

International Energy Business



Note: Starting in the fiscal year ended March 31, 2015, Osaka Gas repositioned the renewable energy business from the environment/non-energy segment to the LPG/electricity/other energy segment or to the international energy segment according to the details of individual business activities. For this reason, figures from the fiscal year ended March 31, 2015 on include the international renewable energy business.

*1 Segment income = Operating income + Equity in earnings of affiliates

In the fiscal year ended March 31, 2016, net sales from the international energy business amounted to ¥18.7 billion. Segment income was negative at –¥200 million due to income reductions at affiliates accounted for by the equity method, as a result of the decline in crude oil prices and other factors.

As a supplier of energy, the Osaka Gas Group first focused its attention on the natural gas value chain from an early stage. Comprehensive efforts have been directed toward expanding business activities from the upstream business such as the overseas acquisition of rights in gas fields and extraction of natural gas, to downstream businesses, including LNG terminal business, independent power producer (IPP) business, and international city gas sales and energy service business utilizing domestically cultivated know-how.

Moreover, the Group is taking steps to expand its trading business by leveraging its own fleet of LNG carriers.

Upstream Business

Business Overview and Characteristics

The energy resource development business activities of Osaka Gas are helping to expand profits for the entire Group and stabilize profits by serving as a natural hedge against fluctuations in crude oil prices and foreign currency exchange rates. The activities also contribute to the accumulation of valuable

expertise and experience in the field of LNG procurement.

Moving forward, we will robustly promote those ventures in which we have already decided to engage, and will continue pursuing the acquisition of new interests as we carefully examine new investment opportunities.

Status of Main Upstream Investments

The gas liquefaction facility that is part of the Freeport LNG Project (Texas, USA) has been granted approval by the U.S. Federal Energy Regulatory Commission, with construction getting underway in November 2014.

We are actively moving forward on this project,

including the construction of pipelines and liquefaction facilities for the gas that will be used as a resource, with the goal of starting shipments in the latter half of 2018. In 2016, production started at the Gorgon LNG Project, in which we are an investor. Around 2017, production is slated to begin at the Ichthys LNG Project.

Schedule for Commencement of Operations at Main Projects



Downstream Business

Business Overview and Characteristics

Aiming to utilize the know-how gleaned from domestic energy business in overseas development and to secure stable income, the Osaka Gas Group participates in LNG terminal business and IPP business in North America, Europe, the Middle East, and Australia.

We are also working to develop our natural gas retail business and develop our energy services business* in Southeast Asia, and to further expand our business domains in this region, where energy demand is expected to rise.

* Services that allow customers to introduce natural gas facilities without requiring any initial investment—by only paying rates for the amount of energy used.

Development of the Power Generation Business Overseas

To secure stable income and acquire experience and expertise, the Osaka Gas Group has been developing the power generation business in the USA, Australia, and other countries. At present, the Osaka Gas Group owns stakes totaling 1.10 GW in power sources outside of Japan. In June 2015 the Group began participating in a project to build the St. Charles Energy Center Natural Gas-Fired Power Plant in Maryland, USA. Going forward we will continue to pursue power generation overseas.



St. Charles Energy Center Natural Gas-Fired Power Plant (under construction)

Participation in City Gas Distribution Business Overseas

In December 2015, we concluded a joint business contract in which we received a capital increase through a third-party allocation of stocks conducted by Erogasmet S.p.A, an Italian city gas distribution company. This was our first time participating in overseas city gas distribution business and represents our willingness to take on new challenges. Using our experience and knowledge as a gas provider, we supported Erogasmet's business expansion and aimed to increase stable revenues.



Emergency response vehicle



Governor station

Developing Our Natural Gas Sales and Energy Services in Southeast Asia

In March 2013, after setting up a local representative company in Singapore, we began selling natural gas and offering energy services to the industrial markets in Singapore and Thailand, utilizing our energy-saving technologies related to cogeneration, boilers, and industrial furnaces. We are rolling out operations across Southeast Asia, a region where continued economic growth is expected, promoting conversion from heavy oil and other fuels to clean natural gas, which also helps contribute to energy conservation.

Developing the Energy Services Business in Thailand Striving to Raise the Business Performance of Local Companies

Toshihiro Ouchi

Managing Director
Osaka Gas (Thailand) Co., Ltd.



Osaka Gas established a staffed office in Thailand in 2012 and explored the potential of the energy services business in the industrial market. Thailand has not only maintained a high rate of economic growth in recent years, but also has the kind of gas pipeline infrastructure that our business requires. It is furthermore home to the plants of numerous Japanese companies. Recognizing its potential as a large market with remarkable growth within Southeast Asia, we established Osaka Gas (Thailand) Co., Ltd. in September 2013.

On the ground, we began checking the pipeline conditions needed for converting customers to natural gas service. We propose energy service plans that allow us to serve as a one-stop-shop for everything from pipeline construction and gas supply contracts, to the development, new procurement, and repair of natural gas fuel equipment, such as boilers and heating furnaces, as well as the measurement and management of energy usage conditions, and maintenance services, based on our customers' needs. We collect energy service fees from customers based on their energy usage, including energy fees, installation fees, and other service fees. Customers likewise benefit from the introduction of natural gas without any upfront investment, as they are able to reduce costs through energy conservation and have access to a stable supply system, all with the minimum of effort. By utilizing the engineering and problem-solving capabilities cultivated in the domestic industrial market, Osaka Gas is able to exercise its forte in surveying natural gas fuel facilities, and plants as a whole, and proposing efficient energy use systems. We provide carefully tailored services to customers, holding regular energy management workshops for facility managers after our proposals have been accepted. This has allowed us to significantly increase our customer base, particularly among Japanese companies.



In 2015, we entered into a joint venture with Thailand's largest comprehensive gas company, the PTT Group, which engages in activities ranging from natural gas extraction and imports to retail sales. Through this, we established OGP Energy Solutions Co., Ltd., a new company that engages in the energy services business targeting industrial customers. By partnering with PTT, we were able to open up major new sales channels to local companies, and to increase our name recognition and credibility among local Thai companies. This also helped increase our ability to appeal to Japanese companies operating in Thailand.

In FY2016, our goal was to improve our performance not only among Japanese companies, but also among local companies with a growing interest in energy conservation. In addition, through a joint project with a local company, we are exploring the possibility of establishing a gas supply business for natural gas vehicles using biogas. We strive to offer a wide array of helpful services to our customers and to expand our businesses, without being limited to businesses related to natural gas.

Investments in the International Energy Business



Norwegian North Sea
(Idemitsu Snorre Oil
Development Co., Ltd.)

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Sagunto LNG Terminal

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Freeport LNG Terminal
(artist's impression)

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Aurora Solar Power
Generation Project

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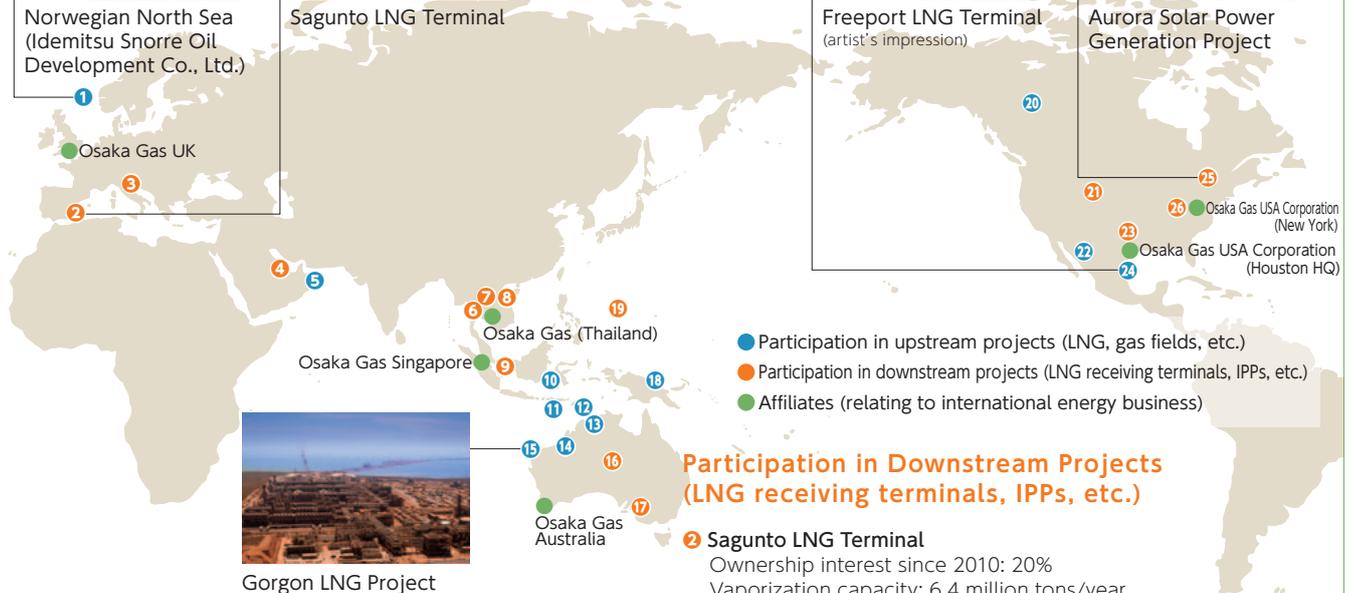
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● Participation in upstream projects (LNG, gas fields, etc.)

● Participation in downstream projects (LNG receiving terminals, IPPs, etc.)

● Affiliates (relating to international energy business)



Gorgon LNG Project

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

- 1 **Norwegian North Sea (Idemitsu Snorre Oil Development Co., Ltd.)**
Stake since 2005: 2-10%
- 3 **Qalhat LNG**
Stake since 2006: 3% LNG output: 3.3 million tons/year
- 10 **Universe Gas & Oil Company, Inc. (Sanga Sanga Gas Field)**
Stake since 1990: 1.5%
- 11 **Crux Gas and Condensate Field**
Stake since 2007: 3%
- 12 **Sunrise LNG Project**
Stake since 2000: 10%
Projected LNG output: about 4 million tons/year (planned)
- 13 **Evans Shoal Gas Field**
Stake since 2000: 10%
- 14 **Ichthys LNG Project**
Stake since 2012: 1.2% Projected LNG output: 8.4 million tons/year (planned)
(Start of production scheduled for 2016)
- 15 **Gorgon LNG Project**
Stake since 2009: 1.25% Projected LNG output: 15 million tons/year (planned)
(Start of production scheduled for 2015)
- 18 **Western Papua New Guinea Gas and Condensate Field**
Stake since 2014: 10-20% (ratio depends on field)
- 20 **Cordova Shale Gas Development Project**
Stake since 2011: 3.75%
- 22 **Pearsall Shale Gas and Liquids Development Project**
Stake since 2012: 35%
- 24 **Freeport LNG Project**
Stake since 2012: 25% (train I)
Projected LNG output: 4.64 million tons/year (planned)

Participation in Downstream Projects (LNG receiving terminals, IPPs, etc.)

- 2 **Sagunto LNG Terminal**
Ownership interest since 2010: 20%
Vaporization capacity: 6.4 million tons/year
- 3 **Erogasmet**
Stake since 2015: City gas distribution business
- 4 **Shuweihat S2 IWPP**
Ownership since 2011: 10% (25% equity interest in the operation and maintenance company)
Power generation capacity: 151 MW Freshwater processing capacity: 10 million gallons/day
- 6 **Osaka Gas (Thailand)**
Stake since 2013: Energy services business
- 7 **OGP Energy Solutions**
Stake interest since 2015: Energy services business
- 8 **NS-OG Energy Solutions**
Ownership interest since 2014: 30% Cogeneration business
- 9 **CITY-OG Gas Energy Services**
Ownership interest since 2013: 49% Gas retail business
- 16 **EII (Energy Infrastructure Investments)**
Ownership interest since 2008: 30.2% Four pipelines, two gas-refining facilities, two power plants, two interconnected power transmission lines
Power generation capacity: 18 MW
- 17 **Hallett 4 Wind Farm Project**
Ownership interest since 2009: 39.9% Power generation capacity: 53 MW
- 19 **Marianas Energy IPP**
Ownership interest since 2005: 100% Power generation capacity: 87 MW
- 21 **Osaka Gas Power America**
Ownership interest since 2005: 8 IPP projects Power generation capacity*: 381 MW
* Excludes 50% interest in 87 MW generation capacity of Marianas Energy IPP
- 23 **Tenaska Gateway IPP**
Ownership interest since 2004: 40% Power generation capacity: 338 MW
- 24 **Freeport LNG Terminal (vaporization business)**
Ownership interest since 2008: 10.81% Vaporization capacity: 13 million tons/year
- 25 **Aurora Solar Power Generation Project**
Ownership interest since 2012: 50% Power generation capacity: 51 MW
- 26 **St. Charles Energy Center Natural Gas-Fired Power Plant**
Ownership interest since 2015: 25% Power generation capacity: 181 MW
(Start of operations scheduled for 2017)

Osaka Gas USA Corporation
(New York)
Osaka Gas USA Corporation
(Houston HQ)