Tokyo Gas Group Management Vision

Compass 2030

Providing energy and solutions to the future of our life, society and the earth

November 27, 2019

Tokyo Gas Co., Ltd.
Tokyo Gas has led the way to the age of city gas.

In 1969, Tokyo Gas became the first company to introduce LNG in Japan. We constructed LNG receiving terminals, a main circular and a subsea trunk pipelines. Over the course of 17 years, we also visited and achieved the calorific value change to supply city gas with a high calorific value for 5.5 million customers.

In the half-century since, we have led Japan and the rest of the world in promoting more widespread use of this new source of energy, through a stable supply and new products and solutions that include manufacturing using clean natural gas, urban development through smart energy networks, and lifestyle design using new technologies such as fuel cells. In this way, Tokyo Gas has led the way to the age of natural gas. Creating innovative change through energy and achieving a sustainable society is very much in the Tokyo Gas Group’s DNA and is in line with both the spirit of the United Nations Sustainable Development Goals (SDGs) and the strongly held desire of the founder of Tokyo Gas, Eiichi Shibusawa, who valued common good.

We are on the cusp of a new age of innovation in the lead-up to 2030.

In the new digital age that is causing profound changes in work and lifestyles, values are also continuing to evolve, and people are less concerned with “what one has” while placing more importance on “what one experiences” and “what one feels.” In addition, progress in the decentralization and deregulation of energy has resulted in a fierce competition in terms of various models for providing added value.

At the same time, climate change and other problems affecting society have also become increasingly severe, and decarbonization has become a major trend. Moreover, as exemplified by the SDGs, people have come to naturally view such issues that affect societies and the world as issues that affect them personally.

Amidst these major changes, we feel that the ten-year period leading up to 2030 is one in which we must question the proper roles for both energy and energy suppliers.

The Tokyo Gas Group is ready to tackle new challenges.

In preparation for the next half-century, the Tokyo Gas Group has formulated its “Compass 2030” management vision outlining the course that should be pursued in this age of uncertainty. As the management decided 50 years ago, Compass 2030 states the Group's determination to take on this new challenge.

Natural gas, one of the pillars of the Tokyo Gas Group’s business, is expected to play an even larger role due to its stability, environment-friendly nature, and economic viability, as well as its affinity for use in combination with inherently unstable renewable energy sources. We will continue to provide such of natural gas to our customers.

At the same time, however, as a leading company dealing in natural gas (a fossil fuel), we feel it is our responsibility to deal forthrightly with the issue of climate change. The Tokyo Gas Group will combine natural gas with renewable energies and other new technologies to provide solutions for our life, society and the earth.

In this way, the value that will be created by the Tokyo Gas Group will be working with customers, business partners and society as a whole to identify and resolve problems and to quickly and flexibly provide energy and solutions.

We will strive to become a corporate group that uses the various strengths of each partner to tackle new challenges and create greater value through encounters with diversity. The result will be the achievement of personal growth, corporate growth and sustainable growth for society.

By “Providing energy and solutions to the future of our life, society and the earth,” together with the society as a whole, the Tokyo Gas Group will explore to the future.
2 Environmental awareness and our future goals

- The Tokyo Gas Group, while maintaining S+3E* as the bedrock of its business activities, recognizes changes in the market environment as a major opportunity for growth in the lead-up to 2030.

Our goal will be a business group which continues to create value together with our customers, business partners and society as a whole while becoming a leader in the future energy systems.

Noteworthy changes in the market environment

(1) Decarbonization
- Increased desire for decarbonization on the part of the general public worldwide
- Increase in the number of companies participating in the RE100 initiative, etc.

(2) Digitalization (rapid technical innovation)
- Changes in how people purchase and communicate in their daily lives
- Changes in the efficiency of work processes and work styles in business

(3) Diversification of customer
- Change from “things” to “experiences” and “value” in consumption behavior
- Increase in the number of “prosumers”** due to increased decentralization

(4) Deregulation in Energy Market
- Increased competition between energy providers
- Changes in industry structure that transcend industrial sectors (market entry by companies in different industries such as telecommunications, railways, IT and so on)

S+3E: The “Golden Rules” for Energy

Certain achievement of the energy mix*** leading up to 2030 natural gas — with its outstanding stability, environment-friendliness and economic viability — will become even more important in the global energy market.

* S+3E: Safety + Energy security, Economic efficiency and Environment
** Prosumer: Consumers who engage in production activities (for example, consumers who own power generation equipment and sell the power they generate)
*** Energy mix: Policy objectives for energy supply and demand in FY 2030 as indicated in the Strategic Energy Plan of Japan
Three Challenges

1: Leadership in the effort to achieve Net-Zero CO₂

2: Establishment of a value co-creation ecosystem

3: Transformation of the LNG value chain

In addition to providing value in retail sales of city gas, the Tokyo Gas Group, working with its customers, business partners and society as a whole, will create and provide various types of value in each function of the LNG value chain.
Challenge 1: Leadership in the effort to achieve Net-Zero CO₂

- In its overall business activities, the Tokyo Gas Group will work to achieve Net-Zero CO₂ emissions including customer emissions and lead the transition to a decarbonized society.
- We will use technologies and expertise for the effective use of natural gas to promote decarbonization in the electricity and heat sectors as well as for CO₂ capture technologies.
- We will contribute to reduce carbon emissions on the scale of 10 million tons by 2030 (which exceeds Japan’s target ratio*) and lead the way to reducing CO₂ emissions on a global scale.

<Efforts to achieve Net-Zero CO₂ in the Tokyo Gas Group’s style>

1: Zero emissions
- Expanded use of renewable power sources
- Development of decarbonization technologies for gaseous energy

2: Zero emissions achieved through offsetting
- Effective use of natural gas (reduced energy consumption through efficient use of natural gas, coordination with the fluctuating output of renewable energy sources)
- Use of CCUS** technologies (capture of emitted CO₂)
- Incorporation of successful reduction efforts overseas

* Japan’s reduction target ratio: The greenhouse gas reduction target in the Intended Nationally Determined Contribution submitted to the United Nations (26% reduction in FY 2030 as compared to FY 2013).
** CCUS: Carbon Capture, Utilization, and Storage
4 Challenge 2: Establishment of a value co-creation ecosystem

- We will establish a **value co-creation ecosystem** that creates value together with customers, the local community, local governments, and business partners that include companies in different industries and venture firms.

- We will **flexibly combine the diverse products, technologies and services** in the ecosystem to provide a **variety of solutions that resolve various issues** in areas ranging from individual lifestyles to the local community.

---

**Provision of solutions for the home**
- Comfortable living spaces
- Lifestyles solutions that match life cycles

**Business partner participation**
- Energy technologies (IoT equipment, storage batteries)
- Digital technologies (blockchain)
- Data analysis (AI)
- Connections with individual company customers

**Customer participation**
- Volume of energy use and equipment operation
- Data on spaces and living environments
- Excess energy from prosumers
- Life cycle and lifestyle preferences

**Strengths of the Tokyo Gas Group**
- Data and connections with customers (primarily through Tokyo Gas Lifeval)
- Provision of gas, electricity and solutions
- Equipment/appliances, construction and maintenance

---

* Ecosystem: Business environment in which many companies combine their technologies, expertise and knowledge in their specific areas of strength in order to create new value.
4 Challenge 3: Transformation of the LNG value chain

- We will create and provide the various types of value from trading, production and power generation, networks, and customer solutions.
- We will Crystallize the business expertise accumulated up to now and Explore new domains in order to expand the customers base for whom value is created and provided, and maximize each of the functions of the LNG value chain.

<table>
<thead>
<tr>
<th>Trading</th>
<th>Production &amp; power generation</th>
<th>Networks</th>
<th>Customer solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pursuit of “safety, security and reliability” through diverse procurement, increased resilience</td>
<td>Stable, inexpensive and flexible purchasing through the use of AOT*</td>
<td>Achievement of world-class digitalized terminals</td>
<td>Streamlining and increased efficiency for pipeline maintenance work</td>
</tr>
<tr>
<td>Crystallize</td>
<td></td>
<td></td>
<td>Deepening of the “last mile” services***</td>
</tr>
<tr>
<td>Explore</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full-fledged deployment of LNG and power trading</td>
<td>Global deployment of Construction of LNG receiving terminals, power plants, engineering and O&amp;M**</td>
<td>Deployment of new services, including those that utilize smart meters</td>
<td>“Energy as a Service” to expand the domains in which value is provided in daily life and businesses****</td>
</tr>
<tr>
<td>Use of digital technologies (AI and IoT)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Expand the customer base for whom value is created and provided

- For markets, energy providers and service providers
- Customers in the Tokyo metropolitan area
- Nationwide and internationally

* AOT: Asset Optimization & Trading (use of digital technology for optimal linkage of LNG transactions, LNG vessels and receiving terminals)
** O&M: Operation & maintenance
*** Last mile: Site operations that require human intermediation in the final process of the value chain.
**** Energy as a Service: Sale not of energy alone but of a menu of services combining energy, equipment, control technologies and maintenance, etc.
Action 1: Coordination of renewable energies and natural gas

- We will accelerate the efforts to acquire renewable power sources both in Japan and global markets, and actively use of decentralized resources such as PV*, storage batteries and EV** to develop businesses that combine large-scale power sources and decentralized power sources.
- We will combine renewable energies with clean natural gas that offers excellent control to achieve a stable and inexpensive supply of energy.

### Acquisition of renewable power sources
- Expand renewable power source transaction volumes both at home and abroad

<table>
<thead>
<tr>
<th>Year</th>
<th>Domestic</th>
<th>International</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019</td>
<td>0.49 million kW</td>
<td></td>
</tr>
<tr>
<td>2030</td>
<td>5 million kW</td>
<td></td>
</tr>
</tbody>
</table>

### New businesses utilizing decentralized resources
- Promote new businesses utilizing PV, storage batteries, EV etc. as well as VPP***

### Effective use of natural gas
- Adjustment of fluctuating renewable energy output using gas-fired power generation and gas cogeneration systems

---

* PV: Photovoltaic power  ** EV: Electric vehicles  *** VPP: Virtual power plant. A mechanism that uses IoT to manage and control decentralized power sources, batteries, etc. as if they were a single power plant.
Action 2: Decarbonization technology innovations

- We will promote innovations in essential core technologies that contribute to decarbonization in the period leading up to 2030.
- After 2030, we will promote hydrogen production and direct use that make use of both domestic and global renewable power sources and the introduction and use of methanation technology,* etc. to meet the demand for heat. In addition, these means will be combined and utilized for achieving Net-Zero CO₂ through IoT, AI.

Roadmap to Net-Zero CO₂

Development of essential core technologies using open-innovation

<table>
<thead>
<tr>
<th>Hydrogen production technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO₂ separation and capture technologies</td>
</tr>
</tbody>
</table>

Degree of contribution to Net-Zero CO₂ Achievement

Combination and use of various means

- Introduction and use of hydrogen, methanation technology etc.
- Introduction of ultra-high efficiency fuel cells
- Introduction and use of CCUS
- Optimal use and control of renewable power sources
- Advanced use of natural gas

Partner companies, universities and research institutions

* Methanation technology: Producing carbon-neutral methane by combining hydrogen and CO₂
Action 3: Resolving problems in daily life and businesses

- We will confront problems in daily life and businesses and provide various solutions, beginning with “Energy as a Service.” Efforts to create and provide new solutions, including the establishment of new companies, will be accelerated.

- A digital infrastructure for value co-creation will be established and advanced digital marketing will be employed. In addition, we will expand the number of business partners, the amount of data used, and products and technologies to enable a broader range of solutions to be created and provided.

<table>
<thead>
<tr>
<th>Resolving various customer needs and problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Accelerate the creation of new solutions including the establishment of new companies</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Instantly offering wide-ranging values tailored to customers</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Establishment of a digital infrastructure for value co-creation</td>
</tr>
</tbody>
</table>

- Expanded utilization of renewable energy
- Living security
- Smart homes
- Needs and problems in daily life
  - Reduced housework / improved diet
  - Shifting from “owning things in daily life” to “using things in daily life”
- Proposal for residences that match life cycles

- Expanded range of data used
- Expanded products and technologies
- AI
- Wider range of solutions

- Behavioral data (from meetings, Web, IoT and smart meters)
  - Providing even value that the person does not notice
  - Providing value when desired and at a time of the person’s choosing

- Customer
  - Predicted needs
  - Combined

- Proposal for residences that match life cycles
- Expanded number of partner companies
**Action 4: Enhanced resilience functions through the use of natural gas**

- The opening of the Ibaraki Line in 2020 will create our second circular trunk pipeline network. The Tokyo Gas Group, through stronger cooperation with local governments and infrastructure companies, will work to **strengthen the resilience of the natural gas infrastructure** towards 2030 in the Tokyo metropolitan area that is the political, economic and industrial center of Japan.

- By expanding decentralized energy systems, we will promote **disaster-resilient lifestyles and urban design** that can continue to supply energy even in the event of an emergency.

### Enhanced resilience of natural gas infrastructure

- **In the period leading up to 2030**
  - Cooperation with local governments and infrastructure companies (interconnected pipeline, etc.)

#### 2020
- Four LNG receiving terminals interconnected through a main trunk pipeline network by opening of the Ibaraki Line

#### 1999
- Three LNG receiving terminals interconnected through a main trunk pipeline network in order to increase and expand natural gas use

---

### Disaster-resilient lifestyles and urban design

- Enhanced disaster preparedness functions for homes and businesses through the expansion of decentralized energy systems

- Urban design that not only provides electricity in the event of an emergency but also ensures the stable use of heat, water, and IT and data systems

---

- Residential fuel cell (“ENE-FARM”)<br>Gas cogeneration system

- <Nihonbashi Smart Energy Project>

- Electrical equipment and system power

- Redeveloped building

- City gas (medium pressure)

- 50% supply of electricity even during an emergency
5. Action 5: Overseas expansion

- The Tokyo Gas Group will strive to achieve Net-Zero CO₂ on a global scale through business development, considering the energy market environment in each country.
- We will work to **triple overseas profits through business operations** that utilize the Group’s strengths in the LNG value chain.
- In addition to resource development, we will diversify operations our activities **gas & power supply and the renewable energy business**.

**Utilization of LNG value chain functions**
- Expansion into renewable energy business

**Expansion of profits by overseas investment**
- Expand operations at an accelerated pace by means of growth engine type investment* that utilizes our expertise cultivated through project investments.
- Promote shale gas and other resource development that creates the Group’s earnings base, and expand into renewable energy business, gas & power supply and LNG terminal business.

**Expansion of LNG trading**
- Work with business partners mutually taking advantage of individual strengths and regional differences, etc. to develop full-fledged trading in expanding LNG markets.
- Optimally combine LNG trading, owned LNG vessels and receiving terminals, using digital technologies as well
- Increase LNG added value through transport and operation

---

Growth engine type investment: Activities to grow operating companies by investing them and taking part in their management.
Management guidelines and key figures for achieving growth

- In the first half of the 2020s, we will concentrate primarily on making operations more cost-effective in accordance with the transformation of the LNG value chain, in order to expand energy (gas + power) profits.
- Throughout the second half of the 2020s, we will work to increase profits from services and overseas projects in which we have invested, and actively use means such as M&A to achieve growth.
- We will work to increase the overall profit level to approximately JPY 200 billion by 2030, while maintaining profitability and fiscal health and judging the results of activities based on key figures. We will meet shareholder expectations through the increase in enterprise value.

**Company portfolio in 2030: Profit level**

<table>
<thead>
<tr>
<th>Category</th>
<th>Current</th>
<th>2030</th>
<th>Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy*** (Gas+Power)</td>
<td>-</td>
<td>Approximately JPY 200 billion</td>
<td>+ Approximately JPY 80 billion</td>
</tr>
<tr>
<td>Solutions, etc.**</td>
<td>-</td>
<td>Approximately JPY 200 billion</td>
<td>+ Approximately JPY 80 billion</td>
</tr>
<tr>
<td>Overseas*</td>
<td>-</td>
<td>Approximately JPY 200 billion</td>
<td>+ Approximately JPY 80 billion</td>
</tr>
</tbody>
</table>

**Key figures**

- **Challenge 1: Leadership in the effort to achieve Net-Zero CO₂**
  - CO₂ reduction contribution: -10 million tons
  - Renewable power source transaction volume: 5 million kW (domestic and international, including purchasing)
- **Challenge 2: Establishment of a value co-creation ecosystem**
  - No. of customer accounts****: 20 million
- **Challenge 3: Transformation of the LNG value chain**
  - Natural gas transaction volume*****: 20 million tons

* Overseas: All overseas businesses
** Solutions, etc.: Ongoing service agreements, engineering, real estate etc.
*** Energy: Domestic gas and power business
**** Total no. of gas, power and service agreements (domestically and internationally)
***** LNG equivalent including overseas business and trading
The Tokyo Gas Group will make “Three Promises” to current and future colleagues working on the “Three Challenges.”

We will formulate a personnel strategy and conduct diversity activities in order to fulfill these promises.

1. We will produce work that will have a major impact on society.
   We commend a spirit of taking on challenges and the ability to learn from mistakes.

2. We will create a venue for encounters with diversity and friendly competition.
   The Tokyo Gas Group will be a gathering place for diverse thinking and experience.

3. We will emphasize the self-fulfillment of each person.
   We believe in the potential of each individual and will support each employees activities.