Action plans of Japan's City Gas for the efficient and advanced use of natural gas

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Hokuriku Gas Co., Ltd.

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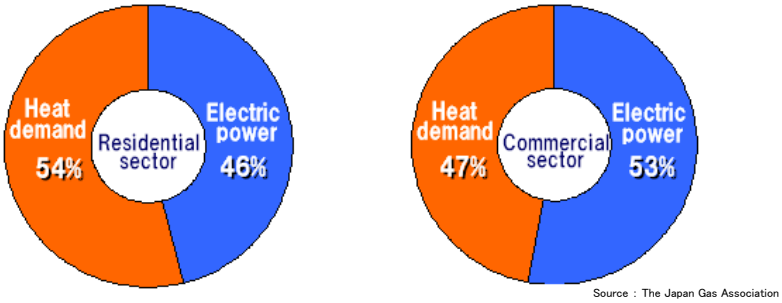
1. Hokuriku Gas : Profile

Head Office	1-2-23 Higashi-ohdohri , Chuou-ku, Niigata City 950-8748, Japan
Established	June 2, 1913
Service area	Niigata City , Nagaoka City , Sanjo City , Kamo City , Tagami Town
Number of gas customers	359,754（As of March 31,2011）
Net sales	36,499 millions yen（As of March 31,2011）
Gas sales volume	337,315 thousands m3（As of March 31,2011）

2. Advanced Use of Natural Gas

Proportions of heat demand and power demand in gross energy consumption



Source : The Japan Gas Association

Advanced use of natural gas toward creating a low-carbon society

(1) Shift to natural gas for meeting heat demand
(2) Development of cogeneration systems including fuel cell systems
(3) Combining natural gas with renewable and unused energy sources
(4) Advanced use of natural gas in transport

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3. Residential High-efficiency Gas Appliances

- The sales volume of “Eco-Joez” (residential condensing boiler) and “Eco-Will” (gas engine cogeneration system for residential use) is increasing year by year.
- Gas industry intends to make Eco-Joez the de facto standard by 2013.

エコジョーズ

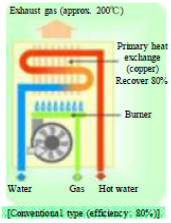
Trademark of Eco-Joez

エコジョーズ化宣言 2013

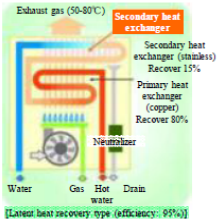
エコウィル ECO WILL

Trademark of Eco-Will

[Conventional type]



[Latent heat recovery type]



Energy-saving rate: 13%

Source: The Japan Gas Association

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4. Gas Air Conditioning Systems

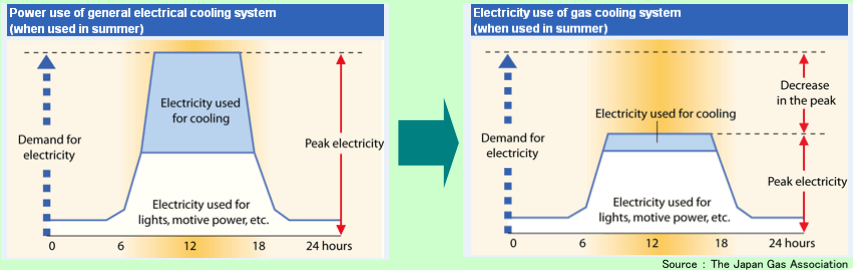
- The gas air conditioning system offers a multitude of benefits including economic efficiency, energy conservation, space conservation, and easy management.
- Contributing to the peak shaving of electricity demand in summer.

GHP (Gas Heat Pump) type

Examples of installation sites:
•Small retail stores, schools, hospitals, etc.
•Medium-size buildings, etc. (total floor area up to approx. 10,000 m^2)

Absorption type

Examples of installation sites:
-Office buildings, shopping centers, public facilities, etc.



Source : The Japan Gas Association

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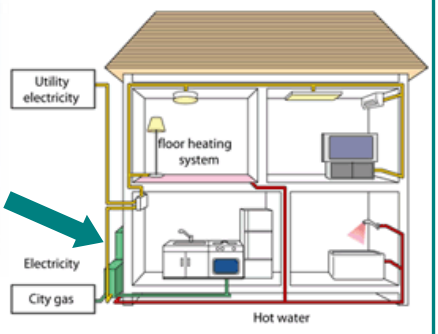
5. Residential Fuel Cell

- "ENE-FARM" is a new energy generation system, which simultaneously produces electricity and hot water at home.
- In Niigata, the sales start of the "ENE-FARM" was carried out from June, 2011.

PEFC (Polymer electrolyte fuel cell) system



Overall efficiency: 72%*
- **Power generation efficiency: 31.5%***
- **Waste heat recovery ratio: 40.5%** *HHV

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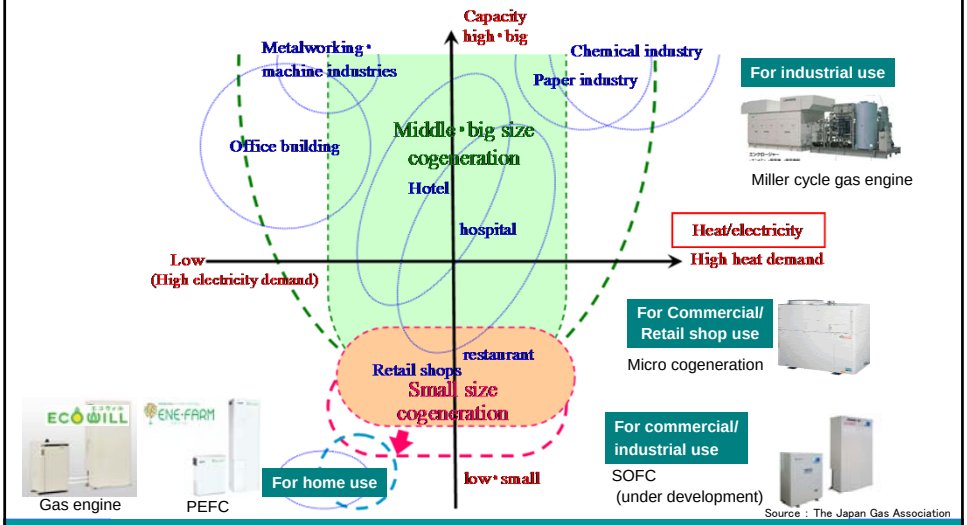
6. Wide variety of Cogeneration Systems

We provide a wide variety of cogeneration systems, differently balanced between the demand for heat and the demand for power.



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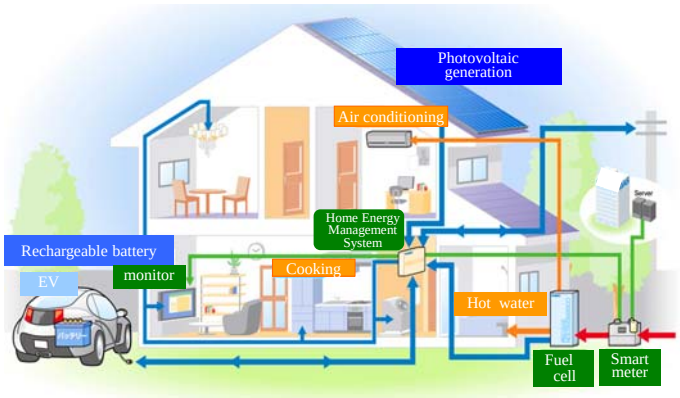
7. Expanding the Use of Residential Fuel Cell Systems

"Smart house" will optimize the energy supply and demand and minimize CO2 emissions for entire house by allowing harmonious interconnection with renewable and unused energy.

"Smart House" The Energy System for the Next Generation



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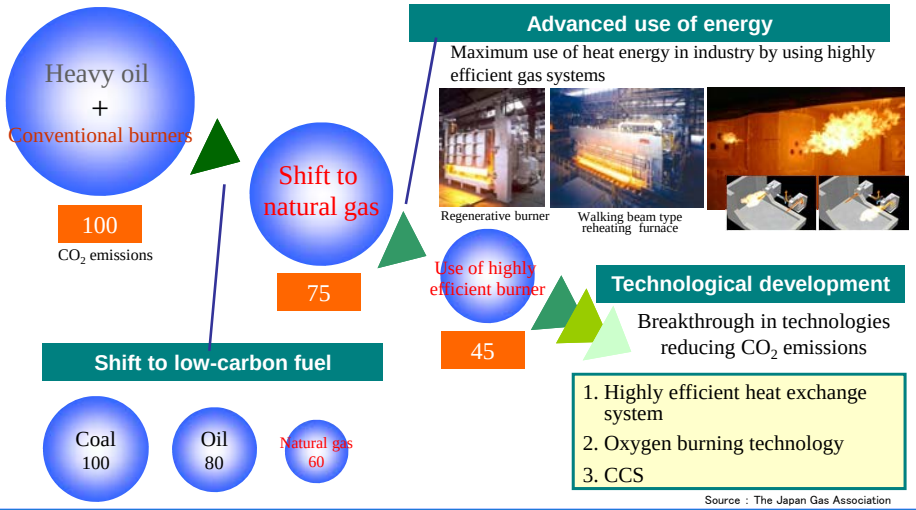
8. Shift to and the Advanced Use of Natural Gas in Industrial Sector

Shift to natural gas and use of highly efficient gas systems will reduce CO2 emissions from the use of heat energy in industry by about half. .



Source : The Japan Gas Association

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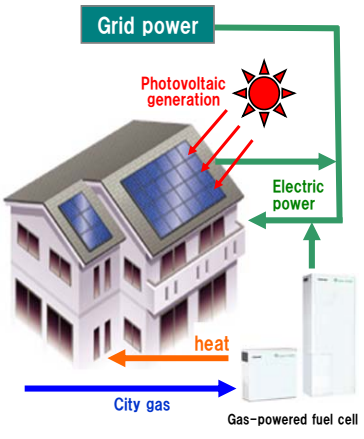
9-1. Utilization of Renewable and Unused Energy Sources

1. Dual mode generation system

Photovoltaic + Fuel cell
Photovoltaic + Gas engine cogeneration



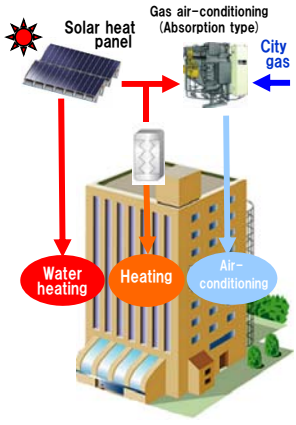
2. Combining solar heat with gas appliance systems

Residential sector

Solar heat + Highly efficient gas water heating

Commercial sector

Solar heat + Gas air conditioning



Source : The Japan Gas Association

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9-2. Utilization of Renewable and Unused Energy Sources

3. Using urban waste heat

Using industrial waste heat for heating

Energy required at factory
<Heat>
<Electric power>

Waste treatment plant

Waste heat from the combustion of natural gas for power generation

Waste heat recovery boiler

Warm bath facilities

4. Using biogas from sewage and waste treatment plant

Using biogas (mixing with city gas)

Nagaoka city, Niigata

Using biogas as fuel for cogeneration, boiler, air conditioning systems

Kyoto bio-cycle project

Source : The Japan Gas Association

10. Natural Gas Vehicle

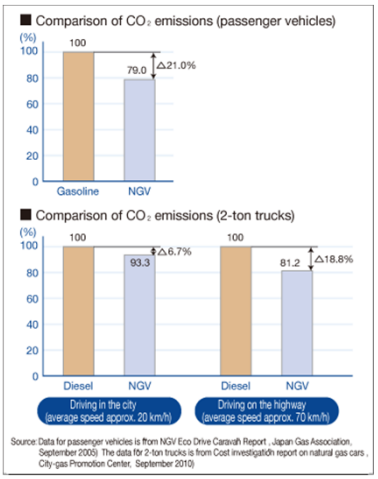
A wide variety of vehicles, from light vehicles to trucks and buses, run on natural gas, and these low emission vehicles are expected to be used more widely.

Use of natural gas for a cargo truck

Eco station

Greater use of fuel cell vehicles

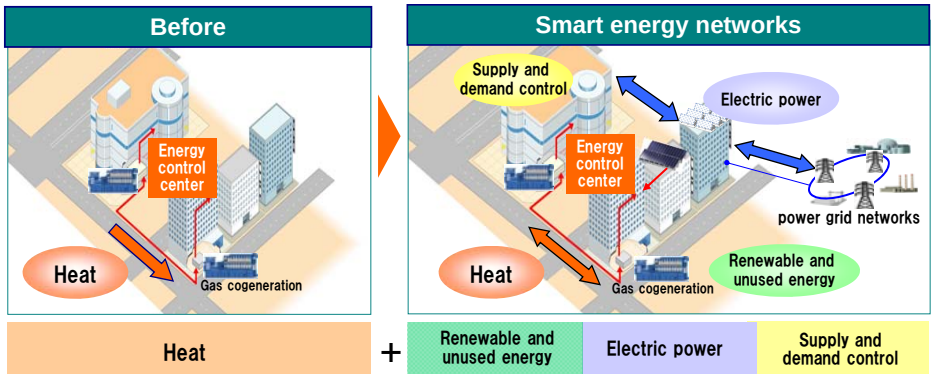
Hydrogen station



Source : The Japan Gas Association

11-1. Development of New Energy Network Systems

"Smart energy networks" combining gas cogeneration systems with renewable energy, solar energy etc, or unused energy, waste heat from waste incineration plant and factory, optimize the energy supply and demand (heat and electric power) and minimize CO2 emissions.



Source : The Japan Gas Association

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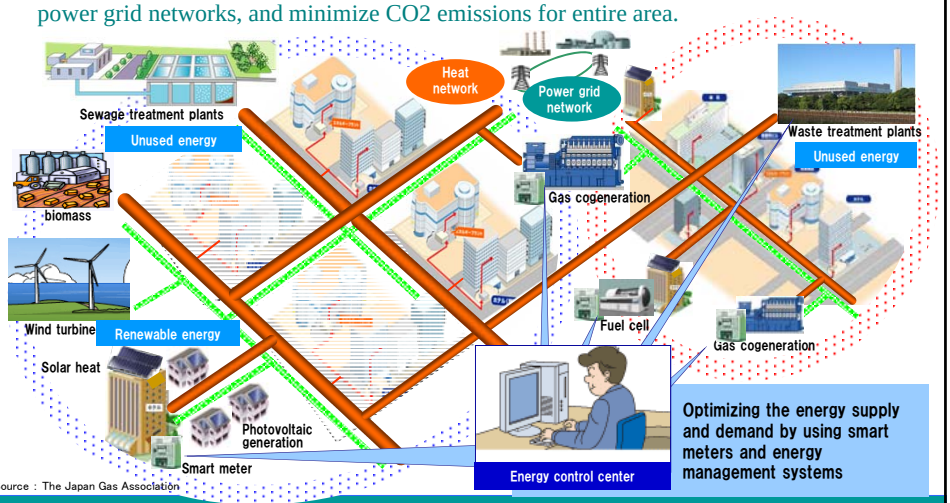
11-2. Development of New Energy Network Systems

"Smart energy networks" in urban area by connecting consumers with various sources of heat and electric power, including local sources of renewable and unused energy, will optimize the heat and electric power allowing harmonious interconnection with existing power grid networks, and minimize CO2 emissions for entire area.



Source : The Japan Gas Association

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Thank you for your kind attention.

Hokuriku Gas Co., Ltd.

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