

# Domestic Energy Businesses

Having Japan's leading gas supply business at its core, the Osaka Gas Group is a provider of other energy services and is accordingly active in the electric power business, LPG and industrial gas businesses, and energy businesses in diverse locations. Backed by solid structures for reliable supply, safety and services, the Osaka Gas Group's multi-energy business contributes to the realization of abundant and comfortable lifestyles of its customers.

## External Environment

- Heightening concerns about energy security, the environment and the economy
- A declining population and greater awareness of energy conservation
- Volatility in crude oil prices and foreign exchange markets

## Objectives and Issues to Address

- Technological improvement and wider use of distributed power generation (gas cogeneration systems)
- Expansion of power generation capacity
- Stable procurement of competitive LNG

## Business Structure

### Gas Business

The gas business is the core business of the Osaka Gas Group. In this business segment, we provide a wide array of services to promote the use of gas, ranging from the production, supply and marketing of gas to installing house pipes and selling gas appliances.

### Electric Power Business

The electric power business is an integral part of the multi-energy services of the Osaka Gas Group. Positioned as our second core business, activities include IPP, power generation, and power marketing.

### LPG Businesses and Industrial Gas Businesses

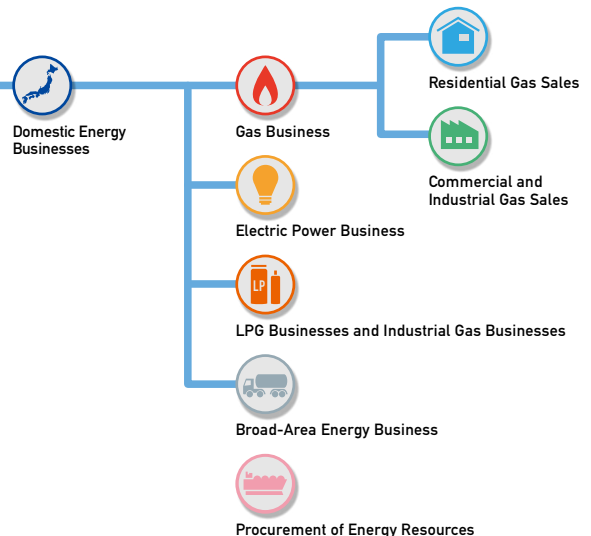
The Osaka Gas Group's LPG business mainly serves customers outside the natural gas service area by providing retail and wholesale supplies of LPG. In addition, we operate industrial gas business that utilizes LNG cryogenics, and a low-temperature crushing business.

### Broad-Area Energy Business

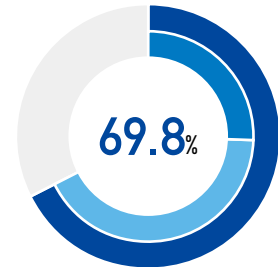
In its broad-area energy business, the Group sells LNG to large-scale customers outside its service area and to other utilities.

### Procurement of Energy Resources

Amid changes in energy markets with worldwide growth of demand for energy, economic fluctuations and technological innovation, the Group procures energy resources to ensure stable supplies of energy.



## Segment Income\* (2013.3)

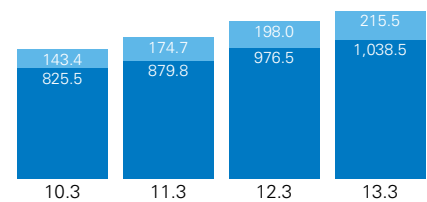


● Gas	26.4%
● LPG, electricity, and other energy	43.3%

\* Segment Income = Operating income + Equity in net earnings of affiliates

## Net Sales

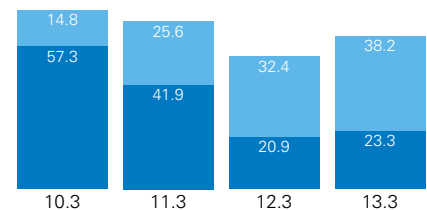
(Billions of yen)



■ Gas ■ LPG, electricity, and other energy

## Segment Income\*

(Billions of yen)



■ Gas ■ LPG, electricity, and other energy

\* Segment Income = Operating income + Equity in net earnings of affiliates

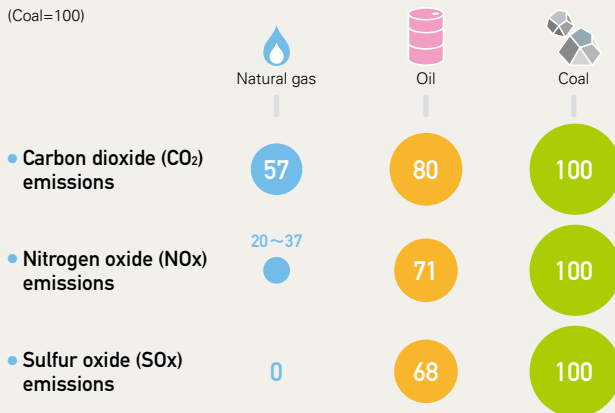
## The Advantages of Natural Gas

### Environmental Friendliness

- Natural gas consists primarily of methane, and, compared to other fossil fuels, the energy provided by this resource has the lowest environmental impact.
- Energy production using natural gas releases very little carbon dioxide (CO<sub>2</sub>), which contributes to global warming, and nitrogen oxide (NO<sub>x</sub>), which is an atmospheric pollutant. In addition, there are no emissions of sulfur oxide (SO<sub>x</sub>), which contributes to acid rain.

### Comparison of Emission Levels of Combustion Products of Fossil Fuels

(Coal=100)



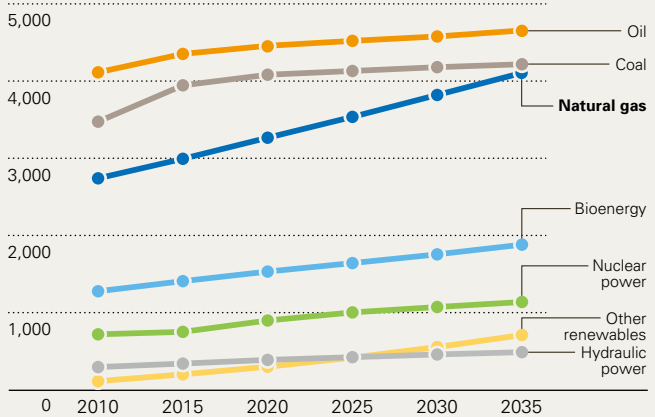
Sources: (CO<sub>2</sub> figures) The Institute of Applied Energy, "Report on Thermal Power Plant Atmospheric Impact Assessment Technology Demonstration Surveys" (March 1990)  
 (SO<sub>x</sub> and NO<sub>x</sub> figures) International Energy Agency (IEA), "Natural Gas Prospects to 2010" (1986)

### Future Potential

Among the fossil fuels, natural gas is projected to see the strongest growth in consumption over the longer term.

### Primary Energy Consumption Forecasts (Global)

(Million tons crude oil equivalent)



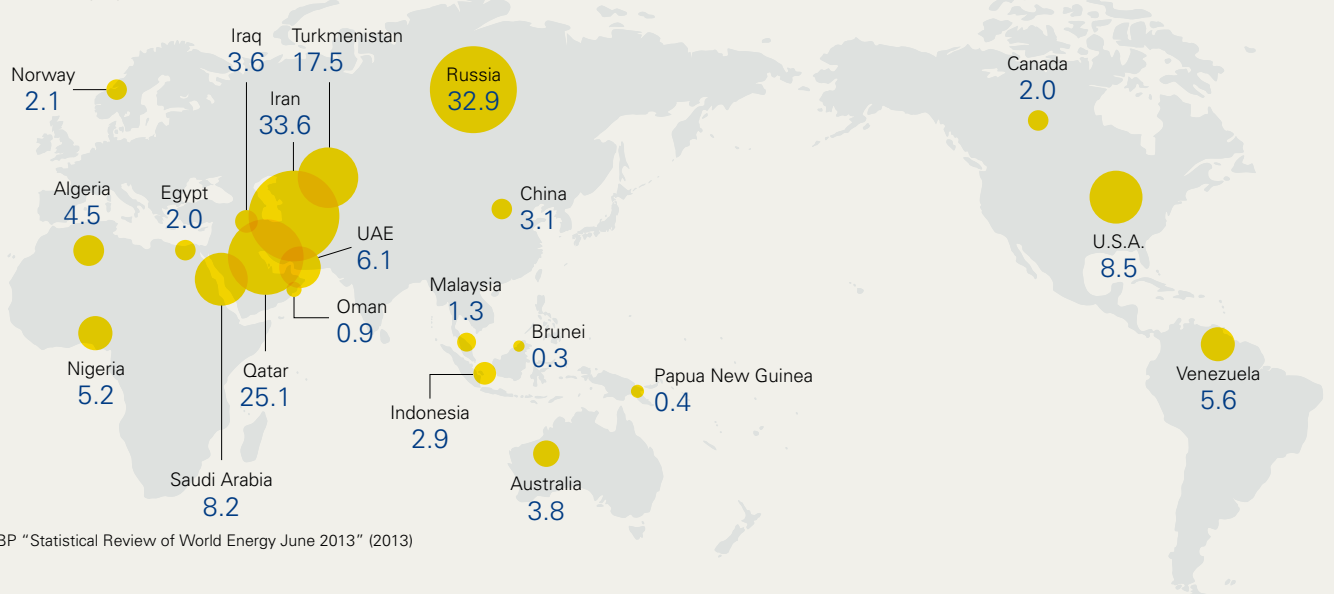
Sources: International Energy Agency (IEA), "New Policies Scenario Energy Demand, World Energy Outlook 2012" (2012)

### Stable Supply

The combined volume of the confirmed natural gas reserves around the world is estimated to be 187 trillion m<sup>3</sup>, sufficient for meeting the yearly natural gas demand for 55.7 years, meaning that a stable supply of this resource can be secured.

### Major Nations with Natural Gas Reserves

● Volume of natural gas proven reserves (Trillion m<sup>3</sup>)



Source: BP "Statistical Review of World Energy June 2013" (2013)

Domestic Energy Businesses

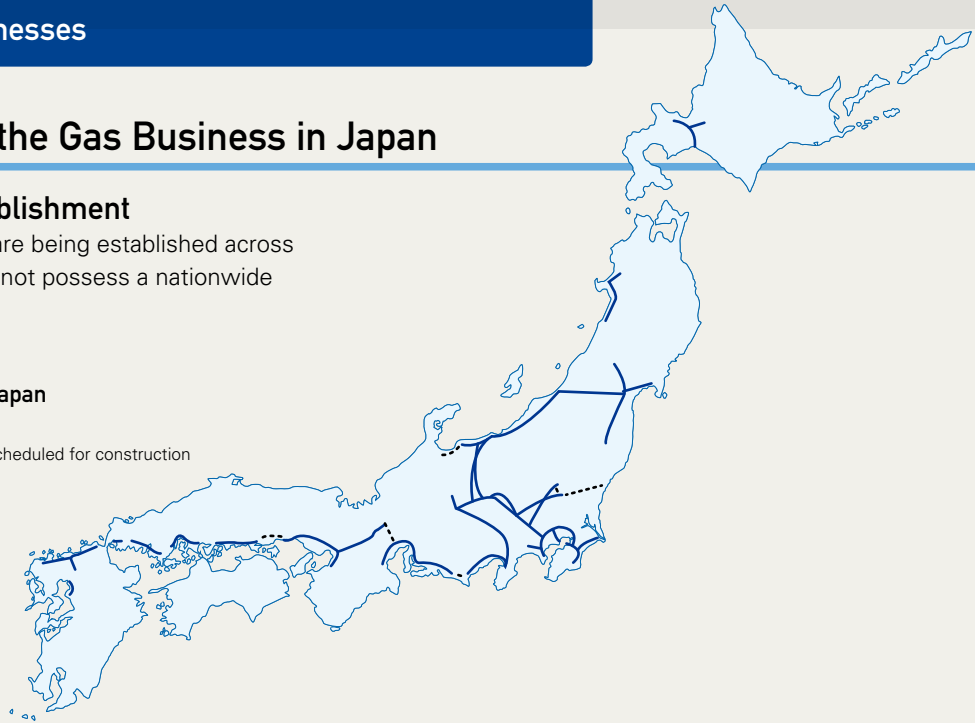
# Characteristics of the Gas Business in Japan

## Regional Pipeline Establishment

Regional pipeline networks are being established across Japan, but the country does not possess a nationwide pipeline network.

## City Gas Pipeline Network in Japan

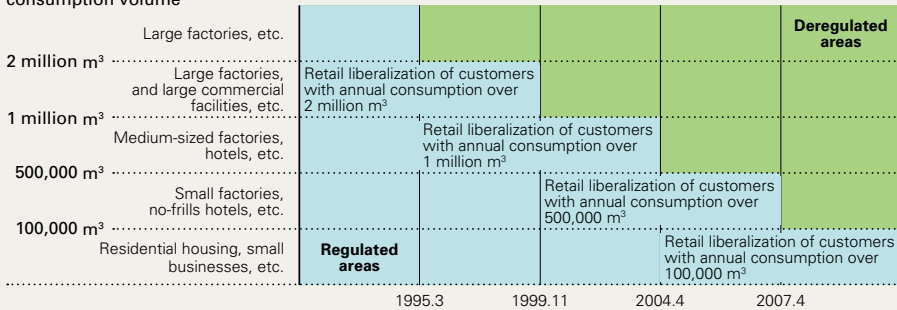
- Major pipelines
- Pipelines under construction or scheduled for construction



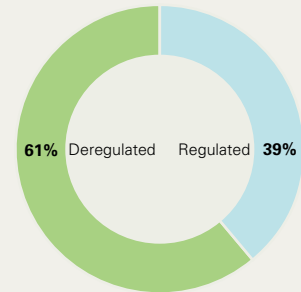
## Transition to Gas Retail Liberalization

Ever since the liberalization of retail operations in the gas business was adopted in 1995, deregulation has progressed by expanding the scope of liberalization.

Annual contracted gas consumption volume



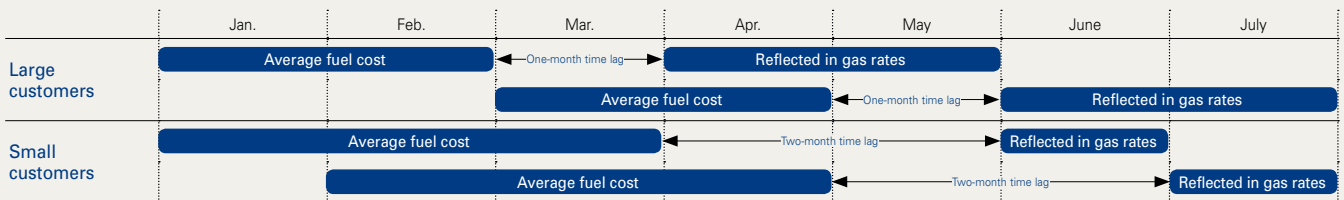
Market Deregulation (2013.3)



## Fuel Cost Adjustment System

The purchasing prices of LNG and LPG, both gas raw materials, fluctuate in accordance with movements in foreign currency exchange rates and the price of crude oil. In addition to reflecting these types of external factors in gas rates, steps have also been taken to apply a mechanism that clarifies the results of efforts to increase operating efficiency in areas other than raw material costs. This mechanism is referred to as the Fuel Cost Adjustment System. As this system causes a time lag before fluctuations in prices of raw materials can be reflected in gas rates, such price fluctuations can result in short-term impacts on the performance of gas suppliers on an individual fiscal-year basis. However, these impacts are neutralized over the medium to long term.

This system reflects changes in resource costs into gas rates. (Example)



←→ Time lag

# Gas Business

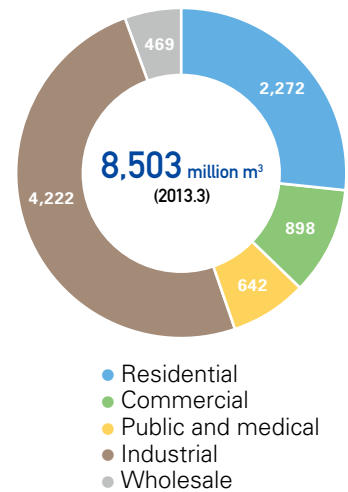
In the gas business, we provide a wide range of services to encourage customers in the Kansai region to use gas. These include producing, supplying, and selling gas; installing house pipes; and selling gas appliances. The Group fulfills the energy needs of customers in the residential; commercial, public, and medical; and industrial sectors.

## Overview of Gas Sales in the Fiscal Year under Review

In the fiscal year ended March 31, 2013, gas sales volume declined 2.1% year on year, to 8,503 million m<sup>3</sup>.

Even though we captured new gas demand, sales volume of gas to industrial customers decreased 3.1%, to 4,222 million m<sup>3</sup>, owing to lower utilization at customers' facilities in reaction to economic trends and other factors. Meanwhile, sales volume of gas to residential customers were largely unchanged from the previous fiscal year at 2,272 million m<sup>3</sup>, reflecting no year-on-year deviation from average temperatures and water temperatures for the service area. Sales volume of gas for commercial use decreased by 3.1%, to 898 million m<sup>3</sup>, and sales volume for public and medical use were down 0.9%, to 642 million m<sup>3</sup>. These declines can be attributed to the energy-saving initiatives implemented by customers. On a wholesale basis, the volume of gas sold to other gas providers was 469 million m<sup>3</sup>, down 2.3%.

Gas Sales Volume by Use (Non-Consolidated)

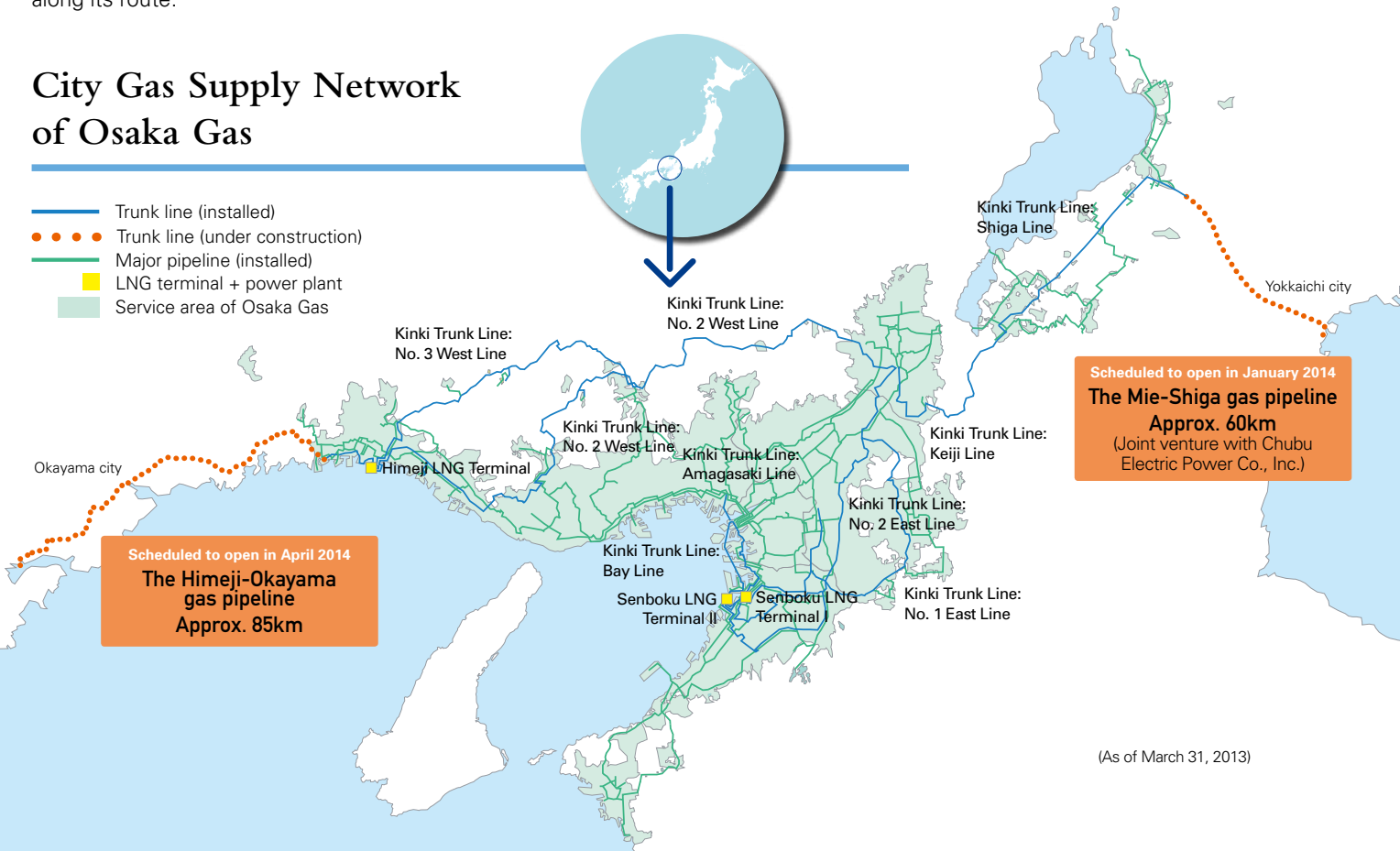


## Expansion of pipeline network

Osaka Gas is currently constructing two pipeline extensions; the Mie-Shiga Line in the east to enhance security of supply, and the Himeji-Okayama Line to acquire gas demand along its route.

## City Gas Supply Network of Osaka Gas

- Trunk line (installed)
- - - Trunk line (under construction)
- Major pipeline (installed)
- LNG terminal + power plant
- Service area of Osaka Gas



(As of March 31, 2013)

## Domestic Energy Businesses

# Residential Gas Sales

In the residential sector, we provide homes with a stable and safe supply of gas and also sell various gas appliances with the aim of encouraging increased gas usage. We engage in development of new gas appliances that better meet their needs and contribute to energy savings and CO<sub>2</sub> emission reductions. In addition, we propose more comfortable lifestyles utilizing gas appliances and are quick to respond should these appliances need maintenance or repairs. Recently, in the Kansai region, populations have been declining, and natural gas has been facing increased competition from rival energy sources. In this challenging environment, we are taking other steps to contribute to the realization of a low-carbon society through the efficient use of energy and by targeting higher levels of energy security through the increased usage of distributed power generation systems. In these ways, we are working to expand gas demand in the residential sector.

## Promoting the Spread of Residential Gas Cogeneration Systems

At Osaka Gas, we believe that residential gas cogeneration systems, a type of distributed power generation system, will be a cornerstone of next-generation. We have supported this vision with the development and launch of the "ECOWILL" gas engine cogeneration system in 2003, the "ENE-FARM" (PEFC<sup>\*1</sup>-type) fuel cell cogeneration system in 2009, and the "ENE-FARM" Type S (SOFC<sup>\*2</sup>-type) fuel cell cogeneration system in 2012.

Ever since the Great East Japan Earthquake, interest in distributed power generation systems has risen. In the fiscal year ended March 31, 2013, sales of ENE-FARM far exceeded our initial forecast. Cumulative sales volume since its launch has now exceeded 12,000 units.

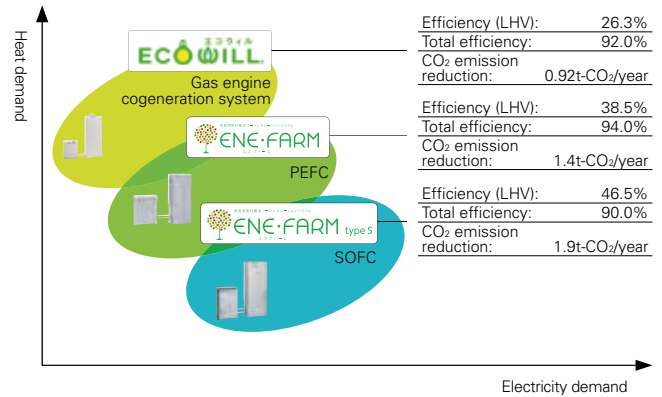
With the goal of further improving energy security, in June 2012 we released a new version of ENE-FARM that can operate independently in the event of a power outage. We will continue to push forward with the development of new technologies.

Furthermore, we are stepping up our sales efforts proposing "hybrid generation" systems that realize even lower levels of CO<sub>2</sub> emissions by combining residential gas cogeneration systems with solar power generation systems, a source of renewable energy. Currently, more than 10,000 households are using such systems.

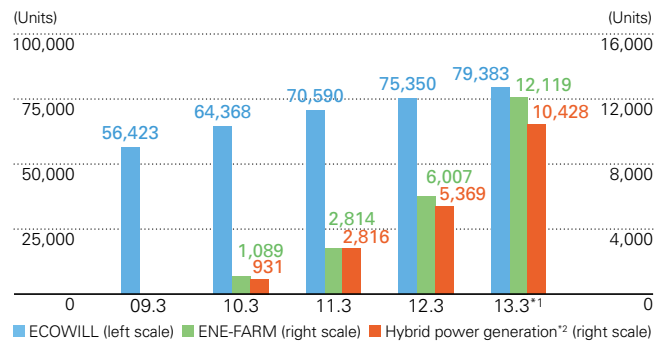
\*1 PEFC is the abbreviation for Polymer Electrolyte Fuel Cell

\*2 SOFC is the abbreviation for Solid Oxide Fuel Cell. SOFCs are fuel cells that use ceramics as an electrolyte. Compared to PEFCs, their power generation efficiency is higher and they can be made smaller. Electric current is generated when oxygen is ionized and reacts chemically with hydrogen and carbon monoxide as it passes through the electrolyte. The ability to use carbon monoxide is a significant feature.

## Residential Cogeneration System Lineup



## Residential Gas Cogeneration System Units Sold (Cumulative Total)

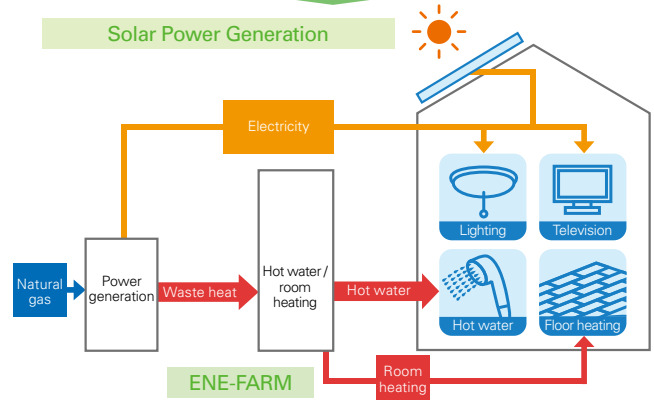


\*1 Units sold up to December 31, 2012.

\*2 Sales volume for hybrid generation systems is included in figures for ECOWILL and ENE-FARM.

## Energy Efficiency of ENE-FARM and Hybrid Power Generation

ENE-FARM (PEFC-type) Alone Reduces: CO<sub>2</sub> emissions by approx. 1.4 tons per year  
 Hybrid with ENE-FARM Reduces: CO<sub>2</sub> emissions by approx. 3.53 tons per year



\* Estimates are for a four-person family living in detached housing and switching from a conventional system to a system using ENE-FARM (PEFC-type) and ENE-FARM (PEFC-type) with solar power generation.

## The Development of ENE-FARM Type S and Future Initiatives

Osaka Gas has been researching and developing the SOFC-type cogeneration system for more than two decades. When R&D first began, it was unthinkable to install fuel cells next to private homes, but after finding solutions to a long list of issues, such as durability and cost, we were able to commercialize and release the ENE-FARM Type S in April 2012. Boasting a high power generation efficiency of 46.5%, we are confident that the cogeneration system will contribute to reducing CO<sub>2</sub> emissions in the residential sector.

Osaka Gas is seeking ways to improve power generation efficiency even further while reducing costs by optimizing the materials used in parts and their design. Looking to the future, we aim to develop a system that is compact enough to install in apartment buildings, which should spread their use even further.



**Masakazu Yoda**

Residential Energy System Development Dept.  
Osaka Gas Co.,Ltd.

## Warranties for Water Heaters through Water Heater Insurance Service "RAKU-TOKU"

Striving to be the fuel of choice, we are practicing community based marketing and developing new services. As one such service, the Water Heater Insurance Service "RAKU-TOKU" offers customers repair services if their gas water heater experiences difficulties and periodic inspections free of charge for up to 10 years after purchase. Customers only have to pay a set monthly fee. This service is available even for customers using gas heaters made by other companies and can be subscribed to at the time of purchase or after. As of March 31, 2013, the number of contracts for this convenient service was up to 103,000. Moreover, we plan to further develop the service and consistently provide high-quality service in order to remain the preferred choice of customers.



# Commercial and Industrial Gas Sales

In the business-use sectors, which include industrial facilities, commercial facilities and public and medical institutions, customers continue to use gas for various applications, such as a heat source for production activities, gas cogeneration systems, gas heating and cooling systems, and gas kitchen equipment. Osaka Gas promotes the greater utilization of natural gas by working to create new sources of demand through proposals tailored to customers in various sectors with appliances and services that meet their needs. Osaka Gas focuses on engineering solutions and developing gas appliances that help conserve energy in order for its customers to use natural gas more efficiently as a core source of environmentally friendly energy. Furthermore, to offer more convenience and economic viability to its customers, Osaka Gas strives to expand its business of providing a broad range of services that go beyond energy supply as an energy service provider. These services include energy services for managing utilities, such as water treatment systems and lighting facilities, and financing for installing gas equipment as well as IT monitoring systems.

## Self-Sufficient Gas Engine Heat Pump GHP Excel Plus that Can Operate During Power Outages

After the Great East Japan Earthquake, there was a rapid rise in the number of customer requests for means of using air conditioning and lighting at minimal levels during power outages. In response to this demand, the Company developed the self-sufficient gas engine heat pump "GHP Excel Plus" that can be used even during power outages. Sales commenced from April 2012. This product was developed by attaching a start-up battery to our gas engine heat pump air conditioner High Power EXCEL. As "GHP Excel Plus" features an electricity generator, the battery allows the gas engine to start up during power outages, enabling customers to use air conditioning and lighting to a certain degree.

While developing new technologies, we will work to expand usage of gas air conditioning systems that help reduce power usage during peak hours and lower energy consumption and CO<sub>2</sub> emissions.



GHP Excel Plus



## Domestic Energy Businesses

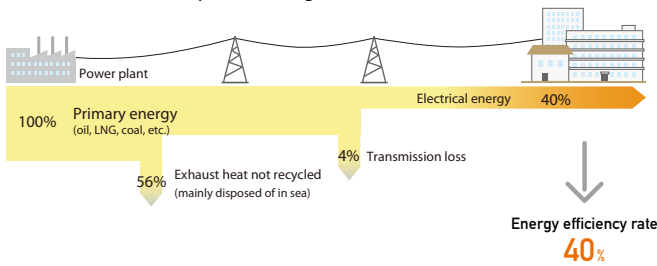
### Spreading Usage of Gas Cogeneration Systems

When gas cogeneration systems started to proliferate in the 1980s, they primarily consisted of large-scale facilities. However, technologies have continued to advance since then, leading to the creation of smaller and more efficient facilities. Today, Osaka Gas possesses a diverse lineup of gas cogeneration systems, and has supplied them to a wide variety of customers, ranging from factories and large-scale commercial facilities, to hospitals, hotels, and small retail stores.

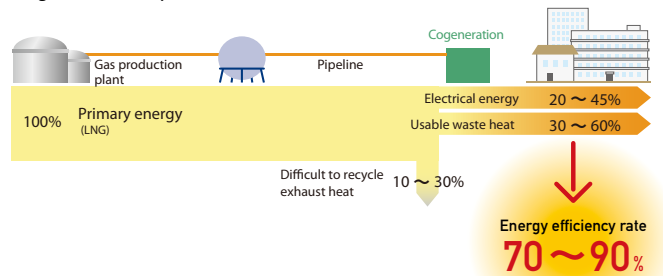
Following the Great East Japan Earthquake, the need for secure power sources began to rise rapidly. A result of this shift would be the growing importance of cogeneration systems, which serve as a backup source for electricity and other forms of energy and can provide customers with a stable supply of energy even during power outages.

### Differences between Conventional Generation Systems and Cogeneration Systems

Power Generation System Using Conventional Methods\*



Cogeneration System



\* Average for 10 power companies (2005.3)  
Source: Japan Gas Association "Cogeneration System"

### Gas Cogeneration System Lineup

Note: Representative examples are listed.

	Residential		Commercial			Industrial	
	Detached homes	Apartments	Restaurants and stores	Public baths	Hospitals and hotels	Electric appliances and foods	Chemical and steel
Primarily electric energy use	<p>ENE-FARM Type S (SOFC) Efficiency (LHV): 47% Waste heat recovery ratio: 43% Total efficiency: 90%</p>						
Primarily thermal energy use	<p>ECOWILL Efficiency (LHV): 26% Waste heat recovery ratio: 66% Total efficiency: 92%</p>	<p>ENE-FARM (PEFC) Efficiency (LHV): 39% Waste heat recovery ratio: 55% Total efficiency: 94%</p>	<p>Genelight (5kW) Efficiency (LHV): 29% Waste heat recovery ratio: 51% Total efficiency: 85%</p>	<p>Genelight (35kW) Efficiency (LHV): 34% Waste heat recovery ratio: 51% Total efficiency: 85%</p>	<p>Miller-Cycle Gas Engine (400kW) Efficiency (LHV): 40% Waste heat recovery ratio: 32% Total efficiency: 72%</p>	<p>Miller-Cycle Gas Engine (1MW) Efficiency (LHV): 42% Waste heat recovery ratio: 32% Total efficiency: 74%</p>	<p>Gas Turbine (7.24MW) Efficiency (LHV): 33% Waste heat recovery ratio: 47% Total efficiency: 80%</p>

### Further Development and Expansion of Commercial and Industrial-Use Sectors

As Osaka Gas continues to market its products and services to customers in commercial and industrial-use sectors, it will deepen its engagement with customers and expand sales channels through collaborations with air conditioning dealerships, subcontractors and manufacturers. Moreover, Osaka Gas will start selling gas over a wider service area as it seeks out demand along its Himeji-Okayama gas pipeline, which is scheduled to open in April 2014.

# Electric Power Business

## Business Overview and Characteristics

As of March 31, 2013, the total power generation capacity of our domestic power resources amounted to approximately 1.8 GW, with our flagship power plant being the Senboku Natural Gas Power Plant (approximately 1.1 GW), which commenced operation in 2009. The electric power business can fully leverage the Group's strengths in infrastructure, solution-based marketing techniques, and customer network nurtured through city gas operations. The Company positions this business as its second core business after city gas operations.

The electric power business consists of three domains: IPP operations, power generation, and power marketing. Power generation is primarily conducted using natural gas thermal power plants. However, in an effort to contribute to environmental preservation, the Company is also actively engaged in expanding the supply of renewable energies such as CO<sub>2</sub> emission-free wind power generation and solar power generation. In power marketing, we sell our electricity through the joint venture ENNET Corporation, our wholesale power to Japan Electric Power Exchange (JEPX), and have thus managed to establish a well-balanced optimal marketing portfolio.

## Efforts to Expand the Electric Power Business

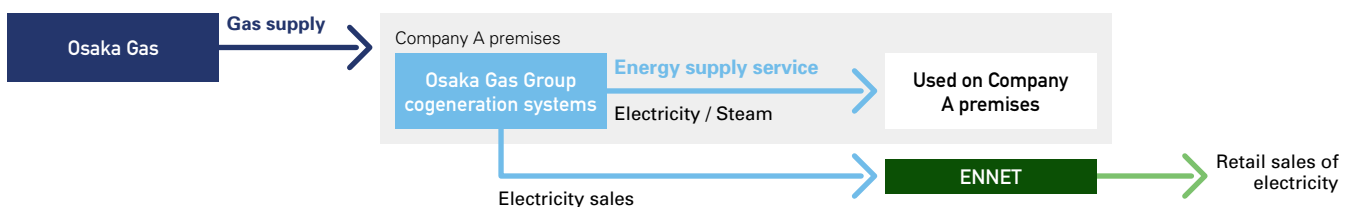
In response to the incidents at a nuclear power station that was damaged during the Great East Japan Earthquake, and the subsequent electricity shortages, there has been much debate in Japan about expanding the scope of regional electrical power system operators and the full liberalization of the retail electricity sector.

The Osaka Gas Group is closely monitoring the direction of these discussions on energy policy and trends in the supply and demand balance for electricity, and is seriously considering the possibility of introducing gas cogeneration systems with capacities ranging from 10 to 100 MW or large-scale natural gas thermal power plants with the goal of contributing to the creation of stable power supplies and furthering the growth of its electric power business. Osaka Gas plans to increase its total power generation capacity (in Japan and abroad) from the present level of approximately 3.2 GW to around 6.0 GW in the future.

## Cogeneration-Based Power Export Business Plays Social Role in Energy Mix

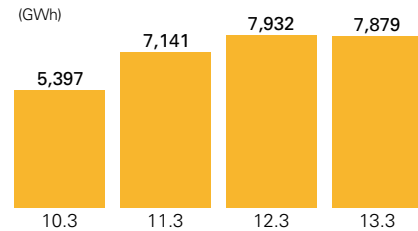
Looking to strengthen its electric power business, the Osaka Gas Group installs cogeneration systems and other medium-scale power generation facilities at the properties of customers that require large amounts of heat for their factories, for example. The cogeneration-based power export business promotes the proliferation of distributed power sources and creates a channel for Osaka Gas to purchase any surplus electricity generated by its customers and resell it on the retail electricity market. As such, Osaka Gas contributes to improving the balance of supply and demand for electrical power.

### Example of a Cogeneration Plant's Schemes



Senboku Natural Gas Power Plant

## Electricity Sales Volume (Consolidated)



## Power Sources Owned by the Osaka Gas Group (As of March 2013)

Domestic power plant	Capacity
Torishima Energy Center	150MW
Nakayama Joint Power Generation	142MW*
Nakayama Nagoya Joint Power Generation	142MW*
Himeji Power Plant	55MW
Senboku Natural Gas Power Plant	1,109MW
Hayama Wind Farm Power Plant	20MW
Hirogawa Myojin-yama Wind Power Plant	16MW
Yura Wind Power Plant	10MW
Hizen Wind Power Plant	30MW
Hirao Wind Power Plant	9MW
Others	116MW*
<b>Total</b>	<b>1,799MW*</b>

\*Company share of capacity  
In addition to the above, 1.4 GW (Group stake) is sourced abroad. For more details, please refer to page 36.



## Domestic Energy Businesses

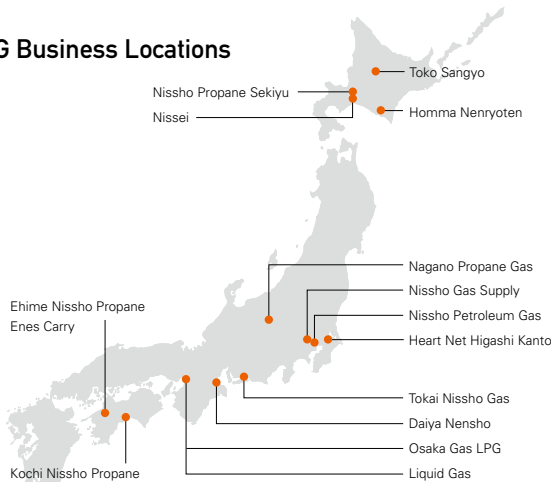
# LPG Businesses and Industrial Gas Businesses

### Business Overview and Characteristics

#### LPG Business Leveraging the Group's Network

The Osaka Gas Group's LPG business mainly serves customers outside the natural gas service area by providing retail and wholesale supplies of LPG. The Group takes full advantage of its nationwide network, as well as its marketing and technical knowledge from the natural gas supply business, to enhance its competitiveness in LPG. The LPG business is a part of the Company's multi-energy services combining gas and electricity supplied to a range of users from residential to industrial.

#### LPG Business Locations



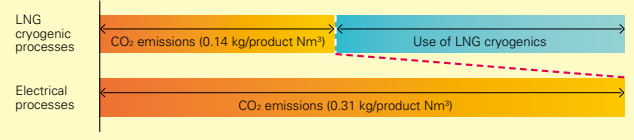
#### Industrial Gas and Other Business that Effectively Employ LNG Cryogenics\*

Utilizing the cryogenic technologies for LNG, Osaka Gas is involved in businesses such as air separation, the manufacturing and marketing of liquefied carbon dioxide and dry ice, high-purity methane-related businesses, and the on-site supply of hydrogen from the hydrogen generator "HYSERVE." Additionally, we are expanding businesses using our proprietary cryogenic crushing technologies.

\* LNG cryogenics is the thermal energy released when LNG cooled to  $-160^{\circ}\text{C}$  evaporates back into room-temperature natural gas. This energy can be used for power generation and freezing materials.

#### Significantly Lower CO<sub>2</sub> Emissions from Industrial Gas Production with LNG Cryogenics

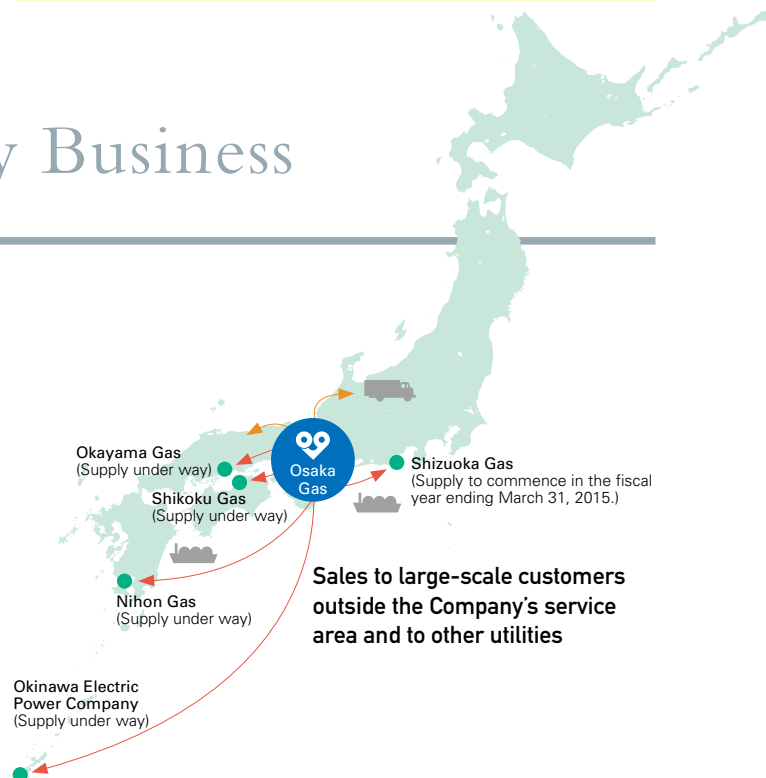
When producing industrial gases such as liquid oxygen, LNG cryogenics can be used to improve the efficiency of air separation processes. The production processes at highly efficient, energy-saving plants that employ these technologies emit 55% less CO<sub>2</sub> than conventional plants using electrical processes.



## Broad-Area Energy Business

### Business Overview and Characteristics

The Osaka Gas Group does not merely supply natural gas to customers within its service area. The Group also sells part of the LNG that it procures to large-scale customers outside its service area, and to other utilities, by transporting the gas by truck, train, or ship. In addition to the LNG already being supplied to Nippon Gas Co., Ltd. by LNG tanker, the Group began providing LNG to Okinawa Electric Power Company, Inc. from the fiscal year ended March 31, 2013. From the fiscal year ending March 31, 2015, Osaka Gas plans to supply LNG to Shizuoka Gas Co., Ltd. Going forward, we will expand the volume of LNG we deal in with the aim of enhancing competitiveness from a resource procurement standpoint, and will continue to pursue alliances with regional utilities to provide various energy solutions.



# Procurement of Energy Resources

## Business Overview and Characteristics

The LNG currently consumed by the Osaka Gas Group is entirely imported from abroad. Due to the changes in energy market conditions accompanying expansion of global energy demand, economic fluctuations and technological innovation, securing a long-term stable and competitive supply of LNG is a key management issue for the Osaka Gas Group. In the fiscal year under review, we procured LNG by concluding long-term contracts with producers in seven countries: Brunei, Indonesia, Malaysia, Australia, Qatar, Oman and Russia. In this manner, we are diversifying sources of supply.

In the future, we plan to procure LNG from new projects in Papua New Guinea and Australia. We also plan to initiate procurement of shale gas, a new resource for natural gas, going forward.

## Efforts to Procure LNG from the United States

In July 2012, Osaka Gas and Chubu Electric Power Co., Inc. executed binding natural gas liquefaction tolling agreements with FLNG Liquefaction, LLC, an affiliate of Freeport LNG Expansion, L.P. Pursuant to the agreements, Osaka Gas will acquire a 2.2 million ton per year production capacity for natural gas liquefaction around 2017. Osaka Gas plans to secure LNG by liquefying natural gas it procures on its own from shale gas and other resources within the United States.

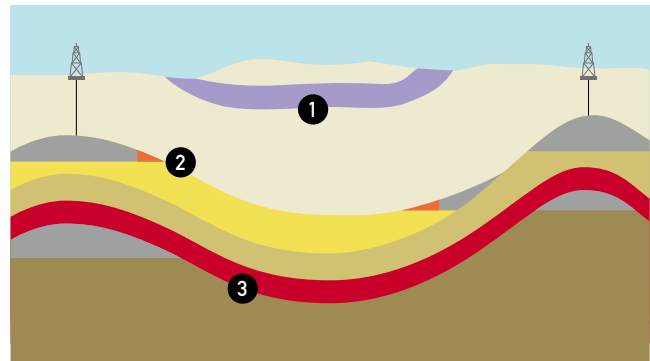
The acquisition of LNG made in the United States will help diversify supply sources and procurement methods. Osaka Gas will continue efforts to procure energy resources that are stable and competitive.

## LNG Transportation

The Osaka Gas Group is continuing to acquire new LNG carriers. This is consistent with the Group's efforts to expand its network of LNG suppliers and entails joint ownership with other companies with respect to a number of projects, including those in Papua New Guinea and Australia.

By engaging in LNG transportation using its own fleet, the Group is better positioned to reduce transportation costs. Ownership also affords the Group the opportunity to expand its business through the leasing of carriers to other companies as well as LNG trading.

## Unconventional Gas Resources



● Conventional Gas Field

### 1 Coal-Bed Methane (CBM)

CBM is a natural gas that consists mainly of methane and is found in coal beds. Reserves of this resource are thought to be plentiful.

### 2 Tight Sand Gas

Tight sand gas is natural gas that is trapped within tightly compressed rock and sand formations with low permeability. Commercial production of this resource is conducted mainly in the United States.

### 3 Shale Gas

Shale gas is a natural gas collected from cracks in shale formations that have become buried in sedimentary rock. Substantial reserves of this resource are believed to exist, and shale gas production is rising significantly in the United States. Currently, shale gas is gaining a great deal of attention on a global scale.



Freeport LNG terminal  
Photograph courtesy of Freeport LNG Development, L.P.



LNG carrier under construction

# International Energy Businesses along the Energy Value Chain

The Osaka Gas Group strives for stable and flexible procurement of highly competitive supplies of LNG. In the field of international energy businesses along the energy value chain, we are constructing a natural gas value chain that extends from upstream to mid- and downstream businesses by utilizing the knowledge, expertise, and networks cultivated through our operations. In this endeavor, we intend to maximize synergies across the entire value chain.

In addition to pushing ahead with the development of natural gas fields, oil fields, and other energy resources in the upstream area, we also promote the development of mid- and downstream operations in LNG terminals, pipelines, gas distribution, and IPP projects. In the future, we plan to leverage our LNG terminals and LNG carriers to develop global operations, including possible engagement in global energy trading businesses, in our goal to offer a variety of energy solutions.

## External Environment

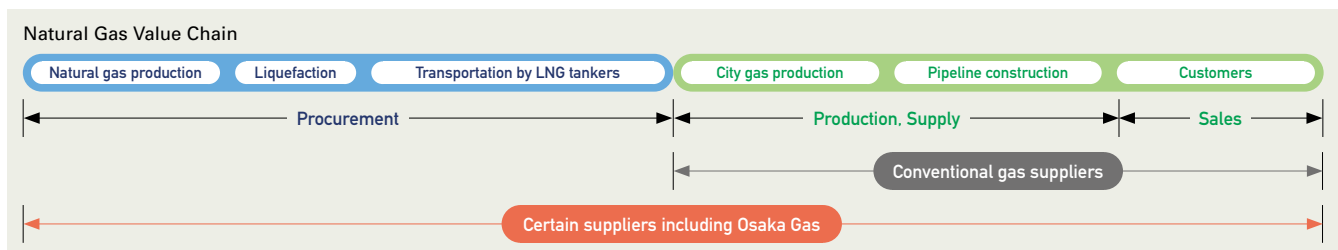
- Growing demand for natural gas around the world
- Increasing needs in emerging countries for environmental friendliness and combustion technology
- Fluctuations in crude oil prices and foreign currency markets

## Objectives and Issues to Address

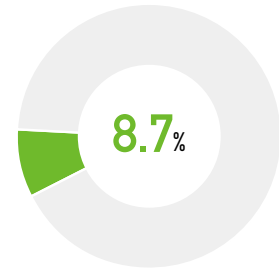
- Acquisition of gas field interests
- Broaden gas business from upstream to mid- and downstream areas

## Overseas Business Development

While gas suppliers in Japan conventionally engage in range of activities gas production, supply, and the sale of gas, the Osaka Gas Group pays particular attention to the natural gas value chain and is active across a broader spectrum of areas from the overseas production of natural gas through liquefaction facility businesses to the transportation of resources using LNG tankers.



Segment Income\* (2013.3)

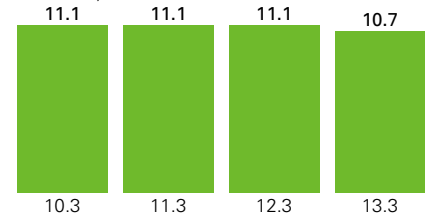


● International Energy

\* Segment Income = Operating income + Equity in net earnings of affiliates

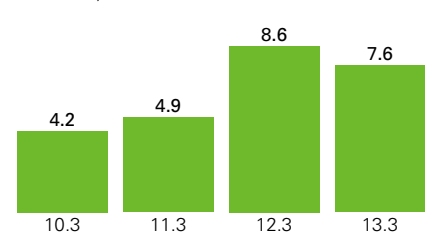
Net Sales

(Billions of yen)



Segment Income\*

(Billions of yen)



\* Segment Income = Operating income + Equity in net earnings of affiliates

## Upstream Businesses

The resource development business conducted as part of upstream business activities not only enables us to gain valuable experience in the field of LNG procurement but also helps raise profits while serving as a natural hedging mechanism against fluctuations in crude oil prices and exchange rates, which stabilizes profits. Accordingly, we will continue to acquire interests in promising upstream projects in the future.

### Participation in Condensate<sup>\*1</sup> and Gas Development Business in Papua New Guinea

In order for Osaka Gas to participate with a subsidiary of Horizon Oil Limited in condensate and gas development operations in Papua New Guinea, Osaka Gas acquired<sup>\*2</sup> a portion of interests held by Horizon Oil Limited for resource development and exploration/production. Through this acquisition, we are proceeding in stages to develop condensate resources with the objective of starting production around 2015.

\*1 Condensate is a type of ultra-light crude oil that has characteristics that are similar to naphtha and gasoline.

\*2 The official decision on acquisition of interests and development pending subject to government approvals and the satisfaction of contractual condition precedents.

In line with the "Field of Dreams 2020" plan, the Osaka Gas Group aims to expand the international energy businesses along the energy value chain, and has focused on developing gas and oil fields in various parts of the world as well as acquiring new projects in upstream business.

The condensate and gas development business we acquired in Papua New Guinea is likely to not only start generating business profits in the relatively near future, but through exploration of nearby fields, it could also possibly develop into an LNG project in the future, one of our loftiest ambitions.

We are committed to making this project a success by cooperating closely with project partners and applying the Osaka Gas Group's gas- and LNG-related technology and knowledge. We look forward to the day that LNG shipments start to flow from this project and contribute to the growth and development of the Osaka Gas Group.



**Takeshi Shinohara**

Dispatched to Osaka Gas Australia Pty Ltd

## Mid- and Downstream Businesses

The Osaka Gas Group has actively participated in LNG terminal as well as pipeline operations and IPP projects as part of its efforts to channel the know-how accumulated through its domestic energy business toward the development of business opportunities overseas and to secure a stable stream of earnings. Looking ahead, the Group will work diligently to further expand its business and to aggressively consider participating in gas distribution projects in new regions.

### Osaka Gas Participates in Natural Gas Retail Business in Singapore

In March 2013, Osaka Gas reached an agreement with City Gas Pte. Ltd. to participate in a joint natural gas retail business for industrial customers in Singapore. On this basis, the Company concluded a purchase and sale agreement to acquire shares of City-OG Gas Energy Services Pte. Ltd. ("City-OG"), an industrial-use natural gas retail company newly established by City Gas.

While utilizing the natural gas retail business infrastructure held by City Gas, City-OG plans to contribute to customers by using technological and proposal capabilities of the Osaka Gas Group related to cogeneration system and industrial furnace.

In specific terms, particular emphasis will be placed on servicing the needs of customers in the chemical and food industries. In addition to making full use of the Company's strengths in energy solutions, every effort will be made to promote the advanced use of natural gas by promoting a variety of initiatives, including the effective application of gas cogeneration exhaust heat and the implementation of highly efficient burner proposals that address the individual needs of customers.

Moving forward, the Osaka Gas Group will not only look to develop its business in Singapore, but also to further harness its know-how to expand the natural gas retail business to other countries, focusing mainly on Southeast Asia.

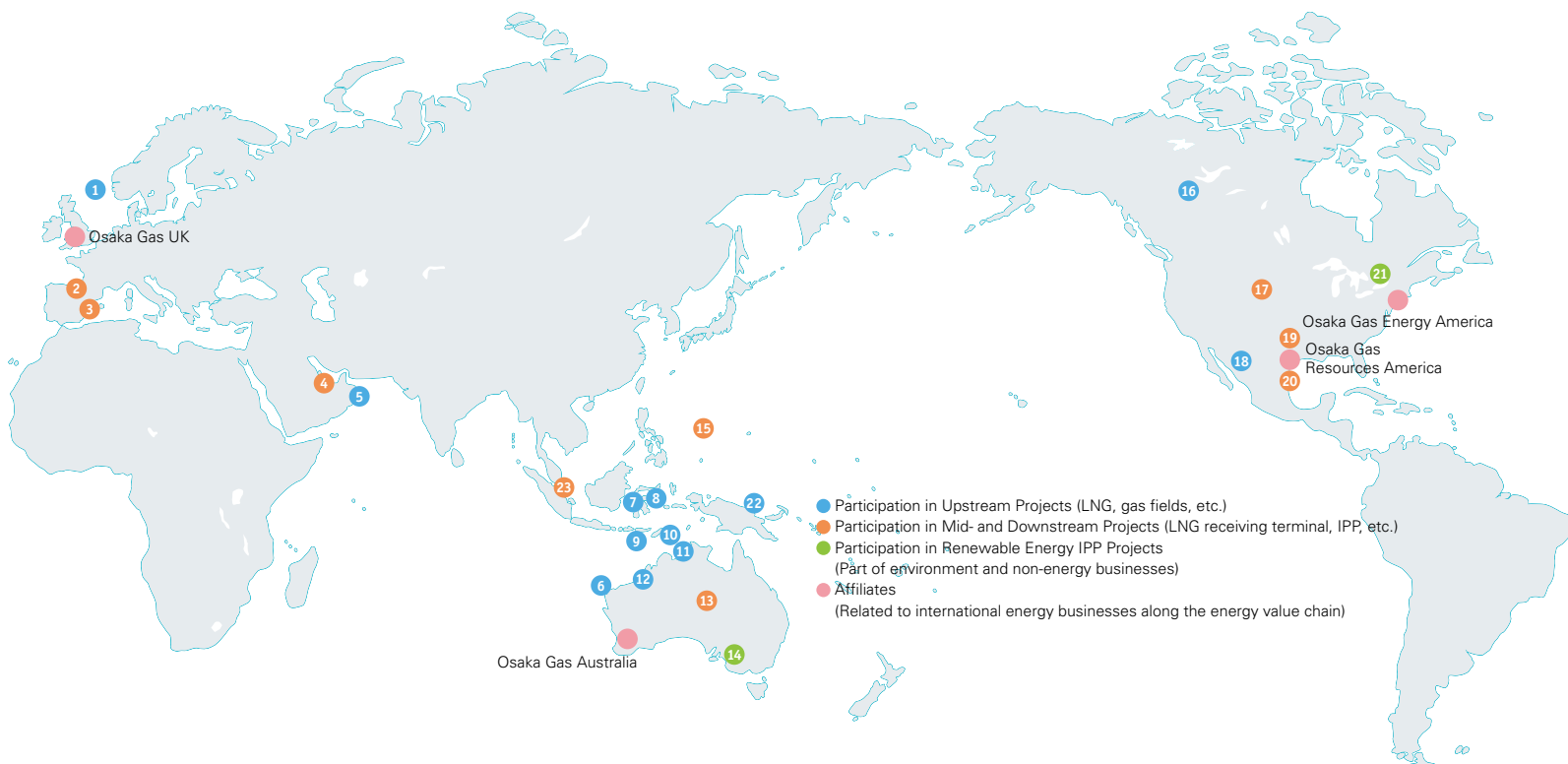


**Masahiro Kuwahara**

(Back row, second from the left) dispatched to Osaka Gas Singapore Pte. Ltd. with members of City-OG Gas Energy Services.

## International Energy Businesses along the Energy Value Chain

### Investments in International Energy Businesses along the Energy Value Chain



#### Participation in Upstream Projects (LNG, gas fields, etc.)

**1 Idemitsu Snorre Oil Development Co., Ltd.**  
Stake since 2005: 34.65%



- 5 Qalhat LNG**  
Stake since 2006: 3.00%  
Liquefaction capacity: 3.3 million tons/year
- 6 Gorgon Project Gas Field**  
Stake since 2009: 1.25%  
Projected LNG output: 15 million tons/year (planned)  
(Start of production scheduled for 2015)
- 7 Universe Gas & Oil Company, Inc. (Sanga Sanga Gas Field)**  
Stake since 1990: 33.43%
- 8 Japan CBM Limited**  
Stake since 2011: 40.12%
- 9 Crux Gas and Condensate Field**  
Stake since 2007: 3%
- 10 Sunrise LNG Project**  
Stake since 2000: 10%  
Projected LNG output: about 4 million tons/year (planned)
- 11 Evans Shoal Gas Field**  
Stake since 2000: 10%

**12 Ichthys LNG Project**  
Stake since 2012: 1.2%  
Projected LNG output: 8.4 million tons/year (planned)  
(Start of production scheduled for 2016)



- 16 Cordova Shale Gas Development Project**  
Stake since 2011: 3.75%
- 18 Pearsall Shale Gas and Liquids Development Project**  
Stake since 2012: 35%
- 22 Western Papua New Guinea Gas and Condensate Field\***  
Stake since 2013: 10-20% (ratio depends on field)

\* The official decision on acquisition of interests and development pending subject to government approvals and the satisfaction of contractual condition precedents



#### Participation in Mid- and Downstream Projects (LNG receiving terminal, IPP, etc.)

- 2 Amorebieta IPP**  
Ownership interest since 2005: 50%  
Power generation capacity: 378 MW
- 3 Sagunto LNG Terminal**  
Ownership interest since 2010: 20%  
Vaporization capacity: 6.4 million tons/year



- 4 Shuweiht S2 IWPP**  
Ownership interest since 2011: 10% (25% equity interest in the operation and maintenance company)  
Power generation capacity: 151 MW  
Freshwater processing capacity: 10 million gallons/day
- 13 EII**  
Ownership interest since 2008: 30.2%  
Four pipelines, two gas-refining facilities, two power plants, two interconnected power lines
- 15 Marianas Energy IPP**  
Ownership interest since 2005: 100%  
Power generation capacity: 87 MW
- 17 Osaka Gas Power America**  
Ownership interest since 2005: 8 projects  
Power generation capacity: 403 MW  
Includes 50% interest in 87 MW generation capacity of Marianas Energy IPP

**19 Tenaska Gateway IPP**  
Ownership interest since 2004: 40%  
Power generation capacity: 338 MW

**20 Freeport LNG Terminal**  
Ownership interest since 2008: 10%  
Vaporization capacity: 13 million tons/year



Photograph courtesy of Freeport LNG Development, L.P

**23 Singapore Gas Sales**  
Stake since 2013: 49%

#### Participation in Renewable Energy IPP Projects

- 14 Hallett 4 Wind Farm Project**  
Ownership interest since 2009: 39.9%  
Power generation capacity: 53 MW
- 21 Ontario Solar Power Generation Project**  
Ownership interest since 2012: 50%  
Power generation capacity: about 50MW





# Environment and Non-Energy Businesses

The Osaka Gas Group's environment and non-energy businesses, centered on the real estate business, IT business, and material solutions business, are being developed with technologies and expertise gained from the gas business. We are also investing in renewable energy, including solar and wind power generation. We aim to secure a stable source of earnings in the business through selection and concentration based on strategic considerations of spurring growth in existing businesses and current business conditions.

## External Environment

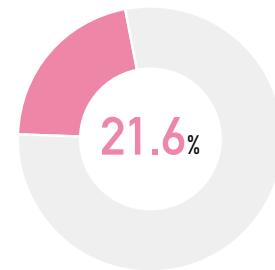
- Changes in the economic environment
- Growing social interest in renewable energy

## Objectives and Issues to Address

We aim to diversify the business risk of the Osaka Gas Group by seeking to expand the scope of operations through the provision of services that utilize the brand awareness and technological capabilities from the gas business. Osaka Gas hopes to establish new businesses that will support the earnings foundation of the entire Group.

- **Real Estate Business (Osaka Gas Urban Development Group)**  
Aiming to grow into a top-class comprehensive real estate business in the Kansai region by steadily expanding the property leasing and selling businesses
- **IT Business (OGIS-RI Group)**  
Eyeing growth fields, including cloud-based services and datacenters
- **Material Solutions Business (Osaka Gas Chemicals Group)**  
Growing operations through sales of chemical materials and environmentally friendly materials
- **Environment-Related Businesses**  
Planning to establish businesses through strategic investments and by utilizing technologies held by the Osaka Gas Group
- **Life Service and Outsourcing Services Businesses**  
Promoting operations that enhance the brand value of the Osaka Gas Group and contribute to efficient and effective Group management

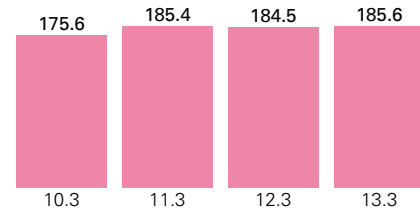
Segment Income\* (2013.3)



● Environment and Non-Energy  
\* Segment Income = Operating income + Equity in net earnings of affiliates

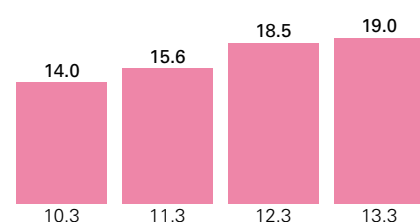
Net Sales

(Billions of yen)



Segment Income\*

(Billions of yen)



\* Segment Income = Operating income + Equity in net income of affiliates



## Environment and Non-Energy Businesses

# Real Estate Business (Osaka Gas Urban Development Group)

### Business Overview and Characteristics

In the real estate business field, the Osaka Gas Group develops, leases, and sells office buildings, housing, and other properties, and also engages in the condominium business. Through these business activities, the Osaka Gas Group strives to effectively use its real estate holdings and acquire new prime real estate assets. We also offer services for the efficient management and maintenance of office buildings and other commercial facilities while looking to pursue business opportunities in the research park field for use as bases for the creation of new industries as well as private, academic, and public sector collaboration.

### Initiatives in the Fiscal Year under Review

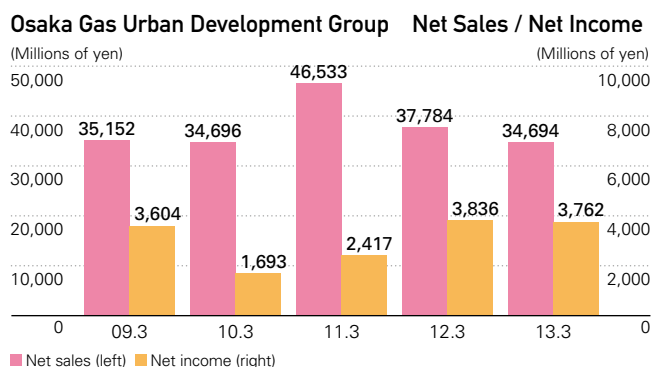
In the real estate leasing business, the Osaka Gas Group provides high value-added residences. In addition to rental properties that are outfitted with solar power generation and energy conservation equipment, the Group works diligently to deliver properties that take into consideration environmental concerns. As one example, steps are taken to landscape the areas surrounding properties with endangered species of plants. Thanks largely to successful efforts to further enhance the satisfaction of customers toward existing properties, the Group maintained high rates of occupancy.

In condominium sales, the company sold five properties, and was the lead manager for most of the properties, thereby providing a lift to earnings.

Going forward, we will continue to expand the real estate business by developing and acquiring quality real estate assets. At the same time, we will pursue synergies with our energy businesses by providing properties that enable customers to experience the benefits of gas, such as by installing gas appliances like mist saunas, glass-top gas stoves, and floor heating systems.



Urbanex Kobe Rokko



# IT Business (OGIS-RI Group)

### Business Overview and Characteristics

Having started with system development for its own gas operations, the Osaka Gas Group's IT businesses, led by OGIS-RI Co., Ltd., offer a wide range of services to customers, including the design, development, operation, and maintenance of core IT systems. Centered on the OGIS-RI Group's proprietary technologies and customer base, the IT business currently provides a comprehensive suite of IT services that precisely match the diversifying and increasingly sophisticated IT requirements of corporations. These services range from cutting-edge systems development to cloud-based services, datacenters and IT support for Japanese companies expanding overseas.

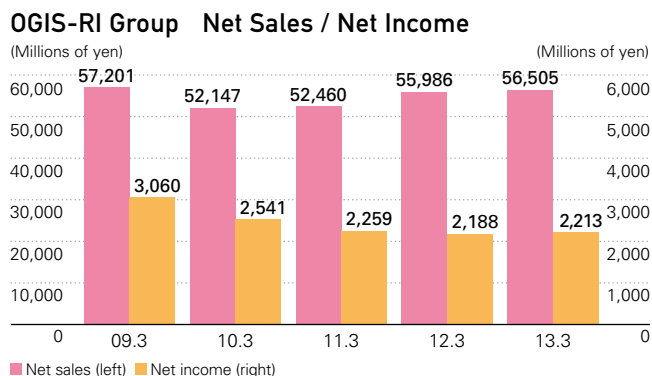
### Initiatives in the Fiscal Year under Review

The OGIS-RI Group has been expanding its datacenter operations, demand for which has been rising rapidly in line with advances in cloud-based services, requirements for information security, and the need for backup systems during disasters. The OGIS-RI Group commenced operations at its Osaka No. 2 Datacenter in April 2013 and its Tokyo No. 2 Datacenter in July 2013. While

fortifying the datacenter business foundation and integrating our datacenters in Osaka and Tokyo, we aim to provide safety and security for corporate IT environments through services ranging from monitoring, maintenance and operations to security countermeasures.



ICC Building



## Material Solutions Business (Osaka Gas Chemicals Group)

### Business Overview and Characteristics

This business domain draws on the coal chemical technology of Osaka Gas accumulated through the production of coal gas, to operate a variety of businesses ranging in application from electronics to the environment. In the fine materials field, the group manufactures and sells fluorine derivatives with excellent optical properties and outstanding heat resistance. These derivatives are used as materials in fabricating film materials for LCDs and resins for optical lenses used in mobile phones and other devices. The company boasts the highest share of the world market for fluorine derivatives. We also manufacture and market products in the carbon materials field, including molded carbon-fiber insulation for use in fusion furnaces that process polysilicon to be used in photovoltaic cells, activated charcoal for various applications, and residential products that use activated carbon such as water purifier cartridges and air purifying filters. Also produced are preservatives, including a widely recognized brand of wood protective paints.

### Initiatives in the Fiscal Year under Review

In the fiscal year under review, earnings continued to worsen in the carbon fiber business due to weak market conditions, and performance was worsen throughout the Group. In the fine materials and activated charcoal businesses, however, earnings were favorable owing to the development of new products and unearthing of new demand.

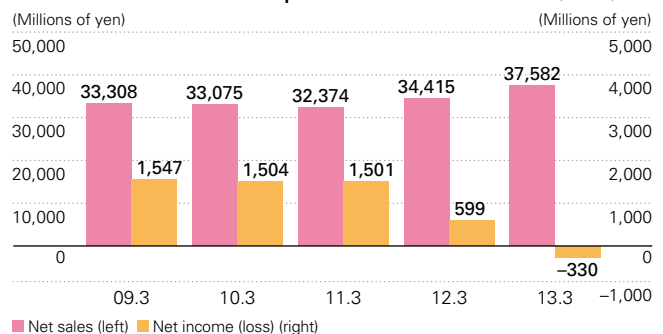
The company concentrated on the development of new applications, expansion of sales channels, and improvement

of profit margins in all business fields with the objective of achieving sustainable growth amid challenging business conditions. In the fiscal year ended March 31, 2013, the company established a local subsidiary in China to strengthen marketing in China. In Japan, the Company has established the Frontier Materials Laboratories as a new R&D base for inventing new materials for primarily the opto-electronics, environment and biotechnology fields. The Osaka Gas Chemicals Group aims to grow into a world-class chemicals company by continuing to implement aggressive growth strategies.



Frontier Materials Laboratories

### Osaka Gas Chemicals Group Net Sales / Net Income (Loss)



## Environment-Related Businesses

### Business Overview and Characteristics

The Osaka Gas Group encourages the widespread use of energy that is easy on the global environment in order to take one step closer to the realization of a low-carbon society. This entails deepening its knowledge of renewable energy while engaging in solar and wind power generation operations in Japan and overseas.

### Initiatives in the Fiscal Year under Review

During the fiscal year under review, Osaka Gas Group commenced operations of large-scale solar power generation plants in three locations (Torishima, Konohana Ward, Osaka City; Shoo Town, Katsuta-gun, Okayama Prefecture; Hirogawa Town, Arida-gun, Wakayama Prefecture) for a total output capacity of 3.5 MW.

In addition to existing wind power generation installations in Kochi Prefecture and Wakayama Prefecture, in November 2012 Osaka Gas Group acquired shares in Hizen Wind Power Co., Ltd. in Saga Prefecture and Hirao Wind Power Co., Ltd. in Yamaguchi Prefecture. The combined output from our five wind power sites in Japan now stands at 85 MW.

Overseas, Osaka Gas Group is investing in a major new solar power generation project in Canada composed of nine sites for a total output of about 100 MW.



Hirogawa Myojin-yama Wind Power Plant



Torishima Solar Power Plant