Chapter 3

Country Analysis

October 2014

This chapter should be cited as
ERIA (2013), 'Country Analysis', in Kutani, I. (ed.), *Sustainable Development of the natural Gas Market in the EAS Region*. ERIA Research Project Report 2013-26, pp.17-59. Available at: http:/www.eria.org/RPR_FY2013_No.26_Chapter_3.pdf

CHAPTER 3
Country Analysis

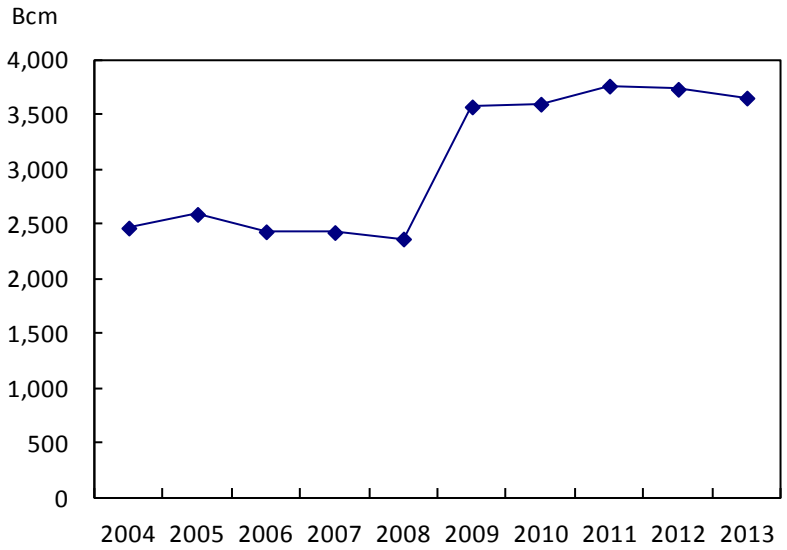
This chapter examines demand, supply, international trade, and policies of the major natural gas–producing and –consuming countries in the EAS region. Countries described here are Australia, Brunei Darussalam, China, India, Indonesia, Japan, Korea, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Viet Nam. Other EAS countries—Cambodia, Lao PDR, and New Zealand—are excluded because of non-usage, at least statistically, or absence of international trade of natural gas.

Australia

Resources

Proven reserves of natural gas in Australia total 3,650 BCM, which is the largest in the EAS region. The major sedimentary basins are Carnarvon and Browse in Western Australia, and Bonaparte in the Northern Territory. Proven reserves of coal bed methane (CBM) amount to 960 BCM, accounting for 26 percent of total proven gas reserves.

Figure 3-1 Proven Reserves of Natural Gas in Australia



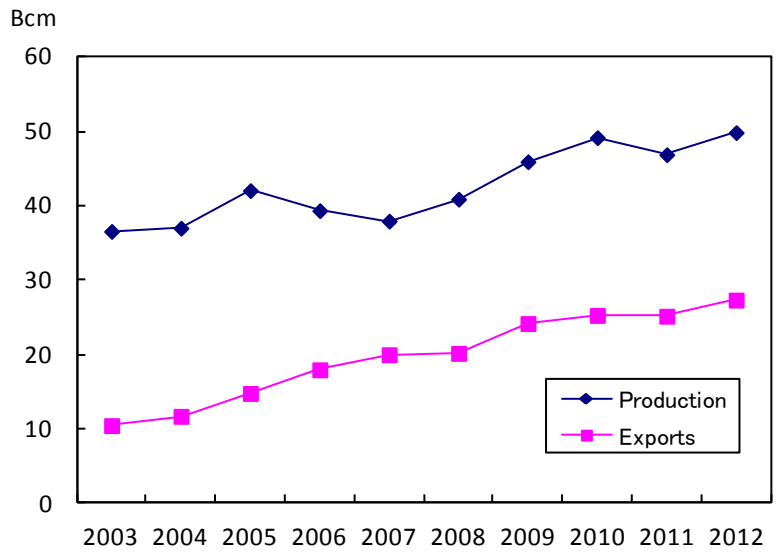
Source: Cedigaz Statistical Database.

Whilst CBM already shares a considerable amount in Australia's proven reserves, the country is believed to possess considerable shale gas resources. According to the EIA, technically recoverable resources of shale gas in Australia are 12 Tcm.

Supply and Demand

Australia is not only a major producing country but also the third largest exporter of natural gas in the EAS region. According to Cedigaz statistics, Australia produced 49.9 BCM and exported 27 BCM of natural gas in 2012. Exports amount has increased steadily due to capacity addition of LNG liquefaction plants.

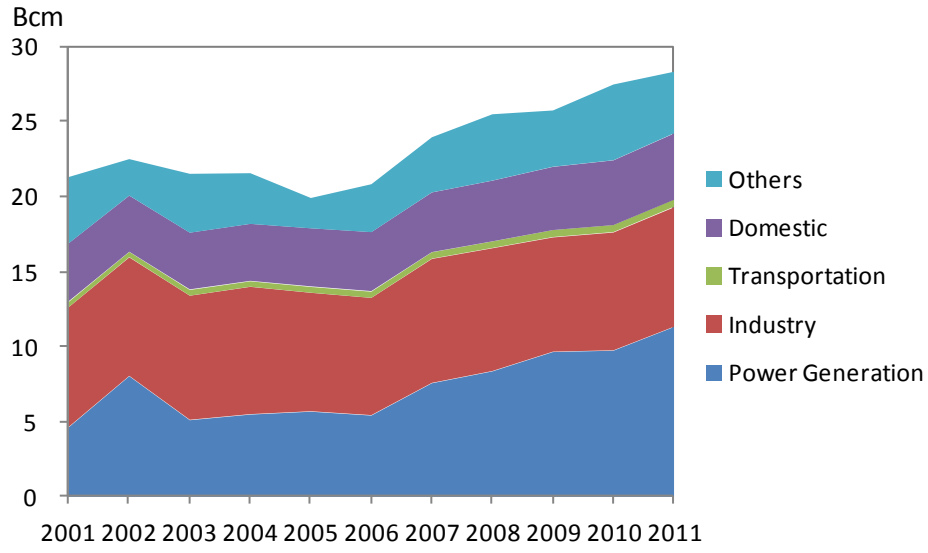
Figure 3-2 Natural Gas Production and Exports of Australia



Source: Cedigaz Statistical Database.

Natural gas consumption in 2011 was 27 Mtoe (28 BCM). Power generation is the largest demand sector, sharing 40 percent of the total, followed by the industry sector of 28 percent.

Figure 3-3 Natural Gas Demand in Australia, by sector



Source: IEA.

According to the Bureau of Resources and Energy Economics,[1] gross natural gas production will increase yearly at 2.9 percent to reach 8,595 PJ (215 BCM) in 2049–50. Meanwhile, the bureau forecasts that natural gas demand is expected to increase to 2,469 PJ (62 BCM) in the same fiscal year. The share of natural gas in the energy mix will expand from 26 percent in 2012–13 to 34 percent in 2049–50.

Therefore, Australia's export potential will increase significantly. Indeed, Australia has a number of new LNG projects. The total liquefaction capacity of those projects with FID (Final Investment Decision) has already amounted to 62 MT, which is expected to be on stream in several years. As a result, Australia will be the largest LNG exporter in the world by 2020.

Energy Policy

In Australia, the Department of Industry is responsible for gas and other energy policies. The Energy White Paper published in 2012 under the Labour government expects natural gas production to quadruple by 2017. The paper also anticipates not only conventional but also CBM, shale gas, and tight gas to contribute to this dramatic production increase. With this supply expansion potential, the paper targets more energy exports especially for Asia. However, the following challenges are recognized:

- attracting timely and efficient investment in our energy sector,
- minimizing energy price pressures,
- improving energy productivity and reducing inefficient peak demand,
- managing transitional pressures in the gas markets,
- bringing new technologies to market,
- ensuring our long-term liquid fuel security,
- safely and sustainably developing our energy resources, and
- promoting informed energy choices.

Whilst Australia is expected to be the largest LNG exporter in this decade, it is true that many new LNG projects face considerable cost overruns. After the

[1] 'Australian Energy Projections', Bureau of Resources and Energy Economics, http://www.bree.gov.au/publications/australian-energy-projections-2049%E2%80%9350 (accessed December 19, 2012).

Liberal Party took over the power in 2013, the Department of Industry has been working on a new Energy White Paper to be published in September 2014. The new paper will consider the following:[2]

- policy and regulatory reform to secure reliable, competitively, and transparently priced energy for a growing population and productive economy, including the efficiency and effectiveness of regulatory bodies;
- the appropriate role of government in the energy sector;
- opportunities to drive the more productive and efficient use of energy;
- energy-related distribution infrastructure to deliver efficient national markets;
- alternative transport fuel sources;
- workforce issues, including national skills development needs;
- emerging energy technologies and new energy sources; and
- future growth in exports of energy products, including the world leading services industries.

Initiating the formulating work of the new paper, Minister Macfarlane stated:

> 'the White Paper will deliver on the Government's economy-wide reforms relevant to the energy sector. Reforming regulation, improving workforce skills and encouraging innovation will help drive the efficiencies and productivity to put downward pressure on domestic costs and grow energy exports.'[3]

Brunei Darussalam

Resources

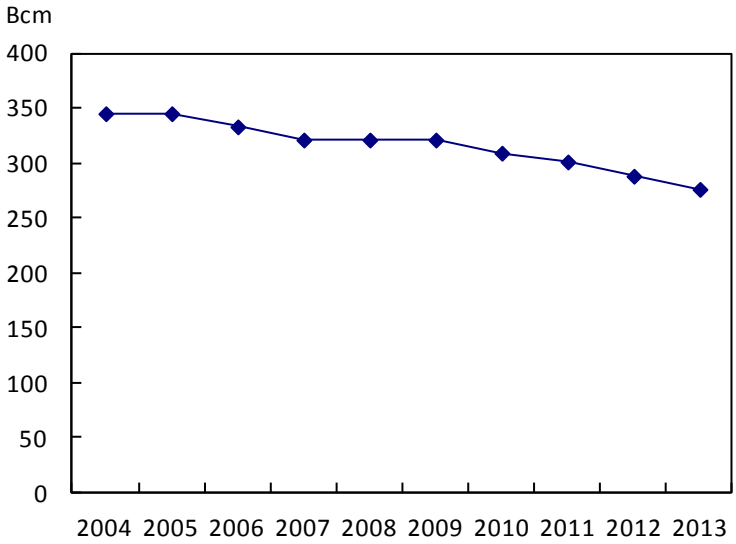
Proven reserves of natural gas in Brunei Darussalam are 276 BCM. Since there is little new development happening, proven reserves have been declining in recent years.

---

[2] Energy White Paper Issue Paper, Department of Industry, http://ewp.industry.gov.au/documents/issues-paper (accessed December 2013).

[3] 'Work begins on Energy White Paper', Ministry of Industry press release, http://minister.industry.gov.au/ministers/macfarlane/media-releases/work-begins-energy-white-paper (accessed December 5, 2013).

Figure 3-4 Proven Reserves of Natural Gas in Brunei Darussalam

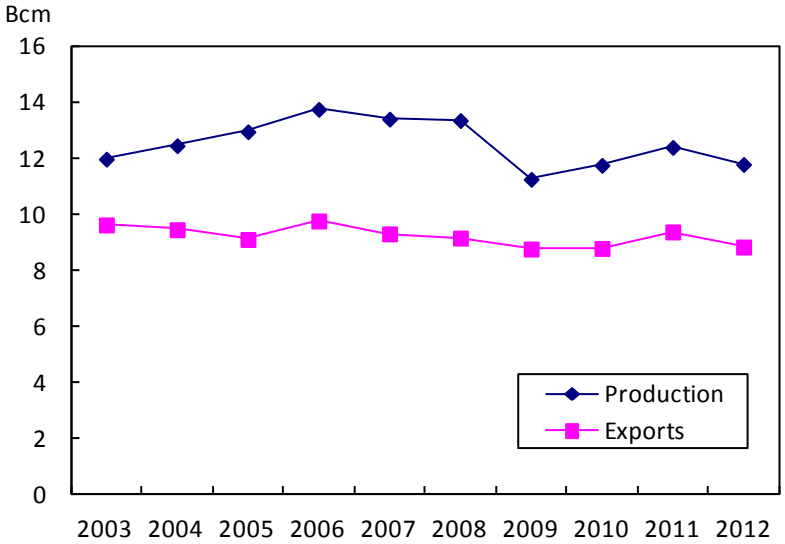


Source: Cedigaz Statistical Database.

Supply and Demand

With little new developments, natural gas production in Brunei Darussalam has stagnated for the past decade. Production in 2012 was 12 BCM, slightly declined from the previous year due to infrastructure refurbishment work.

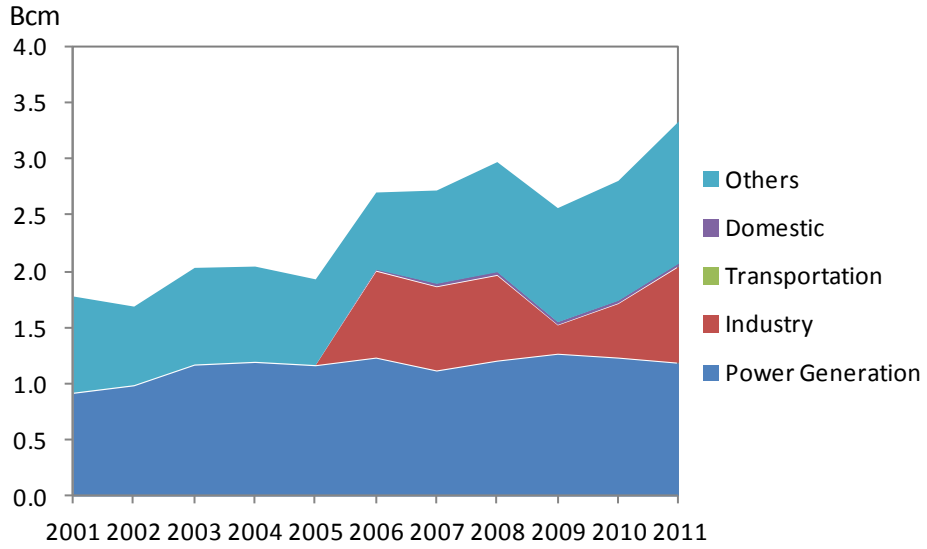
Figure 3-5 Natural Gas Production and Exports of Brunei Darussalam



Source: Cedigaz Statistical Database.

Natural gas consumption in 2011 was three BCM. Own use at energy plants is the largest demand sector, sharing 38 percent of the total, followed by the power generation sector at 36 percent.

Figure 3-6 Natural Gas Demand in Brunei Darussalam, by sector



Source: IEA.

According to the Prime Minister's Office, Brunei Darussalam's energy production will increase to 27 MToe in 2020 and remain around the same amount in 2035.[4] Natural gas production, too, will be in a similar trend to reach 18 MToe (19 BCM) in 2020 and stay at the same level in 2035. Natural gas exports are expected to be stable at 15 MToe (16 BCM) for both 2020 and 2035. Natural gas demand in the country will expand to 2.9 MToe (3.0 BCM) in 2020 and 3.3 MToe (3.5 BCM). The power generation and industry sectors are expected to share 44 percent and 33 percent, respectively, in both 2020 and 2035.

Energy Policy

Oil and LNG exports account for 96 percent of Brunei Darussalam's export value in 2012. The core of the country's energy policy is, therefore, maintaining stable production and export of oil and gas. However, slow progress of new gas developments casts shadows on maintaining the current level of production and exports. Offshore deep-water blocks adjacent to

[4] Data submitted to IEEJ.

Malaysia's maritime water were hoped to be the breakthrough, but no gas discovery has been successful so far.

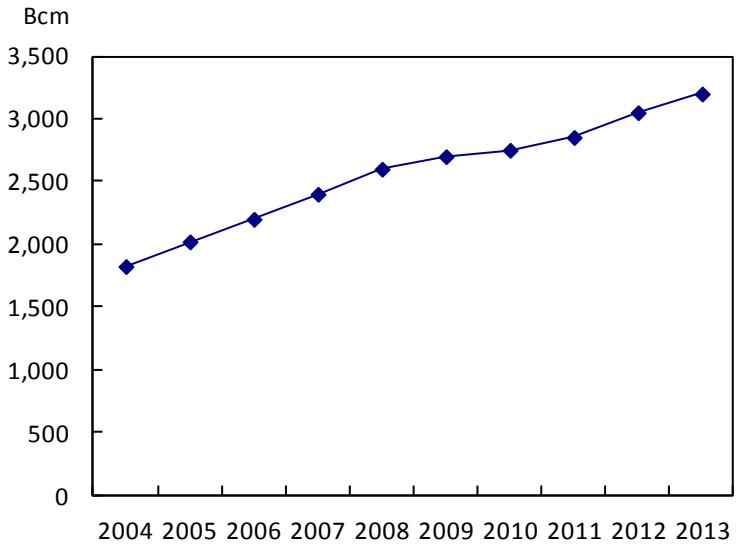
The Energy Department formulates and executes energy policies. Domestic energy developments are stipulated by the Petroleum Mining Act that was established in 1963. According to the Act, oil and gas upstream developments are controlled by the development plans of the government.
Another pillar of the country's energy policy is diversification away from heavy dependency on oil and LNG exports. The government has been investing on petrochemical and refinery industries and energy efficiency programs.

China

Resources

With 3,200 BCM in 2013, China holds the second largest proven reserves of natural gas in the EAS region. Exploration and production activities in major basins like Tarim, Ordos, Songliao, Sichuan, and Bohai Bay have contributed to steady reserve additions in the past decade.

Figure 3-7 Proven Reserves of Natural Gas in China



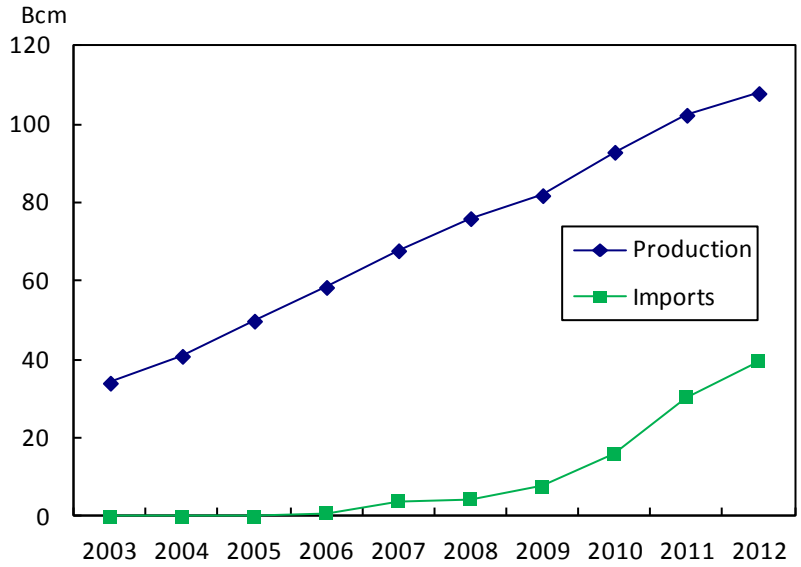
Source: Cedigaz Statistical Database.

China also has a substantial potential for unconventional gas resources. The Ministry of Land and Resources of China estimates that recoverable resources of tight gas, CBM, and shale gas are 3.3 Tcm, 10.9 Tcm, and 25.1 Tcm, respectively.

Supply and demand

China produced 108 BCM of natural gas in 2012. The production has increased dramatically at 13 percent per annum since 2003, yet imports have increased even faster in recent years. China started to import LNG in 2006 and pipeline gas in 2009 to keep up with the rapidly rising demand.

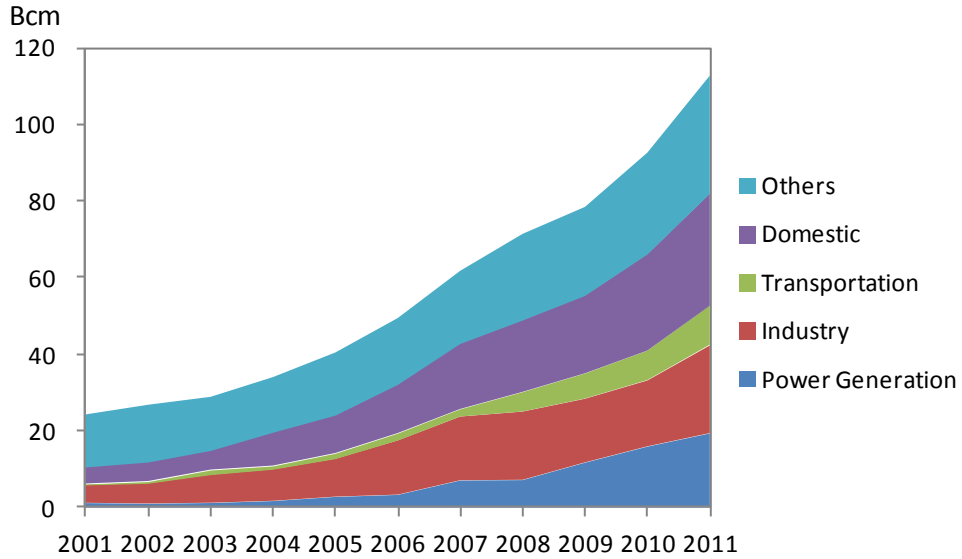
Figure 3-8 Natural Gas Production and Imports of China



Source: Cedigaz Statistical Database.

China consumed 113 BCM of natural gas in 2011. The consumption has grown at 17 percent per annum for the past 10 years. 'Others', mainly own use by energy industries and feed stocks for petrochemical, shares 27 percent of the total, followed by domestic at 26 percent, industry at 20 percent, and power generation at 17 percent.

Figure 3-9 Natural Gas Demand in China, by sector

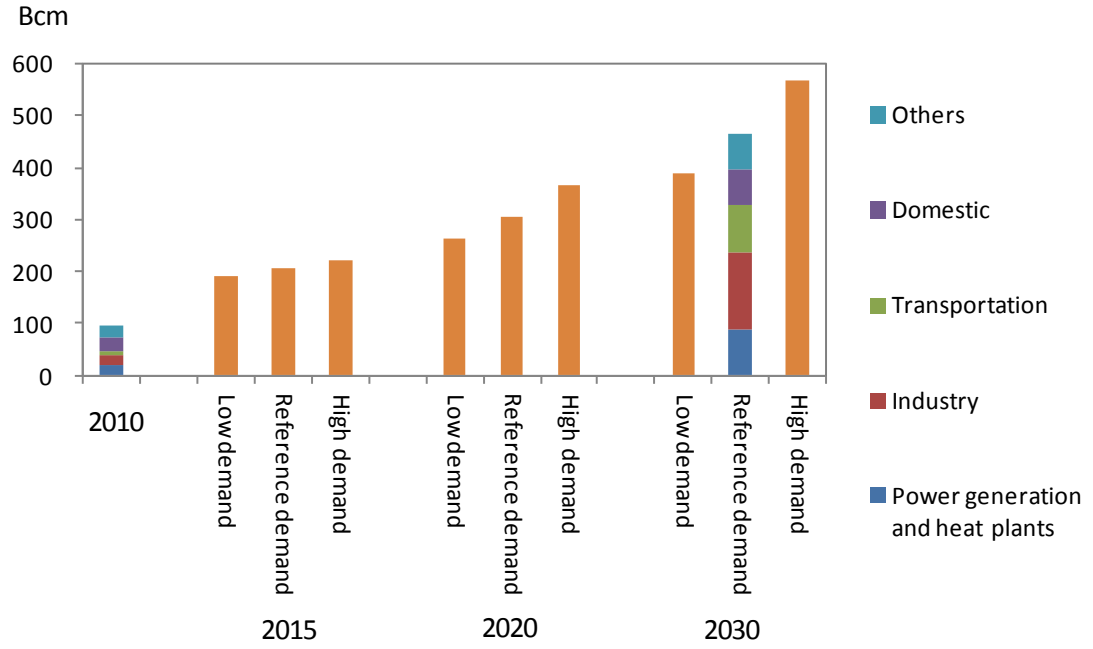


Source: IEA.

According to CNPC (China National Petroleum Corporation) Economics & Technology Research Institute (ETRI), natural gas production in China will increase to 150 BCM in 2015, 200 BCM in 2020, and 240 BCM in 2030 (including 60 BCM of CBM and 50 BCM of shale gas). Pipeline gas import is expected to reach 40 BCM in 2015, 70–95 BCM in 2020, and 100–125 BCM in 2030. LNG import is expected to reach 40 BCM (29 MT) in 2015, 50–70 BCM (37–51 MT) in 2020, and 70–95 BCM (51–70 MT) in 2030.

As for natural gas demand, CNPC ETRI forecasts that the demand will increase to 190–222 BCM in 2015, 265–365 BCM in 2020, and 389–568 BCM in 2030, depending on the scenarios. The demand growth will be driven mainly by industry and transportation.

Figure 3-10 Natural Gas Demand Outlook in China



Source: CNPC Economics & Technology Research Institute.

Energy Policy

The National Energy Administration, under the supervision of the National Energy Commission chaired by Prime Minister Li, draws up and exercises China's energy policy. Such policy is outlined in the 12th Five Year Plan adopted in 2011, which emphasizes energy efficiency, energy source diversification, environmental protection, international cooperation, optimization of demand/supply structures, and establishment of stable/competitive/clean energy supply system. Bohai Bay, Jungar, Ordos, Sichuan, and Tarim are mentioned as the major producing areas. Additionally, offshore oil and gas and CBM developments are also promoted. With aggravating air pollution, the Government of China published the *Action Plan for Air Pollution Prevention and Control* in 2013 that prohibits new coal-fired power plants by auto producers in major cities, and promotes combined heat and power and use of natural gas.

As far as natural gas is concerned, priority is given to reforming domestic gas pricing so that the gap between import and domestic prices can be narrowed down, the demand can be optimized, and domestic gas developments can be incentivized. A series of pricing reforms has been conducted over the last decade to achieve these goals. Recently, in 2013, the National Development

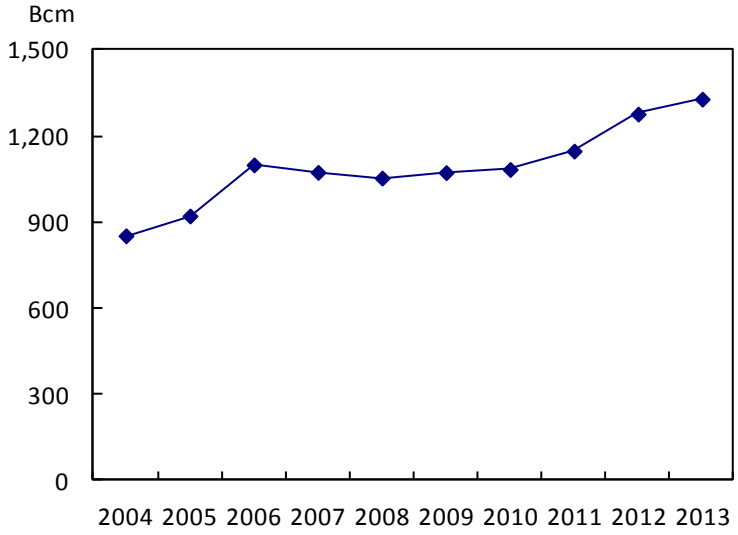
and Reform Commission altered the wholesale pricing point from wellheads to city gates, and increased the average wholesale price from 1.69 yuan/m^3 ($7.39/MMBtu) to 1.95 yuan/m^3 ($8.52/MMBtu).

India

Resources

India possesses substantial natural gas reserves of 1,330 BCM as of 2013; thanks to domestic gas exploration and development promotion policy since the 1990s that contributed significant reserve additions, especially in the early 2000s, although the reserve increase has slowed down in recent years.

Figure 3-11 Proven Reserves of Natural Gas in India



Source: Cedigaz Statistical Database.

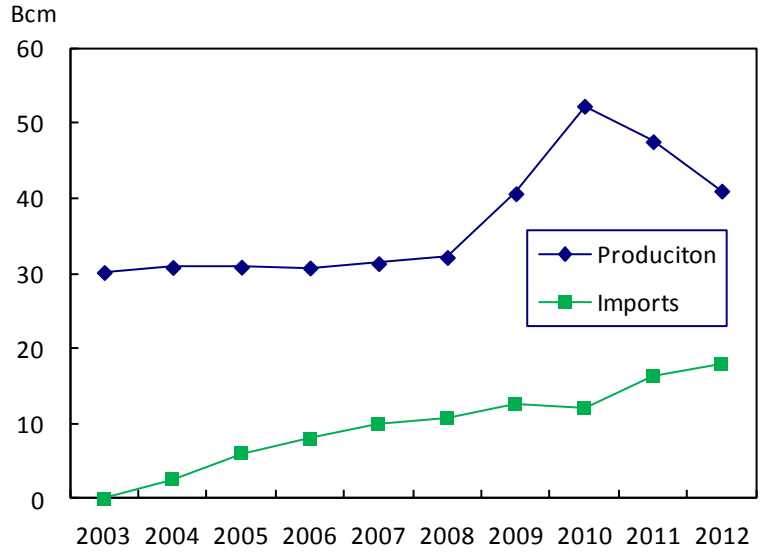
India is also rich in unconventional gas resources. According to the Directorate General of Hydrocarbons under the Ministry of Petroleum and Natural Gas, CBM resource in India is 2,609 BCM.[5] As for shale gas, the US EIA estimates India's technically recoverable resources amounts to 63Tcf (1.8 Tcm).[6]

[5] Directorate General of Hydrocarbons, 'Hydrocarbon Exploration and Production Activities – 2012-13', p. 7.
[6] Energy Information Administration (EIA), 'Technically Recoverable Shale Oil and Shale Gas Resources: An Assessment of 137 Shale Formations in 41 Countries Outside the United States',

Supply and demand

Natural gas production in India in 2012 was 41 BCM. With the start of gas production of Krishna-Godavari, the country's total production increased dramatically in 2009 and 2010. However, geological complexity and lower performance of the current wells in Krishna-Godavari resulted in sharp decline of the production in 2011 and 2012. Stagnating domestic gas production tightens the demand/supply in the country, leading to more LNG imports.

Figure 3-12 Natural Gas Production and Imports of India

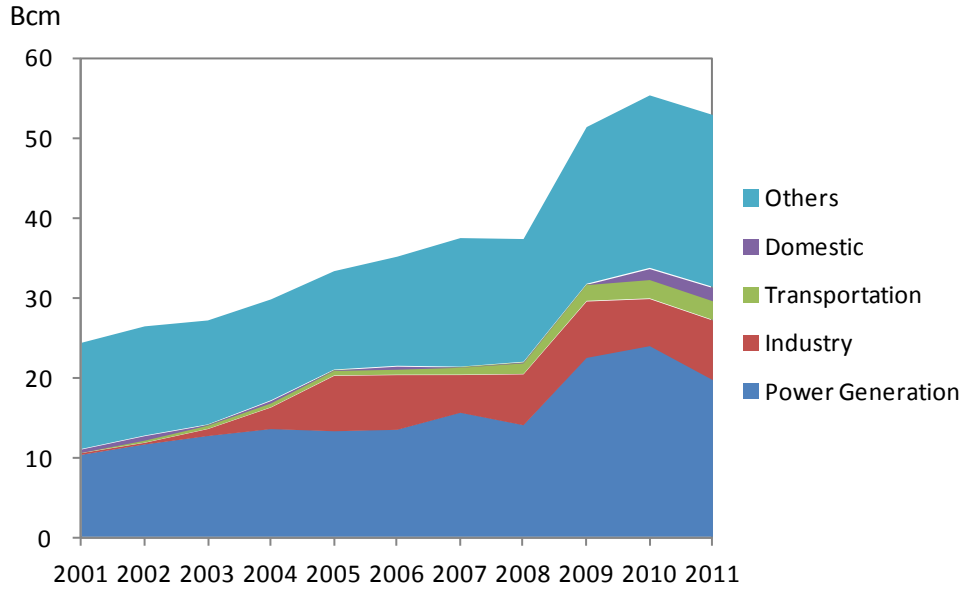


Source: Cedigaz Statistical Database.

Gas consumption in India in 2011 was 53 BCM. The consumption has grown at eight percent per annum for the past decade. Like in China, 'Others', mainly own use by energy industries and feed stocks for petrochemical, shared the largest portion of 41 percent of the total, followed by power generation at 37 percent and industry at 14 percent.

http://www.eia.gov/analysis/studies/worldshalegas/

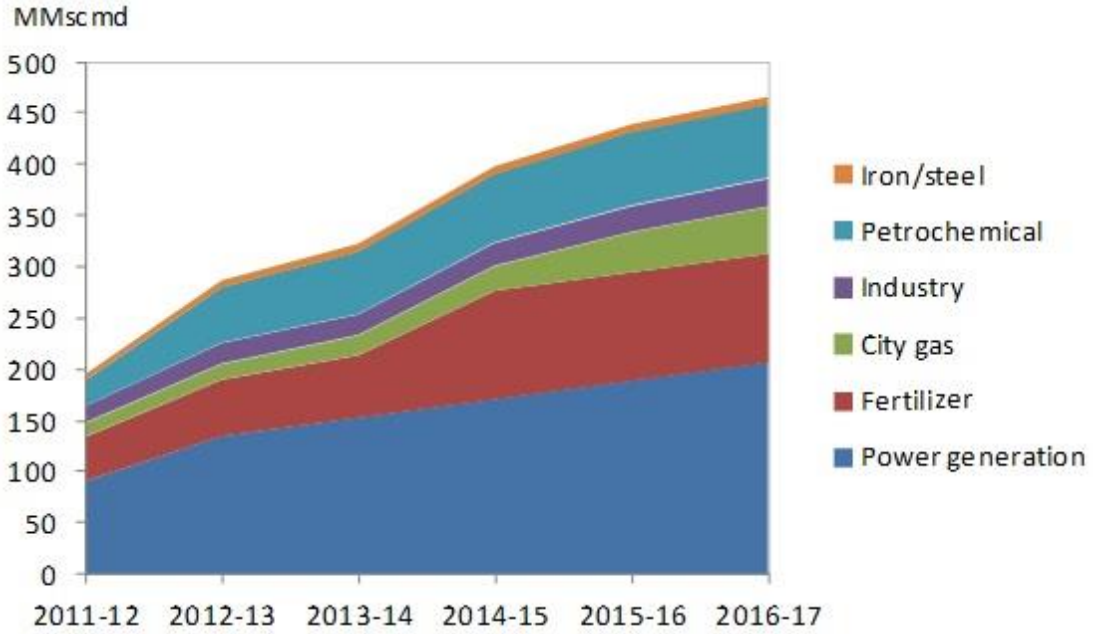
Figure 3-13 Natural Gas Demand in India, by sector



Source: IEA.

According to the 12th Five Year Plan, India's natural gas demand will increase at an astonishing 19 percent per annum to 466 million standard cubic meter per day (MMscmd) (161 BCM) in 2016–2017. However, majority of the demand growth is expected to accrue in power generation and fertilizer sectors which are regarded as 'price elastic'. Therefore, the demand growth is highly dependent on cost competitiveness of natural gas for those sectors.

Figure 3-14 Natural Gas Demand Outlook in India



Source: Planning Commission, 12th Twelfth Five Year Plan.

Energy Policy

India's energy policy administration is divided among several ministries, namely, Planning Committee, Ministry of Petroleum and Natural Gas, Ministry of Power, Ministry of Coal, Ministry of New and Renewable Energy, and Department of Atomic Energy. The Five Year Plan, the basic policy paper not only on energy but also on many other policy fields, is formulated by the Planning Committee based on proposals by the above ministries.

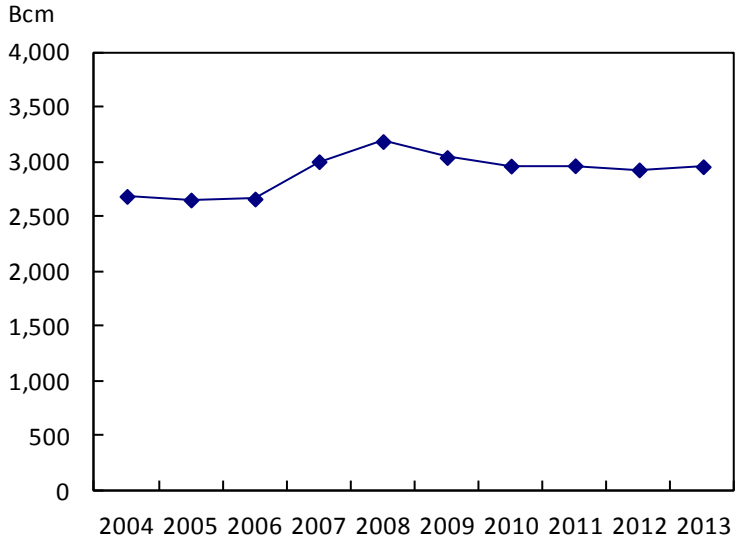
The current 12th Five Year Plan recognizes achieving low-cost energy supply and emphasizes the need for energy efficiency and domestic resource developments. India is similar to China in terms of gas policies. The plan calls not only for conventional but also for CBM and shale gas developments, and addresses domestic gas pricing reform.

Indonesia

Resources

After Australia and China, Indonesia is the third largest proven gas reserve holder of 2,954 BCM as of the beginning of 2013. The major reserves are located in Natuna, Sumatra, East Kalimantan, Maluku, and Papua. Additionally, there are CBM recoverable reserves of 113 Tcf (3 Tcm).

Figure 3-15. Proven Reserves of Natural Gas in Indonesia

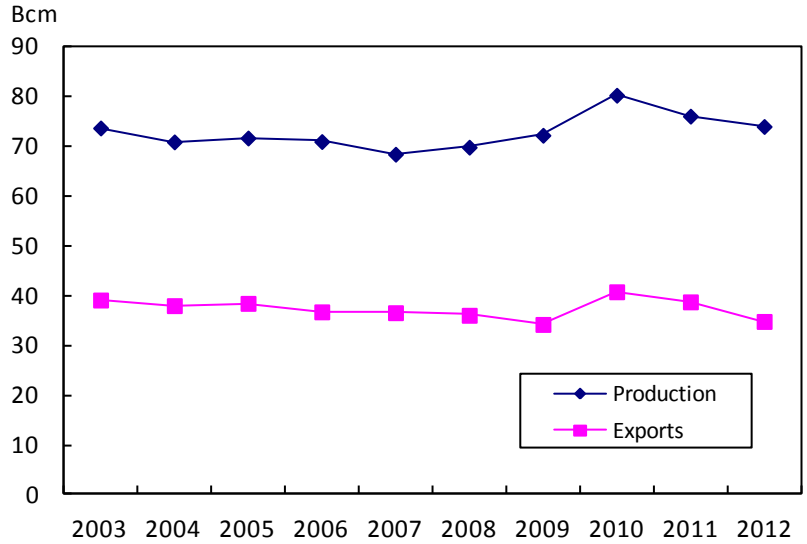


Source: Cedigaz Statistical Database.

Supply and demand

Natural gas production in Indonesia has hovered around 70–80 BCM per annum in the past decade. Both production and exports decreased in two consecutive years in 2011 and 2012.

Figure 3-16 Natural Gas Production and Exports of Indonesia

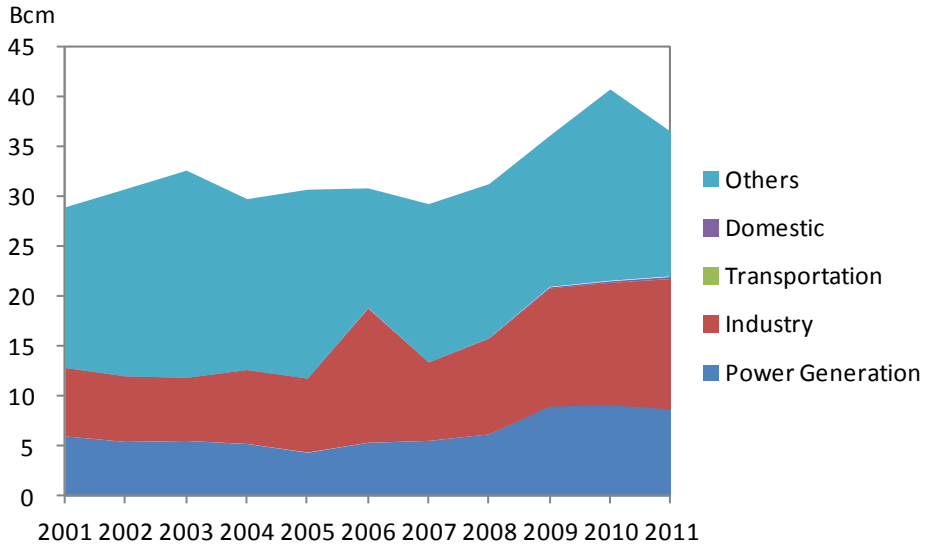


Source: Cedigaz Statistical Database.

Indonesia consumed 36 BCM of natural gas in 2011. 'Others' that include fertilizer production and own use by energy plants shared 40 percent of the

total, followed by industry at 36 percent and power generation at 24 percent. In 2011, the demand decreased by four BCM, partly because slower upstream activities reduced own use by energy plants.

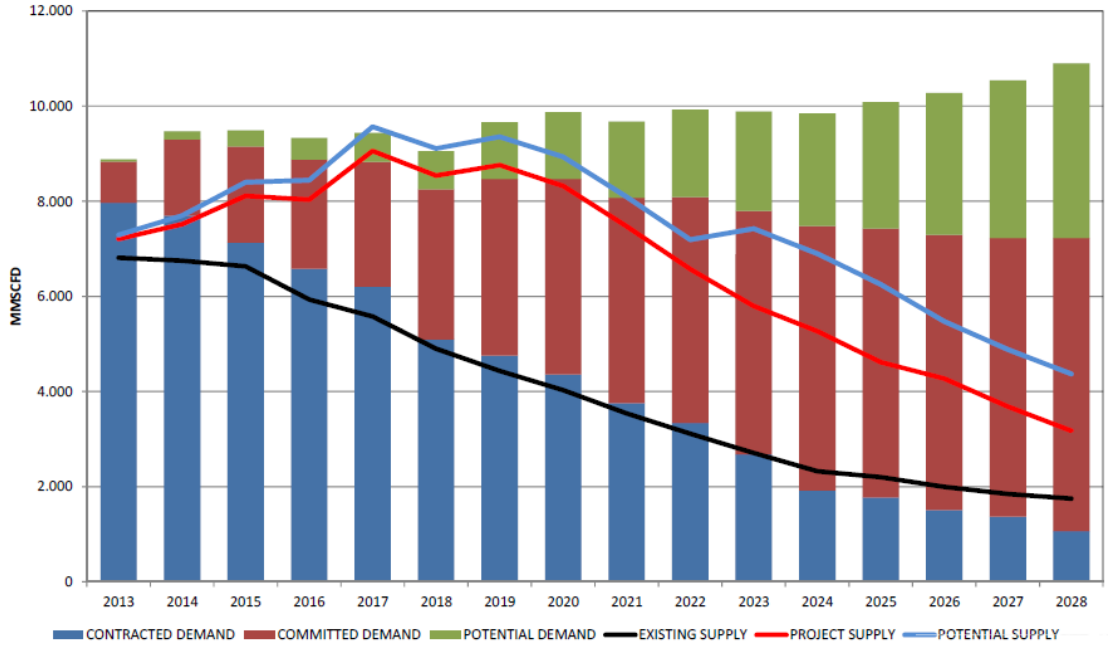
Figure 3-17 Natural Gas Demand in Indonesia, by sector



Source: IEA.

According to a forecast by the Ministry of Energy and Mineral Resources, domestic natural gas production will peak in 2017, and will meet less than half of the demand in 2028. This means Indonesia is likely to turn into a net import country in the long run. Indeed, the state-owned oil company Pertamina signed a sale and purchase agreement with Cheniere Energy to import 0.8 MT of LNG per year from the Sabine Pass project in the USA. If potential demand is included, Indonesia's natural gas demand could rise steadily to about 11,000 million standard cubic feet per day (MMscfd) (107 BCM) in 2028. However, because potential demand shares as much as 40 percent of the total demand in 2028, whether the demand of 107 BCM will be generated seems to depend on the availability and import cost of domestic gas.

Figure 3-18 Natural Gas Demand/Supply Outlook in Indonesia



Source: Ministry of Energy and Mineral Resources.

Energy Policy

Indonesia's energy policy is controlled by the Ministry of Energy and Mineral Resources. The main policy paper is the National Energy Policy of 2006, which envisaged oil consumption replaced by coal, natural gas, and renewable energy. The principle of reducing oil dependency seems to remain the same in the new energy mix target that the government is currently formulating.[7] The policy intention of less oil dependency reflects the expanding oil subsidies, aggravated by the demand growth and increasing expensive oil imports. Therefore, the importance of natural gas as alternative fuel is rising. Indeed, in principle, 25 percent of gas production is required to be supplied to the domestic market which is known as Domestic Market Obligation policy.

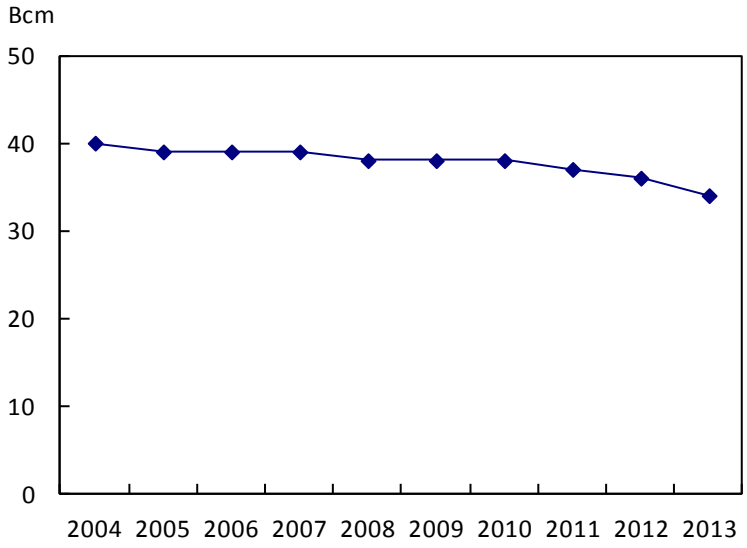
[7] *Jakarta Post*, 'RI turns to renewable resources for future energy use', January 29, 2014.

Japan

Resources

Japan has little gas resources. In the beginning of 2013, proven reserves in the country totalled merely 34 BCM. No significant unconventional gas resources were reported. Although the government has been researching on methane hydrate resources for the past decades, there is no concrete schedule for any reserve additions and commercialization of methane hydrate.

Figure 3-19 Proven Reserves of Natural Gas in Japan

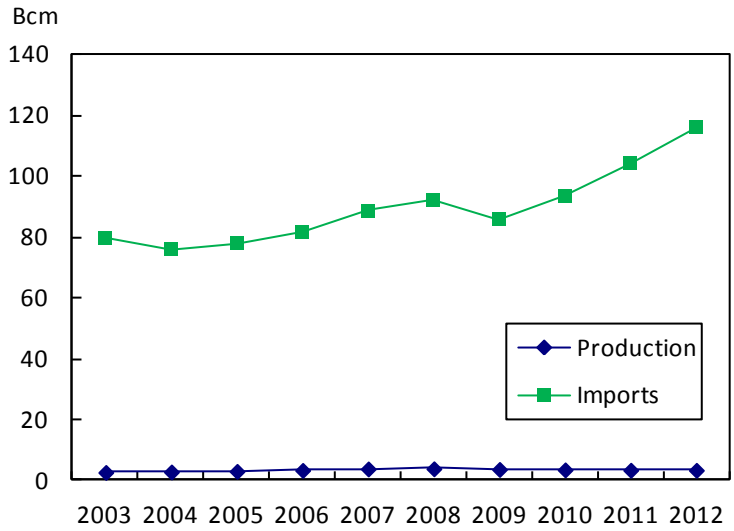


Source: Cedigaz Statistical Database.

Supply and Demand

Japan produced three BCM of natural gas in 2012, which is three percent of the demand. Production has been stable for the past 10 years. Lacking international pipeline connections, imports are only in the form of LNG. After the Fukushima nuclear accident, import amount jumped to reach 116 BCM in 2012, making Japan the largest natural gas importer in the world.

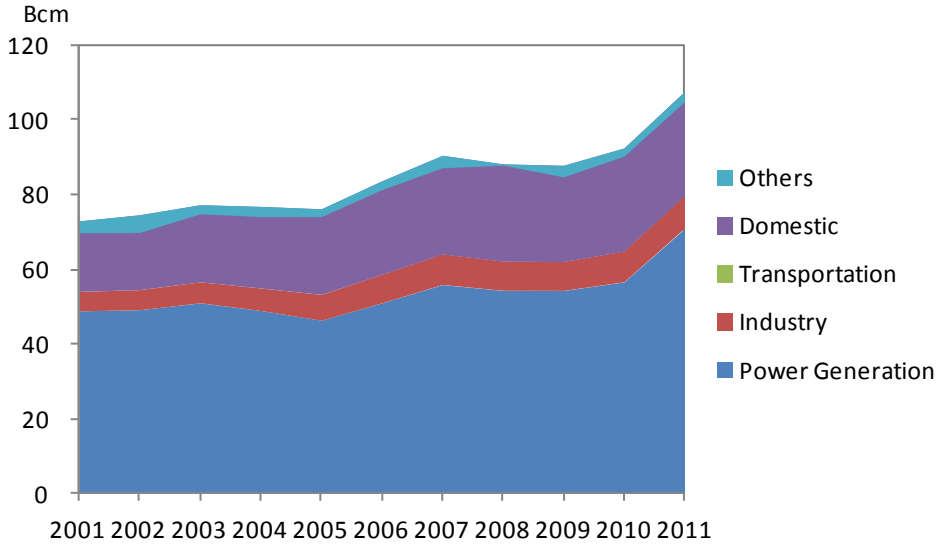
Figure 3-20 Natural Gas Production and Imports of Japan



Source: Cedigaz Statistical Database.

Japan consumed 105 BCM of natural gas in 2011. Sharing 68 percent of the total, power generation is the largest demand sector, followed by domestic at 27 percent.

Figure 3-21 Natural Gas Demand in Japan, by sector

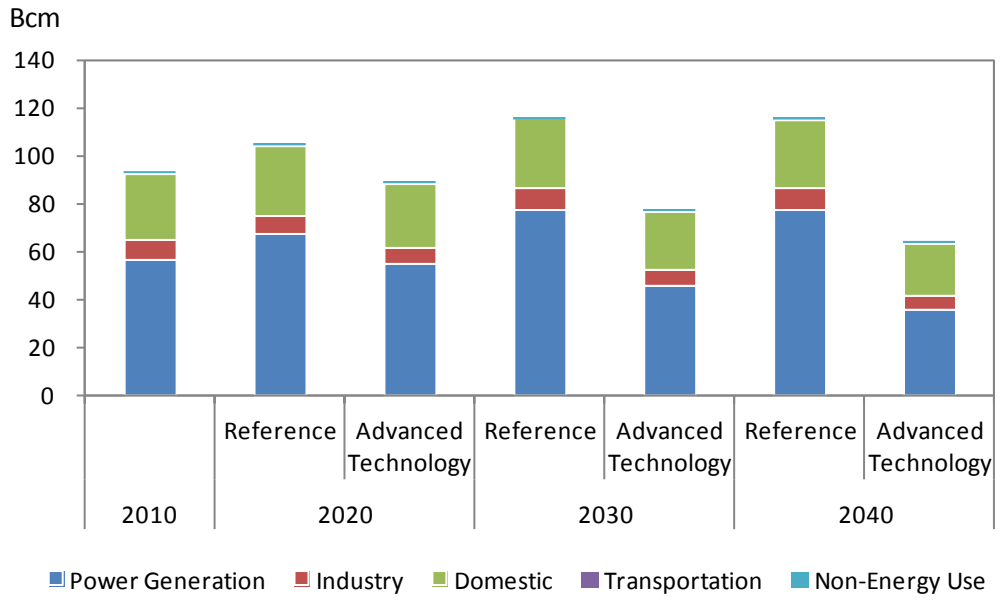


Source: IEA.

IEEJ forecasts that natural gas demand will fluctuate from 93 BCM in 2010 to 89–102 BCM in 2020, 74–113 BCM in 2030, and 61–112 BCM in 2040,

highly dependent on the extent of nuclear restart and decommissioning. Demand will be met primarily by imported LNG. Whilst methane hydrate has great potential, this forecast does not consider any significant production, given the uncertainty on technology development.

Figure 3-22 Natural Gas Demand Outlook in Japan



Notes: Advanced Technology scenario assumes energy conservation and low-carbon technologies, including renewable and nuclear, to a maximum extent to enhance energy security and address climate change issues.
Source: IEEJ.

Energy Policy

The Ministry of Economy, Trade and Industry is responsible for formulating and executing energy policy in Japan. Traditionally, energy security, environmental protection, and economic efficiency are the three pillars of Japan's energy policy. Concerned about high dependency on imported fossil fuels, Japan has been working on energy diversification, especially away from oil, energy efficiency, reducing CO_2 (carbon dioxide) emission, and other measures.

The Fukushima Daiichi accident in 2011 forced the government to fundamentally alter its nuclear-oriented energy policy. The Basic Energy Plan

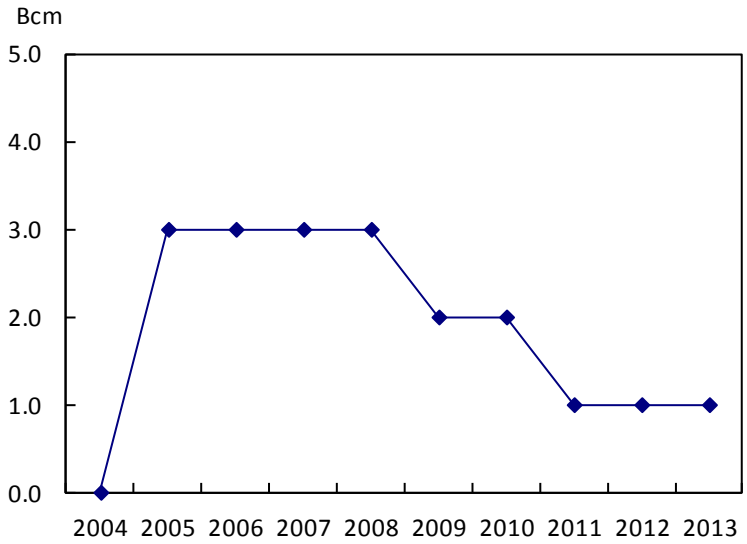
of 2014 toned down the emphasis on nuclear power to a significant extent, although it promotes nuclear restart as long as safety standards are met. With the rising import cost of LNG, reducing import cost has been given priority in the plan. In relation to that priority, the plan calls for LNG market flexibility by, for instance, introducing the USA LNG, abolishing destination clause, and jointly purchasing LNG. The plan also mentions fully liberalizing the power market and unbundling the electricity supply industry by 2020. The government is also discussing the similar liberalization of the gas industry.

Korea

Resources

Korea is similar to Japan in terms of its lack of gas resources. Proven reserves of natural gas in Korea are as little as one BCM as of January 2013. The reserve, discovered in 1997, exists at the offshore East Coast.

Figure 3-23 Proven Reserves of Natural Gas in Korea

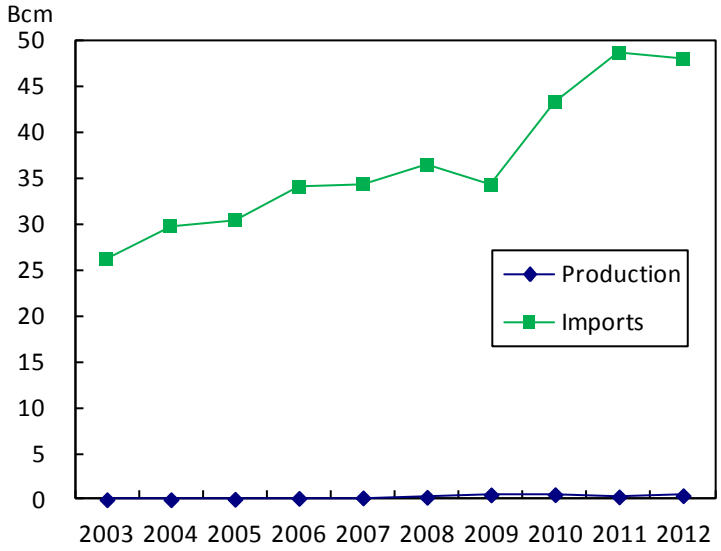


Source: Cedigaz Statistical Database.

Supply and demand

Natural gas production in Korea in 2012 was 0.4 BCM. The current Donghae-1 field is expected to be depleted in the near future. Almost all demand is met by imported LNG. Korea is the second largest LNG importer in the world, having imported 48 BCM in 2012.

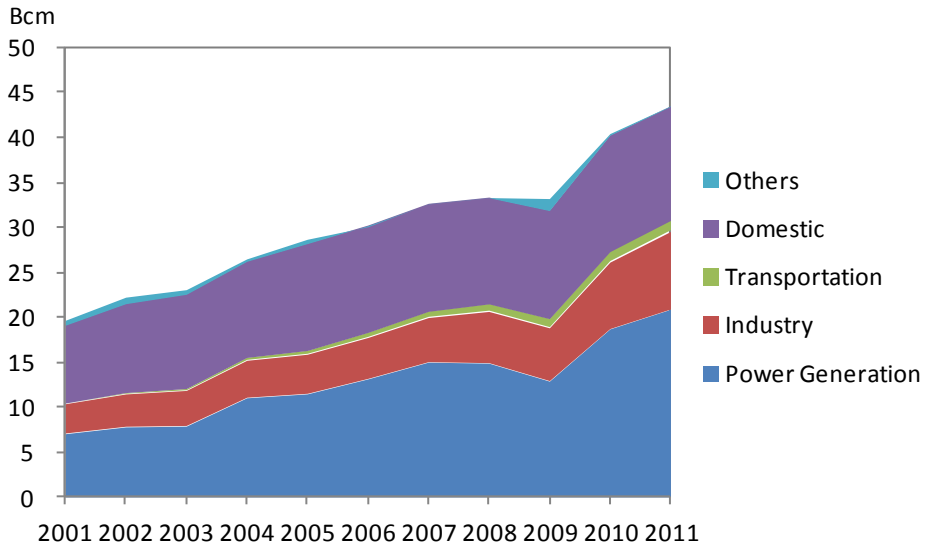
Figure 3-24 Natural Gas Production and Imports of Korea



Source: Cedigaz Statistical Database.

Korea consumed 43 BCM of natural gas in 2011. With a share of 48 percent of the total, power generation is the largest demand sector. Domestic and industry sectors followed at 30 percent and 20 percent shares, respectively. The demand has been growing eight percent per annum for the past decade.

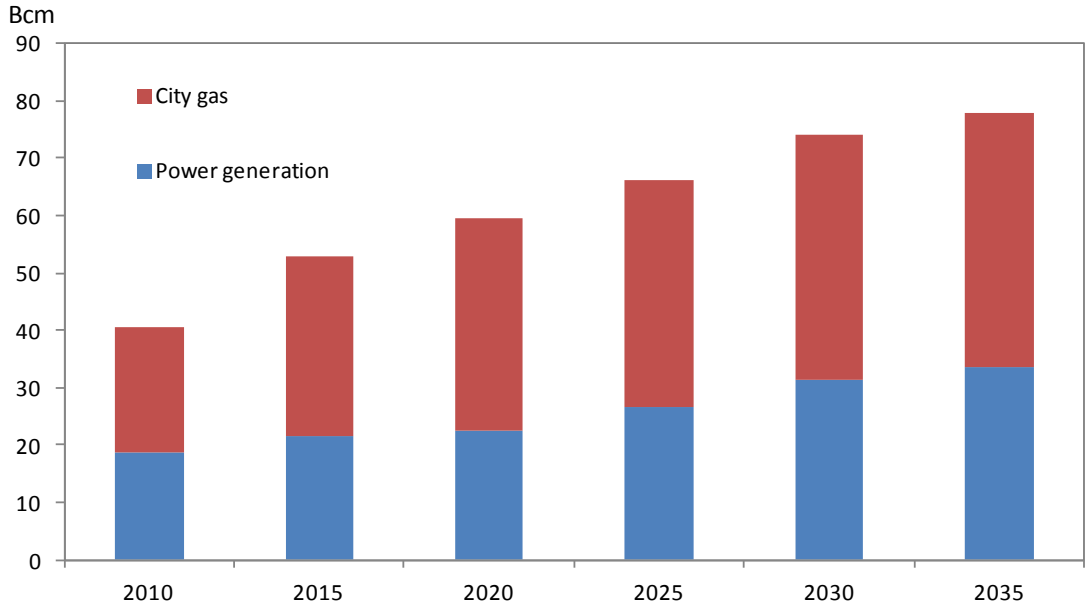
Figure 3-25 Natural Gas Demand in Korea, by sector



Source: IEA.

According to the Korea Energy Economics Institute, natural gas demand in Korea will increase from 40 BCM in 2011, to 59 BCM in 2020, 74 BCM in 2030, and 78 BCM in 2035. City gas sector and power generation will share 56 percent and 44 percent, respectively, in 2035. Like in Japan, there is substantial uncertainty in demand growth for power generation, depending on the development of nuclear, coal-fired, and renewable generation capacities. Anticipating the only domestic gas production will terminate in 2018, the demand is assumed to be supplied primarily by imported LNG. There are plans to import Russian pipeline gas; however, there is no concrete contract or schedule to do so at the moment.

Figure 3-26 Natural Gas Demand Outlook in Korea



Source: Korea Energy Economics Institute.

Energy Policy

Korea's energy policy is under the supervision of the Ministry of Trade, Industry and Energy. The National Basic Plan for Energy, Korea's principal energy policy document, emphasizes the importance of nuclear power in the energy mix, energy demand management, and distributed energy. Priority on non-fossil fuel and energy demand control is the reflection of Korea's heavy dependence on imported fossil fuels.

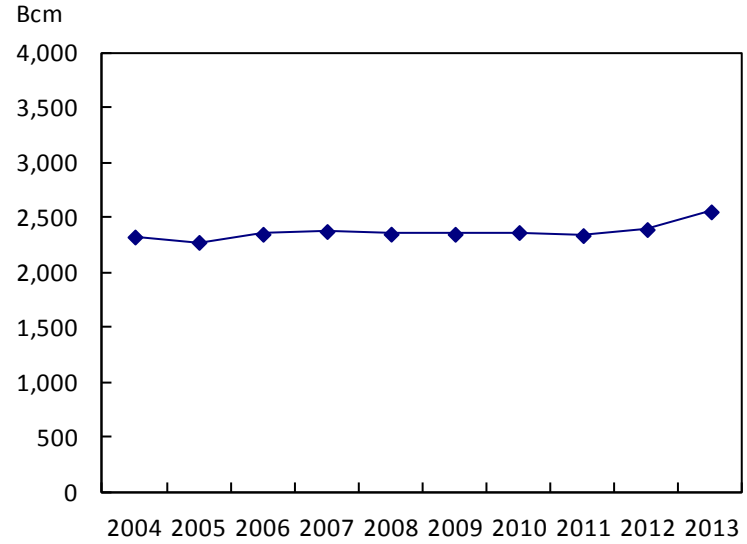
In accordance with the principle of the Plan, the ministry's *11th Long Term Natural Gas Supply/Demand Plan* published in 2013 targets demand for natural gas to remain at the similar level in 2027; however, it is generally considered pessimistic. To alleviate the burden of rising energy cost, the *National Basic Energy Plan* published in January 2014 states that taxes on LNG, liquefied petroleum gas (LPG), and gas oil will be reduced to a different extent.

Malaysia

Resources

Proven reserves of natural gas in Malaysia in 2013 totalled 2,550 BCM,[8] which makes the country the fourth largest gas reserve holder in the EAS region. The reserves have been fairly stable in the last decade, although there is some sign of reserve additions, thanks to gas discovery offshore Sawarak and Sabah.

Figure 3-27 Proven Reserves of Natural Gas in Malaysia



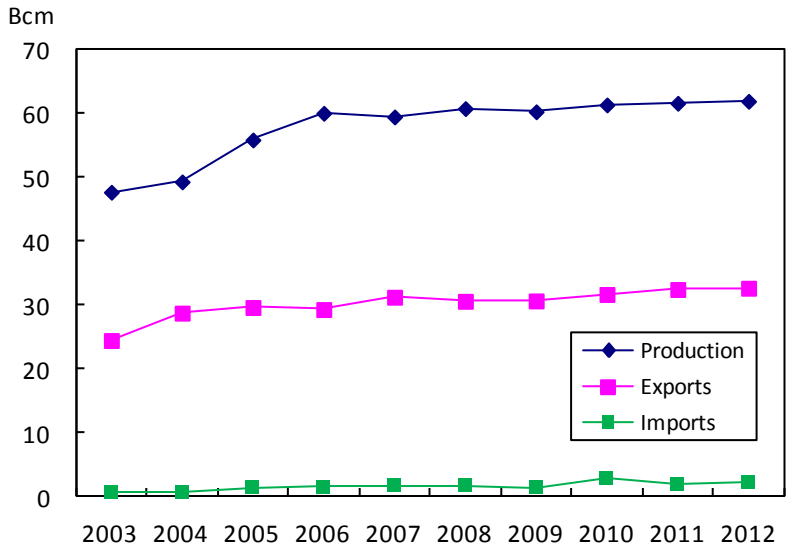
Source: Cedigaz Statistical Database.

Supply and Demand

Malaysia produced 62 BCM of natural gas in 2012. Geographical mismatch of gas production and demand makes the country both an importer and exporter of natural gas. Whilst Sarawak state is the major LNG export centre, Peninsula Malaysia imports pipeline gas from Indonesia and exports to Singapore. Malaysia also started LNG imports in 2013.

[8] There is discrepancy between the figures of Cedigaz and Malaysia's Energy Commission; the latter is 2,784 BCM.

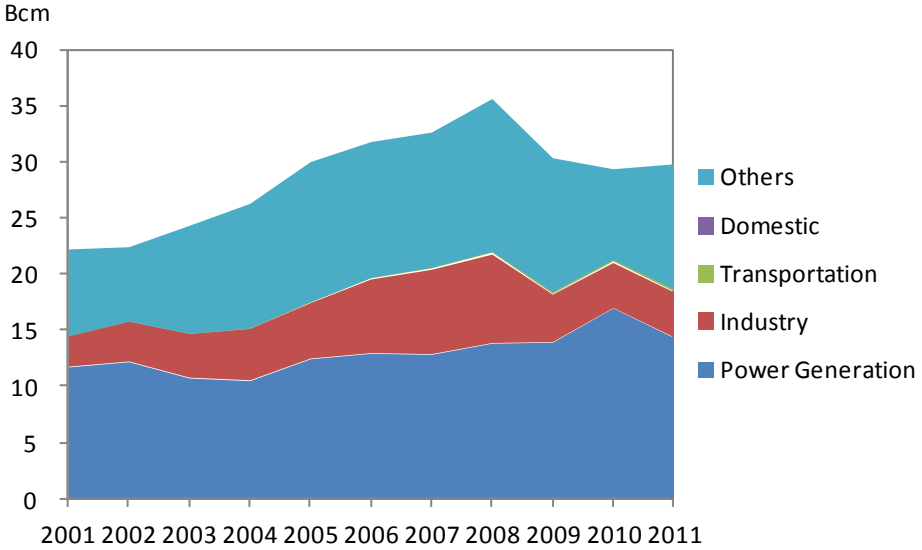
Figure 3-28 Natural Gas Production and Imports/Exports of Malaysia



Source: Cedigaz Statistical Database.

Natural gas consumption in Malaysia in 2011 was 30 BCM.[9] Power generation shared 48 percent of the total. Being a major gas producer, own use at energy plants made 'Others' the significant demand sector at the share of 37 percent of the total.

Figure 3-29 Natural Gas Demand in Malaysia, by sector

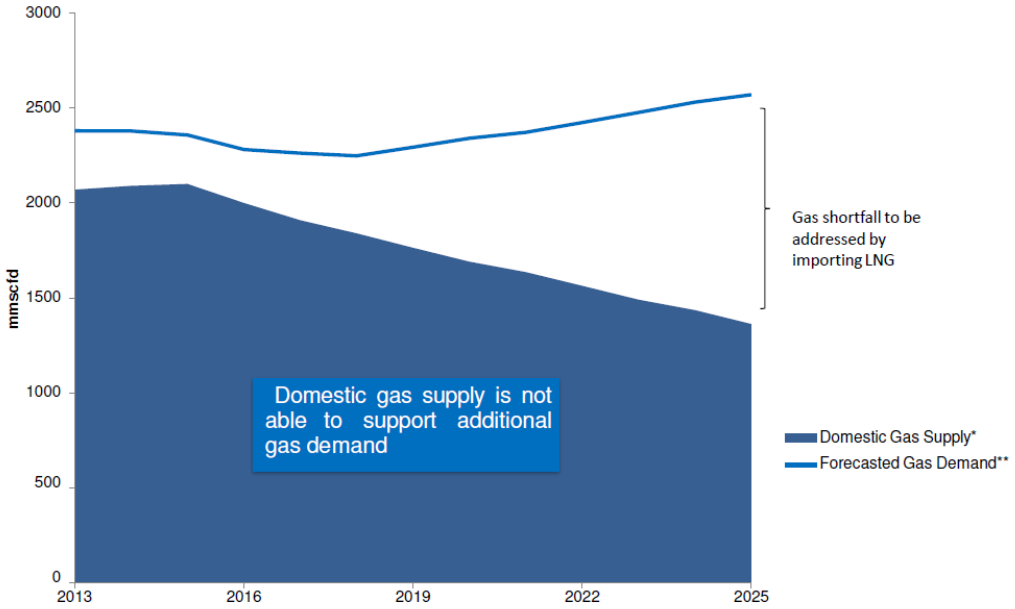


Source: IEA.

[9] Like proven reserves, there is discrepancy between IEA and Energy Commission figures: the latter is 22.5 BCM.

According to the Energy Commission of Malaysia, domestic gas supply will not keep up with rising demand in the future, and the gap (about 1,200 MMscfd or 8.5 MT per year by 2025) will be met by imported LNG.

Figure 3-30 Natural Gas Balance Outlook in Malaysia



* Includes JDA, Natuna and PM3
** Demand growth projected for power and non-power sectors

Source: Energy Commission of Malaysia.

Energy Policy

The 10th Malaysia Plan, the comprehensive general policy of the country, identifies the following aspects as five strategic pillars of the new energy policy:

- initiatives to secure and manage reliable energy supply,
- measures to encourage energy efficiency,
- adoption of market-based energy pricing,
- stronger governance, and
- managing change.

The above pillars are based on the fundamental change happening in the country in the energy demand and supply structures. Energy demand has been increasing rapidly and domestic supply is struggling to keep up. Therefore,

the country will need more energy imports which will lead to more exposure to potentially volatile international energy markets. Emphasis on energy security, energy efficiency, and rationale energy pricing is aimed especially for adaption of the changing energy structure.

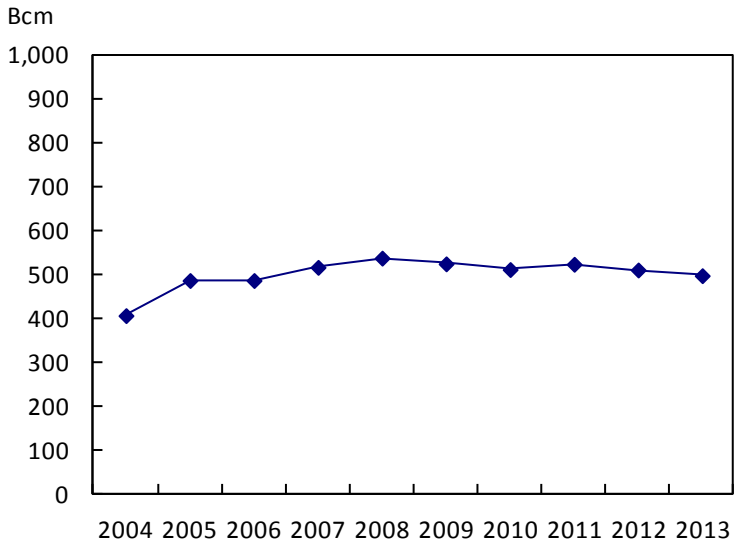
In accordance with the above pillars, the basis of gas policy is to encourage gas resource development, shift to market-oriented pricing for domestic gas, and import LNG. In relation to resource development, the government introduced tax incentives in 2010 to promote developing low-profitable marginal oil and gas fields.

Myanmar

Resources

Myanmar possesses 496 BCM of natural gas reserves as of January 2013. The reserves mainly exist in Yadana field and Yetagun fields in Andaman Sea.

Figure 3-31 Proven Reserves of Natural Gas in Myanmar

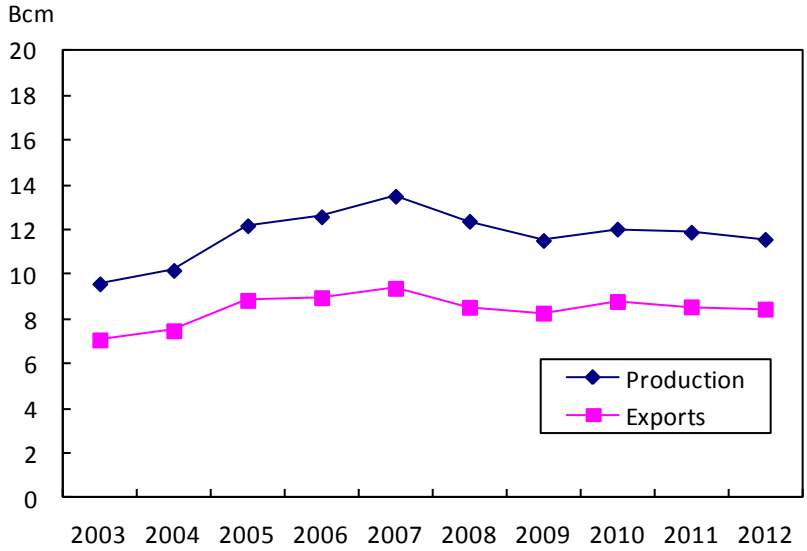


Source: Cedigaz Statistical Database.

Supply and Demand

Myanmar produced 12 BCM of natural gas in 2012, of which nine BCM was exported to Thailand. Exports are expected to increase significantly in the near future with the completion of the Myanmar–China pipeline in 2013.

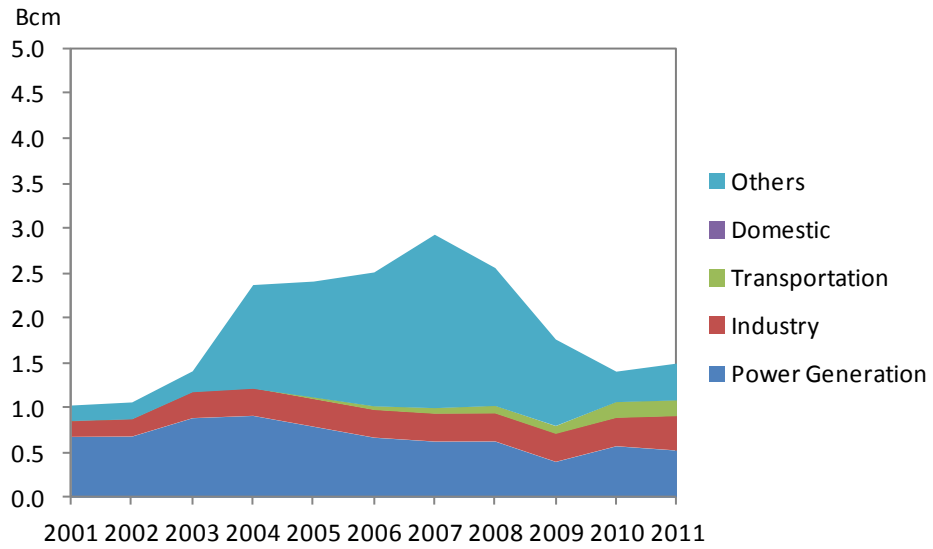
Figure 3-32 Natural Gas Production and Exports of Myanmar



Source: Cedigaz Statistical Database.

Natural gas use in Myanmar was fairly limited at 1.5 BCM in 2011. Power generation was the largest demand sector at 35 percent, followed by 'Others', mainly own use at energy plants and petrochemical feed stock, at 28 percent, and industry at 26 percent. Gas use for transportation has been growing rapidly in recent years to reach 12 percent of the total demand in 2011.

Figure 3-33 Natural Gas Demand in Myanmar, by sector



Source: IEA.

According to the Ministry of Energy, natural gas production from four major gas fields—M-3, Shwe, Yadana, Zawtika—in Myanmar is planned for additional domestic supply of 380 MMcfd (4 BCM per annum) from 2013 to 2018.[10] No official demand forecast is available but, considering the government recognizes the need to import LNG, domestic gas production is not thought to increase as fast as the demand.

Energy Policy

Political and economic reforms in recent years are transforming the country dramatically, and reintegration to the international community is taking place. The National Energy Management Committee supervises the Ministry of Energy, Ministry of Electric Power, and energy-related ministries in terms of national energy policy formation and execution. The basic principle of energy policy, especially after the recent reforms, is to give more attention to domestic energy supply and foreign investment on upstream developments. As far as natural gas is concerned, the government addresses the need for more domestic gas supply whilst maintaining the current export contracts. The action plans up to 2018 by the Ministry of Energy emphasize supply expansion by not only domestic conventional gas but also unconventional gas

[10] '1st ERIA Working Group Meeting for Sustainable Development of Natural Gas Market in EAS region', Ministry of Energy, Jakarta, December 2013.

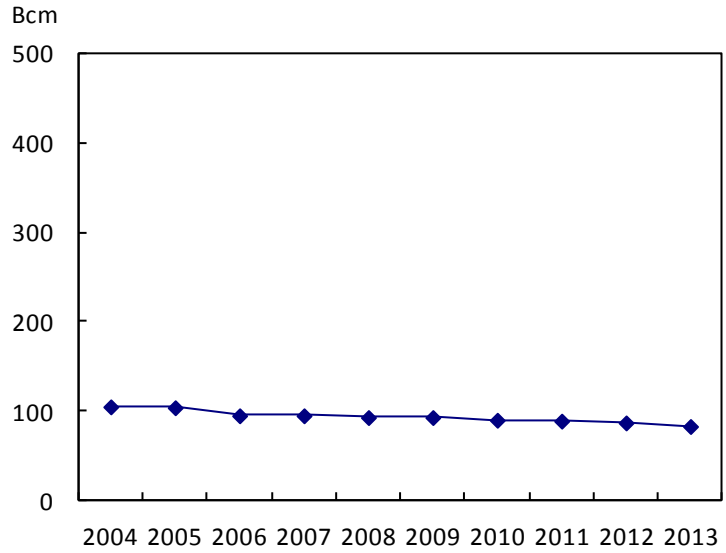
development and LNG imports.[11] A number of international oil and gas companies have already entered into resource development in the country for the past few years. The government expects new gas developments to secure the supply for the domestic market whilst seeking for the possibility of more exports.

Philippines

Resources

Proven reserves of natural gas in the Philippines were 83 BCM as of January 2013. Virtually all the reserves exist in the Malampaya/Camago gas fields in the West Philippine Sea. With the lack of new reserve additions, proven reserve figures have been declining slowly for the past decade. No unconventional resources in the Philippines were reported at the time of writing.

Figure 3-34 Proven Reserves of Natural Gas in the Philippines



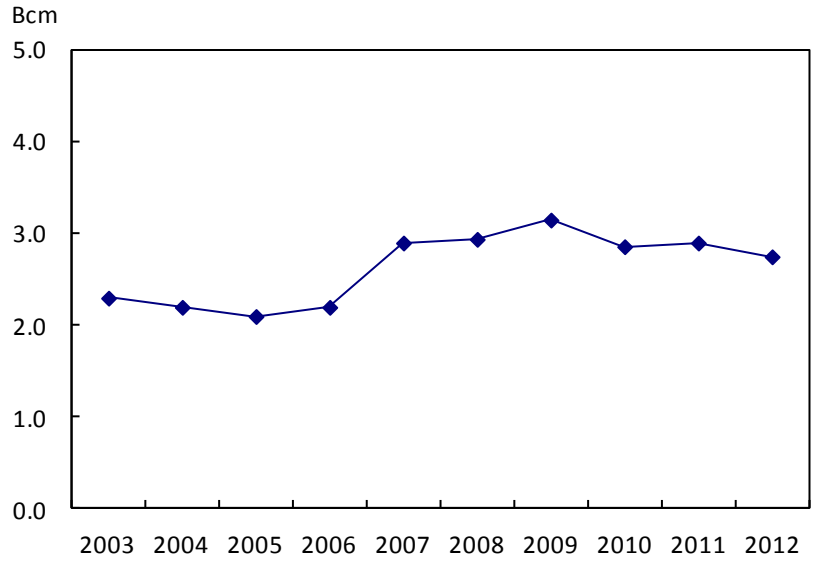
Source: Cedigaz Statistical Database.

[11] Ibid.

Supply and demand

The Philippines produced three BCM of natural gas in 2012. Most of the production takes place in the Malampaya/Camago fields. No international trade exists so far, although there are plans for LNG import projects.

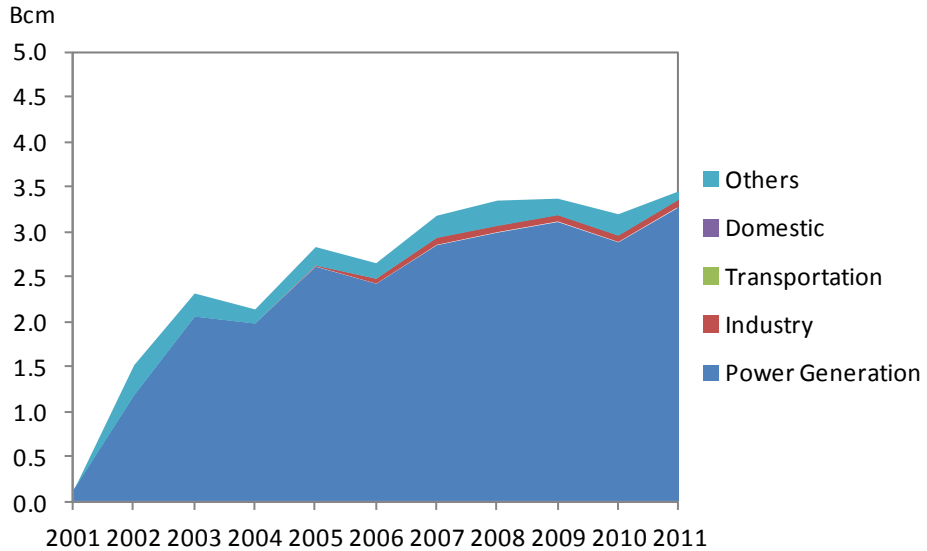
Figure 3-35 Natural Gas Production of the Philippines



Source: Cedigaz Statistical Database.

Natural gas demand in the Philippines in 2011 was three BCM. Power generation consumed 95 percent of natural gas supplied in the country.

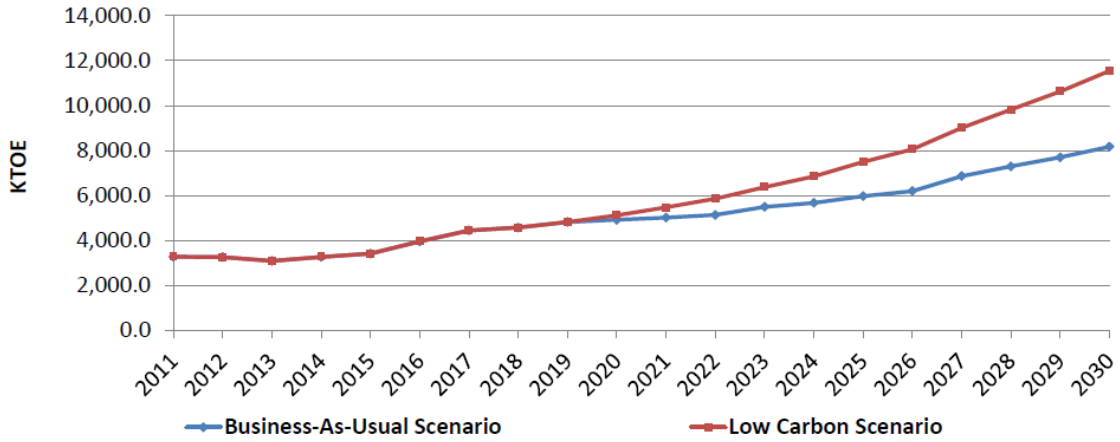
Figure 3-36 Natural Gas Demand in the Philippines, by sector



Source: IEA.

According to the Department of Energy, natural gas demand in the Philippines is expected to increase to reach 8.2–11.6 MToe (8.6–12.1 BCM) in 2030, driven by the power generation sector. Domestic production will unlikely keep up with the demand growth, and LNG imports are being planned.

Figure 3-37 Natural Gas Demand Outlook in the Philippines



Source: Department of Energy.

Energy Policy

The Department of Energy is in charge of energy policy in the Philippines. According to the Philippine Energy Plan 2012–2030, the basic energy policy paper by the Department of Energy, the following major policy thrusts are set:

- Ensure energy security.
- Expand energy access.
- Promote a low-carbon future.
- Climate-proof the energy sector.
- Promote investment in the energy sector.
- Develop regional energy plans.

There is significant policy focus on renewable energy to achieve many of the above policy targets. The government aims to triple renewable generation capacity to 9,931MW in 2030, consisting mainly of hydro, wind, and geothermal energy. Natural gas production target in 2030 in the plan is 752Bcf (21 BCM) for 2026–2030 period (i.e., 188Bcf or 5 BCM per annum).

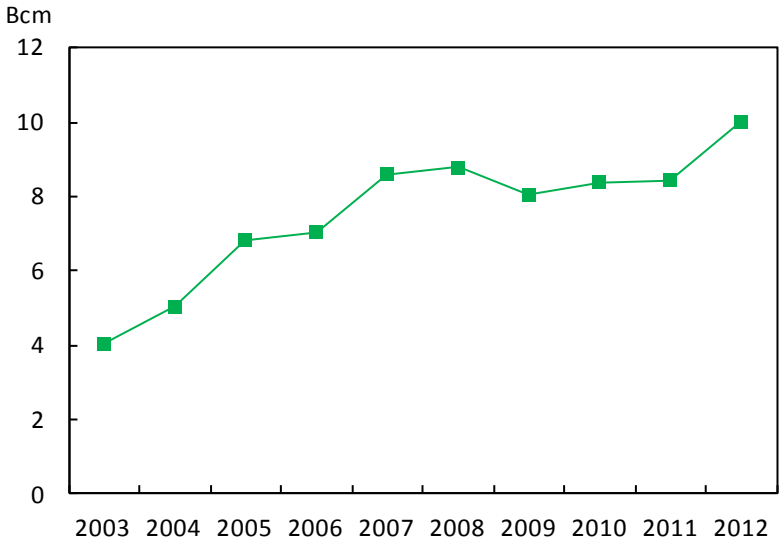
The plan also mentions plans of three LNG import terminals in Bataan, Batangas, and Pagbilao, as well as pipeline construction in Luzon.

Singapore

Supply and Demand

Being a city-state with a land area of 715 km^2, Singapore does not have any recorded gas resources. All demand is met by imported pipeline gas or LNG. In 2012, Singapore imported 10 BCM of pipeline gas from Indonesia and Malaysia. LNG imports started in 2013 from Equatorial Guinea, Trinidad and Tobago, and Qatar, aggregated by the BG Group.

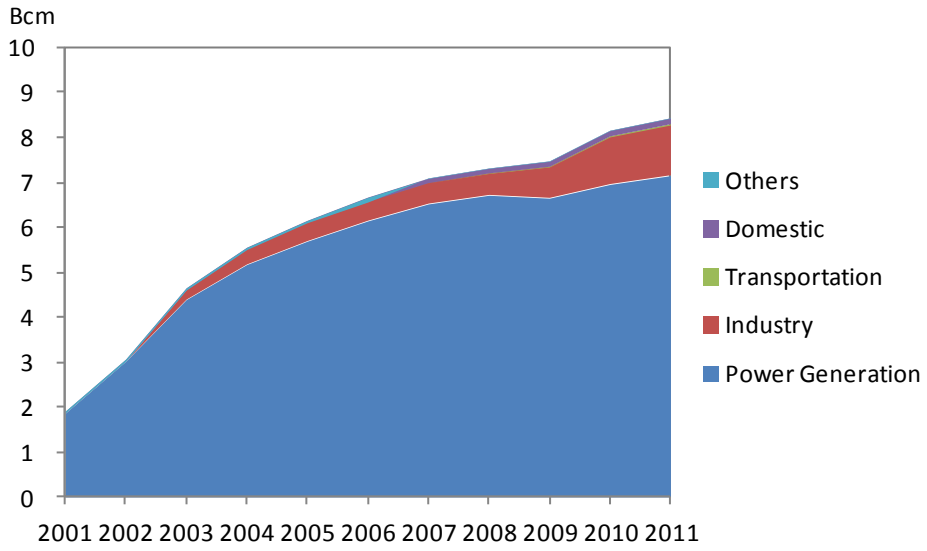
Figure 3-38 Natural Gas Imports of Singapore



Source: Cedigaz Statistical Database.

Singapore's natural gas demand in 2011 was eight BCM. Eighty-five percent of natural gas is consumed by the power generation sector, followed by the industry sector at 13 percent. Gas-fired generation was introduced in the early 1990s, and demand has been growing rapidly.

Figure 3-39. Natural Gas Demand in Singapore, by sector



Source: IEA.

According to a forecast by the Asia Pacific Energy Research Centre, natural gas demand in Singapore will expand to 8.9 Mtoe (9.3 BCM) in 2020 and 9.8 MToe (10.3 BCM) in 2035. The demand is expected to be increasingly met by imported LNG. The current capacity of LNG import is 3.5 MT per annum, and there are plans to expand it to nine MT per annum by adding fourth and fifth tanks as well as building a second import terminal at unspecified location.

Energy Policy

Lacking any significant energy resources and high dependency on oil, Singapore is diversifying its energy sources away from oil, although oil still shares 73 percent of the total primary energy supply in 2011. Natural gas is the major alternative fuel for the country, and fuel shift to natural gas has been taking place mainly for power generation, underpinned by pipeline gas from Indonesia and Malaysia. However, LNG imports gathered momentum mainly because erratic pipeline gas supply led to power blackouts in the 2000s.

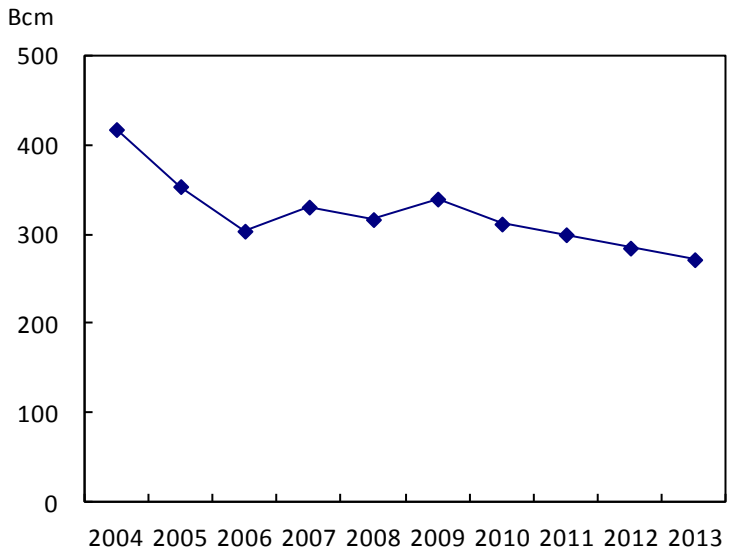
In relation to the emphasis on market-oriented policy, Singapore has liberalized the power and gas markets since the 1990s. The retail markets are fully liberalized and the transmission/transportation segment of power and gas industries is unbundled. Being a successful oil trading hub, Singapore also intends to develop an LNG trading hub although there is no concrete plan yet.

Thailand

Resources

Thailand possesses 272 BCM of proven reserves of natural gas as of January 2013. Majority of the reserves are offshore in the Gulf of Thailand. With no reserve additions and increasing production, the reserves have been on downward trend for the last decade.

Figure 3-40 Proven Reserves of Natural Gas in Thailand

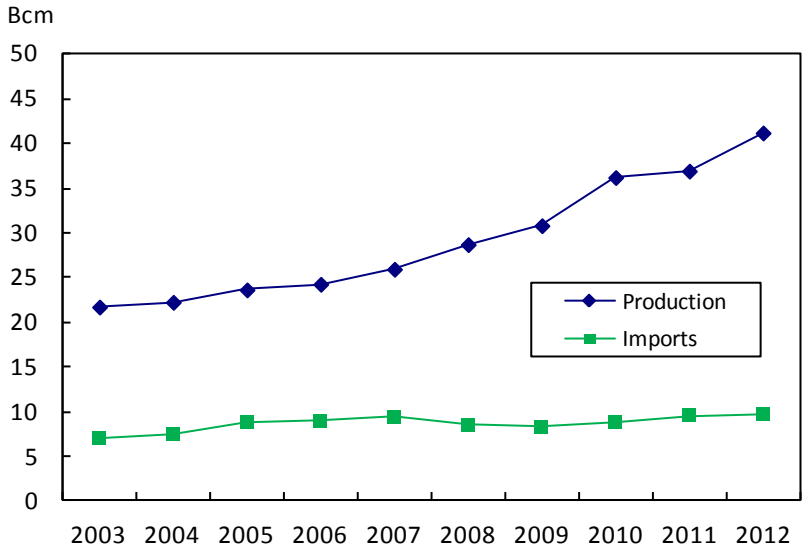


Source: Cedigaz Statistical Database.

Supply and Demand

Keeping up with the demand growth, natural gas production has been increasing rapidly at seven percent per annum. Almost all production comes from the Gulf of Thailand. Imports started in 1998 from Myanmar, and the import amounts hover around 10 BCM recently. Thailand also started to import LNG in 2010.

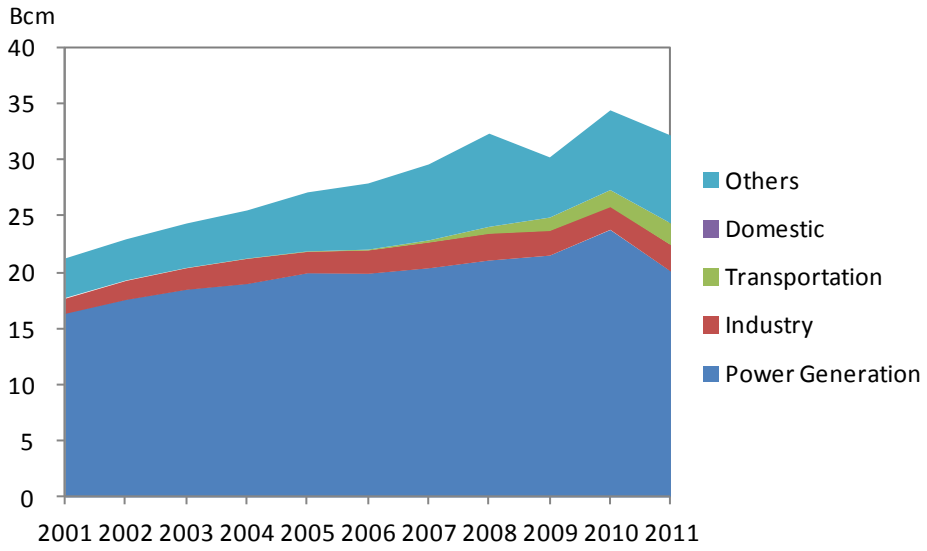
Figure 3-41 Natural Gas Production and Imports of Thailand



Source: Cedigaz Statistical Database.

In 2011, natural gas demand in Thailand was 32 BCM, down seven percent from the previous year due to pipeline leakage and massive flood in the same year. Of the total demand, 62 percent was for power generation. 'Others', including own use at energy plants and petrochemical feedstock, shared 24 percent of the total.

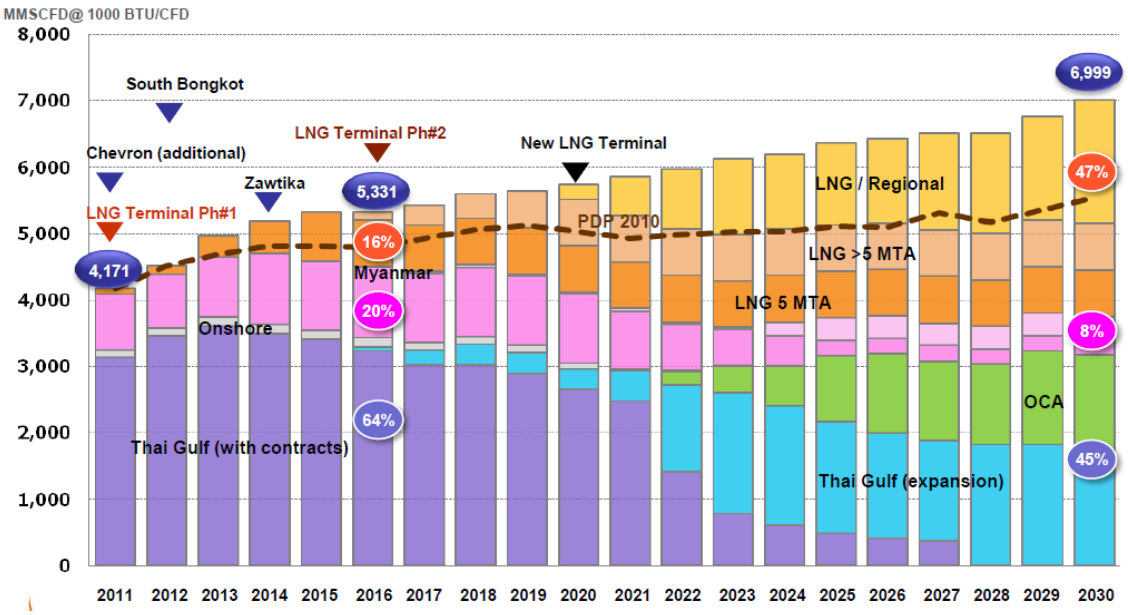
Figure 3-42 Natural Gas Demand in Thailand, by sector



Source: IEA.

The Ministry of Energy expects natural gas demand in the country to increase from 4,167 MMscfd (43 BCM) in 2011 to 6,999 MMscfd (68 BCM) in 2030, driven by power generation as is the case with many other countries in Southeast Asia. Despite the new developments in domestic gas resources, the import will need to be expanded significantly to meet the demand. Anticipating shrinking supply from Myanmar, LNG imports are expected to be more than 10 MT per annum in the future.

Figure 3-43. Natural Gas Balance Outlook in Thailand



Source: Ministry of Energy.

Energy Policy

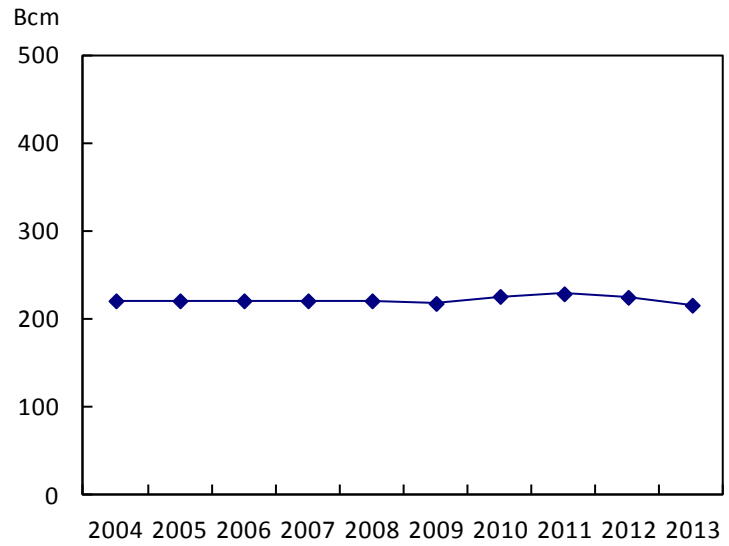
In Thailand, the Ministry of Energy is in charge of energy policy formation and execution. With rising energy demand and increasing import dependency, the core of Thailand's energy policy is ensuring supply security, alternative energy developments, and energy efficiency, although there is some element of energy supply as social welfare. In the policy statement delivered in 2011, Prime Minister Shinawatra emphasized energy infrastructure investments, domestic and international upstream developments, rationalization of domestic energy pricing, promotion of renewable and alternative energy to replace 25 percent of the fossil fuel–based electricity, and improvement of energy efficiency.[12]

Viet Nam

Resources

As of January 2013, proven reserves of natural gas in Viet Nam were 215 BCM. Proven reserves are mainly offshore basins such as Nam Con Son, Cuu Long, Malay-Tho Chu, and Song Hong.

Figure 3-44 Proven Reserves of Natural Gas in Viet Nam



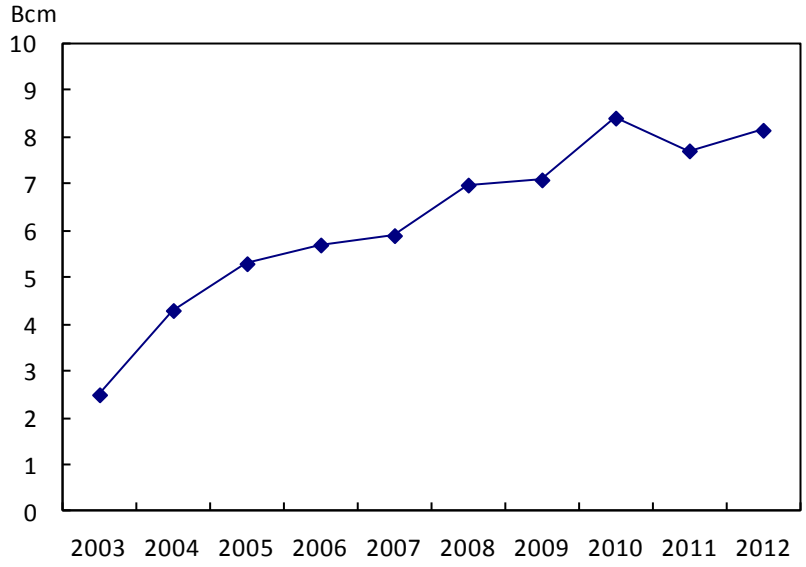
[12] 'Policy Statement of the Council of Ministers', delivered by Prime Minister Yingluck Shinawatra to the National Assembly, http://www.eppo.go.th/doc/gov-policy-2554-E.pdf (accessed August 23, 2011).

Source: Cedigaz Statistical Database.

Supply and Demand

Natural gas production in Viet Nam in 2012 was eight BCM, which was all consumed within the country. There is no international trade of natural gas, although the government is planning LNG import projects in the coming decade.

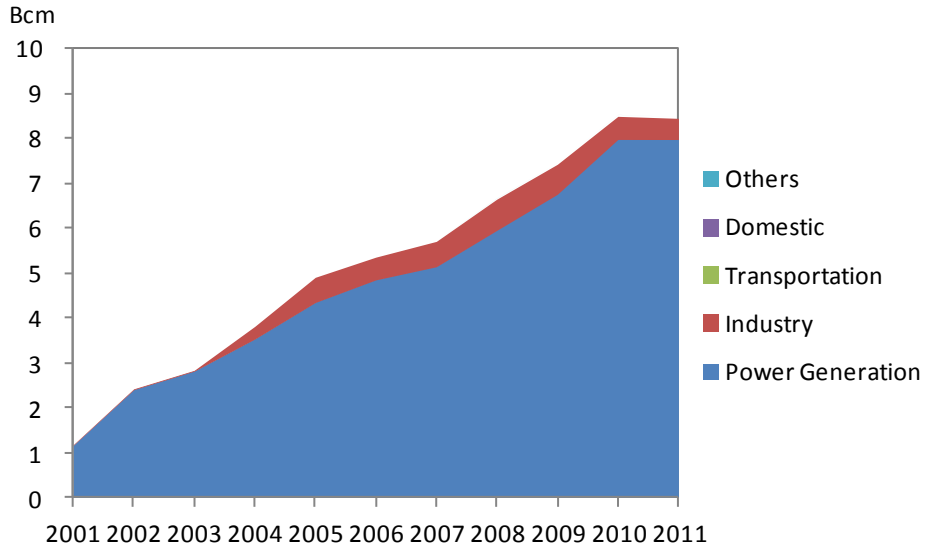
Figure 3-45 Natural Gas Production in Viet Nam



Source: Cedigaz Statistical Database.

Viet Nam consumed eight BCM of natural gas in 2011. Power generation is the dominant demand sector, and the demand has been expanding rapidly at 21 percent per annum for the past 10 years.

Figure 3-46 Natural Gas Demand in Viet Nam, by sector



Source: IEA.

According to the Ministry of Industry and Trade (MIT), natural gas production in Viet Nam will increase steadily to 10.8–12.3 MToe (11.3–12.9 BCM) in 2020 and 23.5–26.6 MToe (24.6–27.9 BCM) in 2035.[13] Power generation will be the driving force to the demand growth. Like many countries in the region, domestic production is not likely to expand fast enough, and imports will start and expand inevitably. The MIT is conducting a feasibility study of an LNG import terminal in Vung Tau in the south with target import year of 2017.[14] There is also a possibility of building import terminals in the northern and central parts of the country. The import amounts are expected to reach 14.5–17.6 MToe (11.2–13.5 MT).

Energy Policy

Energy policy in Viet Nam is under the control of the MIT. Like many other Asian countries, energy demand in Viet Nam is increasing significantly. Introducing foreign investment especially on oil and gas developments offshore Viet Nam since the 1990s resulted in substantial domestic energy supply, but import dependency is expected to rise in the future. Therefore, Viet Nam's priority is on securing energy supply, mainly through further

[13] Forecast submitted by the MIT to IEEJ.
[14] 'The 2nd ERIA Working Group Meeting in FY 2013 for Study on Sustainable Development of Natural Gas in EAS Region', MIT, Jakarta, April 2014.

domestic oil and gas developments; introducing nuclear power; demand control through improving energy efficiency; and reducing energy subsidies.

As far as natural gas is concerned, ambitious policy targets were set for production (15–19 BCM/y for 2016–2025), consumption (22–29 BCM/y for 2016–2025), LNG import terminals (import capacity of 7–10 BCM/y for 2016–2025), and pipelines (2,847 km in total).[15]

[15] 'Decision No. 2412/QD-BCT dated May 17, 2011 of the Ministry of Industry and Trade approving Planning of developing production, distribution system of gas and oil in the 2010–2020 period with orientation toward 2025', Ministry of Industry and Trade, May 17, 2011.