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Tokyo Gas and Osaka Gas Begin Smart Energy Network Demonstration Project

Tokyo Gas Co., Ltd.
Osaka Gas Co., Ltd.

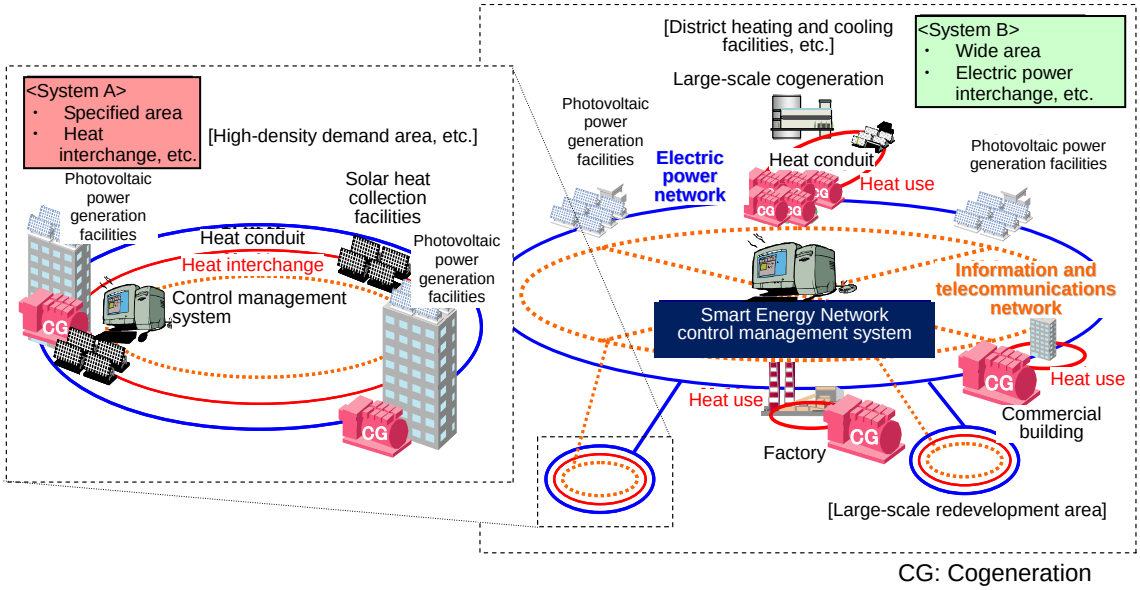
Tokyo Gas Co., Ltd. (headquarters: Minato-ku, Tokyo; President: Tsuyoshi Okamoto; hereafter "Tokyo Gas") and Osaka Gas Co., Ltd. (headquarters: Osaka City, Osaka prefecture: President Hiroshi Ozaki; hereafter "Osaka Gas") will be jointly implementing a Smart Energy Network demonstration project from this month, May 2010. The Smart Energy Network will introduce large quantities of renewable energies and unused energies in dispersed energy systems, and use information and telecommunications technologies for the optimal control of energy supply and demand. The two companies will conduct detailed design works and initiate the Smart Energy Network demonstration project from May 2010 to collect and analyze data and advance improvements to the system.

■ Outline of the Demonstration Project

This project will implement demonstration works on two systems: System A, which aims at optimization within a given community through the interchange of electric power and heat within a specific area, and System B, which works at optimization throughout a wide area by linking multiple geographically scattered System A communities with a natural gas cogeneration system for full use of heat at each site and interchange of electric power throughout the wide area. The project is expected to reduce CO_2 emissions by over 30%.[*1] The project also promotes the introduction of photovoltaic power generation by supplementing photovoltaic power – whose output fluctuates depending on the weather – with cogeneration, which reduces the required capacity of photovoltaic power storage facilities.

*1. Ratio of the CO_2 emissions volumes from the demonstration project facilities to those from the facilities in 1990 with no cogeneration (with system electric power CO_2 unit emissions calculated at 0.69kg-CO_2/kWh).

Figure 1. Outline of the Smart Energy Network Demonstration Project



CG: Cogeneration

Tokyo Gas will be in charge of System A. In this system, electric power and heat supplied from high-efficiency cogeneration, solar heat collection and photovoltaic power generation facilities installed at the Tokyo Gas Senju Techno Station (Arakawa-ku, Tokyo) will be interchanged among multiple buildings within the compound. With project support from Arakawa-ku, Tokyo Gas will also install a conduit which crosses a ward road for the interchange of heat with the Arakawa Ward Special Nursing Care Home for the Elderly.

Osaka Gas will be in charge of System B. Osaka Gas will construct a remote supervisory control system to control optimization, assuming electricity interchange, linking an existing district heating and cooling facility – the Iwasaki Energy Center (Osaka City, Osaka Prefecture) – with photovoltaic power generation facilities installed at about four locations (Kakogawa City, Hyogo Prefecture; Konan City, Shiga Prefecture; etc.) and about five customer cogeneration facilities.

This project was selected today as a Ministry of Economy, Trade and Industry (METI) “Dispersed Energy Compound Optimization Demonstration Project.”

■ Future Development

Tokyo Gas and Osaka Gas both participate in the Smart Community Alliance established by METI in April 2010, and are actively working to promote smart communities.[*2] Tokyo Gas and Osaka Gas also both participate in the “Next-Generation Energy and Social Systems Demonstration Areas”[*3] that are being advanced by METI. The present Smart Energy Network demonstration project should establish universal models that can be introduced to diverse buildings, be broadly applied in other demonstration projects and in

actual supply, and advance the realization of a low-carbon society.

*2. Smart communities are next-generation energy and social systems within specific areas which combine the effective utilization of electric power with the district-wide use of energy including heat and unused energy, local transportation systems, and reforms to residents' lifestyles.

*3. Demonstration projects to realize next-generation energy and social systems, including a Japanese version smart grid, being advanced by METI. Tokyo Gas is participating in the Yokohama City project, and Osaka Gas is participating in Kyoto Prefecture (Keihanna Science City) project.

<Supplement> Regarding Smart Energy Networks

The demand for renewable energy supply facilities and for cogeneration – which is a dispersed electric power generation system with superior energy conservation and CO_2 reduction – continues growing as we move toward energy security and realization of a low-carbon society. Further advancing the effective use of energy overall will require the effective use not only of electric power, but also considerations of heat, which accounts for over 50% of final energy consumption, the coordination of large-scale networks with dispersed systems, and the best mix of renewable energies and conventional energies. Smart Energy Networks are next-generation energy and social systems which work at optimal energy use by combining electric power with heat, renewable energies, garbage incineration plant waste heat and other unused energies, and arranging interchange among multiple end users.

<Reference>

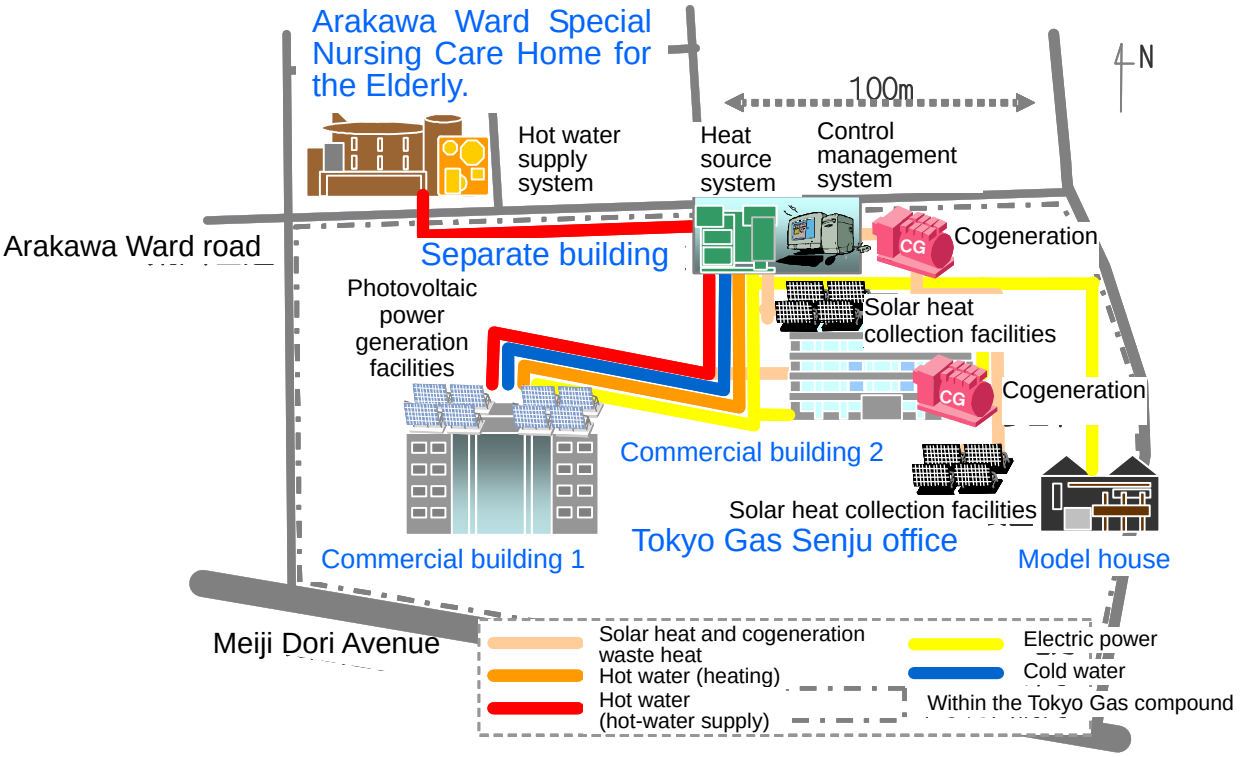
■ Outline of System A

System A constructs a heat interchange network which integrates nearby heat demand in an area with high-density heat demand, combines this with cogeneration, solar heat collection and photovoltaic power generation facilities, and regulates heat and electric power interchange.

This project will verify (1) the effect of electric power and heat interchange among multiple structures including commercial buildings and homes, (2) the centralized control and prioritized use of heat resource facilities combining collected solar heat – which fluctuates with the weather – with cogeneration waste heat, and (3) the control of cogeneration to supplement photovoltaic power, whose output also fluctuates with weather.

The project is expected to realize CO_2 emissions reductions of approximately 30%.

Figure 2. Outline of System A Demonstration Project



System A Main Equipment Specifications

Item	Specifications
Solar heat collection facilities	Approx. 300m^2 (separate installations at two locations)

Photovoltaic power generation facilities	Approx. 90kW
Cogeneration	One 370 kW unit plus one 700kW unit

■ Outline of System B

System B assumes the interchange of electric power linking a large-capacity cogeneration system installed at a major consumer with geographically scattered photovoltaic power generation facilities and other cogeneration facilities.

The demonstration facilities assume the Iwasaki Energy Center as a system installed at a major consumer, approximately five other existing customer cogeneration systems whose output is viewed as interchange electric power produced by large-scale cogeneration, and about four photovoltaic power generation facilities on company property.

This project will verify (1) the effect of electric power interchange throughout a wide area considering the optimal use of heat at each site, through centralized control over multiple, geographically separated power supply sources and demand end users, (2) remote control of energy supply facilities using regular telecommunications lines, (3) countermeasures to output fluctuations and countermeasures to surplus electric power from the large-scale introduction of photovoltaic power generation facilities through cooperative control of cogeneration in accordance with the output of the photovoltaic power generation facilities.

This project is expected to realize CO_2 emissions reductions of approximately 30%.

Figure 3. Outline of System B Demonstration Project

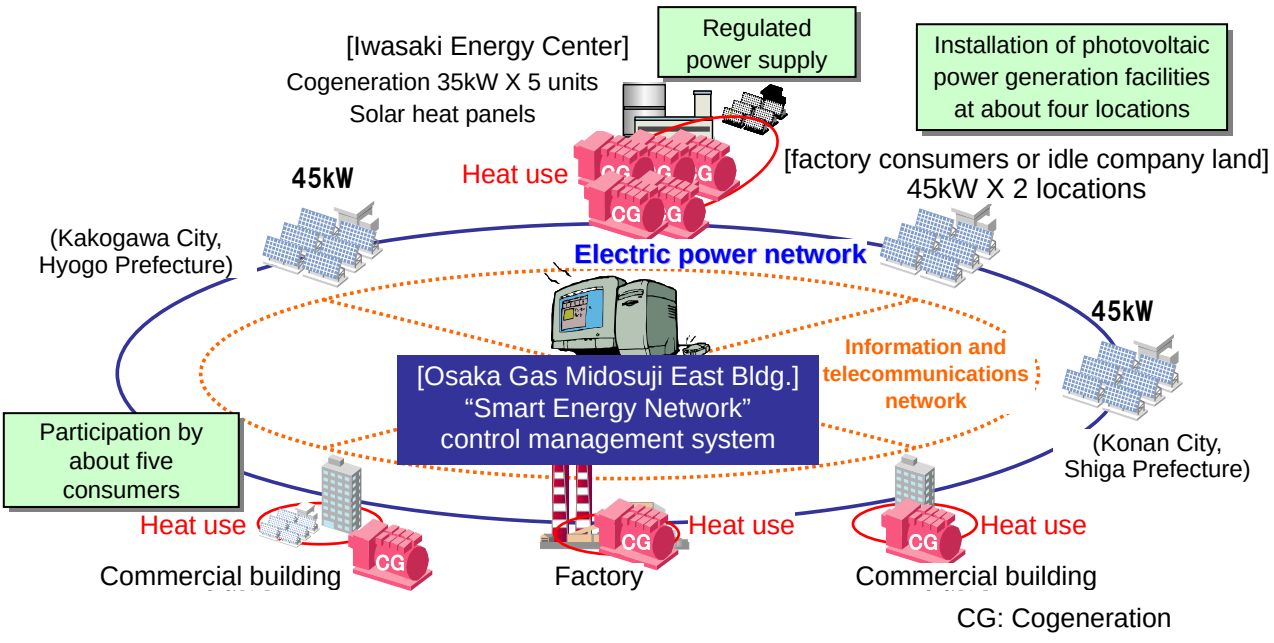
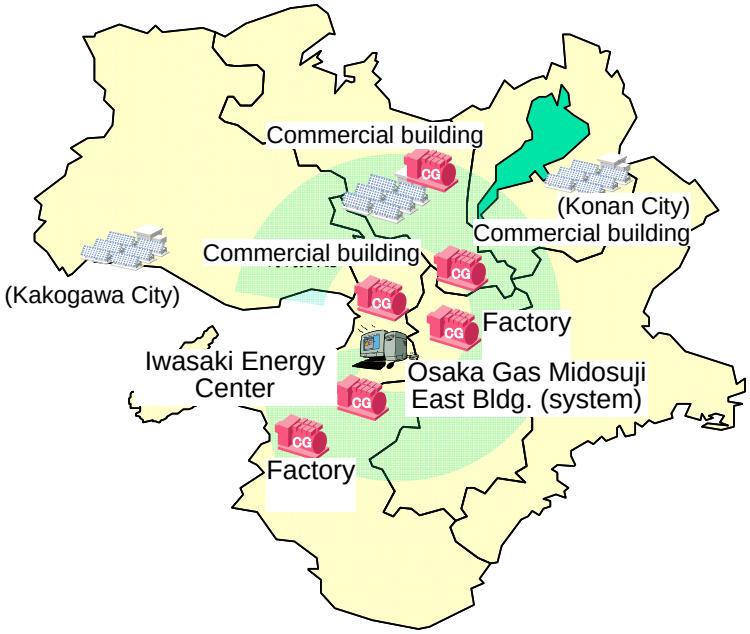


Figure 4. System B Demonstration Project Facilities Locations Image



Locations indicated are per the present plan.

System B Main Equipment Specifications

Item	Specifications
Solar heat collection facilities	100m^2
Photovoltaic power generation facilities	180kW (separate installations at about four locations)
Customer cogeneration	800kW scale X about 5 locations
Iwasaki Energy Center cogeneration	175kW (35kW X 5 units)