers' houses

② Forecast the power demand for the entire city block from the following day based on the collected data to make a control plan (by utilizing AI and the like)

③ Set a control plan based on the demand forecast

④ Send instructions for optimal energy management also in consideration of the real-time situation of the day

(Output control of ENE-FARM, charge/discharge control of storage batteries, etc.)

*5: Participated in the FY2020 Subsidized Demonstration Project for the Construction of a Virtual Power Plant that Utilizes Demand-Side Energy Resources and the FY2021 Subsidized Demonstration Project for the Construction of Next-Generation Technology that Utilizes Storage Batteries and Other Distributed Energy Resources