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# Steady Advances in Three Areas of Diversification for Resource Procurement

—Preparations for Importing LNG from the United States



### Procurement from the Cove Point LNG Project

In April 2013, Tokyo Gas entered into a Heads of Agreement for Sale and Purchase that enables it to procure LNG from the Cove Point LNG Project in Maryland State, in the United States. This agreement marked the conclusion of the Company's first long-term LNG procurement contract to have procurement prices linked to the U.S. natural gas market through the use of the Henry Hub index. The Cove Point LNG Project is being developed jointly with Sumitomo Corporation. Natural gas procured from the U.S. market through this project will be liquefied and then exported out of the country as LNG. Cove Point is a project of particular significance to Tokyo Gas as it represents a large step forward in the three areas of diversification described in the Company's resource procurement strategy. In this section, we explain in detail the significance of this project.

### The Company's Three Areas of Diversification

Tokyo Gas is advancing an LNG resource procurement strategy that defines three areas of diversification. These areas are: diversification of resource suppliers; diversification of procurement contract conditions; and diversification of our global LNG network. By pursuing these types of diversification, Tokyo Gas will seek to secure stable supplies of affordable resources into the future.

#### 1 Diversification of Resource Suppliers

Currently, Tokyo Gas has long-term procurement agreements to import LNG from 10 projects in five countries. By further diversifying the range of resource suppliers, the Company aims to increase its options, boost bargaining power, and mitigate risks through dispersion. We are not limiting ourselves to conventional LNG projects in this pursuit. Rather, floating LNG projects and other projects employing new technologies are also being considered as options for advancing the diversification of resource suppliers.

Tokyo Gas LNG Imports by Country

Location	Thousands of tons			Composition
	FY2011	2012	2013	
Malaysia	4,479	4,409	<b>4,767</b>	(37.2%)
Australia	2,264	3,379	<b>3,992</b>	(31.2%)
Brunei	1,362	1,439	<b>962</b>	(7.5%)
Indonesia	1,011	835	<b>614</b>	(4.8%)
Russia	1,678	1,682	<b>1,813</b>	(14.2%)
Qatar	290	235	<b>325</b>	(2.5%)
Other	826	734	<b>330</b>	(2.6%)
Total	11,910	12,712	<b>12,804</b>	(100.0%)

## 2 Diversification of Procurement Contract Conditions

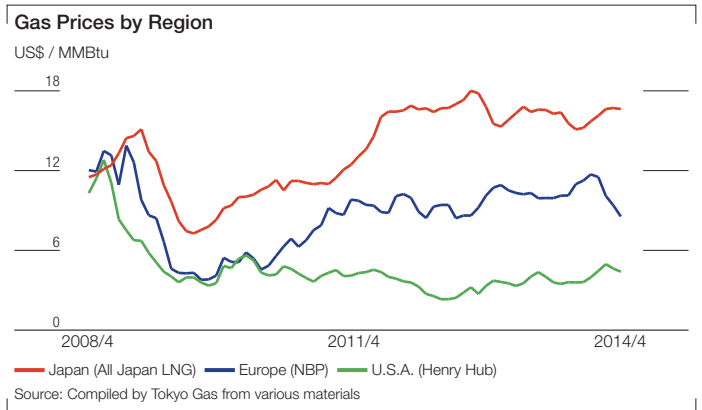
Previously, LNG procurement was mainly conducted through traditional contracts with prices linked to the price of crude oil. Going forward, however, we will also employ procurement contracts with prices linked to U.S. and European natural gas indexes. We are also pursuing diversification in terms of contract periods and other detailed conditions. Specifically, short-term and medium-term procurement contracts are now being considered, when long-term contracts used to be the main focus, and contracts with free destination clauses are being concluded, a departure from the traditional contract conditions that forbade reselling procured LNG to a third party without the permission of the seller. This diversification in contract conditions will enable the Company to stabilize procurement prices by building a portfolio that includes contracts linked to different indexes. In addition, more flexible contract conditions will open the door for LNG to be sold to different markets when our supplies are in surplus.

## 3 Diversification of Our Global LNG Network

At present, there is a disparity between LNG prices in different parts of the world. However, the impacts of this disparity can be lessened by constructing sales channels that link Asia to North America and Europe. Furthermore, by linking overseas upstream businesses with such downstream businesses as power generation, we will be able to divert LNG intended for generation purposes to be used as city gas when the supply and demand situation is tight. In this manner, we aim to create a framework for realizing the flexible trade of resources.

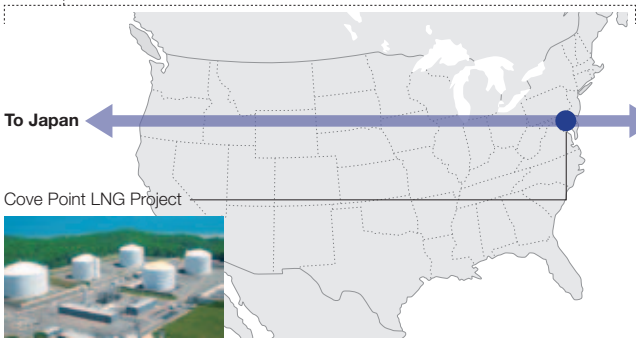
### Background for Three Areas of Diversification

Currently, it is common for LNG to be procured through a pricing framework that links the price of LNG to the price of crude oil, which means that a rise in the price of crude oil will result in a subsequent rise in the price of LNG. This situation is compounded by Japan's lack of alternative energy sources and Asia's lack of pipeline networks, like those used to supply natural gas in North America and Europe without using LNG. Due to this situation, LNG buyers in Asia suffer from a lack of bargaining power, and the region has thus been forced to accept LNG prices higher than those in the United States and Europe, creating an "Asia premium" on LNG. Even faced with such pressures, Tokyo Gas has continued to strike hard bargains with LNG sellers with the aim of procuring more affordable gas.



### Significance of the Cove Point LNG Project

- 1 The procurement of LNG from the United States, where long-term contracts are not concluded at the moment, will advance the diversification of resource suppliers.



- 2 Contract agreements provide for LNG prices linked to the Henry Hub U.S. natural gas price index, which is holding stable at approximately US\$4 / MMBtu, allowing LNG to be procured at prices that are lower than previously available, even if liquefaction and transportation costs are added on top of the LNG prices. Also, the diversification away from crude oil price linked contracts will allow procurement prices to be stabilized under various circumstances.

- 3 Contract conditions allow for procured LNG to be resold to third parties. Supply to Japan will remain our first priority; however, should LNG stocks in Japan be in surplus, this LNG could be sold to other markets in need.

Due to these factors, the Cove Point LNG Project is advancing diversification in all three areas.

## Focus Story

### Steady Advances in Three Areas of Diversification for Resource Procurement —Preparations for Importing LNG from the United States

#### Future Outlook

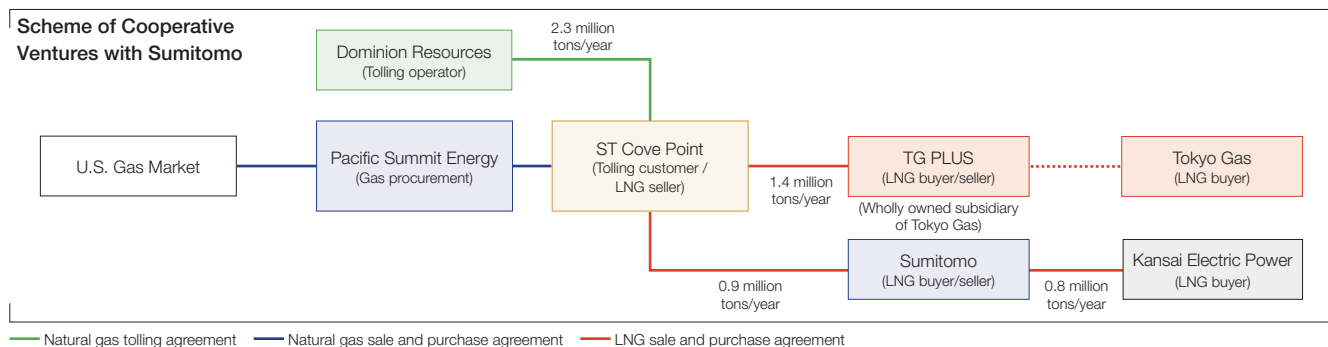
As there are currently no free-trade agreements between the United States and Japan, in order to procure LNG from Cove Point, Tokyo Gas was required to receive LNG export approval from the U.S. Department of Energy. This approval was received on September 11, 2013 (EDT). Going forward, we will advance the necessary measures to get the project producing and to commence export to Japan in 2017.



Cove Point LNG Project

#### Deeper Project Involvement

In February 2014, joint venture company ST Cove Point LLC was established through the respective subsidiaries of project partner Sumitomo Corporation and the Company. ST Cove Point will also be responsible for contracting liquefaction to Dominion Cove Point LNG, LP. The investment by Tokyo Gas in ST Cove Point represents a deeper level of project involvement for the Company. Whereas our role has previously been limited to purchasing or holding a partial stake, we will participate in the Cove Point LNG Project by dealing directly with liquefaction facility operators and arranging transportation vessels. Through such hands-on involvement, we aim to procure LNG more stably and with greater transparency with regard to the price of shipments.



#### Acquisition of Upstream Shale Gas Interests

In April 2013, Tokyo Gas acquired a interests in a shale gas development project in the Barnett basin, in the U.S. state of Texas. These interests were acquired from Quicksilver Resources Inc., the operator of the project, and represents our first upstream interest in the United States. At present, the Barnett basin project is producing approximately 275 million cubic feet per day (natural gas equivalent) of shale gas and natural gas liquids to be marketed in the United States. A total of US\$485 million was paid to acquire 25% working interests in this project through TG Barnett Resources LP (TGBR), a wholly owned subsidiary of Tokyo Gas America Ltd., and it is estimated that these interests will entitle the Company to receive between 350,000 tons and 500,000 tons of gas resources a year in LNG equivalent. Roughly one year has passed since we commenced participation in this project. We continue to see smooth production at gas fields, and we are accumulating a great deal of knowledge through our involvement.



Shale gas development project in the Barnett Basin

Upstream areas are positioned as a core focus of overseas businesses. In addition to generating stable returns, upstream investments also help increase resilience to resource price fluctuations, thereby stabilizing the overall earnings of the Tokyo Gas Group. Specifically, the price of resources procured from the Cove Point LNG Project and the natural gas sold by TGBR are both tied to the Henry Hub index. This situation makes our earnings more resilient to fluctuations in the Henry Hub index as any change in the price of procuring LNG from the U.S. market will be offset by an equal change in the price at which TGBR sells natural gas in this market. In addition, as the project advances, we are actively sharing information with operators through such venues as monthly meetings regarding operations, natural gas sales, or other matters. For this reason, our involvement in this project is enabling us to develop expertise in this upstream area.

## On-Site Progress toward Realizing the “Challenge 2020 Vision”

### Resource Procurement

General Manager,  
Energy Resources  
Planning Section,  
Gas Resources  
Department

**Satoshi Tanazawa**



### I am persistent in negotiations, always aiming to capture better procurement conditions.

Tokyo Gas procures more than 12 million tons of LNG each year. At the Energy Resources Planning Section of the Gas Resources Department, we strive to procure resources flexibly as necessitated by fluctuating gas demand. In this endeavor, we coordinate with relevant divisions, such as those related to LNG receiving terminal operations and sales. Always committed to receiving more affordable and flexible procurement conditions, we persistently negotiate with various sellers. The three areas of diversification for resource procurement advocated by the “Challenge 2020 Vision” are at the forefront of our minds in these negotiations. Traditionally, procurement contracts have been centered on Southeast Asia and Australia and were generally long-term agreements that came with crude oil linked prices. However, we are broadening our view to include the entire world, seeking out new projects and negotiating with new sellers to capture procurement contracts with a more diverse range

of conditions. We are persistent in negotiations regarding existing contracts as well, making strong pushes toward revised agreements that grant us better conditions.

For example, we have concluded a natural gas tolling agreement and an LNG sale and purchase contract with the U.S. Cove Point LNG Project. We later received approval from the U.S. Department of Energy to export LNG to countries with which the United States does not have free-trade agreements. Japan is one such country. This is a stride forward in all three areas of diversification. After the project commences operations in 2017, we anticipate that it will be an invaluable asset in our efforts to stably acquire affordable LNG.

We also must look at the possible electricity and gas system reforms. These reforms will potentially agitate demand fluctuations, and we therefore feel the need to strengthen coordination with relevant divisions to prepare for these changes. As demand fluctuations become more pronounced in the future, flexible procurement alone will not be a sufficient response. We will need to be able to employ a wider range of options that includes reselling resources should our stock exceed the demand in our service area. From this perspective as well, the creation of an optimal procurement portfolio is an urgent task for Tokyo Gas, and we are constantly pursuing progress in this area.

Japan is forced to procure LNG at higher prices than other regions, which is no doubt a factor behind the country's growing trade deficit. For this reason, the procurement of a stable supply of affordable LNG is not only crucial for the Company's operations; it also represents an important obligation toward society. While I recognize that these issues will not be resolved overnight, I will remain vigilant and work to procure economically sound energy, in order to contribute to economic development in Japan.

### Overseas Businesses

Tokyo Gas America Ltd.  
Director,  
General Manager of  
Houston Office

**Koji Yoshizaki**



### I will create new, upstream business opportunities for natural gas.

At Tokyo Gas, upstream businesses are advanced through coordination between the Tokyo Head Office and local subsidiaries in Australia and North America. As the Company's U.S. subsidiary, Tokyo Gas America is mainly responsible for developing and managing the Company's upstream resource interests in the United States. Here, the shale gas revolution is expected to result in the majority of the country's natural gas being supplied through shale gas by 2040. The price of this gas is expected to remain consistently stable over the long term as well. Furthermore, natural gas demand is anticipated to grow substantially in this country for various applications, including generation and industrial applications, as well as for export as LNG.

Currently, the operation and management of the shale gas development project in the Barnett basin is progressing without a hitch. In addition, we are leveraging the location utility of our office positioned in Houston, Texas, the energy capital of the world, and coordinating with

LNG Upstream Sect. to uncover new candidate projects for investment. However, even faced with appealing projects, we take a cautious approach. By tapping our experience and human networks, we scrutinize such projects to identify hidden risks and other pitfalls.

Our participation in the Barnett basin project is a result of information acquired through our human network. We had initially planned to invest in a different project, but the negotiations led us to consider Barnett with Quicksilver Resources Inc. and finally resulted in us choosing this project instead. This experience reaffirmed to me the importance of constantly expanding such networks, in addition to one's view field, while considering a wide range of options.

In the shale gas development project in the Barnett basin, approximately 1,000 shale gas wells are currently in operation, and we expect that several additional wells will be opened each year, gradually expanding production volumes at this project. Participation in new well openings is left to the discretion of each participant. We make these decisions quickly and after careful evaluation of the business feasibility of each well. We currently contract Quicksilver Resources to sell natural gas produced at this project in the U.S. market, but we are considering the possibility of conducting sales directly in the future.

The number of opportunities to participate in upstream resource projects is growing in North America. Globally as well, chances for participating in natural gas projects are expected to increase as resource development commences in new regions, such as Africa, and through new development methods, such as floating LNG projects. The “Challenge 2020 Vision” defines the goals of reducing resource costs, constructing a global LNG value chain, and growing overseas businesses to the extent that they account for 25% of total net income. I hope to create new business opportunities to move us closer toward achieving these goals, and I will do this through close coordination with our team in Japan.

## 2 Fuel Conversion as Promoted by Tokyo Gas



Tokyo Gas is cultivating demand for city gas by promoting fuel conversion to natural gas. In this section, we introduce an example of how we are accelerating demand cultivation in the Kashima Waterfront Industrial Zone.

Asahi Tostem Exterior Building Materials Co., Ltd.'s Kashima Plant

### Kashima Plant, Asahi Tostem Exterior Building Materials Co., Ltd.

#### Obstacles to Fuel Conversion

Ceramic siding is a material commonly used in the outer walls of housing. It is also the main product of Asahi Tostem Exterior Building Materials Co., Ltd., a company that we recently guided through the processes of fuel conversion. Ceramic siding is made by sterilizing raw clay materials in a high-temperature, high-pressure steamer known as an autoclave and then by molding and drying these materials. After drying, the clay is glazed and dried again. This process is repeated to finish products. A gas-fired furnace is used in the drying process.

Asahi Tostem's Exterior Building Materials' Kashima Plant had originally used LPG to fuel its drying furnace. After the opening of the Company's Chiba-Kashima Line, however, the plant began considering fuel conversion to city gas in light of a proposal we had made. The maintenance processes associated with using LPG were expensive and time consuming, and the plant's facilities were in need of replacement. These were factors considered in the decision to undertake fuel conversion.

The troublesome maintenance and other procedures associated with LPG created significant costs and time losses in plant operations. As LPG was stored in tanks and then supplied as gas to furnaces, appropriate management of LPG stocks and orders was necessary. Tanks, gasification equipment, pipes, and other facilities also had to undergo daily inspection with legally mandated inspections sometimes required. The Kashima Plant had high expectations that the introduction of city gas would alleviate these issues. However, the plant also faced a number of obstacles in undergoing this fuel conversion. For example, several kilometers of piping needed to be installed, and production line downtime had to be minimized so as not to interfere with the plant's duty of supplying products.

"It was a daunting task," recalls Section Chief Nakata, manager in charge of the project. Through extensive discussions, Asahi Tostem Exterior Building Materials and Tokyo Gas sought out a solution to the issues.



From left: Kimijima (Tokyo Gas), Section Chief Nakata (Asahi Tostem Building Materials), Kashima Plant Manager Kokubo (Asahi Tostem Building Materials), and Aihara (Tokyo Gas)



Drying furnace

## Concentrated Effort of More Than 200 Workers

The solution came in two parts. First, we would use the existing LPG pipes in order to minimize renovations to the drying furnace and limit costs. Second, we would finish the conversion through a concentrated effort over a period of roughly 10 days. With this decision made, we began conducting the various preliminary studies and tests that were necessary, a process that took a year and a half. "My greatest concern was calorie adjustment," reflects Kashima Plant Manager Kokubo. In March 2013, a coordinated team of more than 200 workers, consisting of gas supply and facility modifying teams from Tokyo Gas as well as specialists we had recommended for the project, jumped into action at the command of Section Chief Nakata. City gas flowed into the drying furnace 10 days later, right on scheduled, allowing all production lines to be restarted simultaneously. The cost of the conversion was also 20% less than would normally be required.

Section Chief Nakata had praise for our efforts, saying, "This success was a result of the people at Tokyo Gas and their masterful installation techniques." Meanwhile, Kashima Plant Manager Kokubo offered words of encouragement, "The benefits of the maintenance cost reductions were just as I had anticipated. In the future, I hope Tokyo Gas will be able to seek out more affordable natural gas to reduce the price of LNG."

For the Kashima Plant, planning this undertaking while continuing normal operation would have been a herculean task to surmount with their limited manufacturing staff. However, by outsourcing the planning, scheduling, and implementation of this project to Tokyo Gas, the plant was able to undergo fuel conversion without incurring additional labor requirements. This fact is significant in and of itself.

For Tokyo Gas, this project serves as a prime example of how we can muster our collective strength to remove obstacles to fuel conversion and provide comprehensive support in areas ranging from energy provision to consumption.



Siding is a manmade building material primarily created from cement that is applied to the outer walls of houses. Common types of siding include ceramic siding and metal siding (photograph is an example of ceramic siding).

### Asahi Tostem Exterior Building Materials Co., Ltd.

Asahi Tostem Building Materials is an external building material manufacturer created through the integration of the exterior building material operations of Asahi Glass Co., Ltd. and Tostem Corporation (currently LIXIL Corporation). The company provides various functional and aesthetically pleasing products—ranging from ceramic and metal sidings to other exterior building materials and roofing materials—that create comfortable living environments.

## On-Site Progress toward Realizing the "Challenge 2020 Vision"

### Sales

General Manager,  
Energy Service  
Promotion Section,  
Industrial Gas Sales  
Department

Shingo Nagashima



### I will drive the transformation from a gas supplier to an energy solutions partner.

To contribute to the realization of the "Challenge 2020 Vision," the Industrial Gas Sales Department is advancing three priority measures: encouraging fuel conversion, spreading the usage of cogeneration systems that match customer needs and feature high total efficiency, and expanding operations in the new field of energy services.

In the near future, it can be expected that a number of new players will enter the gas market. As such, we will have to abandon the assumption that customers who want to use gas will naturally select Tokyo Gas. In my

department, we aim to have users choose Tokyo Gas as a solutions partner, and therefore we are putting incredible effort into providing energy services that combine energy provision with solutions. One such solution is "TG Miru Net". This service helps track energy consumption rates and facility efficiency to contribute to energy savings and cost management. Customers using this service have offered very high opinions. We also hope to have customers view our technologies firsthand at the "Asu Times Laboratory", and we are steadfastly promoting visitation. Created through a combined effort by sales and technology divisions, this permanent exhibit enables people to view the combustion and other technologies used by Tokyo Gas. Numerous visitors have expressed how they view Tokyo Gas as a partner that provides solutions to their problems. I therefore believe that the Company is successfully cultivating a corporate culture that equates good service with earnings.

Going forward, we will develop a deep understanding of customers' production processes and future refine "TG Miru Net" to create more valuable solutions for contributing to quality improvements and cost reductions. In addition, we are investigating the possibility of constructing a business model that combines the supply of gas and electricity with energy solutions. In these ways, we are preparing for the impending full deregulation of the market. By expanding high-value-added services and utilizing these services in sales, we aim to grow Tokyo Gas into the No. 1 energy solutions provider in Japan, a company that can win out against any rival.

\* TG Miru Net: This energy traceability service tracks the flow rate and pressure of gas and steam and uses this data to measure energy usage levels, equipment operating rates, and energy consumption rates of factories and facilities. Reports can be prepared based on user needs, making this system a viable tool for helping conserve energy and maintain facilities.

3

Continually Growing Electric Power Business  
—Ohgishima Power Station



Characteristics of the Ohgishima Power Station

1 State-of-the-Art GTCC Generation Method

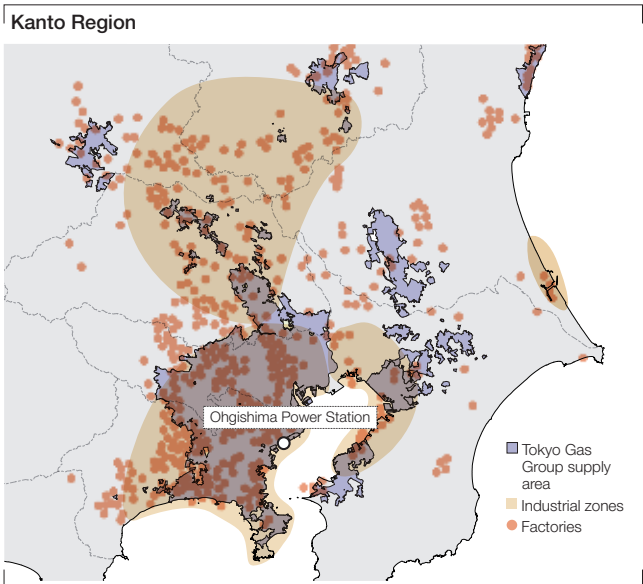
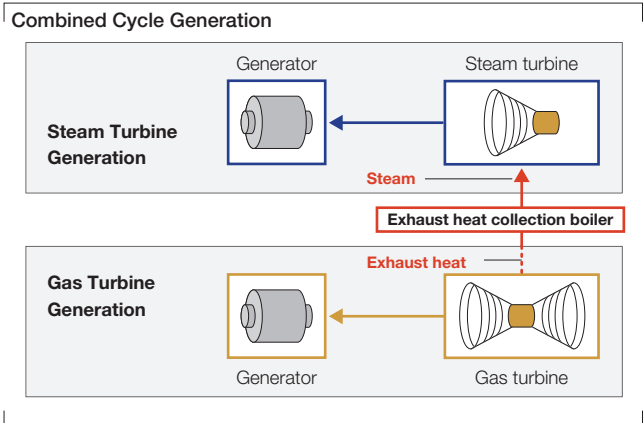
The Ohgishima Power Station's gas turbines use the state-of-the-art gas turbine combined cycle (GTCC) generation method. Under this method, exhaust heat from a gas turbine's generation process is recovered and used to power a steam turbine to generate additional power. As a result, generation efficiency is significantly higher (record high of 58% realized at the Ohgishima Power Station) than simple cycle generation, which cannot utilize steam power.

2 Close Proximity to High Demand Areas

The Ohgishima Power Station is situated in Kawasaki City, in Kanagawa Prefecture. The prefecture and the surrounding Kanto region are densely populated by industrial zones, such as the Tokyo–Yokohama Industrial Zone, and electricity demand is robust as a result. Electricity differs from gas in the fact that it cannot be stored, and it is therefore necessary to adjust generation levels in conjunction with demand fluctuations. Electricity also incurs large losses during transmission. For these reasons, a location close to high demand areas is a great advantage for an electric power business.

3 Neighboring LNG Terminal

The Ohgishima Power Station neighbors the Company's Ohgishima Terminal. The close proximity to this LNG receiving terminal means that the power station can be easily supplied with the natural gas it uses as fuel. In addition, the Ohgishima Terminal can be contracted to conduct generation within its facilities, thereby ensuring efficient operation with low costs.



## Ohgishima Power Station's Third Unit

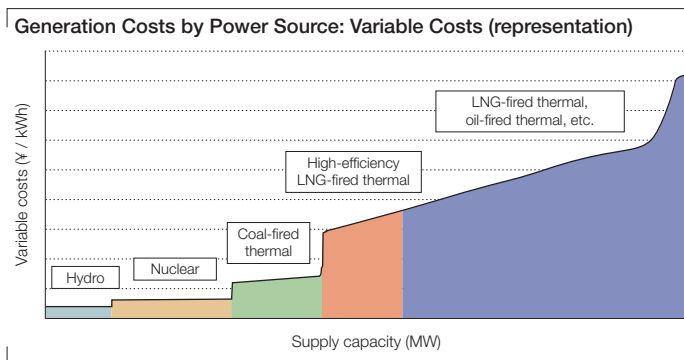
### 1 Construction of the Third Unit

In addition to the two units already operating at the Ohgishima Power Station, Tokyo Gas is constructing a third unit. Scheduled to commence operation in fiscal 2015, this unit will have a generation capacity of 407 MW, which will raise the overall generation capacity of the power station from the current 814 MW to 1,221 MW. As the supply and demand situation for electricity remains tight in the Tokyo metropolitan area, the highly competitive power we supply will continue to benefit from robust demand, enabling us to contribute to a stable supply of electricity.

### 2 Continuation of Tight Electricity Supply and Demand Situation after Fiscal 2015

Some stakeholders have expressed concern that the construction of a third unit at the Ohgishima Power Station could result in a supply glut. The basis for this concern is the possibility of Japan's nuclear power plants being restarted, which would likely result in an easing of the supply and demand situation for electricity.

The Company's highly efficient natural gas-fired thermal power plants boast incredible cost competitiveness when compared with older oil-fired and LNG-fired thermal power plants. It can be expected that buyers will choose to fill demand by first using lower-cost power sources. For this reason, we anticipate that demand will be lost for older model thermal power plants should nuclear power plants be restarted. It is difficult to imagine a situation in which we could not find buyers for the electricity from the Company's highly efficient natural gas-fired thermal power plants.



## On-Site Progress toward Realizing the “Challenge 2020 Vision”

### Electric Power Business

General Manager,  
Power Strategy Section,  
Total Energy Business  
Department

Shinya Nishigata



### I will be both bold and calculating in advancing the electric power business.

The Company's “Challenge 2020 Vision” defines the goal of raising our domestic generation capacity to between 3,000 MW and 5,000 MW. Our first step toward realizing this goal is the construction of the Ohgishima Power Station's third unit, which is scheduled to commence operations in fiscal 2015. Going forward, we will examine various options for achieving the vision's goal.

In expanding generation capacity, the strength of Tokyo Gas lies in its ability to use its LNG procurement capabilities as well as its LNG terminals, pipelines, and other infrastructure to develop and operate natural gas-fired thermal power plants that utilize highly efficient combined cycle generation methods. While leveraging this strength to its full extent, we will also build a strong power supply portfolio to boost the competitiveness of the

electric power business, with base power sources like coal-fired thermal included among the options. Collaboration with capable partners will also be considered as a way of advancing this quest in the future.

However, expanding the scale of our power generation operations will not be easy. Currently, the environment surrounding energy in Japan is highly opaque, particularly with regard to trends in electricity and gas regulatory systems, the possible timing for the restart of nuclear power plants, and medium-to-long-term electricity demand growth. In all honesty, it is difficult to project what the electricity supply and demand situation and market prices for electricity will look like even a year down the line.

In this unclear environment, we must make difficult decisions regarding the construction of large-scale power plants, which entail massive investments and require a period of seven or eight years before a plant can be brought on stream. Even looking at the large-scale natural gas-fired thermal power plants Tokyo Gas is currently operating, we will see that circumstances surrounding energy changed substantially after their construction was approved. Moreover, there are a variety of opinions and perspectives within the Company, and the decisions themselves are not easy.

Nonetheless, I believe that no matter how the operating environment for energy may look, there will be business opportunities to be found therein. In seeking out these opportunities, it is crucial to develop scenarios based on various projected changes in the environment, and these scenarios will need to be carefully examined. We must then formulate strategies that will allow us to respond flexibly, even if a serious risk materializes. In the coming age of unprecedented uncertainty, this type of bold and calculating approach will be more important than ever to developing business operations.