CHAPTER 4: Emergency response systems of individual IEA countries

The ability of the International Energy Agency (IEA) to co-ordinate a swift and effective international response to an oil supply disruption stems from the strategic efforts of member countries to maintain a state of preparedness at the national level. Energy security is more than just oil, as the role of natural gas continues to increase in the energy balances of IEA countries. The most recently completed cycle of Emergency Response Reviews (ERRs) reflected this change by assessing, for the first time, the member countries’ exposure to gas disruptions and their ability to respond to such crises. This chapter provides general profiles of the oil and natural gas infrastructure and emergency response mechanisms for 29 IEA member countries.

Each country profile is set out in the following sequence:

**Key data**
- Key oil data, 1990-2018
- Key natural gas data, 1990-2018
- Total primary energy source (TPES) trend, 1973-2012

**Infrastructure map**

**Country overview**

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  - Oil demand
  - Imports/exports and import dependency
  - Oil company operations
- Oil supply infrastructure
  - Refining
  - Ports and pipelines
  - Storage capacity
- Decision-making structure
- Stocks
  - Stockholding structure
  - Crude or products
  - Location and availability
  - Monitoring and non-compliance
  - Stock drawdown and timeframe
  - Financing and fees
- Other measures
  - Demand restraint
  - Fuel switching
  - Other

**GAS**
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  - Gas production and reserves
  - Gas demand
  - Gas import dependency
  - Gas company operations
- Gas supply infrastructure
  - Ports and pipelines
  - Storage
- Emergency policy
  - Emergency response measures
## Japan

### Key data

#### Table 4.15.1  Key oil data

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<tr>
<td>Production (kb/d)</td>
<td>13.3</td>
<td>17.5</td>
<td>18.5</td>
<td>18.1</td>
<td>17.4</td>
<td>16.5</td>
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<td>Demand (kb/d)</td>
<td>5 315.3</td>
<td>5 515.4</td>
<td>5 327.9</td>
<td>4 455.4</td>
<td>4 471.2</td>
<td>4 714.8</td>
<td>4 354.6</td>
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<td>Motor gasoline</td>
<td>738.5</td>
<td>998.9</td>
<td>1 045.6</td>
<td>1 003.8</td>
<td>976.9</td>
<td>978.2</td>
<td>-</td>
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<tr>
<td>Gas/diesel oil</td>
<td>1 112.3</td>
<td>1 241.3</td>
<td>1 149.8</td>
<td>842.3</td>
<td>820.8</td>
<td>826.3</td>
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<tr>
<td>Residual fuel oil</td>
<td>898.3</td>
<td>653.2</td>
<td>581.5</td>
<td>394.0</td>
<td>439.2</td>
<td>562.1</td>
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<td>Others</td>
<td>2 566.2</td>
<td>2 622.0</td>
<td>2 551.1</td>
<td>2 215.4</td>
<td>2 234.3</td>
<td>2 348.1</td>
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<td>Net imports (kb/d)</td>
<td>5 302.0</td>
<td>5 497.9</td>
<td>5 309.4</td>
<td>4 437.3</td>
<td>4 453.8</td>
<td>4 698.3</td>
<td>4 338.5</td>
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<td>Import dependency (%)</td>
<td>99.7</td>
<td>99.7</td>
<td>99.7</td>
<td>99.6</td>
<td>99.6</td>
<td>99.7</td>
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<tr>
<td>Refining capacity (kb/d)</td>
<td>4 198.0</td>
<td>4 997.7</td>
<td>4 706.9</td>
<td>4 896.5</td>
<td>4 896.5</td>
<td>-</td>
<td>-</td>
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<tr>
<td>Oil in TPES** (%)</td>
<td>57</td>
<td>49</td>
<td>47</td>
<td>41</td>
<td>45</td>
<td>46</td>
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* Forecast.
** TPES data for 2012 are estimates.

#### Table 4.15.2  Key natural gas data

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<td>Production (mcm/y)</td>
<td>2 119</td>
<td>2 499</td>
<td>3 140</td>
<td>3 343</td>
<td>3 334</td>
<td>3 177</td>
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<td>Demand (mcm/y)</td>
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<td>83 499</td>
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<td>109 344</td>
<td>126 358</td>
<td>130 737</td>
<td>130 622</td>
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<tr>
<td>Transformation</td>
<td>39 526</td>
<td>55 840</td>
<td>52 768</td>
<td>64 244</td>
<td>80 304</td>
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<tr>
<td>Industry</td>
<td>4 728</td>
<td>6 266</td>
<td>8 153</td>
<td>9 666</td>
<td>10 372</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>Residential</td>
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<td>10 640</td>
<td>11 081</td>
<td>10 849</td>
<td>10 841</td>
<td>0</td>
<td>-</td>
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<tr>
<td>Others</td>
<td>5 157</td>
<td>10 753</td>
<td>16 065</td>
<td>24 585</td>
<td>24 841</td>
<td>0</td>
<td>-</td>
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<tr>
<td>Net imports (mcm/y)</td>
<td>55 988</td>
<td>81 000</td>
<td>84 927</td>
<td>106 001</td>
<td>123 024</td>
<td>127 560</td>
<td>128 191</td>
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<tr>
<td>Import dependency (%)</td>
<td>96.4</td>
<td>97.0</td>
<td>96.4</td>
<td>96.9</td>
<td>97.4</td>
<td>97.6</td>
<td>98.1</td>
</tr>
<tr>
<td>Natural gas in TPES (%)</td>
<td>10</td>
<td>13</td>
<td>14</td>
<td>17</td>
<td>22</td>
<td>23</td>
<td>-</td>
</tr>
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</table>

* 2012 data are estimates.
** Forecast.

Note: This section on the emergency response systems of individual member countries was written by the IEA. All countries provided valuable information and comments. All opinions, errors and omissions are solely the responsibility of the IEA.
Figure 4.15.1 Total primary energy source (TPES) trend, 1973-2012
Map 4.15.1 Oil infrastructure of Japan

This map is without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.
Map 4.15.2  Gas infrastructure of Japan

This map is without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.
Country overview

Oil remains the most significant energy source in Japan, accounting for some 46% of the country’s total primary energy supply (TPES) in 2012. Japan’s oil demand steadily decreased from 5.7 million barrels per day (mb/d) in 1997 to 4.5 mb/d in 2010. However, its oil demand increased to 4.7 mb/d in 2012 because of the Great East Japan Earthquake in March 2011 and its subsequent impacts. The transport sector represented around 36% of total consumption in 2011, while the industry sector accounted for 29%. A significant proportion of the industry sector’s oil demand comes from the chemical industry.

Of the 4.8 mb/d of oil imported by Japan in 2012, 3.5 mb/d consisted of crude oil, 209 thousand barrels per day (kb/d) of natural gas liquids (NGLs) and feedstocks, and some 1.2 mb/d of refined products. About 83% of Japan’s crude oil imports in 2012 came from the Middle East. The country has 27 operational refineries with a total crude distillation capacity of around 4.5 mb/d.

Japan meets its 90-day stockholding obligation to the International Energy Agency (IEA) by holding government emergency stocks and by placing a minimum stockholding obligation on industry. The primary role of the Japan Oil, Gas and Metals National Corporation (JOGMEC) is to manage public stocks under the Oil Stockpiling Act, while industry (refineries, specified distributors and importers) is obliged to hold the equivalent of 70 days of their daily imports, sales or refinery production, based on the average of the previous 12 months. The public stocks mostly consist of crude oil, but the government has expanded its emergency inventory to include four categories of refined products – gasoline, kerosene, fuel oil and diesel oil.

Japan held 596 mb of oil stocks at the end of April 2013, equal to 153 days of 2012 net imports (84 days of government stocks and 69 days of industry stocks). Around 70% of total stocks were held in the form of crude oil. Japan has consistently met its minimum IEA stockholding obligation.

The share of natural gas in the country’s TPES increased significantly from 17% in 2010 (before the March 2011 earthquake) to 23% in 2012, because of growing demand from the electricity generation sector. Japan’s demand for natural gas steadily increased from 26 bcm (71 mcm/d) in 1980 to around 109 bcm (298.6 mcm/d) in 2010, to 124 bcm (340 mcm/d) in 2012. Japan’s domestic natural gas production is limited, with production of around 3.3 bcm in 2012.

Natural gas supply sources to the country are well diversified. In 2012, Australia was the largest supplier, representing 20% of total imports. As Japan has no cross-border pipelines, the country imported natural gas through 31 LNG terminals with around 10 billion cubic metres (bcm) of natural gas storage capacity.

Key elements of Japan’s overall gas security policy are: diversifying its long-term supply contract portfolio; ensuring that long-term contracts include flexibility to increase imports during an emergency; and using voluntary commercial LNG stocks in industry. Even though industry is not obliged to hold any emergency gas stocks, industry has commercial stocks equivalent to about 20 to 30 days of consumption.

There is no single gas transmission system operator (TSO) in the country as the trunk line networks have developed separately around LNG terminals and are not necessarily connected to each other. Each gas company is asked to ensure its natural gas supply to its distribution area.
Market features and key issues

Domestic oil production
Japan produced only 17 kb/d of crude oil in 2012, which was equivalent to 0.3% of total consumption. Almost all Japanese oil consumption is covered by imports.

Oil demand
The country’s oil demand steadily decreased from 5.7 mb/d in 1997 to 4.5 mb/d in 2010. However, its oil demand increased to 4.7 mb/d in 2012 owing to the Great East Japan Earthquake in March 2011 and its subsequent impacts. In 2011, around 36% of Japanese total oil demand was consumed by the transport sector, while the industry sector and the transformation/energy sector accounted for 29% and 20% respectively. High oil demand in the industry sector mostly derives from the chemical sector, including petrochemicals, accounting for 65% of total industry consumption.

Figure 4.15.2 Oil consumption by sector, 1973-2011

Demand for all oil products decreased from 2003 to 2012. Demand for gasoline decreased by 5% during the last decade, while demand for diesel dropped by about 19%. Demand for heating/other gasoil also significantly decreased by 40% from 632 kb/d in 2003 to 377 kb/d in 2012.
Imports exports and import dependency
Japan’s oil imports in 2012 were around 4.8 mb/d, consisting of about 3.5 mb/d of crude oil, 209 kb/d of NGL and feedstocks, and 1.2 mb/d of refined products. Saudi Arabia was the largest supply source of crude oil with about 33% of the 2012 total, followed by the United Arab Emirates (UAE) (23%), Kuwait (8%), Qatar (6%) and the Russian Federation (5%).

In 2012, almost half of refined product imports came from the OPEC countries, followed by OECD countries (27%) and non-OPEC Asia (18%). By country, Korea was the largest supplier of refined products with about 15% of the 2012 total, followed by Qatar (14%), UAE (13%), Kuwait (10%) and Saudi Arabia (10%).

Oil company operations
Refining and distribution of oil products are fully privatised and open to foreign capital companies. As domestic oil demand has continuously decreased in the country, the retail market has been rationalised accordingly. The number of filling stations has been streamlined from over 60 000 in 1995 to 38 777 stations in 2011. Oil companies in the country have also been reorganised in the context of high crude oil prices and severe competition in the overall energy market.
Oil supply infrastructure

Refining

In 2012, there were 27 refineries with a total crude distillation capacity of around 4.5 mb/d – a decrease of some 850 kb/d (from 5.3 mb/d) since 2000. This decline in refining capacity occurred against a backdrop of decreasing domestic oil demand.

By company, four major oil companies owned 17 refineries in 2012: Cosmo Oil operates four refineries with a total capacity of 635 kb/d; Idemitsu Kosan operates four refineries (640 kb/d); JX Nippon Oil and Energy operates six refineries (1.2 mb/d); and Tonen General operates three refineries (661 kb/d). Refineries are mostly located close to demand centres of refined products, and eight refineries are located in Kanto Region in order to supply oil products in the region which includes Tokyo.

By 2014, three refineries, with a capacity of 440 kb/d in total (amounting to almost 10% of the country’s capacity in 2012), are expected to be closed according to the Law on Sophisticated Methods of Energy Supply Structures of 2009.

In 2011, the total crude throughputs were around 198 million kilolitres (kl), averaging 3.4 mb/d. The total utilisation rate of refineries was around 75%, although six refineries had been temporarily shut down by the March 2011 earthquake, which reduced total operational refining capacity to 70%.

In 2012, the refined product output totalled 3.6 mb/d. The main products of the refineries were gas/diesel oil (25%), followed by gasoline (25%), other middle distillates (15%), residual fuel oil (13%), naphtha (9%) and liquefied petroleum gas (4%).

With the exception of jet and kerosene, gas/diesel oil and residual fuels, domestic refinery production is insufficient for meeting demand in the country. In 2012 domestic production of naphtha met 44% of domestic demand and LPG/ethane 26%.

Figure 4.15.5 Refinery output vs. demand, 2012
Ports and pipelines
As Japan is an island country surrounded by ocean, imports of crude oil and petroleum products are undertaken by oil tankers; between April 2010 and March 2011, 837 crude oil tankers arrived at Japanese ports. The country has five main oil ports which are located in Chiba, Yokohama, Yokkaichi, Shibushi and Okinawa. Chiba port unloads crude oil to supply four refineries holding a total distillation capacity of 760 kb/d. Yokohama port supplies imported crude oil to two refineries in Kawasaki, while Yokkaichi port also delivers crude oil to two refineries in the city. Two other oil ports in Shibushi and Okinawa mainly supply crude oil to closely located national stockholding bases.

Oil products are delivered from refineries to consumers mainly by coastal tankers, tank trucks and railroad tankers. There were 574 domestic vessels for oil products transport in March 2011, while 1,644 railroad tankers were also registered. Around 7,000 tank trucks were deployed for domestic transport in 2010.

There is only one oil pipeline in the country, which transports jet fuels from Chiba refinery to Narita International Airport.

Storage capacity
Storage capacity in Japan was estimated at over 900 mb (over 150 million cubic metres) at the end of March 2012. Within the supply chain, private companies own 225 mb of storage capacity for crude oil – mainly located at refineries. The country also has 361 mb of storage capacity for oil products in the refining and distribution sectors.

In addition, JOGMEC operates national emergency crude oil reserves at ten national stockholding bases (40 mcm or about 251 mb) and in 16 industry-leased tanks (15.7 mcm or some 99 mb). National stockholding bases are spread around coastal areas in the country in different forms: 20.5 mcm (129 mb) of stock are held in above-ground tanks at four national stockholding bases; 5 mcm (31 mb) are held in underground rock caverns at three bases; 10 mcm (63 mb) are held in floating tanks at two bases in the south of the country; and 4.5 mcm (28 mb) are held in the form of an inground tank at Akita base.

Decision-making structure
The Petroleum Refining and Reserve Division of the Natural Resources and Fuel Department acts as a secretariat and forms the core of the Japanese national emergency strategy organisation (NESO) during oil supply disruptions, in co-operation with other relevant ministries and industry.

The Oil Stockpiling Act allows the Minister of Economy, Trade and Industry (METI) to make a decision to release government stocks or lower the industry obligation. According to a decision by the minister, the Petroleum Refining and Reserve Division coordinates government stock releases with JOGMEC which is responsible for managing the stocks. When lowering the industry obligation, the division co-operates closely with the Petroleum Association of Japan (PAJ).

The government has implemented changes for improvements following the regional shortages of oil products caused by the 2011 earthquake. One of the improvements is to oblige oil companies to jointly prepare emergency oil supply co-operation plans in order to ensure co-operation among companies in supplying oil products to end-users in the event of a disaster.
Stocks

Stockholding structure
Japan meets its stockholding obligation to the IEA by holding government emergency stocks and by placing a minimum stockholding obligation on industry.

Under the Oil Stockpiling Act, METI delegates JOGMEC to manage government emergency stocks. The country has accomplished its national stockholding target of holding 50 million kl (equivalent to 315 mb) since 1998. JOGMEC also manages around 0.64 million kl (about 4 mb) of national stocks for LPG – accounting for 19 days of imports held at four national LPG stockholding bases in August 2012.

According to the act, refineries, specified distributors and importers are obliged to hold from 70 to 90 days of their average daily imports, sales or refined production from the previous 12 months. Since 1993, the stockholding obligation on industry has been set at 70 days. In addition, LPG importers are obliged to maintain 50 days of daily LPG imports.

METI is responsible for ensuring the implementation of the oil stockpiling obligations. It is empowered to set the quantities of oil to be stockpiled on an annual basis and to supervise the compulsory stocks and their use.

Crude or products
Japan held around 596 mb of oil stocks (321 mb of government stocks and 275 mb of industry stocks) at the end of April 2013 – equal to 153 days of 2012 net imports (84 days of government stocks and 69 days of industry stocks) – to meet its IEA obligation. Around 70% of total stocks were held in the form of crude oil, as crude oil accounted for about 97% of public stocks.

However, according to the amendments of the Oil Stockpiling Act, the government plans to hold up to four days of refined products such as gasoline, kerosene, fuel oil and diesel oil in the national emergency oil inventory.

In terms of industry stocks, crude oil is the main product held in reserve (39%), followed by natural gas liquids (NGLs) and feedstocks (24%), middle distillates (13%) and motor gasoline (5%). Industry may substitute crude oil for oil products which it is obliged to hold.

Location and availability
Japan has a bilateral agreement with New Zealand that allows it to hold stocks on New Zealand’s behalf (using petroleum reserve ticket contracts) that count towards New Zealand’s IEA obligation.

Public crude oil stocks are widely dispersed at ten national stockholding bases and in 16 domestic private terminals. Around 70% of public stocks are held at national stockholding bases. Compulsory stocks are commingled with commercial and operational stocks.

Monitoring and non-compliance
METI can conduct on-site inspections of stockholding facilities to monitor the physical availability of compulsory stocks.

In the case of a failure to comply with compulsory stockholding obligations, companies can be sentenced to up to one year in prison or fines up to JPY 3 million (or around USD 32 000).
Stock drawdown and timeframe

The Oil Stockpiling Act requires a decision by the Minister of the Economy, Trade and Industry to draw down public stocks in global supply disruptions or local disruptions because of natural disaster. Upon receiving the stock release order from the minister, METI opens a public tendering process. After completion of the tendering process, JOGMEC is instructed to supply public stocks to the successful bidders. It is estimated that it would take around 10 to 15 days to draw down public stocks after receipt of the instruction from the government. The 2012 amendments to the act also allow the government to loan public stocks to the market.

A decision from the minister is required to lower the compulsory stockholding obligation (CSO). Decisions on how the compulsory stocks should practically be released are made by the stockholder in close co-operation with the PAJ.

Financing and fees

In the fiscal year 2012, the government budgeted JPY 45 billion (around USD 485 million) for maintenance of public stocks managed by JOGMEC. The cost of compulsory industry stocks is basically passed on to final consumers at market prices. JOGMEC, however, provides a loan for industry to purchase a part of the compulsory oil stocks. The government provides industry players covered by the CSO with interest subsidies for purchasing compulsory oil stocks.

Other measures

Demand restraint

Demand restraint is considered as a secondary emergency response measure that could complement an oil stock release in Japan. But, as Japan has abundant amounts of emergency oil stocks, demand restraint measures would only be deployed in the event of a severe oil supply crisis.

Japan’s demand restraint measures would range from light-handed measures (e.g. accurate information sharing and energy saving campaigns) to heavy-handed measures (e.g. limitations in oil use in specific industrial sectors, instruction of oil products mediation for end-users and allocation of oil). The latter measures would be taken under the Petroleum Supply and Demand Optimization Act. According to the act, the prime minister can announce the necessary demand restraint measures based on a cabinet council decision.

To monitor these actions, the government is requested to report to the parliament on the implementation status of demand restraint measures which the prime minister has announced. The METI and relevant ministries monitor measures through regular reports from the oil industry.

Fuel switching

Short-term fuel switching from oil to other fuels is not regarded as an emergency response measure in Japan, as the country had only 2.5 kb/d of potential fuel-switching capacity in 2010. In addition, the government has no legal authority to oblige power generators to switch fuels.
Other
Japan produced only 17 kb/d of crude oil in 2012, which was equivalent to 0.3% of total consumption. Although this is estimated to increase by 10% to 15%, it is too little to cover domestic oil demand.

Gas

Market features and key issues

Gas production and reserves
In 2012, indigenous natural gas production totalled 3.3 bcm, which accounted for about 3% of total domestic natural gas demand.

Gas demand

Figure 4.15.6 Natural gas consumption by sector, 1973-2011

Japan’s demand for natural gas has steadily increased from 26 bcm (71 mcm/d) in 1980 to 109 bcm (298.6 mcm/d) in 2010 and to 124 bcm (340 mcm/d) in 2012.

In 2011, the transformation sector was the largest consumer of natural gas in Japan, representing about 64% of the country’s total gas consumption, while the commercial/other sector and the residential sector represented 16% and 9% respectively. The Japanese monthly peak gas demand stood at 11.8 bcm per month in January 2012. Daily peak demand was recorded in February 2012, totalling around 401 mcm/d.

In order to compensate for nuclear outages, natural gas use in power generation significantly increased from 27% of total electricity generation in 2010 to 41% in 2012.

Gas import dependency
Japanese gas demand is mainly supplied by imports in the form of LNG. The country’s total natural gas imports in 2012 amounted to 121.6 bcm (333 mcm/d). Natural gas
imports in 2012 significantly increased by 23% from 99 bcm in 2010 because of a strong
gas demand in power generation.

Figure 4.15.7 Natural gas imports by source, 2012

Natural gas supply sources to the country are widely diversified. In 2012, Australia was
the largest supplier, representing 20% of total imports. Qatar (17%), Malaysia (16%),
Russia (10%) and Brunei (7%) are other key gas supply sources for Japan.

Gas company operations

The majority of natural gas is imported by seven electricity companies for power
generation. The share of the power companies in total LNG imports increased from 62% in
2010 to 65% in 2011. These electricity utilities import their gas independently from
the city gas industry.

City gas companies sold around 35.9 bcm to 29 million consumers throughout the country
in 2011. Around 27.4 million customers (94%) were residential consumers accounting for
about 27% of total city gas sales, while over half of city gas was consumed by industry.

The city gas industry is fragmented into many vertically integrated regional companies.
In September 2012, there were 209 general gas utilities. According to data on gas sales
volumes, the four major gas utilities – Tokyo Gas, Osaka Gas, Toho Gas and Seibu Gas –
held a combined market share of 72% in 2011. Tokyo gas had a share of 34%, Osaka Gas
25%, Toho Gas 11% and Seibu Gas 2%.

Gas supply infrastructure

Pipelines

Japan has no cross-border gas pipelines. Total gas pipeline length accounts for
249 786 km through the country. Around 86% of gas pipelines are low-pressure grids
for local distribution, while only 4 772 km are for high pressure. Although there are
around 43 main interconnection points between areas, the trunk line networks are not
necessarily connected to each other as they have developed separately around LNG
terminals.

There is no single operator of the national transmission system in the country, as the
trunk line networks are not necessarily connected each other. Each industry (mainly
electricity utilities and city gas companies) owns and operates its gas pipelines. Third-
party access to trunk pipelines and distribution networks was introduced in 2004 and
is to be individually negotiated by parties proposing to supply customers, although the
lack of interconnections between regions may limit the ability to increase competition through third-party access.

Storage and LNG terminals
While the country has no underground storage for natural gas in its gaseous state, Japan has 31 operational LNG receiving terminals with a total LNG storage capacity of over 16 mcm (equivalent to around 10 bcm of natural gas storage capacity). The country’s total storage capacity meets close to 30 days of domestic natural gas consumption.

The country plans to build new LNG facilities or expand storage capacity of existing terminals, which will give the country a further 3.5 mcm of LNG storage capacity in total (equivalent to 2.2 bcm of natural gas) in the near future.

LNG terminals are owned and operated by electricity utilities, city gas companies, other industries such as steel company, and local governments. Electricity companies own close to half of total LNG storage capacity, followed by gas utilities (over 40%). Of the 31 operational LNG terminals, 11 are co-sponsored by power companies, gas utilities, industry or local governments. As of February 2012, the total nominal regasification capacity in LNG terminals represented around 252 bcm of natural gas per year (or 690 mcm/d) with 238 vaporisers.

Emergency policy
Key elements of Japan’s overall gas security policy are: diversifying its long-term supply contract portfolio, ensuring the flexibility of increasing imports in contracts in an emergency situation, and using voluntary commercial LNG stocks in industry. The largest natural gas supplier, Australia, represented around 20% of Japan’s total imports in 2012.

The Gas Business Act (1954) sets the standard of market activities for natural gas. According to Article 25, gas utilities are obliged to compile and submit gas supply plans to the government every fiscal year. The gas supply plans cover gas supply and demand in a certain period, and the plans are evaluated by the government.

There is no legal obligation for industry to hold emergency stocks in the form of natural gas, LNG or alternative fuels in the country.

Japan has not established a NESO structure for natural gas supply disruptions. However, the divisions in charge of natural gas emergency response at the Agency for Natural Resources and Energy (ANRE) – including the Gas Market Division – are supposed to take the leading roles in co-ordinating the necessary action and liaising with industry.

There is no single transmission operator in the country, as the trunk line networks have developed separately around LNG terminals and are not necessarily connected to each other. Each gas company is obliged to ensure its natural gas supply to its distribution area.

Emergency response measures
Even though industry is not obliged to hold any emergency gas stocks, electric power companies and city gas companies hold a certain amount of commercial stocks. The companies adjust the level of commercial stocks to meet around two weeks of natural gas demand in normal times as well as in times of high demand. As a result, when the country’s peak monthly gas demand was recorded in January 2012 with 11.8 bcm, stock levels at the end of the same month and during the following month were maintained at 5.9 bcm and 5.5 bcm respectively. This indicates that the country’s commercial stocks
covered between 13 and 16 days of domestic consumption even in a time of such high demand.

In the event that LNG import is disrupted, importing companies (seven electricity companies and less than ten gas utilities) can also allocate their gas imports through reciprocal backup supply.

Japan has no legislation allowing the government to oblige electricity utilities to switch fuels from natural gas to other fuels. The country has 22 dual-fired power generation units with a total generating capacity of 9 gigawatts (GW) as of 2012. However, it has very limited impact to reduce gas demand in a gas supply shortage, as more than 350 terrawatt hours (TWh) of electricity are generated by natural gas.

During a supply disruption, TSOs will reduce gas supplies according to interruptible contracts. Tokyo Gas, which has around 34% of total market sales of city gas, reduces gas supply to its customers consuming over 0.5 mcm per year with the exception of priority customers such as hospitals, welfare institutions and government offices. Tokyo gas also has over 200 portable air-mixed propane gas generators to temporarily supply gas for priority consumers.

In order to strengthen resistance to disasters such as earthquakes in particular, the Japanese gas industry has replaced old low-pressure gas pipes with polyethylene pipes and high seismic resistant pipes. For the prevention of secondary disasters, it has also been building a shutting-off system which uses block formations and devices for automatic remote shutdown.