

Sitting on top of four colliding tectonic plates, Japan is known as an earthquake-prone nation. As a provider of public services to the nation's economic center, it is our duty to enhance our social value by continuing to ensure a stable supply of energy, while making safety the foremost priority.

Natural disasters pose a serious threat to Tokyo Gas. Constantly aware that a disaster could occur tomorrow, the Company's crisis management system is based on the three pillars of "prevention," "emergency," and "restoration." Preventive measures help minimize damage when a major earthquake occurs; emergency measures prevent secondary damage, such as fires and explosions; and restoration measures target the resumption of gas supplies as soon as possible. Ensuring that these three disaster preparedness pillars are firmly in place is intricately linked to raising our social value and enhancing the Tokyo Gas brand, which centers on "security, safety, and reliability."

GROWTH THROUGH THE CREATION OF SHARED VALUE

SPECIAL FEATURE 2: THREE INITIATIVES FOR SECURITY, SAFETY, AND RELIABILITY

PREVENTIVE MEASURES

We Have Built Production and Supply Facilities Using Advanced Seismic Design Standards and We Have Doubled and Tripled Safety Precautions.

City gas produced at our three LNG terminals on the shores of Tokyo Bay is supplied to households, office buildings, commercial facilities, and factories via an extensive pipeline network. Gas is sent from the terminals through a high-pressure trunk pipeline that loops the Tokyo area, then through a network of medium-pressure pipelines, which branch into many low-pressure pipelines.

These city gas production facilities have been built so that they are capable of withstanding earthquakes on a scale similar to the Great Hanshin-Awaji Earthquake (M7-class earthquakes).

The surface level of the liquid stored in some of the largest underground tanks in the world is always below ground level. Consequently, even in the unlikely event of a crack or break in a tank, the LNG could not seep outside.

Tokyo Gas is able to provide stable supplies of city gas using its safe production and supply system, which has been constructed to withstand major earthquakes and other natural disasters. Nonetheless, we have had to face the reality that the recent Great East Japan Earthquake triggered unexpected developments that caused serious accidents. Therefore, we are currently investigating measures needed to ensure an even higher safety threshold, which we will implement in due course.

Tokyo Gas Uses Strong Pipelines Capable of Withstanding Movements in the Earth's Crust.

Because almost all of our pipelines are underground, ground movement during an earthquake can have a direct impact on them. This is why Tokyo Gas uses high-pressure and medium-pressure pipelines made from welded steel pipes that provide exceptional strength and flexibility. In both the Great Hanshin-Awaji Earthquake and the recent Great East Japan Earthquake, the pipes exhibited excellent earthquake resistance.

City Gas Production Terminals

LNG transported by LNG vessels is stored in underground tanks at three terminals on the shores of Tokyo Bay. There, the LNG is vaporized and odorized before being sent out as city gas.



LNG Vaporizers

LNG is pumped into aluminum pipes, and the liquid is warmed by the seawater around the pipes, which transforms LNG back into its gaseous form.



Underground Tanks

LNG is stored in underground tanks that are made to withstand M7-class earthquakes. Even in the unlikely event of damage to a tank, the LNG cannot leak because the surface level of the liquid is always below ground level.

High-Pressure Pipelines

The high-pressure pipelines that connect one terminal with another and terminals with governor stations are made of strong steel pipes that are welded together. Tokyo Gas patrols the ground above the pipelines on a routine basis. Our high-pressure pipelines withstand the force similar to the Great Hanshin-Awaji Earthquake, with no interruption to gas supplies.

SPECIAL FEATURE 2 THREE INITIATIVES FOR SECURITY, SAFETY, AND RELIABILITY



Tokyo Gas Supply Control Center

The Supply Control Center monitors and controls gas supply around the clock, 365 days a year. Our own wireless communication network links the Supply Control Center with the LNG terminals and governor stations. In case of emergency, the Center can quickly gather information and control gas supply.

Gas Meters (Microcomputer-Controlled)

Gas meters are installed in the homes of all of Tokyo Gas's 10 million customers to measure the amount of gas used. When an earthquake measuring five on the Japanese seismic intensity scale of seven is detected, the task of ensuring safety by shutting off the gas is entrusted to each microcomputer-controlled meter, which stops the flow of gas.

Vent Tower

Vent towers are used to safely release pipeline gas into the atmosphere depending on the severity of damage caused by an earthquake. Vent towers are located at LNG terminals and governor stations

Low-Pressure Pipelines

ernors, our network of more than 45,000-km lowpressure pipelines delivers the gas to homes, offices, stores, and other facilities. Tokyo Gas is steadily switching to the use of polyethylene pipelines, which offer superior durability, to increase the earthquake resistance of low-pressure pipelines.

After gas pressure has been reduced at district gov-

Disaster Prevention Blocks

I ow-pressure pipelines are divided into approximately 140 large district blocks. If a block sustains serious damage, gas supply to pipes in that particular block can be shut off without affecting supply to other blocks.

District Governors (Pressure Regulators)

District governors reduce the pressure of gas transferred through medium-pressure pipelines, then sends it on through low-pressure pipelines. All district governors are equipped with earthquake sensors. When a sensor detects an earthquake measuring lower six on the Japanese seismic intensity scale of seven, the district governor automatically shuts off gas supply.



Earthquake Sensors (Seismometers)

A seismometer detects the seismic intensity felt by a building during an earthquake. Seismometers are linked to the automatic shut-off system at the nearest district governor so that supply can be immediately shut off when seismic intensity reaches a predetermined level.

Medium-Pressure Pipelines

After gas pressure has been reduced at governor stations, it is sent to district governors located in each area via medium-pressure pipelines. As is the case with high-pressure pipelines, most of these pipelines are buried below ground. They are made by welding strong steel pipes together and are designed to withstand earthquakes on a scale similar to the Great Hanshin-Awaji Earthquake.



A gas holder is a spherical container made from high-strength steel plates. It stores gas during the day to meet the demand fluctuation between day and night. A gas holder can withstand a strong earthquake such as the Great Hanshin-Awaji Earthquake. An ignition source will not ignite or explode when placed in a gas holder that contains no air.



Governor Stations

Governor stations are facilities that adjust gas pressure. The pressure of gas sent from a terminal is reduced at a governor station before it is delivered to a medium-pressure pipeline.



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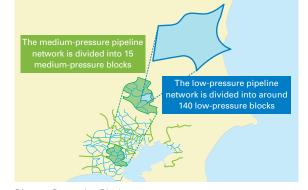
EMERGENCY MEASURES

All Major Facilities Have Emergency Shutoff Systems.

The delivery of gas must be stopped immediately in the unlikely event of a break in a gas pipeline. Therefore, all supply facilities, such as terminals and gas holders, as well as large buildings and facilities, including underground malls and high-rise buildings, are equipped with an emergency shutoff system. There are two types of emergency shutoff systems. There is the emergency shutoff valve, which can be operated remotely, and the automatic shutoff system, which is connected to seismometers. These systems are used to ensure safety in a number of other situations besides an earthquake. They also safely release gas inside pipelines into the atmosphere via vent towers installed in major facilities if required due to the severity of damage.

Our System Prevents Secondary Damage and Minimizes the Area in Which Supply Is Interrupted.

In a major earthquake, in order to prevent secondary damage, it is necessary to stop the supply of gas to areas where gas facilities and equipment have sustained damage. However, even in the event of an emergency, Tokyo Gas considers it important to continue supplying gas wherever possible so as not to cause inconvenience to customers, although of course



Disaster Prevention Blocks

it first ensures that it can do so safely. In such situations, medium-pressure and low-pressure pipeline networks are divided into a number of "blocks." Supply is shut off to blocks that have sustained considerable damage, while blocks with no damage or relatively minor damage continue to receive gas supplies.

Because the system is configured so that gas is not supplied from one block to another, gas supply can be stopped quickly without affecting other blocks by shutting down the supply sources, such as district governors and governor stations, within a particular block. Even during the recent earthquake, Tokyo Gas's earthquake damage prevention system functioned properly.

Our SUPREME* System Controls Low-pressure Gas Supply

Under the SUPREME system, we have installed earthquake sensors in all of our nearly 4,000 district governors, which supply low-pressure gas. With approximately one sensor per square kilometer, this level of installation density is unparalleled on a global scale. The system quickly and effectively helps prevent secondary damage by estimating damage from the distribution of the size of tremors. The system then collects fire warnings information and remotely shuts off supply to blocks assumed to have sustained considerable damage.



Distribution of Earthquake Sensors (Red dots: Tokyo Gas seismometers Blue frameworks: Disaster prevention blocks)



Earthquake Sensor (Seismometers)

* Super-dense Real-time Monitoring of Earthquakes

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3 MEASURES

RESTORATION

Meticulous Preparedness Ensures Resumption of Supply as soon as Possible.

In areas where the supply of gas has been shut down, we must resume service as quickly as possible to minimize the inconvenience to our customers. We have equipment, materials, and systems ready for deployment at a moment's notice in the event of a disaster. This enables Tokyo Gas to draw on the combined strengths of the Group to begin repairs and restoring services.

Mobile Gas Generation Equipment Temporarily Enables Supply to Hospitals and Evacuation Centers.

Tokyo Gas has portable gas generation equipment that it uses to provide temporary gas supplies until normal supplies in the area



are resumed. Using this equipment, we can supply gas continuously to high-priority customers, such as hospitals, welfare facilities, and evacuation centers.

Gas Companies Nationwide Join Forces in Times of Disaster.

There are as many as 200 companies supplying city gas throughout Japan. When an earthquake or other kind of disaster causing serious damage occurs, these companies come together under the auspices of the Japan Gas Association to help efforts to resume gas supply as soon as possible. In the recent disaster,

teams from Tokyo Gas and other companies swung into action to provide assistance primarily in the Tohoku region.



On March 11, 2011, the Great East Japan Earthquake occurred. The earthquake's epicenter was located in the Pacific Ocean off the Sanriku area of northeastern Honshu. Here, we explain this earthquake's impact on our customers, and our response and other initiatives.

Although the Great East Japan Earthquake was the greatest earthquake ever recorded in Japan, Tokyo Gas was fortunate in that none of its terminals, pipelines, or other facilities sustained major damage. However, we shut off gas supplies to 30,596 customers, including the entire area of Hitachi City, in order to ensure their safety.

Directly after the earthquake, the Company established an Emergency Response Organization, with President Tsuyoshi Okamoto as its leader, and immediately launched its response.

When restoring services to areas where gas supply has been stopped, it is important to prevent secondary damage from occurring once service is resumed. Consequently, Tokyo Gas has to check pipes supplying each customer and gas appliances one by one to ascertain whether or not there has been any damage. Up to 711 employees, including those from Tokyo Gas, installation companies, Tokyo Gas LIFEVAL, and other Group members, took part in the restoration of services in order to minimize the inconvenience to our customers as quickly as possible and reduce their anxiety. On the first day, March 13, gas supply was restored to hospitals, which had top priority. In the end, gas services had been reinstated to all customers in about one week.

One reason we were able to restore services ahead of schedule was that we had begun using methods for rapid restoration that had been provisionally implemented from October 2010. We developed these methods by applying past experiences in restoring gas supplies following earthquakes. We first devised a number of restoration methods suitable for a variety of damage scenarios. We then selected the most practical of these for implementation.

Going forward, even if a major earthquake should occur, we will work hard to secure the safety of customers and minimize inconvenience. By adopting this approach, we will endeavor to establish and maintain trust in gas as a form of energy, as well as in Tokyo Gas itself.



Inspecting a Customer's Gas Meter



Repairing a Low-pressure Supply Pipe