

Natural Gas Value Chain of the Osaka Gas Group

Osaka Gas provides a secure and competitive gas supply by utilizing its strengths as a group that covers both the upstream processes of extracting and transporting natural gas and the downstream processes of producing, supplying, and selling gas. We are now actively exploring ways to expand new business domains both in Japan and internationally that utilize the expertise we have gained through our operations to date to further strengthen the natural gas value chain.

Business Domains of Certain Gas Supply

Upstream Business

Expanding Business Domains



Natural Gas Extraction and Liquefaction ▶



Natural gas is a raw material used in the production of city gas. After the liquefaction processes, the natural gas extracted overseas is imported into Japan as LNG. Currently, the Group has concluded long-term purchase agreements with natural gas suppliers in eight countries worldwide and is working to ensure stable LNG procurement.



LNG Transportation ▶



We are planning to establish our own transportation fleet to enable a more flexible response to changes in demand and other external factors, and to curtail transportation costs.

Strengthening and Expanding the Value Chain

● Extracting Natural Gas Ourselves and Selling It Overseas

▶ Gorgon LNG Project

In addition to procuring natural gas, we participate in several upstream business projects. By expanding our business fields, we are able to procure more cost-competitive LNG.



▶ Freeport LNG Project

In various domestic businesses we utilize highly competitive LNG that Osaka Gas has procured independently, and also sell it to other providers through market trading to increase profits.

● Flexible Use of LNG Carriers

▶ Our Fleet of Eight Ships

By chartering out our LNG tankers we can increase their rate of operation to further contribute to profits.





Business Domains of Osaka Gas Group

Downstream Business



City Gas Production ▶



Imported LNG is stored in tanks and subjected to an evaporation process using the heat from seawater. Gas is then produced by adjusting the amount of heat. The Group produces gas at two LNG terminals—in Senboku and Himeji—aiming to ensure the stable supply of city gas.



Gas Supply ▶



Focusing mainly on the Kyoto, Osaka and Kobe areas, we are developing a gas pipeline network that covers the Kansai urban region, ensuring the stable delivery of gas to customers through this network. At the same time, the Group actively promotes disaster countermeasures, particularly in connection to earthquakes and tsunamis.



Sales and Services ▶



We offer optimal proposals to meet a wide range of demand, from residential hot water and heating systems, to factory and office heating/cooling and combustion systems.

Securing Highly Competitive Power Sources

▶ Senboku Natural Gas Power Plant

We also put to work our gas production facilities and operational expertise in the electric power business. Using cost-sharing, moreover, we can secure competitive power sources, thereby contributing to group profits.



Developing Energy Services

▶ Energy Service Business in Southeast Asia

We are utilizing the engineering expertise gained in Japan to provide energy services in Thailand. We have also begun sales of gas to non-residential customers in Singapore. These are two examples of our international business development.



Energy Supply Across a Broad Area

▶ The Himeji-Okayama Gas Pipeline Opens

The Himeji-Okayama Gas Pipeline opened in March 2014. We are aiming to secure new demand in areas along the pipeline that lie outside our current city gas supply area.



Business Climate Surrounding the Osaka Gas Group

Characteristics of Natural Gas

Environmental Friendliness of Natural Gas

Natural gas, a fossil fuel like petroleum and coal, is an energy resource which contains methane as its principal component. A major advantage of natural gas over petroleum and coal is its low emissions of carbon dioxide (CO₂), a cause of global warming. When it is burned, natural gas emits only limited amounts of nitrogen oxides (NO_x), a contributing factor in air pollution, because of its low nitrogen content, and emits no sulfur oxides (SO_x), which are a contributor to acid rain.

Prospects for Natural Gas

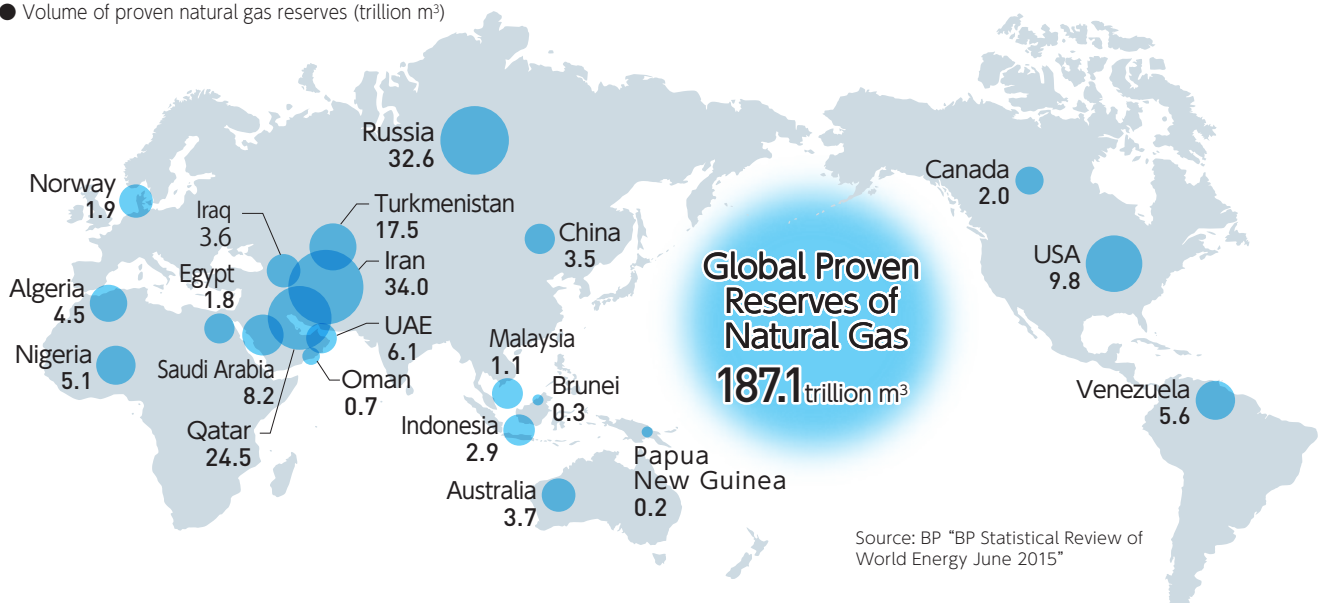
Against a backdrop of increasing demand for energy in emerging countries, the expanding use of natural gas as a non-conventional energy source, and changing conditions in electricity supply and demand in Japan, natural gas has been growing in importance. The International Energy Agency (IEA) projects that demand for natural gas will grow sharply through 2040, when it will account for around 25% of primary energy consumption worldwide.

Supply Stability of Natural Gas

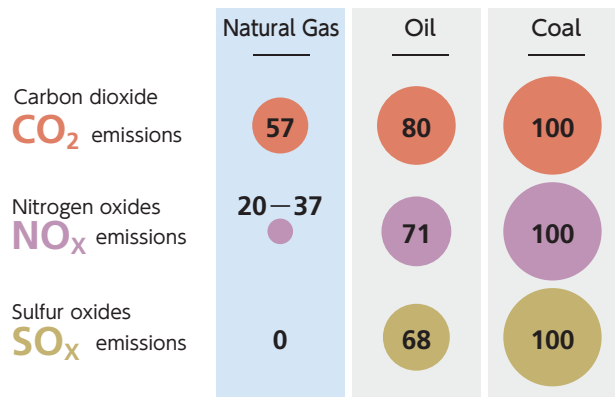
Abundant reserves of natural gas have been discovered around the world, making it likely that a stable supply of natural gas will be available to meet growing demand. Proven reserves of natural gas are sufficient to satisfy global demand for more than 50 years.

Nations with Major Natural Gas Reserves

● Volume of proven natural gas reserves (trillion m³)

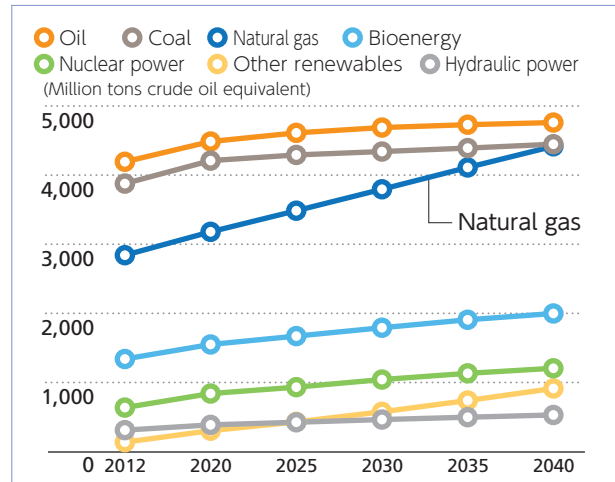


Comparison of Amount of Emissions with Coal as 100



(CO₂ figures) The Institute of Applied Energy, "Report on Thermal Power Plant Atmospheric Impact Assessment Technology Demonstration Surveys" (March 1990) (SO_x and NO_x figures) International Energy Agency (IEA), "Natural Gas Prospects to 2010" (1986)

Primary Energy Consumption Forecasts (Global)



Sources: World Energy Outlook 2014 Global Energy Trends

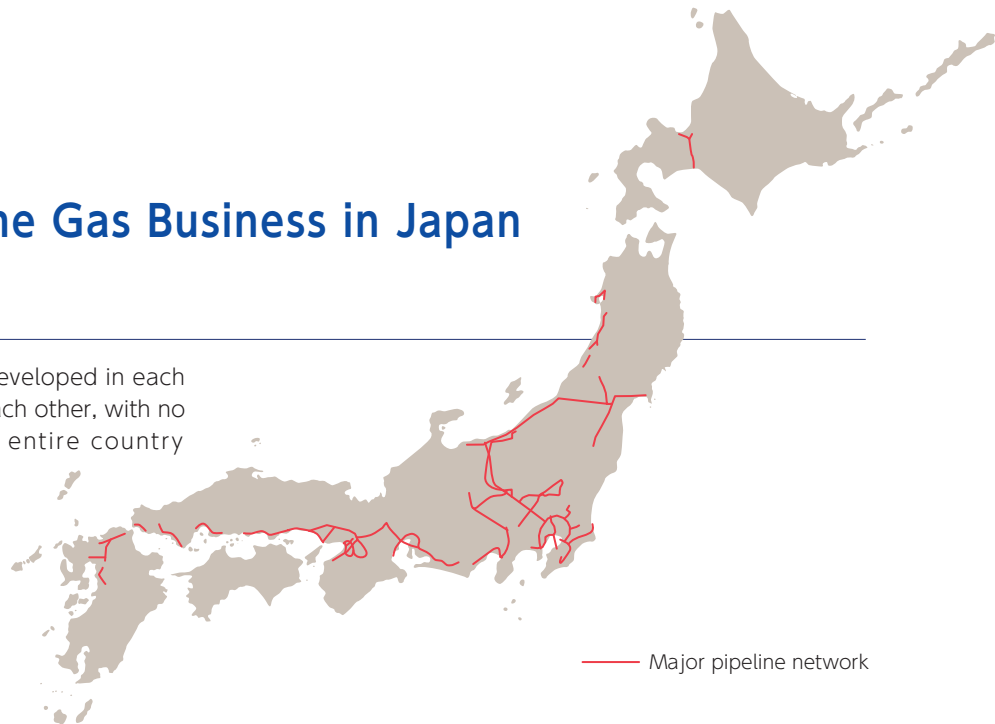
Characteristics of the Gas Business in Japan

Gas Pipeline Networks

Gas pipeline networks have been developed in each region of the country, separate from each other, with no trunk line running throughout the entire country connecting local networks.



Pipeline open-cut construction work



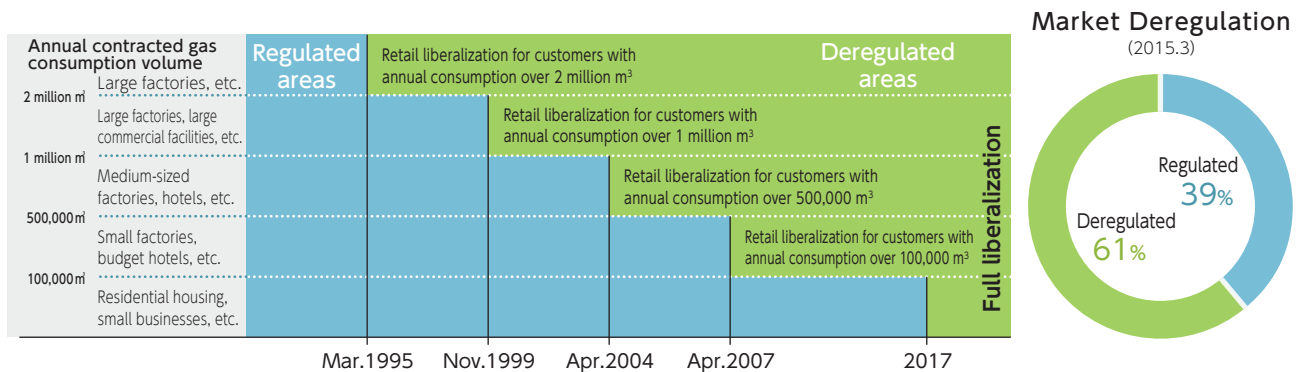
Major pipeline network

Transition to Liberalization of the Retail Gas Market

Liberalization of the retail gas sector began in 1995, and the scope of liberalization has expanded in phases since then. Currently, customers that have annual gas consumption contracts in excess of 100,000 m³ (46

MJ/m³) fall within the scope of liberalization.

The revised Gas Business Act will be adopted and enacted by the Diet in June 2015, and full liberalization will take place in 2017.



Fuel Cost Adjustment System

The purchasing prices of LNG and LPG, both raw materials for the gas supplied to customers, fluctuate in accordance with movements in foreign currency exchange rates and the price of crude oil. The mechanism for determining gas rates is referred to as the Fuel Cost Adjustment System. In addition to reflecting external factors in gas rates, this system is

designed to clarify the results of efforts in enhancing operating efficiency in areas other than raw material costs. Due to its structure, it also causes a time lag before price fluctuations of raw materials are reflected in gas rates, which impacts performance on a single fiscal-year basis. However, these impacts are neutralized over the medium to long term.

System Reflecting Changes in Resource Costs in Gas Rates (example) ←→ Time lag

