



このまち思いエネルギー。

広島ガス

CSR Report

Corporate Social Responsibility Report

2018

Digest

Working toward a sustainable society





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

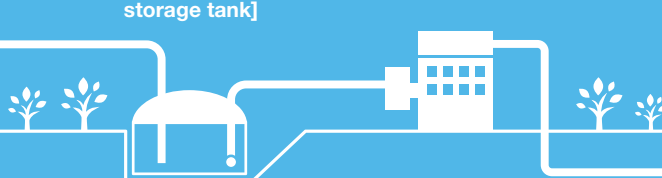
[Natural gas extraction]

[LNG transport ship]



[In-pit method LNG storage tank]

[LNG vaporizer]



Supply area and organization

(As of March 31, 2018)

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

411,000

Hiroshima district

Number of customers

347,000



Kabe facilities



Kaita facilities



Higashi-hiroshima plant



Head office



Kure district

Number of customers

47,000



Hatsukaichi LNG terminal



Kure branch



Kumano facilities

Safe and environmentally friendly for the future of the earth and humanity

City gas supply

Delivery to customers

Gas is supplied to customers through 5,136km of underground piping (supply and service pipelines).



Gas pipe bridges

[Gas holder]



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



Factories, etc.



Hotels, buildings, schools, etc.



Kitchens, hot water supply, etc.

[Industrial use]

[Commercial use]

[Residential use]



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.



Bingo plant

Onomichi branch

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)	

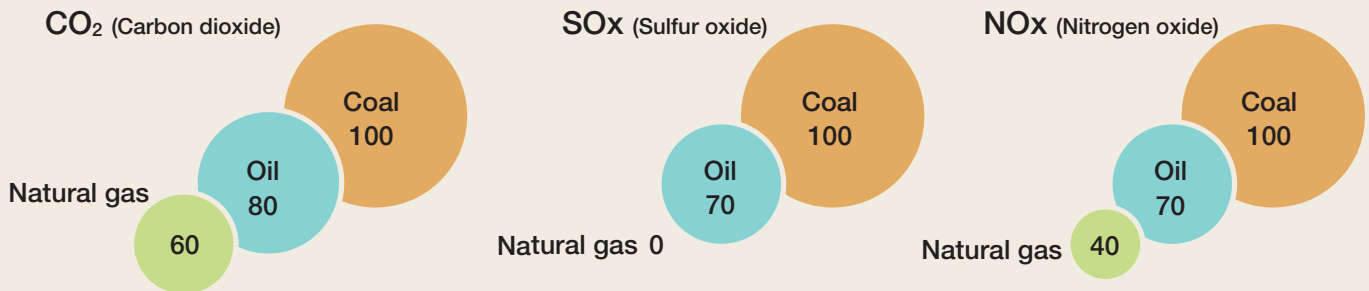
Q What kind of energy is environmentally friendly natural gas?

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 CO₂ or other pollutants during combustion.

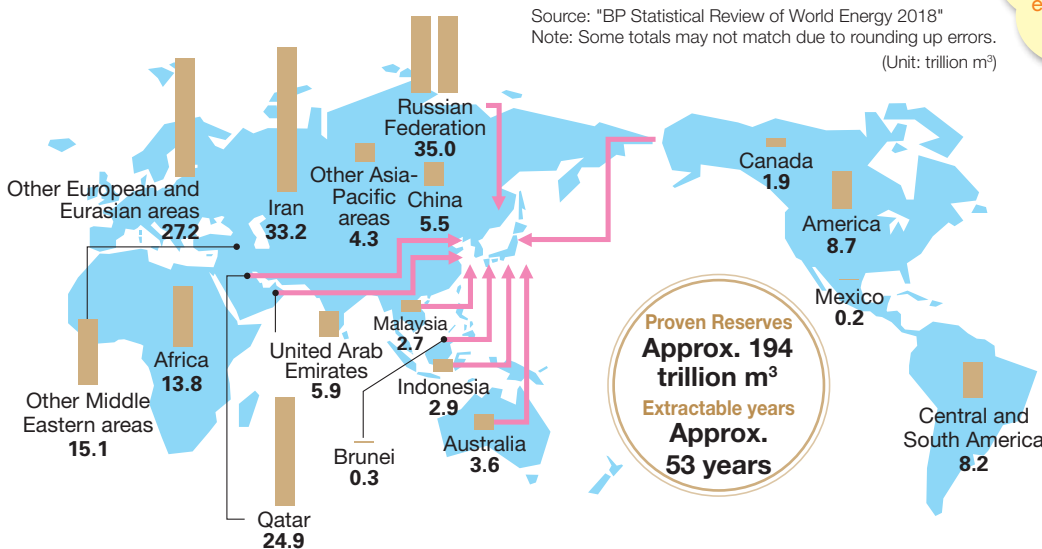
Unlike oil, which is mainly concentrated in the Middle East, natural gas is distributed all around the world and has excellent supply stability.

■ **Environmental impact of natural gas** A comparison of emissions during combustion. Coal has been given a reference value of 100.



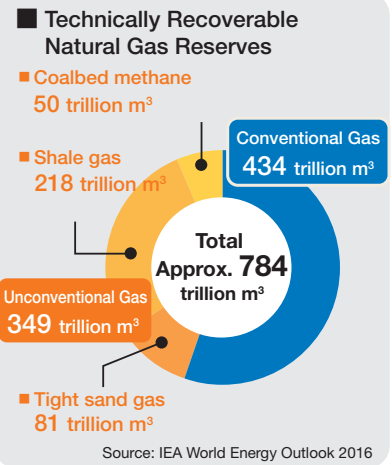
Source: "Energy White Paper 2013", Agency for Natural Resources and Energy

Natural Gas Proven Reserves (Conventional Gas)



Source: "BP Statistical Review of World Energy 2018"
Note: Some totals may not match due to rounding up errors.
(Unit: trillion m³)

Natural gas is a clean and abundant energy source!



Source: IEA World Energy Outlook 2016

* Proven Reserves: The amount of natural gas reserves that can be recovered in the future by mining in an economically feasible manner using the current mining technology.

Supply Stability

Natural gas is abundant around the world. Hiroshima Gas imports LNG (liquefied natural gas) 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, with imports of shale gas produced in the USA to Japan having started in 2017.

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)

Hiroshima Gas uses liquefied natural gas to produce city gas which is delivered to customers through the gas piping network. We use non-poisonous colorless odorless methane gas which has been factory-odorized as our main gas.

[Characteristics of city gas] Composition and content (Natural gas supply area)

Components		Composition
Name	Chemical formula	% (By volume)
Methane	CH ₄	91
Ethane	C ₂ H ₆	5
Propane	C ₃ H ₈	2
Butane	C ₄ H ₁₀	2

Note: Gas composition shows a representative value.

Gas type	13A
Standard calorific value	45MJ/m ³ (10,750 kcal/m ³)
Specific gravity (Air = 1)	0.639 (Lighter than air)
CO ₂ emission coefficient	2.29kg-CO ₂ /m ³ (60% of coal)



What activities is Hiroshima Gas actively involved in?

Management

Delivering safe, stable, and clean natural gas

A comprehensive system has been put into place to ensure that gas is used in a safe and secure manner.



Company performance information

First increase in revenue in three years and second consecutive year of decrease in ordinary income

Business activities

Due to an increase in sales and rise in the unit sales price based on the raw material costs adjustment system, consolidated net sales in FY2017 totaled 73,717 million yen. This is an increase in revenue of 3,715 million yen (5.3%) when compared with the previous fiscal year. In regard to profits, ordinary income was 3,506 million yen, a decrease of 803 million yen (18.6%) compared to the previous fiscal year due to reasons such as an increase in raw material costs exceeding the increase in sales. Net income attributable to profit attributable to owners of the parents was 2,499 million yen, a decrease of 3,061 million yen (55.1%) due mainly to a decrease in ordinary income, as well as a decrease in special profit.

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.

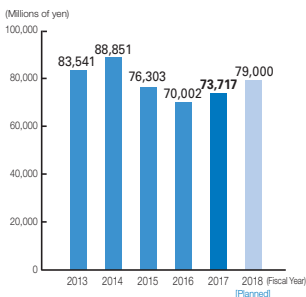


LNG ship entering port for loading or unloading and our Hatsukaichi LNG terminal

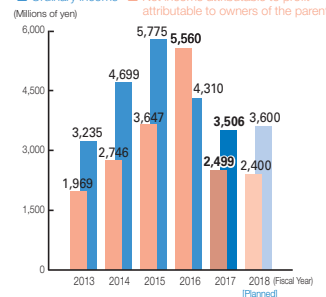


Central control room

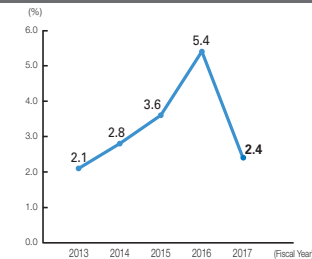
Consolidated net sales



Consolidated profit

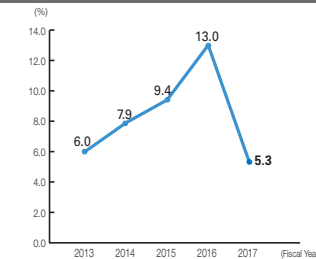


Return on assets (ROA)



$$\text{Return on assets (ROA)} = \frac{\text{Net income attributable to profit attributable to owners of the parent}}{\text{Average total assets}} \times 100$$

Return on equity (ROE)



$$\text{Return on equity (ROE)} = \frac{\text{Net income attributable to profit attributable to owners of the parent}}{\text{Average equity capital}} \times 100$$

Supply and distribution plants

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

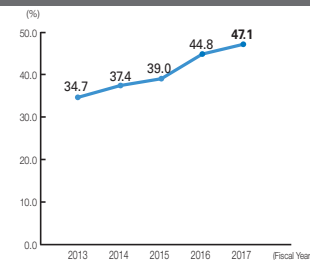
Business segment information

	Net sales	Operating income
Gas business	57,803 (6.3%)	2,182 (△26.9%)
LPG business	14,709 (9.5%)	307 (△48.1%)
Other	3,970 (△38.0%)	83 (△51.9%)
Adjusted values	△ 2,766	346
Consolidated	73,717 (5.3%)	2,920 (△23.4%)

* 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



$$\text{Equity ratio} = \frac{\text{Equity capital}}{\text{Total assets}} \times 100$$

Yearly overview

Number of customers

(Unit: Individual customer locations)

Fiscal Year	Number of customers
FY2013	410,353
FY2014	409,185
FY2015	408,490
FY2016	409,881
FY2017	411,080

Gas sales volume

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

Fiscal Year	Residential use	Commercial use	Industrial use	Other	Total	Wholesale supply, etc.	Grand total
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
FY2017	104,100	45,791	271,312	38,954	460,159	58,977	519,137

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

Environment

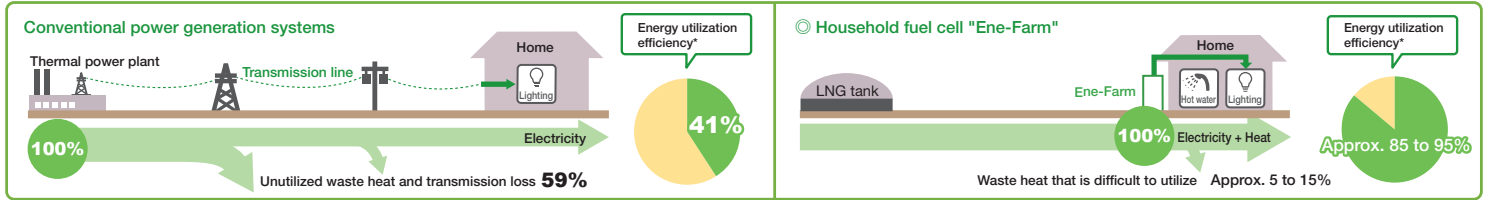
Actively working toward an expanded and full use of environmentally-friendly natural gas

Promotion of high-efficiency natural gas applications

Rather than simply generating heat, natural gas can be used for a wide range of applications such as generating electricity (in gas cogeneration systems), cooling/heating, and powering natural gas vehicles.

Comparison of energy utilization efficiency

Most heat generated by power plants is discarded. Power transmission losses also occur during transmission to far away homes. Using our "Ene-Farm" household fuel cell (a household gas cogeneration system) allows users to create energy at the same location as where it is used. This reduces loss and enables effective use of waste 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.

Source: The Japan Gas Association

* Calculated using Ene-Farm manufacturer published values.

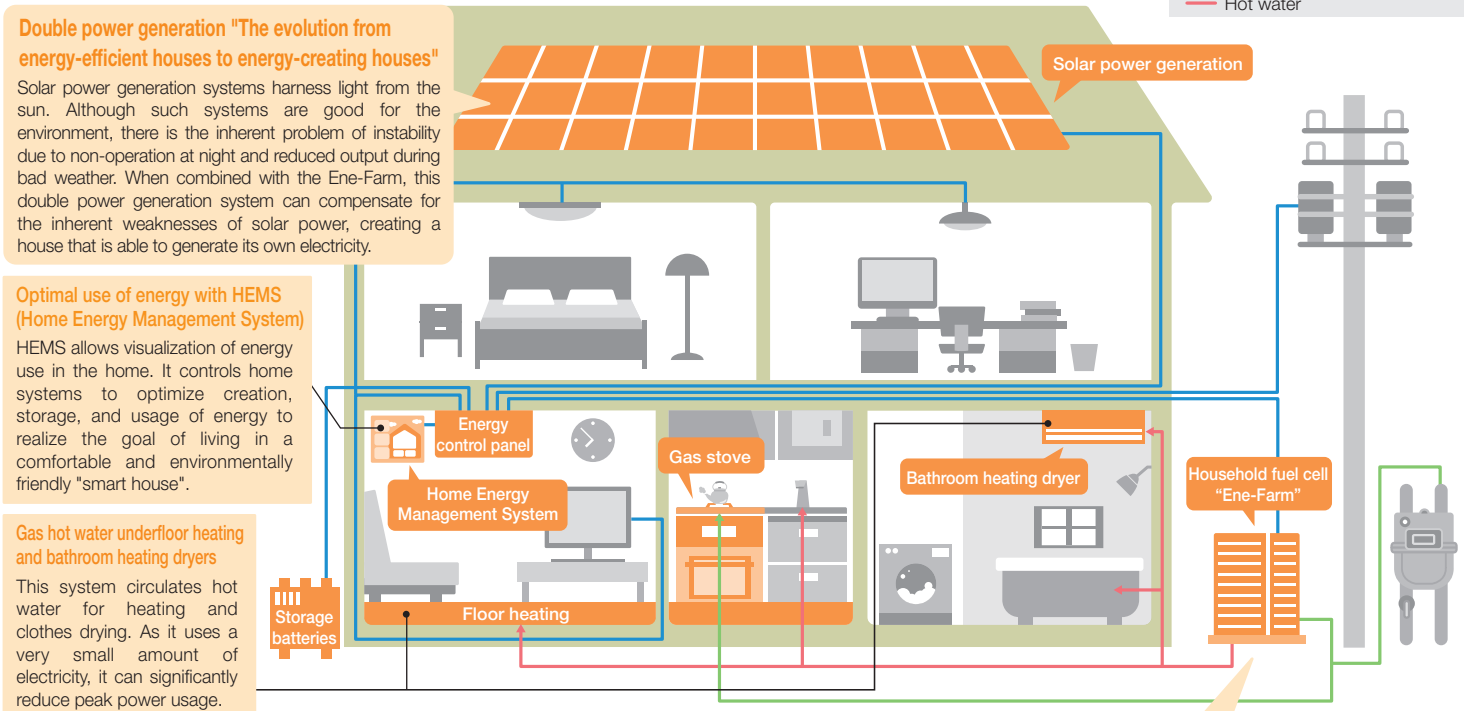
Residential use

While working to spread the use of natural gas, we are creating initiatives that can further conserve energy, reduce CO₂, and expand the use of 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"
(Cumulative sales of 43,916 units)
(As of March 31, 2018)

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%.

High efficiency water heater "Eco-Jozu"

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 1,812 units)
(As of March 31, 2018)

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 highly energy efficient power generation and water heating system can reduce annual CO₂ emissions in standard homes by around 1.2t to 1.5t.

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 CO₂ emissions.



Gas industrial furnace

We are striving to create a sustainable society.

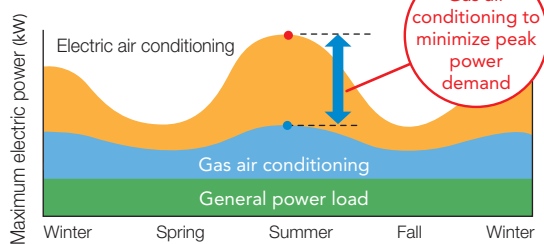


Commercial use

● 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)]



Gas heat pump (GHP)



Gas absorption chiller (Natural chiller)

● Natural gas vehicles for city driving



Natural gas truck

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 reduce CO₂ 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	Hiroshima Gas disaster prevention classes

We have all kinds of programs!



Hiroshima Gas disaster prevention classes

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

▶ 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 31st 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.



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

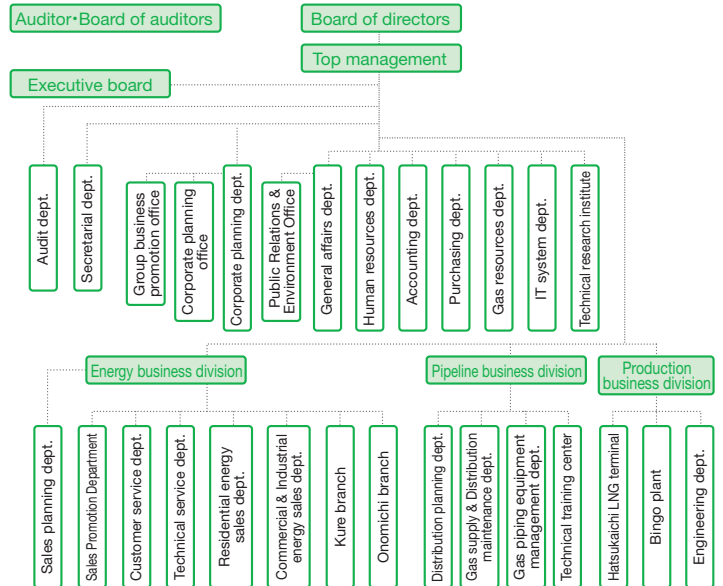
Business field: 1. Gas business
2. Sales of gas appliances
3. Sales of liquefied natural gas

Hiroshima Gas Disaster Prevention Center Building (Left) and Hiroshima Gas Head Office (Right)

(As of March 31, 2018)

Hiroshima Gas organizational chart

(As of July 1, 2018)



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, 2018)

HIROSHIMA GAS PROPANE Co., Ltd.

•Capital: 300 million yen •Established: March 1969 •Sales: 11,049 million yen •Number of employees: 87

HIROSHIMA GAS TECHNO-SERVICE Co., Ltd.

•Capital: 80 million yen •Established: June 1998 •Sales: 9,824 million yen •Number of employees: 206

HIROSHIMA GAS MATE Co., Ltd.

•Capital: 20 million yen •Established: April 1975 •Sales: 1,113 million yen •Number of employees: 159

RUNET Co., Ltd.

•Capital: 30 million yen •Established: October 2000 •Sales: 277 million yen •Number of employees: 6

BE-SMILE Co., Ltd.

•Capital: 50 million yen •Established: June 2001 •Sales: 182 million yen •Number of employees: 28

SETOUCHI PIPELINE Co., Ltd.

•Capital: 150 million yen •Established: May 2003 •Sales: 1,022 million yen •Number of employees: 10

HG LNG SHIPPING CORPORATION

•Capital: 1 million yen •Established: February 2005 •Sales: 3,888 million yen

Showroom

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

Examples of exhibition equipment

- Household fuel cell (Ene-Farm)
- 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/>