

Evolution from energy-using homes into energy-producing homes - home power generation

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Hokuriku Gas Co.Ltd.
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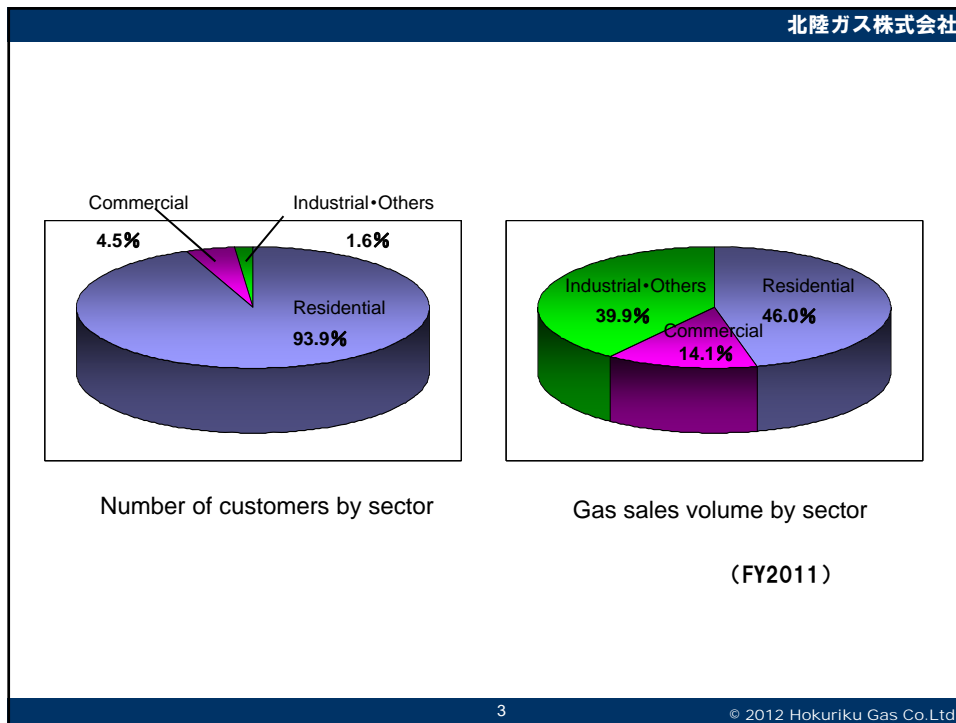
1. Hokuriku Gas : Profile

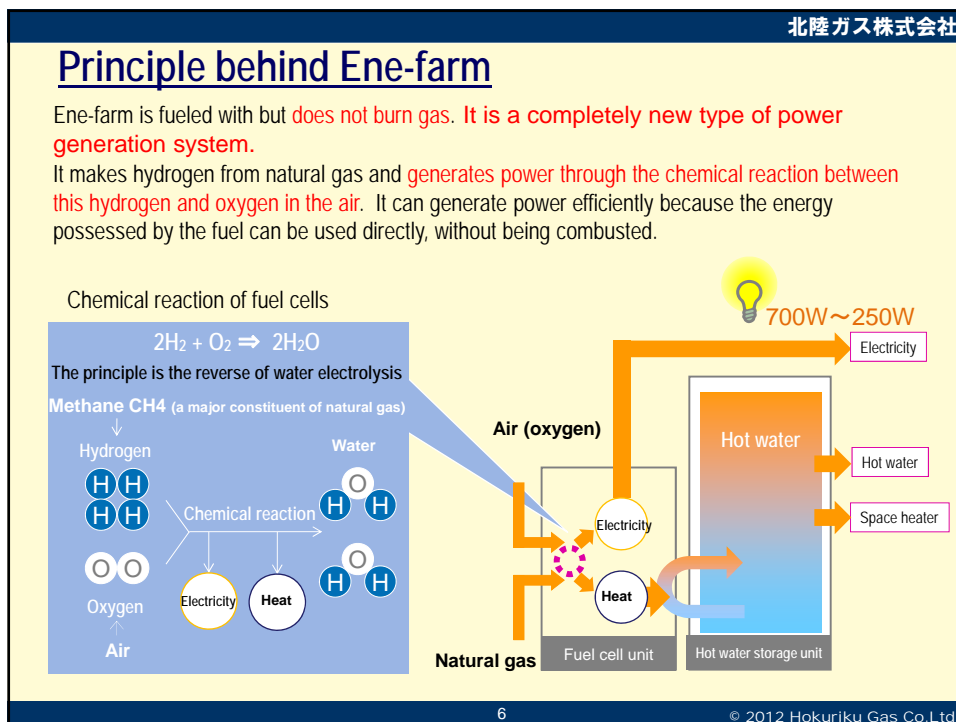
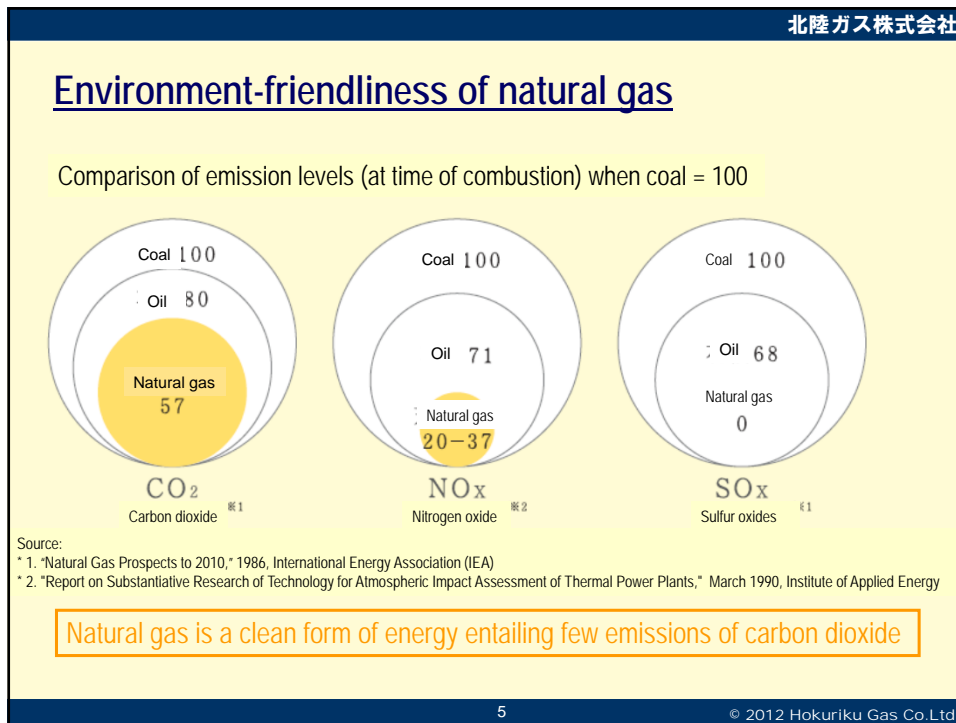
- Head Office 1-2-23 Higashi-Ohdohri , Chuou-ku, Niigata City 950-8748, Japan
- Established June 2, 1913
- Capital 2.4 billion yen
- Number of employees 377
- Gas supply area Niigata City , Nagaoka City , Sanjo City
Kamo City , Tagami Town
- Number of gas customers 360,000
- Gas sales volume 340 million m3 (45MJ)

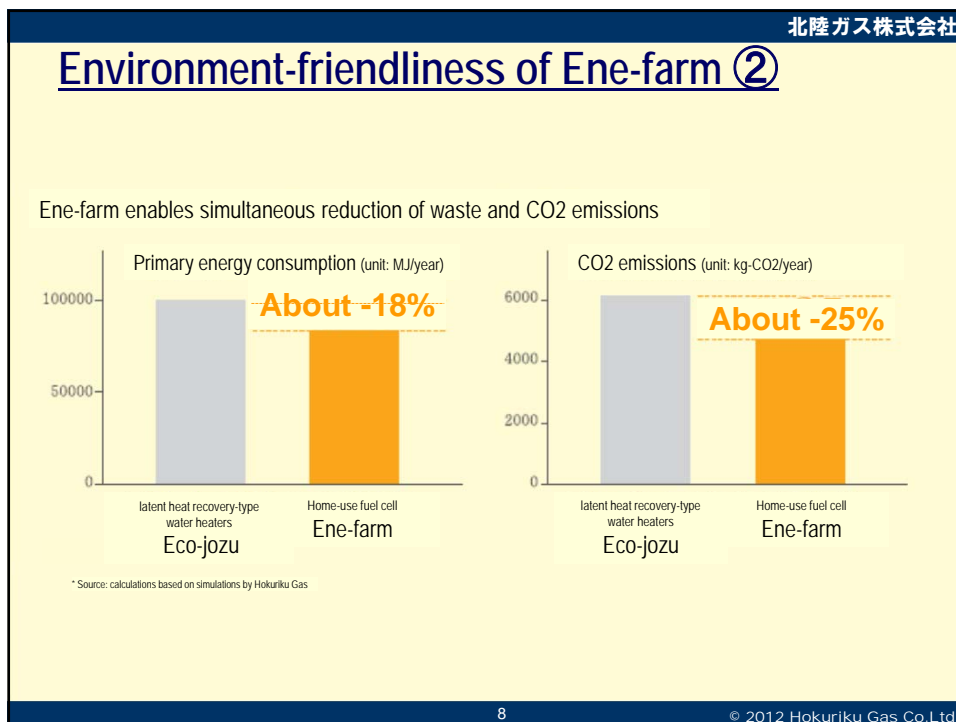
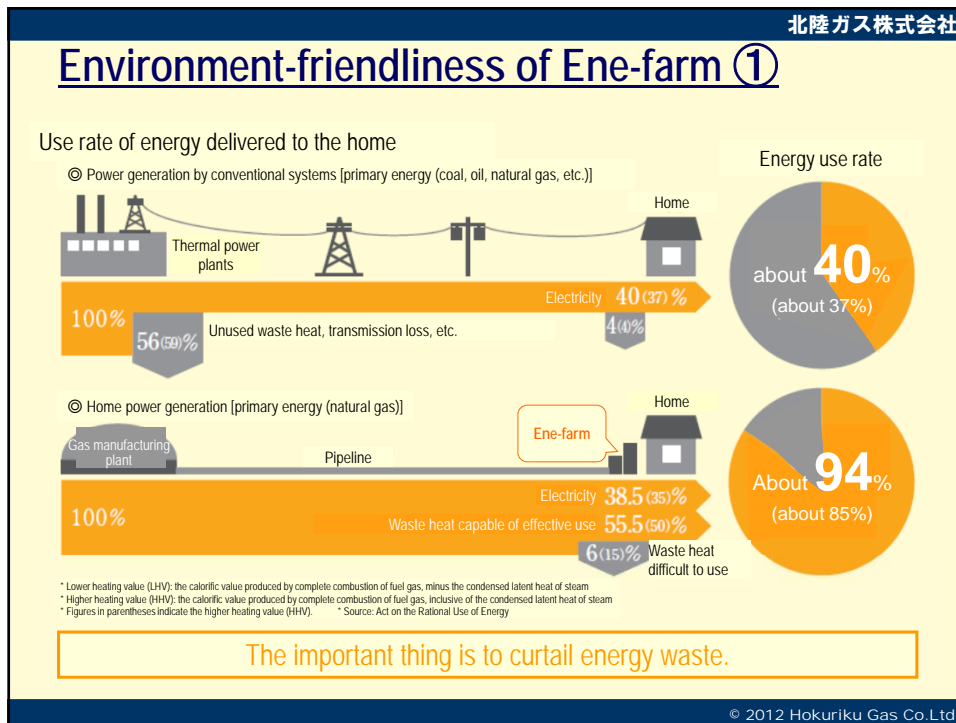


Headquarters building

(As of March 31,2012)







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Environment-friendliness of Ene-farm ③

Use of Ene-farm is the equivalent of bringing about six tennis courts's worth of forest into the home.

6 tennis courts (500 m²) = One Ene-farm unit

One Ene-farm unit produces a CO₂ emission reduction equal to the amount of CO₂ absorbed by about 2,900 square meters of forest.¹
 The CO₂ emission reduction of about 1,500 kg/year is equivalent to the amount absorbed by about 2,900 square meters of forest.

Annual CO₂ emission reduction of fuel cell systems: about **1,500 kg/year**¹

Other CO ₂ emission reduction activities ²	
Practice of turning engines off when vehicles are stopped instead of allowing them to idle:	-40 kg/year
Shortening of showering time by one minute:	-29 kg/year
Raising of the air conditioner thermostat from 27 to 28 degrees C:	-10 kg/year
Reduction of TV viewing time by one hour per day:	-11 kg/year

■ Yearly amount of reduction in CO₂ emissions as a result of various energy-saving activities
¹ Source: calculations based on simulations by Hokuriku Gas
² Source: "Home Energy-Saving Dictionary," February 2011, The Energy Conservation Center, Japan

9

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The comfort of Ene-farm ①

ENE-FARM
エネファーム

Use of heat produced during power generation

Power generation

Fuel cell unit

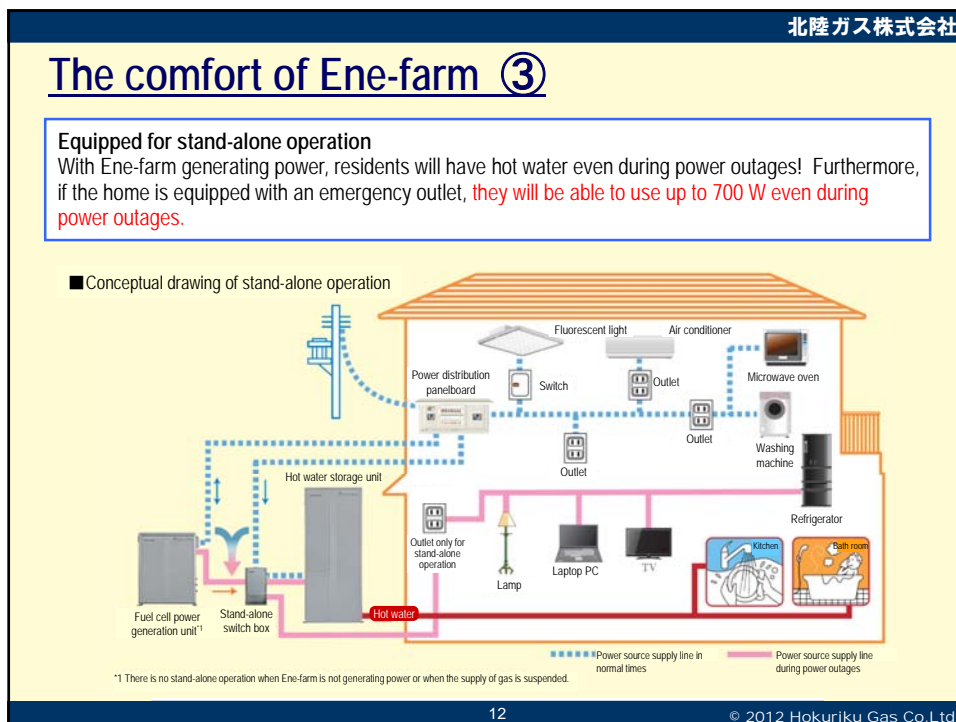
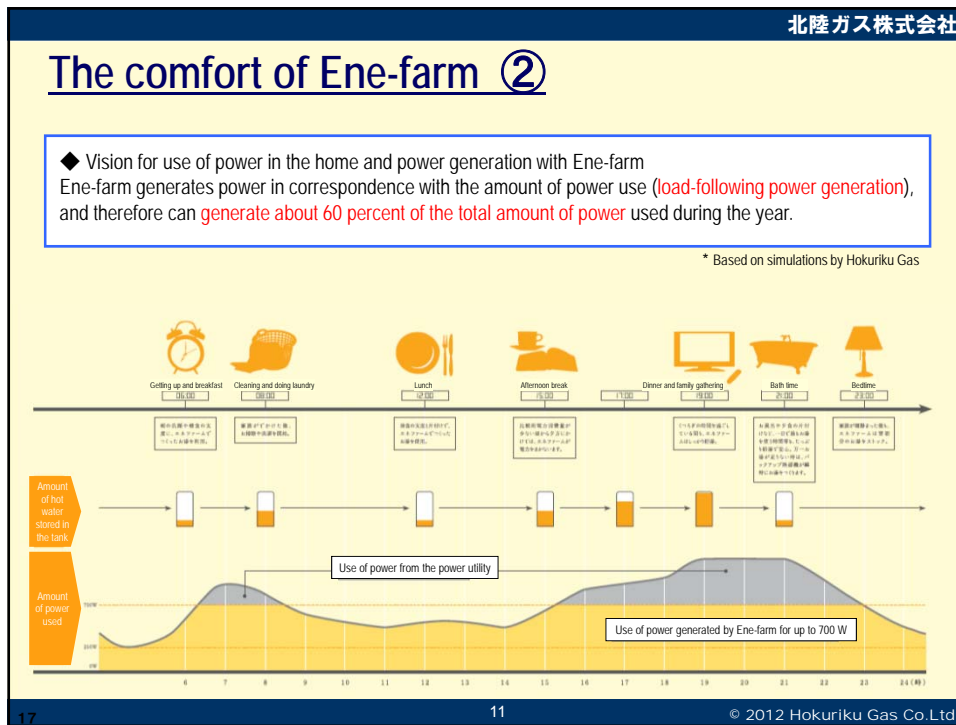
Hot water

Hot water storage unit

- Electricity → Lighting, TV
- Hot water supply → Shower, Gas-fueled hot water underfloor heater
- Space heating → Gas-fueled hot water underfloor heater

10

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Double power generation by Ene-farm and a PV system

- Home-use fuel cells save energy and reduce CO2 emissions due to their high overall efficiency.
- Double power generation in combination with a photovoltaic (PV) system will increase the amount of electricity sold during the daytime.
- The cumulative total of Ene-farm units installed in the city gas industry tops 20,000 nationwide.

Double power generation

Fusion of high-efficiency energy-saving equipment and renewable energy

【Graph image of daily amount of power】

Cumulative installation volume

The cumulative number of Ene-farm units installed nationwide topped 20,000 as of September 2012 and is projected to reach 30,000 by the end of fiscal 2012 (31 March 2013).

Launch of sales in May 2009

*1: Number of units installed as of September (estimated by the JGA based on manufacturer shipments over the months April - June 2012)

*2: Number of units installed as of the end of fiscal 2012 (estimated by the JGA based on data on applications for FCA subsidies)

17
13
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Ecowill equipped for stand-alone operation

Ecowill Plus can be started up through a simple procedure even in emergencies.

Please activate it upon confirmation of normal supply of gas and water to your home.

step 1 Change the outlet

Remove the power source plug for the water-heating unit from the outlet for normal times and insert it into the outlet for times of power outage.

step 2 Switch the power generation mode

Turn the power generation mode switch on the power generation unit to "Time of outage (stand-alone)".

step 3 Pull the start-up grip

Pull the start-up grip with both hands and start the engine.

step 4 Finally, insert plugs for appliances into the indoor outlet for use during power outages (outlet exclusively for stand-alone operation)

Electrical equipment

Indoor outlet for use during power outages

- Lighting: 100W
- Fan: 80W
- TV set: 120W
- Computer: 300W
- Rechargeable power supply: 10W

Supply of hot water Space heating

Electrical power is also needed for water heaters and space heaters.

Efficiency (LHV basis) Power generation: 26.3% Overall: 92.0%

17
14
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Future outlook for Ene-farm - ①

Smart energy house

① Storage cell

② Solar cells

+

③ Fuel cell

Optimization of energy use in the home

Fuel cell plus solar cell

Without control

The fuel cell is operated at low output at night

Fuel cell + solar cells + storage cell

With control

Storage cell use

Recharging late at night

Discharge of power from evening to night

Source: Osaka Gas Co., Ltd.

15
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Future outlook for Ene-farm - ②

● Start of "smart house" proving test for collective housing (Tokyo Gas)

Power reception and transformation facilities

— Electricity — Heat — Water

PV power generation system		About 25kW
SOLAMO, a gas-fueled system for hot water applying solar heat	Rooftop installation type	About 10m ²
	Balcony built-in type	1 unit
Home-use fuel cells Ene-farm		10 units (two in four dwelling units)

【Proving test site】
 Building A, Esperansa Isogo, Isogo housing for Tokyo Gas employees
 (3-3-2 Shiomidai, Isogo Ward, Yokohama, Kanagawa Prefecture, Japan)

Collective housing - one underground floor and four aboveground floors (24 units)

Source: press release data from Tokyo Gas Co., Ltd.

17
16
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Thank you for your kind attention.