このまち思いエネルギー。
広島ガス
HIROGAS

Hiroshima Gas CSR Report 2017

Corporate Social Responsibility Report

Digest

Working toward a sustainable society

Q How is natural gas delivered to customers?

City gas supply flowchart

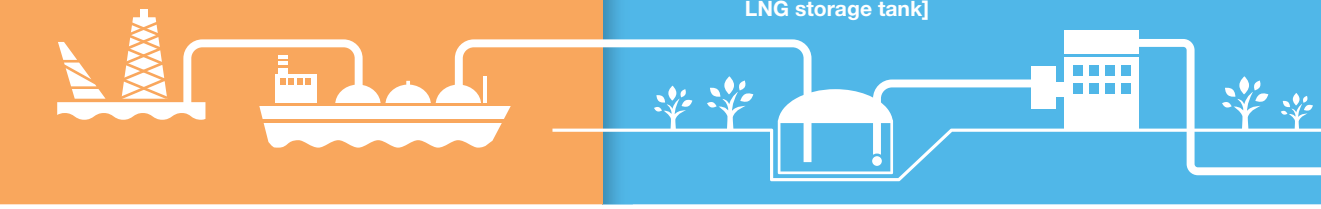
Raw material procurement and transport → **City gas production**

Natural gas is extracted overseas, cooled to approximately -160°C, liquefied, and then imported as LNG (liquefied natural gas).

Russia, Prigorodnoye facilities

LNG is placed into storage tanks and vaporized according to demand. It then undergoes calorific value adjustment and is supplied as city gas.

Hatsukaichi LNG terminal



Supply area and organization

Supply area (7 cities and 4 towns within Hiroshima prefecture)
Hiroshima, Kure, Onomichi, Mihara, Hatsukaichi, Higashi-hiroshima, Fukuyama, Aki-gun Kaita-cho / Saka-cho / Fuchu-cho / Kumano-cho

Number of customers **409,000**

Hiroshima district
Number of customers **345,000**

Kabe facilities

Higashi-hiroshima plant

Kaita facilities

Head office

Hatsukaichi LNG terminal

Kure district
Number of customers **47,000**

Kure branch

Kumano facilities

City gas supply

Gas is supplied to customers through 5,108km of underground piping (supply and service pipelines).

Gas pipe bridges

Delivery to customers

The gas that we supply can be used in a variety of applications.

Factories, etc.

Hotels, buildings, schools, etc.

Kitchens, hot water supply, etc.

Natural gas is an environmentally friendly type of energy!

Hiroshima prefecture

Bingo plant

Wholesale supply
(Hiroshima Gas)

Wholesale supply utilizing equipment from Setouchi Pipeline Co., Ltd., a consolidated subsidiary

Mizushima station
(Setouchi Pipeline Co., Ltd.)

Mizushima LNG terminal
(Mizushima LNG Co., Ltd.)

Okayama prefecture

Mizushima station
Mizushima LNG terminal

Fukuyama Gas Co., Ltd.

Energy plays an important part in every part of our lives.

Onomichi/Mihara district

Number of customers
17,000

Onomichi branch

Legend			
Supply area (Hiroshima district)		Gas holder	
Supply area (Kure district)		Gas production plant	
Supply area (Onomichi/Mihara district)		Head office/Branch/ Facilities	
Pipeline (Hiroshima Gas)		Proposed pipeline	
		Pipeline (Setouchi Pipeline)	

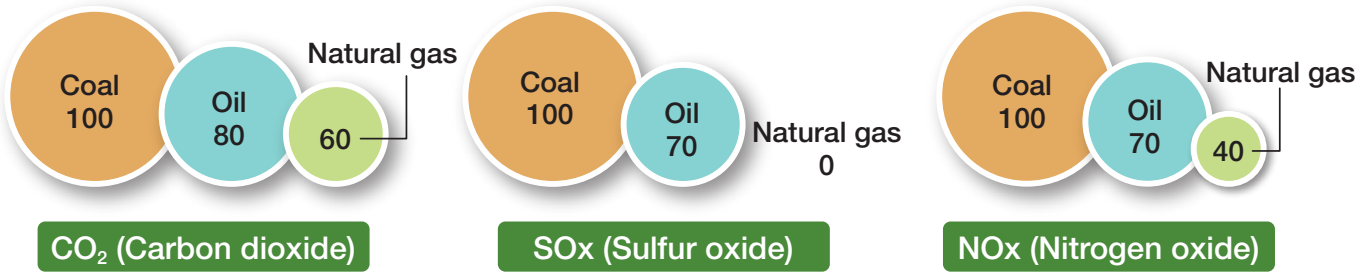
Q What kind of energy is environmentally friendly natural gas?

Characteristics of natural gas

Natural gas is a type of fossil fuel that was created when ancient flora and fauna were buried underground for many thousands of years. It is mainly composed of methane which contains only a small amount of carbon. This means that it is a relatively clean form of energy that emits only a small amount of CO_2 or other pollutants during combustion.
Unlike oil, which is mainly concentrated in the Middle East, natural gas is distributed all around the world and has excellent supply stability.

Environmental impact of natural gas

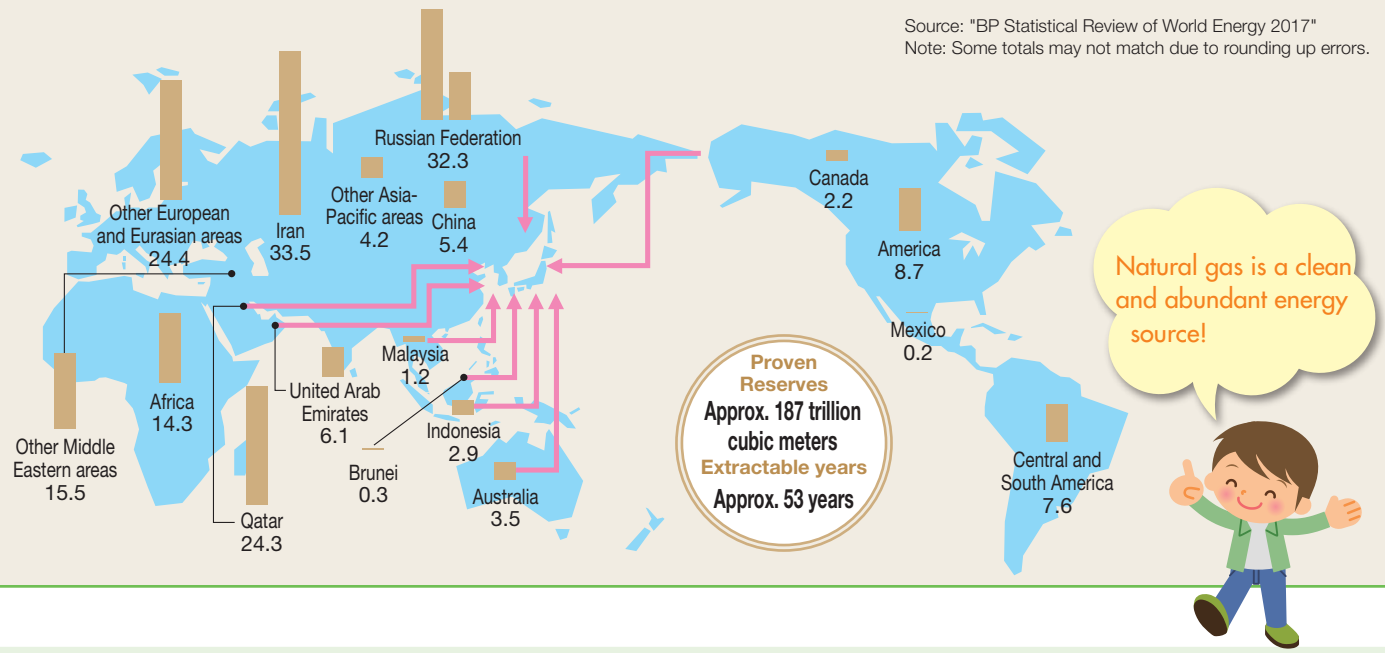
A comparison of emissions during combustion. Coal has been given a reference value of 100.



Source: "Energy White Paper 2013", Agency for Natural Resources and Energy

Natural Gas Proven Reserves (Unit: Trillions of cubic meters)

Source: "BP Statistical Review of World Energy 2017"
Note: Some totals may not match due to rounding up errors.



Supply Stability

Natural gas is abundant around the world. Hiroshima Gas imports liquefied natural gas (LNG) extracted, refined, and liquefied in areas such as Russia (Sakhalin) and Malaysia, and receives it at our Hatsukaichi LNG terminal. With the improvement of mining technology in recent years, unconventional natural gas sources that have traditionally been difficult to extract such as shale gas, coalbed methane, and tight sand gas can now be produced and stable supply is expected.
In addition, there are methane hydrate deposits in the coastal waters of Japan equivalent to around 100 years worth of Japan's annual consumption amount. Government-led initiatives for development of these resources are currently being carried out.

Composition of City Gas

Hiroshima Gas uses liquefied natural gas to produce city gas which is delivered to customers through the gas piping network.

Characteristics of city gas

Composition and content (Natural gas supply area)

Components		Composition
Name	Chemical formula	% (By volume)
Methane	CH_4	91
Ethane	C_2H_6	5
Propane	C_3H_8	2
Butane	C_4H_{10}	2

Note: Gas composition shows a representative value.

Gas type	13A
Standard calorific value	45MJ/m^3
Specific gravity (Air = 1)	0.640
CO_2 emission coefficient	2.29kg-CO_2/m^3

Q What activities is Hiroshima Gas actively involved in?

Management

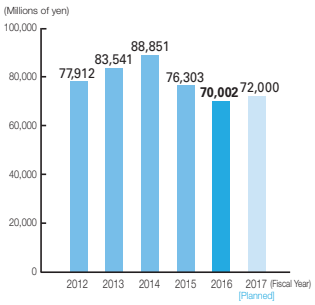
Delivering safe, stable, and clean natural gas

Company performance information

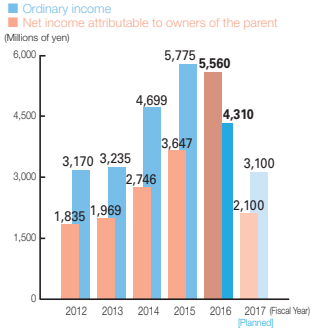
Second consecutive year of decline in revenue, first decline in ordinary income in 5 years

Due to a decrease in the unit sales price based on the raw material cost adjustment system in the gas business, consolidated net sales in FY2016 totaled 70,002 million yen. This is a decrease in revenue of 6,300 million yen (8.3%) when compared with the previous fiscal year. In regard to profits, ordinary income was 4,310 million yen, a decrease of 1,465 million yen (25.4%) compared to the previous fiscal year. However, net income attributable to owners of the parents was 5,560 million yen, an increase of 1,912 million yen (52.4%) due to special profit accounting due to acquittal of consolidated subsidiaries.

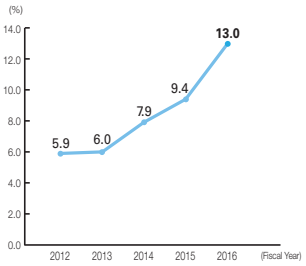
Consolidated net sales



Consolidated profit

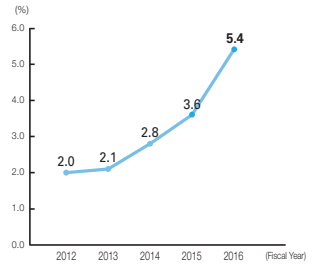


Return on equity (ROE)



Return on equity (ROE) = Net income attributable to owners of the parent / Average equity capital ×100

Return on assets (ROA)



Return on assets (ROA) = Net income attributable to owners of the parent / Average total assets ×100

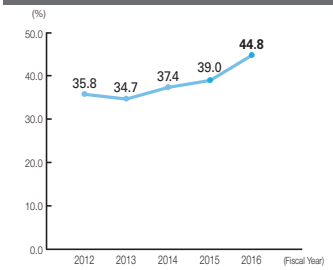
Business segment information

[FY2016] (Unit: Millions of yen)

	Net sales	Operating income
Gas business	54,396 (△12.0%)	2,984 (△31.3%)
LPG business	13,433 (△2.7%)	592 (△2.7%)
Other	6,400 (72.0%)	173 (–)
Adjusted values	△4,227	60
Consolidated	70,002 (△8.3%)	3,812 (30.4%)

* Figures in parentheses indicate relative change from the previous fiscal year.
Note: As figures for each segment are rounded down to the nearest million yen, the total of the adjusted value and each segment may not match the consolidated total.

Equity ratio



Equity ratio = Equity capital / Total assets ×100

Business activities

LNG procurement and production

Based on long-term contracts with Sakhalin, Osaka Gas Co., Ltd., and Malaysia, it is possible to source 400,000 tons of LNG per year. This is the raw material used to create city gas.
City gas is produced at the Hatsukaichi LNG terminal, the Bingo plant, and the Higashi-hiroshima plant. Liquefied natural gas reception and the entire gas production process at these locations are tightly controlled via the central control room.


Standard LNG transport ship


Central control room

Supply and distribution

In order to reliably supply customers with city gas produced in our factory, the security command center constantly monitors the gas pressure and supply state.
To ensure adequate response in an emergency situation, we have established a system that allows quick 24-hour response and dispatch even during night hours and holidays.


Security command center


Emergency vehicles


Gas piping work

Business

We have established a system to allow more customers to safely and reliably use environmentally friendly natural gas.


Meetings with developers


Maintenance of an "Ene-Farm" household fuel cell

Yearly overview

Number of customers

(Unit: Individual customer locations)

	Number of customers
FY2012	412,793
FY2013	410,353
FY2014	409,185
FY2015	408,490
FY2016	**409,881**
Average growth rate	△0.3%

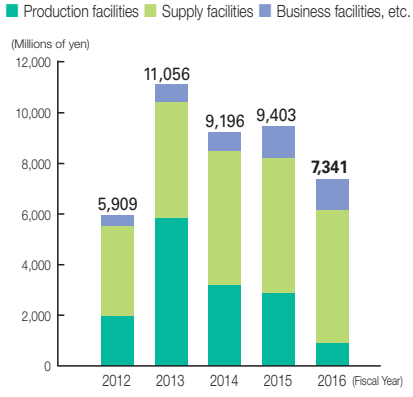
Gas sales volume

(Unit: Thousands of cubic meters, 45MJ/m³ conversion)

	Residential use	Commercial use	Industrial use	Other	Total	Wholesale supply, etc.	Grand total
FY2012	105,486	48,244	262,078	37,857	453,666	60,142	513,808
FY2013	103,130	47,728	258,695	38,890	448,445	61,292	509,737
FY2014	103,866	45,389	242,213	37,264	428,733	62,918	491,651
FY2015	100,244	43,871	242,183	36,264	422,565	60,456	483,021
FY2016	**99,329**	**44,692**	**255,322**	**38,385**	**437,729**	**56,916**	**494,646**
Average growth rate	△1.5%	△1.9%	△0.7%	0.3%	△0.9%	△1.4%	△0.9%

Note: As sales volume figures are rounded down to the nearest thousand cubic meters, there may be small discrepancies in the grand total value.

Amount of capital investment



Environment

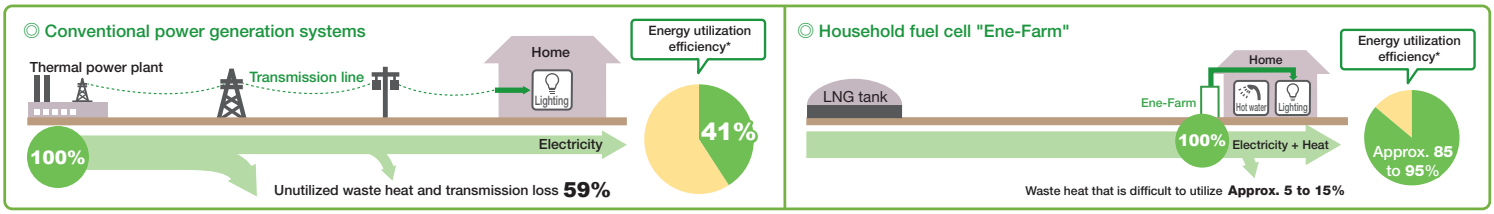
Actively working toward an expanded and full use of environmentally-friendly natural gas

Promotion of high-efficiency natural gas applications

Rather than simply generating heat, natural gas can be used in gas cogeneration systems, highly efficient gas equipment, and natural gas vehicles. It can be used in a wide range of applications such as power generation, air conditioning and automobiles.

Comparison of energy utilization efficiency

Most heat generated by power plants is discarded. Power transmission losses also occur during transmission to far away homes. "Ene-Farm" allows the user to create energy at the same location where it is it used. This can reduce loss and utilize excess heat. With an expected energy utilization efficiency of around 80 to 90%, it has superior energy savings and environmental friendliness.



* Based on LHV (Lower Heating Value: Calorific value not including latent heat of vaporization of water vapor generated during fuel combustion) criteria.
* Calculated using Ene-Farm manufacturer published values.

Source: The Japan Gas Association

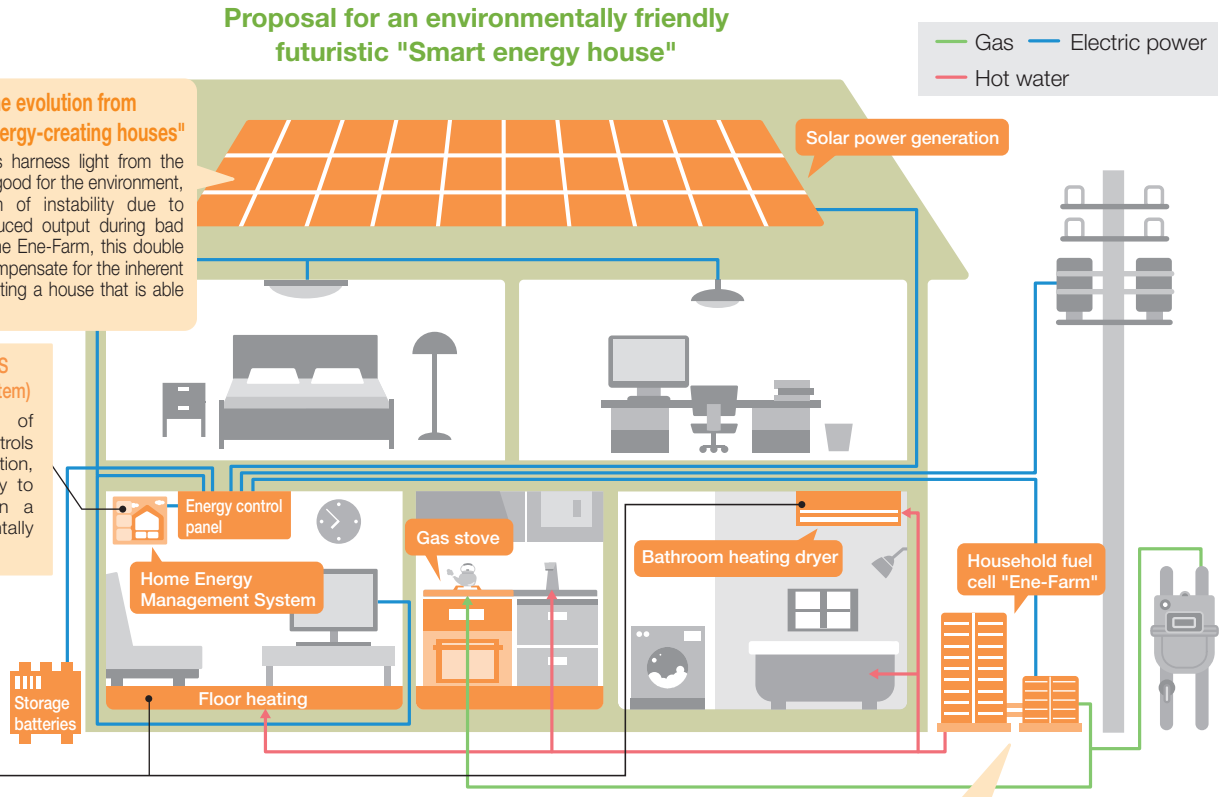
Residential use

While working to spread the use of natural gas, we are creating initiatives that can further conserve energy, reduce CO_2, and increase ZEH* (net zero energy houses) to improve the standard of living for all people. These initiatives include promoting the full utilization of energy and using natural gas to compensate for fluctuations in the output of renewable energy sources such as solar power.

* ZEH: Home with an annual primary energy consumption balance of +/- zero.

◉ The spread of highly efficient household equipment

Proposal for an environmentally friendly futuristic "Smart energy house"



Double power generation "The evolution from energy-efficient houses to energy-creating houses"

Solar power generation systems harness light from the sun. Although such systems are good for the environment, there is the inherent problem of instability due to non-operation at night and reduced output during bad weather. When combined with the Ene-Farm, this double power generation system can compensate for the inherent weaknesses of solar power, creating a house that is able to generate its own electricity.

Optimal use of energy with HEMS (Home Energy Management System)

HEMS allows visualization of energy use in the home. It controls home systems to optimize creation, storage, and usage of energy to realize the goal of living in a comfortable and environmentally friendly "smart house".

Gas hot water underfloor heating and bathroom heating dryers

This system circulates hot water for heating and clothes drying. As it uses a very small amount of electricity, it can significantly reduce peak power usage.

High efficiency water heater "Eco-Jozu"

High efficiency water heater "Eco-Jozu" (Cumulative sales of 38,251 units)

(As of March 31, 2017)

This highly efficient water heater uses condensing technology to take advantage of previously unutilized waste heat in order to raise thermal efficiency from 80% to 95%.

Household fuel cell "Ene-Farm"

Made by company "P" (Solid polymer type)

Made by company "A" (Polymer electrolyte type)

Household fuel cell "Ene-Farm" (Cumulative sales of 1,449 units)

(As of March 31, 2017)

An "Ene-Farm" is a device that reacts hydrogen extracted from sources such as natural gas with oxygen in the air to generate electricity. The heat from this chemical reaction is then utilized to make hot water. When compared with conventional water heating systems, this cutting-edge power generation and water heating system can reduce annual CO_2 emissions in standard homes by around 1.2t.

Industrial use

Around 50% of our natural gas sales at Hiroshima Gas are for industrial customers. The transition from petroleum-based fuel to natural gas enables a 25% reduction in CO_2 emissions.

Gas industrial furnace

◉ Natural gas vehicles for city driving

Natural gas truck

Gas heat pump (GHP)

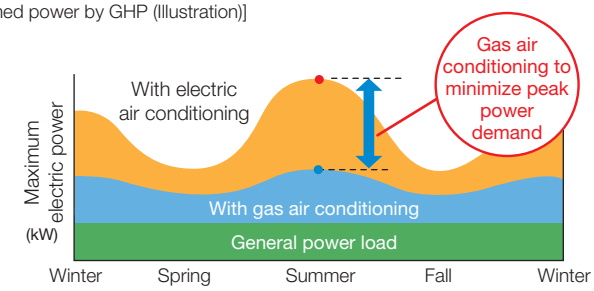
Gas absorption chiller (Natural chiller)

Commercial use

◉ Promotion of gas heat pumps (GHP) and gas absorption chillers (natural chiller)

Gas heat pumps and gas absorption chillers for gas-powered air conditioning systems have a big impact in cutting summer and winter peak power demand.

[Leveling consumed power by GHP (Illustration)]



Development of environmental technology (Hiroshima Gas Technical Research Institute)

◉ Development of energy-saving devices and systems

We developed a blast-type burner that combusts on the surface of a metal fiber mat, and the peripheral parts.

This system is sold by our joint-development partner, Shoei Seisakusho Co., Ltd., and is equipped in industrial kitchen equipment to contribute to the reduction of CO_2 emissions at the customer premises.

High-efficiency surface combustion gas burner

Society We cherish the connections with our community.

Relationship with local communities

Educational support (Commitment to the next generation of education)

In order to help children have a better understanding of natural gas, we carry out educational activities regarding food education, fire education, energy/environmental education, and disaster prevention education.

Next-generation educational programs pamphlet

Next-generation educational programs	
Food education	Eco-cooking* classes Tasting classes
Fire education	Fire education classes
Energy and environmental education	Science show Technical Research Institute science experiment lessons
Disaster prevention education	Lifeline disaster prevention classes

Note: "Eco-cooking" is a registered trademark of Tokyo Gas Co., Ltd.

Lifeline disaster prevention classes

Promotion of arts, culture, community, and sport

Hiroshima Gas has a strong relationship rooted in the local area and conducts a wide range of social contribution activities throughout the area.

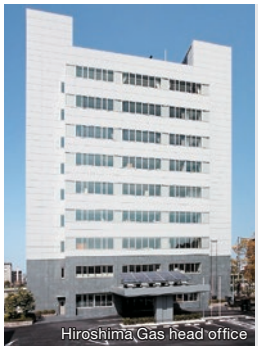
◉ Holding the 30th Hiroshima Symphony Orchestra Concert

Concert stage

Management philosophy

Striving to be a company trusted by the community

Based on our management philosophy that aims to create a company that is trusted by the local community, Hiroshima Gas wishes to continue carrying out business activities emphasizing on the stable supply of energy and ensuring the safety of all as our corporate social responsibility.

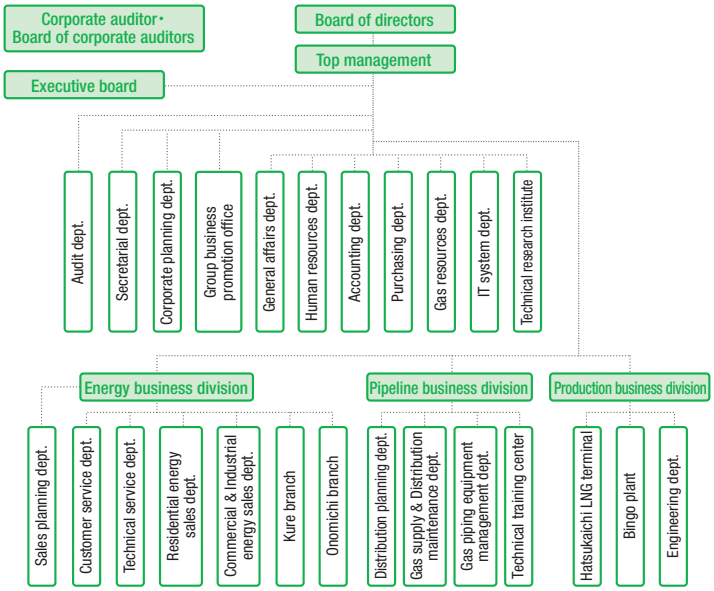

Hiroshima Gas head office

Head office address:	2-7-1, Minamimachi, Minami-ku, Hiroshima TEL: 082-251-2151 (Switchboard)
Established:	October 1909
Capital:	5.181 billion yen
Number of employees:	669
Business field:	1. Gas business 2. Sales of gas appliances 3. Sales of liquefied natural gas

(As of March 31, 2017)

Hiroshima Gas organizational chart

(As of April 01, 2017)



Regional service representatives

◎ Gas shop

Gas shop business hours: 9am to 7pm (Monday to Saturday)
* The Mihara shop is open 9am to 5:30pm (Monday to Friday)

1 Fuchu Gas Shop	TEL: 082-282-3359	3-4-26, Hamada, Fuchu-cho, Aki-gun
2 Aki Gas Shop	TEL: 082-821-1055	3-1-14, Funakoshiminami, Aki-ku, Hiroshima
3 Ujina Gas Shop	TEL: 082-253-1261	2-12-19, Ujinakanda, Minami-ku, Hiroshima
4 Itsukaichi Gas Shop	TEL: 082-922-3670	2-7-43, Kairoen, Saeki-ku, Hiroshima
5 Furue Gas Shop	TEL: 082-272-0050	6-4, Furueshinmachi, Nishi-ku, Hiroshima
6 Takanobashi Gas Shop	TEL: 082-243-7520	5-10-19, Otemachi, Naka-ku, Hiroshima
7 Hakushima Gas Shop	TEL: 082-228-1000	17-17, Higashi-hakushima-cho, Naka-ku, Hiroshima
8 Gion Gas Shop	TEL: 082-850-3505	5-13-1, Nishihara, Asaminami-ku, Hiroshima
9 Koyo Gas Shop	TEL: 082-842-4433	1-3-10, Ochiaiminami, Asakita-ku, Hiroshima
10 Kure Gas Shop	TEL: 0823-23-5050	1-6-16, Chuo, Kure
11 Onomichi Gas Shop	TEL: 0848-22-4378	3-2, Tenma-cho, Onomichi
12 Mihara Gas Shop*	TEL: 0848-62-7108	2-7-5, Shiromachi, Mihara
13 Kabe Gas Shop	TEL: 082-814-3322	9-13-7, Kameyama, Asakita-ku, Hiroshima
14 Saijo Gas Shop	TEL: 082-493-8801	4-38, Saijogojo-cho, Higashi-hiroshima

Overview of main subsidiaries

(As of March 31, 2017)

HIROSHIMA GAS PROPANE Co., Ltd.
・Capital: 300 million yen ・Established: March 1969 ・Sales: 9,210 million yen ・Number of employees: 91

HIROSHIMA GAS TECHNO-SERVICE Co., Ltd.
・Capital: 80 million yen ・Established: June 1998 ・Sales: 11,811 million yen ・Number of employees: 208

HIROSHIMA GAS MATE Co., Ltd.
・Capital: 20 million yen ・Established: April 1975 ・Sales: 1,093 million yen ・Number of employees: 155

RUNET Co., Ltd.
・Capital: 30 million yen ・Established: October 2000 ・Sales: 296 million yen ・Number of employees: 6

BE-SMILE Co., Ltd.
・Capital: 50 million yen ・Established: June 2001 ・Sales: 183 million yen ・Number of employees: 27

SETOUCHI PIPELINE Co., Ltd.
・Capital: 150 million yen ・Established: May 2003 ・Sales: 1,011 million yen ・Number of employees: 10

HG LNG SHIPPING CORPORATION
・Capital: 1 million yen ・Established: February 2005 ・Sales: 3,706 million yen

◎ Showroom

Experience the latest gas equipment and the sheer warmness provided by gas.

Examples of exhibition equipment

● Household fuel cell (Ene-Farm) ● Household gas cogeneration system (Ecowill)
● Floor heating and bathroom heater comparison rooms ● Mist sauna experience room
● Try it! Kitchen activities (Kitchen comparison) ● Solar power generation
● Renovation materials

Gastopia Center
1-30, Minamitakeya-cho, Naka-ku, Hiroshima
TEL: 082-240-8888

Gastopia Itsukaichi
2-7-43, Kairoen, Saeki-ku, Hiroshima
TEL: 082-923-5678

Gastopia Gion
5-13-1, Nishihara, Asaminami-ku, Hiroshima
TEL: 082-850-3506

Gastopia Aki
3-1-14, Funakoshiminami, Aki-ku, Hiroshima
TEL: 082-821-1130

Gastopia Kure
1-6-16, Chuo, Kure
TEL: 0823-22-1262

Gastopia Onomichi
3-2, Tenma-cho, Onomichi
TEL: 0848-22-2161

HIROSHIMA GAS Co., Ltd.
2-7-1, Minamimachi, Minami-ku, Hiroshima, 734-8555
General Affairs Department, Public Relations & Environment Office:
082-252-3154 (Direct line)

Hiroshima Gas Website
http://www.hiroshima-gas.co.jp/