Suruhanjaya Tenaga
Energy Commission

NATIONAL ENERGY BALANCE
2017

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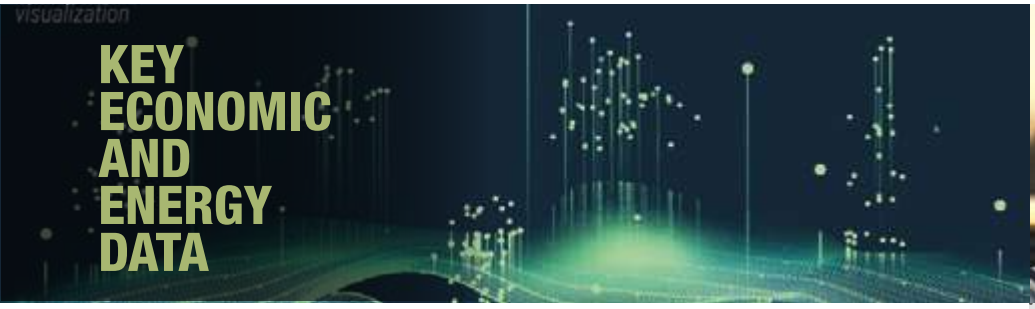
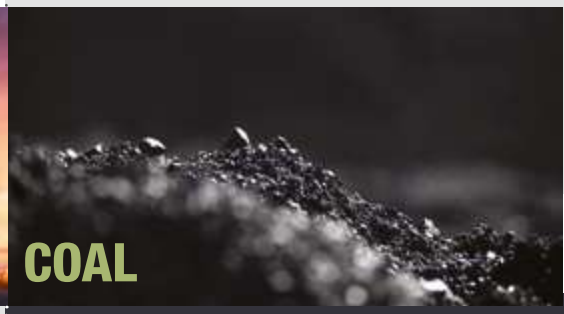
TABLE OF CONTENTS



KEY ECONOMIC AND ENERGY DATA

NATURAL GAS

OIL



COAL

ELECTRICITY

KEY ENERGY STATISTICS

PREFACE

The Malaysian economy grew at a higher rate of 5.9 percent in 2017 compared to the past two years, boosted by strong domestic demand, higher exports and the recovery of commodity prices. The services sector accounted for 54.4 percent of the total national GDP, followed by manufacturing (23.0 percent) and mining and quarrying (8.4 percent). The electricity and gas services sub-sector grew 2.0 percent whilst the oil and gas industry recovered with higher output of natural gas offsetting lower production of crude oil.

Primary energy supply to the economy rose at a slower rate of 1.8 percent in 2017 compared to 4.15 percent in 2016, attributed mainly to 46.5 percent reduction in the supply of petroleum products. This reduction, however, was offset by increases in coal (10.8 percent) and hydropower (38.7 percent) supply, which contributed to a higher total primary energy supply of 98,298 ktoe.

Final energy consumption increased at a slower rate of 9.2 percent (2016: 10.5 percent). The transport sector continued to be the country's largest consumer of energy with a 38.5 percent share (24,039 ktoe), followed by the industry sector at 27.9 percent (17,463 ktoe). However, the major contributor to the significant increase in total final energy consumption was the non-energy sector, which consumed 12,517 ktoe in 2017 from only 8,729 ktoe in 2016, an increase of 43.4 percent. This was attributed mainly to the Sabah Ammonia Urea (SAMUR) project in Sipitang, Sabah which started commercial operations in 2017.

Total installed generation capacity as at end of 2017 stood at 34,182.9 MW, an increase of 3.5 percent from 2016, while total electricity gross generation increased by 2.5 percent to 160,634 GWh. The electricity generation mix (excluding self-generation plants) remained reasonably diversified, comprising of coal with a share of 44.3 percent (2016: 46.0 percent), followed by natural gas with 37.4 percent (2016: 39.7 percent) and renewable energy (RE), including hydro, with 17.7 percent (2016: 13.7 percent).

Total electricity consumption grew at a slower rate of 1.7 percent (2016: 8.7 percent) to reach 146,524 GWh in 2017. The industry sector was the largest electricity consumer which accounted for 48.7 percent (2016: 47.0 percent) of the total electricity consumption in Malaysia. Higher demand from the Samalaju Industrial Park in Sarawak contributed to this increased share. Electricity consumption by the commercial sector stood at 29.8 percent (2016: 30.8 percent), residential sector at 20.7 percent (2016: 21.6 percent), transport sector at 0.3 percent (2016: 0.2 percent) and agriculture sector at 0.4 percent (2016: 0.4 percent).

In terms of energy intensity, Malaysia's primary energy intensity decreased 3.8 percent to 83.71 toe/RM million GDP in 2017. Final energy intensity was at 53.21 toe/RM million GDP, which was higher by 3.1 percent compared to the intensity in 2016. Whilst industrial energy intensity increased markedly by 17.0 percent to 59.90 toe/RM million GDP, electricity intensity in the economy fell from 0.130 GWh/RM million GDP in 2016 to 0.125 GWh/RM million GDP in 2017. This 3.8 percent improvement in electricity intensity could be attributable to energy efficiency support initiatives implemented by the government in the electricity supply industry.

The share of RE, including hydropower, in the country's installed capacity has reached 21.3 percent in 2017. This is good progress towards delivering Malaysia's commitment under the 2015 Paris Climate Conference (COP21) to reduce greenhouse gas emissions intensity by 45 percent by the year 2030. RE share is well on the way to increase further in the next few years with the ongoing large scale solar and hydropower capacity development initiatives as well as the introduction of rooftop solar net energy metering and leasing schemes.

In conclusion, I would like to take this opportunity to thank everyone involved in the preparation of this report, namely the relevant Government agencies, power utilities, independent power producers, oil and gas companies, coal producers and the cement and iron and steel manufacturers for your continuous support in providing relevant and accurate data in a timely manner for the publication of the National Energy Balance (NEB) report. It is hoped that the report is a useful source of reference and guide to those involved in energy research and planning in institutions as well as others in industry, government, NGOs and the general public, locally and internationally.

Thank you.

Datuk Ir. Ahmad Fauzi bin Hasan
Chairman
Energy Commission
Malaysia

INTRODUCTION

The National Energy Balance (NEB) 2017 marks the 8th publication of the NEB by the Energy Commission of Malaysia. The NEB has been around for quite some time in the country, where the first edition of the NEB can be traced back to as early as the 1980s. Over the years, the NEB has become more comprehensive and public awareness on energy data shows positive feedbacks. The NEB is now able to reach out to a wider range of viewers thanks to the advancement of technology. Our hope for the future is to further enhance our database, hence more analysis can be done which could improve the decisions and plans we make for the future.

The NEB contains information on energy supply and demand in Malaysia. This publication covers the whole perspective of energy in Malaysia. Energy in the Malaysian context includes oil and gas, coal and coke, electricity and last but not least, renewable energy. Malaysia is blessed with an abundance of primary energy resources and we have the infrastructures in place to transform these primary energies into usable energy that can be utilised by the industry.

There are five refineries in Malaysia that process crude oil to produce petroleum products such as petrol, diesel, liquified petroleum gas (LPG), jet kerosene, and others. The transformation process for natural gas is done in the gas processing plants, and in Malaysia, there are four types of gas processing plants, namely Malaysian Liquefied Natural Gas (MLNG), Middle Distillate Synthesis (MDS), Gas Processing Plant – Liquefied Petroleum Gas (GPP-LPG) and Regasification Terminal (RGT) whereby these plants transform natural gas into their respective products. Natural gas on the other hand can also be used directly, one of the examples is the usage of natural gas in the commercial sector, for instance the natural gas used for cooking and air-conditioning in commercial complexes.

In the power sector, coal and natural gas are the dominant fuels used to generate electricity and there is also a small portion of diesel and fuel oil still used in thermal stations. In this regard, these primary energy sources are the fuel used to transform into electricity which is categorised as a secondary energy source. These secondary energy supply will then be consumed by the end-user. In 2001, the Five-Fuel Diversification Strategy was introduced and renewable energy was identified as the 'fifth fuel' which further diversified the energy mix in Malaysia.

The end-user of energy can be categorised into seven sectors, namely the residential, commercial, industrial, transport, agriculture, fishing and non-energy uses. Supply and end-uses should balance out although statistically this is not obtainable and this is where the statistical discrepancy plays its part. The statistical discrepancy is the difference between the supply and demand, where it captures any undeclared information. Nevertheless, the value is usually insignificant.

The energy consumption trend in Malaysia in the early 1990s to 2000s was rapidly growing each year and this was due to the emphasis paid towards heavy industry which is electricity intensive. However, for the past few years, as the country shifts its focus to the services sector, the energy consumption trend has been growing at a slower rate and has plateaued. Similar trends were experienced by developed countries when they were still developing at the time. We are hopeful that Malaysia will follow suit to become one of the most developed countries in Southeast Asia.

I would like to thank the Honourable Minister and the Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC) for their guidance and support in realising the NEB publication every year. We would also like to acknowledge and thank the data providers for providing data in a timely and systematic manner, and others who have directly or indirectly assisted us in publishing the NEB 2017. We look forward to greater cooperation and involvement from everyone in the future.

Thank you.

Abdul Razib bin Dawood
Chief Executive Officer
Energy Commission
Malaysia

DATA COMPILATION

The first stage in compiling the overall energy balance is to rearrange the data to fit into a standard structure of commodity (or partial) balance. The commodity balance shows clearly the production, imports, exports, stock change and consumption for each energy commodity. The basic sequence adhered to in the overall balance is: -

Production + Imports - Exports +/- Stock change = Apparent inland deliveries (or consumption)

In practice, however, "Apparent inland deliveries" deduced from supply statistics hardly ever match the actual sales data. It is necessary, therefore, to include two "statistical discrepancies" - the first to account for the difference in apparent inland delivery of primary supply mainly due to the difficulties in obtaining the actual stock change data and difference in data compilation at source and the second is to account for the difference in secondary supply as the result of the transformation processes of one form of energy to another.

In addition, the statistical discrepancies also act as a balancing tool to minimise possible errors. In the case of oil and oil products, losses in transportation and distribution, as well as statistical errors are included in the statistical discrepancies. However, for electricity, distribution losses and the sector's own use of electricity are accounted for under "losses and own use".

Stock changes are not fully accounted for in the balance. It is extremely difficult to obtain stocks of all energy commodities at the distributors' and final users' level. Only oil companies' stocks are readily available, and these would include stocks at refineries and depots. The statistical discrepancy might thus also include unrecorded stock changes. Coal stocks at TNB power stations and at a producer in Sarawak are also considered in this report.

In summary, the flow of energy is represented by the following equations: -

Primary Energy Supply = Production + Imports - Exports - Bunkers +/- Stock change

Energy Consumption =

Gross inland consumption
Final energy consumption
+ Consumption of the energy transformation sector
+ Distribution losses
+ Non-energy consumption

EXECUTIVE SUMMARY

ENERGY OVERVIEW

In 2017, the Malaysian economy recorded a growth of 5.9 percent (2016: 4.2 percent) supported by faster expansion in both private and public sector spending. A key highlight for the year was the rebound in gross exports growth as global demand strengthened. This was mainly due to higher demand from major trading partners following the upswing in the global technology cycle, investment expansion in the advanced economies and the turnaround in commodity prices.

Following the trend of global demand, our final energy demand displayed growth of 9.2 percent (2016: 10.5 percent) to register at 62,489 ktoe.

PRIMARY ENERGY SUPPLY

Total primary energy supply showed slight increase of 1.8 percent (2016: 4.2 percent) to settle at 98,298 ktoe (2016: 96,525 ktoe). The increase is driven by growth in hydropower and coal supply. The rate of increase however, is slower than the previous year and this is due to huge reduction in petroleum products supply from 3,627 ktoe to 1,941 ktoe, attributed to lower import of motor petrol, fuel oil, Aviation Turbine Fuel (ATF) and non-energy products. The supply of coal and coke recorded growth of 10.8 percent to register at 20,771 ktoe due to a higher import of coal and coke to cater to the increasing demand from the power sector. Crude oil supply remained consistent with a slight increase to 27,471 ktoe in 2017. The total primary energy supply for renewable energy including large hydro showed strong growth, registering at 6,947 ktoe, 33.6 percent higher than in 2016. This shows that the Government's efforts in promoting renewable energy in Malaysia is showing encouraging results.

Natural gas remained as the dominant primary energy supply in Malaysia which accounted for 41.9 percent (2016: 42.7 percent) of total primary energy supply, albeit a slight reduction in its share. This was followed by crude oil and petroleum products with a share of 29.9 percent (2016: 32.5 percent), coal and coke with 21.1 percent (2016:19.4 percent) and last but not least, hydropower and renewable energy with 7.1 percent (2016: 5.4 percent).

ENERGY TRANSFORMATION

In Malaysia, energy transformation from primary energy to secondary energy involves gas plants, oil refineries and power stations. In general, there are four (4) types of gas plants in Malaysia, namely; Malaysian Liquefied Natural Gas (MLNG), Middle Distillate Synthesis (MDS), Gas Processing Plant – Liquefied Petroleum Gas (GPP-LPG) and Regasification Terminal (RGT). In MLNG plant, the local natural gas is transformed into LNG and the LNG is then exported to other countries. In 2017, the total LNG export was 29,428 ktoe, 7.2 percent higher than the previous year (2016: 27,457 ktoe). Besides LNG, the MLNG plant also produced a small amount of 40 ktoe of LPG. The MDS plant is a gas-to-liquid plant that converts natural gas into petroleum products. In 2017, the total output from MDS plant was 509 ktoe where it consisted of 320 ktoe (62.9 percent) of non-energy products, 138 ktoe (27.1 percent) of diesel and 51 ktoe (10.0 percent) of kerosene. Another supply of LPG comes from the GPP-LPG plant where its production was recorded at 1,961 ktoe in 2017 (2016:1,997 ktoe). The Regasification Terminal (RGT) in Sungai Udang, Melaka was developed to accommodate for the increasing natural gas demand in Peninsular Malaysia. In 2017, there was 1,815 ktoe of LNG imported mainly from Australia and Brunei Darussalam. This supply of LNG was regasified in the RGT plant and then supplied to consumer through the pipeline, and they were mainly consumed by the power sector and the industry sector.

The amount of crude oil used as feedstock in the oil refineries was 27,252 ktoe which consisted of both local and imported crude oil with their respective share of 64.8 percent (17,647 ktoe) and 35.2 percent (9,605 ktoe). The total production from refineries was 27,226 ktoe of petroleum products, showcasing an increase of 9.4 percent from the previous year. 9,877 ktoe (36.3 percent) of diesel was produced from refineries, followed by petrol (30.3 percent), ATF and AV Gas (12.0 percent), non-energy (11.4 percent), fuel oil (6.3 percent), LPG (3.1 percent) refinery gas (0.6 percent) and a minute amount of kerosene. Malaysia's total refinery capacity stood at 566.3 thousand barrels per day (kbpd) including condensates splitter.

ELECTRICITY

As of 31st December 2017, Malaysia's total installed capacity was at 34,182.9 MW, an increase of 3.5 percent from 2016. This was led by the commissioning of new power stations namely; Manjung Five (1,000 MW), and Pengerang (600 MW) which started their operations on September and October of 2017 respectively. The Government's initiatives such as the LSS, Net Energy Metering projects as well as the Feed-in-Tariff (FiT) scheme also contributed to the increase . The total electricity gross generation in 2017 was registered at 160,634 GWh, an increase of 2.5 percent (2016: 156,665 GWh) from 2016. The total electricity consumption in Malaysia was 146,524 GWh, an increase of 1.7 percent from the previous year (2016: 144,042 GWh). Meanwhile, the peak demand for Peninsular Malaysia was recorded at 17,790 MW , Sarawak at 3,302 MW and Sabah at 938 MW . The calculated reserve margin for Peninsular Malaysia stood at 35.5 percent , while Sarawak at 28.2 percent and Sabah at 36.0 percent.

In Malaysia, the fuel used to generate electricity consisted of natural gas, coal, hydro, oil and renewable energy. The total energy input in power stations (excluding self-generation plants) has increased by 6.1 percent in 2017 to register at 37,509 ktoe. Coal and coke remained as the main fuel source of electricity generation in the country, with a share of 50.6 percent of total fuel input (18,967 ktoe), followed by natural gas at 31.7 percent (11,872 ktoe), hydropower at 16.6 percent (6,240 ktoe), diesel and fuel oil at 0.7 percent (246 ktoe) and renewables at 0.5 percent (185 ktoe). In terms of the generation mix (excluding self-generation plants), the share of coal and coke constituted of 44.3 percent, followed by natural gas at 37.4 percent, hydropower at 17.3 percent, oil at 0.5 percent and the remaining 0.4 percent taken up by renewable energy.

The industry sector remained as the largest electricity consumer with a share of 48.7 percent of total electricity consumption. Its consumption increased by 5.5 percent from 2016 to settle at 71,417 GWh. The commercial and residential sectors recorded an electricity consumption of 43,724 GWh and 30,340 GWh

respectively. The transportation sector electricity consumption has grown from 340 GWh to 459 GWh in 2017, contributed by the new Mass Rapid Transit (MRT) stations that started their operations in 2017. Around 78.0 percent of the electricity was consumed in the Peninsular Malaysia while the remaining are consumed in Sabah (3.7 percent) and Sarawak (18.3 percent). Peninsular Malaysia and Sabah showed a decline in their electricity consumption while Sarawak on the other hand registered an increase of 24.7 percent which was largely driven by the heavy industry activities in Samalaju Industrial Park.

FINAL ENERGY CONSUMPTION

The total final energy consumption in 2017 recorded a growth of 9.2 percent (2016: 10.5 percent) to settle at 62,489 ktoe compared to the previous year at 57,218 ktoe. The largest final energy consumer goes to the transport and industry sector which accounted for two-third of the total final energy consumption. Both the transport and industry sectors' final energy consumptions are recorded at 24,039 ktoe and 17,463 ktoe respectively. Although the bulk of energy consumption is from the transport and industry sector, the significant increase in the final energy consumption in 2017 was mainly attributed to the consumption in non-energy sector. The consumption which increased 43.4 percent to 12,517 ktoe from only 8,729 ktoe in 2016 was primarily driven by the Sabah Ammonia Urea (SAMUR) project in Sipitang, Sabah that came on stream in 2017 where it utilises natural gas as its feedstock. In the residential sector, there were no significant changes in the final energy consumption where energy usage in this sector was dominated by LPG and electricity. Similarly, the commercial sector also showed no significant changes from the previous year, with a slight decrease from 4,766 ktoe to 4,057 ktoe in 2017. Agriculture and fisheries sector accumulated to 673 ktoe which accounted for 1.0 percent of the total final energy consumption in Malaysia.

In the industry sector, its intensity increased by 17.0 percent to settle at 59.90 toe/RM million at 2010 prices from 51.18 toe/RM million at 2010 prices in 2016. This is evident in the increase in the industry sector's energy consumption. Each of the fuel type consumed in the industry sector registered growth, especially for natural gas with a significant increase of 14.0 percent. Petroleum products and electricity consumption increased by 10.8 percent, and 5.5 respectively. Coal and coke consumption in the industry sector almost reached a plateau since 2008 and were particularly consumed by the cement and steel industry.

Overall, petroleum products dominated the final energy consumption with a share of 50.0 percent followed by natural gas, electricity and coal and coke with their percentage share of 26.9 percent, 20.2 percent and 2.9 percent respectively. Each fuel recorded an increasing trend whereby the major contributor is natural gas where its consumption grew by 36.8 percent from 2016. The total electricity consumption in 2017 increased by 1.6 percent from the previous year to register at 12,607 ktoe or 146,524 GWh. The final consumption of petroleum products posted an increase of 2.9 percent from the previous year to settle at 31,241 ktoe. As for coal and coke, its final consumption increased by 1.1 percent to register at 1,804 ktoe.

CONCLUSION

In 2017, the performance of energy supply and demand in the country remained resilient in line with the nation's steady economic growth. All major sectors and fuel types recorded a positive trend when compared with the previous year. As for 2017, the energy performance was consistently strong and stable as commodity prices have recovered steadily from the lows in early 2016. Crude oil prices have improved following the agreement among OPEC members and several other non-OPEC producers, including Malaysia, to limit supply. This effort helped in stabilizing the oil prices and in enhancing job creation especially in the oil and gas sector. Higher oil prices in 2017 also impacted the inflation level in the country, averaging between 3.0 percent to 4.0 percent (2016: 2.1 percent). Thus, this influenced consumer spending especially on energy and surely effecting the total demand in the country.

KEY ECONOMIC AND ENERGY DATA

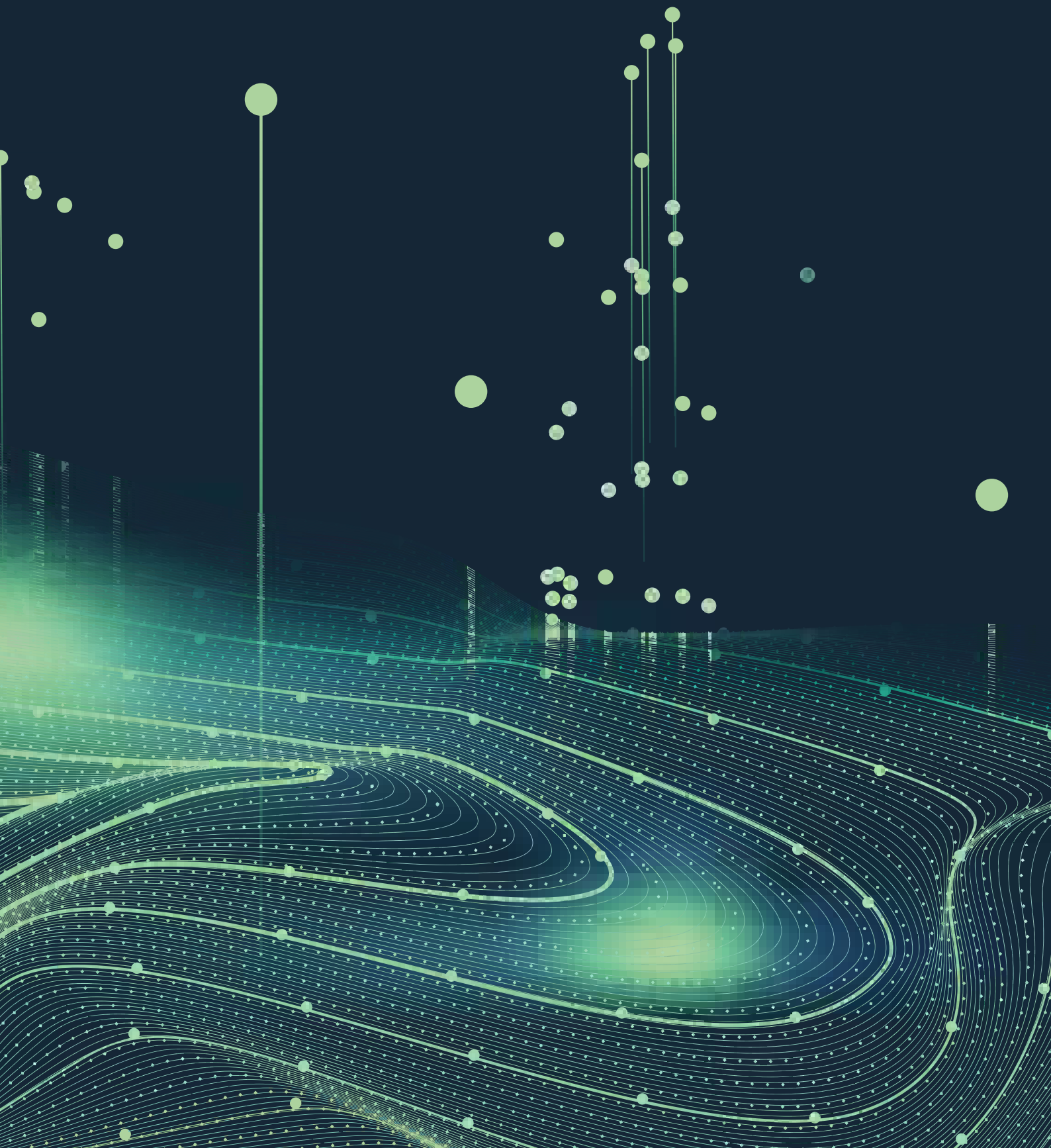


TABLE 1: KEY ECONOMIC AND ENERGY DATA

	2017				
	1Q	2Q	3Q	4Q	Total
GDP at current prices (RM million)*	324,577	329,787	343,008	356,009	**1,353,381**
GDP at 2010 prices (RM million)*	280,248	287,300	298,702	308,078	**1,174,329**
GNI at current prices (RM million)*	314,430	321,619	333,377	347,601	**1,317,027**
Population ('000 people)**	31,925	32,023	32,113	32,204	**32,023**
Primary Energy Supply (ktoe)	23,506	24,309	24,622	25,861	**98,298**
Final Energy Consumption (ktoe)	14,980	15,616	16,093	15,800	**62,489**
Electricity Consumption (ktoe)	2,991	3,193	3,222	3,201	**12,607**
Electricity Consumption (GWh)	34,767	37,113	37,445	37,199	**146,524**
Per Capita					
GDP at Current Prices (RM)*	40,667	41,194	42,725	44,219	**42,263**
Primary Energy Supply (toe)	0.734	0.759	0.769	0.807	**3.070**
Final Energy Consumption (toe)	0.469	0.488	0.501	0.491	**1.951**
Electricity Consumption (kWh)	1,086	1,159	1,169	1,162	**4,576**
Energy Intensity					
Primary Energy Intensity (toe/GDP at 2010 prices (RM million))	83.88	84.61	82.43	83.94	**83.71**
Final Energy Intensity (toe/GDP at 2010 prices (RM million))	52.1	53.7	54.4	52.8	**53.2**
Electricity Intensity (toe/GDP at 2010 prices (RM million))	10.7	11.1	10.8	10.4	**10.7**
Electricity Intensity (GWh/GDP at 2010 prices (RM million))	0.124	0.129	0.125	0.121	**0.125**

Note (*) : Quarterly data is from the Department of Statistics Malaysia
(**) : Mid-year population data is from the Department of Statistics Malaysia

TABLE 2: KEY ECONOMIC AND ENERGY DATA BY REGION

Peninsular Malaysia	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
GDP at Current Prices (RM million)*	464,431	507,814	562,522	641,175	600,630	672,787	739,349	793,280	835,888	909,988	959,507	1,022,555	1,125,017
GDP at 2010 Prices (RM million)*	537,441	567,920	603,537	634,266	621,915	672,787	709,030	752,858	789,217	838,939	881,462	920,163	975,045
Population ('000 people)**	20,785	21,180	21,577	21,970	22,363	22,753	23,099	23,417	23,868	24,281	24,669	24,995	25,303
Final Energy Consumption (ktoe)	32,195	34,390	37,921	38,530	34,521	35,593	35,968	36,683	41,859	42,470	43,011	45,872	46,520
Electricity Consumption (ktoe)	6,366	6,669	7,030	7,307	7,567	8,145	8,427	8,791	9,108	9,315	9,531	10,026	10,004
Electricity Consumption (GWh)	73,987	77,504	81,710	84,924	87,950	94,666	97,939	102,174	105,861	108,259	110,770	116,529	116,273
Per Capita													
GDP at Current Prices (RM)*	22,344	23,976	26,071	29,185	26,858	29,569	32,008	33,876	35,021	37,478	38,895	40,910	44,462
Final Energy Consumption (toe)	1.549	1.624	1.757	1.754	1.544	1.564	1.557	1.567	1.754	1.749	1.744	1.835	1.839
Electricity Consumption (kWh)	3,560	3,659	3,787	3,866	3,933	4,161	4,240	4,363	4,435	4,459	4,490	4,662	4,595
Energy Intensity													
Final Energy Intensity (toe/GDP at 2010 prices (RM million))	59.9	60.6	62.8	60.7	55.5	52.9	50.7	48.7	53.0	50.6	48.8	49.9	47.7
Electricity Intensity (toe/GDP at 2010 prices (RM million))	11.8	11.7	11.6	11.5	12.2	12.1	11.9	11.7	11.5	11.1	10.8	10.9	10.3
Electricity Intensity (GWh/GDP at 2010 prices (RM million))	0.138	0.136	0.135	0.134	0.141	0.141	0.138	0.136	0.134	0.129	0.126	0.127	0.119

Note (*) : 1. GDP data by State is from the Department of Statistics Malaysia
2. GDP for Peninsular Malaysia includes Supra State (Supra State covers production activities that beyond the centre of predominant economic interest for any state)
3. GDP data by State from 2005 until 2009 and 2017 were estimated by the Energy Commission

(**) : Mid-year population data is from the Department of Statistics Malaysia

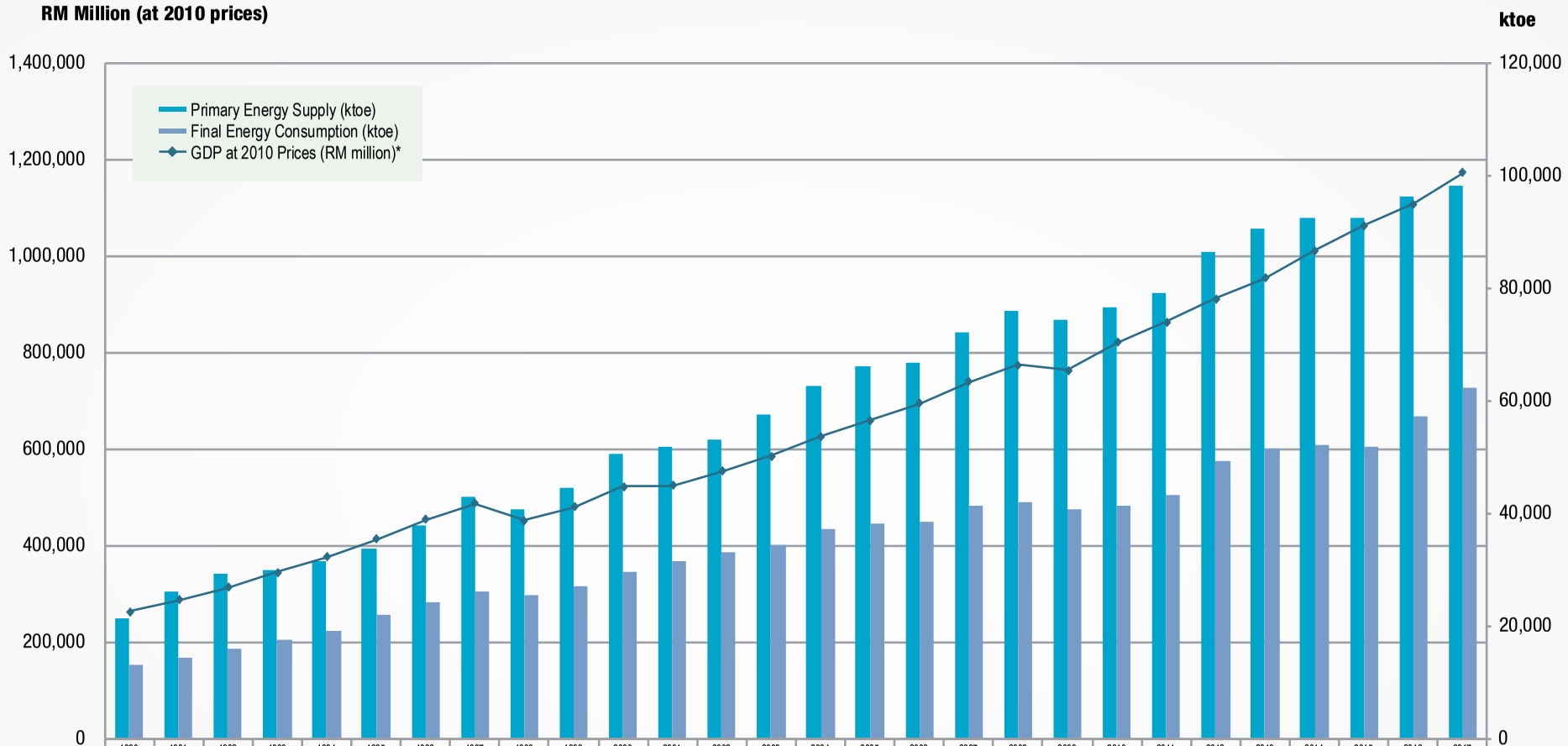
Sabah	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
GDP at Current Prices (RM million)*	36,258	40,649	48,129	60,312	55,102	61,516	69,672	71,347	72,361	77,594	79,098	86,151	94,784
GDP at 2010 prices (RM million)*	47,529	50,552	52,235	57,029	59,763	61,516	63,191	65,390	67,775	71,150	75,586	79,285	83,964
Population ('000 people)**	2,978	3,045	3,116	3,190	3,267	3,348	3,435	3,523	3,703	3,764	3,816	3,900	3,954
Final Energy Consumption (ktoe)	2,806	2,587	2,879	3,068	3,046	2,758	3,466	4,671	4,097	4,128	3,845	5,015	9,512
Electricity Consumption (ktoe)	238	255	285	299	329	355	368	425	439	423	499	487	477
Electricity Consumption (GWh)	2,766	2,969	3,317	3,474	3,818	4,127	4,275	4,943	5,097	4,919	5,805	5,665	5,548
Per Capita													
GDP at Current Prices (RM)*	12,176	13,350	15,448	18,909	16,864	18,373	20,284	20,251	19,542	20,616	20,730	22,092	23,975
Final Energy Consumption (toe)	0.942	0.850	0.924	0.962	0.932	0.824	1.009	1.326	1.106	1.097	1.008	1.286	2.406
Electricity Consumption (kWh)	929	975	1,065	1,089	1,169	1,233	1,245	1,403	1,377	1,307	1,521	1,453	1,403
Energy Intensity													
Final Energy Intensity (toe/GDP at 2010 prices (RM million))	59.0	51.2	55.1	53.8	51.0	44.8	54.8	71.4	60.4	58.0	50.9	63.3	113.3
Electricity Intensity (toe/GDP at 2010 prices (RM million))	5.0	5.1	5.5	5.2	5.5	5.8	5.8	6.5	6.5	5.9	6.6	6.1	5.7
Electricity Intensity (GWh/GDP at 2010 prices (RM million))	0.058	0.059	0.064	0.061	0.064	0.067	0.068	0.076	0.075	0.069	0.077	0.071	0.066

Note (*) : 1. GDP data by State is from the Department of Statistics Malaysia
2. GDP for Sabah includes WP Labuan
3. GDP data by State from 2005- 2009 and 2017 were estimated by the Energy Commission
(**) : Mid-year population data is from the Department of Statistics Malaysia

Sarawak	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
GDP at Current Prices (RM million)*	59,218	66,262	74,739	91,739	78,680	87,131	102,713	106,625	110,365	118,862	119,119	121,414	133,580
GDP at 2010 prices (RM million)*	75,096	78,434	84,965	85,209	83,521	87,131	92,700	94,013	98,089	102,359	106,307	108,778	115,260
Population ('000 people)**	2,282	2,325	2,366	2,408	2,451	2,487	2,528	2,570	2,643	2,664	2,702	2,739	2,766
Final Energy Consumption (ktoe)	3,274	3,330	3,461	3,302	3,277	3,125	4,086	5,358	5,628	5,612	4,951	6,331	6,458
Electricity Consumption (ktoe)	339	348	368	380	391	493	445	795	1,043	1,304	1,344	1,878	2,126
Electricity Consumption (GWh)	3,940	4,045	4,277	4,416	4,544	5,730	5,172	9,237	12,118	15,152	15,624	21,831	24,703
Per Capita													
GDP at Current Prices (RM)*	32,902	33,737	35,909	35,380	34,079	35,033	36,671	36,585	37,120	38,423	39,351	39,719	41,641
Final Energy Consumption (toe)	1.434	1.432	1.463	1.371	1.337	1.256	1.616	2.085	2.130	2.106	1.833	2.312	2.335
Electricity Consumption (kWh)	1,726	1,740	1,808	1,834	1,854	2,304	2,046	3,594	4,586	5,688	5,784	7,971	8,930
Energy Intensity													
Final Energy Intensity (toe/GDP at 2010 prices (RM million))	43.6	42.5	40.7	38.8	39.2	35.9	44.1	57.0	57.4	54.8	46.6	58.2	56.1
Electricity Intensity (toe/GDP at 2010 prices (RM million))	4.5	4.4	4.3	4.5	4.7	5.7	4.8	8.5	10.6	12.7	12.6	17.3	18.5
Electricity Intensity (GWh/GDP at 2010 prices (RM million))	0.052	0.052	0.050	0.052	0.054	0.066	0.056	0.098	0.124	0.148	0.147	0.201	0.214

Note (*) : 1. GDP data by State is from the Department of Statistics Malaysia
2. GDP data by State from 2005 until 2009 and 2017 were estimated by the Energy Commission
(**) : Mid-year population data is from the Department of Statistics Malaysia

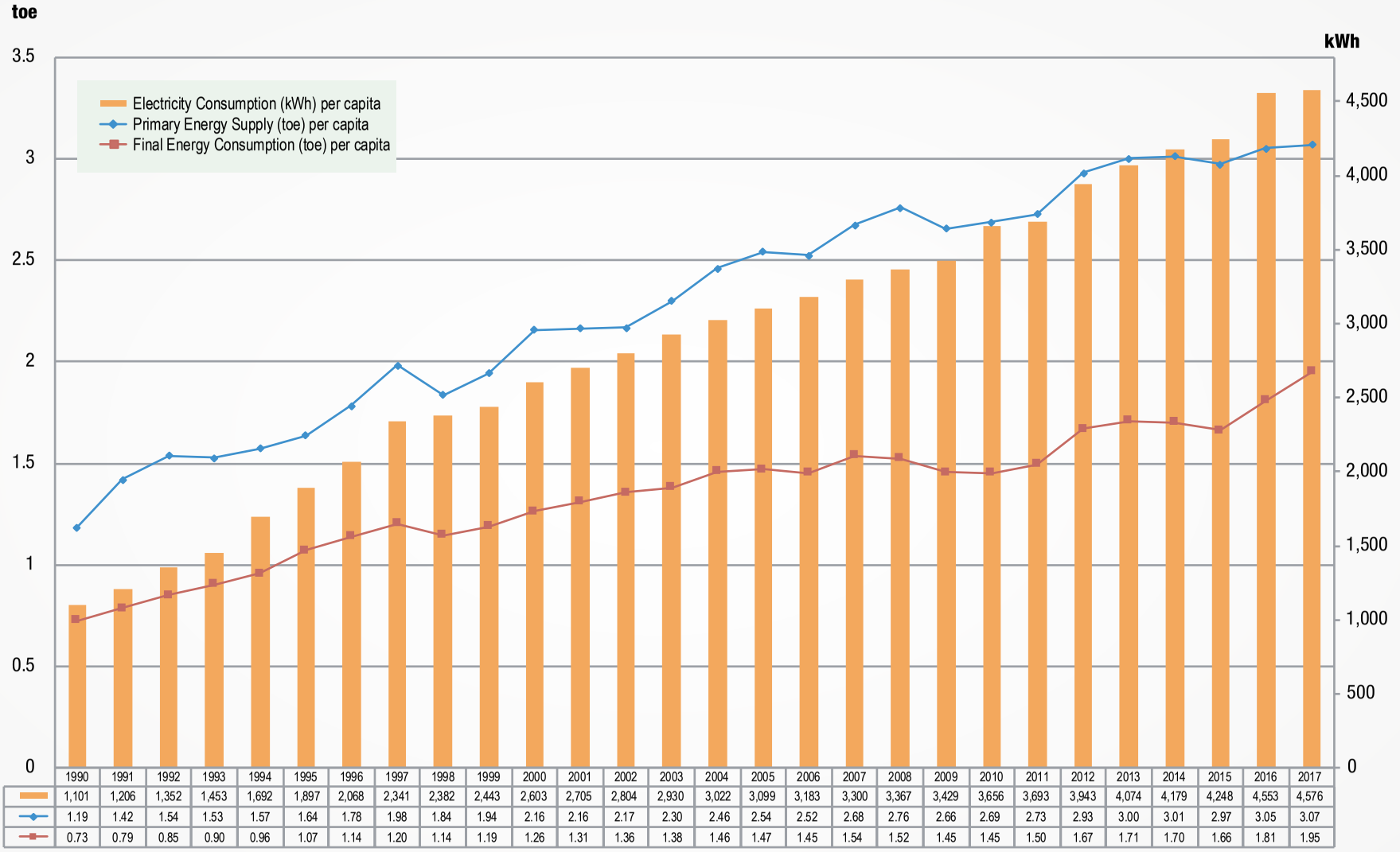
FIGURE 1: TRENDS IN GDP, PRIMARY ENERGY SUPPLY AND FINAL ENERGY CONSUMPTION



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Primary Energy Supply (ktoe)	21,471	26,335	29,291	29,925	31,662	33,879	37,840	43,173	40,996	44,534	50,710	51,979	53,196	57,565	62,836	66,211	6,7021	72,389	76,032	74,583	76,809	79,289	86,495	90,730	92,487	92,677	96,525	98,298
Final Energy Consumption (ktoe)	13,146	14,563	16,185	17,728	19,287	22,164	24,181	26,167	25,558	27,228	29,699	31,515	33,289	34,586	37,323	38,285	38,567	41,606	41,968	40,845	41,476	43,455	49,291	51,583	52,209	51,806	57,219	62,489
GDP at 2010 Prices (RM million)*	263,488	288,639	314,285	345,384	377,201	414,276	455,715	489,086	453,092	480,901	523,503	526,213	554,581	586,683	626,481	659,885	696,739	740,625	776,410	764,659	821,434	864,920	912,261	955,080	101,2449	1,063,998	1,108,935	1,174,329

Source : GDP data is from the Department of Statistics Malaysia
Note : GDP at 2010 Prices (RM Million) for 1990 until 2009 was calculated by the Energy Commission

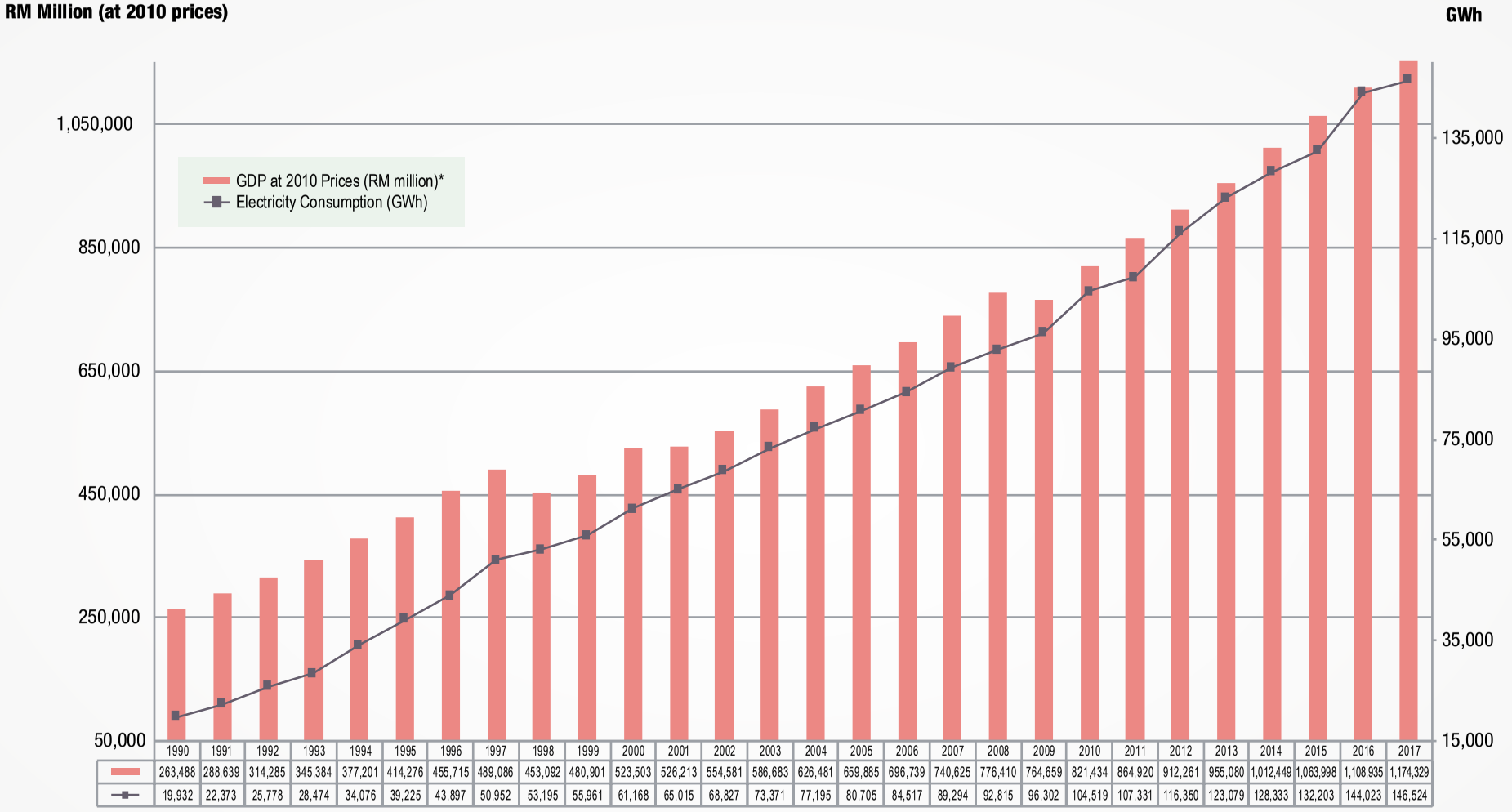
FIGURE 2: PRIMARY ENERGY SUPPLY, ELECTRICITY CONSUMPTION AND FINAL ENERGY CONSUMPTION PER CAPITA



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Electricity Consumption (kWh) per capita	1,101	1,206	1,352	1,453	1,692	1,897	2,068	2,341	2,382	2,443	2,603	2,705	2,804	2,930	3,022	3,099	3,183	3,300	3,367	3,429	3,656	3,693	3,943	4,074	4,179	4,248	4,553	4,576
Primary Energy Supply (toe) per capita	1.19	1.42	1.54	1.53	1.57	1.64	1.78	1.98	1.84	1.94	2.16	2.16	2.17	2.30	2.46	2.54	2.52	2.68	2.76	2.66	2.69	2.73	2.93	3.00	3.01	2.97	3.05	3.07
Final Energy Consumption (toe) per capita	0.73	0.79	0.85	0.90	0.96	1.07	1.14	1.20	1.14	1.19	1.26	1.31	1.36	1.38	1.46	1.47	1.45	1.54	1.52	1.45	1.45	1.50	1.67	1.71	1.70	1.66	1.81	1.95

Source : Population data is from the Department of Statistics Malaysia
Note : Based on the Energy Commission's calculation

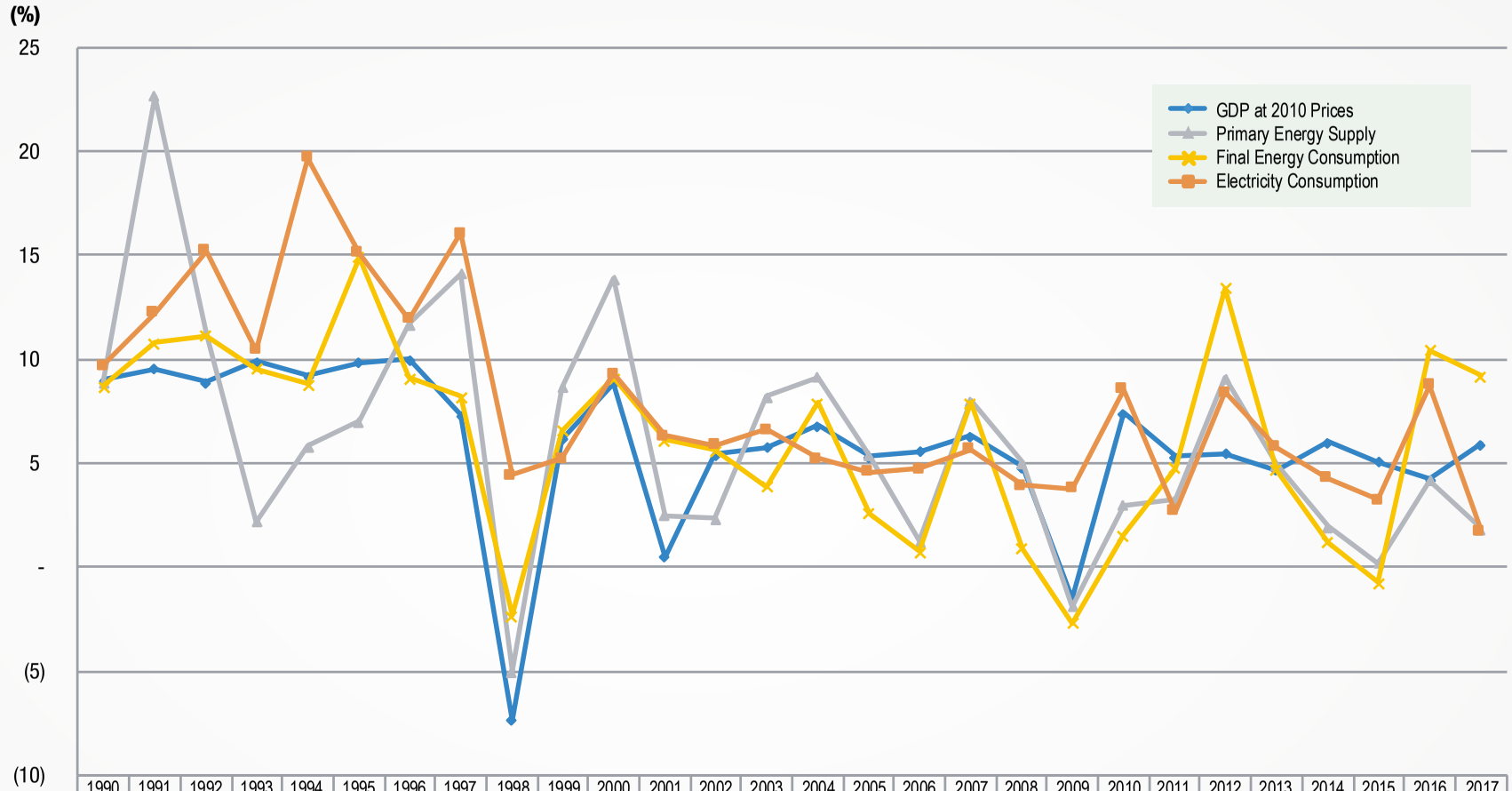
FIGURE 3: TRENDS IN GDP AND ELECTRICITY CONSUMPTION



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
GDP at 2010 Prices (RM million)*	263,488	288,639	314,285	345,384	377,201	414,276	455,715	489,086	453,092	480,901	523,503	526,213	554,581	586,683	626,481	659,885	696,739	740,625	776,410	764,659	821,434	864,920	912,261	955,080	1,012,449	1,063,998	1,108,935	1,174,329
Electricity Consumption (GWh)	19,932	22,373	25,778	28,474	34,076	39,225	43,897	50,952	53,195	55,961	61,168	65,015	68,827	73,371	77,195	80,705	84,517	89,294	92,815	96,302	104,519	107,331	116,350	123,079	128,333	132,203	144,023	146,524

Source : GDP data is from the Department of Statistics Malaysia
Note : GDP at 2010 Prices (RM Million) for 1990 until 2009 was calculated by the Energy Commission

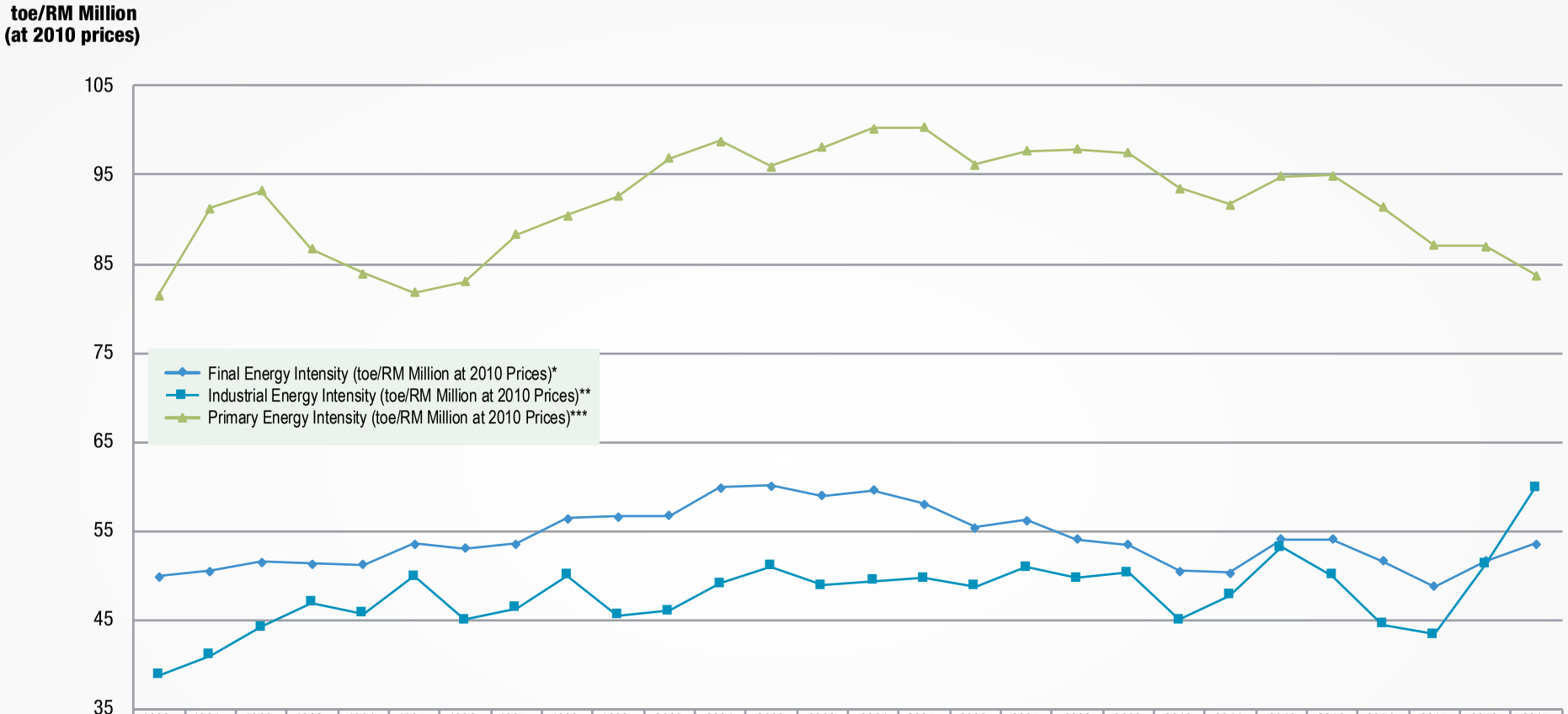
FIGURE 4: ANNUAL GROWTH RATES OF GDP, PRIMARY ENERGY SUPPLY, FINAL ENERGY CONSUMPTION AND ELECTRICITY CONSUMPTION



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
GDP at 2010 Prices	9.00	9.55	8.89	9.89	9.21	9.83	10.00	7.32	(7.36)	6.14	8.86	0.52	5.39	5.79	6.78	5.33	5.58	6.30	4.83	(1.51)	7.42	5.29	5.47	4.69	6.01	5.09	4.22	5.90
Primary Energy Supply	8.90	22.65	11.22	2.16	5.80	7.00	11.69	14.09	(5.04)	8.63	13.87	2.50	2.34	8.21	9.16	5.37	1.22	8.01	5.03	(1.91)	2.98	3.23	9.09	4.90	1.94	0.21	4.15	1.84
Final Energy Consumption	8.70	10.78	11.14	9.53	8.79	14.92	9.10	8.21	(2.33)	6.53	9.08	6.11	5.63	3.90	7.91	2.58	0.74	7.88	0.87	(2.68)	1.54	4.77	13.43	4.65	1.21	(0.77)	10.45	9.21
Electricity Consumption	9.70	12.24	15.22	10.46	19.67	15.11	11.91	16.07	4.40	5.20	9.30	6.29	5.86	6.60	5.21	4.55	4.72	5.65	3.94	3.76	8.53	2.69	8.40	5.78	4.27	3.22	8.74	1.72

Source : GDP data is from the Department of Statistics Malaysia
Note : GDP growth rates at 2010 Prices (RM Million) for 1990 until 2009 was calculated by the Energy Commission

FIGURE 5: PRIMARY AND FINAL ENERGY INTENSITY

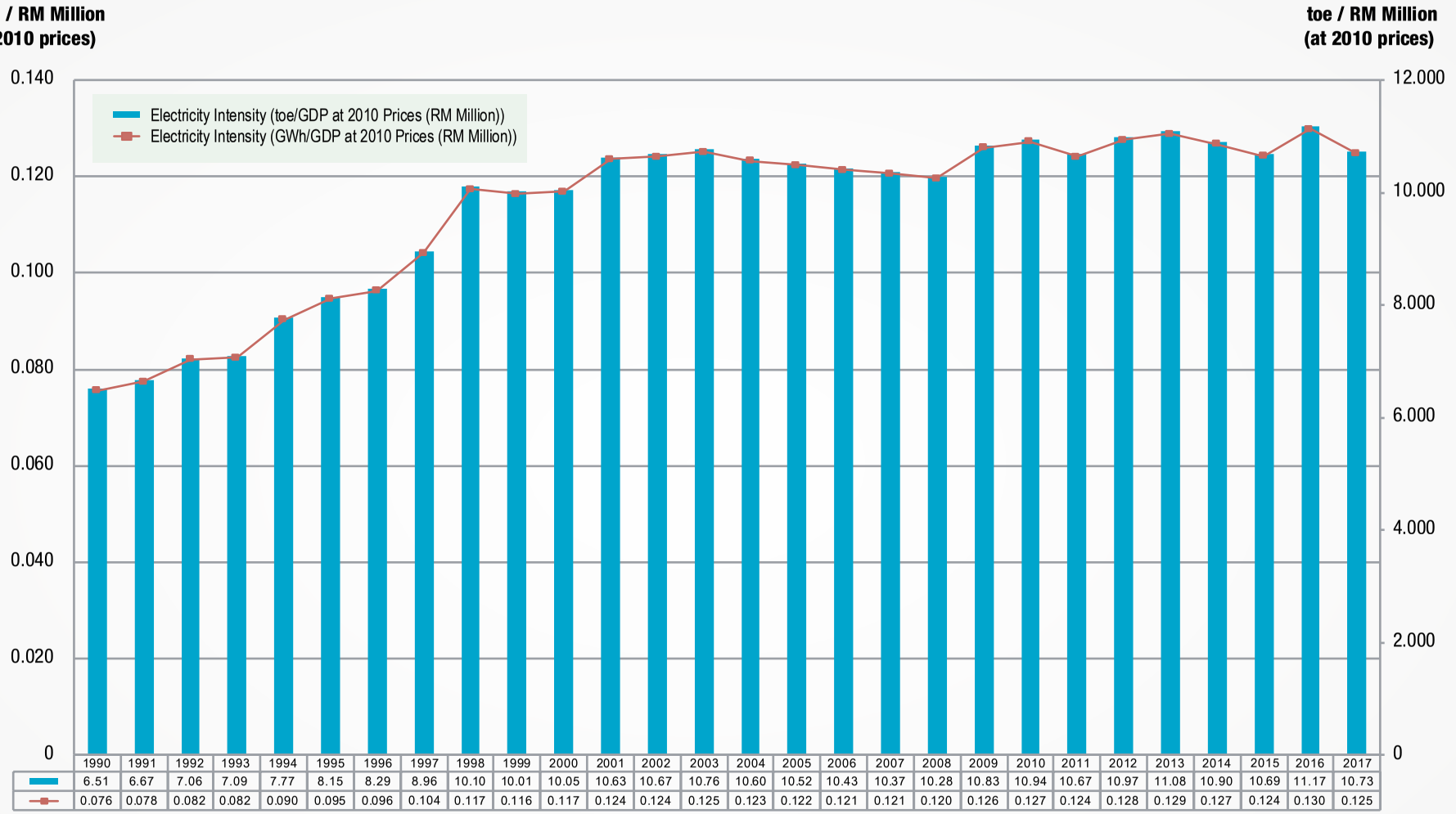


	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Final Energy Intensity (toe/RM Million at 2010 Prices)*	49.89	50.45	51.50	51.33	51.13	53.50	53.06	53.50	56.41	56.62	56.73	59.89	60.03	58.95	59.58	58.02	55.35	56.18	54.05	53.42	50.49	50.24	54.03	54.01	51.57	48.69	51.60	53.21
Industrial Energy Intensity (toe/RM Million at 2010 Prices)**	38.70	41.01	44.19	46.90	45.66	49.86	44.90	46.30	49.98	45.52	45.92	49.08	51.00	48.84	49.31	49.61	48.70	50.87	49.69	50.21	44.99	47.72	53.12	49.97	44.46	43.33	51.18	59.90
Primary Energy Intensity (toe/RM Million at 2010 Prices)***	81.49	91.24	93.20	86.64	83.94	81.78	83.03	88.27	90.48	92.61	96.87	98.78	95.92	98.12	100.3	100.3	96.19	97.74	97.93	97.54	93.51	91.67	94.81	95.00	91.35	87.10	87.04	83.71

Source: GDP data is from the Department of Statistics Malaysia

Note:
11. Measurement in ktoe is based on the Energy Commission's calculation
2. Intensity = Quantity of energy required per unit output or activity
3. (*): Final Energy Consumption (inclusive of non-energy use) / GDP at 2010 prices
4. (**): Industry Energy Consumption / Industry GDP at 2010 prices
5. (***) Primary Energy Supply / GDP at 2010 prices

FIGURE 6: ELECTRICITY INTENSITY

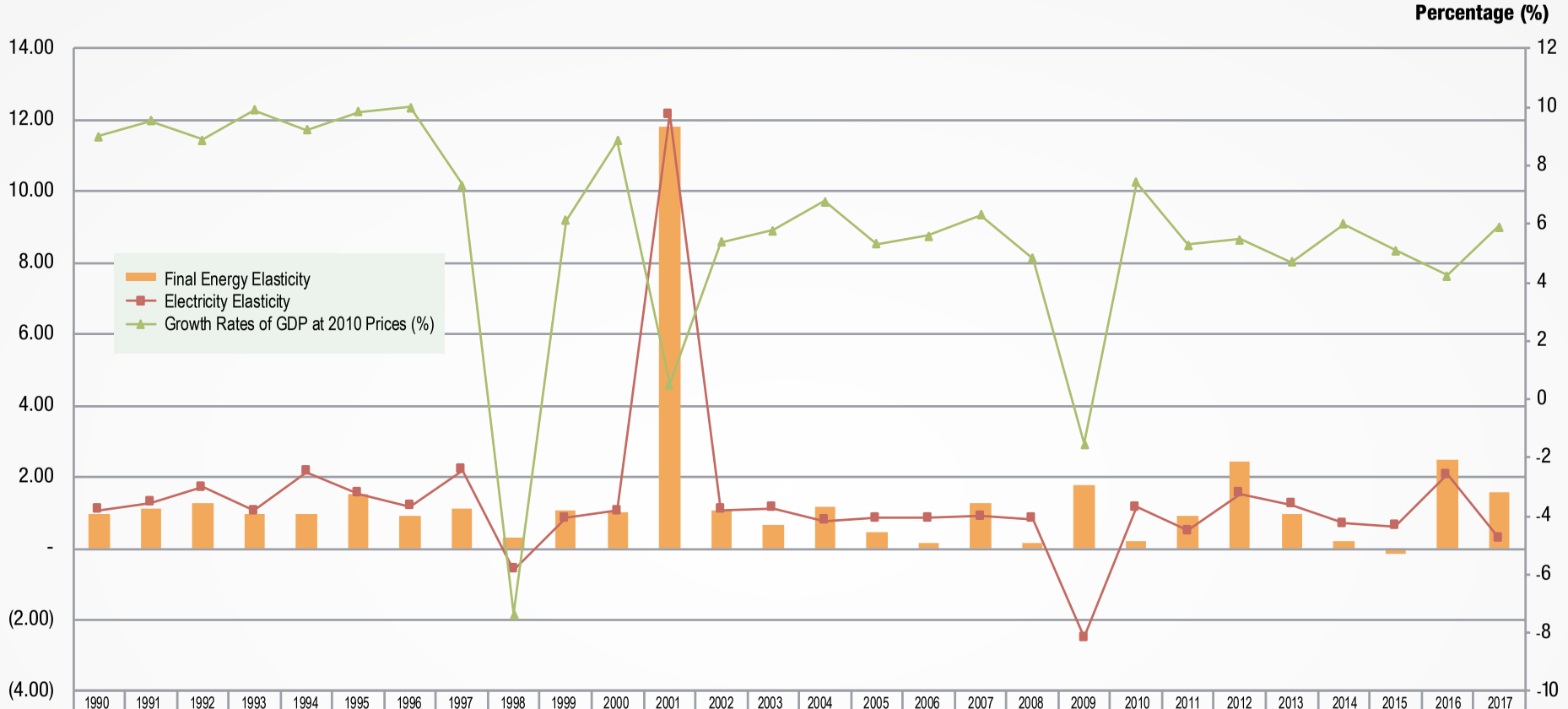


	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
toe/GDP	6.51	6.67	7.06	7.09	7.77	8.15	8.29	8.96	10.10	10.01	10.05	10.63	10.67	10.76	10.60	10.52	10.43	10.37	10.28	10.83	10.94	10.67	10.97	11.08	10.90	10.69	11.17	10.73
GWh/GDP	0.076	0.078	0.082	0.082	0.090	0.095	0.096	0.104	0.117	0.116	0.117	0.124	0.124	0.125	0.123	0.122	0.121	0.121	0.120	0.126	0.127	0.124	0.128	0.129	0.127	0.124	0.130	0.125

Sources : 1. GDP data is from the Department of Statistics Malaysia
2. TNB, SESB, SEB and IPPs

Note : 1. Measurement in ktoe is based on the Energy Commission's calculation
2. Intensity = Quantity of energy required per unit output or activity
3. (*): Electricity Intensity (toe/RM Million GDP at 2010 prices)
4. (**): Electricity Intensity (GWh/RM Million GDP at 2010 prices)

FIGURE 7: FINAL ENERGY AND ELECTRICITY ELASTICITY



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Final Energy Elasticity	0.97	1.13	1.25	0.96	0.95	1.52	0.91	1.12	0.32	1.06	1.02	11.81	1.04	0.67	1.17	0.48	0.13	1.25	0.18	1.77	0.21	0.90	2.45	0.99	0.20	(0.15)	2.47	1.56
Electricity Elasticity	1.08	1.28	1.71	1.06	2.14	1.54	1.19	2.19	(0.60)	0.85	1.05	12.15	1.09	1.14	0.77	0.85	0.85	0.90	0.82	(2.48)	1.15	0.51	1.54	1.23	0.71	0.59	2.12	0.29
Growth Rates of GDP at 2010 Prices (%)	9.00	9.55	8.89	9.89	9.21	9.83	10.00	7.32	(7.36)	6.14	8.86	0.52	5.39	5.79	6.78	5.33	5.58	6.30	4.83	(1.51)	7.42	5.29	5.47	4.69	6.01	5.09	4.22	5.90

Note: 1) Final Energy Elasticity = Ratio between growths of energy consumption with economic growth

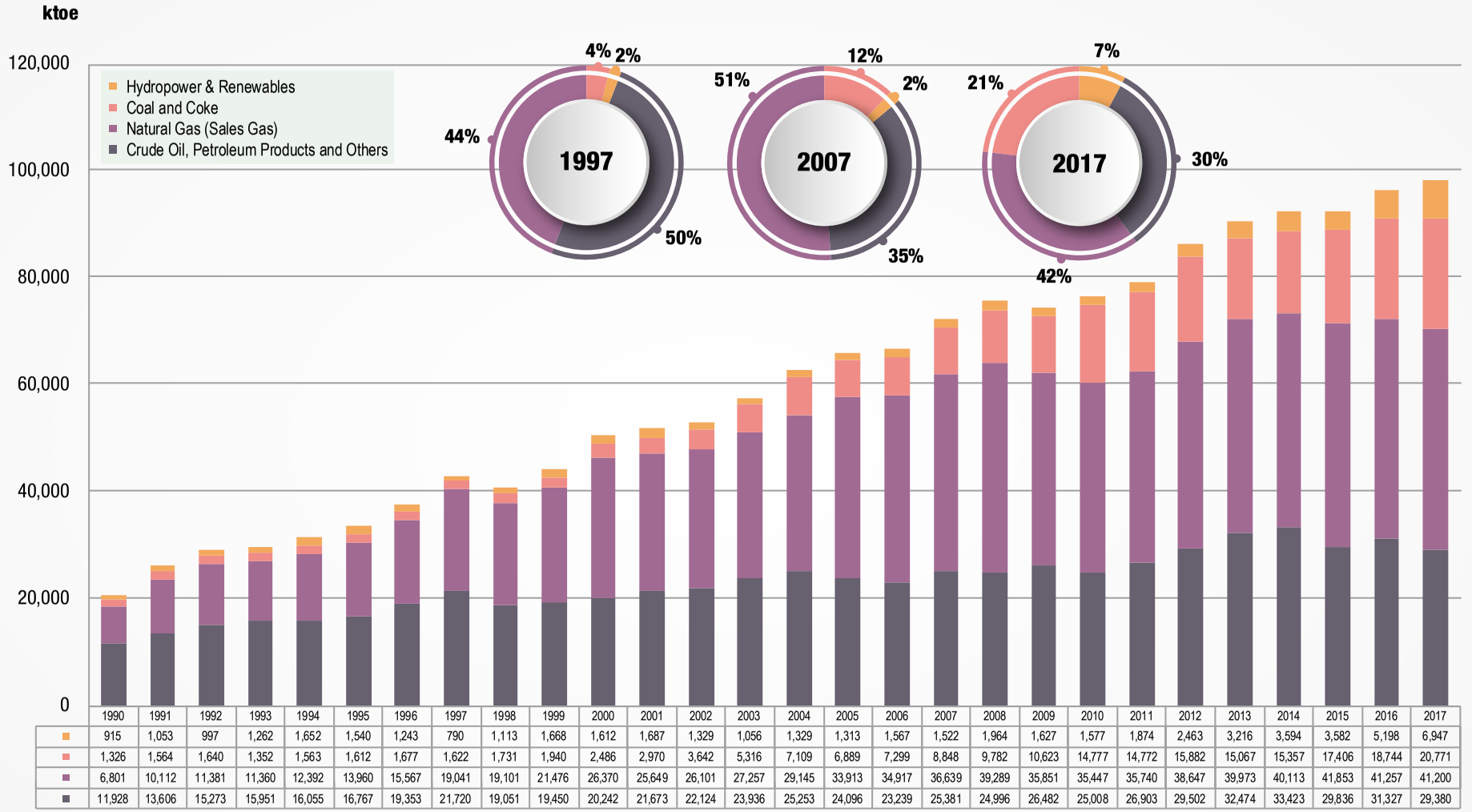
$$\text{Final Energy Elasticity} = \frac{\text{Growth Rate of Energy Consumption (\%)}}{\text{Growth Rate of GDP (\%)}}$$

2) Electricity Elasticity = Ratio between growths of electricity consumption with economic growth

$$\text{Electricity Elasticity} = \frac{\text{Growth Rate of Electricity Consumption (\%)}}{\text{Growth Rate of GDP (\%)}}$$

3) GDP growth rates at 2010 prices (RM Million) for 1990 until 2009 was estimated by the Energy Commission

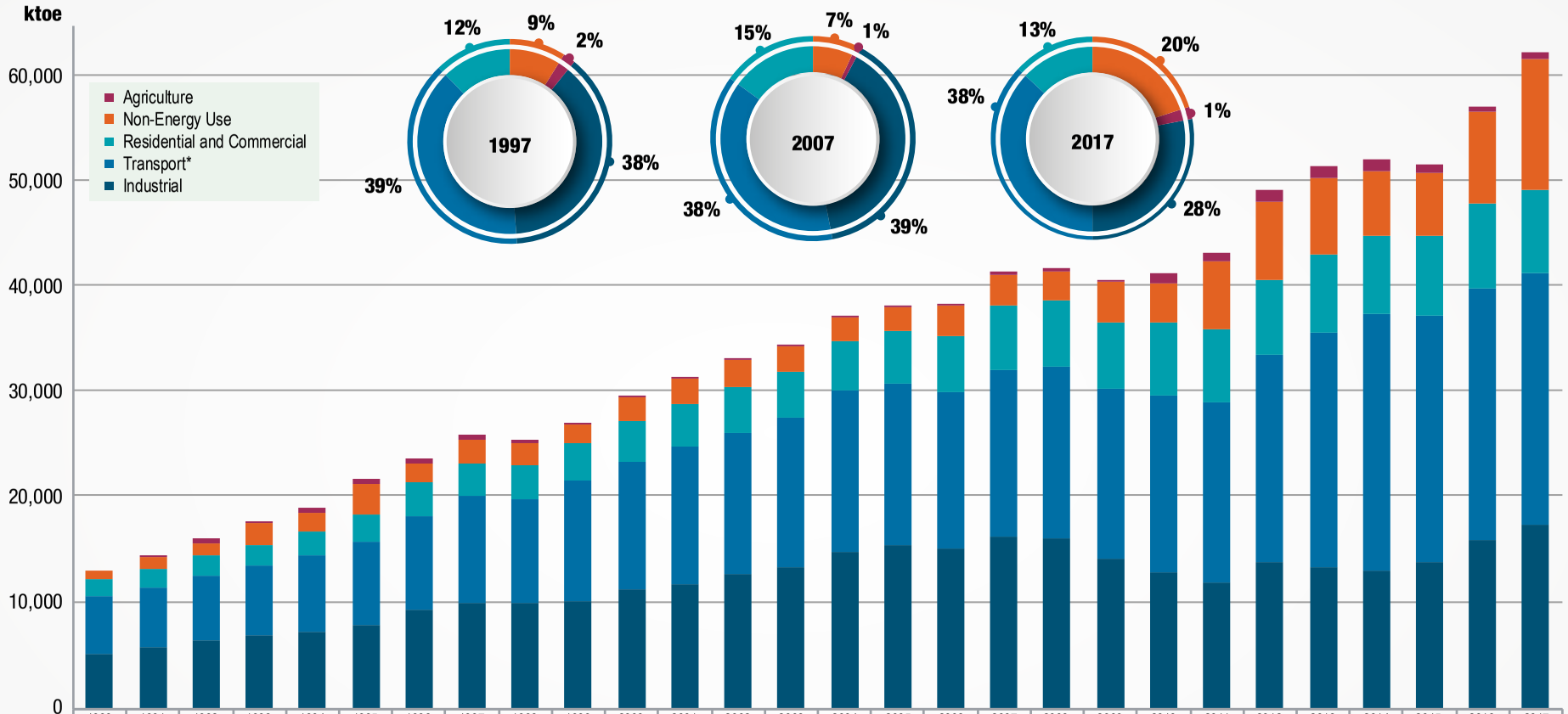
FIGURE 8: PRIMARY ENERGY SUPPLY



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Hydropower & Renewables	915	1,053	997	1,262	1,652	1,540	1,243	790	1,113	1,668	1,612	1,687	1,329	1,056	1,329	1,313	1,567	1,522	1,964	1,627	1,577	1,874	2,463	3,216	3,594	3,582	5,198	6,947
Coal and Coke	1,326	1,564	1,640	1,352	1,563	1,612	1,677	1,622	1,731	1,940	2,486	2,970	3,642	5,316	7,109	6,889	7,299	8,848	9,782	10,623	14,777	14,772	15,882	15,067	15,357	17,406	18,744	20,771
Natural Gas (Sales Gas)	6,801	10,112	11,381	11,360	12,392	13,960	15,567	19,041	19,101	21,476	26,370	25,649	26,101	27,257	29,145	33,913	34,917	36,639	39,289	35,851	35,447	35,740	38,647	39,973	40,113	41,853	41,257	41,200
Crude Oil, Petroleum Products and Others	11,928	13,606	15,273	15,951	16,055	16,767	19,353	21,720	19,051	19,450	20,242	21,673	22,124	23,936	25,253	24,096	23,239	25,381	24,996	26,482	25,008	26,903	29,502	32,474	33,423	29,836	31,327	29,380

Source : Oil and gas companies, power utilities, IPPs, cement, iron and steel manufacturers

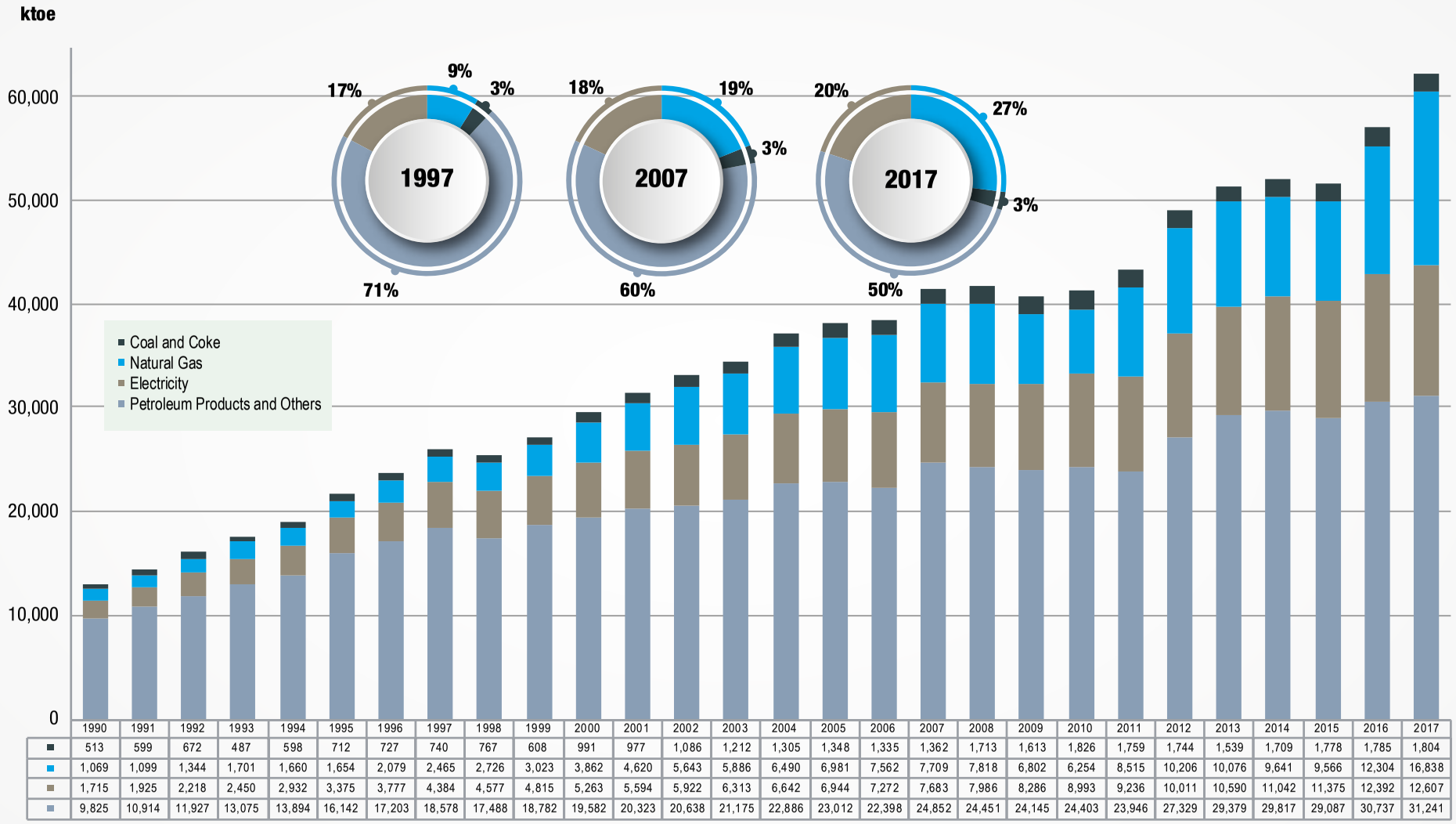
FIGURE 9: FINAL ENERGY CONSUMPTION BY SECTOR



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Agriculture	0	130	391	62	422	446	486	490	307	106	104	98	96	98	87	101	258	281	287	211	1,074	916	1,053	1,051	1,045	895	415	674
Non-Energy Use	838	1,071	1,222	2,027	1,817	2,994	1,744	2,298	2,023	1,799	2,250	2,378	2,511	2,345	2,183	2,173	2,819	2,957	2,876	3,868	3,696	6,377	7,497	7,277	6,217	5,928	8,729	12,517
Residential and Commercial	1,622	1,721	1,867	2,055	2,300	2,556	3,162	3,073	3,314	3,653	3,868	4,048	4,387	4,399	4,754	5,134	5,424	6,197	6,205	6,336	6,951	6,993	7,065	7,403	7,459	7,559	8,049	7,796
Transport*	5,386	5,806	6,226	6,558	7,262	7,827	8,951	10,201	9,793	11,393	12,071	13,137	13,442	14,271	15,385	15,293	14,819	15,717	16,395	16,119	16,828	17,070	19,757	22,357	24,327	23,435	24,004	24,039
Industrial	5,276	5,809	6,455	7,012	7,283	8,060	9,443	10,106	10,121	10,277	11,406	11,852	12,854	13,472	14,914	15,583	15,248	16,454	16,205	14,312	12,928	12,100	13,919	13,496	13,162	13,989	16,019	17,463

Source : Oil and gas companies, TNB, SESB, SEB, IPPs, cement, iron and steel manufacturers
Note (*) : Transport sector's energy consumption includes international aviation

FIGURE 10: FINAL ENERGY CONSUMPTION BY FUEL TYPE

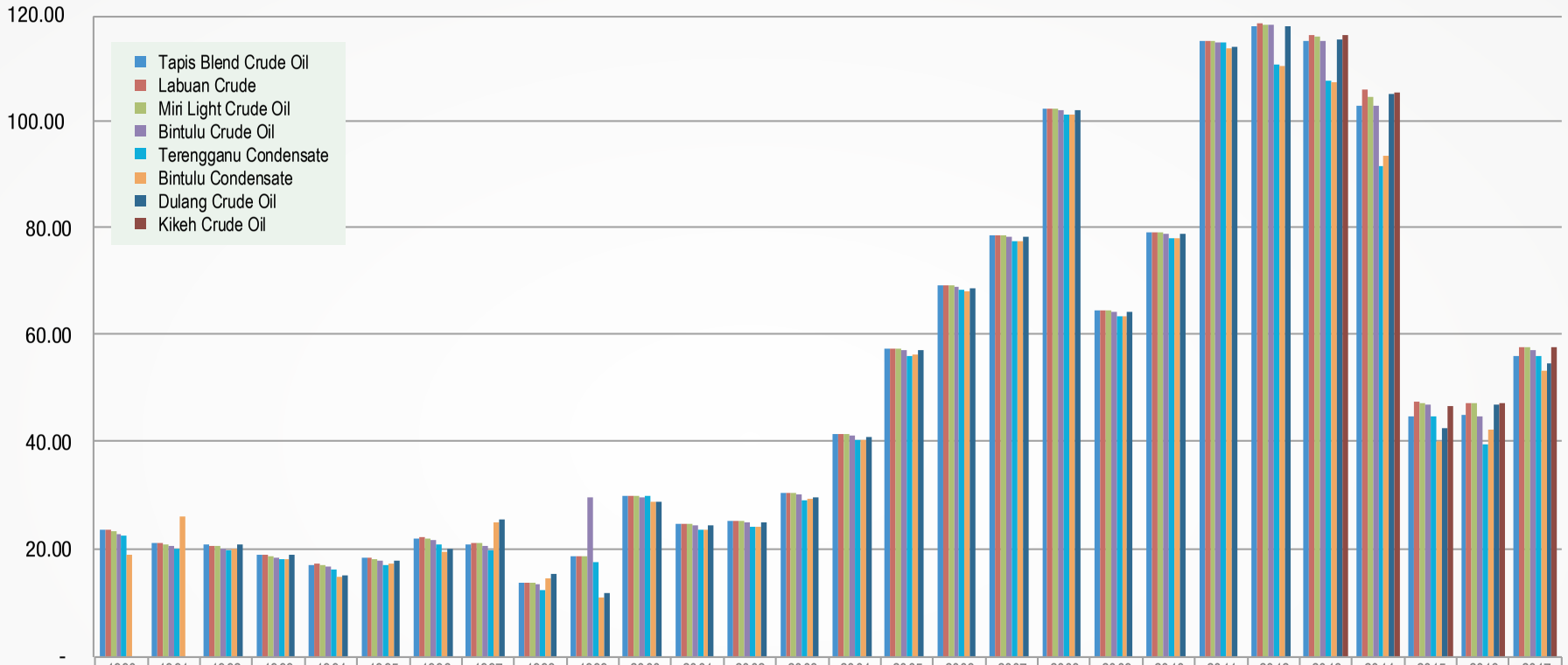


	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
■	513	599	672	487	598	712	727	740	767	608	991	977	1,086	1,212	1,305	1,348	1,335	1,362	1,713	1,613	1,826	1,759	1,744	1,539	1,709	1,778	1,785	1,804
■	1,069	1,099	1,344	1,701	1,660	1,654	2,079	2,465	2,726	3,023	3,862	4,620	5,643	5,886	6,490	6,981	7,562	7,709	7,818	6,802	6,254	8,515	10,206	10,076	9,641	9,566	12,304	16,838
■	1,715	1,925	2,218	2,450	2,932	3,375	3,777	4,384	4,577	4,815	5,263	5,594	5,922	6,313	6,642	6,944	7,272	7,683	7,986	8,286	8,993	9,236	10,011	10,590	11,042	11,375	12,392	12,607
■	9,825	10,914	11,927	13,075	13,894	16,142	17,203	18,578	17,488	18,782	19,582	20,323	20,638	21,175	22,886	23,012	22,398	24,852	24,451	24,145	24,403	23,946	27,329	29,379	29,817	29,087	30,737	31,241

Source : Oil and gas companies, power utilities, IPPs, cement, iron and steel manufacturers

FIGURE 11: OFFICIAL SELLING PRICES OF MALAYSIAN CRUDE OIL

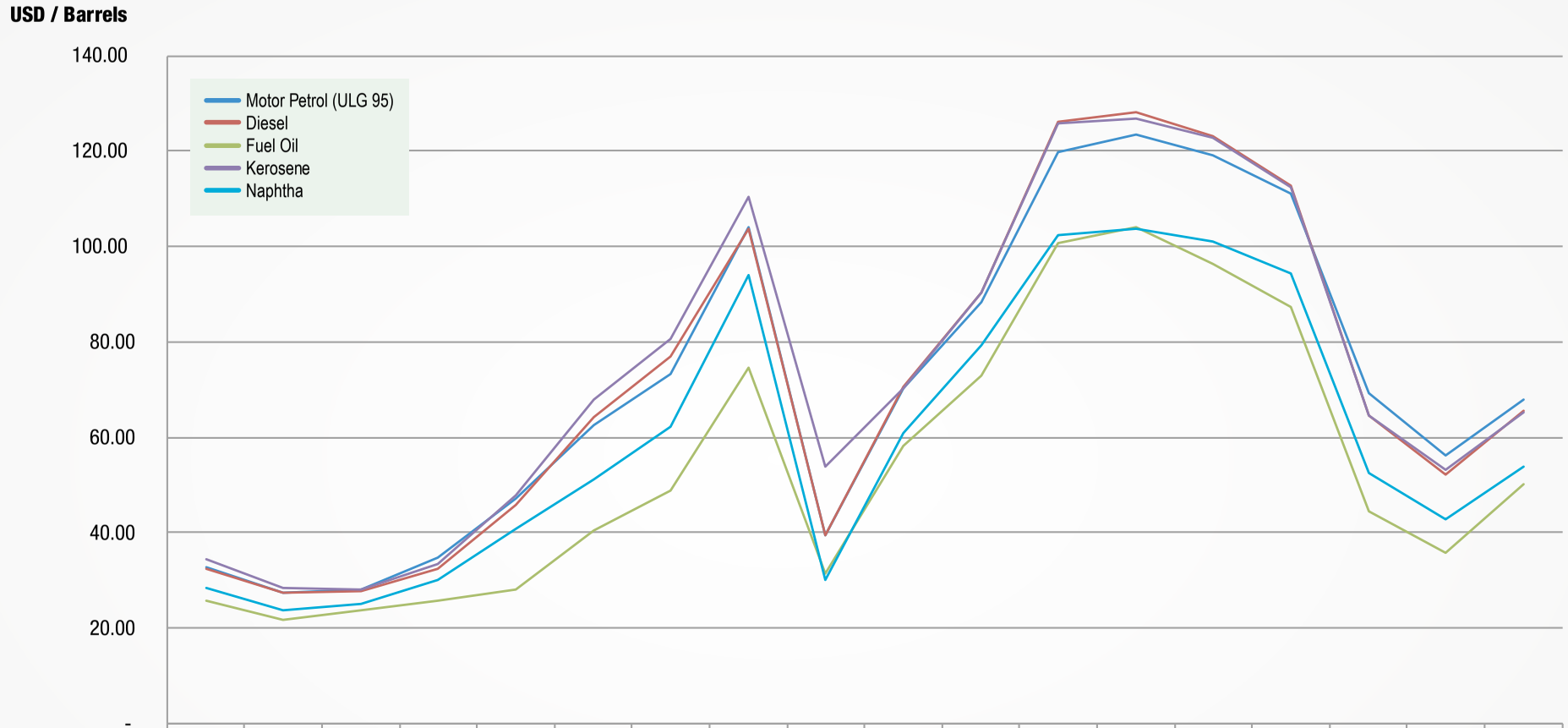
USD / Barrels



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Tapis Blend Crude Oil	23.86	21.47	20.98	19.11	17.30	18.53	22.28	21.18	13.81	18.95	30.25	25.06	25.52	30.60	41.84	57.71	69.56	78.96	102.7	64.97	79.51	115.3	118.2	115.3	103.2	45.12	45.43	56.30
Labuan Crude	23.76	21.37	20.88	19.11	17.40	18.63	22.38	21.33	13.84	18.95	30.25	25.06	25.52	30.60	41.84	57.71	69.56	78.96	102.7	64.97	79.51	115.3	118.6	116.6	106.4	47.73	47.63	57.90
Miri Light Crude Oil	23.56	21.17	20.68	18.91	17.20	18.43	22.18	21.28	13.83	18.95	30.25	25.06	25.52	30.60	41.84	57.71	69.56	78.96	102.7	64.97	79.51	115.3	118.5	116.3	104.8	47.63	47.63	57.90
Bintulu Crude Oil	23.06	20.67	20.18	18.46	16.90	18.06	21.89	20.78	13.48	29.95	29.95	24.78	25.22	30.33	41.54	57.43	69.28	78.66	102.4	64.67	79.21	115.0	118.3	115.4	103.1	47.35	45.13	57.50
Terengganu Condensate	22.76	20.37	19.88	18.26	16.45	17.33	21.08	19.98	12.61	17.76	30.29	23.86	24.32	29.40	40.64	56.51	68.66	77.91	101.5	63.77	78.31	115.0	110.9	108.0	91.82	44.94	39.76	56.30
Bintulu Condensate	19.10	26.35	20.20	18.25	15.00	17.36	19.79	25.13	14.80	11.14	29.09	23.96	24.42	29.50	40.74	56.61	68.45	77.92	101.6	63.87	78.41	114.1	110.6	107.7	93.99	40.28	42.56	53.57
Dulang Crude Oil	-	-	21.15	19.20	15.40	18.16	20.30	25.66	15.57	11.84	29.18	24.68	25.23	29.99	41.17	57.41	68.96	78.59	102.4	64.67	79.21	114.2	118.1	115.7	105.4	42.98	47.23	54.97
Kikeh Crude Oil	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	116.6	105.6	46.96	47.63	57.90

Source : PETRONAS

FIGURE 12: EX-SINGAPORE PRICES OF MAJOR PETROLEUM PRODUCTS

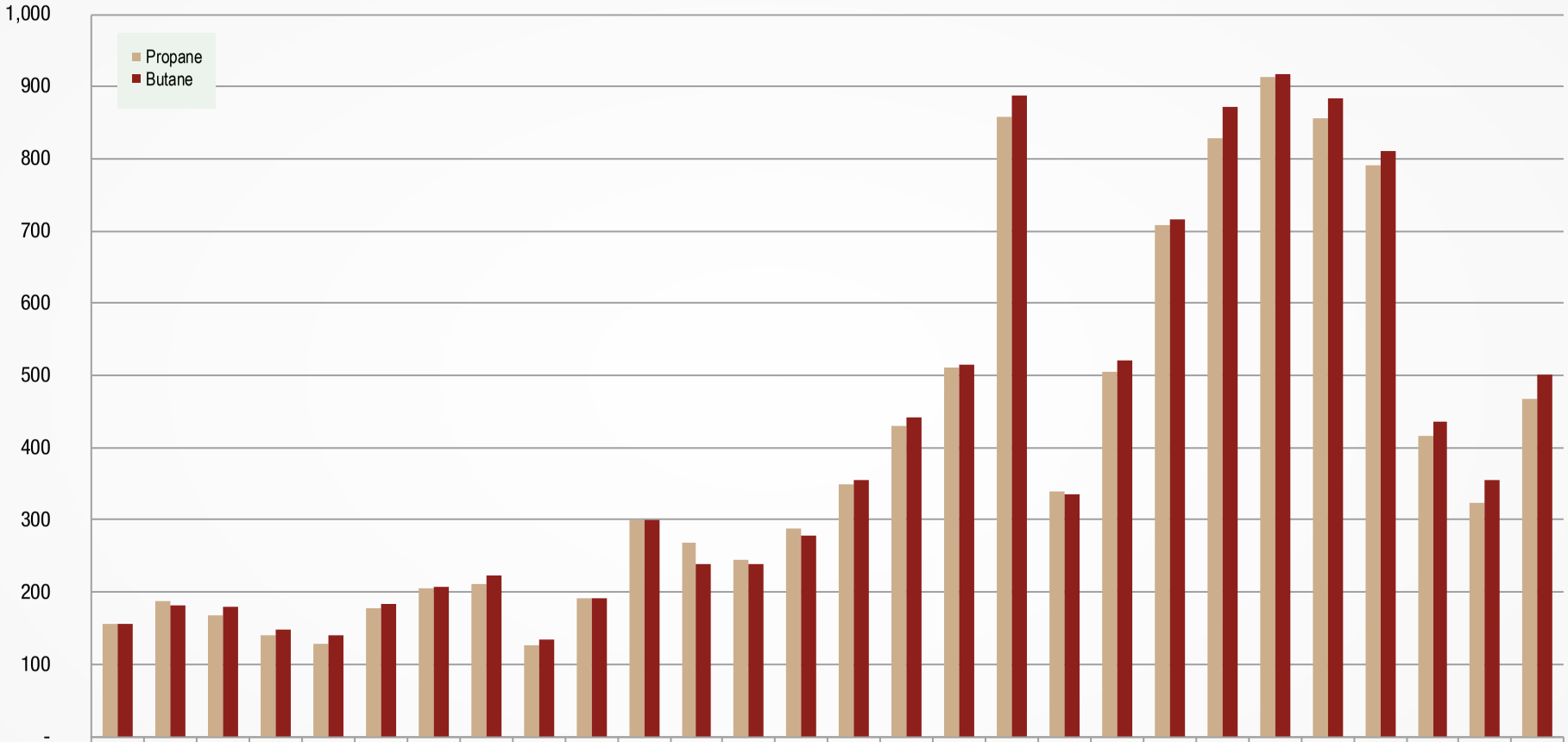


	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Motor Petrol (ULG 95)	32.64	27.43	28.04	34.69	47.23	62.38	73.20	104.05	39.25	70.38	88.41	119.79	123.42	119.00	110.97	69.17	56.26	67.99
Diesel	32.48	27.32	27.55	32.46	45.92	64.35	76.93	103.74	39.32	70.42	90.35	126.28	128.10	123.27	112.69	64.47	52.24	65.65
Fuel Oil	25.82	21.78	23.63	25.72	28.15	40.32	48.84	74.60	31.40	58.12	72.85	100.68	103.92	96.35	87.31	44.52	35.62	49.99
Kerosene	34.27	28.32	28.08	33.25	47.69	67.99	80.72	110.50	53.90	70.14	90.18	125.71	126.79	122.85	112.50	64.69	53.00	65.27
Naphtha	28.32	23.75	24.93	30.14	40.82	51.04	62.13	93.98	29.90	60.96	79.24	102.49	103.57	100.99	94.40	52.62	42.65	53.79

Note : Historical prices have been revised as per revision by Platts
Source : Platts

FIGURE 13: ANNUAL LIQUEFIED PETROLEUM GAS (LPG) CONTRACT PRICES – ARAB GULF

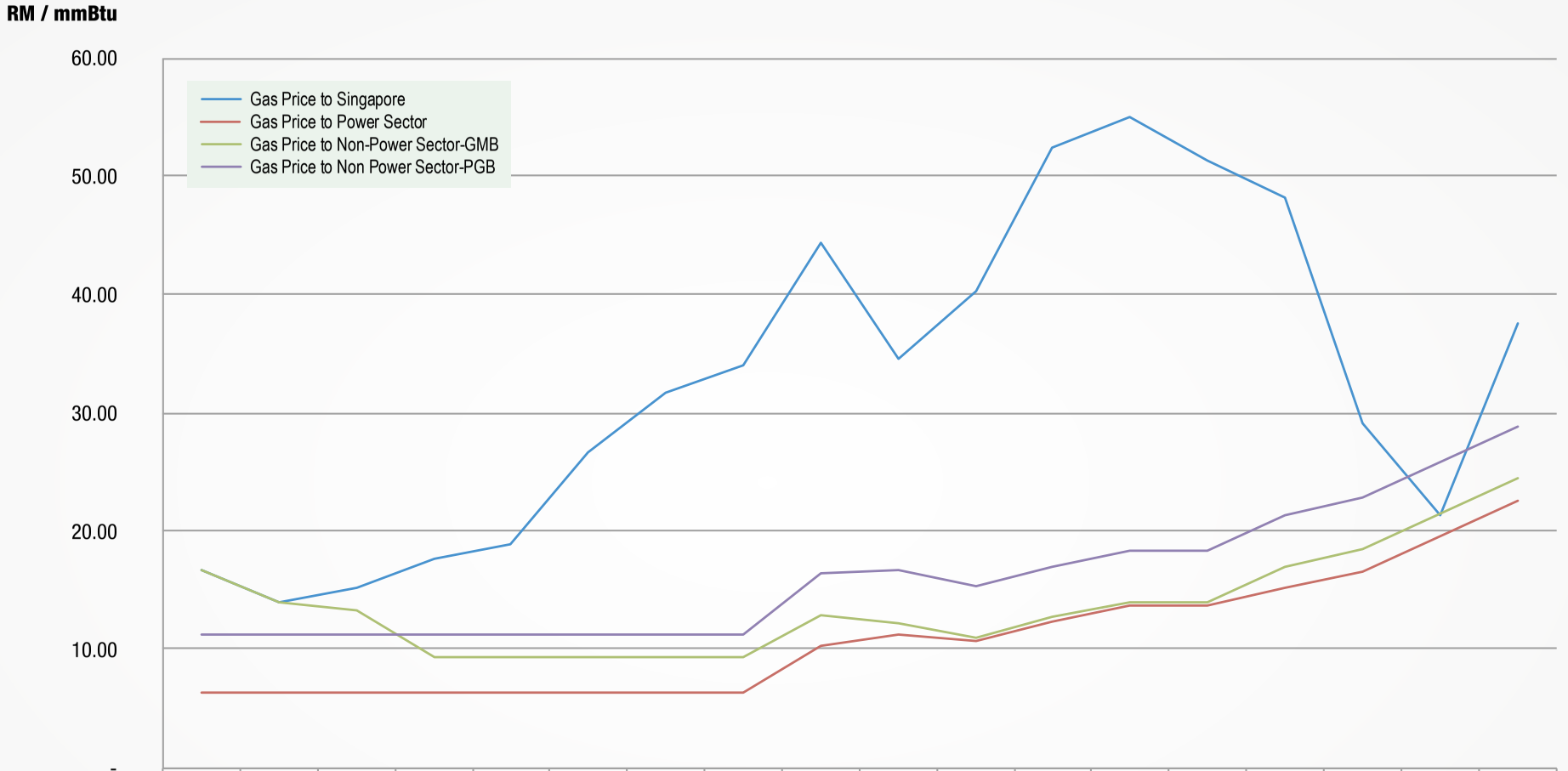
USD / Metric Tonne



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Propane	155.96	186.89	167.13	140.02	129.13	178.62	204.42	210.35	126.50	191.07	299.29	269.29	244.58	288.84	348.61	430.79	510.27	858.00	340.00	504.37	708.01	828.03	914.12	856.79	790.70	416.75	323.67	467.56
Butane	156.13	182.19	179.95	147.67	140.90	183.82	207.21	222.21	134.55	190.84	299.46	239.43	238.48	278.46	355.33	442.89	514.00	887.50	335.00	521.43	716.81	871.12	917.45	884.14	810.58	436.57	356.17	502.06

Source : PETRONAS

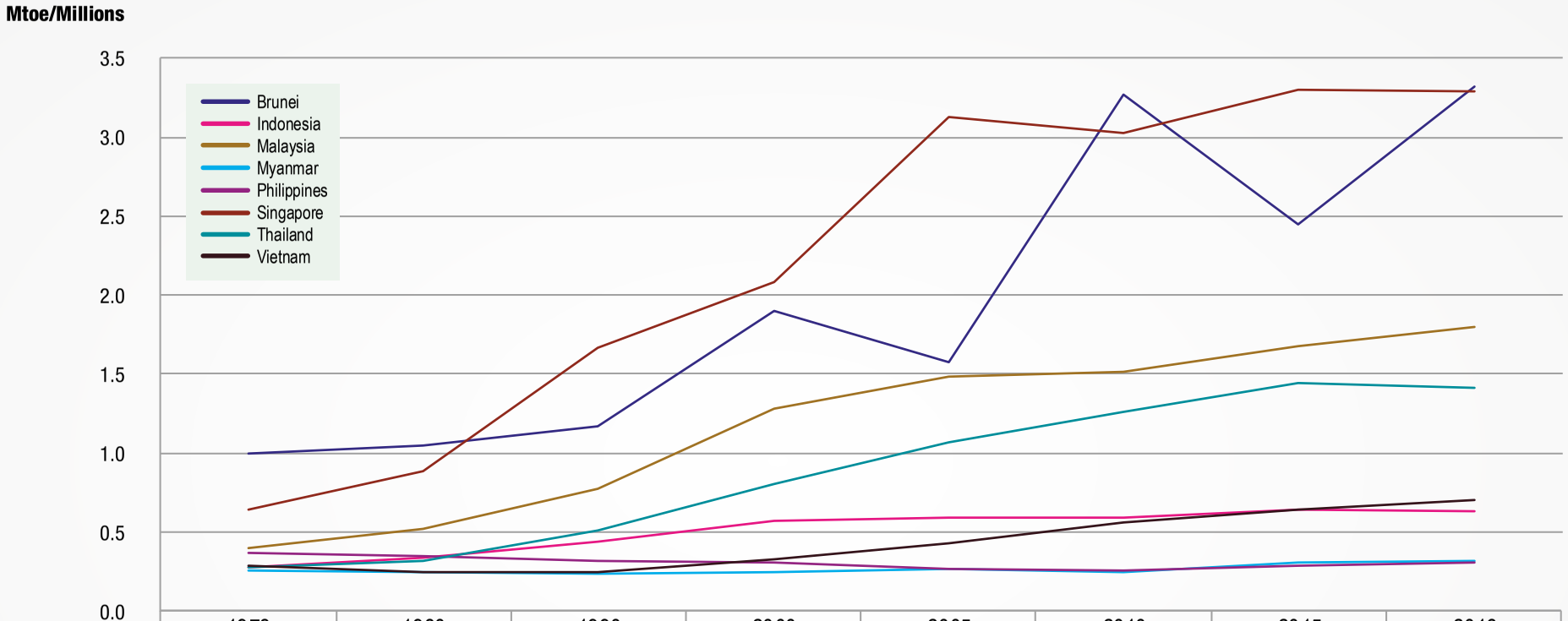
FIGURE 14: AVERAGE ANNUAL NATURAL GAS PRICE IN MALAYSIA



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Gas Price to Singapore	16.72	14.10	15.30	17.74	18.92	26.76	31.77	34.10	44.41	34.58	40.42	52.47	55.08	51.36	48.28	29.21	21.43	37.60
Gas Price to Power Sector	6.40	6.40	6.40	6.40	6.40	6.40	6.40	6.40	10.36	11.30	10.70	12.45	13.70	13.70	15.20	16.70	19.70	22.70
Gas Price to Non-Power Sector-GMB	16.72	14.10	13.40	9.40	9.40	9.40	9.40	9.40	12.98	12.21	11.05	12.80	14.05	14.05	17.05	18.55	21.55	24.55
Gas Price to Non Power Sector-PGB	11.32	11.32	11.32	11.32	11.32	11.32	11.32	11.32	16.55	16.77	15.35	17.10	18.35	18.35	21.35	22.85	25.85	28.85

Source : Energy Commission

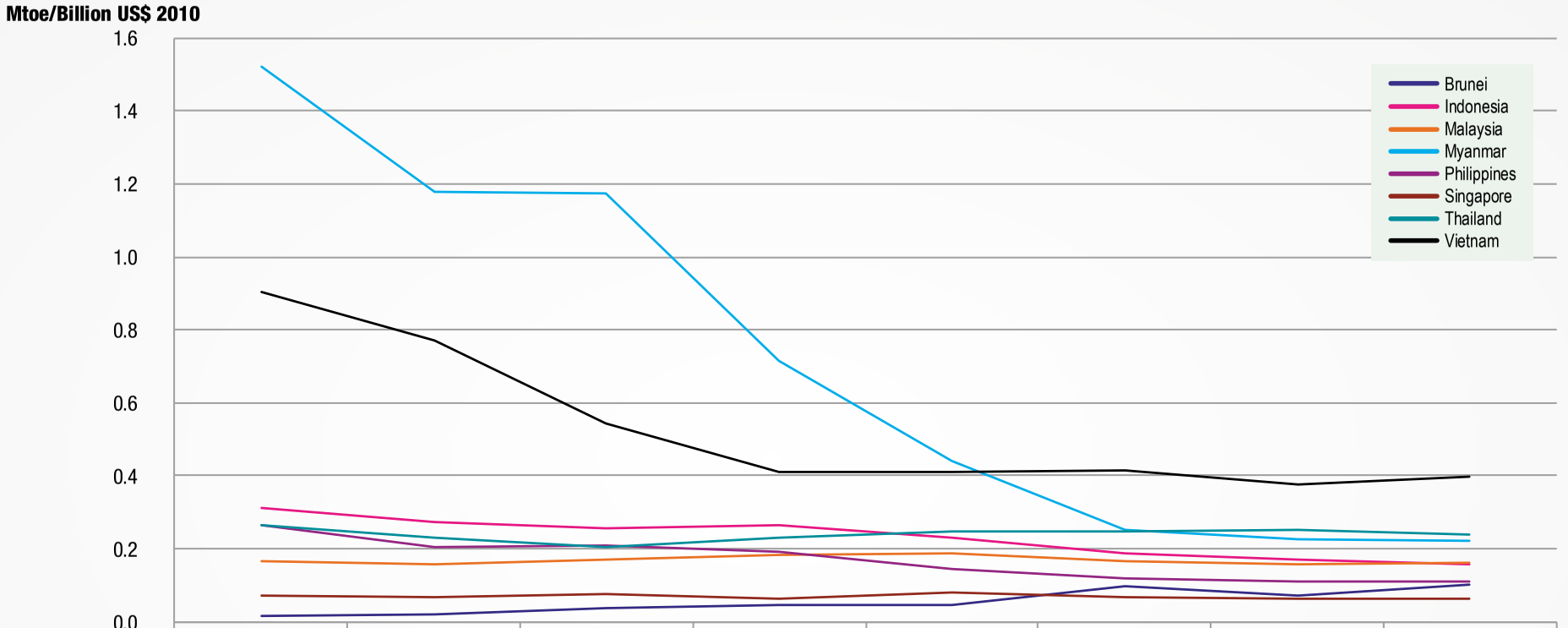
FIGURE 15: FINAL ENERGY CONSUMPTION PER CAPITA IN ASEAN



	1973	1980	1990	2000	2005	2010	2015	2016
Brunei	1.000	1.050	1.167	1.900	1.575	3.275	2.450	3.325
Indonesia	0.275	0.337	0.441	0.568	0.585	0.589	0.644	0.631
Malaysia	0.395	0.519	0.773	1.283	1.479	1.512	1.680	1.793
Myanmar	0.253	0.250	0.232	0.249	0.266	0.249	0.302	0.312
Philippines	0.368	0.344	0.317	0.307	0.264	0.253	0.285	0.306
Singapore	0.636	0.888	1.670	2.078	3.130	3.029	3.300	3.289
Thailand	0.271	0.320	0.510	0.803	1.069	1.263	1.440	1.415
Vietnam	0.286	0.243	0.243	0.323	0.427	0.555	0.636	0.700

Source : Energy Balances of Non-OECD Countries, 2018 Edition, International Energy Agency (IEA)

FIGURE 16: FINAL ENERGY INTENSITY IN ASEAN



	1973	1980	1990	2000	2005	2010	2015	2016
Brunei	0.015	0.018	0.036	0.048	0.047	0.096	0.072	0.100
Indonesia	0.311	0.274	0.258	0.265	0.232	0.189	0.168	0.159
Malaysia	0.165	0.156	0.170	0.183	0.185	0.167	0.156	0.163
Myanmar	1.523	1.177	1.175	0.717	0.440	0.252	0.224	0.220
Philippines	0.263	0.204	0.208	0.191	0.145	0.119	0.109	0.111
Singapore	0.073	0.066	0.074	0.062	0.079	0.065	0.063	0.062
Thailand	0.263	0.228	0.204	0.232	0.246	0.249	0.251	0.240
Vietnam	0.905	0.773	0.544	0.411	0.412	0.416	0.378	0.396

Source : Energy Commission


OIL

TABLE 3: PRODUCTION AND RESERVES 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 : PETRONAS

TABLE 4: REFINERY LICENSED CAPACITY

	Location	Start-up date	Thousand barrels/day
Hengyuan Refining Company (formerly known as Shell Refining Co. (FOM) Bhd)	Port Dickson, Negeri Sembilan	1963	155
Petron Malaysia (previously owned by ESSO Malaysia Bhd)	Port Dickson, Negeri Sembilan	1960	88
PETRONAS	Kertih, Terengganu*	1983	49
PETRONAS	Melaka	1994	100
Malaysia Refining Company Sdn Bhd (PETRONAS / ConocoPhillips)	Melaka	1998	100
Total			**492**

Source : PETRON, PETRONAS & SHELL

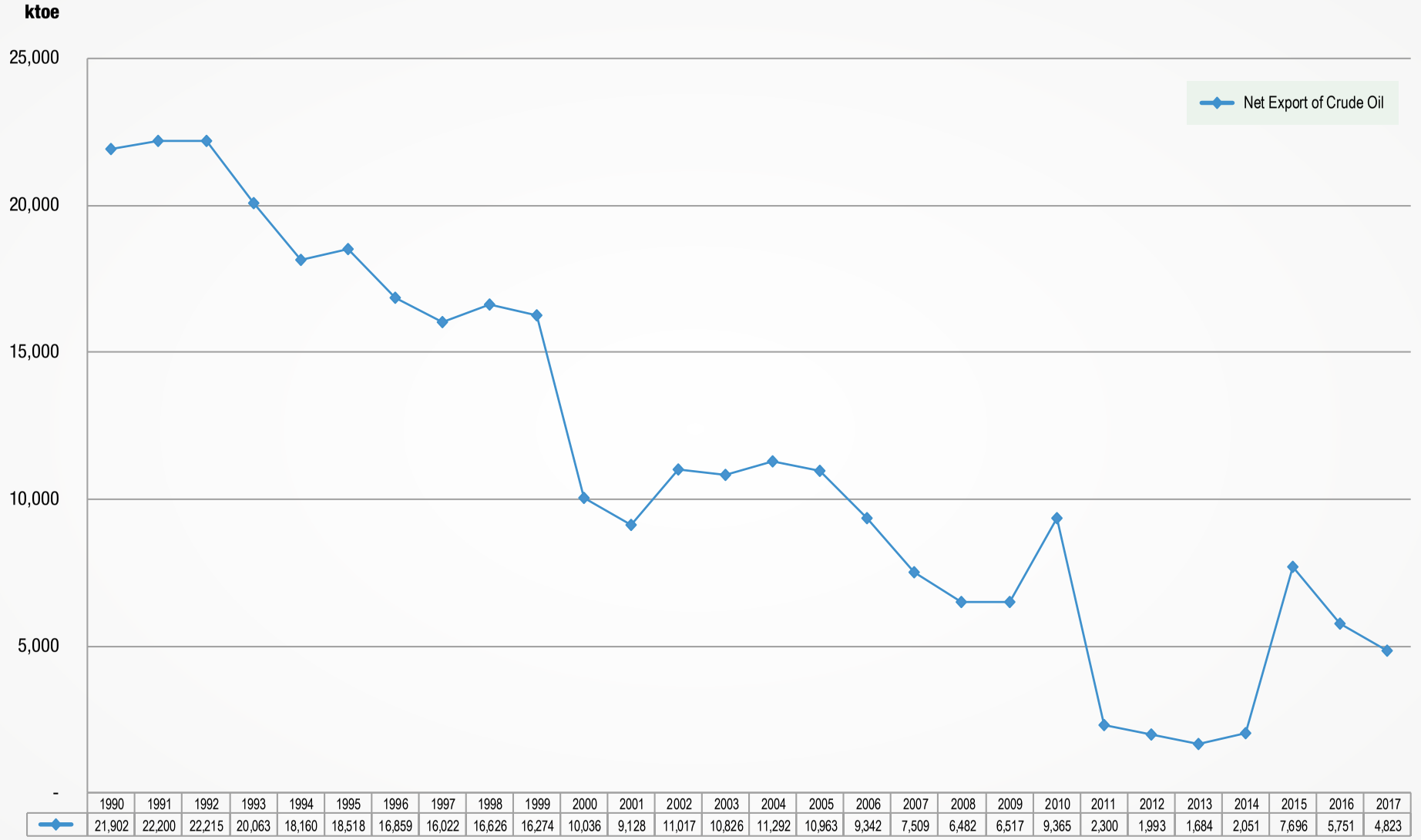
Note (*) : Excludes condensate splitter of 74,300 bpd

TABLE 5: 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**

Source : Oil companies

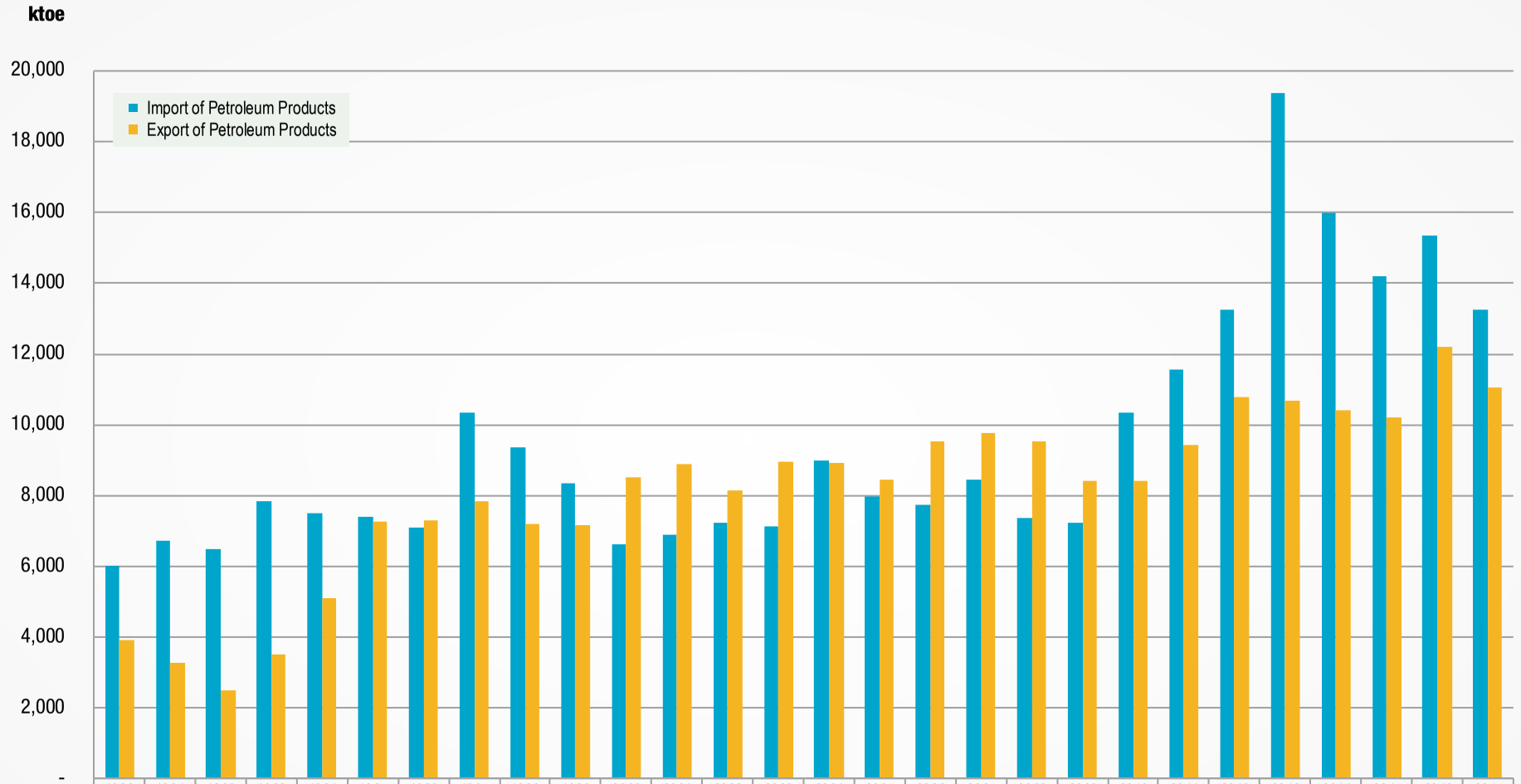
FIGURE 17: NET EXPORT OF CRUDE OIL



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Net Export of Crude Oil	21,902	22,200	22,215	20,063	18,160	18,518	16,859	16,022	16,626	16,274	10,036	9,128	11,017	10,826	11,292	10,963	9,342	7,509	6,482	6,517	9,365	2,300	1,993	1,684	2,051	7,696	5,751	4,823

Source : Department of Statistics Malaysia and Oil companies
Note : Measurement in ktoe is based on the Energy Commission's calculation

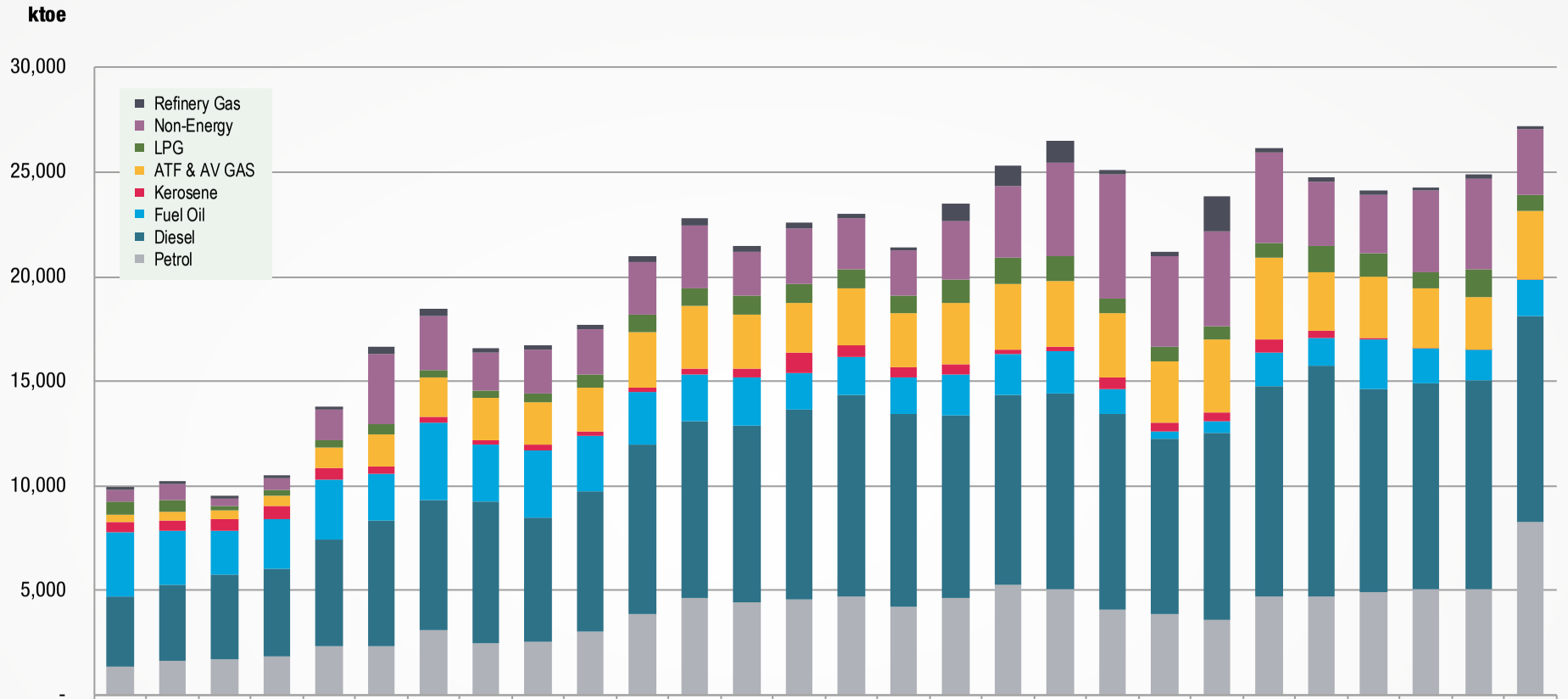
FIGURE 18: EXPORT AND IMPORT OF PETROLEUM PRODUCTS



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Import of Petroleum Products	6,031	6,728	6,499	7,835	7,492	7,411	7,095	10,331	9,360	8,357	6,619	6,881	7,220	7,116	8,980	7,961	7,734	8,452	7,376	7,243	10,359	11,579	13,242	19,383	16,009	14,218	15,341	13,252
Export of Petroleum Products	3,913	3,272	2,513	3,507	5,094	7,261	7,317	7,840	7,194	7,161	8,533	8,900	8,158	8,972	8,912	8,435	9,535	9,780	9,527	8,419	8,431	9,421	10,784	10,679	10,399	10,220	12,214	11,063

Source : Department of Statistics Malaysia and Oil companies
Note : Measurement in ktoe is based on the Energy Commission's calculation

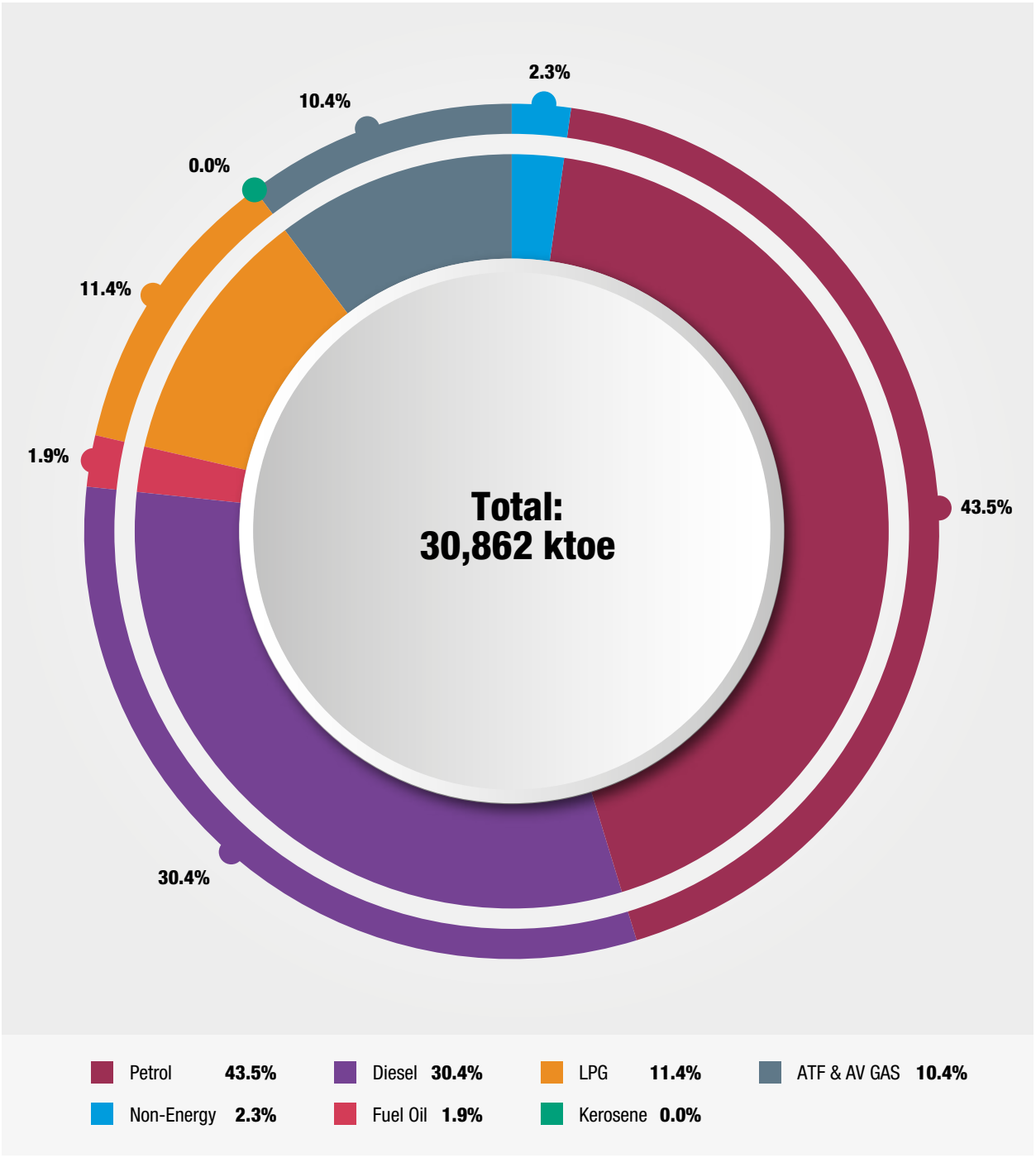
FIGURE 19: PRODUCTION OF PETROLEUM PRODUCTS FROM REFINERIES



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Refinery Gas	151	168	143	106	162	385	331	203	192	230	241	331	294	262	215	202	849	938	991	195	209	1,659	197	195	192	172	201	174
Non-Energy	561	772	324	600	1,468	3,380	2,554	1,783	2,117	2,159	2,492	3,020	2,127	2,623	2,455	2,157	2,750	3,461	4,475	5,905	4,357	4,572	4,318	3,089	2,826	3,869	4,339	3,100
LPG	613	548	200	244	319	431	371	371	449	617	838	875	897	932	897	822	1,118	1,228	1,208	732	697	665	702	1,252	1,102	780	1,285	832
ATF & AV GAS	360	390	412	517	980	1,587	1,899	2,000	1,985	2,140	2,660	2,954	2,570	2,367	2,693	2,553	2,938	3,138	3,139	3,085	2,891	3,457	3,918	2,750	2,916	2,841	2,548	3,255
Kerosene	491	526	541	576	563	360	292	265	285	210	239	283	414	983	591	521	537	234	245	565	483	419	654	387	100	6	4	10
Fuel Oil	3,106	2,547	2,110	2,375	2,887	2,212	3,696	2,716	3,233	2,603	2,532	2,269	2,332	1,763	1,813	1,777	1,933	1,990	1,994	1,144	327	571	1,608	1,286	2,340	1,692	1,479	1,725
Diesel	3,350	3,681	4,048	4,249	5,108	6,011	6,174	6,744	5,926	6,712	8,059	8,462	8,401	9,062	9,611	9,161	8,752	9,033	9,364	9,415	8,369	8,925	10,033	11,063	9,725	9,890	9,988	9,877
Petrol	1,347	1,611	1,724	1,816	2,316	2,320	3,134	2,491	2,545	3,056	3,893	4,623	4,460	4,584	4,724	4,245	4,607	5,285	5,066	4,052	3,873	3,599	4,708	4,702	4,918	5,031	5,044	8,253

Source : Oil companies

FIGURE 20: FINAL CONSUMPTION FOR PETROLEUM PRODUCTS



Source : Oil companies

NATURAL GAS

TABLE 6: 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	6.333	19.327	25.659	1,792.31
Sabah	1.487	11.060	12.547	883.71
Sarawak	1.508	43.184	44.692	4,124.69
Total	**9.327**	**73.570**	**82.897**	**6,800.71**

Notes : Refers to the amount of gas produced/generated from associated fields
1 cubic feet = 0.028317 cubic metre
Associated Gas: Natural gas produced in association with oil
Non-Associated Gas: Natural gas produced from a gas reservoir not associated with oil

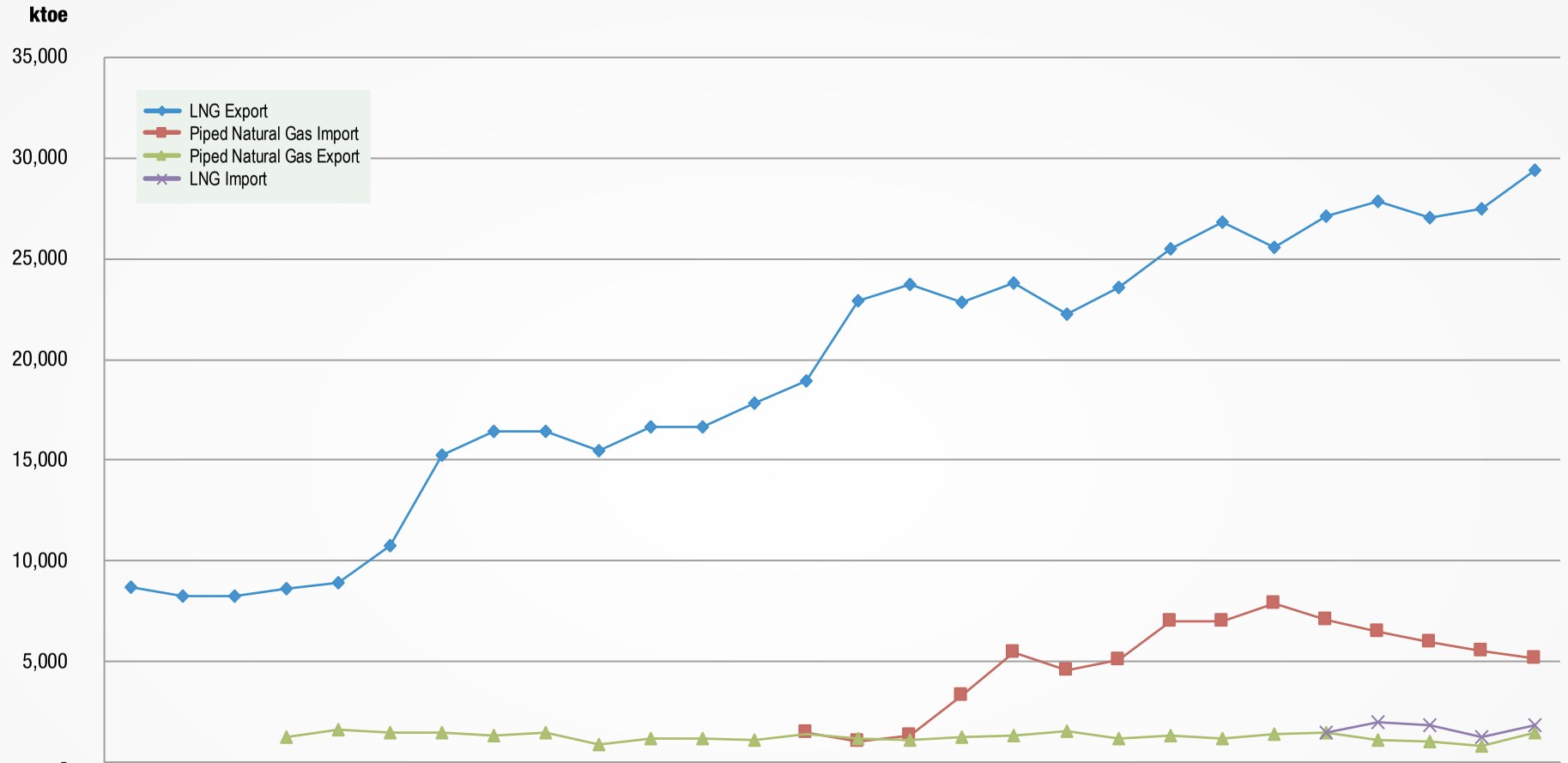
Source : PETRONAS

TABLE 7: CONSUMPTION OF NATURAL GAS IN MMSCF

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

Source : Power utilities, IPPs, PETRONAS and gas distribution companies

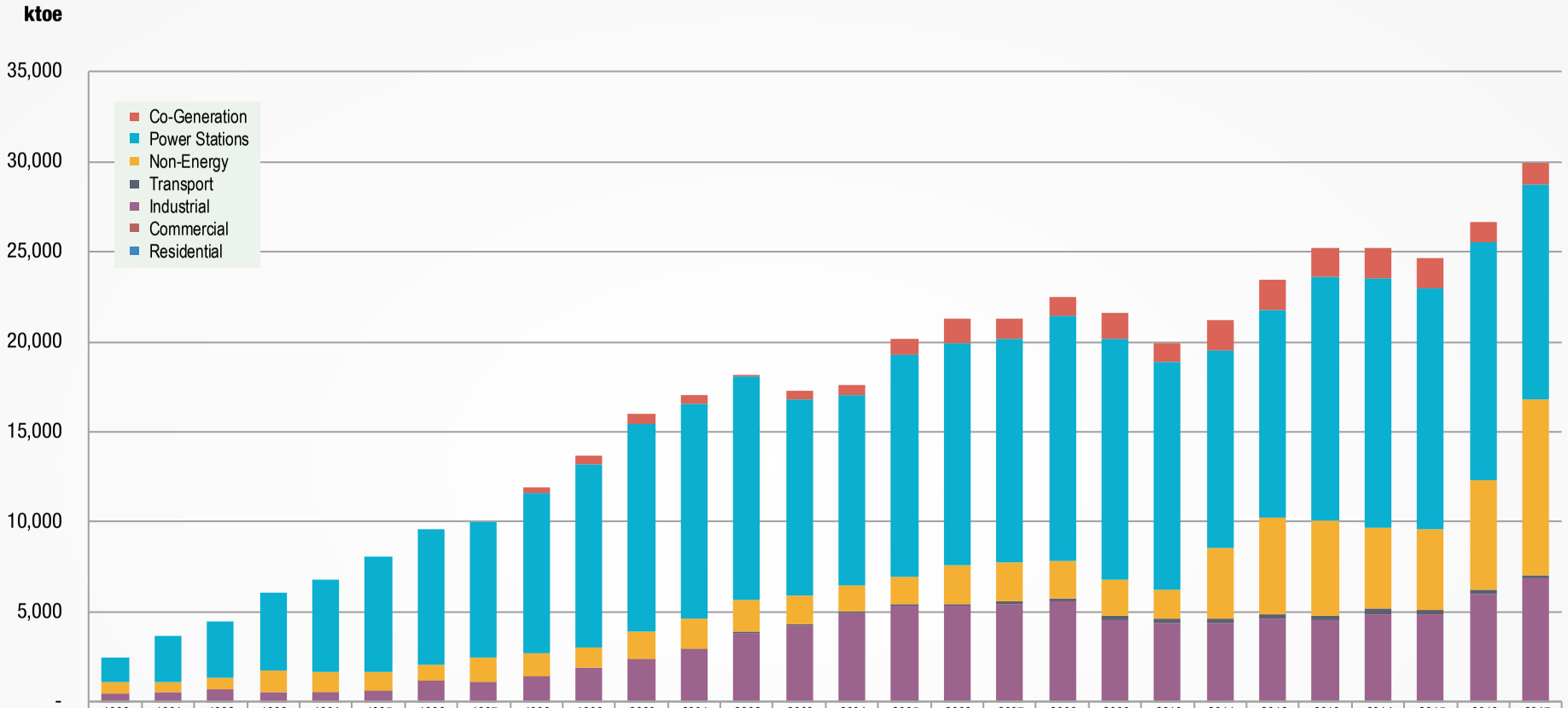
FIGURE 21: EXPORT AND IMPORT OF PIPED NATURAL GAS AND LNG



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
LNG Export	8,686	8,278	8,262	8,654	8,938	10,790	15,251	16,396	16,429	15,445	16,633	16,636	17,803	18,965	22,944	23,707	22,874	23,777	22,277	23,606	25,487	26,856	25,547	27,089	27,835	27,057	27,457	29,428
Piped Natural Gas Import	-	-	-	-	-	-	-	-	-	-	-	-	-	1,501	999	1,340	3,313	5,435	4,565	5,055	7,013	6,979	7,866	7,098	6,472	5,941	5,557	5,183
Piped Natural Gas Export	-	-	1	1,258	1,589	1,474	1,474	1,340	1,444	860	1,198	1,178	1,098	1,402	1,143	1,134	1,257	1,295	1,524	1,166	1,340	1,147	1,368	1,497	1,129	1,062	841	1,452
LNG Import	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,450	2,019	1,873	1,275	1,815

Source : Department of Statistics Malaysia, gas companies and others
Note : Measurement in ktoe is based on the Energy Commission's calculation

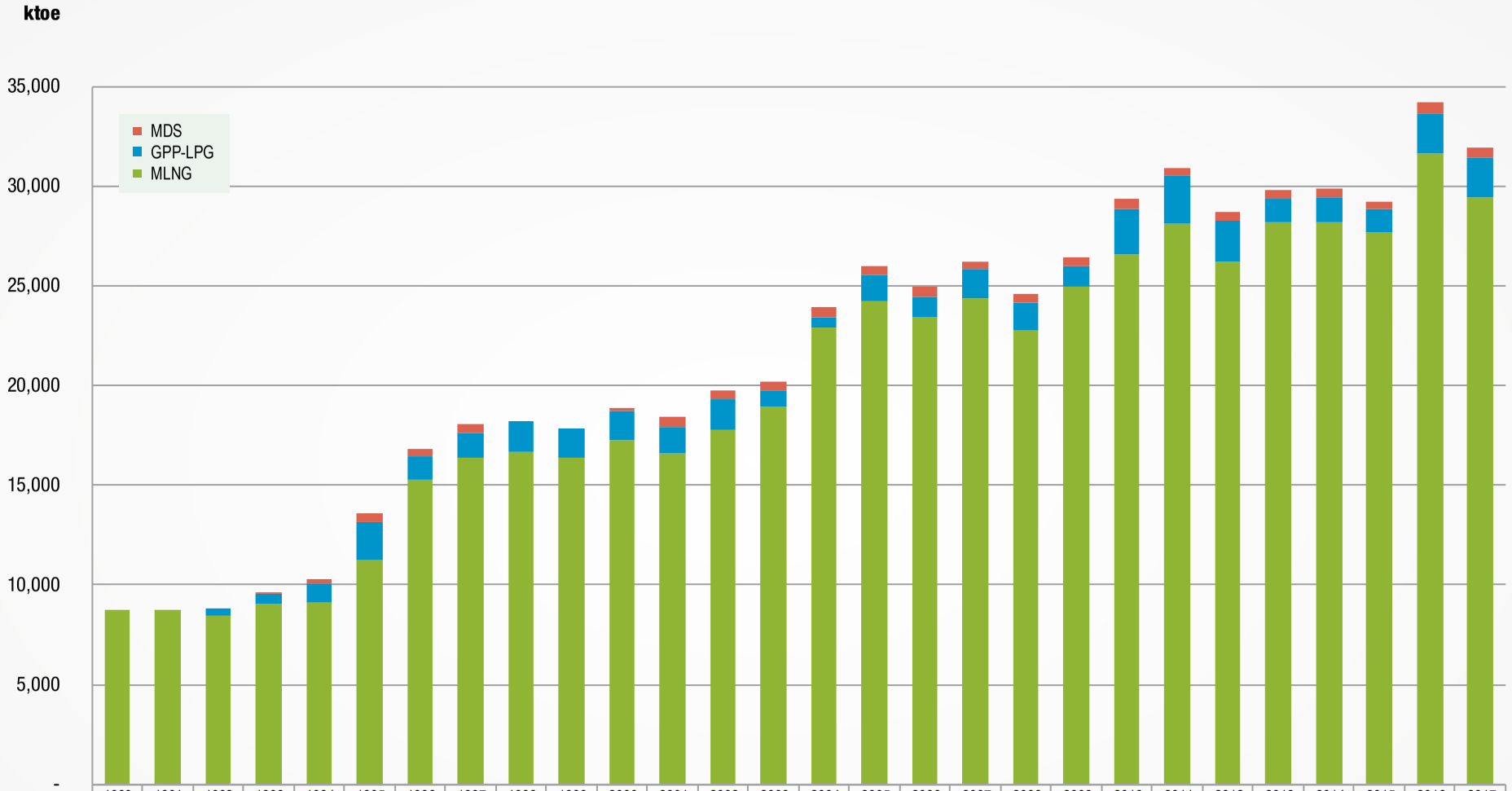
FIGURE 22: NATURAL GAS CONSUMPTION BY SECTOR



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Co-Generation	-	-	-	-	-	-	-	-	271	488	530	495	128	469	568	923	1,431	1,140	1,030	1,385	1,031	1,697	1,734	1,650	1,678	1,739	1,094	1,222
Power Stations	1,361	2,533	3,144	4,374	5,119	6,414	7,489	7,531	8,886	10,162	11,580	11,922	12,424	10,893	10,545	12,271	12,330	12,476	13,651	13,390	12,628	10,956	11,533	13,520	13,860	13,378	13,260	11,872
Non-Energy	609	604	657	1,141	1,163	1,064	870	1,378	1,282	1,118	1,512	1,655	1,775	1,616	1,476	1,541	2,110	2,112	2,046	1,995	1,661	3,967	5,336	5,276	4,472	4,470	6,083	9,837
Transport	-	-	-	-	5	5	4	5	4	-	7	14	28	40	54	95	120	147	194	236	247	272	292	289	276	264	208	148
Industrial	452	487	679	552	484	577	1,197	1,074	1,430	1,891	2,327	2,937	3,824	4,207	4,937	5,317	5,301	5,416	5,541	4,544	4,310	4,300	4,556	4,488	4,869	4,808	5,989	6,827
Commercial	4	4	4	4	4	4	4	4	6	9	12	10	11	18	18	23	24	28	31	25	30	32	22	22	22	24	24	25
Residential	4	4	4	4	4	4	4	4	4	5	4	4	4	5	5	5	5	6	6	2	6	7	1	1	1	1	1	1

Source: PETRONAS, Gas Companies, Power Utilities, IPPs and Self-Generation Plants

FIGURE 23: CONVERSION IN GAS PLANTS



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
MDS	-	-	-	39	238	421	344	389	-	-	164	513	445	443	513	460	464	417	481	426	454	359	486	478	420	423	573	509
GPP-LPG	-	-	392	529	948	1,900	1,212	1,258	1,526	1,472	1,482	1,310	1,504	790	520	1,319	1,036	1,483	1,362	1,012	2,299	2,434	2,035	1,174	1,250	1,155	1,997	1,961
MLNG	8,761	8,749	8,425	9,019	9,087	11,244	15,251	16,396	16,688	16,417	17,231	16,636	17,803	18,965	22,944	24,254	23,450	24,355	22,793	25,004	26,601	28,130	26,231	28,209	28,213	27,683	31,658	29,468

Note : MDS commenced pre-commercialization operation in year 2000
Source : Oil and gas companies

COAL

TABLE 8: RESOURCES AND PRODUCTION OF COAL AS OF 31st DECEMBER 2017

Location	Reserves (Million Tonnes)			Coal Type	Production
	Measured	Indicated	Inferred		(metric tonnes)
SARAWAK					
1. Abok & Silantek, Sri Aman	7.25	10.60	32.40	Coking Coal, Semi-Anthracite and Anthracite	
2. Merit-Pila, Kapit	170.26	107.02	107.84	Sub-Bituminous	938,021
3. Bintulu	6.00	0.00	14.00	Bituminous (partly coking coal)	
4. Mukah - Balingian	86.95	170.73	646.53	Lignite, Hydrous Lignite and Sub-Bituminous	2,050,191
5. Tutoh Area	5.58	34.66	162.33	Sub-Bituminous	
Subtotal	**276.04**	**323.01**	**963.10**		2,988,212
SABAH				Sub-Bituminous	
1. Silimpopon	4.80	14.09	7.70	Sub-Bituminous	
2. Labuan			8.90	Bituminous	
3. Maliau			215.00		
4. Malibau		17.90	25.00		
5. SW Malibau		23.23		Bituminous	
6. Pinangan West Middle Block			42.60		
Subtotal	**4.80**	**55.22**	**299.20**		
SELANGOR					
1. Batu Arang			17.00	Sub-Bituminous	
Subtotal	**0.00**	**0.00**	**17.00**		
Total	**280.84**	**378.23**	**1,279.30**		**2,988,212**

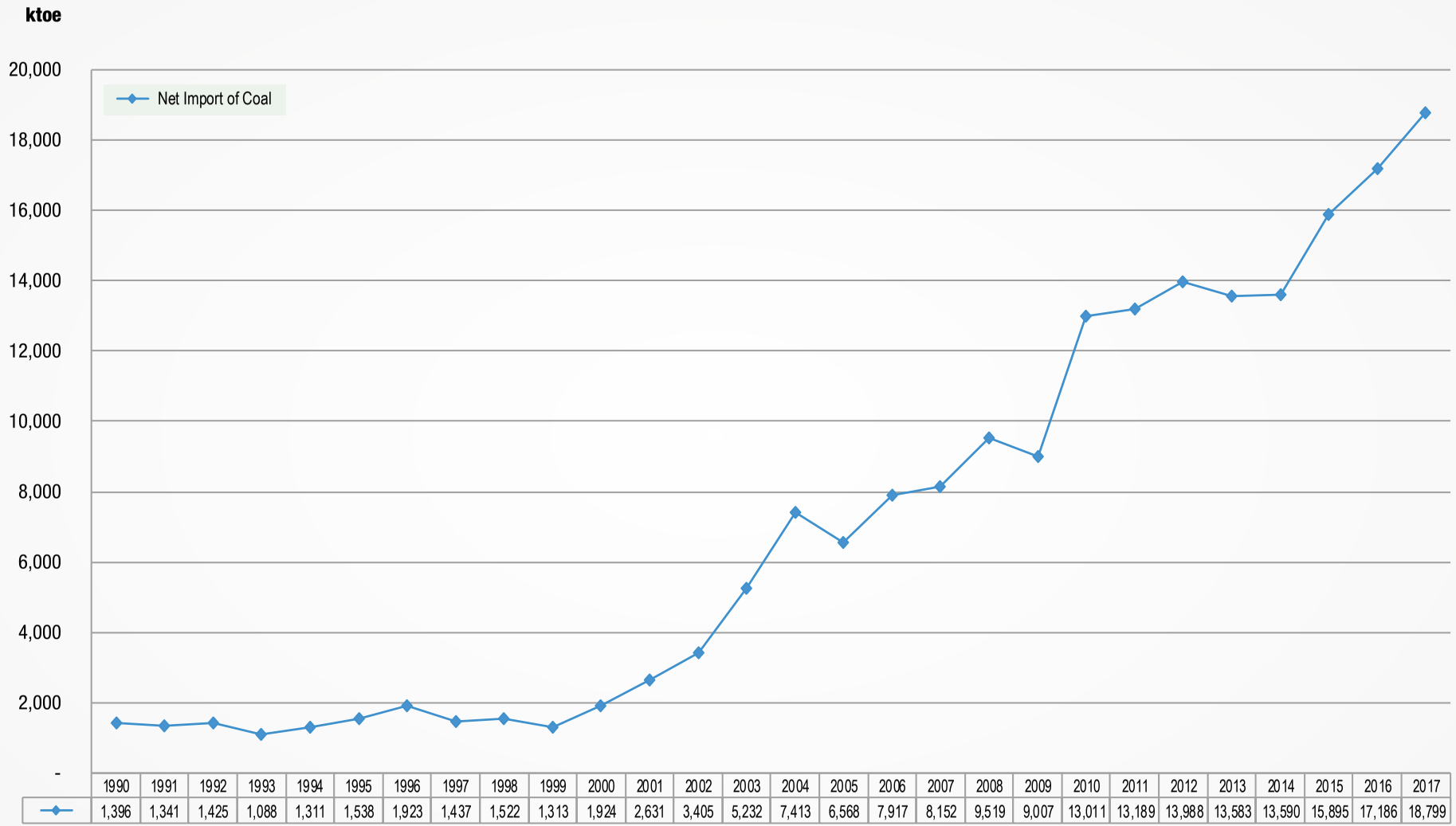
Source : Department of Mineral and Geosciences Malaysia

TABLE 9: CONSUMPTION OF COAL IN METRIC TONNES

Sectors	Peninsular Malaysia	Sabah	Sarawak	Malaysia
Industry	2,720,888	-	140,386	2,861,274
Power Stations	27,719,826	-	2,191,785	29,911,611
Total	**30,440,714**	**0**	**2,332,171**	**32,772,885**

Source : Power Utilities, IPPs, cement, iron and steel manufacturers

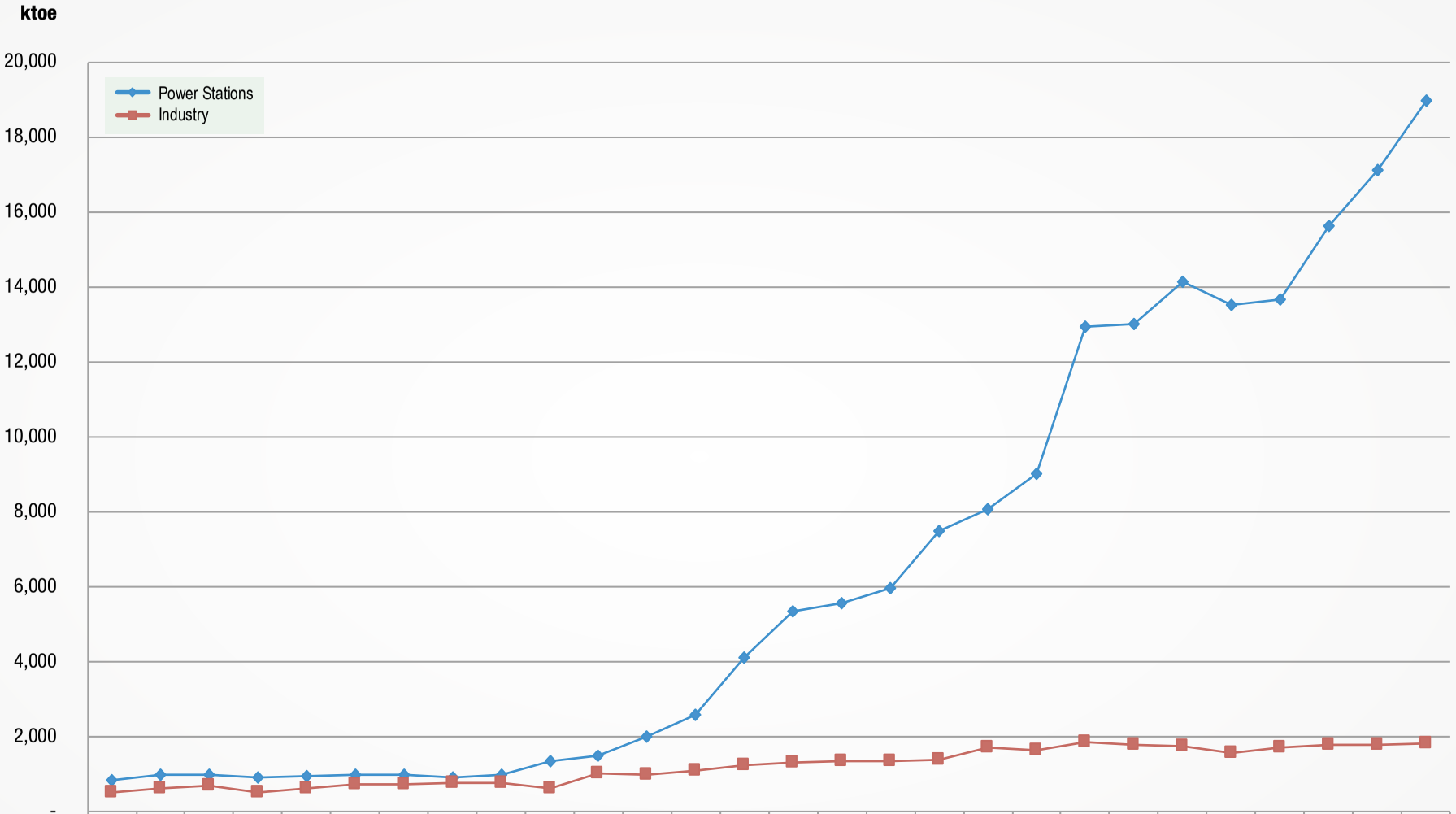
FIGURE 24: NET IMPORT OF COAL



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Net Import of Coal	1,396	1,341	1,425	1,088	1,311	1,538	1,923	1,437	1,522	1,313	1,924	2,631	3,405	5,232	7,413	6,568	7,917	8,152	9,519	9,007	13,011	13,189	13,988	13,583	13,590	15,895	17,186	18,799

Source: Department of Statistics Malaysia, Power Utilities, IPPs, cement, iron and steel manufacturers
Note: Measurement in ktoe is based on the Energy Commission's calculation

FIGURE 25: COAL CONSUMPTION BY SECTOR



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Power Stations	813	963	968	884	925	957	950	882	964	1,332	1,495	1,994	2,556	4,104	5,327	5,541	5,964	7,486	8,069	9,010	12,951	13,013	14,138	13,527	13,648	15,627	17,101	18,967
Industry	513	599	672	487	598	712	727	740	767	608	991	977	1,086	1,212	1,305	1,348	1,335	1,361	1,713	1,613	1,826	1,759	1,744	1,539	1,709	1,778	1,785	1,804

Source: Power Utilities, IPPs, cement, iron and steel manufacturers

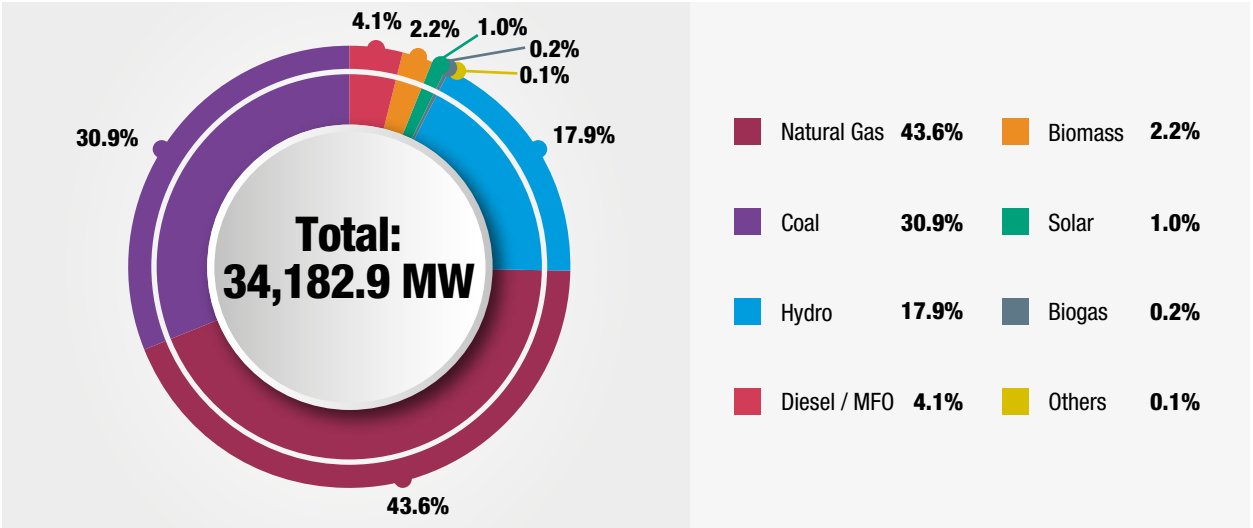
ELECTRICITY

TABLE 10: INSTALLED CAPACITY AS OF 31st DECEMBER 2017, IN MW

		Hydro	Natural Gas	Coal	Diesel / MFO	Biomass	Solar	Biogas	Others	Total
Peninsular Malaysia	TNB	2,554.1	2,531.0	0.0	0.0	0.0	0.0	0.0	0.0	**5,085.1**
	IPPs	0.0	9,225.8	10,066.0	0.0	0.0	0.0	0.0	0.0	**19,291.8**
	Co-Generation	0.0	924.8	0.0	79.2	12.4	0.0	0.0	25.0	**1,041.4**
	Self-Generation	2.1	0.0	0.0	399.0	351.8	1.0	4.9	0.0	**758.8**
	FiT	23.8	0.0	0.0	0.0	39.0	317.1	46.2	0.0	**426.1**
	Subtotal	**2,580.0**	**12,681.6**	**10,066.0**	**478.2**	**403.2**	**318.1**	**51.1**	**25.0**	**26,603.2**
Sabah	SESB	82.1	112.0	0.0	172.9	0.0	0.0	0.0	0.0	**367.0**
	IPPs	0.0	1,012.6	0.0	101.9	0.0	0.0	0.0	0.0	**1,114.5**
	Co-Generation	0.0	106.8	0.0	0.0	116.2	0.0	0.0	0.0	**223.0**
	Self-Generation	0.0	0.0	0.0	526.8	130.4	0.1	8.8	0.0	**666.1**
	FiT	6.5	0.0	0.0	0.0	48.9	36.9	9.6	0.0	**101.9**
	LSS	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	**2.0**
	Subtotal	**88.6**	**1,231.4**	**0.0**	**801.6**	**295.5**	**39.0**	**18.4**	**0.0**	**2,474.5**
Sarawak	SEB	3,459.5	594.6	480.0	114.0	0.0	0.5	0.0	0.0	**4,648.6**
	Co-Generation	0.0	389.0	0.0	0.0	0.0	0.0	0.0	0.0	**389.0**
	Self-Generation	0.0	0.0	0.0	12.6	49.5	0.0	0.5	5.1	**67.6**
	Subtotal	**3,459.5**	**983.6**	**480.0**	**126.6**	**49.5**	**0.5**	**0.5**	**5.1**	**5,105.2**
Total		**6,128.1**	**14,896.6**	**10,546.0**	**1,406.4**	**748.2**	**357.6**	**70.0**	**30.1**	**34,182.9**
Share (%)		**17.9%**	**43.6%**	**30.9%**	**4.1%**	**2.2%**	**1.0%**	**0.2%**	**0.1%**	**100.00%**

Source : Power Utilities, IPPs and SEDA Malaysia
Note : Exclude plants that are not in operation

FIGURE 26: INSTALLED CAPACITY AS OF 31st DECEMBER 2017



Source : Power Utilities and IPPs

TABLE 11: AVAILABLE CAPACITY AS OF 31ST DECEMBER 2017, IN MW

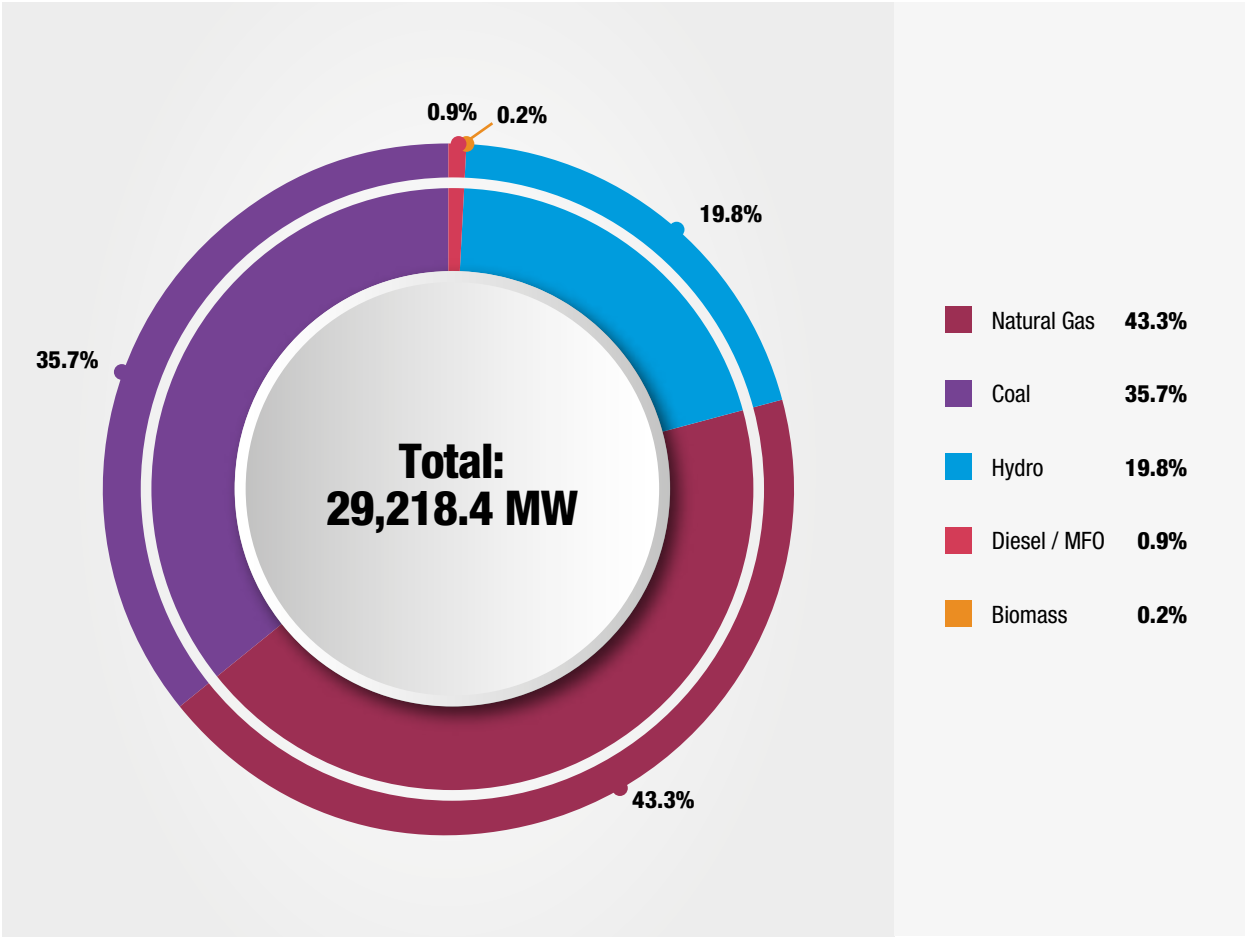
		Hydro	Natural Gas	Coal	Diesel / MFO	Biomass	Total
Peninsular Malaysia	TNB	2,514.8	2,527.0	0.0	0.0	0.0	**5,041.8**
	IPPs	0.0	8,602.7	10,066.0	0.0	0.0	**18,668.7**
	Subtotal	**2,514.8**	**11,129.7**	**10,066.0**	**0.0**	**0.0**	**23,710.5**
Sabah	SESB	74.6	103.4	0.0	141.1	0.0	**319.1**
	IPPs	0.0	865.0	0.0	36.0	0.0	**901.0**
	FiT	6.5	0.0	0.0	0.0	48.9	**55.4**
	Subtotal	**81.1**	**968.4**	**0.0**	**177.1**	**48.9**	**1,275.5**
Sarawak	SEB	3,202.0	566.0	378.0	86.5	0.0	**4,232.5**
	Subtotal	**3,202.0**	**566.0**	**378.0**	**86.5**	**0.0**	**4,232.5**
Total		**5,797.9**	**12,664.1**	**10,444.0**	**263.6**	**48.9**	**29,218.4**

Note : 1. Available Capacity for Peninsular Malaysia is based on Tested Annual Available Capacity (TAAC),
2. Available Capacity for Sabah is based on Dependable Capacity
3. Bakun hydro acquisition by SEB in Q3 2017

Source : Power Utilities and IPPs

FIGURE 27: AVAILABLE CAPACITY AS OF 31ST DECEMBER 2017

Availaible Capacity as of 31st December 2017



Source : Power Utilities and IPPs

TABLE 12: INSTALLED CAPACITY OF MAJOR HYDRO POWER STATIONS

Station	Installed Capacity (MW)	Total (MW)
Peninsular Malaysia		
1. Terengganu		
- Stesen Janakuasa Sultan Mahmud Kenyir	4 x 100	400.0
- Stesen Janakuasa Hulu Terengganu	2 x 125	250.0
- Stesen Janakuasa Tembat	1 x 15	15.0
2. Perak		
- Stesen Janakuasa Temenggor	4 x 87	348.0
- Stesen Janakuasa Bersia	3 x 24	72.0
- Stesen Janakuasa Kenering	3 x 40	120.0
- Stesen Janakuasa Chenderoh	3 x 10.7 + 1 x 8.4	40.5
- Stesen Janakuasa Sg. Piah Hulu	2 x 7.3	14.6
- Stesen Janakuasa Sg. Piah Hilir	2 x 27	54.0
3. Pahang		
- Stesen Janakuasa Sultan Yussuf, Jor	4 x 25	100.0
- Stesen Janakuasa Sultan Idris II, Woh	3 x 50	150.0
- Stesen Janakuasa Ulu Jelai	2 x 186	372.0
- Cameron Highland Scheme		11.9
4. Kelantan		
- Pergau	4 x 150	600.0
Subtotal		**2,548.0**
Sabah		
- Tenom Pangi	3 x 25	75.0
Subtotal		**75.0**
Sarawak		
- Batang Ai	4 x 27	108.0
- Bakun	8 x 300	2,400.0
- Murum	4 x 236	944.0
Subtotal		**3,452.0**
Total		**6,060.0**

Source : TNB, SESB and SEB
Note : Exclude plants that are not in operation or in rehabilitation.
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TABLE 13: INSTALLED CAPACITY OF MINI HYDRO POWER STATIONS

Station	Total (MW)
1. Kedah	
- Sg Tawar Besar	0.55
- Sg Mempelam	0.38
- Sg Mahang	0.45
2. Perak	
- Sg Tebing Tinggi	0.15
- Sg Asap	0.11
- Sg Kinjang	0.33
- Sg Bil	0.23
- Sg Kenas	0.50
- Sg Chempias	0.12
3. Pahang	
- Sg Perdak	0.27
4. Kelantan	
- Sg Renyok G1	0.80
- Sg Renyok G2	0.80
- Sg Sok	0.56
5. Terengganu	
- Sg Berang	0.36
- Sg Cheralak	0.48
Sub Total	**6.09**
Sabah	
- Sayap (Kota Belud)	1.00
- Bombalai (Tawau)	1.00
- Merotai (Tawau)	1.00
- Kiau (Kota Belud)	0.35
- Naradau (Ranau)	1.76
- Carabau (Ranau)	2.00
Sub Total	**7.11**
Sarawak	
- Sg Pasir	0.80
- Penindin	0.30
- Sebako	0.30
- Lundu	0.30
- Kalamuku 1	0.50
- Kalamuku 2	0.50
- Sg Keijin	0.48
- Sg Kota	4.00
- Long Banga*	0.32
Sub Total	**7.50**
Total	**20.70**

Source : TNB, SESB and SEB
Notes : 1. * Micro hydro Project Long Banga owned by SEB
2. Exclude plants that are not in operation or in rehabilitation.

TABLE 14: TRANSMISSION NETWORK IN CIRCUIT KILOMETRES, CCT-KM

Utility	500 KV	275 KV	132 KV	66 KV
TNB	784	9,637	12,420	-
SESB	-	598	2,075	119
SEB	754	2,761	826	-

Source : TNB, SESB and SEB

TABLE 15: DISTRIBUTION NETWORK IN CIRCUIT KILOMETRES, CCT-KM

Utility	Overhead Lines	Underground Cables
TNB	339,793	305,464
SESB	9,026	791
SEB	11,998	5,175

Source : TNB, SESB and SEB

TABLE 16: GROSS GENERATION, CONSUMPTION, AVAILABLE CAPACITY, PEAK DEMAND AND RESERVE MARGIN FOR ELECTRICITY IN MALAYSIA

Region	Electricity Gross Generation		Electricity Consumption		Available Capacity[2]	Peak Demand	Reserve Margin
	GWh	%	GWh	%	MW	MW	%
Peninsular Malaysia	127,236	79.6	116,273	78.0	23,711	17,790	35.5
Sabah[1]	6,557	16.2	5,548	3.7	1,276	938	36.0
Sarawak	26,841	4.2	24,703	18.3	4,233	3,302[3]	28.2
Total	**160,634**	**100.0**	**146,524**	**100.0**	**29,229**		

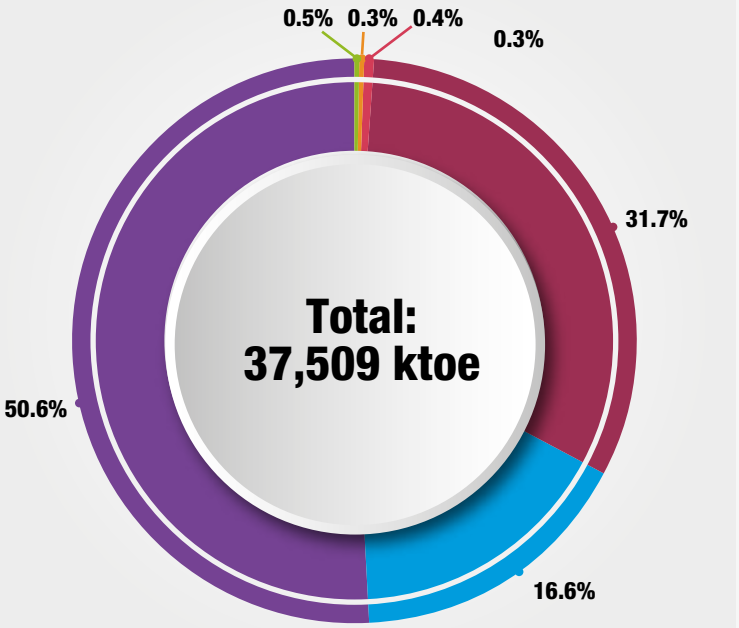
Source : TNB and IPPs, SESB and SEB

Notes : 1. Most diesel units in SESB are aged sets hence they are derated due to thermal limitations. However, during operational state, some generating units are not available due to maintenance outages as well as random breakdowns; the actual operation capacity available to system operation for dispatch was very limited.

2. Available Capacity for Peninsular Malaysia was based on Tested Annual Available Capacity (TAAC), Available Capacity for Sabah is based on Dependable Capacity

3. Peak demand for Sarawak is the co-incidental peak

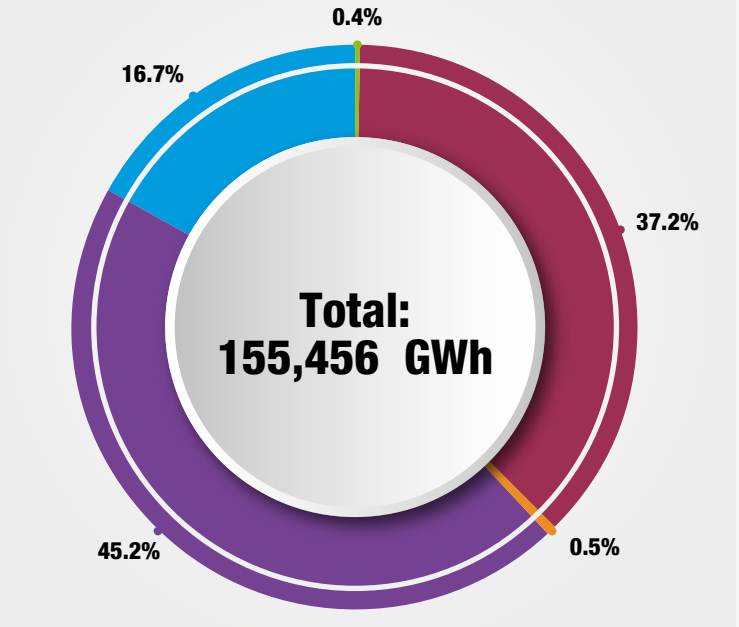
FIGURE 28: ENERGY INPUT IN POWER STATIONS, 2017



Coal	50.6%
Natural Gas	31.7%
Hydro	16.6%
Renewables	0.5%
Diesel Oil	0.4%
Fuel Oil	0.3%

Note : Figures exclude fuel consumption for self-generation plants
Source : Power utilities and IPPs

FIGURE 29: GENERATION MIX BY FUEL TYPES, 2017



Coal	44.3%
Natural Gas	37.4%
Hydropower	17.3%
Oil	0.5%
Renewables	0.4%

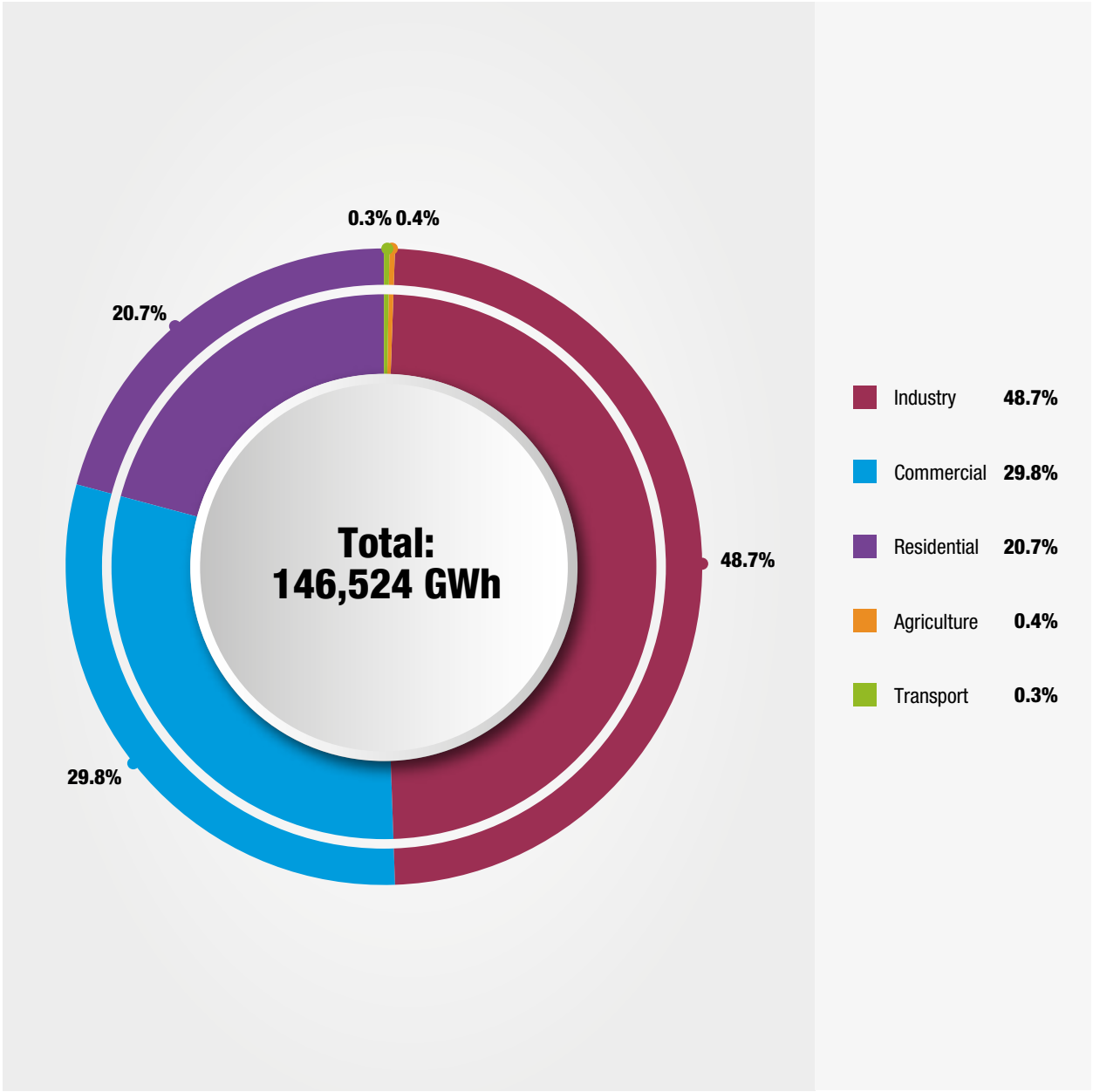
Note : Figures exclude electricity generation for self-generation plants
Source : Power utilities and IPPs

TABLE 17: ELECTRICITY CONSUMPTION BY SECTOR IN GWh, 2017

Region	Industry		Commercial		Residential		Transport		Agriculture		Total
	GWh	%	GWh	%	GWh	%	GWh	%	GWh	%	
Peninsular Malaysia	50,082	70.1%	38,838	88.8%	26,310	86.7%	459	100.0%	584	100.0%	116,273
Sarawak	19,904	27.9%	2,562	5.9%	2,237	7.4%	-	0.0%	-	0.0%	24,703
Sabah	1,431	2.0%	2,324	5.3%	1,793	5.9%	-	0.0%	-	0.0%	5,548
Total	**71,417**	**100.0%**	**43,724**	**100.0%**	**30,340**	**100.0%**	**459**	**100.0%**	**584**	**100.0%**	**146,524**

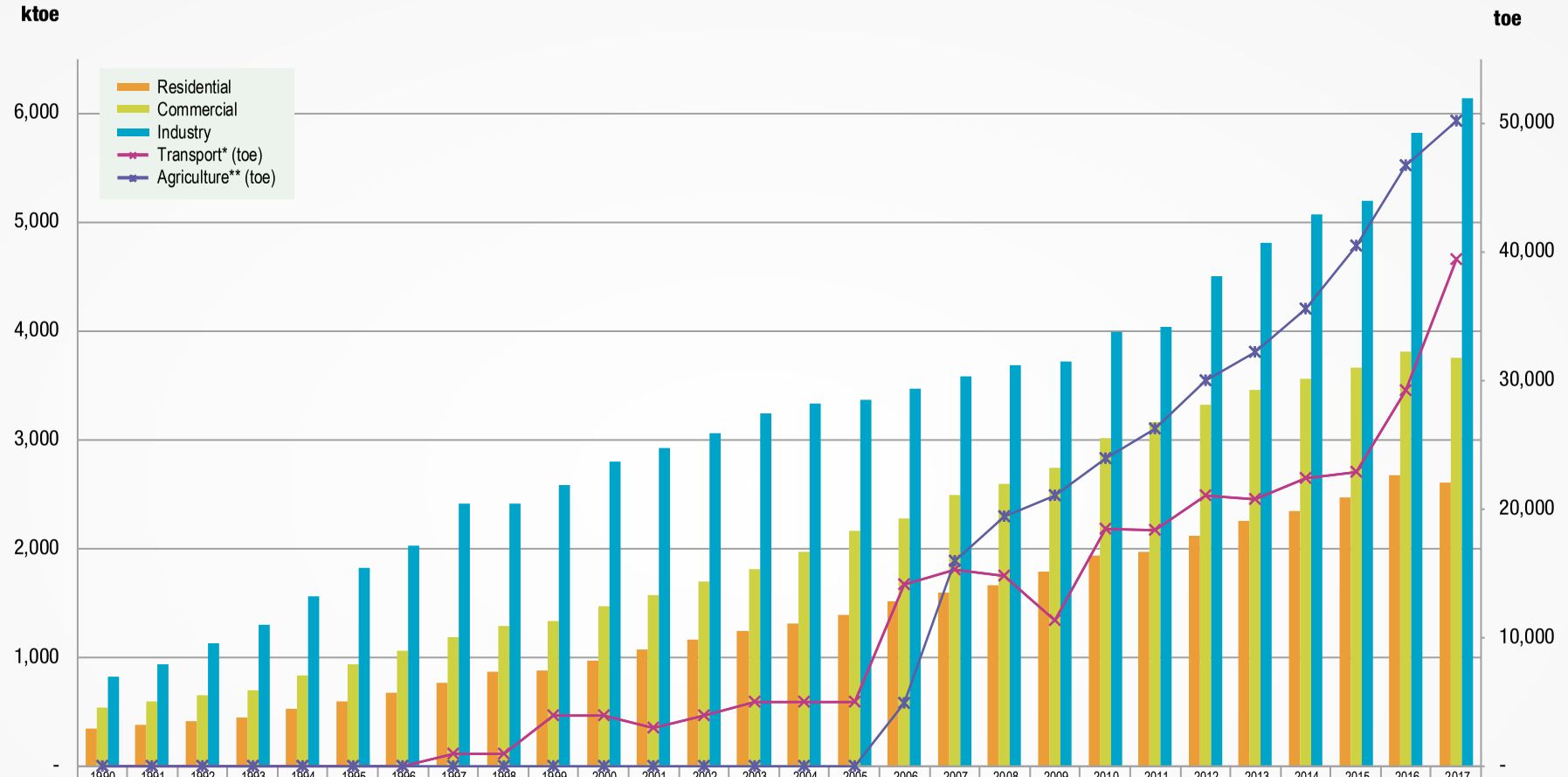
Source : Power utilities, IPPs and Self-Generators

FIGURE 30: ELECTRICITY CONSUMPTION BY SECTOR, 2017



Source : TNB, SESB and SEB

FIGURE 31: ELECTRICITY CONSUMPTION BY SECTOR



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Residential	345	385	422	447	532	604	681	770	874	885	975	1,081	1,161	1,248	1,319	1,395	1,515	1,598	1,668	1,792	1,937	1,974	2,126	2,262	2,346	2,471	2,678	2,610
Commercial	540	603	659	700	833	945	1,066	1,191	1,291	1,335	1,478	1,579	1,698	1,818	1,979	2,172	2,277	2,496	2,598	2,743	3,020	3,172	3,325	3,466	3,566	3,663	3,816	3,762
Industry	830	937	1,137	1,303	1,567	1,826	2,029	2,422	2,411	2,591	2,805	2,930	3,059	3,242	3,340	3,371	3,475	3,587	3,687	3,719	3,994	4,045	4,509	4,818	5,072	5,200	5,822	6,145
Transport* (toe)	-	-	-	-	-	-	-	1,000	1,000	4,000	4,000	3,000	4,000	5,000	5,000	5,000	14,117	15,295	14,862	11,358	18,439	18,428	21,027	20,774	22,443	22,901	29,291	39,451
Agriculture** (toe)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4,886	15,991	19,393	21,080	23,920	26,312	30,014	32,240	35,578	40,526	46,747	50,228

Source: TNB, SEB, SESB, Co-Generators and Land Public Transport Commission
Note (*): From 2006 until 2014 data were collected directly from train operators
(**): Effective from 1st June 2006, TNB has introduced Specific Agriculture Tariff; previously Agriculture was under the Commercial Tariff

TABLE 18: ELECTRICITY GENERATION AND INSTALLED CAPACITY OF RENEWABLE ENERGY BY PUBLIC LICENSEES BY REGION IN 2017

Region	Type of Prime Mover	Installed Capacity (MW)	Unit Generated (MWh)
Peninsular Malaysia	Major Hydro - TNB	2,548.0	7,088,630
	Mini Hydro - FiT	23.8	53,713
	Mini Hydro - Cameron Highlands Scheme	11.9	36,510
	Mini Hydro - TNB	6.2	5,653
	Solar - FiT	317.1	286,187
	Solar - Non-FiT	0.5	144
	Biogas - FiT	46.2	103,448
	Biomass - FiT	39.0	77,321
	Subtotal	**2,992.7**	**7,651,606**
Sabah	Major Hydro - SESB	75.0	306,910
	Mini Hydro-SESB	7.1	15,016
	Mini Hydro - FiT	6.5	10,876
	Solar - FiT	36.9	43,842
	Biogas - FiT	9.6	38,835
	Biomass - FiT	48.9	108,153
	Biomass - Co-Gen	29.2	25,210
	Subtotal	**213.2**	**548,842**
Sarawak	Major Hydro - SEB	3,452.0	19,320,000
	Mini Hydro -SEB	7.5	2,700
	Solar	0.5	120
	Subtotal	**3,460.0**	**19,322,820**
Grand Total		**6,665.9**	**27,523,268**

Source : Energy Commission, TNB, SESB, SEB, Ministry of Public Utilities Sarawak and SEDA Malaysia
Note : 1. Public Licencees are the licensees that generates electricity for self consumption as well as to supply to other parties

TABLE 19: ELECTRICITY GENERATION AND INSTALLED CAPACITY OF RENEWABLE ENERGY BY PRIVATE LICENSEES BY REGION IN 2017

Region	Type of Prime Mover	Installed Capacity (MW)	Unit Generated (MWh)
Peninsular Malaysia	Biomass - Co-Gen	7.5	7,590
	Biomass - Self-Gen	351.8	102,620
	Biogas - Self-Gen	4.9	7,140
	Solar - Self-Gen	1.0	120
	Mini Hydro - Self-Gen	2.1	5,280
	Subtotal	**367.3**	**122,750**
Sabah	Biomass - Co-Gen	7.5	24,580
	Biomass - Self-Gen	130.4	191,050
	Biogas - Self-Gen	8.8	4,720
	Subtotal	**146.7**	**220,350**
Sarawak	Biomass - Self-Gen	53.5	74,780
	Biogas - Self-Gen	0.5	-
	Subtotal	**54.0**	**74,780**
Grand Total		**567.9**	**417,880**

Source : Energy Commission, TNB, SESB, SEB and Ministry of Public Utilities Sarawak
Note : 1. Private Licencees are the licensees that generates electricity for self-consumption only


IDEA
BUSINESS
TECHNOLOGY
MARKET
DIGITAL
CONNECT

KEY ENERGY STATISTICS

TABLE 20: PRIMARY ENERGY SUPPLY IN KTOE

	Crude Oil	Petroleum Products & Others	Natural Gas	Coal and Coke	Hydropower & Renewables	Total	Annual Growth Rate (%)	Share (%)			
								Crude Oil and Petroleum Products & Others	Natural Gas	Coal and Coke	Hydropower & Renewables
1990	8,783	3,145	6,801	1,326	915	20,970	8.9	56.9	32.4	6.3	4.4
1991	9,443	4,163	10,112	1,564	1,053	26,335	25.6	51.7	38.4	5.9	4.0
1992	10,175	5,098	11,381	1,640	997	29,291	11.2	52.1	38.9	5.6	3.4
1993	10,135	5,816	11,360	1,352	1,262	29,925	2.2	53.3	38.0	4.5	4.2
1994	13,605	2,450	12,392	1,563	1,652	31,662	5.8	50.7	39.1	4.9	5.2
1995	16,159	608	13,960	1,612	1,540	33,879	7.0	49.5	41.2	4.8	4.5
1996	18,255	1,098	15,567	1,677	1,243	37,840	11.7	51.1	41.1	4.4	3.3
1997	17,917	3,803	19,041	1,622	790	43,173	14.1	50.3	44.1	3.8	1.8
1998	17,132	1,919	19,101	1,731	1,113	40,996	(5.0)	46.5	46.6	4.2	2.7
1999	17,643	1,807	21,476	1,940	1,668	44,534	8.6	43.7	48.2	4.4	3.7
2000	21,673	(1,431)	26,370	2,486	1,612	50,710	13.9	39.9	52.0	4.9	3.2
2001	23,590	(1,917)	25,649	2,970	1,687	51,979	2.5	41.7	49.3	5.7	3.2
2002	22,647	(523)	26,101	3,642	1,329	53,196	2.3	41.6	49.1	6.8	2.5
2003	25,344	(1,408)	27,257	5,316	1,056	57,565	8.2	41.6	47.3	9.2	1.8
2004	25,335	(82)	29,145	7,109	1,329	62,836	9.2	40.2	46.4	11.3	2.1
2005	24,339	(243)	33,913	6,889	1,313	66,211	5.4	36.4	51.2	10.4	2.0
2006	24,910	(1,671)	34,917	7,299	1,567	67,022	1.2	34.7	52.1	10.9	2.3
2007	26,571	(1,190)	36,639	8,848	1,522	72,390	8.0	35.1	50.6	12.2	2.1
2008	26,776	(1,780)	39,289	9,782	1,964	76,031	5.0	32.9	51.7	12.9	2.6
2009	26,386	96	35,851	10,623	1,627	74,583	(1.9)	35.5	48.1	14.2	2.2
2010	22,487	2,521	35,447	14,777	1,577	76,809	3.0	32.6	46.1	19.2	2.1
2011	24,679	2,224	35,740	14,772	1,874	79,289	3.2	33.9	45.1	18.6	2.4
2012	28,053	1,449	38,647	15,882	2,463	86,494	9.1	34.1	44.7	18.4	2.8
2013	27,154	5,320	39,973	15,067	3,216	90,730	4.9	35.8	44.1	16.6	3.5
2014	26,765	6,658	40,113	15,357	3,594	92,487	1.9	36.1	43.4	16.6	3.9
2015	24,971	4,865	41,853	17,406	3,582	92,677	0.2	32.2	45.2	18.8	3.9
2016	27,757	3,570	41,257	18,744	5,198	96,525	4.2	32.5	42.7	19.4	5.4
2017	27,471	1,909	41,200	20,771	6,947	98,298	1.8	29.9	41.9	21.1	7.1

TABLE 21: NET IMPORT AND EXPORT OF ENERGY IN KTOE

	Net Export of Crude Oil	Net Export of LNG	Net Export of Natural Gas	Net Export of Electricity	Net Import of Petroleum products	Net Import of Coal and Coke
1990	21,902	8,686	-	5	2,618	1,396
1991	22,200	8,278	-	2	3,456	1,341
1992	22,215	8,262	1	2	3,986	1,425
1993	20,063	8,654	1,258	(2)	4,328	1,088
1994	18,160	8,928	1,589	(4)	2,398	1,311
1995	18,518	10,790	1,474	2	150	1,538
1996	16,859	15,251	1,474	1	778	1,923
1997	16,022	16,396	1,340	(1)	2,491	1,437
1998	16,626	16,429	1,444	(1)	2,164	1,522
1999	16,274	15,445	1,177	-	1,196	1,313
2000	10,036	16,633	1,198	-	(1,914)	1,924
2001	9,128	16,636	1,163	-	(2,019)	2,631
2002	11,017	17,803	1,098	3	(936)	3,405
2003	10,826	18,965	(99)	17	(1,856)	5,232
2004	11,292	22,944	144	45	68	7,413
2005	10,963	22,299	(206)	192	(474)	6,568
2006	9,342	22,873	(2,404)	200	(1,798)	7,917
2007	7,509	23,777	(4,140)	195	(1,329)	8,152
2008	6,482	22,277	(3,041)	41	(1,609)	9,519
2009	6,517	23,606	(3,889)	8	(1,177)	9,007
2010	9,365	26,857	(4,183)	(32)	1,930	13,011
2011	2,300	26,856	(5,832)	(31)	2,159	13,189
2012	1,993	25,547	(6,498)	(7)	2,458	13,988
2013	1,684	25,639	(5,602)	(16)	7,400	13,583
2014	2,051	25,816	(5,343)	-	5,611	13,590
2015	7,696	25,184	(4,879)	(1)	3,998	15,895
2016	5,751	26,182	(4,716)	57	3,128	17,186
2017	4,823	27,613	(3,731)	96	2,189	18,799

TABLE 22: CONVERSION IN GAS PLANTS IN KTOE

	Input	Gas Plants			
	Natural Gas	MLNG	GPP - LPG	MDS	RGT
1990	9,797	8,761	na	na	na
1991	11,715	8,749	na	na	na
1992	11,681	8,425	392	na	na
1993	13,005	9,019	529	39	na
1994	14,634	9,087	948	238	na
1995	17,088	11,244	1,900	421	na
1996	20,822	15,251	1,212	344	na
1997	24,945	16,396	1,258	389	na
1998	23,138	16,688	1,526	na	na
1999	24,116	16,417	1,472	na	na
2000	26,093	17,231	1,482	164	na
2001	25,703	16,636	1,310	513	na
2002	25,571	17,803	1,504	445	na
2003	27,940	18,965	790	443	na
2004	33,176	22,944	520	513	na
2005	36,447	24,254	1,319	460	na
2006	35,378	23,450	1,036	464	na
2007	38,141	24,355	1,483	417	na
2008	38,193	22,793	1,362	481	na
2009	37,098	25,004	1,012	426	na
2010	40,246	26,601	2,299	454	na
2011	40,737	28,130	2,434	359	na
2012	40,042	26,231	2,035	486	na
2013	39,678	28,209	1,174	478	na
2014	39,193	28,213	1,250	420	na
2015	40,773	27,722	1,155	423	1,873
2016	39,665	31,658	1,997	573	1,277
2017	38,296	29,468	1,961	509	1,815

Note : 1.na means not applicable
2.Middle Distillate Synthesis (MDS) commenced pre-commercialization operation in year 2000
3.MLNG plant produced LPG in the year 2003

TABLE 23: CONVERSION IN REFINERIES IN KTOE

	Input:			Output								
	Local Crude Oil	Imported Crude Oil & Other	Total Input	Petrol	Diesel	Fuel Oil	Kerosene	ATF & AV GAS	LPG	Non-Energy	Refinery Gas	Total Output
1990	8,072	2,342	10,414	1,347	3,350	3,106	491	360	613	561	151	9,979
1991	8,476	2,113	10,589	1,611	3,681	2,547	526	390	548	772	168	10,243
1992	9,016	1,409	10,425	1,724	4,048	2,110	541	412	200	324	143	9,502
1993	8,502	3,195	11,697	1,816	4,249	2,375	576	517	244	600	106	10,483
1994	12,326	1,853	14,179	2,316	5,108	2,887	563	980	319	1,468	162	13,803
1995	15,991	969	16,960	2,320	6,011	2,212	360	1,587	431	3,380	385	16,686
1996	15,879	3,501	19,380	3,134	6,174	3,696	292	1,899	371	2,554	331	18,451
1997	16,382	3,224	19,606	2,491	6,744	2,716	265	2,000	371	1,783	203	16,573
1998	15,942	1,347	17,289	2,545	5,926	3,233	285	1,985	449	2,117	192	16,732
1999	14,595	4,437	19,032	3,056	6,712	2,603	210	2,140	617	2,159	230	17,727
2000	15,421	6,743	22,164	3,893	8,059	2,532	239	2,660	838	2,492	241	20,954
2001	13,299	10,546	23,845	4,623	8,462	2,269	283	2,954	875	3,020	331	22,817
2002	14,838	8,032	22,870	4,460	8,401	2,332	414	2,570	897	2,127	294	21,495
2003	17,127	8,322	25,449	4,584	9,062	1,763	983	2,367	932	2,623	262	22,576
2004	16,810	8,764	25,574	4,724	9,611	1,813	591	2,693	897	2,455	215	22,999
2005	18,216	6,271	24,487	4,245	9,161	1,777	521	2,553	822	2,157	202	21,438
2006	16,797	8,113	24,910	4,607	8,752	1,933	537	2,938	1,118	2,750	849	23,484
2007	17,320	9,251	26,571	5,285	9,033	1,990	234	3,138	1,228	3,461	938	25,307
2008	18,638	8,138	26,776	5,066	9,364	1,994	245	3,139	1,208	4,475	991	26,482
2009	20,685	5,812	26,497	4,052	9,415	1,144	565	3,085	732	5,905	195	25,093
2010	14,003	8,706	22,709	3,873	8,369	327	483	2,891	697	4,357	209	21,206
2011	14,874	9,904	24,777	3,599	8,925	571	419	3,457	665	4,572	1,659	23,867
2012	17,213	10,347	27,560	4,708	10,033	1,608	654	3,918	702	4,318	197	26,138
2013	17,365	9,289	26,654	4,702	11,063	1,286	387	2,750	1,252	3,089	195	24,724
2014	16,351	10,066	26,417	4,918	9,725	2,340	100	2,916	1,102	2,826	192	24,119
2015	17,249	7,327	24,576	5,031	9,890	1,692	6	2,841	780	3,869	172	24,281
2016	18,170	9,353	27,524	5,044	9,988	1,479	4	2,548	1,285	4,339	201	24,888
2017	17,647	9,605	27,252	8,253	9,877	1,725	10	3,255	832	3,100	174	27,226

TABLE 24: CONVERSION IN POWER STATIONS (EXCLUDE CO-GENERATION & PRIVATE LICENSED PLANTS) IN KTOE

	Input:						Total Input	Annual Growth Rate (%)	Input Share (%)					Output:
	Fuel Oil	Diesel Oil	Natural Gas	Hydropower	Coal	Renewables			Fuel and Diesel Oil	Natural Gas	Hydropower*	Coal & Coke	Renewables	Total Electricity Generated
1990	2,873	116	1,361	915	813	-	6,078	21.2	49.2	22.4	15.1	13.4	-	1,979
1991	2,687	164	2,533	1,053	963	-	7,400	21.8	38.5	34.2	14.2	13.0	-	2,283
1992	2,352	160	3,144	997	968	-	7,621	3.0	33.0	41.3	13.1	12.7	-	2,521
1993	2,388	87	4,374	1,262	884	-	8,995	18.0	27.5	48.6	14.0	9.8	-	2,987
1994	1,957	249	5,119	1,652	925	-	9,902	10.1	22.3	51.7	16.7	9.3	-	3,362
1995	2,073	265	6,414	1,540	957	-	11,249	13.6	20.8	57.0	13.7	8.5	-	3,909
1996	2,354	284	7,489	1,243	950	-	12,320	9.5	21.4	60.8	10.1	7.7	-	4,421
1997	2,482	185	7,531	790	882	-	11,870	(3.7)	22.5	63.4	6.7	7.4	-	4,977
1998	2,130	275	8,886	1,113	964	-	13,368	12.6	18.0	66.5	8.3	7.2	-	5,013
1999	950	172	10,162	1,668	1,332	-	14,284	6.9	7.9	71.1	11.7	9.3	-	5,409
2000	592	191	11,580	1,612	1,495	-	15,470	8.3	5.1	74.9	10.4	9.7	-	5,731
2001	730	278	11,922	1,687	1,994	-	16,611	7.4	6.1	71.8	10.2	12.0	-	5,940
2002	1,363	476	12,424	1,329	2,556	-	18,148	9.3	10.1	68.5	7.3	14.1	-	6,191
2003	289	340	10,893	1,056	4,104	-	16,682	(8.1)	3.8	65.3	6.3	24.6	-	6,568
2004	274	272	10,545	1,329	5,327	-	17,747	6.4	3.1	59.4	7.5	30.0	-	6,716
2005	275	298	12,271	1,313	5,541	-	19,698	11.0	2.9	62.3	6.7	28.1	-	6,706
2006	171	617	12,524	1,567	5,964	-	20,843	5.8	3.8	60.1	7.5	28.6	-	7,240
2007	199	314	12,549	1,522	7,486	-	22,070	5.9	2.3	56.9	6.9	33.9	-	8,385
2008	181	299	13,651	1,964	8,069	-	24,164	9.5	2.0	56.5	8.1	33.4	-	8,422
2009	205	384	13,390	1,627	9,010	-	24,616	1.9	2.4	54.4	6.6	36.6	-	8,531
2010	125	415	12,628	1,577	12,951	-	27,696	12.5	1.9	45.6	5.7	46.8	-	9,404
2011	1,103	981	10,977	1,850	13,013	-	27,924	0.8	7.5	39.3	6.6	46.6	-	10,193
2012	550	811	11,533	2,150	14,138	80	29,262	4.8	4.7	39.4	7.3	48.3	0.3	11,032
2013	392	623	13,520	2,688	13,527	208	30,958	5.8	3.3	43.7	8.7	43.7	0.7	11,630
2014	269	622	13,860	3,038	13,648	171	31,608	2.1	2.8	43.8	9.6	43.2	0.5	12,227
2015	101	279	13,378	3,582	15,627	166	33,133	4.8	1.1	40.4	10.8	47.2	0.5	12,393
2016	155	165	13,260	4,499	17,101	168	35,348	6.7	0.9	37.5	12.7	48.4	0.5	12,944
2017	99	147	11,872	6,240	18,967	184	37,509	6.1	0.5	37.4	17.3	44.3	0.4	13,375

Note (*) : Figures are calculated based on thermal stations' average efficiency in the respective years

TABLE 25: FINAL ENERGY CONSUMPTION BY SECTOR IN KTOE

	Industry	Transport	Residential and Commercial	Non-Energy Use	Agriculture	Total	Annual Growth Rate (%)	Industry including Agriculture & Non-Energy	Industry GDP*	Industry Energy Intensity (toe/RM Million at 2010 Prices)
1990	5,276	5,386	1,622	838	-	13,122	11.0	6,114	157,991	39
1991	5,809	5,806	1,721	1,071	130	14,537	10.8	7,010	170,942	41
1992	6,455	6,226	1,867	1,222	391	16,161	11.2	8,068	182,592	44
1993	7,012	6,558	2,055	2,027	62	17,714	9.6	9,101	194,045	47
1994	7,283	7,262	2,300	1,817	422	19,084	7.7	9,522	208,528	46
1995	8,060	7,827	2,556	2,994	446	21,883	14.7	11,500	230,658	50
1996	9,443	8,951	3,162	1,744	486	23,786	8.7	11,673	259,952	45
1997	10,106	10,201	3,073	2,298	490	26,168	10.0	12,894	278,490	46
1998	10,121	9,793	3,314	2,023	307	25,558	(2.3)	12,451	249,109	50
1999	10,277	11,393	3,653	1,799	106	27,228	6.5	12,182	267,643	46
2000	11,406	12,071	3,868	2,250	104	29,699	9.1	13,760	299,623	46
2001	11,852	13,137	4,048	2,378	98	31,513	6.1	14,328	291,938	49
2002	12,854	13,442	4,387	2,511	96	33,290	5.6	15,461	303,130	51
2003	13,472	14,271	4,399	2,345	98	34,585	3.9	15,915	325,828	49
2004	14,914	15,385	4,754	2,183	87	37,323	7.9	17,184	348,491	49
2005	15,492	15,384	5,134	2,173	101	38,284	2.6	17,766	359,941	49
2006	15,248	14,819	5,424	2,819	258	38,568	0.7	18,325	376,262	49
2007	16,454	15,717	6,197	2,957	281	41,606	7.9	19,692	387,084	51
2008	16,205	16,395	6,205	2,876	287	41,968	0.9	19,368	389,775	50
2009	14,312	16,119	6,336	3,868	211	40,846	(2.7)	18,391	366,284	50
2010	12,928	16,828	6,951	3,696	1,074	41,477	1.5	17,698	393,381	45
2011	12,100	17,070	6,993	6,377	916	43,456	4.8	19,393	406,412	48
2012	13,919	19,757	7,065	7,497	1,053	49,291	13.4	22,469	422,958	53
2013	13,496	22,357	7,403	7,277	1,051	51,584	4.7	21,824	436,712	50
2014	13,162	24,327	7,459	6,217	1,045	52,210	1.2	20,424	459,397	44
2015	13,989	23,435	7,559	5,928	895	51,806	(0.8)	20,812	480,290	43
2016	16,019	24,004	8,049	8,729	415	57,218	10.4	25,164	491,856	51
2017	17,463	24,039	7,796	12,517	674	62,489	9.2	30,654	517,782	60

Note (*) : 1. Defined as total GDP for Agriculture, Forestry and Fishing, Mining and Quarrying, Manufacturing and Construction
2. Industry GDP for year 1990-2009 was calculated by the Energy Commission

TABLE 26: FINAL ENERGY CONSUMPTION BY FUEL TYPE IN KTOE

	Petroleum Products and Others	Electricity	*Gas for Non-Energy*	*Gas for Heating*	Natural Gas	Coal and Coke	Total	Total (excl. Non-Energy)	Annual Growth Rate (%)
1990	9,825	1,715	*609*	*460*	1,069	513	13,122	12,513	8.2
1991	10,914	1,925	*604*	*495*	1,099	599	14,537	13,933	11.3
1992	11,927	2,218	*657*	*687*	1,344	672	16,161	15,504	11.3
1993	13,075	2,450	*1,141*	*560*	1,701	487	17,713	16,572	6.9
1994	13,894	2,932	*1,163*	*497*	1,660	598	19,084	17,921	8.1
1995	16,142	3,375	*1,064*	*590*	1,654	712	21,883	20,819	16.2
1996	17,203	3,777	*870*	*1,209*	2,079	727	23,786	22,916	10.1
1997	18,578	4,384	*1,378*	*1,087*	2,465	740	26,167	24,789	8.2
1998	17,488	4,577	*1,282*	*1,444*	2,726	767	25,558	24,276	(2.1)
1999	18,782	4,815	*1,118*	*1,905*	3,023	608	27,228	26,110	7.6
2000	19,582	5,263	*1,512*	*2,350*	3,862	991	29,698	28,186	8.0
2001	20,323	5,594	*1,655*	*2,965*	4,620	977	31,514	29,859	5.9
2002	20,638	5,922	*1,775*	*3,868*	5,643	1,086	33,289	31,514	5.5
2003	21,175	6,313	*1,616*	*4,270*	5,886	1,212	34,586	32,970	4.6
2004	22,886	6,642	*1,476*	*5,014*	6,490	1,305	37,323	35,847	8.7
2005	23,012	6,944	*1,541*	*5,440*	6,981	1,348	38,285	36,744	2.5
2006	22,398	7,272	*2,120*	*5,442*	7,562	1,335	38,567	36,447	(0.8)
2007	24,852	7,683	*2,112*	*5,597*	7,709	1,362	41,606	39,494	8.4
2008	24,451	7,986	*2,046*	*5,772*	7,818	1,713	41,968	39,922	1.1
2009	24,145	8,286	*1,995*	*4,807*	6,802	1,613	40,846	38,851	(2.7)
2010	24,403	8,993	*1,661*	*4,593*	6,254	1,826	41,476	39,815	2.5
2011	23,946	9,236	*3,906*	*4,609*	8,515	1,759	43,456	39,550	(0.7)
2012	27,329	10,011	*5,336*	*4,870*	10,206	1,744	49,290	43,954	11.1
2013	29,379	10,590	*5,276*	*4,800*	10,076	1,539	51,584	46,308	5.4
2014	29,817	11,042	*4,472*	*5,168*	9,641	1,709	52,209	47,737	3.1
2015	29,087	11,375	*4,470*	*5,096*	9,566	1,778	51,806	47,336	(0.8)
2016	30,737	12,392	*6,083*	*6,221*	12,304	1,785	57,218	51,135	8.0
2017	31,241	12,607	*9,837*	*7,000*	16,838	1,804	62,489	52,652	3.0

TABLE 27: FINAL CONSUMPTION FOR PETROLEUM PRODUCTS IN KTOE

	Diesel	Petrol	Fuel Oil	LPG	Kerosene	ATF & AV GAS	Non-Energy & Others	Total
1990	4,421	2,901	883	548	203	628	239	9,823
1991	4,873	3,135	945	612	180	690	479	10,914
1992	5,291	3,326	1,088	733	160	764	565	11,927
1993	5,339	3,666	1,293	1,119	149	875	635	13,076
1994	5,643	4,139	1,392	926	152	978	664	13,894
1995	5,810	4,548	1,506	2,215	177	1,160	726	16,142
1996	6,735	5,205	1,770	1,215	197	1,335	746	17,203
1997	7,314	5,586	1,978	1,245	169	1,439	847	18,578
1998	6,252	5,854	1,678	1,301	165	1,619	619	17,488
1999	6,506	6,793	1,792	1,523	162	1,424	582	18,782
2000	7,627	6,387	1,875	1,362	131	1,574	625	19,581
2001	8,116	6,827	1,497	1,392	99	1,762	630	20,323
2002	8,042	6,948	1,589	1,542	92	1,785	639	20,637
2003	8,539	7,360	1,256	1,437	93	1,852	639	21,176
2004	9,262	7,839	1,463	1,542	86	2,056	637	22,885
2005	8,672	8,211	1,953	1,510	81	2,010	574	23,011
2006	8,540	7,517	1,901	1,520	79	2,152	684	22,393
2007	9,512	8,600	2,202	1,474	76	2,155	832	24,851
2008	9,167	8,842	1,963	1,475	75	2,112	818	24,452
2009	8,634	8,766	1,291	2,506	30	2,120	799	24,146
2010	8,388	9,560	478	2,920	19	2,380	657	24,402
2011	8,712	8,155	414	2,892	19	2,553	1,178	23,923
2012	9,410	10,843	768	2,892	38	2,521	743	27,215
2013	9,568	12,656	329	2,946	31	2,998	662	29,190
2014	10,161	12,705	246	2,632	23	3,158	592	29,517
2015	9,377	12,804	498	2,261	4	3,134	621	28,699
2016	9,254	13,411	513	3,497	5	3,019	650	30,348
2017	9,388	13,437	579	3,514	5	3,220	719	30,862

TABLE 28: SELECTED ENERGY AND ECONOMIC INDICATORS (1990-2017)

	GDP at Current Price (RM Million)*	GDP at 2010 Prices (RM million)*	Population ('000 people)	Primary Energy Supply (ktoe)	Final Energy Consumption (ktoe)	Electricity Consumption (ktoe)	Electricity Consumption (GWh)	Average Annual Growth (%)		
								GDP at 2010 Prices	Primary Energy Supply	Final Energy Consumption
1990	128,658	263,488	18,102	21,471	13,146	1,715	19,932	9.00	8.90	8.70
1991	145,991	288,639	18,547	26,335	14,563	1,925	22,373	9.55	22.65	10.78
1992	162,800	314,285	19,068	29,291	16,185	2,218	25,778	8.89	11.22	11.14
1993	186,042	345,384	19,602	29,925	17,728	2,450	28,474	9.89	2.16	9.53
1994	211,181	377,201	20,142	31,662	19,287	2,932	34,076	9.21	5.80	8.79
1995	240,365	414,276	20,682	33,879	22,164	3,375	39,225	9.83	7.00	14.92
1996	274,138	455,715	21,223	37,840	24,181	3,777	43,897	10.00	11.69	9.10
1997	304,458	489,086	21,769	43,173	26,167	4,384	50,952	7.32	14.09	8.21
1998	306,022	453,092	22,334	40,996	25,558	4,577	53,195	(7.36)	(5.04)	(2.33)
1999	324,952	480,901	22,910	44,534	27,228	4,815	55,961	6.14	8.63	6.53
2000	370,817	523,503	23,495	50,710	29,699	5,263	61,168	8.86	13.87	9.08
2001	366,841	526,213	24,031	51,979	31,515	5,594	65,015	0.52	2.50	6.11
2002	398,714	554,581	24,543	53,196	33,289	5,922	68,827	5.39	2.34	5.63
2003	435,708	586,683	25,038	57,565	34,586	6,313	73,371	5.79	8.21	3.90
2004	493,223	626,481	25,542	62,836	37,323	6,642	77,195	6.78	9.16	7.91
2005	543,578	659,885	26,046	66,211	38,285	6,944	80,705	5.33	5.37	2.58
2006	596,784	696,739	26,550	67,021	38,567	7,272	84,517	5.58	1.22	0.74
2007	665,340	740,625	27,058	72,389	41,606	7,683	89,294	6.30	8.01	7.88
2008	769,949	776,410	27,568	76,032	41,968	7,986	92,815	4.83	5.03	0.87
2009	712,857	764,659	28,082	74,583	40,845	8,286	96,302	(1.51)	(1.91)	(2.68)
2010	821,434	821,434	28,589	76,809	41,476	8,993	104,519	7.42	2.98	1.54
2011	911,733	864,920	29,062	79,289	43,455	9,235	107,331	5.29	3.23	4.77
2012	971,252	912,261	29,510	86,495	49,291	10,011	116,350	5.47	9.09	13.43
2013	1,018,614	955,080	30,214	90,730	51,583	10,590	123,079	4.69	4.90	4.65
2014	1,106,443	1,012,449	30,709	92,487	52,209	11,042	128,333	6.01	1.94	1.21
2015	1,157,723	1,063,998	31,186	92,677	51,806	11,397	132,464	5.09	0.21	(0.77)
2016	1,230,120	1,108,935	31,634	96,525	57,219	12,394	144,042	4.22	4.15	10.45
2017	1,353,381	1,174,329	32,023	98,298	62,489	12,607	146,524	5.90	1.84	9.21

Source (*) : GDP and Population data are from the Department of Statistics, Malaysia
Note : GDP at 2010 Prices (RM Million) for 1990 until 2009 was calculated by the Energy Commission

	Per Capita				Energy Intensity				Energy Elasticity	
Electricity Consumption	GDP at Current Prices (RM)	Primary Energy Supply (toe)	Final Energy Consumption (toe)	Electricity Consumption (kWh)	Primary Energy Intensity (toe/GDP at 2010 Prices (RM Million))	Final Energy Intensity (toe/GDP at 2010 Prices (RM Million))	Electricity Intensity (toe/GDP at 2010 Prices (RM Million))	Electricity Intensity (GWh/GDP at 2010 Prices (RM Million))	Final Energy	Electricity
9.70	7,107	1.19	0.73	1,101	81.49	49.89	6.51	0.076	0.97	1.08
12.24	7,871	1.42	0.79	1,206	91.24	50.45	6.67	0.078	1.13	1.28
15.22	8,538	1.54	0.85	1,352	93.20	51.50	7.06	0.082	1.25	1.71
10.46	9,491	1.53	0.90	1,453	86.64	51.33	7.09	0.082	0.96	1.06
19.67	10,485	1.57	0.96	1,692	83.94	51.13	7.77	0.090	0.95	2.14
15.11	11,622	1.64	1.07	1,897	81.78	53.50	8.15	0.095	1.52	1.54
11.91	12,917	1.78	1.14	2,068	83.03	53.06	8.29	0.096	0.91	1.19
16.07	13,986	1.98	1.20	2,341	88.27	53.50	8.96	0.104	1.12	2.19
4.40	13,702	1.84	1.14	2,382	90.48	56.41	10.10	0.117	0.32	(0.60)
5.20	14,184	1.94	1.19	2,443	92.61	56.62	10.01	0.116	1.06	0.85
9.30	15,783	2.16	1.26	2,603	96.87	56.73	10.05	0.117	1.02	1.05
6.29	15,265	2.16	1.31	2,705	98.78	59.89	10.63	0.124	11.81	12.15
5.86	16,246	2.17	1.36	2,804	95.92	60.03	10.68	0.124	1.04	1.09
6.60	17,402	2.30	1.38	2,930	98.12	58.95	10.76	0.125	0.67	1.14
5.21	19,310	2.46	1.46	3,022	100.30	59.58	10.60	0.123	1.17	0.77
4.55	20,870	2.54	1.47	3,099	100.34	58.02	10.52	0.122	0.48	0.85
4.72	22,478	2.52	1.45	3,183	96.19	55.35	10.44	0.121	0.13	0.85
5.65	24,589	2.68	1.54	3,300	97.74	56.18	10.37	0.121	1.25	0.90
3.94	27,929	2.76	1.52	3,367	97.93	54.05	10.29	0.120	0.18	0.82
3.76	25,385	2.66	1.45	3,429	97.54	53.42	10.84	0.126	1.77	(2.48)
8.53	28,733	2.69	1.45	3,656	93.51	50.49	10.95	0.127	0.21	1.15
2.69	31,372	2.73	1.50	3,693	91.67	50.24	10.68	0.124	0.90	0.51
8.40	32,913	2.93	1.67	3,943	94.81	54.03	10.97	0.128	2.45	1.54
5.78	33,713	3.00	1.71	4,074	95.00	54.01	11.09	0.129	0.99	1.23
4.27	36,031	3.01	1.70	4,179	91.35	51.57	10.91	0.127	0.20	0.71
3.22	37,123	2.97	1.66	4,248	87.10	48.69	10.71	0.124	(0.15)	0.63
8.74	38,887	3.05	1.81	4,553	87.04	51.60	11.18	0.130	2.47	2.07
1.72	42,263	3.07	1.95	4,576	83.71	53.21	10.74	0.125	1.56	0.29

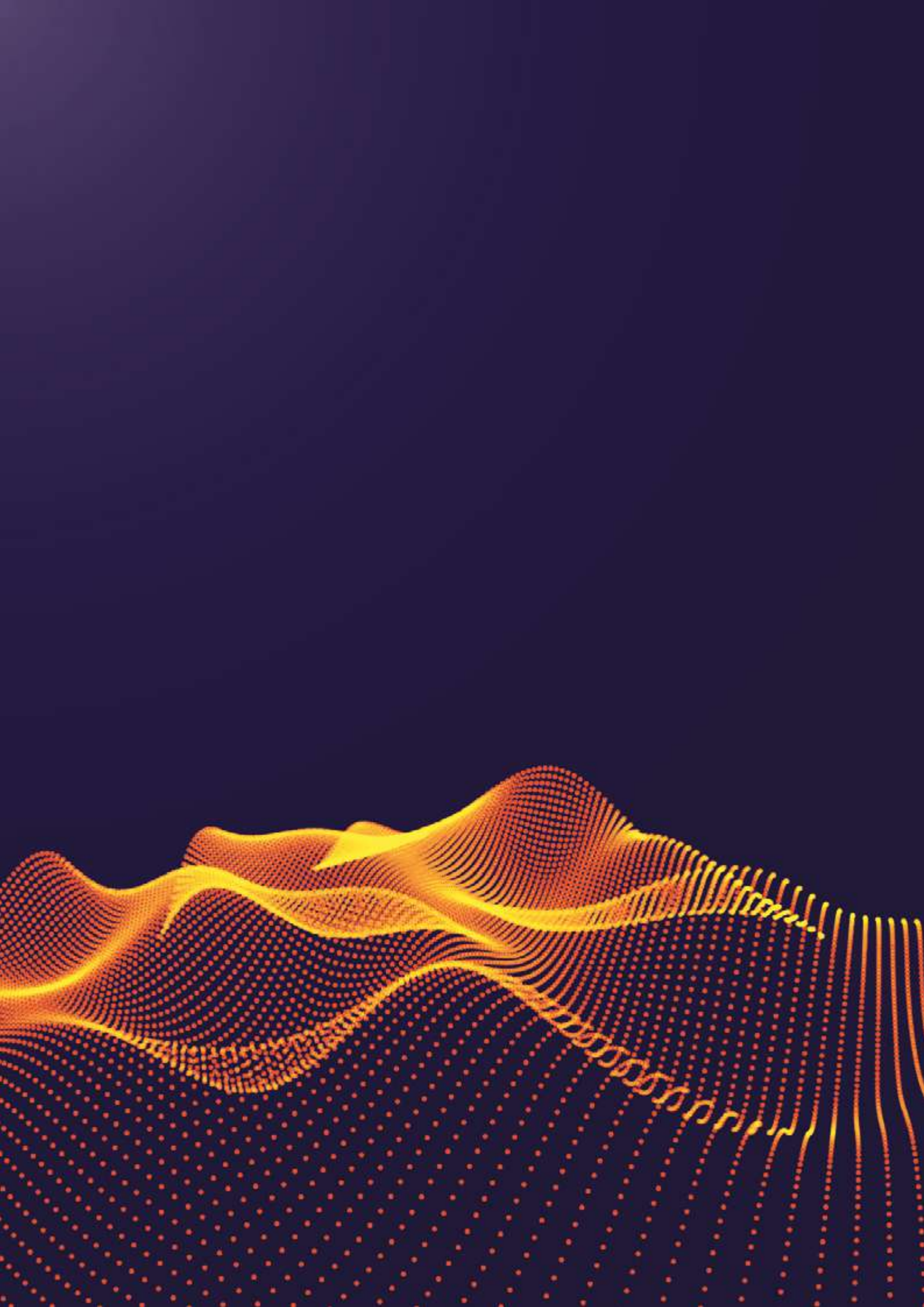
TABLE 29: ENERGY BALANCE TABLE IN 2017 (KILO TONNES OF OIL EQUIVALENT)

COMMERCIAL ENERGY BALANCE FOR MALAYSIA 2017 (KILO TONNES OF OIL EQUIVALENT)

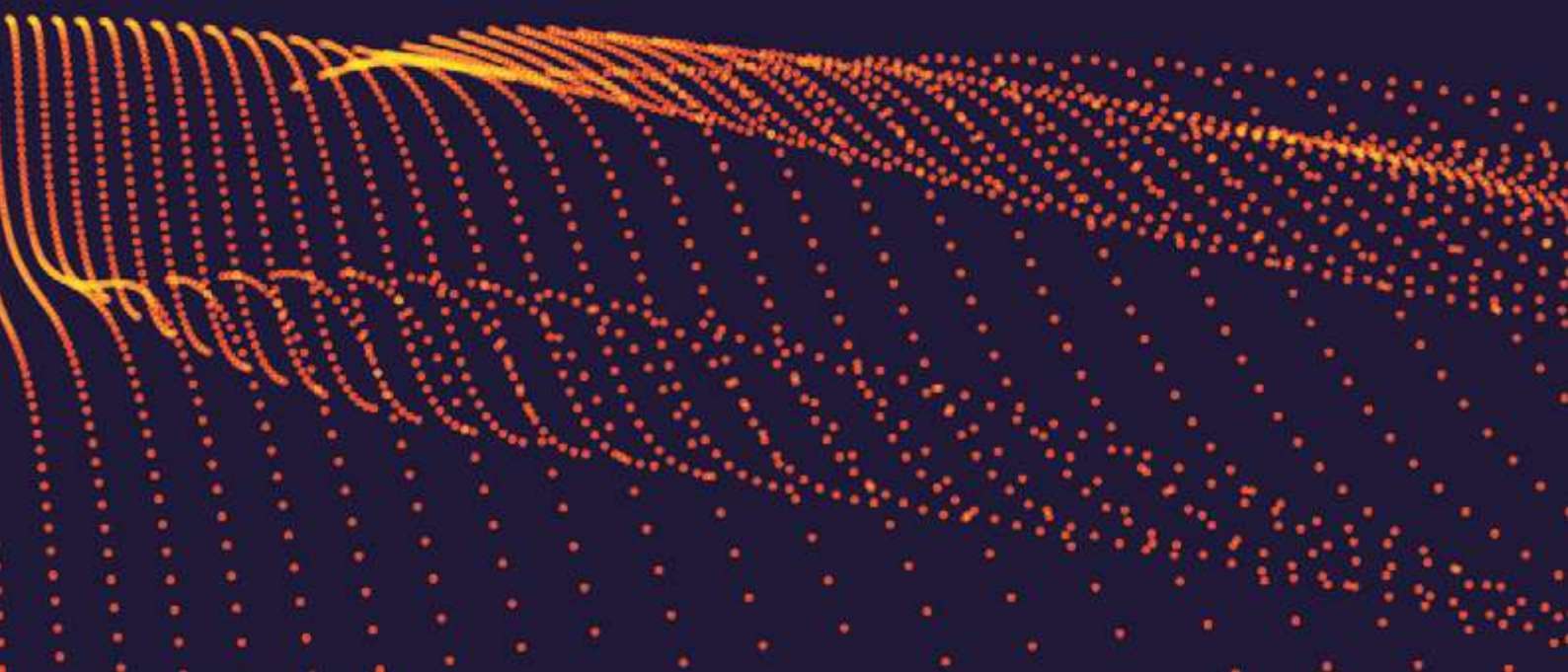
ENERGY SOURCE	NATURAL GAS	LNG	CRUDE OIL (1/)	OTHERS (2/)	TOTAL PETROLEUM PRODUCTS	PETROLEUM PRODUCTS			
						PETROL	DIESEL	FUEL OIL	LPG
PRIMARY SUPPLY									
1. Primary Production	71,140	0	32,807	0	**0**	0	0	0	0
2. Gas Flaring, Reinjection & Use	-6,058	0	0	0	**0**	0	0	0	0
3. Imports	5,183	1,815	10,135	76	**13,252**	5,149	5,167	226	441
4. Exports	-1,452	-29,428	-14,958	-13	**-11,063**	-282	-5,133	-617	-208
5. Bunkers	0	0	0	0	**-390**	0	-93	-297	0
6. Stock Change	0	0	-297	0	**143**	49	65	-11	21
7. Statistical Discrepancy	0	0	-216	0	**0**	0	0	0	0
8. Primary Supply	**68,814**	**-27,613**	**27,471**	**63**	**1,941**	**4,917**	**6**	**-699**	**253**
TRANSFORMATION									
9. Gas Plants									
9.1 LNG	-36,964	29,428	0	0	**40**	0	0	0	40
9.2 MDS	-1,140	0	0	0	**509**	0	138	0	0
9.3 GPP-LPG (3&4/)	-2,008	0	0	0	**1,961**	0	0	0	1,961
9.4 RGT	1,815	-1,815	0	0	**0**	0	0	0	0
Subtotal	**-38,296**	**27,613**	**0**	**0**	**2,510**	**0**	**138**	**0**	**2,001**
10. Refineries	0	0	-27,252	-63	**27,226**	8,253	9,877	1,725	832
11. Power Stations & Self-Generation									
11.1 Hydro Stations	0	0	0	0	**0**	0	0	0	0
11.2 Thermal Stations	-11,872	0	0	0	**-246**	0	-147	-99	0
11.3 Self-Generation (5/)	-1,038	0	0	0	**-226**	0	-226	0	0
Subtotal	**-12,910**	**0**	**0**	**0**	**-472**	**0**	**-372**	**-99**	**0**
12. Losses & Own Use	-770	0	-219	0	**-521**	0	0	-29	0
13. Statistical Discrepancy	0	0	0	-0	**177**	267	-261	-319	429
14. Secondary Supply	**-51,976**	**27,613**	**-27,471**	**-63**	**28,921**	**8,520**	**9,382**	**1,278**	**3,261**
FINAL USE									
15. Residential	1	0	0	0	**1,128**	0	0	0	1,126
16 Commercial	25	0	0	0	**270**	0	22	5	244
17. Industrial	6,827	0	0	0	**2,687**	182	1,750	569	184
18 Transport	148	0	0	0	**23,473**	13,190	7,062	1	0
19. Agriculture	0	0	0	0	**35**	0	31	5	0
20. Fishing	0	0	0	0	**588**	66	523	0	0
21. Non-Energy Use	9,837	0	0	0	**2,680**	0	0	0	1,961
22. Total Final Use	**16,838**	**0**	**0**	**0**	**30,862**	**13,437**	**9,388**	**579**	**3,514**
ELECTRICITY OUTPUT									
Main Activity Producer									
Gross Electricity Generation - GWh	58,201	0	0	0	**890**	0	688	202	0
Autoproducer									
Gross Electricity Generation - GWh	3,930	0	0	0	**805**	0	805	0	0

1/ Crude production includes Condensates compirising Pentane and Heavier Hydrocarbons.
2/ Others Refer to Non-Crude Energy Forms (contsist of Imported Light Diesel, Slop Reprocess, Crude Residuum & Middle East Residue) Which are Used as Refinary Intake.
3/ GPP-LPG Extracts Liqiud Products i.e Condenates, Ethane, Butane, Propane from Natural Gas, Ethane is Not included under LPG production.
4/ Butane and Propane as MTBE Feedstocks are Presented as Non-Energy use under LPG column. Ethane is Presented under Natural Gas Column.
5/ Estimated figures based from the Energy Commission, Statistics of Electricity Supply Industry in Malaysia 2017.
Note : Total may not necessarily add up due to rounding

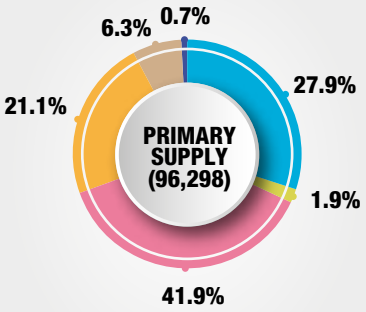
KEROSENE	ATF & AV GAS	NON ENERGY	REFINERY GAS	COAL & COKE	HYDRO POWER	SOLAR	BIOMASS	BIOGAS	BIODIESEL	ELECTRICITY	TOTAL
0	0	0	0	1,884	6,240	93	194	41	467	0	**112,867**
0	0	0	0	0	0	0	0	0	0	0	**-6,058**
0	1,205	1,064	0	19,181	0	0	0	0	0	1	**49,642**
-60	-1,330	-3,433	0	-382	0	0	0	0	-239	-97	**-57,632**
0	0	-0	0	0	0	0	0	0	0	0	**-390**
4	3	12	0	58	0	0	0	0	32	0	**-64**
0	0	0	0	30	0	0	0	0	119	0	**-67**
-56	**-122**	**-2,358**	**0**	**20,771**	**6,240**	**93**	**194**	**41**	**379**	**-96**	**98,298**
0	0	0	0	0	0	0	0	0	0	0	**-7,496**
51	0	320	0	0	0	0	0	0	0	0	**-631**
0	0	0	0	0	0	0	0	0	0	0	**-46**
0	0	0	0	0	0	0	0	0	0	0	**0**
51	**0**	**320**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**-8,173**
10	3,255	3,100	174	0	0	0	0	0	0	0	**-89**
0	0	0	0	0	-6,240	0	0	0	0	2,309	**-3,931**
0	0	0	0	-18,967	0	-93	-52	-40	0	11,066	**-20,203**
0	0	0	0	0	0	-0	-142	-1	0	445	**-962**
0	**0**	**0**	**0**	**-18,967**	**-6,240**	**-93**	**-194**	**-41**	**0**	**13,821**	**-25,096**
0	0	-317	-174	0	0	0	0	0	0	-1,057	**-2,567**
-0	87	-26	0	0	0	0	0	0	0	-61	**116**
61	**3,342**	**3,076**	**0**	**-18,967**	**-6,240**	**-93**	**-194**	**-41**	**0**	**12,703**	**-35,808**
3	0	0	0	0	0	0	0	0	0	2,610	**3,739**
0	0	0	0	0	0	0	0	0	0	3,762	**4,057**
3	0	0	0	1,804	0	0	0	0	0	6,145	**17,463**
0	3,220	0	0	0	0	0	0	0	379	39	**24,039**
0	0	0	0	0	0	0	0	0	0	50	**85**
0	0	0	0	0	0	0	0	0	0	0	**588**
0	0	719	0	0	0	0	0	0	0	0	**12,517**
5	**3,220**	**719**	**0**	**1,804**	**0**	**0**	**0**	**0**	**379**	**12,607**	**62,489**
0	0	0	0	68,866	26,841	330	185	142	0	0	**155,456**
0	0	0	0	0	5	0	426	12	0	0	**5,178**



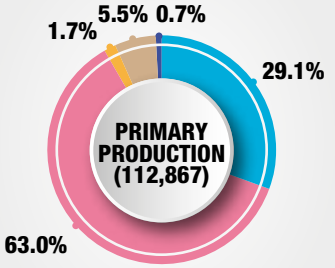
ENERGY FLOW CHART



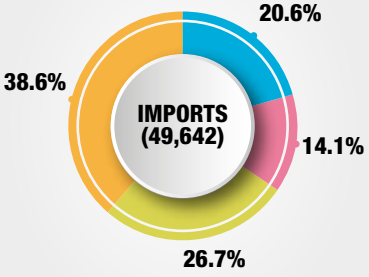
PRIMARY SUPPLY



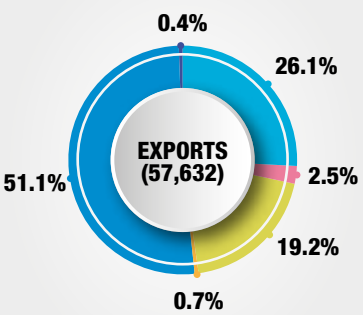
Natural Gas	41,200
Crude Oil	27,471
Coal and Coke	20,771
Hydropower	6,240
Petroleum Products & Others	1,909
Renewables	707



Natural Gas	71,140
Crude Oil	32,807
Hydropower	6,240
Coal and Coke	1,884
Renewables	795

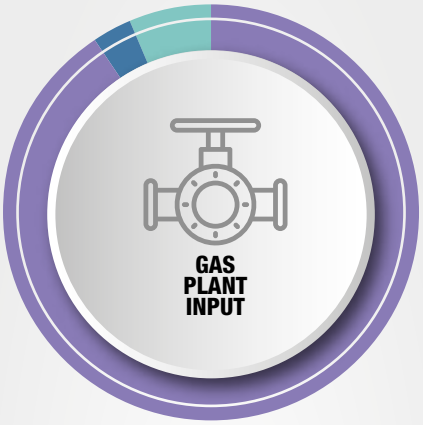


Coal and Coke	19,181
Petroleum Products	13,252
Crude Oil & Others	10,211
Natural Gas & LNG	6,998

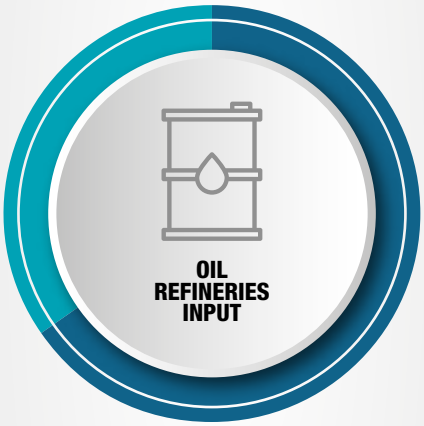


LNG	29,428
Crude Oil & Others	15,067
Petroleum Products	11,063
Natural Gas	1,452
Coal and Coke	382
Renewables	239

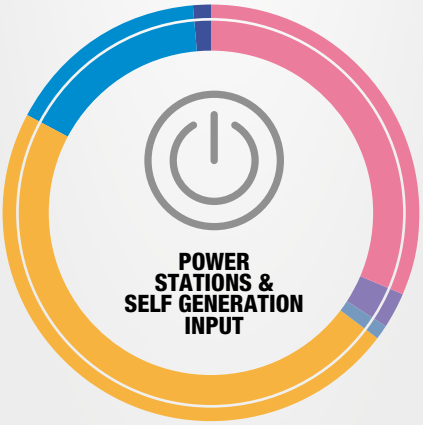
TRANSFORMATION



LNG	36,9641	GPP-LPG	2,008	MDS	1,140

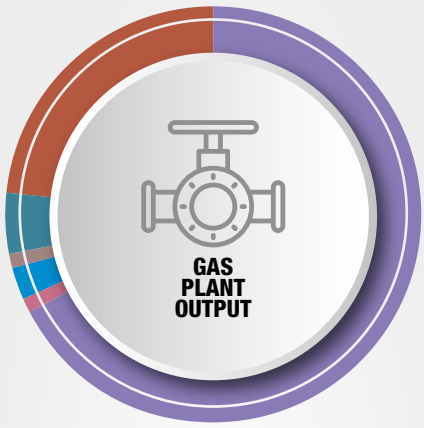


Local	17,647	Import	9,605

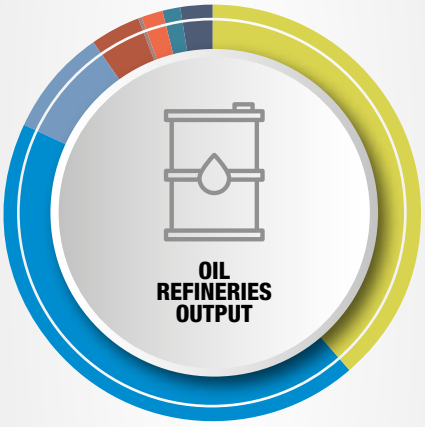


Coal and Coke	18,967	Diesel	372
Natural Gas	12,910	Renewables	328
LNG	6,240	Fuel Oil	99

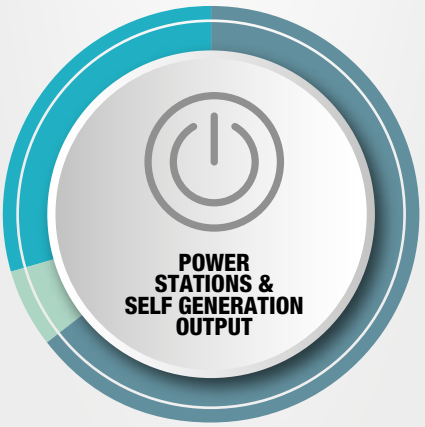
Note * : Primary Supply = Primary Production - Flaring + Imports - Exports - Bunkers (+-) Stock Change (+-) Statistical Discrepancy



LNG	29,428	Diesel	138
LPG	1,961	Kerosene	51
Non-Energy	320	LPG (from LNG)	40

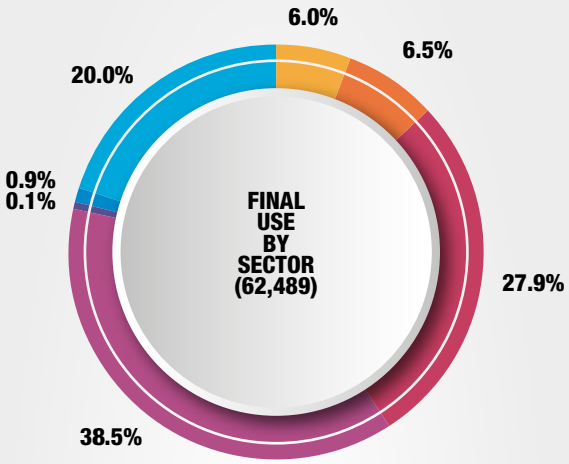


Diesel	9,877	Fuel Oil	1,725
Petrol	8,253	LPG	832
ATF & AV Gas	3,255	Refinery Gas	174
Non-Energy	3,100	Kerosene	10

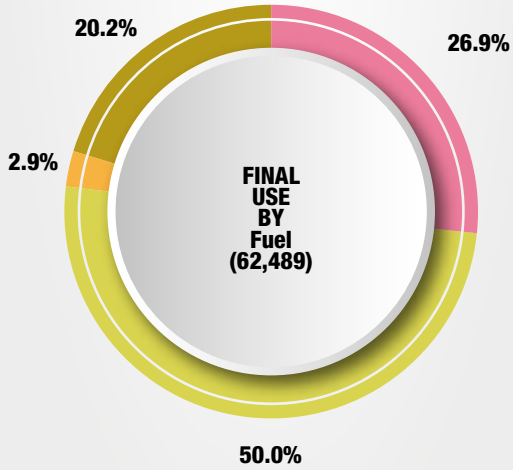


Thermal	11,066	Self-Generation	445
Hydro	2,309		

FINAL USE



Transport	24,039	Residential	3,739
Industry	17,463	Fishery	588
Non-Energy Use	12,517	Agriculture	85
Commercial	4,057		



Petroleum Products	31,241	Electricity	12,607
Natural Gas	16,838	Coal and Coke	1,804

NOTES OF ENERGY BALANCE

The net calorific value (NCV) was chosen as the basis of calculations rather than the gross calorific value (GCV). The Joule was used as the rigorous accounting unit, while the "tonnes oil equivalent" (1 toe= 41.84 Gigajoules) was chosen as the final unit for presentation in the Energy Balance.

ENERGY BALANCE FORMAT

The rows of the Energy Balance tables contain the following items:

Primary Supply	Refers to supply of energy that has not undergone the transformations / conversion process within the country.
Primary Production (1)	Refers to the quantity of fuels extracted. Data for natural gas excludes the amount of reinjected and flared gas. Gross production of hydro is shown in conventional fuel equivalent input.
Gas Flaring, Reinjection & Use (2)	Refers to the quantity of gas flared, reinjected into the gas fields and use for production purpose.
Imports (3) and Exports (4)	Refer to the amount of primary and secondary energy obtained from, or supplied to other countries. In the energy balance format, imports always carry a positive and export a negative sign.
Bunkers (5)	Refers to the amount of fuels delivered to ocean-going ships of all flags engaged in international traffic.
Stock Change (6)	Refers to the difference between the amounts of fuel in stocks at the beginning and end of year and should ideally cover producers, importers and Industry consumers. At this stage, however, only oil companies' stock are taken into account. A negative sign indicates net increase while a positive sign indicates net decrease in stocks.
Total	Under primary supply, 'total' is the addition of columns to obtain total availability. Under transformation, 'total' is the addition of columns to obtain transformation and conversion losses.
Gas Plants (9)	Shows the input of natural gas into the LNG, MDS and GPP-LPG plants and their respective outputs.
Refineries (10), power stations and Co-generation & Private licensees (11)	Show the input of any energy product (negative sign) for the purpose of converting it to one or more secondary products (positive sign).
Losses and Own Use (12)	Refers to losses of electrical energy and natural gas which occur outside the utilities and plants (i.e. distribution losses) and the consumption of energy by utilities and plants for operating their installation (i.e. electricity for operating auxiliary equipment and petroleum products used in the crude distillation process respectively). It does not, however, include conversion loss that is accounted for in the 'total' column.
Secondary Supply (14)	Refers to the supply of energy from the transformation process and after deducting the energy sector's own use and losses, including power station use.
Residential and Commercial (15 & 16)	Not only refers to energy used within households and commercial establishments but includes government buildings and institutions.
Industry (17)	Is a very broad-based sector ranging from manufacturing to mining and construction. Diesel sales through distributors are assumed to be to Industry consumers.
Transport (18)	Basically refers to all sales of motor gasoline and diesel from service stations and sales of aviation fuel. It also includes diesel and motor gasoline sold directly to government and military.
Agriculture (19)	Covers agriculture and forestry.
Fishery (20)	May involve the capture of wild fish or raising fish through fish farming or aquaculture.
Non-Energy Use (21)	Use of products resulting from the transformation process for non-energy purpose (i.e. bitumen/lubricants, asphalt/greases) and use of energy products (such as natural gas) as Industry feedstocks
Final use (22)	Refers to the quantity of energy of all kinds delivered to the final user.

I) Non-commercial energy such as firewood and other biomass fuels have been excluded in the energy balance until more reliable data are made available.

II) The output side of the final user's equipment of device i.e. useful energy will not be dealt with in the balance as it will involve assessing the efficiencies of end - use equipment operating under various different conditions.

NOTES ON ELECTRICITY

Reserve Margin	Total capacity margin is defined as the amount of installed generation available over and above system peak load $\text{Reserve Margin} = \frac{\text{Installed Capacity} - \text{Peak Demand}}{\text{Peak Demand}}$
Peak Demand	The maximum power consumption registered by a customer or a group of customers or a system in a stated period of time such as a month or a year. The value may be the maximum instantaneous load or more usually, the average load over a designated interval of time, such as half an hour and is normally stated in kilowatts or megawatts.
Installed Capacity	Installed capacity is defined as the maximum possible capacity (nameplate rating) that can be provided by the plant.
Dependable Capacity	The maximum capacity, modified for ambient limitations for a specified period of time, such as a month or a season.
Available Capacity	Available capacity refers to the Latest Tested Net Capacity. It is the dependable capacity, modified for equipment limitation at any time.
Unit Generated (Gross Generation)	The total amount of electric energy produced by generating units and measured at the generating terminal in kilowatt-hours (kWh) or megawatt hours (MWh)
Unit Sent Out From Station(s) (Net Generation)	The amount of gross generation less the electrical energy consumed at the generating station(s) for station service or auxiliaries.

NOTES ON COAL

Measured Reserves	Refers to coal for which estimates of the rank and quantity have been computed to a high degree of geologic assurance, from sample analyses and measurements from closely spaced and geologically well-known sample sites.
Indicated Reserves	Refers to coal for which estimates of the rank, quality, and quantity have been computed to a moderate degree of geologic assurance, partly from sample analyses and measurements and partly from reasonable geologic projections.
Inferred Reserves	Refers to coal of a low degree of geologic assurance in unexplored extensions of demonstrated resources for which estimates of the quality and size are based on geologic evidence and projection. Quantitative estimates are based on broad knowledge of the geologic character of the bed or region where few measurements or sampling points are available and on assumed continuation from demonstrated coal for which there is geologic evidence.

NOTES ON GDP

GDP Definition	GDP can be measured by using three approaches namely Production, Expenditure and Income Approach. Conceptually, GDP by these three approaches produce the same results.
Production Approach	GDP based on Production Approach is defined as value of total production of goods and services produced in the economy after deducting value of intermediate consumption. This approach is also known as value added approach.
Expenditure Approach	GDP based on Expenditure Approach is the summation of Private Final Consumption, Government Final Consumption, Gross Fixed Capital Formation, Changes in Inventories and Valuables, Exports of goods and services minus Imports of goods and services. This approach measures value of goods and services used by final users on goods and services produced by resident.
Income Approach	GDP based on Income Approach is the summation of all incomes accruing the production in economy. Thus, this method enables factors of income and the return to factors of production to be measured by economic activity. The income components are Compensation of Employees, Gross Operating Surplus and Taxes Less Subsidies on Production and Imports. GDP by Income Approach is calculated as follows: GDP by Income Approach = CE + GOS + (T - S) where; CE - Compensation of Employees GOS - Gross Operating Surplus (T - S) - Taxes Less Subsidies on Production and Imports

NOTES ON GNI

Definition	The Gross national income (GNI) consists of: the personal consumption expenditure, the gross private investment, the government consumption expenditures, the net income from assets abroad (net income receipts), and the gross exports of goods and services, after deducting two components: the gross imports of goods and services, and the indirect business taxes. The GNI is similar to the gross national product (GNP), except that in measuring the GNP one does not deduct the indirect business taxes.
Measuring GNI	As GNI is an add up of Net Income from abroad and the GDP, one can calculate the GNI by the following formula: GNI = GDP + (FL – DL) + NCI When FL and DL are respectively the foreign and domestic income from labor, and NCI the net capital inflow. For example, if a country A's nominal GDP is $20,000, the domestic income from labor $3,000 and the foreign income from labor $5,000, and the country received a $10,000 donation from another country's charity organization, the GNI of country A would be $32,000.

CONVERSION COEFFICIENTS AND EQUIVALENCE

TJ/1000 Tonnes'

Hard coal	29.3076	**Lignite/brown coal**	11.2834
Coke/oven coke	26.3768	**Peat**	9.525
Gas coke	26.3768	**Charcoal**	28.8888
Brown coal coke	19.6361	**Fuelwood 2**	13.4734
Pattern fuel briquettes	29.3076	**Lignite briquettes**	19.6361

Natural Gas Products (TJ/1000 Tonnes)

Liquefied Natural Gas (LNG)	45.1923	**Natural Gas**	1TJ/ million scf 0.9479 mmbtu/GJ
Butane	50.393	**Ethane**	1,067.82 GJ/mscf
Propane	49.473	**Methane**	1,131.31 GJ/mscf

Electricity

Electricity	3.6 TJ/GWh	**Methane**	1,131.31 GJ/mscf

Petroleum Products (TJ/1000 Tonnes)

Crude Petroleum (imported)	42.6133	**Gas Oil/Diesel**	42.4960
Crude Petroleum (domestic)	43.3000	**Residual Fuel Oil**	41.4996
Plant Condensate	44.3131	**Naphtha**	44.1289
Aviation Gasoline (AV GAS)	43.9614	**White/Industry Spirit**	43.2078
Liquefied Petroleum Gas (LPG)	45.5440	**Lubricants**	42.1401
Petrol	43.9614	**Bitumen (Asphalt)**	41.8000
Natural Gas	44.8992	**Petroleum Waxes**	43.3334
Aviation Turbine Fuel (ATF)	43.1994	**Petroleum Coke**	36.4000
Kerosene	43.1994	**Other Petroleum Products**	42.4960

1,000 Tonnes Oil Equivalent (toe) = 41.84 TJ
Note : 1 Unless otherwise indicated
2 Assuming 9.7 TJ/1000 cu m

Crude Oil and Petroleum Products (Barrels to Tonnes)

Product	Barrels/tonne
Crude Oil - Import	7.33
- Local	7.60
Petrol	8.55
Diesel	7.50
Fuel Oil	6.60
Kerosene	7.90
Liquefied Petroleum Gas (LPG)	11.76
Aviation Turbine Fuel (ATF)	7.91
Aviation Gasoline (AV GAS)	9.05
Non-Energy	6.50

DEFINITION

The sources of energy covered in the Energy Balances are as below:

Natural Gas	Is a mixture of gaseous hydrocarbons (mainly methane), which occur in either gas fields or in association with crude oil in oil fields.
LNG	Is natural gas that is liquefied for ocean transportation and export
Crude Oil	Is natural product that is extracted from mineral deposits and consists essentially of many different non-aromatic hydrocarbons (paraffinic, cyclonic, etc.)
Aviation Gasoline (AV GAS)	Is a special blended grade of gasoline for use in aircraft engines of the piston type. Distillation range normally falls within 30 C and 200 C.
Liquefied Petroleum Gas (LPG)	Commercial LPG consists essentially of a mixture of propane and butane gases which are held in the liquid state by pressure or refrigeration.
Petrol	Petroleum distillate used as fuel in spark- ignition internal combustion engines. Distillation range is within 30 C and 250 C.
Aviation Turbine Fuel (ATF)	Fuel for use in aviation gas turbines mainly refined from kerosene. Distillation range within 150 C and 250 C.
Kerosene	Is a straight-run fraction from crude oil, with boiling range from150 C to 250 C. Its main uses are for domestic lighting and cooking.
Diesel (or Gas Oil)	Distillation falls within 200 C to 340 C. Diesel fuels for high-speed diesel engines (i.e. automotive) are more critical of fuel quality than diesel for stationary and marine diesel engines. Marine oil usually consists of a blend of diesel oil and some residual (asphaltic) material.
Fuel Oil	Heavy distillates, residues or blends of these, used as fuel for production of heat and power. Fuel oil production at the refinery is essentially a matter of selective blending of available components rather than of special processing. Fuel oil viscosities vary widely depending on the blend of distillates and residues.
Non-Energy Products	Refer mainly to naphtha bitumen and lubricants, which are obtained by the refinery process from petroleum but used for non-energy purposes. Naphtha is a refined or party refined light distillate, which is further, blended into motor gasoline or used as feed-stock in the chemical industry. Bitumen is a viscous liquid or solid, non-volatile and possesses waterproofing and adhesive properties. Lubricating oil is used for lubricating purposes and has distillation range within 380 C to 500 C.
Refinery Gas	The gas released during the distillation of crude oil and comprises methane, ethane, propane and butane. Most refinery gas is retained in the refinery and used as fuel in plant operations.
Coal and Coke	Solid fuels consisting essentially of carbon, hydrogen, oxygen sulphur. Coal in the energy balances is mainly bituminous coal (medium grade in terms of energy content) and some anthracite (high quality hard coal). Coke is obtained from coal by heating at high temperature in the absence of air.
Hydropower	Is the inferred primary energy available for electricity production and is shown in terms of conventional fossil fuel equivalent using the average thermal efficiency of conversion for the year, i.e. the hypothetical amount of fossil fuel, which would be needed to produce the same amount of electricity in existing thermal power plants.
Electricity Production	Production of electricity refers to production from public utilities as well as independent power producers (IPPs) and private installations & co-generation plants which obtain licenses from the Electricity Supply and Market Regulation Department. Figures for 'fuel input' into power stations & co-generation plants were only available for TNB, SEB, SESB, IPPs as well as GDC Sdn Bhd. Estimates were made using average conversion efficiency to obtain the fuel input into private installations.

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