PENINSULAR MALAYSIA

Piped Gas Distribution Industry Outlook 2016

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2015 REVIEW

2015 Review

The overall performance of the Natural Gas Distribution System (NGDS) in 2015 continued to be resilient with positive growth of gas users, gas demands and area of supply. Natural gas has been supplied to 795 industrial users, 862 commercial users and 12,571 residential users across Peninsular Malaysia. 2015 also marked a positive growth of natural gas consumptions with a total of 158,770,536 MMBtu of natural gas volume delivered compared to 147,342,490 MMBtu in the previous year. From this, 99.3% of the natural gas volume was consumed by industrial customers. These customers represent a major range of industries including non-metallic minerals, metals, electric and electronics, machinery and equipment, rubber, food, beverages and tobacco, fabricated metal, chemical, glass and others.

The increase in the number of gas users and demand necessitated the expansion of the NGDS by 46.5 kilometres from 1993.24 kilometres to 2,039.74 kilometres, delivering stable supply of natural gas to industries, commercial businesses and residential customers. The new areas covered by this expansion are Kamunting in Perak, Pulau Indah in Selangor, Eastern Port in Pahang and Lipat Kijang in Melaka.

The tariff of natural gas supplied by Gas Malaysia Berhad via the NGDS is regulated by the Government. There were two tariff revisions in year 2015. The first revision was from November 2014 until June 2015, with an average tariff of RM 19.77/MMBtu. The average tariff was then revised to RM21.80/MMBtu for the period of July 2015 to December 2015.

In ensuring the integrity and safety of gas pipelines, the Energy Commission continuously monitors compliance to safety requirements through a gas taskforce programme. Through this taskforce, 167 commercial outlets were audited throughout the year. In addition to that, 119 pre-operating and 117 operational premises were inspected. With these efforts, there was no gas accident recorded in year 2015. In terms of reliability of supply, in 2015, the system average interruption duration index (SAIDI) improved 44% compared to the previous year, from 0.1492 to 0.0874 minutes/customer/year.

At the national level, the Energy Commission chaired the Natural Gas Task Force and coordinated its activities since 2011 to closely monitor major upstream shutdowns. In 2015, nine major shutdowns were registered and monitored. The Gas Supply Committee involving various stakeholders met on 23rd May 2015 and 19th November 2015 to monitor and plan gas supply shutdown programme for the Peninsula.

2015 was also a challenging year for the Energy Commission as it had been entrusted to further expand its regulatory scope. Where previously its regulatory scope only covered downstream of city gate stations, it has now been tasked to regulate a wider scope under a new regulatory regime. This new regulatory regime, called the Third Party Access (TPA), shall enable third parties to utilise Malaysia's major gas infrastructures with the objective of attracting new gas suppliers and providing a level playing field to promote healthy competition among the suppliers so that gas prices will be determined mainly based on the concept of supply and demand.

2016 OUTLOOK

2016 Outlook

2016 will be an interesting and challenging year for the Energy Commission especially for its Gas Development and Regulation Department. After the passing of the amendment to the Electricity Supply Act 1990 by Parliament last year, the Energy Commission is looking forward to the passing of an amendment to its second subsidiary legislation, namely the Gas Supply Act 1993. Further down the road, the Energy Commission will then proceed with the amendment of the Gas Supply Regulations 1997 and establish codes and guidelines to facilitate the amended act which shall enable the implementation of the TPA.

The proposed amendment to the Gas Supply Act 1993 shall be important in changing the landscape of the industry. It shall provide the legal framework for the implementation of the TPA, where other parties apart from the current monopolies are able to bring in LNG-sourced gas into Malaysia. In the long run, the TPA will increase security, reliability and sustainability of gas supply in Malaysia to meet an increasing domestic demand.

Amid the slowing down in economic growth due to various internal and external factors, natural gas demand from distribution pipelines in Peninsular Malaysia is expected to increase by 8.81% in 2016. In terms of volume, the total consumption of natural gas from the distribution pipelines is expected to be approximately 172,750,454 MMBtu per year. The industrial sector will remain the largest consumer which is expected to utilise 99.43% of this volume.

In order to capture new customers and enhance its area of coverage, Gas Malaysia Berhad (GMB) is planning to carry out various new distribution pipelines projects for the next few years. In 2016 alone, GMB will extend its coverage to 32 new locations in various states in Peninsular Malaysia.

With regards to the pricing of gas, the traditional heavy subsidising of natural gas prices by the Government shall be gradually decreased in order to make the gas related industry more efficient and competitive. As the regulatory body overseeing the piped gas supply industry in Peninsular Malaysia and Sabah, the Energy Commission in discharging its fiduciary duty in protecting the interest of customers shall ensure that gas tariff is set at a reasonable and affordable price.

In addition, in moving forward to better operational performance through efficient allocation and use of resources, the Incentive Based Regulation (IBR) has been implemented on 1 January 2016 for a trial run for one year, followed by the first regulatory period from 2017 to 2019. GMB, as the main supplier of piped natural gas in Peninsular Malaysia, is subjected to the IBR. The introduction of the IBR will support the liberalisation of the natural gas industry, which is to gradually align current piped gas prices towards market prices.

Further to this, the Gas Supply Regulations (Amendment) 2014 was gazetted and will come into operation on 1 January 2016. By virtue of this amendment, the fee rates prescribed in the regulations have been revised upward. It is imperative to note that the last revision and adjustment to the gas fee was done in year 1998.

With the positive growth of demand, increase of customer base, expansion of piped gas infrastructure and the implementation of IBR, the performance of natural gas supply from the distribution pipelines is expected to continuously improve from the previous year. More emphasis will be given to the implementation of preventive maintenance so that the reliability of the pipelines system remains high.

INDUSTRY OVERVIEW

Economic Review

Energy Policy

Natural Gas Overview

Distribution Piped Gas Legal Framework

Industry Overview

ECONOMIC REVIEW

Based on the latest report published by the Central Bank of Malaysia, the Malaysian economy grew by 5.0% in 2015 mainly supported by the continued expansion of domestic demand, which was primarily driven by the private sector. The economic growth of 5% was slightly higher than the growth forecasted by the World Bank at 4.7%. Given the high degree of openness of the Malaysian economy and an increased integration with the international financial system, the Malaysian domestic economy is significantly affected by both global and regional developments. Despite the challenges, however, the Malaysian economy has been able to weather the developments in 2015 and sustain a respectable growth.

The drivers which contributed to the Malaysian growth in 2015 were quite similar to those in 2014. In 2014, the Malaysia economy grew by 6% driven primarily by the continued strength of domestic demand and supported by an improvement in external trade performance. While the export sector remained as an important component in Malaysian economy, domestic demand had become the key driver of growth, anchored by strong private sector activity. The growth in private investment was mainly driven by the service and manufacturing sectors.

In the first quarter of 2016, as recently announced by the Central Bank, the Malaysian economy expanded by 4.2% (Q4 2015: 4.5%). The slight moderation in growth mainly reflected external shocks to the economy and cautious spending by the private sector. Private sector activity remained the key driver of growth, although the pace of expansion moderated amid on-going adjustments in the economy. Moving forward, the Malaysian economy is expected to remain on a sustained growth path of 4.0 – 4.5% in 2016, despite the challenging economic environment globally and domestically. Domestic demand will continue to be the principle driver of growth, sustained primarily by private sector spending. However, domestic consumption is expected to grow at a moderate pace. Overall investment are also expected to grow at a slower pace but will remain supported by the implementation of infrastructure development projects and capital spending in the manufacturing and services sectors. In addition, The World Bank has projected a 4.5% GDP growth for Malaysia in 2016 and 2017.

The strong growth in various industrial sectors and subsectors has been translated into the increase of natural gas consumptions. In fact, between 2008 and 2015, the industrial sector had consumed between 99.09 – 99.34% of natural gas from the distribution pipelines in Peninsular Malaysia. Figure 1 shows the changes of natural gas consumptions compared to the country's GDP growth. Even though the growth of natural gas consumptions is not perfectly in tandem with the economic growth of the country due to the size of natural gas consumption from the distribution pipelines compared to overall consumption, which also includes from the transmission pipelines, the GDP growth of the country can provide some indications on the trend of natural gas consumption.

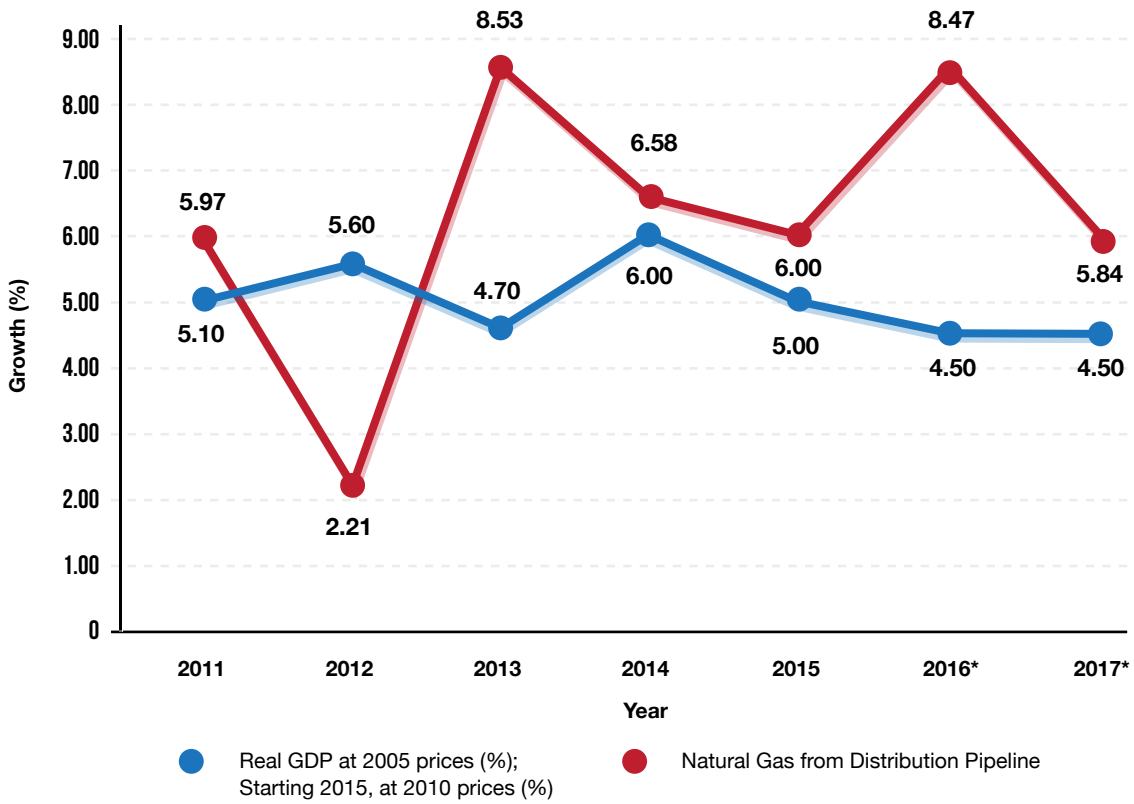


Figure 1: Malaysian GDP Growth and Natural Gas Growth in Peninsular Malaysia

Note:
**Estimated value by the World Bank for GDP growth and the Energy Commission of Malaysia for Natural Gas growth*

ENERGY POLICY

The Malaysian Energy Policy started with the Petroleum Development Act in 1974, which was developed to regulate the exploration and exploitation of petroleum and petrochemical industries. PETRONAS, through this act, is vested with the power to regulate all activities in the upstream petroleum sector.

A year later, in 1980, taking into account the country's main sources of energy (oil and gas in particular) are limited and non-renewable, the government established the National Depletion Policy with the intention to conserve the country's energy resources. With this policy, the production of crude oil was capped to an average of 630,000 barrels per day while the consumption of gas in Peninsular Malaysia was limited to about 32,000 million scf per day. This is to prolong the life span of the nation's oil and gas reserves.

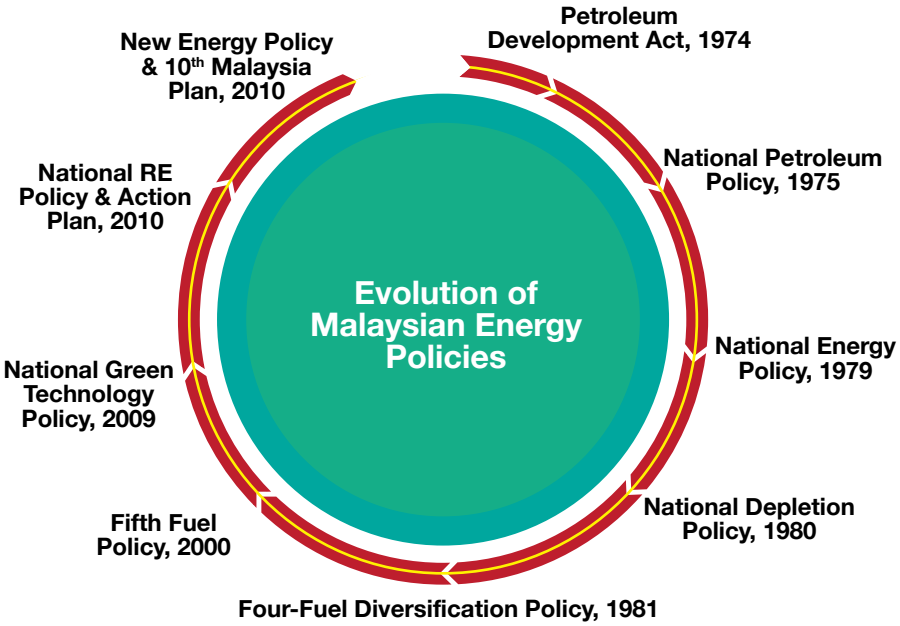


Figure 2: The Evolution of Malaysian Energy Policies

In 1975, the National Petroleum Policy was introduced to equip the general energy policy with broad guidelines on long-term energy objectives and strategies to ensure efficient utilisation of petroleum resources. Four years later, the nation's energy policy was further improved with the introduction of the National Energy Policy (1979) which was developed to ensure adequate, secure, and cost effective energy supply by developing energy resources (both renewable and non-renewable) using the least cost option and diversified sources, and also to promote efficient utilisation of energy.

In complement to the National Depletion Policy, the Four Fuel Diversification Policy was developed in 1981 to avoid over-dependence on a single source of energy - oil. Strategies to overcome this issue were designed and reviewed from time to time, especially after the two occurrences of international oil crisis and quantum leaps in prices in 1973 and 1979. Thus the government called for a diversification of energy resources to achieve stability of oil supply by pursuing balance utilisation of four primary energy resources: oil, natural gas, hydro and coal. The Four Fuel Diversification Policy was then augmented to the Five Fuel Policy in conjunction with the government's effort to introduce renewable energy as the "fifth fuel" resource in year 2000.

The nation's energy policy was continuously enhanced over the years, by the introduction of the National Green Technology Policy in 2009, the Renewable Energy (RE) Policy and Action Plan in 2010, and lastly, the New Energy Policy which addresses economic efficiency, security of supply and social and environmental objectives.

Throughout the years, Malaysia has expanded its energy policies that govern its energy sector. The formulation of acts and policies that have passed through the Malaysian legislature proved that the country is serious in achieving sustainable economic growth.

NATURAL GAS OVERVIEW

The Malaysian gas industry was first established in Sarawak with the introduction of domestic and commercial piped gas system in the early 60s'. While in Peninsular Malaysia and Sabah, it was introduced in 1984. There are two primary sources of natural gas: associated gas reserves and non-associated gas reserves. Associated gas reserves refer to the reservoirs that contain both gas and oil. On the other hand, non-associated gas reserves refer to reservoirs that contain only gas. Malaysia has both types of reservoirs.

In 1980, the natural gas reserves in Malaysia – associated and non-associated – stood at 41.67 trillion standard cubic feet (tscf). 58.03% or equivalent to 24.18 tscf of the reserves were located in Peninsular Malaysia, whereas, Sabah and Sarawak contributed about 0.02% and 41.95% of the reserves respectively. However, in 1990, the pattern changed – the natural gas reserves in Sabah and Sarawak overtook the natural gas reserves in Peninsular – and this trend continues until the present day. In 2013, the reserves in Peninsular, Sabah and Sarawak stood at 34.97 tscf, 13.22 tscf and 50.13 tscf. Considering the size of Malaysian economy, the natural gas reserves are estimated to last for another 44 years.

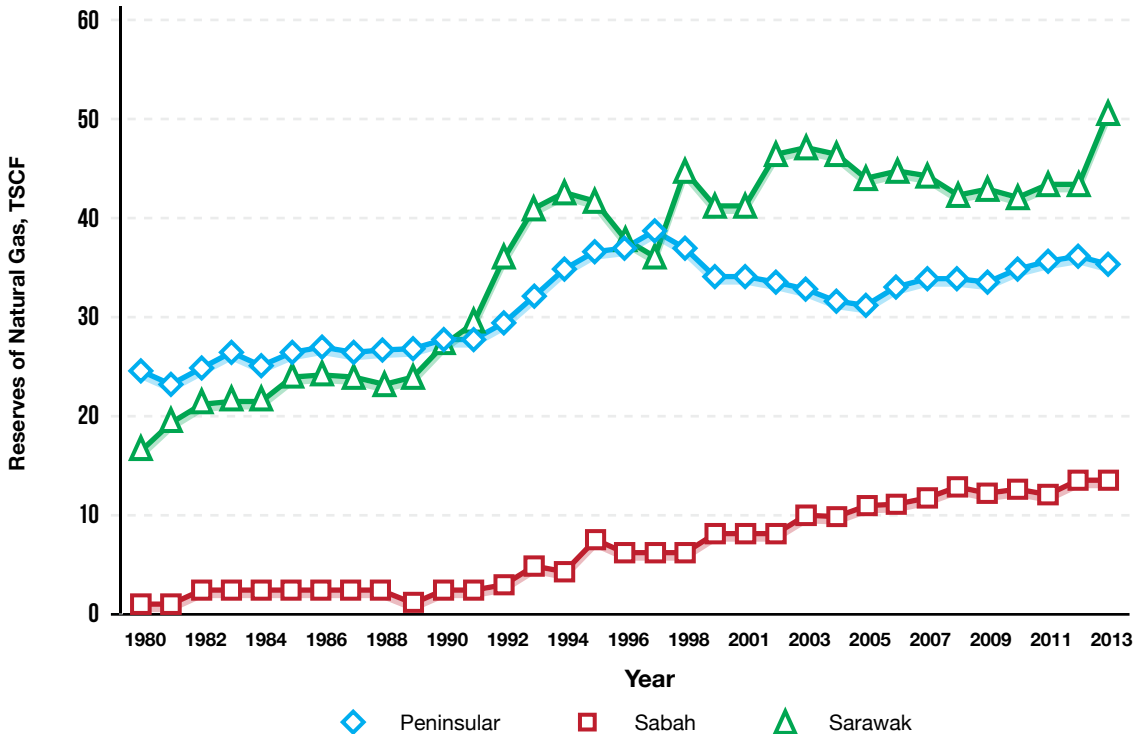


Figure 3: Reserves of Natural Gas by Region in Trillion Standard Cubic Feet (TSCF)

The gas distribution grid in Peninsular Malaysia is known as the Peninsular Gas Utilisation (PGU). Its network which comprises pipelines of more than 2,500 km distributes sales gas (methane) from the gas sources to the customers. The PGU receives gas from three main sources: from Gas Processing Plant (GPP) in Terengganu which processes gases that come from the indigenous fields, PM3 (Vietnam) and West Natuna (Indonesia); from the Malaysia-Thai Joint Development Area (JDA) which is delivered from Songkhla, Thailand and subsequently piped into Malaysia via Padang Besar, Perlis; and from the Regasification Terminal (RGT) in Sungai Udang, Melaka.

Figure 4: Natural Gas Sources and Peninsular Gas Utilisation (PGU) System

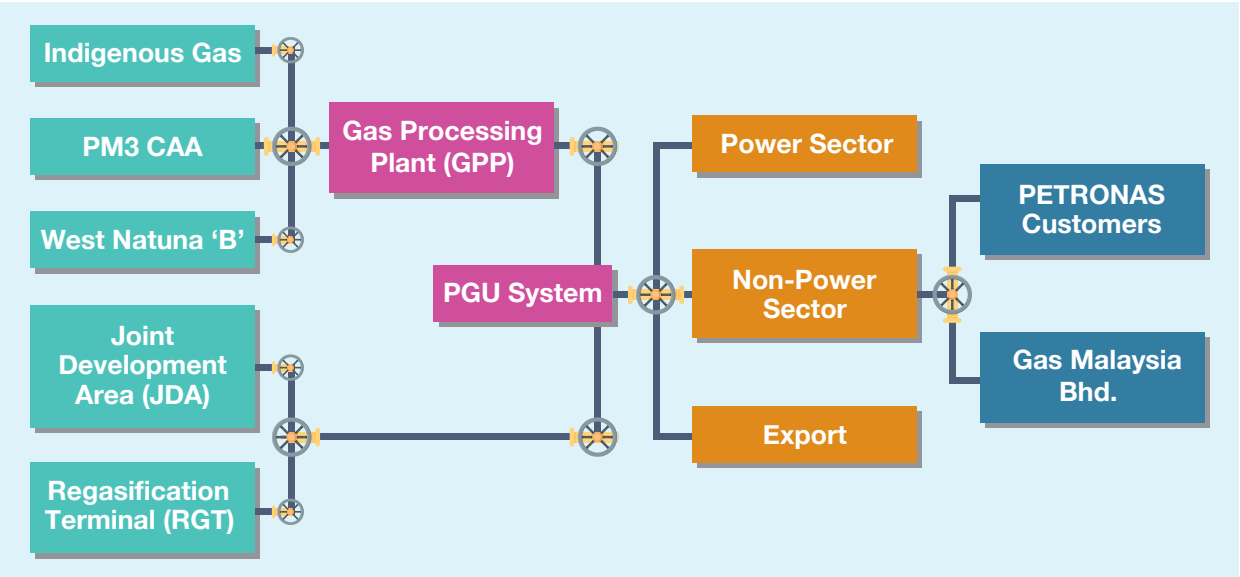


Figure 5: Peninsular Malaysia Natural Gas Value Chain

The commissioning of the RGT in Sungai Udang enables the importation of Liquefied Natural Gas (LNG) which boosts the supply capacity into the PGU system by another 500 mmscfd hence rectifies the gas supply constraint and shortage to the power sector. Another regasification terminal is being built in Pengerang, Johor, which will come into operation tentatively in the third quarter of 2017. It is projected to increase the country's LNG import capacity. Supply from this terminal will be fully dedicated to Refinery and Petrochemical Development (RAPID) area and the Pengerang Cogeneration Plant (PCP). The RGT Pengerang will be equipped with regasification terminal with an initial capacity of 3.5 MTPA (metric tonnes per annum), equivalent to send-out rate of 490 mmscfd of natural gas.

The power sector is the largest consumer of natural gas in Malaysia, of which is seen to be more dependent on natural gas as compared to coal with a dependency ratio of 48.5% and 46.7% respectively (2015). However, by 2020, the Malaysian power sector is expected to be driven by coal at 63% while decreasing its dependency on natural gas at 29%. There are a few factors contributing to this hypothesis, namely; retirement of gas turbine units, new development of coal-fired power plants and the gradual subsidy withdrawal by the Government.

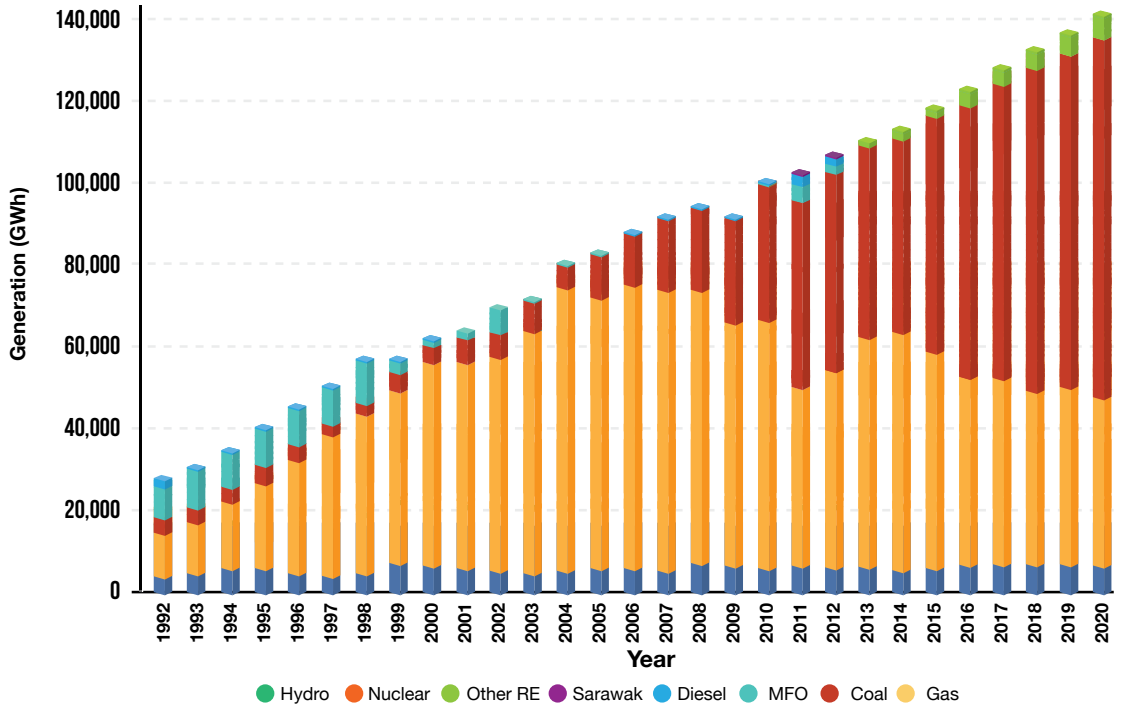
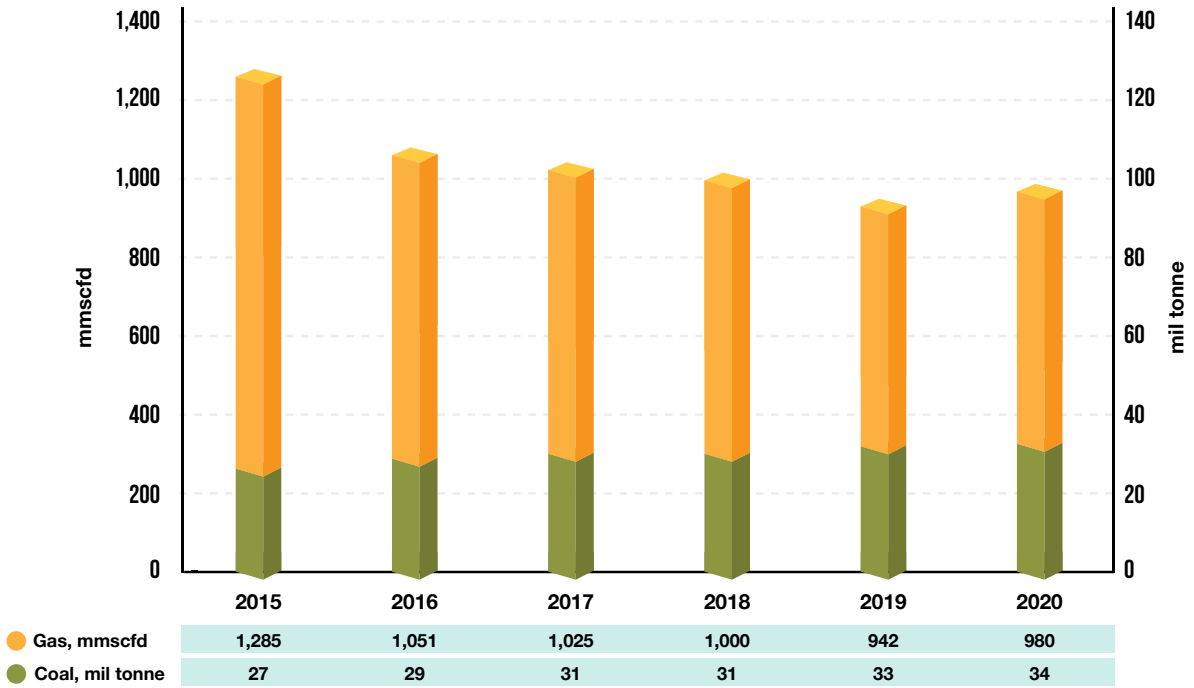


Figure 6: Energy Generation Mix



	2015	2016	2017	2018	2019	2020
Gas, mmscfd	1,285	1,051	1,025	1,000	942	980
Coal, mil tonne	27	29	31	31	33	34

Figure 7: Projected Gas and Coal Consumptions

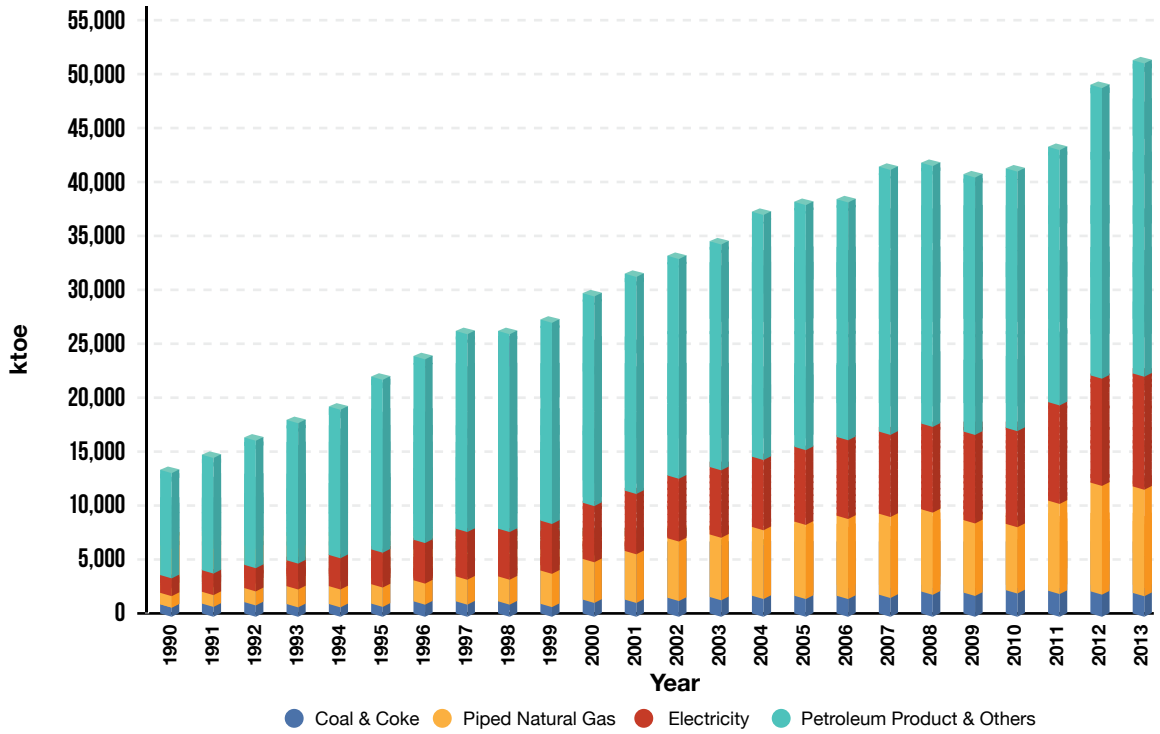


Figure 8: Malaysia Energy Profile

Looking at the performance of the Malaysian gas industry from its beginning until today, it is well justified to say that it had transformed to a well-developed structure, comparable to other world-class gas centres in terms of technology and safety records. In the context of the Malaysian gas market to-date, the combination of oil and gas has contributed almost 18% of Domestic Gross Products. This significant contribution had been maintained for the past ten years. Moving forward, there is a need for the industry to develop strategies to continue to maintain its role as a catalyst for the national economic development.

DISTRIBUTION PIPED GAS LEGAL FRAMEWORK

The government introduced the Gas Supply Act 1993 (Act 501) and the Gas Supply Regulations 1997 to regulate piped gas supply and utilisation activities. The main objective is to protect the interests of the consumers and the public who are affected by the piped gas supply activities whilst at the same time ensuring continued viability of the gas supply businesses. Act 501 prescribes the administrative and technical standards in the aspects of safety, reliability, economy, efficiency and quality.

In Act 501, gas is defined as methane, ethane, propane, butane or hydrocarbons which may consist of one or more of the above gases in the form of gas or liquid. Natural gas is mainly methane with a small percentage of other hydrocarbons and non-hydrocarbon gases whereas Liquefied Petroleum Gas (LPG) comprises mainly of propane and butane. Other types of gases, such as oxygen, nitrogen and acetylene used in the industrial sector are not covered by Act 501. Act 501 covers only the supply of natural gas through pipeline downstream of the last flange of the city gate station or the supply of LPG from the filling point of storage tanks or cylinders to gas appliances. Natural gas transmission and lateral pipeline systems (up to and including the city gate stations) are outside the scope of Act 501. Presently, Act 501 is only applicable in the Peninsula and Sabah.

The Energy Commission of Malaysia, which has been established under the Energy Commission Act 2001, is a statutory body responsible for regulating the energy sector particularly the electricity supply and piped gas supply industries in Peninsular Malaysia and Sabah. The Energy Commission ensures that the supply of electricity and piped gas to consumers is secure, reliable, safe and at reasonable prices. The Commission's responsibilities are enshrined in the Energy Commission Act 2001 and supported by two other main acts: the Electricity Supply Act 1990 and the Gas Supply Act 1993. The Energy Commission reports to the Minister of Energy, Green Technology and Water. However, for gas-related activities, the Commission reports to the Prime Minister as he is in charge of Petroleum through the Economic Planning Unit (EPU) in the Prime Minister Department.

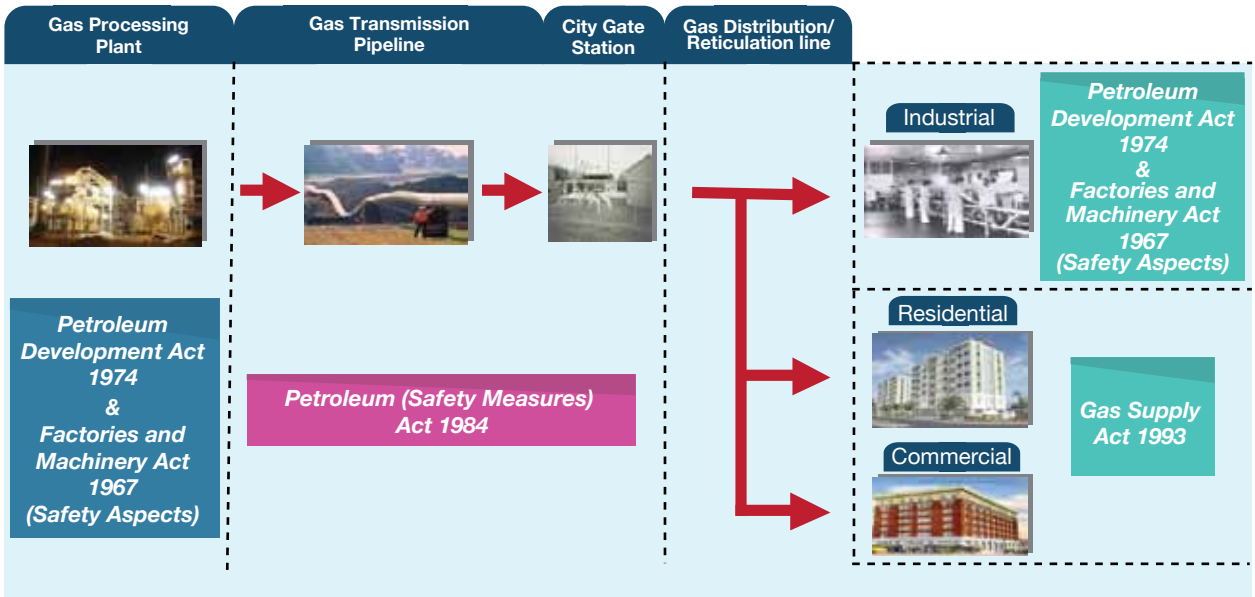


Figure 9: Natural Gas Distribution System

GAS DISTRIBUTION IN PENINSULAR MALAYSIA

Natural Gas Distribution System (NGDS)

Natural Gas User and Consumption

The Extension of Distribution Pipelines in 2015

Future Expansion of NGDS Infrastructure

Gas Supply Performance

Gas Distribution in Peninsular Malaysia

NATURAL GAS DISTRIBUTION SYSTEM (NGDS)

Natural gas supply is sourced from PETRONAS via Petronas Gas Berhad's Peninsular Gas Utilisation pipeline and supplied by Gas Malaysia Berhad (GMB) through the City Gate Stations. As part of safety requirement, a harmless chemical odorant, Mercaptan, is injected to the natural gas at the City Gate Station to facilitate gas leak detection since the natural gas is originally odourless and colourless. Natural gas is then distributed throughout the Natural Gas Distribution System (NGDS) through feeder lines and distribution lines located throughout Peninsular Malaysia. Depending on the volume and pressure requirements, the pipelines pressure will be regulated at district stations, service stations, area stations or regulating stations and delivered to the end customer's internal piping system.

In total, NGDS has 90 district stations, 916 service stations, 73 area stations and 82 regulating stations throughout the Peninsular. In addition to that, NGDS is also equipped with a Supervisory Control and Data Acquisition (SCADA) system. SCADA provides a comprehensive measurement of NGDS which allows accurate and timely information in ensuring efficiency and effective services at all times.

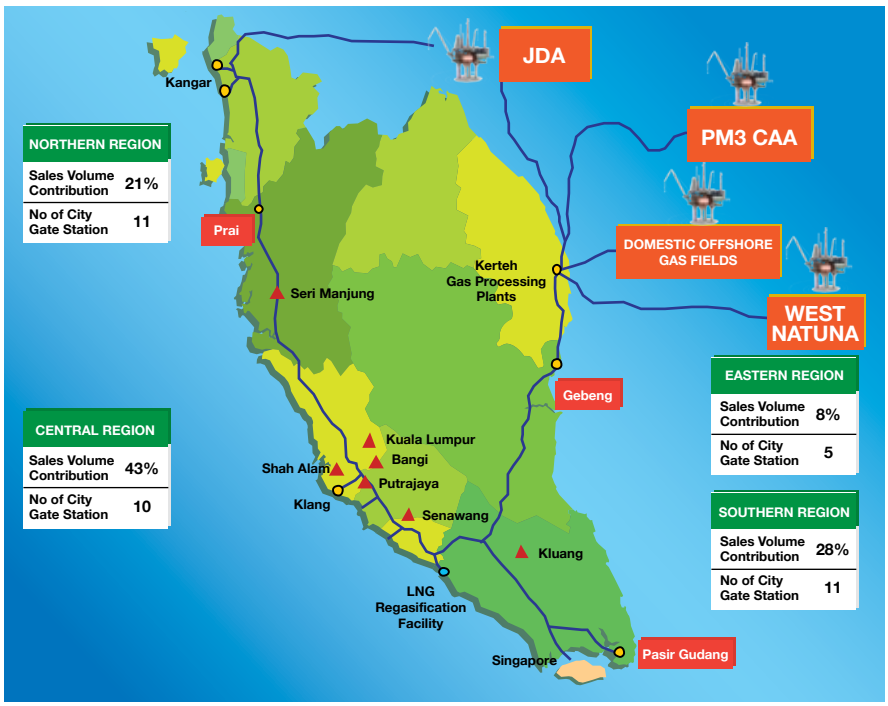


Figure 10: Natural Gas Distribution in Malaysia

Peninsular Gas Utilisation (PGU)

- More than 2500km
- Comprises 6-gas processing plants with combined capacity of 2000 mmscfd
- Consists of gas transmission pipelines, supply pipelines and lateral pipelines
- Owned by PETRONAS and operated by PGB

Odoriser Station

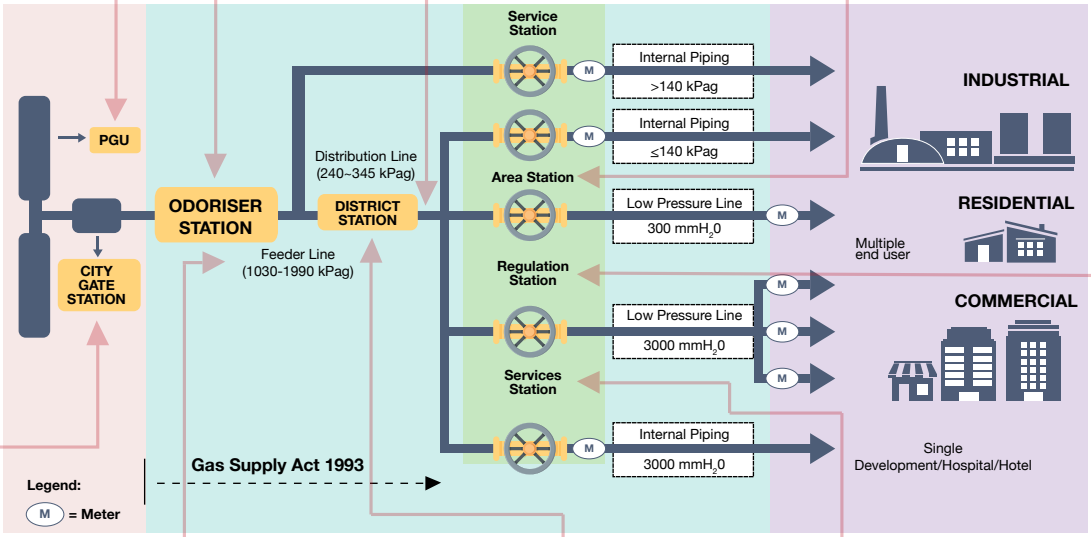
- Station with odorant dispensing facilities
- Merceptan (odorant) is injected into the gas for safety requirements

Distribution Line

- Made of Polyethylene
- Distribute Natural Gas with pressure of 35~50psig
- Residing on Government's road

Area Station

- Stations with pressure regulating facilities
- Reducing pressure of Natural Gas in Distribution Line from 35~50psig to 0.43psig before supplying to residential customers



City Gate Station

- 33 city gate stations across Peninsular Malaysia
- Stations with pressure regulating and gas metering facilities
- Reducing gas pressure from 500~800psig to 260psig
- Transfer points for Natural Gas between NGDS and PGU

Feeder Line

- Made of Carbon Steel
- Distribute Natural Gas at the pressure of 150~60psig
- Residing on Government's road

District Station

- Stations with pressure regulating facilities
- Reducing Natural Gas pressure from Feeder Line from 150~260psig to 50psig

Service Station

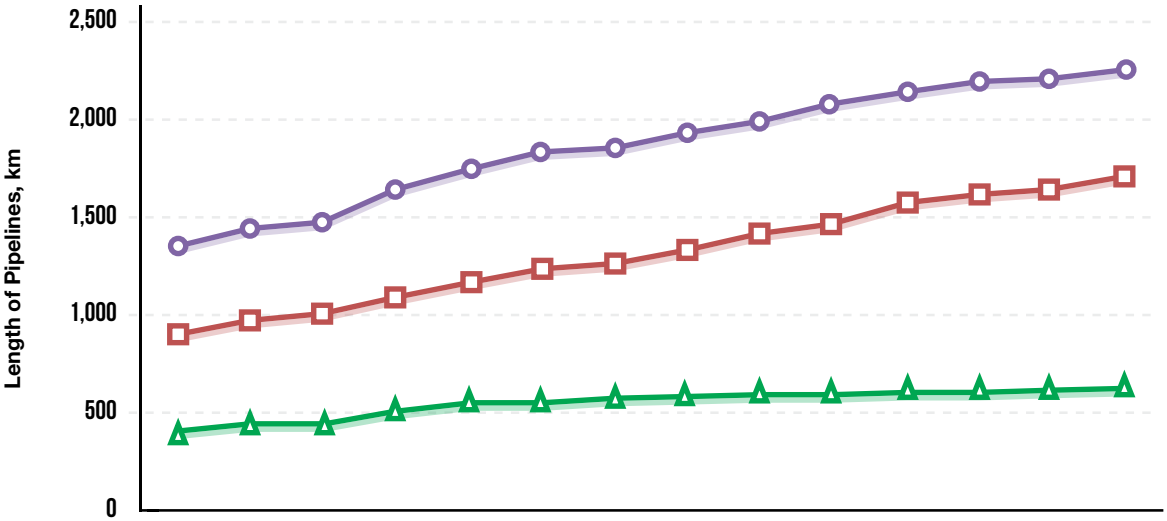
- Stations with pressure regulating and gas metering facilities
- Reducing Natural Gas pressure from either Feeder Line or Distribution Lines to the correct level before supplying to industry and commercial customers

Regulating Station

- Stations with pressure regulating facilities
- Reducing pressure from Distribution Line from 35~50psig to 4.3psig before supplying to commercial customers

Figure 11: Natural Gas Distribution System (NGDS)

As of 2015, GMB operates and maintains approximately 2,040 kilometres of natural gas pipelines across Peninsular Malaysia, supplying natural gas to 795 industrial customers, 862 commercial customers and 12,571 residential customers. Industrial sector is the largest consumer which consumed 99.34% of total gas supplied by GMB followed by 0.65% from the commercial sector and 0.01% from the residential sector. Via the first regasification terminal in Sungai Udang, Melaka, additional volume of gas is injected to the PGU system and GMB is poised to enjoy certainty of supply and able to supply up to 147.34 million MMBtu of natural gas in 2014 and 158.77 million MMBtu in 2015. Supply for 2014 and 2015 has been fully contracted out and GMB is already in consultation with PETRONAS to secure further gas supply beyond 2015.



	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016*	2017*	2018*	2019*
Steel (km)	926	977	1,014	1,098	1,174	1,240	1,262	1,330	1,430	1,473	1,529	1,579	1,605	1,671
Polyethylene (km)	398	428	428	508	534	552	556	558	564	567	572	574	585	586
Total (km)	1,324	1,405	1,443	1,606	1,708	1,791	1,818	1,889	1,993	2,040	2,101	2,154	2,190	2,257

** Forecasted data*

Figure 12: Natural Gas Distribution Pipeline Length

NATURAL GAS USER AND CONSUMPTION

The number of natural gas consumer in Malaysia has been increasing year by year with around 900 new consumers per year since 2008. The positive growth, albeit at varying rate, is in line with the steady development of the Malaysian economy which is reflected by the annual Gross Domestic Product (GDP) growth currently averaging at 5%. This trend will likely continue as the country continues to bring in more natural gas via the regasification terminal to cater for the increasing demand from various sectors.

Similar pattern can be observed in the growth of natural gas consumption in Malaysia, averaging at 5.25% per year. The 2009 global economic crisis stunted the growth of the industry as many players were severely affected by it. However, it is followed by a significant increase of total consumption in 2010 which reflects the recovery of financial situation of the commercial and industrial sectors post-recession. The trend is expected to repeat as the country emerges from the 2015 economic slowdown and the stabilization of the nation's economy.

YEAR	SECTOR			TOTAL
	Residential	Commercial	Industrial	
2008	7,032	464	630	8,126
2009	7,960	456	640	9,056
2010	10,433	489	686	11,608
2011	10,541	536	704	11,781
2012	11,932	565	709	13,206
2013	12,455	630	740	13,825
2014	12,568	799	771	14,138
2015	12,571	862	795	14, 228

Table 1: Number of Natural Gas Consumers by Sector in Peninsular Malaysia

YEAR	SECTOR			TOTAL	Growth (%)
	Residential	Commercial	Industrial		
2008	17,839	1,001,105	110,606,270	111,625,214	4.94%
2009	18,565	934,766	106,359,785	107,313,116	3.86%
2010	19,838	1,006,564	116,579,760	117,606,162	9.59%
2011	20,073	1,021,176	123,587,690	124,628,939	5.97%
2012	24,546	990,892	126,364,815	127,380,253	2.21%
2013	36,627	961,562	137,246,099	138,244,288	8.53%
2014	37,616	992,935	146,311,939	147,342,490	6.58%
2015	28,710	1,021,607	157,720,218	158,770,536	7.76%

Table 2: Natural Gas Consumption by Sector in Peninsular Malaysia (MMBtu)

Historical data proves that the demand for natural gas is closely related to the country's economic condition. With these parameters taken into account, the forecast for natural gas consumption is made so as to provide a platform for industry players and regulator alike to plan ahead on how they should move forward in this expanding industry.

Natural gas consumption is projected to increase at an average rate of 6.42% from 2016 to 2020. However, the annual growth rate is expected to decline over the years due to saturation of the market and filling up of the gas distribution quota set by the government, unless policy revision is exercised. For the next 5 years, the industrial sector will remain the largest consumer of natural gas in which 99.43% consumption goes to this sector, followed by the commercial sector at 0.55% and the residential sector at 0.018%.

Year	Residential	Growth	Commercial	Growth	Industrial	Growth	Total Consumption (MMBtu)	Growth
2016	30,901	7.63%	1,040,641	1.86%	171,678,912	8.85%	172,750,454	8.81%
2017	32,861	6.34%	1,056,792	1.55%	182,106,651	6.07%	183,196,304	6.05%
2018	34,957	6.38%	1,071,357	1.38%	193,132,857	6.05%	194,239,171	6.03%
2019	37,189	6.38%	1,085,048	1.28%	204,945,712	6.12%	206,067,949	6.09%
2020	39,175	5.34%	1,098,223	1.21%	215,498,632	5.15%	216,636,030	5.13%

Table 3: Forecasted Natural Gas Consumption by Sector in Peninsular Malaysia (MMBtu)

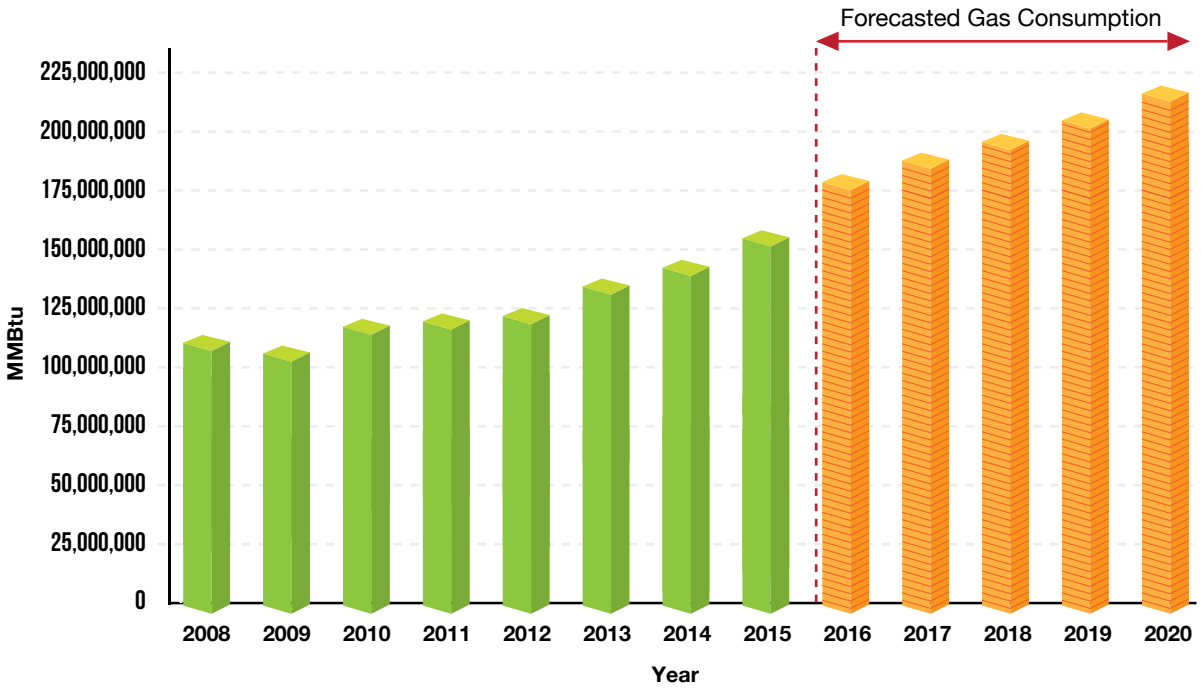
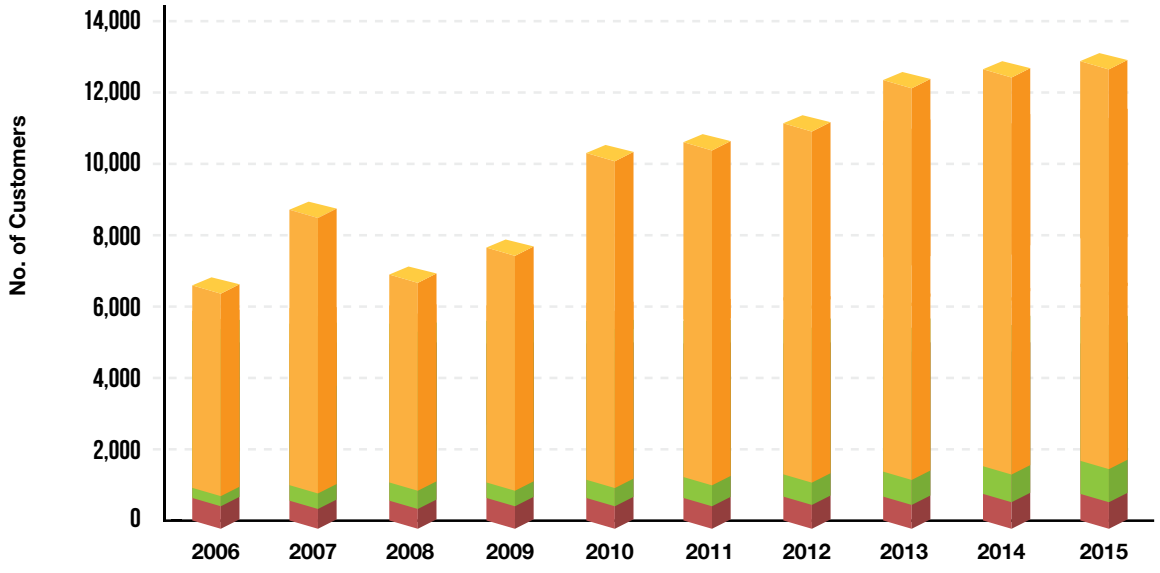


Figure 13: Gas Consumption in Peninsular Malaysia



	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Residential	6,679	8,887	7,032	7,960	10,433	10,541	11,392	12,455	12,568	12,571
Commercial	335	438	464	456	489	536	565	630	799	862
Industry	657	642	630	640	686	704	709	740	771	795

Figure 14: Natural Gas User in Peninsular Malaysia

THE EXTENSION OF DISTRIBUTION PIPELINES IN 2015

Figure 15: The Extension of Distribution Pipelines in 2015 for Northern Region

Figure 16: The Extension of Distribution Pipelines in 2015 for Eastern Region

Figure 17: The Extension of Distribution Pipelines in 2015 for Central Region

Figure 18: The Extension of Distribution Pipelines in 2015 for Southern Region

FUTURE EXPANSION OF NGDS INFRASTRUCTURE

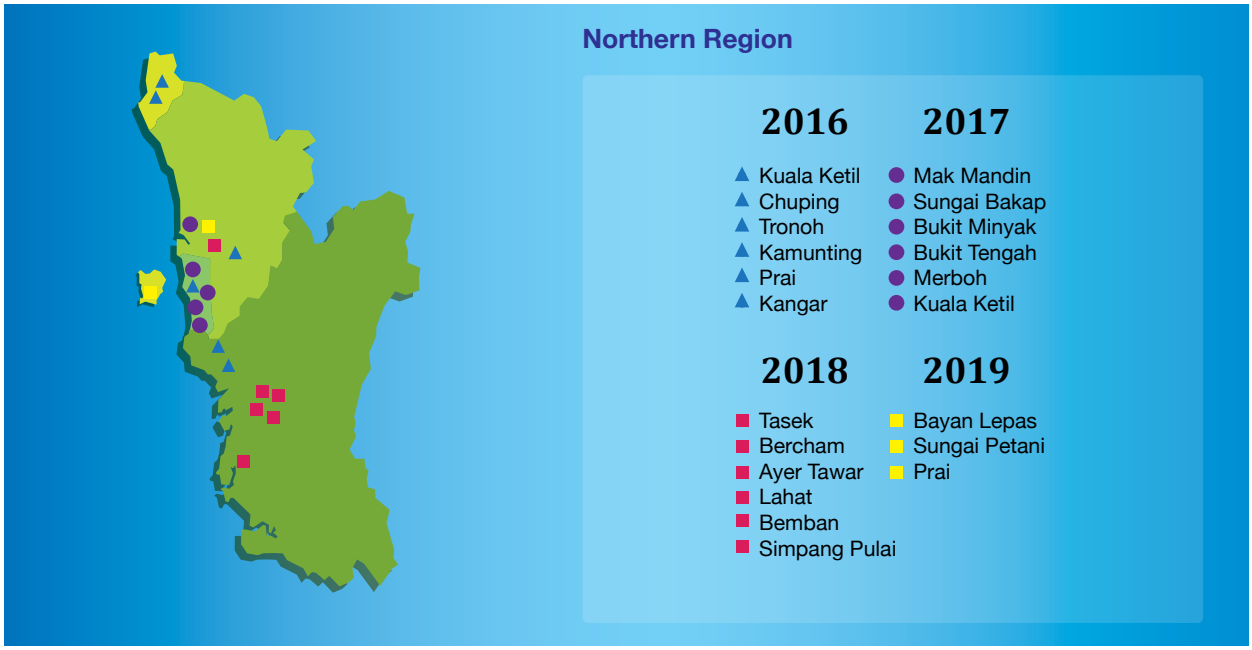


Figure 19: Future Expansion of NGDS Infrastructure for Northern Region

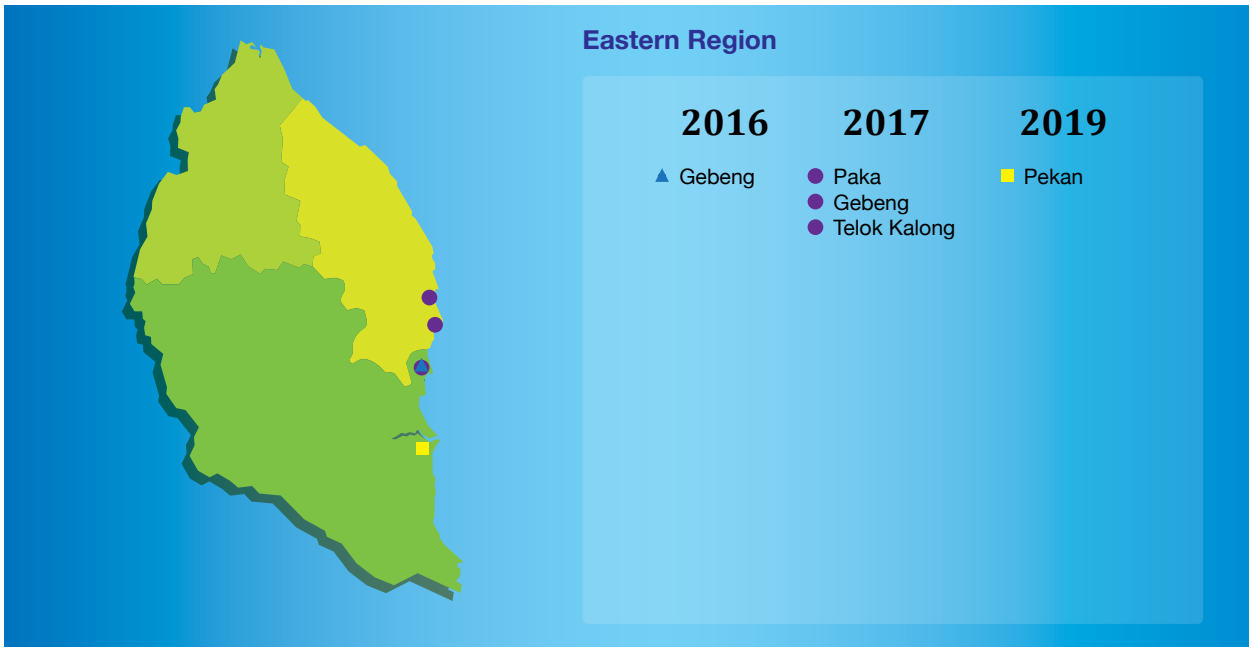


Figure 20: Future Expansion of NGDS Infrastructure for Eastern Region

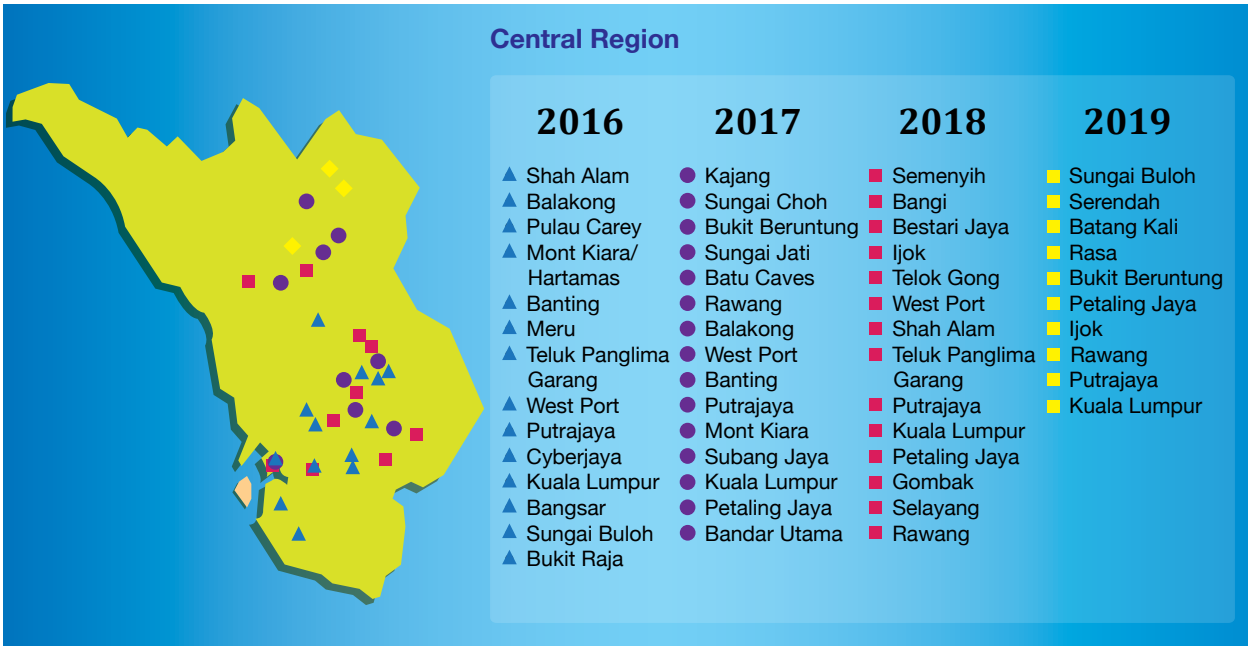


Figure 21: Future Expansion of NGDS Infrastructure for Central Region

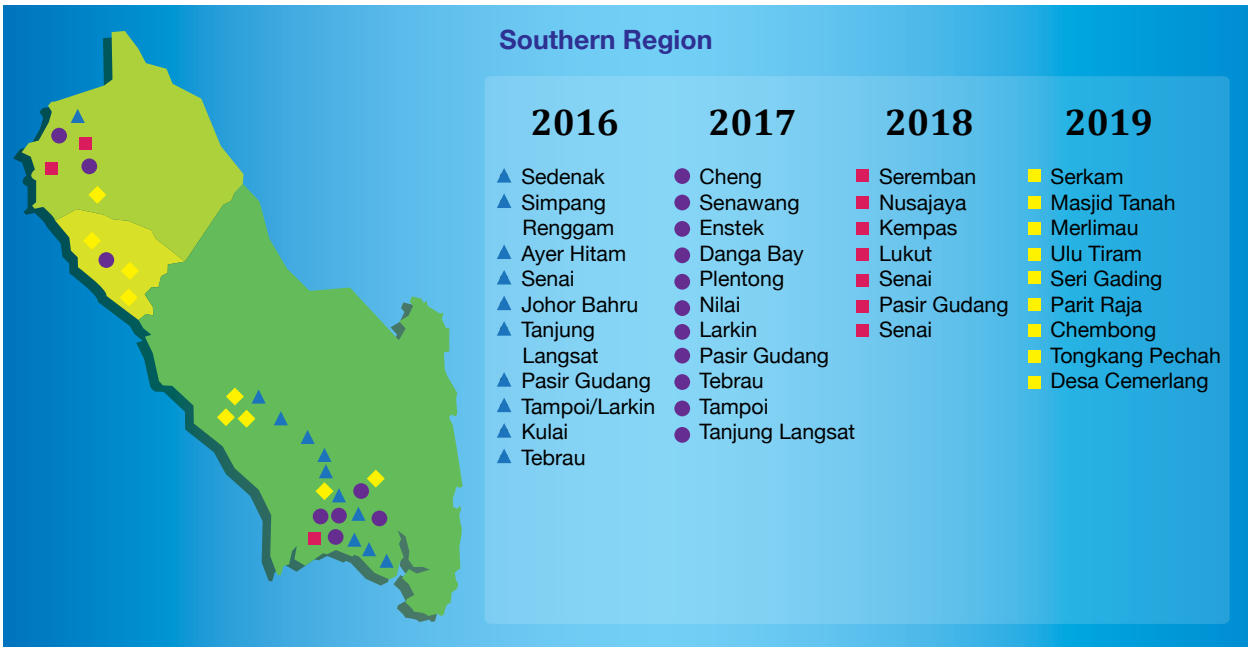


Figure 22: Future Expansion of NGDS Infrastructure for Southern Region

GAS SUPPLY PERFORMANCE

The Gas Supply Performance can be evaluated using various performance indexes such as:

i. System Average Interruption Duration Index (SAIDI);
ii. System Average Interruption Frequency Index (SAIFI);
iii. Customer Average Interruption Duration Index (CAIDI); and
iv. Pipeline Leakages Index.

SAIDI is the duration of interruptions in minute that every registered customer experienced in a particular year. SAIFI means the frequency of interruptions that every registered customer experienced in a particular year. CAIDI means the duration in minutes per interruptions. Lower figures of SAIDI, SAIFI and CAIDI represent better performance of the gas distribution supply.

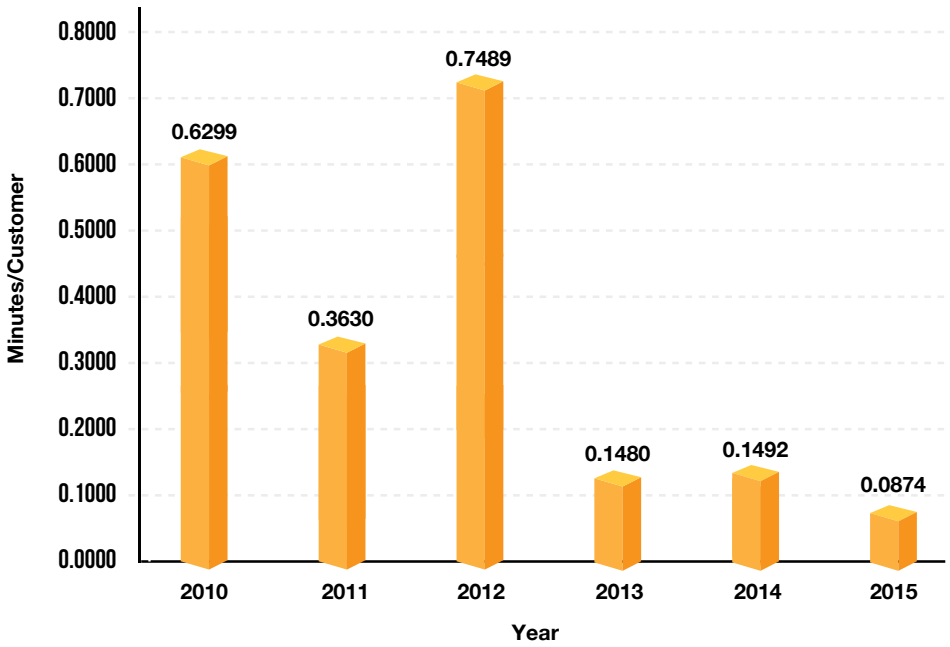


Figure 23: System Average Interruption Duration Index – SAIDI (Minutes/Customer/Year)

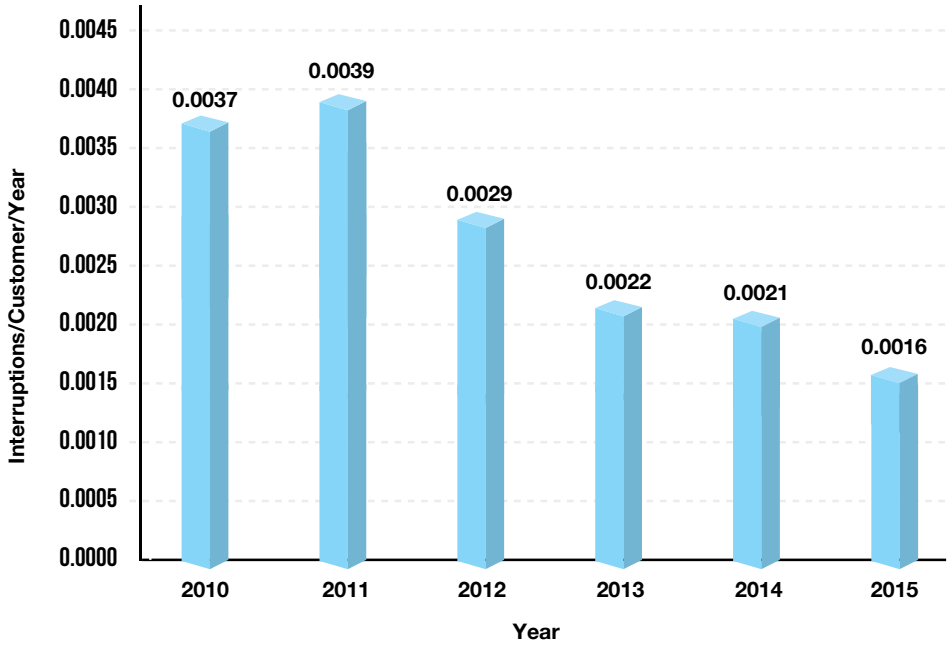


Figure 24: System Average Interruption Frequency Index – SAIFI (Interruptions/Customer/Year)

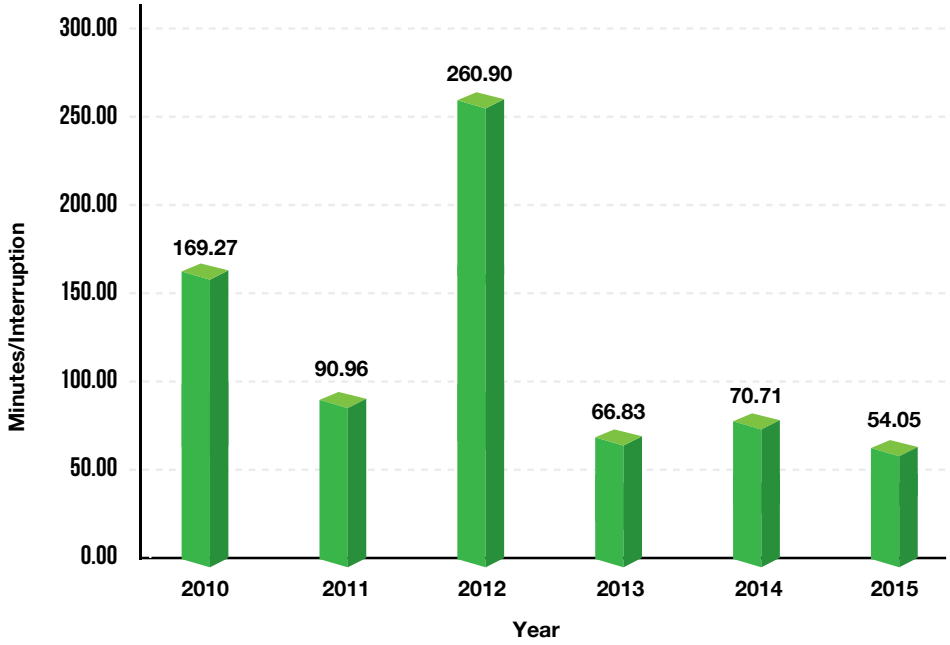


Figure 25: Customer Average Interruption Duration Index – CAIDI (Minutes/Interruption)

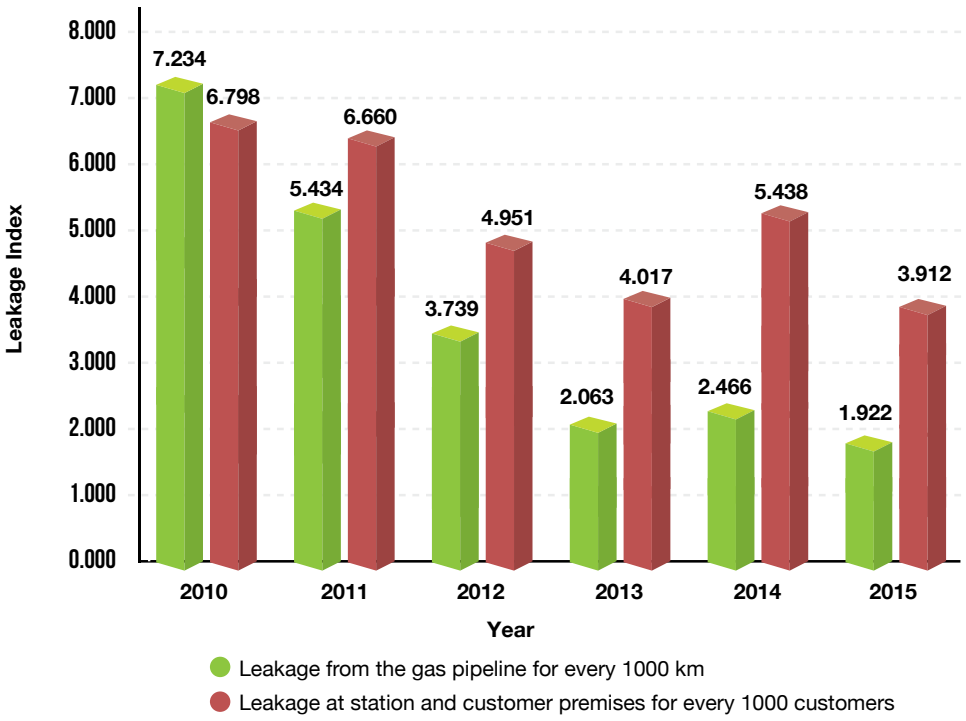


Figure 26: Pipeline Leakage Index

GAS TARIFF

Tariff Setting Mechanism

Natural Gas Tariff

Incentive Based Regulation Initiatives (IBR)

The Implementation of IBR on GMB's Natural Gas Tariff

Gas Tariff

TARIFF SETTING MECHANISM

The Energy Commission as a regulator is responsible to protect the interest of consumers by ensuring the gas tariff is charged at a reasonable and affordable price. At the same time, the Commission is also responsible to ensure that the utility company is financially sustainable for the continuity of gas supply.

For such purpose, since 2002, gas tariff is being regulated and monitored by the Commission. The gas tariff is set for a regulatory period based on forecast gas cost and non-gas costs. Any cost differences between the forecast and actual cost will be adjusted through the Gas Cost Pass-Through (GCPT) mechanism.

The gas tariff components is summarised as Figure 27:

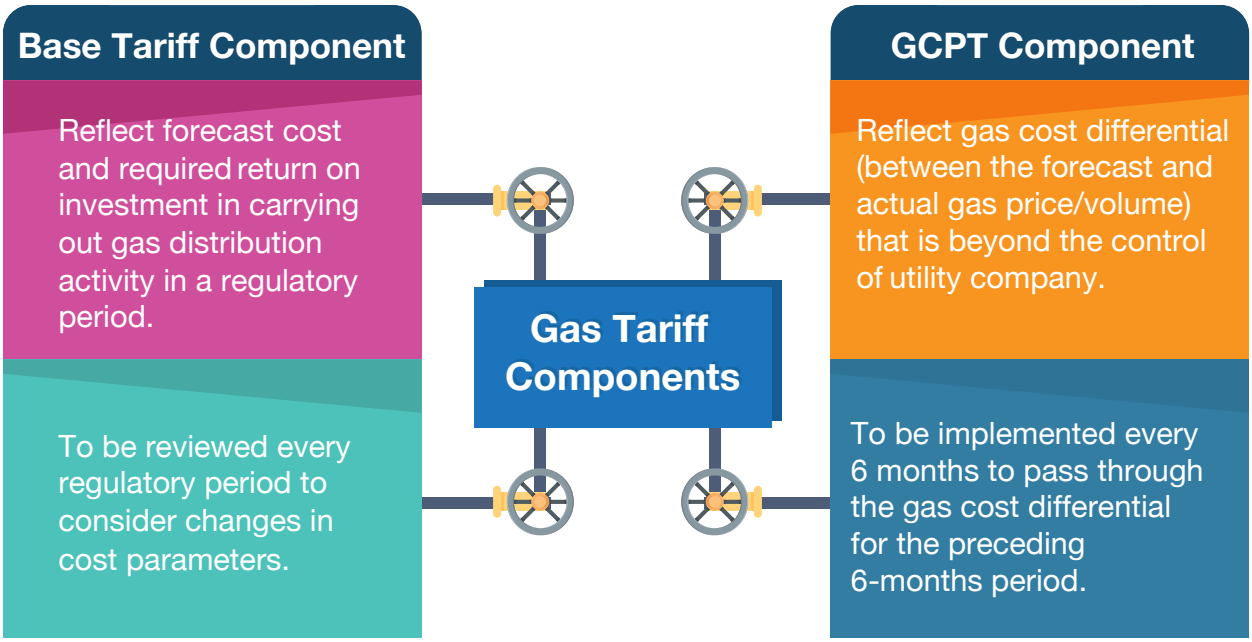


Figure 27: Gas Tariff Components

The base tariff component is illustrated as Figure 28:

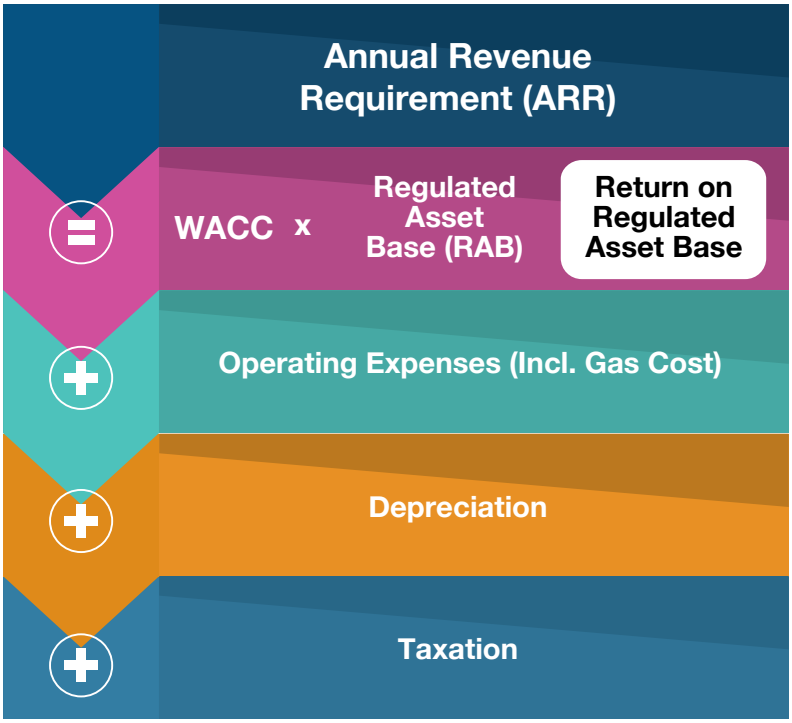


Figure 28: Base Tariff Components

NATURAL GAS TARIFF

The gas tariff involves a combination between the price of regulated piped gas as well as LNG elements supplied by PETRONAS. The regulated piped gas is charged based on price set by the government. Meanwhile, the LNG is charged based on market price on discount factor of 10% to Gas Malaysia Berhad. The LNG price includes the delivery cost elements such as shipping, regasification and transmission cost.

The LNG price by PETRONAS to Gas Malaysia Berhad is illustrated as Figure 29:

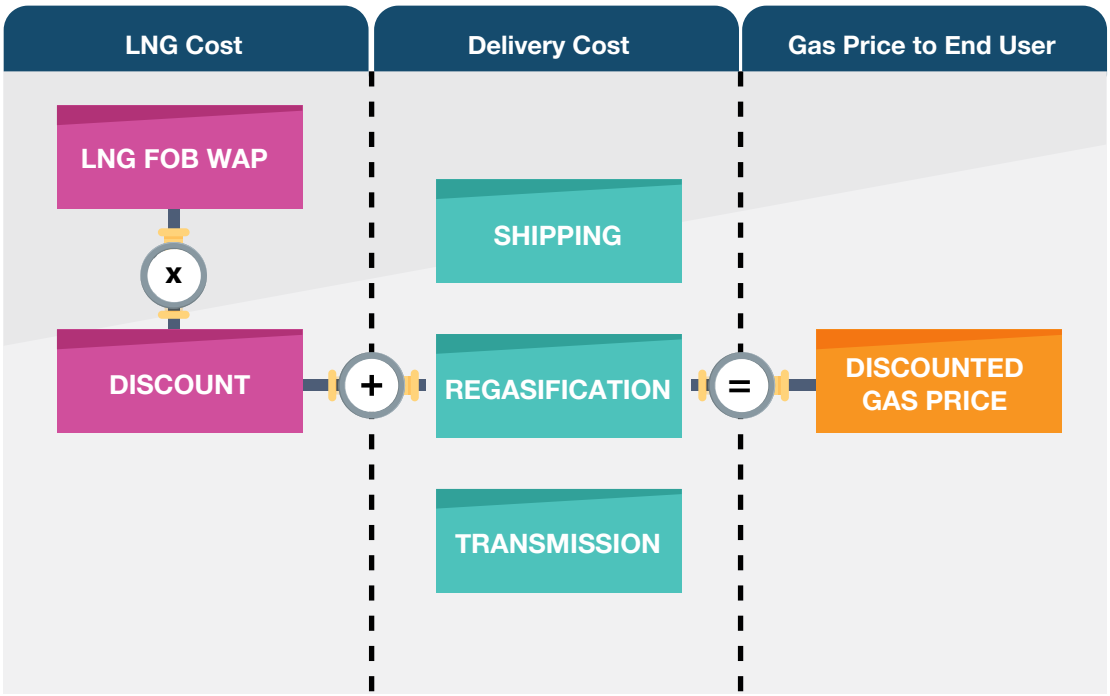


Figure 29: LNG Prices by PETRONAS

Since LNG price is open to the market exposure, it creates a price gap between both regulated piped gas and LNG. To mitigate such gap based on PEMANDU's subsidy rationalisation strategy, in 2011, the government decided to increase the price of regulated piped gas by RM3.00/MMBtu every six months. The decision was however revised and effective from January 2014, the government decided to increase the price of regulated piped gas by RM1.50/MMBtu every six months until it reaches the LNG market price. Nevertheless, on 20 January 2015, the government has announced a deferment of the price increase of regulated piped gas to the non-power sector in 2015 in order to reduce the cost impact of doing business in Malaysia. However, such deferment has been uplifted during the gas tariff revision in July 2015.

The pricing trend for both regulated piped gas and LNG for year 2014 and 2015 is presented in Figure 30:

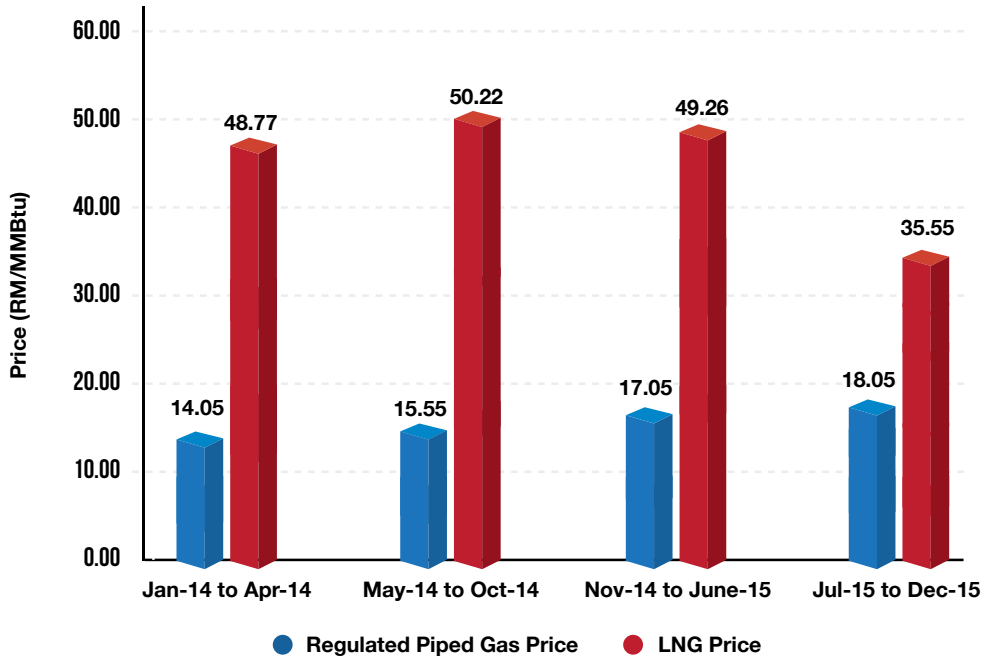


Figure 30: Historical Regulated Piped Gas Price and LNG Price for Year 2014 and 2015

Note: LNG price is based on average price of the stated period

Meanwhile, since 2002, seven revisions of the gas tariff were implemented in Peninsular Malaysia and depicted in Figure 31:

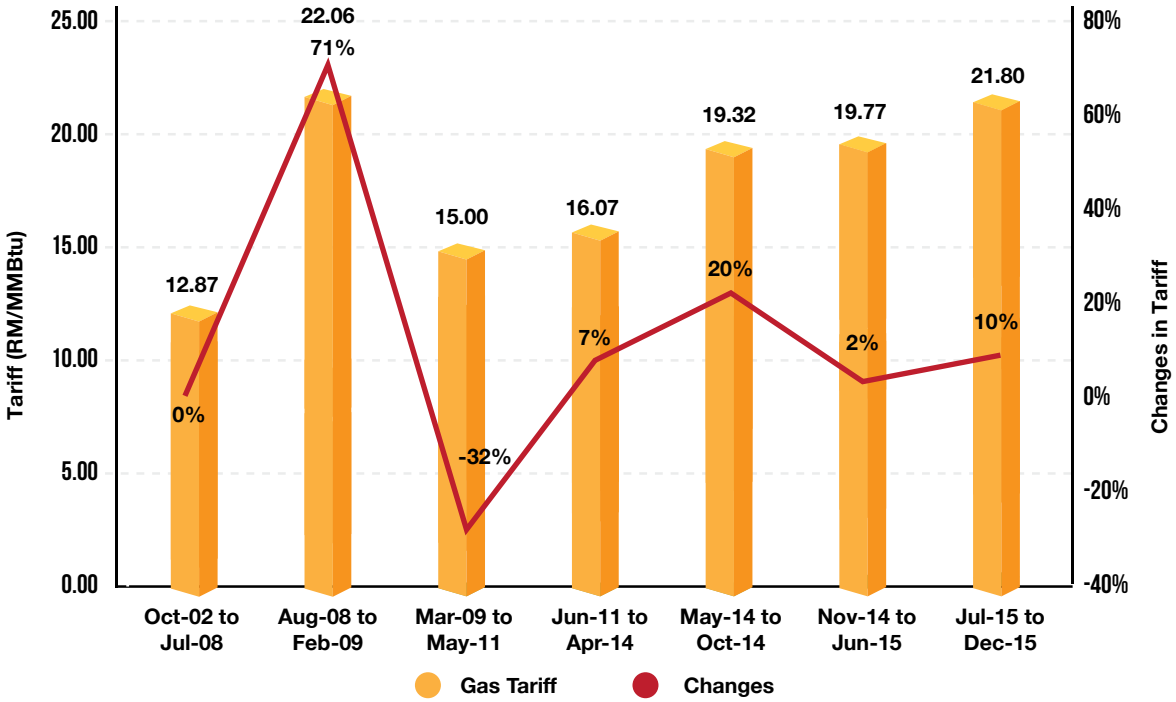


Figure 31: Gas Tariff in Peninsular Malaysia from 2002 to 2015

INCENTIVE BASED REGULATION INITIATIVES (IBR)

The Energy Commission will introduce the Incentive Based Regulation (IBR) mechanism to the gas industry in 2016 with the objective to support the regulatory governance as well as effective decision making while promoting transparency and fairness to the stakeholders. Under the IBR mechanism, a framework known as the Regulatory Implementation Guideline (RIG) will be introduced. The objectives of the framework are:

- To establish the business entities which will be subject to incentive based regulation;
- To define the regulated functions of each of the business activity;
- To specify the flow of funds.

The framework requires costs and business activities relating to gas distribution (including shipping and retail services) to be separately identified and confined from non-regulated business activities. This is to ensure that regulated gas tariff revenue received from customers is not used to subsidise the non-regulated business activities. Under the framework, business entities are subject to the price cap arrangement which will be adjusted based on gas pricing every six months. Business entities will be subjected to price cap arrangement within the regulatory period. The implementation of IBR will start with a trial period of one year, followed by three years of introductory period also known as the 1st Regulatory Period, before another regulatory period of three to five years. Within the regulatory period, business entities are obliged:

- To determine regulated and non-regulated business and separate the accounts.
- To determine financial performance and technical efficiency target of the business entities.
- To implement the GCPT mechanism for the recovery of the differential in price and volume of gas.
- To implement efficiency sharing mechanism, provide continuous and sustainable gas supply in pursuing cost efficiency.
- To produce Regulatory Accounts on top of Audited Accounts for the assessment of actual performance against prior forecast data.

THE IMPLEMENTATION OF IBR ON GMB'S NATURAL GAS TARIFF

The Incentive Based Regulation (IBR) for GMB will be implemented in stages which includes a Trial Period, 1st Regulatory Period, 2nd Regulatory Period, etc. The Trial Period commences in 2016 and will be followed by the 1st Regulatory Period from 2017 to 2019.

There are few activities to be implemented during the Trial Period. The Commission will assess GMB's Performance Incentive Scheme for the Trial Period 2016 proposal in February 2016 and finalise the proposal by April 2016.

For July 2016 gas tariff revision, GMB is required to submit a proposal together with relevant information such as the actual volume and price from January to March by April 2016. Subsequently, the Commission will assess GMB's proposal and make necessary recommendation of the tariff revision to be implemented in July 2016 for Minister's approval.

As the revised tariff is announced in July 2016, GMB is required to submit the IBR Performance Report for the first half of Trial Period to the Commission and IBR proposal for the 1st Regulatory Period in the following month for the Commission's review and recommendation. The Commission will then prepare a draft tariff for the 1st Regulatory Period based on both submissions together with the input of the consultation with relevant stakeholders. The draft decision on tariff for the 1st Regulatory Period will be forwarded to the Economic Planning Unit for the Minister's approval by November 2016.

Meanwhile, in the 1st Regulatory Period, GMB is required to submit its IBR Performance Report to the Commission for assessment by February 2017. On other hand, GMB is scheduled to submit its Regulatory Accounts to the Commission by April 2017 for assessment.

The summary of IBR timeline for Trial Period 2016 is in Table 4:

ASSESMENT OF GMB'S TARIFF AND PERFORMANCE INCENTIVE SCHEME IN TRIAL PERIOD 2016		
Stage	**Indicative Dates**	**Process**
Stage 1:	**April 2016**	The Commission to finalise the Performance Incentive Scheme for Trial Period 2016.
Stage 2:	**April 2016**	GMB to submit the actual gas volume and price from January to March 2016 for implementation of GCPT in July 2016 tariff revision.
Stage 3:	**May 2016**	The Commission to forward the July 2016 tariff revision (inclusive base tariff and GCPT components) proposal to Minister for approval.
Stage 4:	**July 2016**	GMB to submit IBR Performance Report (inclusive tariff and Performance Incentive Scheme) for H1 2016 to the Commission for assessment.
Stage 5:	**August 2016**	GMB to submit revised IBR Proposal and Revenue Requirement Model for 1st Regulatory Period.
	August 2016	The Commission to assess the IBR Performance Report for H1 2016 and make a recommendation for improvement for 1st Regulatory Period.
Stage 6:	**February 2017**	GMB to submit IBR Performance Report (inclusive tariff and Performance Incentive Scheme) to the Commission for assessment.
Stage 7:	**April 2017**	GMB to submit its 2016 audited Regulatory Account to the Commission for assessment.
	April 2017	The Commission to assess the IBR Performance Report and 2016 audited Regulatory Accounts and make recommendation for improvement for the 1st Regulatory Period.

Table 4: The IBR Timeline for Trial Period 2016

THE WAY FORWARD

Introduction of Third Party Access (TPA)

The General Concept of TPA System

The Implementation of TPA System

The Way Forward

INTRODUCTION OF THIRD PARTY ACCESS (TPA)

In Malaysia, traditionally and historically, parties who utilise piped natural gas either for their personal or business use obtain such gas directly or indirectly (via GMB) from PETRONAS. This is mainly attributable to the fact that the main source of piped natural gas is indigenous gas, and the rights to such gas is vested in PETRONAS by virtue of the Petroleum Development Act 1974.

However, cognisant of the fact that depleting indigenous gas supply is gradually unable to satisfy the growing demand for natural gas, the government, via the New Energy Policy 2010, the 10th Malaysia Plan and the Economic Transformation Program, introduced the concept of Third Party Access System (TPA System) for the purpose of ensuring the security, reliability and sustainability of gas supply in Malaysia.

Based on this vision, Malaysia's first regasification terminal in Sungai Udang, Melaka commenced operations in May 2013, and this marked the first step in realising the concept of the TPA System in Malaysia as it allowed for an additional source of supply of gas to be injected into Malaysia.

The task to regulate the economic, technical and, in certain areas, safety aspects of the TPA System has been entrusted to the Energy Commission. Where currently, under the Gas Supply Act 1993, the Commission regulates the economic, technical and safety aspects only downstream of city gate stations, its new task relating to the TPA System would expand its economic and technical regulatory scope even more, whilst maintaining its current safety scope.

THE GENERAL CONCEPT OF TPA SYSTEM

Essentially, the TPA System creates a platform where other (or third) parties are able to utilise without discrimination the three major gas infrastructures in Malaysia: regasification terminals, transmission pipelines and distribution pipelines, irrespective of the ownership of such gas infrastructures. The main objective is to attract new suppliers of gas (referred to as "shippers") into the Malaysian market, providing a level playing field for all shippers in order to promote competition, and with the end objective to create a market where the price of gas is left to the determination of the market based on supply and demand between these shippers and their customers (referred to as "consumers").

THE IMPLEMENTATION OF TPA SYSTEM

To implement the TPA System, an amendment to the current Gas Supply Act 1993 is required. For this purpose, the Commission has liaised closely with the Economic Planning Unit and the Attorney General's Chambers to finalise the proposed amendments, which are targeted to be presented to Parliament for approval in the first sitting of 2016.

The proposed amendments shall create 7 types of participants based on their activities: regasification, transportation, distribution, shipping, import into regasification terminal, retail and use of gas. The first 4 types have already been introduced in the preceding paragraphs, whereas "import into regasification terminal" would refer to the parties importing LNG into regasification terminals and "retail" and "use of gas" would refer to end users who use gas either for commercial or their own use.

The scope of regulation under the TPA System can be seen more clearly in Figure 32.

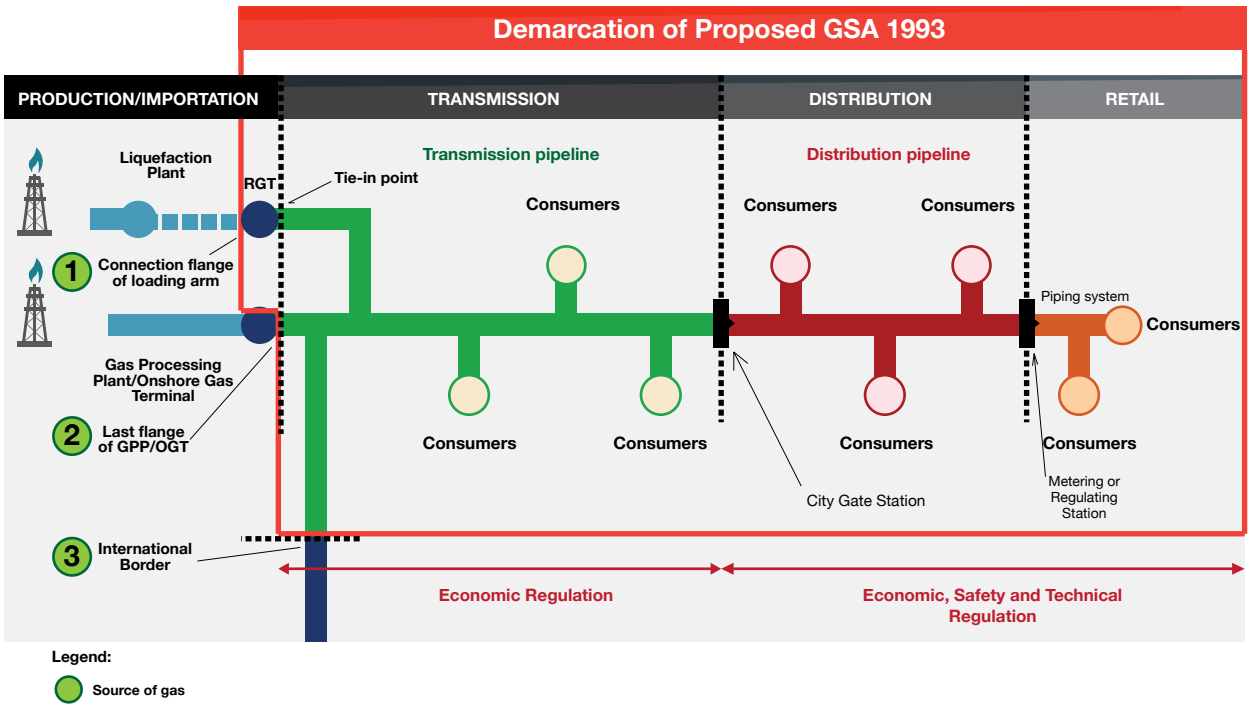


Figure 32: The Proposed Scope under the TPA System

Once the amendments are approved by Parliament, the Commission will proceed with ensuing amendments to the Gas Supply Regulations, as well as issuing the Regasification Code, Transmission Code and Distribution Code and related guidelines in order to facilitate the smooth implementation of the TPA System.

CLOSURE

Closure

For the past five years, the Malaysian economy grew between 4.5 – 6.0% and mainly supported by the private sector which was driven by the service and manufacturing sectors which subsequently contributed to a positive demand of natural gas. For the same period of time, the natural gas demand from distribution pipelines had recorded an average of 6.21% growth annually. The industrial sector was the largest gas consumer and this trend is expected to remain for the years to come. Between 2008 and 2015, this sector consumed an average of 138,246,152 MMBtu or equivalent to an average of 99.3% of natural gas from the distribution pipelines annually. The growth of demand for natural gas is expected to remain between 5.13 – 8.81% from 2016 until 2020.

In order to strengthen the legal and regulatory frameworks, and moving towards market liberalisation of the gas industry, the Energy Commission is looking forward to the amendment of the Gas Supply Act 1993. In this amendment exercise, some new initiatives – such as the Third Party Access (TPA) and Incentive Based Regulation (IBR) – will be introduced. This amendment is expected to be tabled in the Parliament in 2016.

As a regulator, the Energy Commission remains committed to protect the interest of consumers by ensuring that the gas tariff is charged at a reasonable and affordable price. At the same time, the Commission is also responsible to ensure that the utility is financially sustainable for the continuity of gas supply. Thus the price of natural gas from distribution pipelines will be revised from time to time to fulfil these obligations.

The reliability of natural gas supply from distribution pipelines is one of the most important aspects monitored by the Energy Commission. The natural gas utility, currently GMB, is expected to ensure the gas supply reliability to the customers at all times.

Appendix

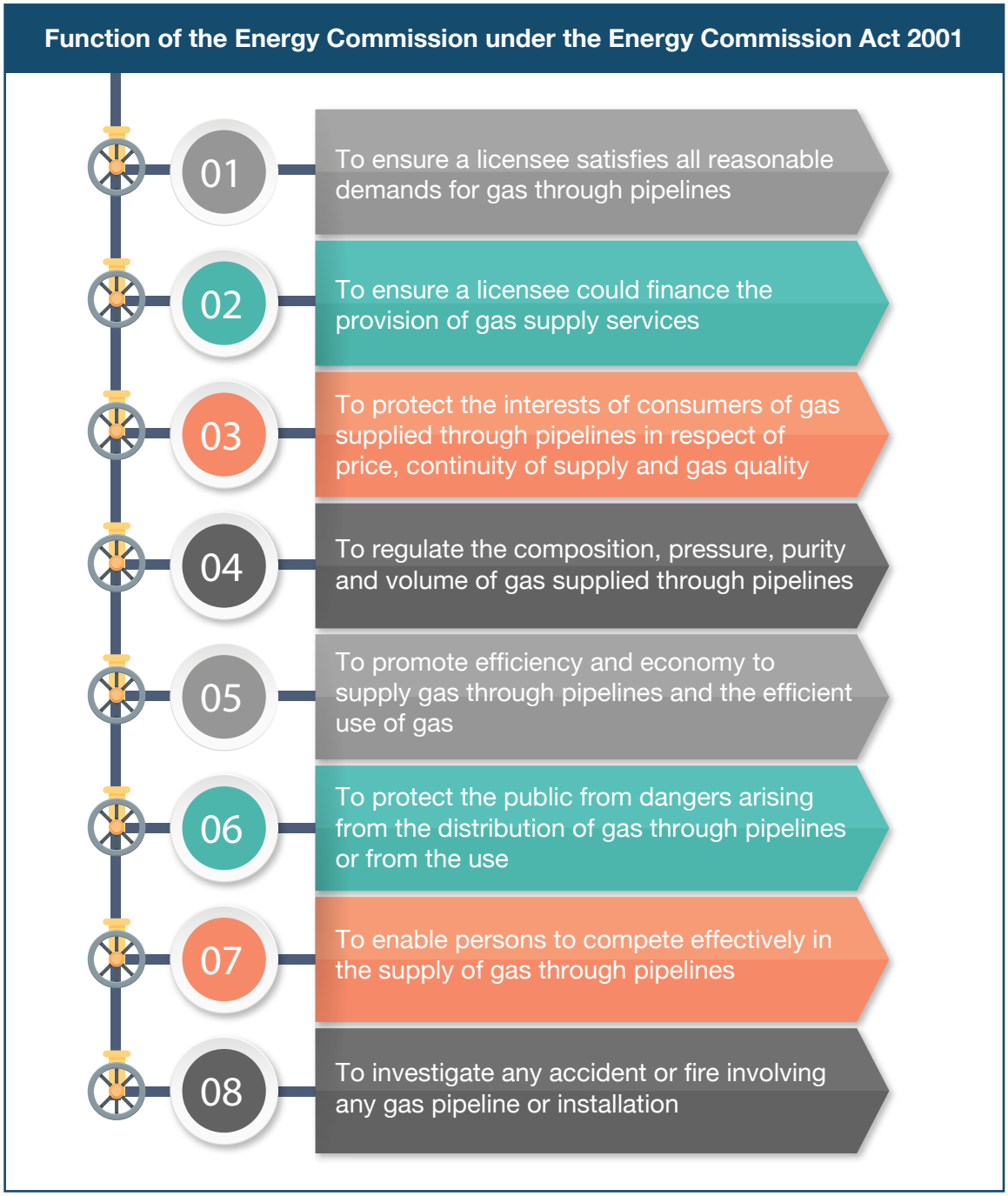


Figure 33: Function of the Energy Commission

Note

Note