

17th APEC Workshop on Energy Statistics

Oil & Gas Statistics In Malaysia

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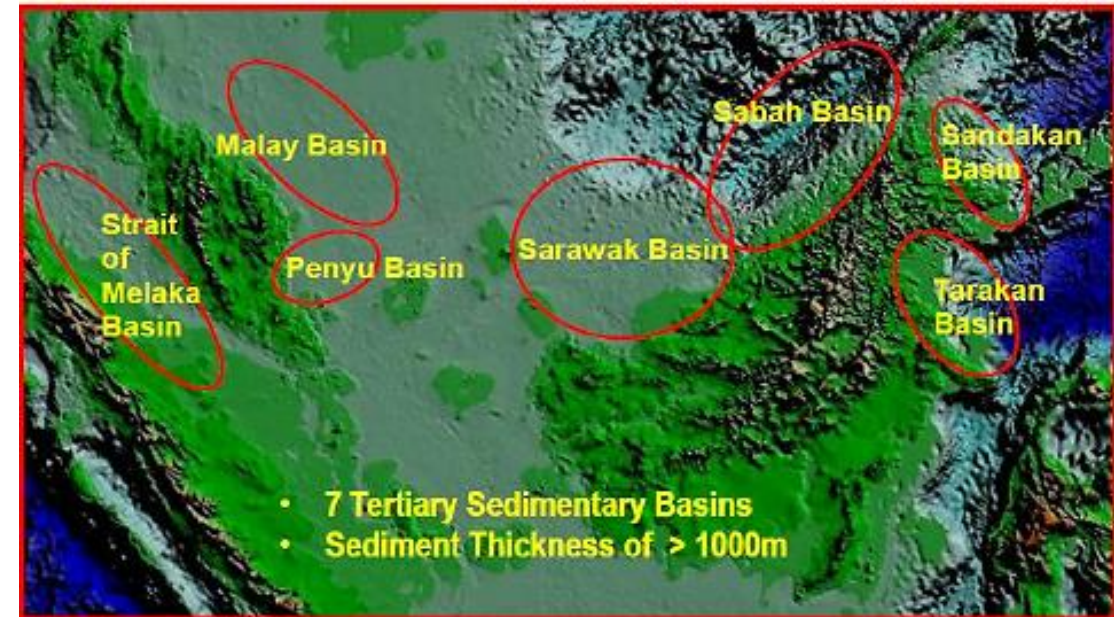
Outline

- Oil and Gas Resources
- Oil and Gas Production and Consumption
- Sources of Oil and Gas Data
- Challenges in Collecting Oil and Gas Data
- Government Roles

Oil and Gas Resources

Peninsular Malaysia	Located offshore east of Peninsular Malaysia, the Malay Basin is the most prolific oil and gas producing basin in Malaysia and contains more than 12,000 metre of sediments. To the south, the Penyu Basin covers an area of 5,000 square kilometres. Part of North Sumatra Basin and Central Sumatra Basin, can be found on the western side of the Peninsular, in the Straits of Malacca.
Sarawak	The Sarawak Basin is a prolific oil and gas producing basin. Seven geological provinces have been identified in the basin, namely the West Baram Delta, Balingian, Central Luconia, Tinjar, Tatau, West Luconia and North Luconia. Exploration activities have been carried out in all seven provinces and commercial hydrocarbons have been found in three provinces of West Baram Delta, Balingian and Central Luconia. More exploration activities are being undertaken in the West and North Luconia provinces including the deepwater area to the north of these provinces.
Sabah	There are three major basins in Sabah namely the Sabah Basin, Northeast Sabah Basin and Southeast Sabah Basin. The Sabah Basin which is located in the Northwest Sabah is mainly offshore while the other two basins cover some areas in the Northeast and Southeast of onshore Sabah.

Sedimentary Basins of [Malaysia](#)



Source: https://www.researchgate.net/figure/Sedimentary-basins-of-Malaysia_fig3_228472902

Oil and Gas Resources

Reserves and Production of Oil as of 1st January 2017

Region	Reserves billion barrels			Production thousand barrels per day		
	Crude Oil	Condensates	Total	Crude Oil	Condensates	Total
Peninsular Malaysia	1.389	0.280	1.669	182.82	27.15	209.96
Sabah	1.647	0.121	1.767	258.12	18.61	276.74
Sarawak	0.809	0.481	1.290	113.54	59.81	173.35
Total	3.845	0.882	4.727	554.48	105.57	660.05

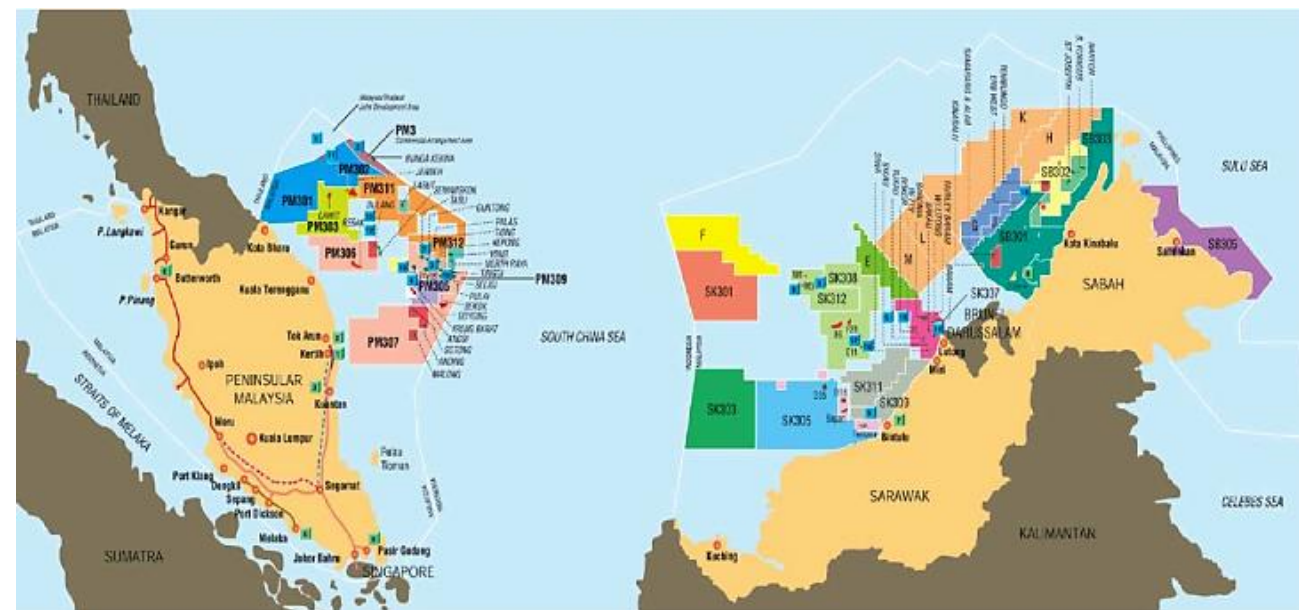
Source: National Energy Balance 2017

Reserves and Production of Natural Gas as of 1st January 2017

Region	Reserves			Production
	Trillion standard cubic feet (Tscf)			Million standard cubic feet per day (MMscf/d)
	Associated	Non-Associated	Total	
Peninsular Malaysia	19.327	6.333	25.659	1,792.37
Sabah	11.060	1.487	12.547	883.71
Sarawak	43.184	1.508	44.692	4,124.70
Total	73.570	9.327	82.897	6,800.77

Source: National Energy Balance 2017

Malaysia Oil and Gas Fields

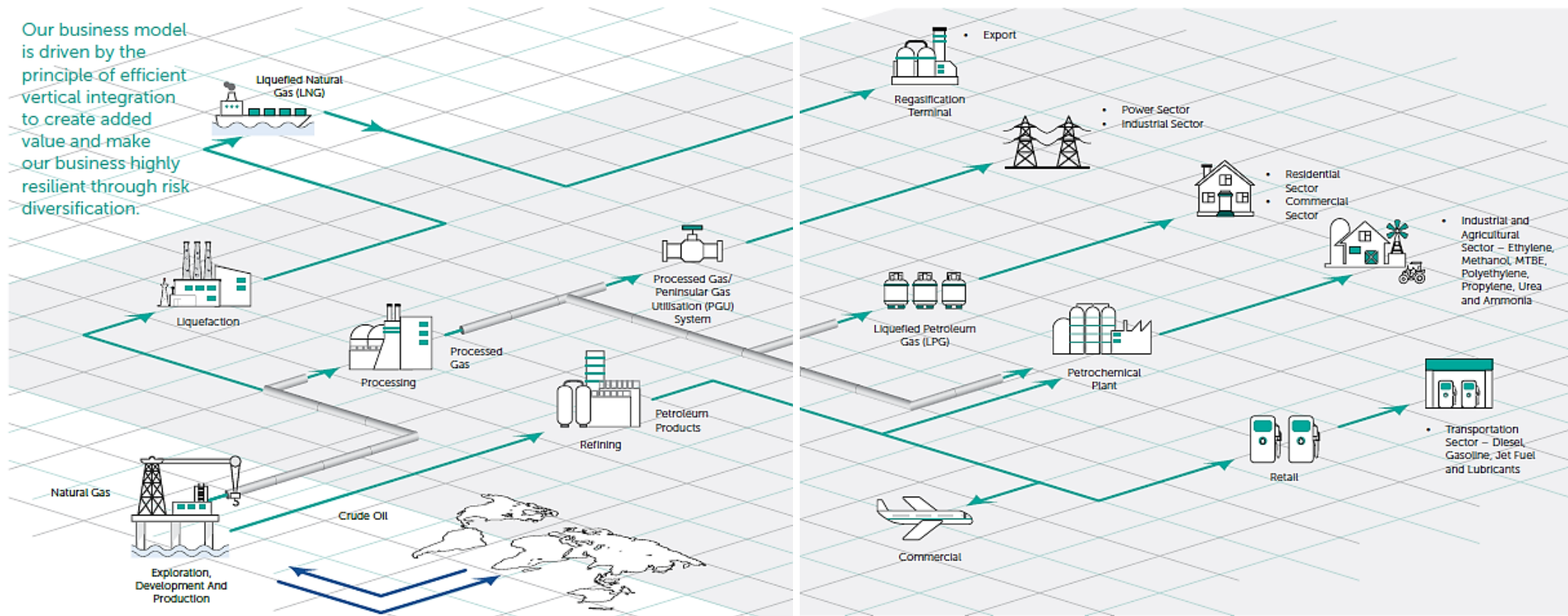


Source: <http://www.poweroilandgas.com/2011/09/malaysia-oil-and-gas-fields.html>

- About 42% of oil produced in Sabah, while Peninsular Malaysia at 32% and remaining 26% from Sarawak.
- Sarawak produced around 61% of natural gas followed by Peninsular Malaysia at 26% and Sabah at 13%.

Oil and Gas Production and Consumption

Our business model is driven by the principle of efficient vertical integration to create added value and make our business highly resilient through risk diversification.



EXPLORATION AND PRODUCTION

EXPLORATION

Developing resource potential and building up commercial reserves.

DEVELOPMENT

Field development and construction (including supporting infrastructure).

PRODUCTION

Drilling and production of hydrocarbons.

PROCESSING

LIQUEFACTION

Converting gas into liquid state by increasing pressure and reducing temperature to shrink the gas volume.

PROCESSING

Turning streams of natural gas into commercial products, in addition to treating gas deposits.

REFINING

Processing crude and condensates into useful petroleum products.

MARKETING AND DISTRIBUTION

RETAIL

Selling and marketing of fuel and non-fuel products and providing one-stop convenience centres at service stations.

COMMERCIAL

Trading and marketing of crude oil and petroleum products to individual and commercial customers.

PETROCHEMICAL PLANT

Processing of oil and gas into products from which other chemicals are derived.

LIQUEFIED PETROLEUM GAS (LPG)

Propane and butane components used as cooking fuel, transport fuel and feedstock for petrochemicals.

PROCESSED GAS/ PENINSULAR GAS UTILISATION (PGU) SYSTEM

Natural gas is processed and fed into a pipeline system that delivers it to different sectors.

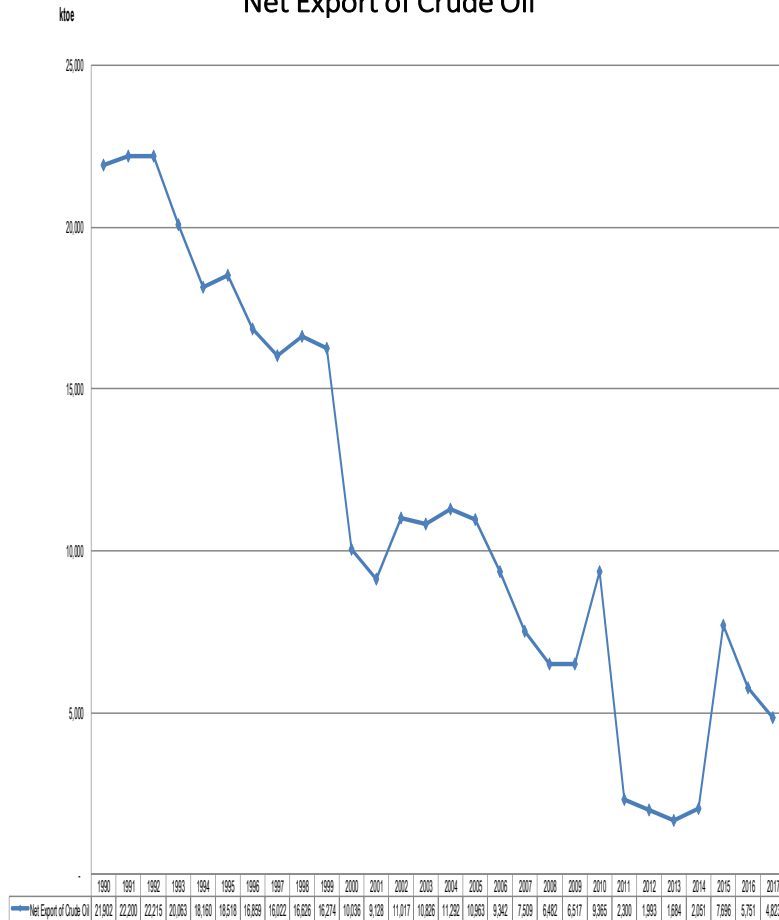
LIQUEFIED NATURAL GAS (LNG)

Natural gas that is liquefied under extremely cold temperatures to facilitate storage or transportation in specially designed vessels.

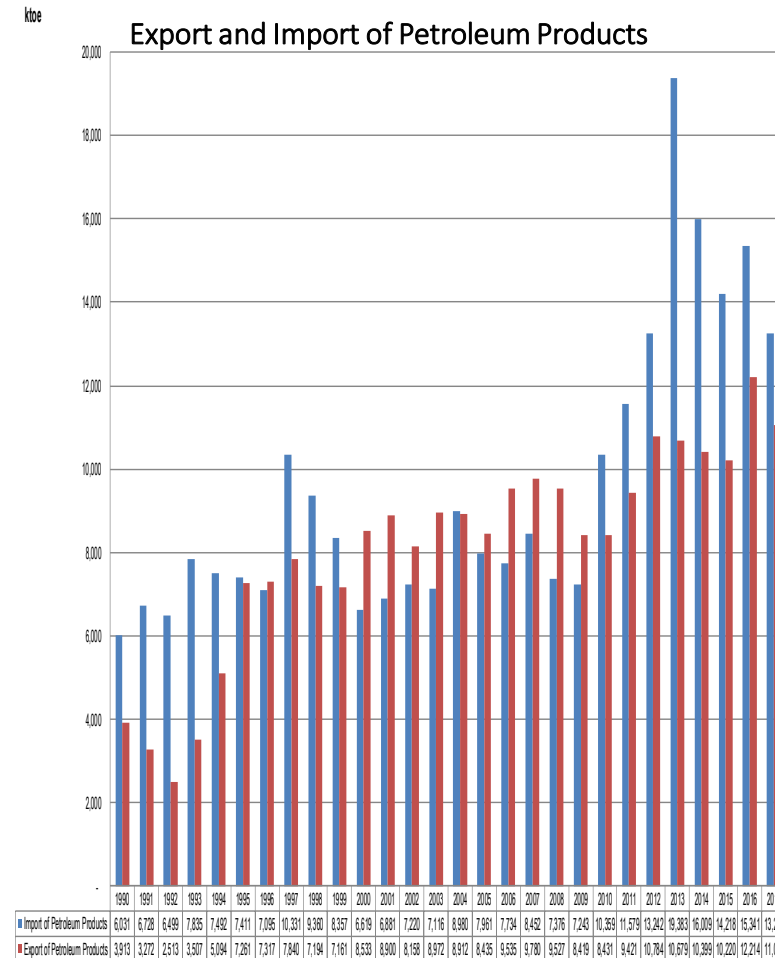
Source: https://www.petronas.com/ws/sites/default/files/2018-08/petronas-annual-report-2017_0.pdf

Oil and Gas Production and Consumption

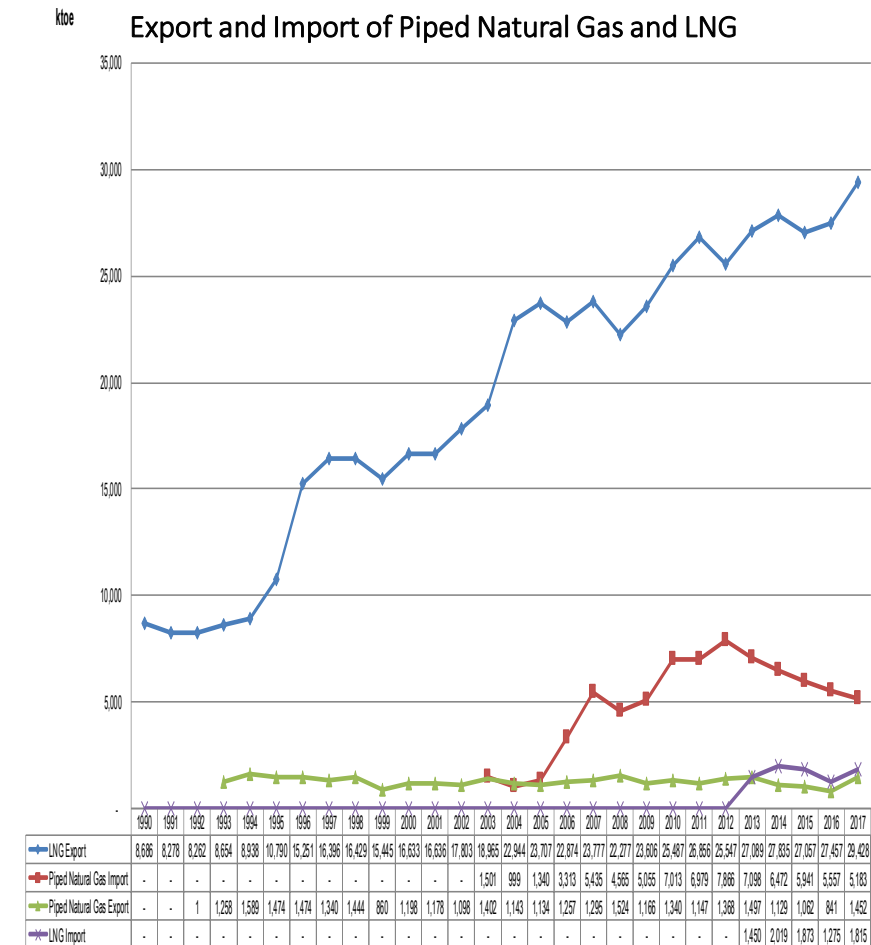
Net Export of Crude Oil



Export and Import of Petroleum Products



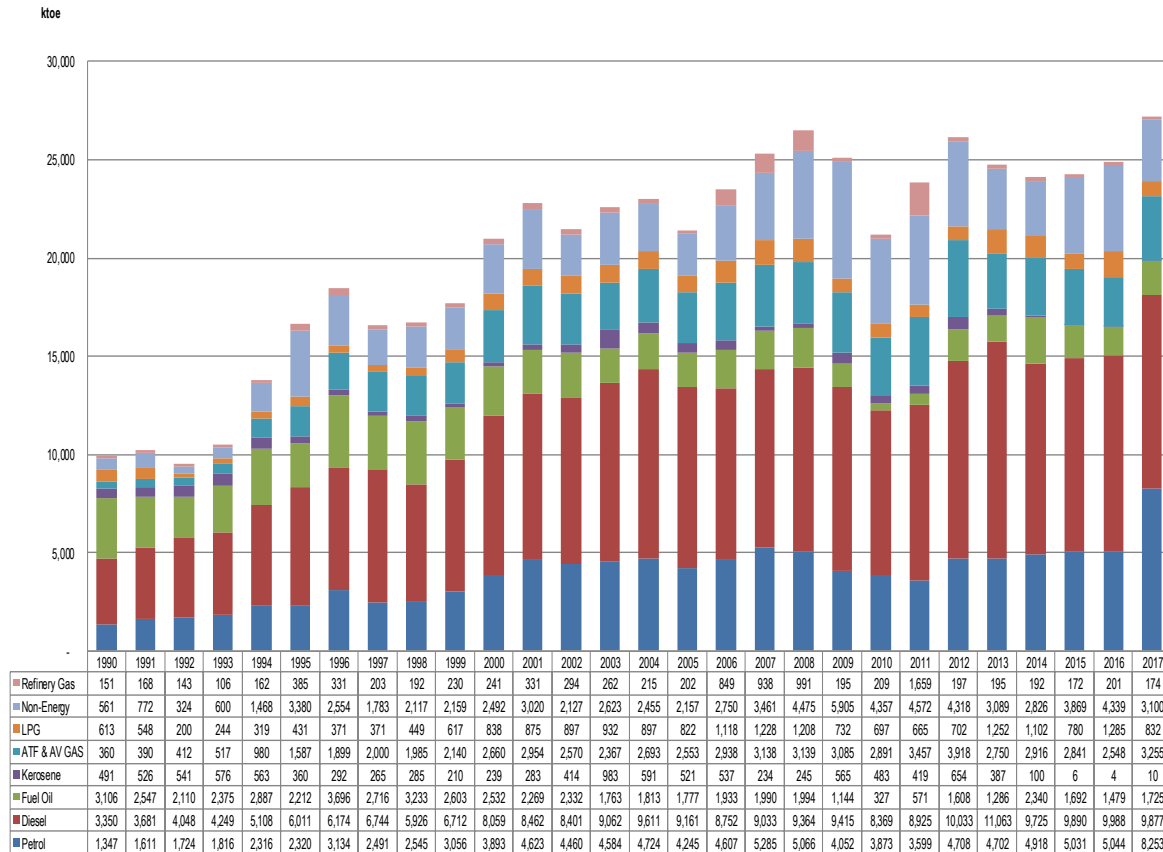
Export and Import of Piped Natural Gas and LNG



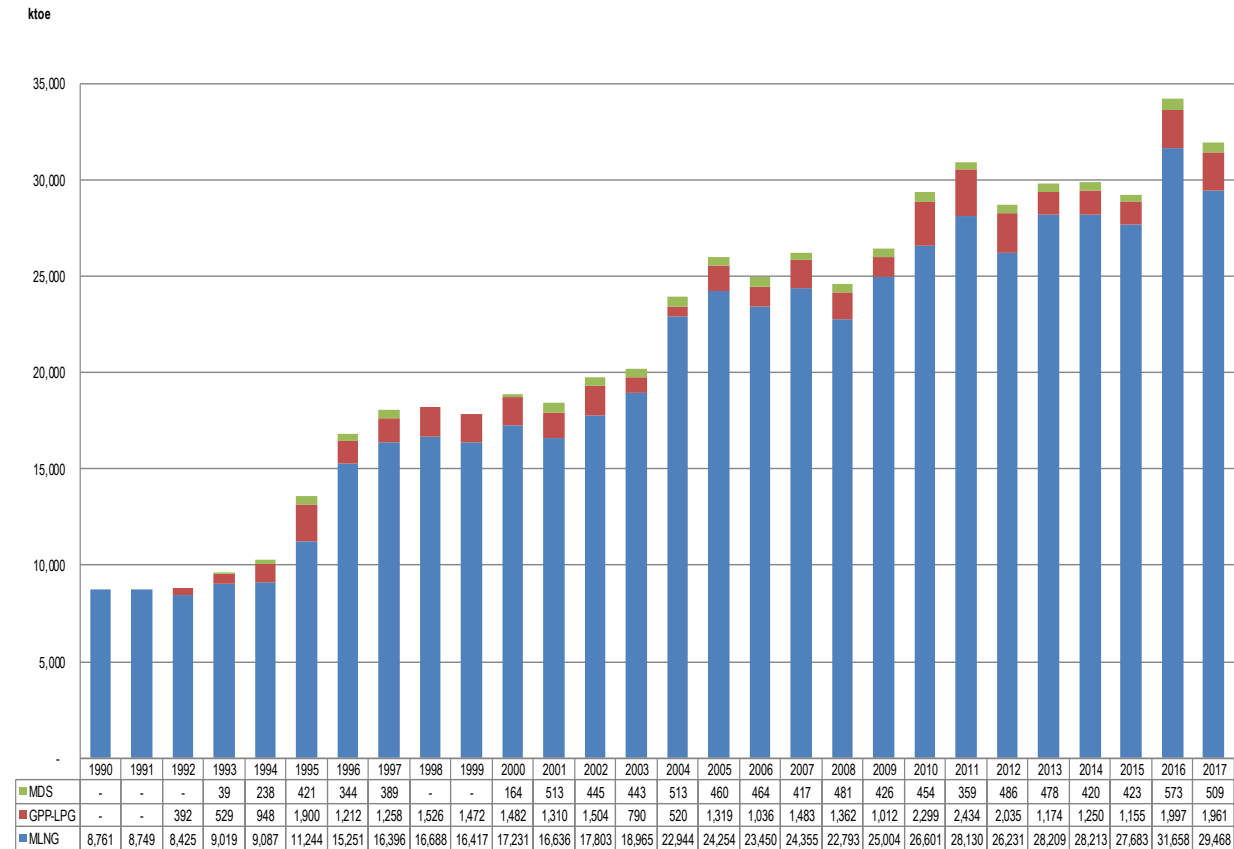
- Malaysia is a net exporter of crude oil and over the years it is showing a downward trend.
- Maintained as a net importer of petroleum products
- Most of the local natural gas is transformed to LNG for export purpose. LNG import starts in 2013.

Oil and Gas Production and Consumption

Production of Petroleum Products from Refineries

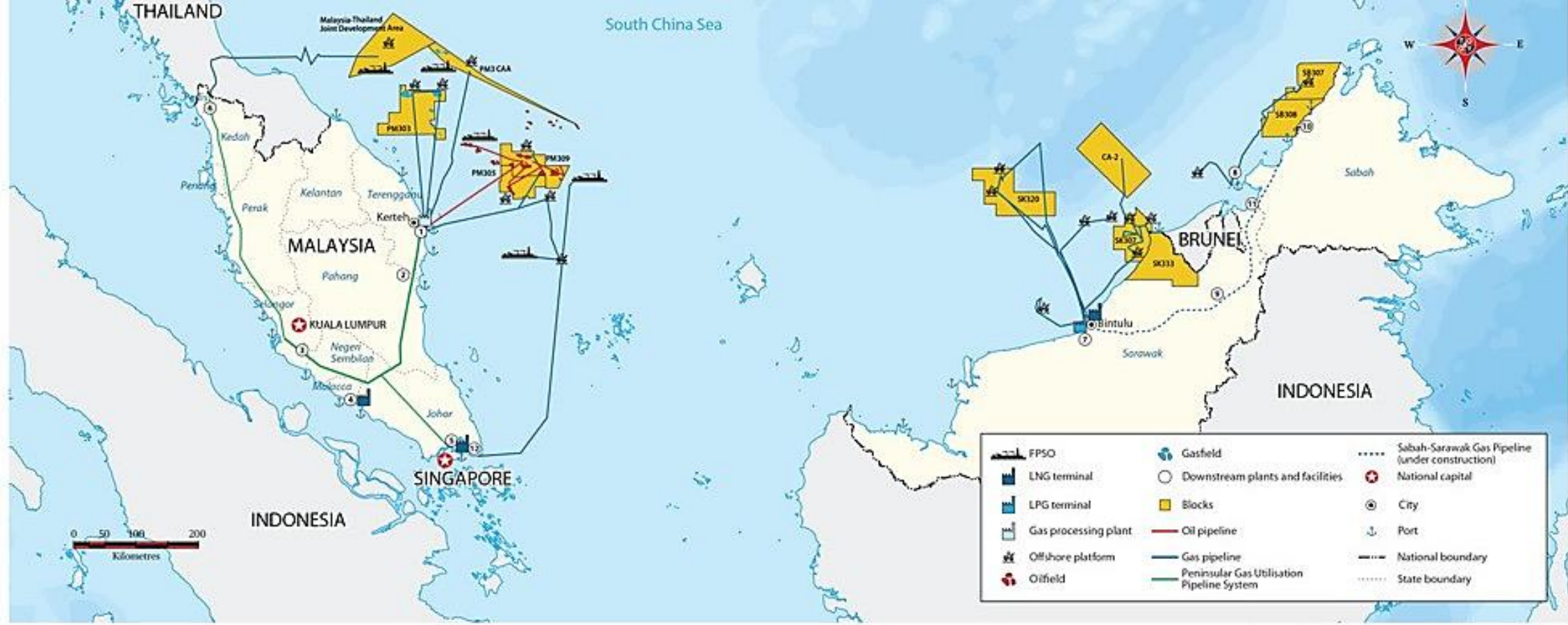


Conversion in Gas Plants



-Diesel and Petrol dominates the production in refineries. New refinery in Pengerang is expected to start operation commercially in Q4 2019

-All of the natural gas produced in Sarawak is transformed to LNG and exported to other countries.



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1 PETRONAS PETROLEUM INDUSTRY COMPLEX, KERTEH

Oil refinery capacity: 114,300 barrels per day (bpd)
 Ethylene plant capacity: 400,000 tonnes per year (tpy) (commissioned 1995)
 Polyethylene plant capacity: 200,000 tpy (commissioned 1995)
 Vinyl chloride monomer plant capacity: 400,000 tpy (commissioned 2001)
 Polyvinyl chloride plant capacity: 150,000 tpy (commissioned 2001)
 Ammonia/syngas plant capacity: ammonia 400,000 tpy; syngas 350,000 tpy (commissioned 2001)
 Acetic acid plant capacity: 400,000 tpy (commissioned 2000)
 Aromatics plant capacity: paraxylene 500,000 tpy; benzene 188,000 tpy (commissioned 2000)
 Olefins plant capacity: ethylene 600,000 tpy; propylene 95,000 tpy (commissioned 2002)
 Ethylene oxide and ethylene glycol plant capacity: ethylene oxide 140,000 tpy; ethylene glycols 385,000 tpy (commissioned 2002)
 Ethylene derivatives plant capacity: ethoxylate 30,000 tpy; ethanolamines 75,000 tpy; glycol ethers 60,000 tpy (commissioned 2002)
 Low-density polyethylene plant capacity: 255,000 tpy (commissioned 2001)

2 POLYPROPYLENE PLANT, KERTEH

Polypropylene plant capacity: 80,000 tpy (commissioned 1992)
 BASF Petronas Acrylics Complex capacity: crude acrylic acid 160,000 tpy; glacial acrylic acid 20,000 tpy; butyl acrylate 100,000 tpy; 2-ethylhexyl acrylate 60,000 tpy (commissioned 2000)
 BPC Oleo-Alcohols/Syngas Complex capacity: 2-ethylhexanol 80,000 tpy; phthalic anhydride 40,000 tpy; plasticisers 100,000 tpy; butanols 160,000 tpy; syngas 170,000 tpy (commissioned 2001)
 BPC Butanediol Complex capacity: 100,000 tpy (commissioned 2004)

3 PUTRAJAYA

Distribution terminal

4 MALACCA GROUP III BASE OIL PLANT (UNDER CONSTRUCTION)

PSR-1 capacity: 114,300 bpd (on stream 1994)
 PSR-2 capacity: 130,000 bpd (on stream 1998)
 LNG regasification terminal, offshore Malacca
 Capacity: 3.8 million tpy
 Marhabat.com/line 4 2013

6 GURUN

Ammonia and urea plant capacity: ammonia 375,000 tpy; urea 600,000 tpy; methanol 66,000 tpy; urea formaldehyde 5,700 tpy (commissioned 1999)

7 BINTULU PETRONAS LNG COMPLEX

LNG processing and export capacity: 4 million tpy
 Trains: 8 trains, with Train 9 due to add 3.6 million tpy in 2015
 Ammonia and urea plant capacity: urea 600,000 tpy; ammonia 400,000 tpy (commissioned 1984)

8 LABUAN

Methanol plant capacity: 660,000 tpy
 Mega Methanol Project: 1.7 million tpy
 Crude oil terminal and gas terminal: under expansion
 Facilities: Asian supply base, logistics support centre
 Total area: 1.4 square kilometres
 Shipyard
 Total area: 392,000 square metres
 (Commissioned 1984)

10 SABAH OIL AND GAS TERMINAL (UNDER CONSTRUCTION)

Expected on stream: 2014
 Projected capacity: 300,000 barrels of oil per day; 35.4 mcm (1.25 bcf) of gas per day

11 SIPITANG OIL AND GAS INDUSTRIAL PARK, SABAH

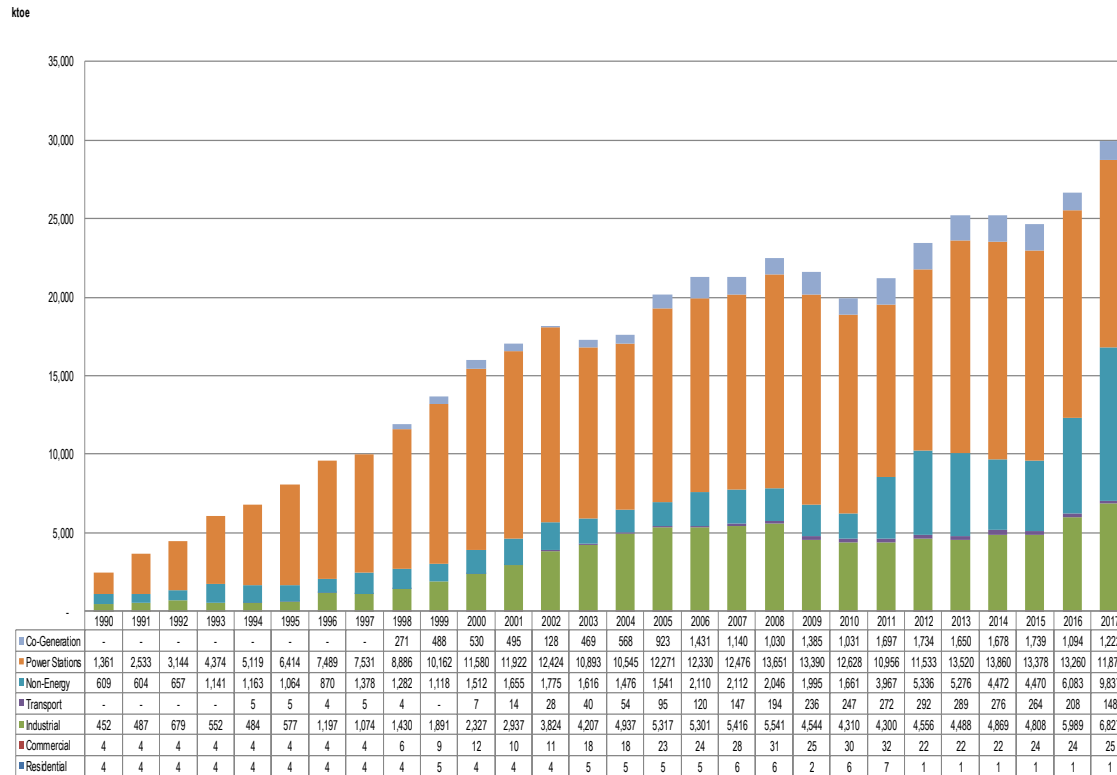
Project start date: 2010
 Size: 16.6 square kilometres
 Facilities: petrochemicals complex, bulk storage, refinery, fabrication yards, ammonia plant, urea plant, granulation plant, integrated utility units, jetty facilities
 Ammonia plant capacity: liquid ammonia 765,000 tpy
 Urea plant capacity: granulated urea 1.3 million tpy
 Construction began: 2012
 Expected on stream: 2015

12 PENERANG INTEGRATED PETROLEUM COMPLEX (UNDER CONSTRUCTION)

Pengerang Independent Deepwater Petroleum Terminal
 Total storage capacity: liquid petroleum products independent storage 1.3 million cubic metres
 Phase 1-A: Q1 2014
 Storage capacity: 432,000 cubic metres
 Phase 1-B: Q3 2014

Oil and Gas Production and Consumption

Natural Gas Consumption



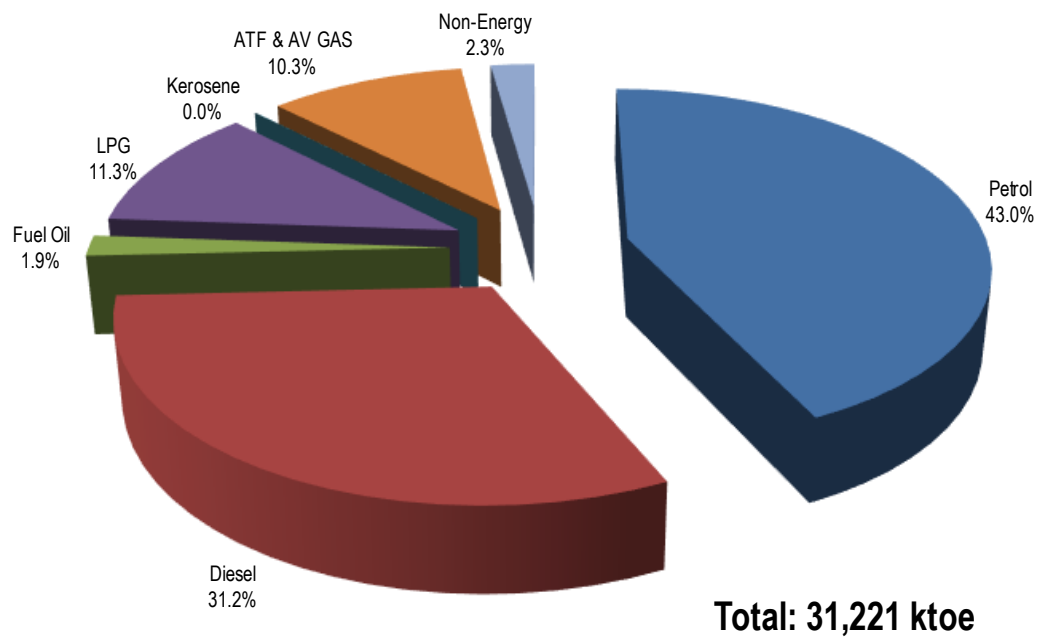
Consumption of Natural Gas in MMscf

Sectors	Peninsular Malaysia	Sabah	Sarawak	Malaysia
Residential	22	0	0	22
Commercial	905	36	0	941
Industry	193,869	44,783	21,744	260,396
Non-energy	96,091	214,795	64,316	375,202
Transport	5,628	0	0	5,628
Power Stations	358,060	136,133	37,440	531,633
Co-Generation	37,421	0	55,808	93,229
Total	691,996	395,748	179,308	1,267,051

- Natural gas is one of the main fuel used in power stations in Malaysia.
- At the end-use chain, industry sector and non-energy sector is the main natural gas consumer.
- Usage of natural gas in non-energy sector shows a spike in 2017 due to the commissioning of a new petrochemical plant in Sabah.

Oil and Gas Production and Consumption

Petroleum Products Consumption



Breakdown on Sales of Petroleum Products in Thousand Barrels

Petroleum Products	Peninsular Malaysia	Sabah	Sarawak	Total
Petrol	98,362	4,971	4,954	108,287
Diesel	57,066	9,884	7,449	74,398
Fuel Oil	3,829	58	3	3,890
Kerosene	38	0	2	40
LPG	15,032	887	863	16,782
ATF & AV Gas	22,847	896	762	24,504
Non Energy	3,782	327	426	4,535
Total	200,955	17,022	14,459	232,436

- *Petrol and diesel are mostly used in transportation sector, specifically for road.*
- *LPG is mainly consumed by the domestic sector and non-energy sector.*

Sources of Oil and Gas Data

	Oil	Gas
Primary Production	PETRONAS	PETRONAS
Import	DOSM / Oil Companies	DOSM / Gas Companies
Export	DOSM / Oil Companies	DOSM / Gas Companies
Stock Change	Oil Companies	N/A
Gas Plants	Oil Companies	Gas Companies
Refineries	Oil Companies	N/A
Power Plant	Oil Companies, Utilities, IPPs, Regulator	Gas Companies, Utilities, IPPs, Regulator
End User	Oil Companies	Gas Companies

- *PETRONAS, the national oil company, was set up in 1974, with the enactment of the Petroleum Development Act (PDA). Its role was to manage and develop the petroleum resources in Malaysia.*
- *The oil and gas/petroleum sector in Malaysia is divided into 2 categories of activity, the upstream and the downstream activities.*
- *The upstream consists of activities related to production, exploration and development of resources.*
- *The downstream, comprises of crude oil refining, petroleum product retailing, natural gas processing, transmission and wholesale, natural gas retailing, shipping of crude oil and petroleum products, manufacturing and shipping of LNG.*

Challenges in Collecting Oil and Gas Data

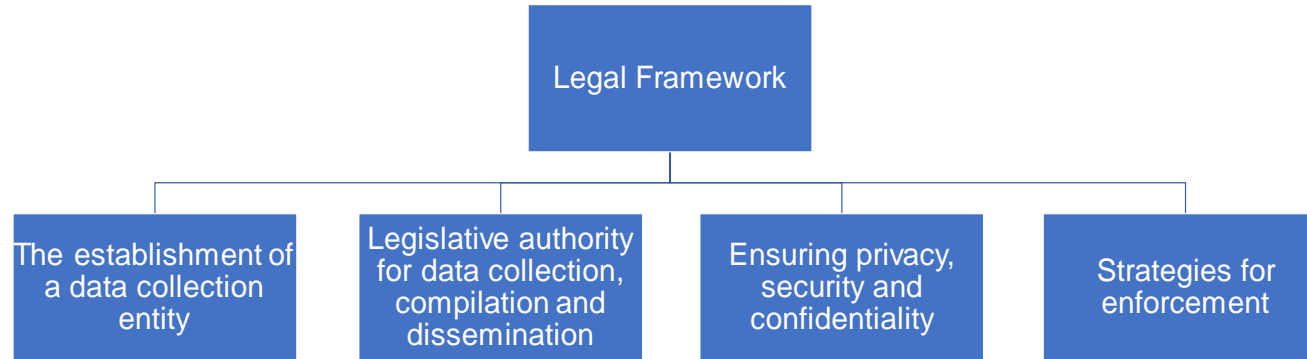
Related Acts to Energy Statistics in Malaysia

Acts	Agency	Functions	Related to Energy Statistics
Statistics Act 1965 (Revised-1989)	Department of Statistics	To collect and interpret statistics for furnishing information required in the formation or carrying out of Government policy in any field or otherwise required for Government purposes or for meeting the needs of trade, commerce, industry or agriculture (including forestry, fishing and hunting).	Not mentioned
Electricity Supply Act 1990 [Act 447]	Energy Commission	An Act to provide for the regulation of the electricity supply industry, the supply of electricity at reasonable prices, the licensing of any electrical installation, the control of any electrical installation, plant and equipment with respect to matters relating to the safety of persons and the efficient use of electricity and for purposes connected therewith.	Not mentioned
Electricity Supply (Amendment) Act 2015 [Act A1501]	Energy Commission	An Act to amend the Electricity Supply Act 1990	The Commission may authorize any of its officer to obtain any information pertaining to the licensee or any other person under this Act and shall be given access to such information whether stored in a computer or otherwise. Any officer authorized by the Commission shall have the power to require the production of records, accounts, data, computerized data and documents kept by a licensee or any other person and to inspect, examine and to download from them, make copies of them or take extracts from them.
Gas Supply Act 1993 [Act 501]	Energy Commission	An Act to provide for the licensing of the supply of gas to consumers through pipelines and related matters, the supply of gas at reasonable prices, the control of gas supply pipelines, installations and appliances with respect to matters relating to safety of persons and for purposes connected therewith.	Any person applying for a licence shall submit to the Commission, whenever applicable, the following details: (a) area of supply of gas; (b) site location plan showing the proposed location of the premises to be installed with the gas pipeline and its neighbouring area; (c) piping layout showing details of pipeline routes including the location of any storage tank or cylinder, site boundary, deflection wall and the nearest sources of ignition; (d) technical specifications of the pipeline or installation; (e) certification of the pipeline or installation; and (f) any other information as may be required by the Commission.
Gas Supply (Amendment) Act 2016 [Act A1515]	Energy Commission	An Act to amend the Gas Supply Act 1993	Power of the Commission to obtain information: The Commission may by notice require any person to furnish within a reasonable period specified in the notice, all information and documents relating to such matters as may be reasonably be required by the Commission to carry out its functions or duties under this Act, which are within the knowledge of that person or in his custody or under his control.

Challenges in Collecting Oil and Gas Data

Fuel	Activity	Challenges / Barriers
Natural Gas	Upstream, Midstream and Downstream	Gas companies don't have any obligation to submit upstream and midstream data to ST (Energy Commission), currently the data is submitted based on voluntary basis
		ST's provision for downstream only starts at the city gate station and only cover Peninsular and Sabah
Oil	Upstream, Midstream and Downstream	Oil companies don't have any obligation to submit upstream, midstream and downstream data to ST, currently the data is submitted based on voluntary basis

Government Roles



Source: International Recommendations for Energy Statistics (IRES), United Nations Statistical Commission (2011)

- According to the International Recommendations for Energy Statistics (IRES) endorsed by the United Nations Statistical Commission in 2011, the existence of a **strong legal framework** is one of the most important prerequisites for building a sound national statistical system in general, and a national system of energy statistics in particular
- A legal framework is a set of laws, rules or regulations that establishes a data collection entity (such as a national statistics office or agency, a state statistical committee or other similar body) with a mandate and legal authority to collect, compile and disseminate statistics within a country, along with the responsibilities of ensuring the privacy of respondents, and the security and confidentiality of the information collected. The framework also provides strategies for the enforcement of these authorities and responsibilities.

Thank You

Malaysia Energy Information Hub

<https://meih.st.gov.my/>

