Suruhanjaya Tenaga
Energy Commission

NATIONAL ENERGY BALANCE 2019

Suruhanjaya Tenaga
Energy Commission

PUBLISHED BY:

SURUHANJAYA TENAGA (ENERGY COMMISSION)
No. 12, Jalan Tun Hussein,
Precinct 2, 62100 Putrajaya,
Malaysia
Tel • +603 8870 8500
Fax • +603 8888 8637

www.st.gov.my
https://meih.st.gov.my

ISSN NO.: 0128 – 6323
ST Publication No.: ST (P) 02/02/2022

PRINTED IN MALAYSIA

TABLE

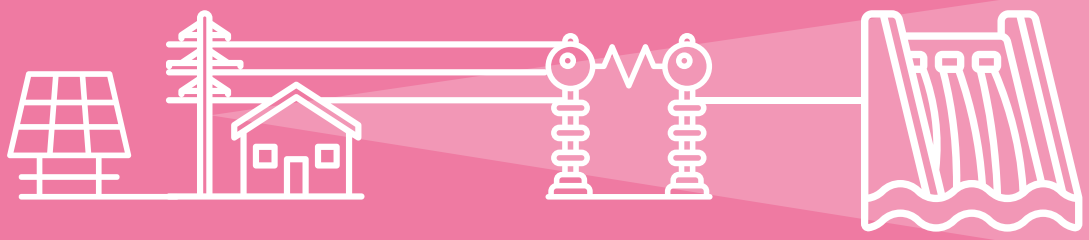
6 PREFACE
7 INTRODUCTION
8 DATA COMPILATION
9 EXECUTIVE SUMMARY

12 **Table 1:** Key Economic and Energy Data
13 **Table 2:** Key Economic and Energy Data by Region
16 **Figure 1:** Trends in GDP, Primary Energy Supply and Final Energy Consumption
17 **Figure 2:** Primary Energy Supply, Electricity Consumption and Final Energy Consumption per Capita
18 **Figure 3:** Trends in GDP and Electricity Consumption
19 **Figure 4:** Annual Growth Rates of GDP, Primary Energy Supply, Final Energy Consumption and Electricity Consumption
20 **Figure 5:** Primary and Final Energy Intensity
21 **Figure 6:** Electricity Intensity
22 **Figure 7:** Final Energy and Electricity Elasticity
23 **Figure 8:** Primary Energy Supply
24 **Figure 9:** Final Energy Consumption by Sectors
25 **Figure 10:** Final Energy Consumption by Fuel Type
26 **Figure 11:** Official Selling Prices of Malaysian Crude Oil
27 **Figure 12:** Ex-Singapore Prices of Major Petroleum Products
28 **Figure 13:** Annual Liquefied Petroleum Gas (LPG) Contract Prices – Arab Gulf
29 **Figure 14:** Average Annual Prices of Natural Gas in Malaysia
30 **Figure 15:** Final Energy Consumption per Capita in ASEAN
31 **Figure 16:** Final Energy Intensity in ASEAN
40 **Table 6:** Resources and Production of Natural Gas as of 1 January, 2019
40 **Table 7:** Consumption of Natural Gas in MMscf, 2019
41 **Figure 21:** Export and Import of Piped Natural Gas and LNG
42 **Figure 22:** Natural Gas Consumption by Sectors
43 **Figure 23:** Conversion in Gas Plants

34 **Table 3:** Resources and Production of Oil as of 1 January, 2019
34 **Table 4:** Refinery Licensed Capacity, 2019
34 **Table 5:** Breakdown on Sales of Petroleum Products in Thousand Barrels, 2019
35 **Figure 17:** Net Export of Crude Oil
36 **Figure 18:** Export and Import of Petroleum Products
37 **Figure 19:** Production of Petroleum Products from Refineries
38 **Figure 20:** Final Consumption for Petroleum Products
46 **Table 8:** Resources and Production of Coal as of 31 December, 2019
46 **Table 9:** Consumption of Coal in Metric Tonnes, 2019
47 **Figure 24:** Net Import of Coal
48 **Figure 25:** Coal Consumption by Sectors

OF CONTENTS

ELECTRICITY



50 **Table 10:** Installed Capacity as of 31 December 2019, in MW

51 **Figure 26:** Share of Installed Capacity as of 31 December, 2019

51 **Table 11:** Available Capacity as of 31 December 2019, in MW

52 **Figure 27:** Share of Available Capacity as of 31 December, 2019

53 **Table 12:** Installed Capacity of Major Hydro Power Stations, 2019

54 **Table 13:** Installed Capacity of Mini Hydro Power Stations, 2019

55 **Table 14:** Transmission Network in Circuit – kilometres, 2019

55 **Table 15:** Distribution Network in Circuit – kilometres, 2019

55 **Table 16:** Gross Generation, Consumption, Available Capacity, Peak Demand and Reserve Margin for Electricity in Malaysia, 2019

56 **Figure 28:** Energy Input in Power Stations, 2019

56 **Figure 29:** Generation Mix by Fuel Type, 2019

57 **Table 17:** Electricity Consumption by Sectors in GWh, 2019

57 **Figure 30:** Electricity Consumption by Sectors in 2019

58 **Figure 31:** Electricity Consumption by Sectors in 2019

59 **Table 18:** Electricity Generation and Installed Capacity of Renewable Energy by Public Licensees by Region in 2019

60 **Table 19:** Electricity Generation and Installed Capacity of Renewable Energy by Private Licensees by Region in 2019

KEY ENERGY STATISTICS

62 **Table 20:** Primary Energy Supply in ktoe

63 **Table 21:** Net Import and Export of Energy in ktoe

64 **Table 22:** Conversion in Gas Plants in ktoe

65 **Table 23:** Conversion in Refineries in ktoe

66 **Table 24:** Conversion in Power Stations (exclude co-generation & private licensed plants) in ktoe

67 **Table 25:** Final Energy Consumption by Sectors in ktoe

68 **Table 26:** Final Energy Consumption by Type of Fuel in ktoe

69 **Table 27:** Final Consumption for Petroleum Products in ktoe

70 **Table 28:** Selected Energy and Economic Indicators (1990-2019)

72 **Table 29:** Energy Balance Table in 2019 (kilotonnes of oil equivalent)

76 **ENERGY FLOW CHART**

NOTES ON ENERGY BALANCE

78 Energy Balance Format

79 Notes on Electricity

79 Notes on Coal

79 Notes on GDP

80 Notes on GNI

80 **CONVERSION COEFFICIENTS AND EQUIVALENCE**

81 **DEFINITION**

PREFACE

In recent years, the energy landscape in Malaysia encountered rapid transformations, driven by the rise of renewable energy (RE), new technologies, and emphasis placed on energy efficiency, among others. The current electricity regulation regime is also influenced by decarbonisation, digitisation and decentralisation where most developed countries are already advocating. All of these seem new to Malaysia, but developed countries have long advocated for these practices, therefore it is best that we learn from their best practices. In realising the Commission's vision to be a world class regulator, numerous efforts need to be undertaken, especially in areas of research and study on the best regulatory and governance regimes that will propel us forward.

The energy sector is the biggest carbon dioxide emitter in Malaysia and therefore boosting the RE capacity could potentially offset the emission from fossil fuel plants on top of reducing energy usage and wastage. Solar photovoltaic capacity in Malaysia has increased tremendously since the launch of the Large Scale Solar (LSS) and Net Energy Metering (NEM) programmes in 2017. A lot have been accomplished since they were first introduced in 2012 under the Feed-in-Tariff scheme. Altogether, Malaysia would be more than able to deliver its target of achieving 31% of RE in the total installed capacity by year 2025. This is also in line with our renewed commitment to reduce greenhouse gas (GHG) emission intensity by 45% unconditionally by 2030 from its 2005 level. Although RE seems like the ideal solution, there remain limitations on the national grid.

Numerous technologies are currently researched worldwide, to reduce GHG emission and one of them is Carbon Capture, Utilisation and Storage (CCUS). CCUS is basically focused on converting high concentrated carbon dioxide emitted by fossil fuel plants into a useful chemical that is commercially used or storing it permanently in geological formations, oceans or soil. CCUS is an effective way of removing carbon dioxide from the atmosphere but there are still limitations and constraints that could hinder its commercial implementation. Aside from CCUS, hydrogen fuel could potentially be an environmentally friendly alternative, substituting some of the conventional fuels still used in Malaysia. It is gaining popularity in Japan, and other ASEAN countries are most likely to follow suit.

For the time being, to integrate these new technologies mentioned above, such as hydrogen and CCUS into an energy statistics report such as the energy balance is a challenge. Hydrogen do not possess thermal characteristics thus the formulation of relevant energy units is impractical. Furthermore, there are no set standards for these fuels to be included in energy statistics. However, with the support from international agencies such as the International Energy Agency (IEA), United Nations Statistics Division (UNSD) and Asia Pacific Energy Research Centre (APERC) we hope that we can overcome this challenge and eventually devise a methodology to include these new technologies into the energy balance.

I would like to express my heartfelt gratitude to our honourable Prime Minister, Minister of Energy and Natural Resources, the Ministry of Energy and Natural Resources and the Economic Planning Unit (EPU) for their continuous support and guidance in realising the National Energy Balance (NEB) each year. My appreciation also goes out to all our stakeholders and data providers for their contributions especially the timely and systematic way data is provided to the Commission. It is my sincere belief that this report will be a useful guide for policy makers and authorities to make sound decisions for the future of the country's energy landscape.

We look forward to working together again in the future.

Thank you.

Dato' Azian Osman
Chairman
Energy Commission Malaysia

INTRODUCTION

In 2019, the economy grew at the rate of 4.3% (2018: 4.7%) and it is mainly driven by the private sector spending. It has been a rather challenging year globally and Malaysia had also not been spared. This circumstance was brought forth by issues such as unresolved trade tensions, slower investments and trading activities, coupled with geopolitical instabilities. Towards the end of 2019, the world is shocked by the Coronavirus disease (COVID-19) pandemic which had affected our country's economic and social wellbeing. Nevertheless, amid all these challenges, the Malaysian economy managed to expand at a moderate growth.

Total primary energy supply (TPES) increased by 2.9% (2018: 1.7%) compared to the previous year and this is primarily driven by an increase in the oil supply. Crude oil recorded a higher import of 10,306 ktoe compared to 9,239 ktoe in 2018. The TPES of coal on the other hand, reported a decline of 5.5% which resulted from lower imports as consumption for coal especially in the Peninsular Malaysia's power plants has declined compared to the previous year. The trend for other fuels' supply did not differ from the previous year. In 2019, natural gas and oil (which includes crude oil and petroleum products) constituted three-quarters of the total primary energy supply, followed by coal and renewable energy (RE) with shares of 21.4% and 3.4% respectively.

Final energy consumption has also increased by 2.8% in 2019 (2018: 3.5%). The transport and commercial sector showed significant increase from the previous year, by 6.2% and 5.2% respectively. The industry sector's energy consumption has declined slightly from 19,046 to 18,921 ktoe. Similarly, the residential sector's consumption also has reduced slightly from 3,343 ktoe to 3,339 ktoe. The agriculture sector's consumption reduced from 1,021 to 927 ktoe. With regards to its share, the transport and industry sector still dominate the top spots for the biggest energy consumer with each taking up 37.6% and 28.5% of the total energy consumption. This is followed by the non-energy sector at 20.5%, commercial sector at 7.0%, residential sector at 5.0% and the remainder 1.4%, which is consumed by agriculture.

Installed capacity recorded at the end of December 2019 was 36,121 MW. Natural gas plants had the biggest capacity in the country with a total of 14,403 MW, followed closely by coal plants with 13,284 MW. The total capacity of coal plants has increased with the commissioning of Jimah East power plant in Peninsular as well as Balingian power plant in Sarawak. The share of RE in the total installed capacity, as expected has risen from 7,597 MW to 7,773 MW or an increment of 2.3%. Solar power shows the most significant increase, from 797.1 MW to 996.4 MW in the span of one year. This is in line with the Government's aspiration to achieve 31% of RE in the capacity mix by year 2025. As of 2019, the RE capacity stands at 21.5% (including self-generation plants).

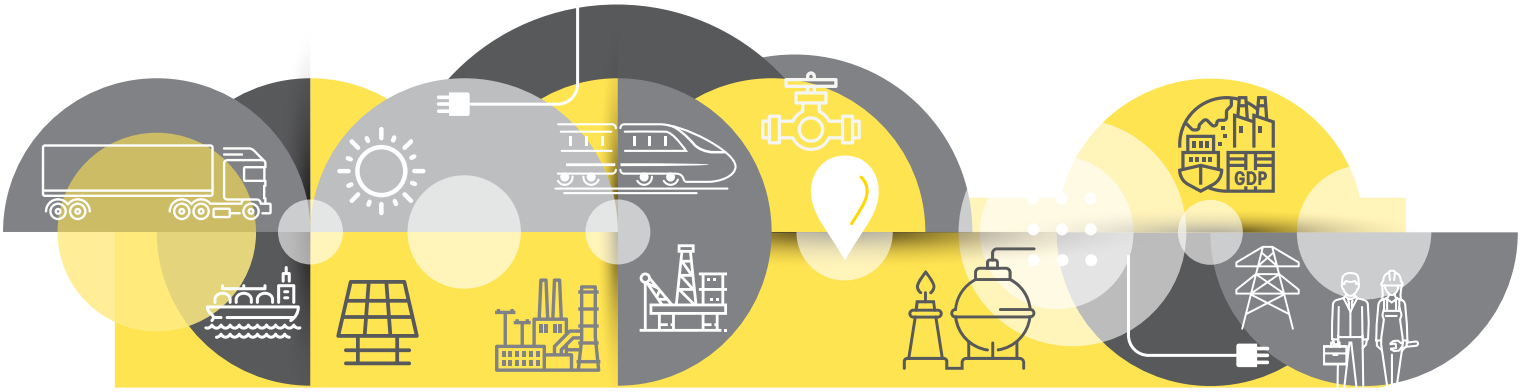
Electricity generation (excluding self-generation plants) increased by 5.1%, to 171,672 GWh. The generation mix showed coal as the largest source of fuel at 44.5%, followed by natural gas at 38.6%, hydro at 15.3%, RE at 1.2% and the remainder 0.5% in oil. Like electricity generation, the trend of electricity consumption also went up by 3.8%, from 152,866 GWh to 158,603 GWh. Industry sector was the largest electricity consumer with 78,427 GWh, followed by the commercial and residential sectors with 45,713 GWh and 33,322 GWh respectively. The remainder of the electricity was consumed by the transport and agriculture sectors. Although the transport sector only takes up about 0.3% of the total consumption, there is a notable increase in the value each year as the number of electric vehicles on the road has risen. Overall, all sectors showed a positive or negative growth with no remarkable difference noted.

Malaysia's primary energy intensity declined by 1.5% while the final energy intensity also declined by 1.5%. The industry sector intensity shows an identical trend, with a decline of 1.8%. The decline in electricity intensity is a positive indication that energy efficiency has improved compared to the previous year. This goes to show that awareness campaigns on energy efficiency is paying off.

I would like to take this opportunity to extend my sincere appreciation to our honourable Prime Minister, Minister of Energy and Natural Resources and the Economic Planning Unit (EPU) for their invaluable efforts rendered to produce the National Energy Balance (NEB) 2019. I am also grateful to our Government Agencies, power utilities, independent power producers, oil and gas companies, iron and steel manufacturers, coal producers, cement manufacturers, and everyone involved for the continuous support in providing relevant and accurate data in a timely manner. We hope that this report will be a useful tool for reference and guidance in the formulation of policies, research, as well as energy planning for the future of our energy industry.

Ts Abdul Razib 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

For decades, Malaysia has been self-sufficient where energy is concerned, and credit should be given to our Mother Nature for providing abundant natural resources in the country. The self-sufficiency rate is calculated by taking the ratio between the primary energy supply and final energy consumption. Although Malaysia have been heavily relying on oil for energy in the 90s, strategies were formulated to diversify the energy resources when the country was hit with the economic crisis in 1997. One of the strategies implemented was by adding coal and natural gas into the equation to ensure energy security. Since then, the energy sector has evolved and now we are observing the rise of renewable energy (RE) in our system.

Our economy grew at a rate of 4.3% (2018: 4.7%), following a challenging economic environment and supply disruptions. Despite these challenges, the Malaysian economy managed to expand moderately. Towards the end of 2019, the world was shaken by the widespread of the Coronavirus disease (COVID-19) pandemic. Economists projected a negative growth worldwide as countries battle with the pandemic and inevitable lockdown implementation which had push businesses to the brink of bankruptcy.

In 2019, the total primary energy supply increased by 2.9% (2018: 1.7%) and similarly, the total final energy consumption also increased by 2.8% (2018: 3.5%).

PRIMARY ENERGY SUPPLY

Primary energy supply marked an increase of 2.9% from the previous year's level to register at 98,681 ktoe (2018: 95,909 ktoe). All fuels recorded an increase except for coal, where it showed a negative growth by 5.5%. This was due to lower imports of coal in 2019 compared to the previous year especially in Peninsular Malaysia. Meanwhile in Sarawak, a fire accident which halted all operations at a power station during the second quarter of 2019 resulted in a lower coal supply for that year.

In terms of fuel share, the breakdown is almost similar to the previous year, where natural gas has the biggest share of 42.0%, followed by crude oil, petroleum products and others at 33.3%, coal and coke at 21.4% and RE at 3.4%.

ENERGY TRANSFORMATION

Malaysia is blessed with ample energy resources such as oil and gas, therefore facilities have been built to transform these raw and crude primary energy sources into usable secondary energy sources. These secondary energy sources can be used locally or exported to other countries. In general, there are three (3) types of energy transformation facilities in the country, which are gas plants, oil refineries and power stations.

Generally, there are four (4) types of gas plants in Malaysia, namely Malaysia Liquified Natural Gas (MLNG) that transforms natural gas into Liquified Natural Gas (LNG), Gas Processing Plant – Liquified Petroleum Products (GPP-LPG) that transforms natural gas into Liquid Petroleum Gas (LPG), Middle Distillate Synthesis (MDS) plant that transforms natural gas into petroleum products and the Regasification Gas Terminal (RGT) that transforms LNG into natural gas.

The MLNG and FLNG produced a total of 27,802 ktoe of LNG and 30 ktoe of LPG which showed an increase of 7.2% from 2018. The MDS plant produced 425 ktoe of petroleum products where there was a reduction from 501 ktoe in the previous year. GPP-LPG and RGT plants both showed an increase in output production for 2019, registering at 2,107 ktoe and 1,954 ktoe respectively.

As of 31 December 2019, Malaysia's total refinery capacity is at 492 thousand barrels per day which excludes 74.3 thousand barrels per day of condensates splitter. 25,207 ktoe of crude oil was utilised in the refinery plant as feedstock to produce petroleum products such as petrol, diesel, kerosene, LPG, fuel oil, Aviation Turbine Fuel (ATF) & Aviation Gas (AV GAS), and other non-energy products. Out of the crude oil input, it produces secondary energy products with a total amount of 23,082 ktoe. The refinery input and output has slightly reduced compared to the previous year and this has to do with the demand of the product during that year. From the 23,082 ktoe total production, 36.8% is diesel, 23.0% is petrol, 16.1% is non-energy products, 15.0% is ATF & AV GAS, 6.0% is fuel oil, 2.4% is LPG while the remaining is kerosene and refinery gas.

ELECTRICITY

Total installed capacity in Malaysia for 2019 was 36,121 MW. Natural gas and coal dominate the chart making up three-quarters of the total installed capacity in Malaysia. RE capacity totalled up to 21.5% with its energy capacity increased by 2.3% from the previous year. This is a good indication of achieving our national target of 31% RE in the capacity mix by 2025. To reach this target, we have ramped up our solar capacity with the launch of Large Scale Solar (LSS) 2.0 as well as Net Energy Metering (NEM) 2.0 with the quota uptake of 500 MW. From the total installed capacity, 78.4% is in Peninsular Malaysia, 15.8% is in Sarawak and the remaining 5.8% is in Sabah.

The peak demand, a point when the electricity consumption is at its highest at a time of a day, was recorded at 18,566 MW in Peninsular Malaysia which showed a 1.2% increase compared to 18,338 MW in 2018. In Sabah, the peak demand rose by 4.8% (955 MW to 1,001 MW) and in Sarawak, the peak demand rose by 7.8% (3,504 MW to 3,777 MW).

The total electricity generation (excluding self-generation plants) in 2019 was recorded at 171,672 GWh, an increase of 5.1% from 2018 level which was at 163,366 GWh. Coal remained the most used fuel to generate electricity with a total of 44.5% in the generation mix. This was followed by natural gas at 38.6%, hydropower at 15.3%, renewables at 1.2% and oil at 0.5%. The total electricity consumption stood at 158,603 GWh in 2019, which showed an increase by 3.8% from the 2018 level. From the total electricity consumption, Peninsular Malaysia tops the list at 79.0%, followed by Sarawak at 17.3% and Sabah at 3.8%. Almost half of Malaysia's total electricity consumption was taken up by the industry sector at 49.4% or 78,427 GWh. The commercial sector consumed 28.8% of total electricity consumption while the residential sector consumed 21.0%. Out of the total consumption, the agriculture and transport sectors consumed 0.4% and 0.3% respectively.

FINAL ENERGY CONSUMPTION

In 2019, the total energy consumption was reported to be 66,483 ktoe, an increase by 2.8% from the previous year. Only the agriculture and industry sectors showed a downward trend in consumption whereas the other sectors showed an increase. The transportation sector posted the highest growth of 6.1% due to the higher growth of petrol and diesel at 6.4% and 4.3% respectively. This was in line with the increment of new passenger vehicles registered in Malaysia by 3.2% in 2019. The agriculture and industry sectors' consumption reduced slightly from the previous year by 9.2% and 0.7% respectively. In terms of share, the industry and transport sectors still dominate, constituting almost three-quarters of the total energy consumption in 2019. This is followed by the non-energy sector, commercial, residential and agriculture sectors with their share of 20.5%, 7.0%, 5.0% and 1.4% respectively.

Malaysia's final energy consumption per capita increased by 2.4% to settle at 2.04 toe per capita as compared to 2.00 toe per capita in 2018. However, the final energy intensity dropped from 47.41 toe/RM Million to 46.68 toe/RM Million. Electricity intensity also decreased at a rate of 0.9% from 0.112 GWh/RM Million to 0.111 GWh/RM Million, which indicates an improvement in efficiency. In 2019, better indication of elasticity is observed in the final energy with a value of 0.64, while electricity shows a value of 0.85.

CONCLUSION

Overall, Malaysia performed adequately well despite all the headwinds affecting the country's economic growth. The Coronavirus disease (COVID-19) pandemic is expected to continue to affect the economy and as long as herd immunity is not achieved through the country's vaccination programme, it will be challenging for the economy to bounce back to its usual rate. The energy sector is the backbone of a country, and with the economic landscape getting more demanding each year, it is vital that the energy sector promotes stability and has a mechanism that can cushion the impact of any disruptions such as the Coronavirus disease (COVID-19) pandemic. More RE capacity is expected as the Government ramps up its effort to achieve the national target of 31% in the capacity mix by 2025.

KEY ECONOMIC AND ENERGY DATA

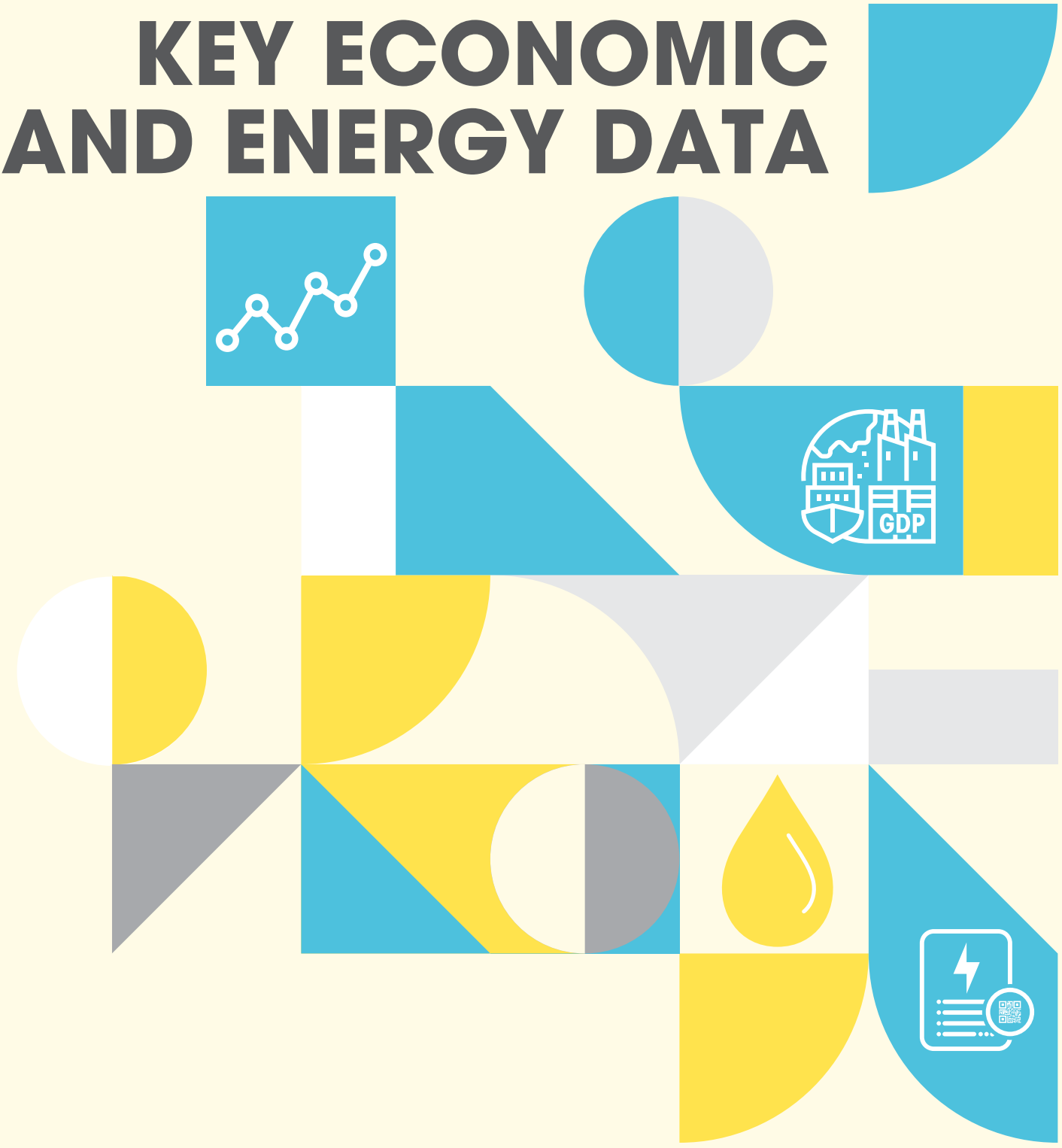


TABLE 1: KEY ECONOMIC AND ENERGY DATA

	2019				
	Q1	Q2	Q3	Q4	Total
GDP at current prices (RM million)*	362,556	371,803	382,470	396,329	**1,513,157**
GDP at 2015 prices (RM million)*	342,398	350,017	361,257	370,638	**1,424,310**
GNI at current prices (RM million)*	353,560	366,551	372,907	380,644	**1,473,662**
Population ('000 people)**	32,488	32,523	32,557	32,590	**32,523**
Primary Energy Supply (ktoe)	24,214	25,037	24,247	25,182	**98,681**
Final Energy Consumption (ktoe)	16,786	16,522	16,031	17,145	**66,483**
Electricity Consumption (ktoe)	3,328	3,501	3,429	3,389	**13,647**
Electricity Consumption (GWh)	38,677	40,690	39,850	39,386	**158,603**
PER CAPITA					
GDP at Current Prices (RM)*	44,639	45,728	46,991	48,644	**46,526**
Primary Energy Supply (toe)	0.745	0.770	0.745	0.773	**3.034**
Final Energy Consumption (toe)	0.517	0.508	0.492	0.526	**2.044**
Electricity Consumption (kWh)	1,190	1,251	1,224	1,209	**4,877**
ENERGY INTENSITY					
Primary Energy Supply (toe/GDP at 2015 prices (RM million))	70.72	71.53	67.12	67.94	**69.28**
Final Energy Consumption (toe/GDP at 2015 prices (RM million))	49.0	47.2	44.4	46.3	**46.7**
Electricity Consumption (toe/GDP at 2015 prices (RM million))	9.7	10.0	9.5	9.1	**9.6**
Electricity Consumption (GWh/GDP at 2015 prices (RM million))	0.113	0.116	0.110	0.106	**0.111**

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

TABLE 2: KEY ECONOMIC AND ENERGY DATA BY REGION

PENINSULAR MALAYSIA	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
GDP at Current Prices (RM million)*	684,057	751,734	806,569	849,891	925,232	975,581	1,038,585	1,131,602	1,193,129	1,254,361
GDP at 2015 Prices (RM million)*	744,624	784,737	833,245	873,486	928,517	975,581	1,020,869	1,080,017	1,137,581	1,192,112
Population ('000 people)**	22,753	23,099	23,417	23,868	24,281	24,669	24,995	25,303	25,593	25,713
Final Energy Consumption (ktoe)	35,593	35,968	36,683	41,859	42,470	43,011	45,872	46,520	47,446	48,085
Electricity Consumption (ktoe)	8,145	8,427	8,791	9,108	9,315	9,531	10,026	10,004	10,378	10,776
Electricity Consumption (GWh)	94,666	97,939	102,174	105,861	108,259	110,770	116,529	116,272	120,617	125,238
PER CAPITA										
GDP at Current Prices (RM)*	30,064	32,544	34,444	35,608	38,105	39,547	41,551	44,722	46,619	48,783
Final Energy Consumption (toe)	1.564	1.557	1.567	1.754	1.749	1.744	1.835	1.839	1.854	1.870
Electricity Consumption (kWh)	4,161	4,240	4,363	4,435	4,459	4,490	4,662	4,595	4,713	4,871
ENERGY INTENSITY										
Final Energy Consumption (toe/GDP at 2015 prices (RM million))	47.8	45.8	44.0	47.9	45.7	44.1	44.9	43.1	41.7	40.3
Electricity Consumption (toe/GDP at 2015 prices (RM million))	10.9	10.7	10.6	10.4	10.0	9.8	9.8	9.3	9.1	9.0
Electricity Consumption (GWh/GDP at 2015 prices (RM million))	0.127	0.125	0.123	0.121	0.117	0.114	0.114	0.108	0.106	0.105

Note (*): 1. GDP data by States 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 States from 2010 until 2014 were estimated by the Energy Commission

(**): 1. Mid-year population from the Department of Statistics Malaysia

Sabah	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
GDP at Current Prices (RM million)*	62,043	70,269	71,958	72,981	78,258	79,775	86,924	101,904	108,058	106,607
GDP at 2015 prices (RM million)*	64,926	66,693	69,014	71,531	75,093	79,775	83,930	90,583	92,253	93,063
Population ('000 people)**	3,348	3,435	3,523	3,703	3,764	3,816	3,900	3,954	3,997	4,004
Final Energy Consumption (ktoe)	2,758	3,466	4,671	4,097	4,128	3,845	5,015	9,512	6,598	6,561
Electricity Consumption (ktoe)	355	368	425	439	423	499	487	477	484	514
Electricity Consumption (GWh)	4,127	4,275	4,943	5,097	4,919	5,805	5,665	5,545	5,630	5,979
PER CAPITA										
GDP at Current Prices (RM)*	18,530	20,457	20,424	19,709	20,793	20,908	22,291	25,776	27,032	26,627
Final Energy Consumption (toe)	0.824	1.009	1.326	1.106	1.097	1.008	1.286	2.406	1.651	1.639
Electricity Consumption (kWh)	1,233	1,245	1,403	1,377	1,307	1,521	1,453	1,402	1,408	1,493
ENERGY INTENSITY										
Final Energy Consumption (toe/GDP at 2015 prices (RM million))	42.5	52.0	67.7	57.3	55.0	48.2	59.8	105.0	71.5	70.5
Electricity Consumption (toe/GDP at 2015 prices (RM million))	5.5	5.5	6.2	6.1	5.6	6.3	5.8	5.3	5.3	5.5
Electricity Consumption (GWh/GDP at 2015 prices (RM million))	0.064	0.064	0.072	0.071	0.066	0.073	0.067	0.061	0.061	0.064

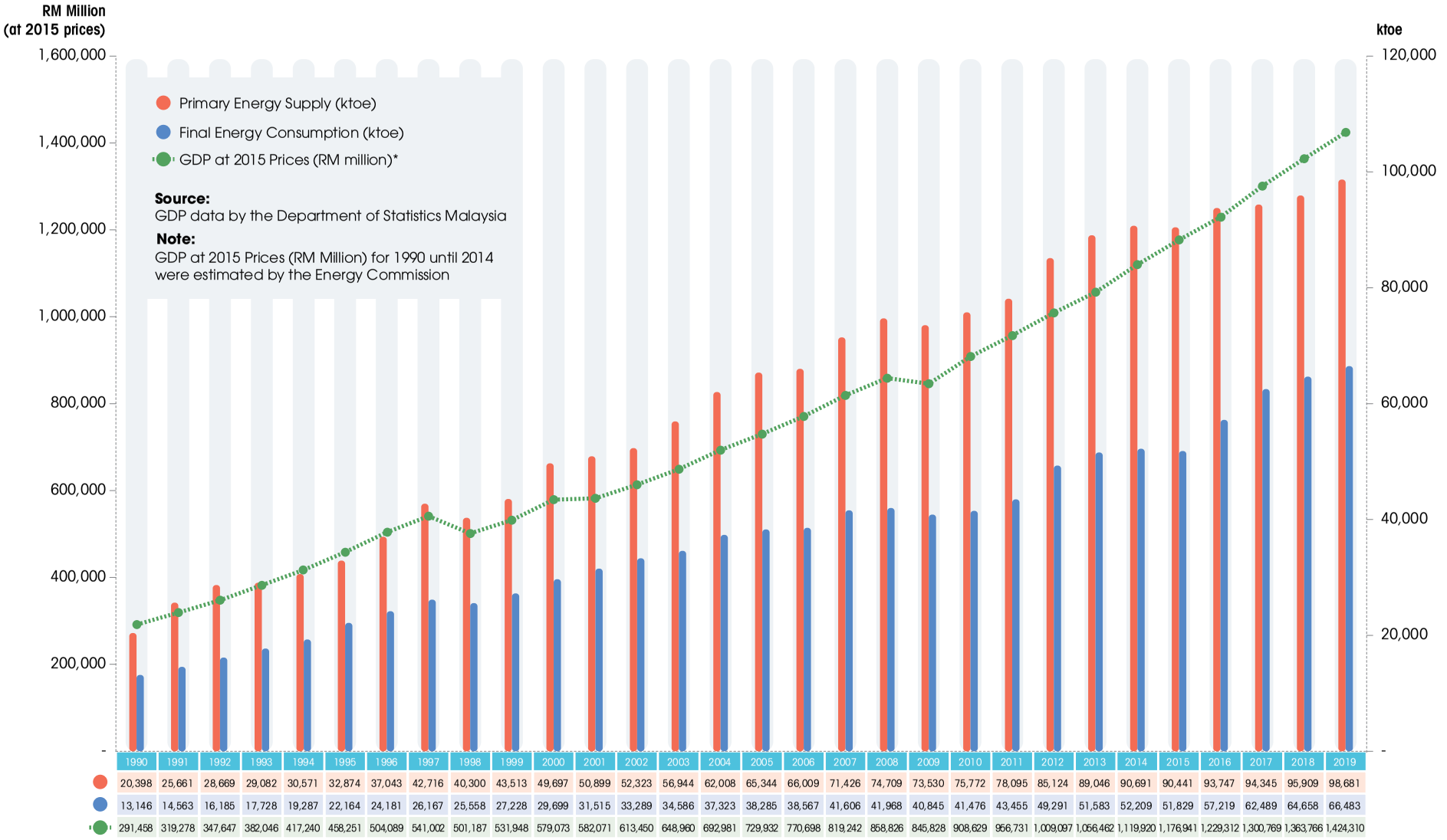
Note (*): 1. GDP data by States from the Department of Statistics Malaysia
2. GDP and population for Sabah includes WP Labuan
3. GDP data by States from 2010 until 2014 were estimated by the Energy Commission

(**): 1. Mid-year population from the Department of Statistics Malaysia

Sarawak	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
GDP at Current Prices (RM million)*	88,935	104,840	108,833	112,650	121,323	121,585	124,189	138,804	146,264	149,724
GDP at 2015 prices (RM million)*	99,653	106,023	107,524	112,186	117,070	121,585	124,513	130,169	132,981	136,279
Population ('000 people)**	2,487	2,528	2,570	2,643	2,664	2,702	2,739	2,766	2,792	2,806
Final Energy Consumption (ktoe)	3,125	4,086	5,358	5,628	5,612	4,951	6,331	6,458	10,614	11,838
Electricity Consumption (ktoe)	493	445	795	1,043	1,304	1,344	1,878	2,126	2,290	2,356
Electricity Consumption (GWh)	5,730	5,172	9,237	12,118	15,152	15,624	21,831	24,703	26,618	27,386
PER CAPITA										
GDP at Current Prices (RM)*	40,068	41,941	41,843	42,455	43,945	45,007	45,464	47,055	47,634	48,567
Final Energy Consumption (toe)	1.256	1.616	2.085	2.130	2.106	1.833	2.312	2.335	3.802	4.219
Electricity Consumption (kWh)	2,304	2,046	3,594	4,586	5,688	5,784	7,971	8,930	9,535	9,760
ENERGY INTENSITY										
Final Energy Consumption (toe/GDP at 2015 prices (RM million))	31.4	38.5	49.8	50.2	47.9	40.7	50.8	49.6	79.8	86.9
Electricity Consumption (toe/GDP at 2015 prices (RM million))	4.9	4.2	7.4	9.3	11.1	11.1	15.1	16.3	17.2	17.3
Electricity Consumption (GWh/GDP at 2015 prices (RM million))	0.057	0.049	0.086	0.108	0.129	0.129	0.175	0.190	0.200	0.201

Note (*): 1. GDP data by States from the Department of Statistics Malaysia
2. GDP data by States from 2010 until 2014 were estimated by the Energy Commission
(**): 1. Mid-year population from the Department of Statistics Malaysia

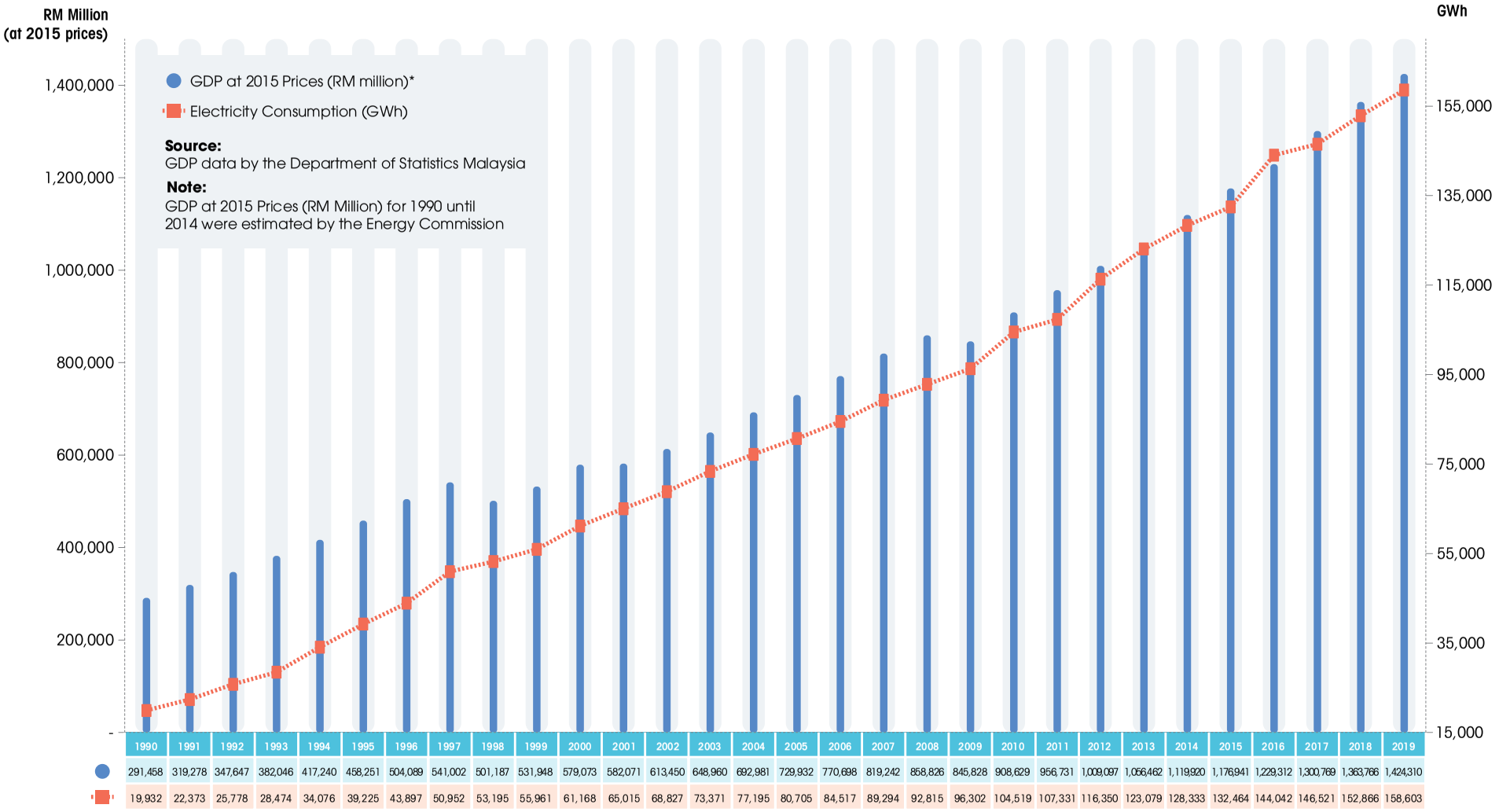
FIGURE 1: TRENDS IN GDP, PRIMARY ENERGY SUPPLY AND FINAL ENERGY CONSUMPTION



	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	2018	2019
Primary Energy Supply (ktoe)	20,398	25,661	28,669	29,082	30,571	32,874	37,043	42,716	40,300	43,513	49,697	50,899	52,323	56,944	62,008	65,344	66,009	71,426	74,709	73,530	75,772	78,095	85,124	89,046	90,691	90,441	93,747	94,345	95,909	98,681
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	51,829	57,219	62,489	64,658	66,483
GDP at 2015 Prices (RM million)*	291,458	319,278	347,647	382,046	417,240	458,251	504,089	541,002	501,187	531,948	579,073	582,071	613,450	648,960	692,981	729,932	770,698	819,242	858,826	845,828	908,629	956,731	1,009,097	1,056,462	1,119,920	1,176,941	1,229,312	1,300,769	1,363,766	1,424,310

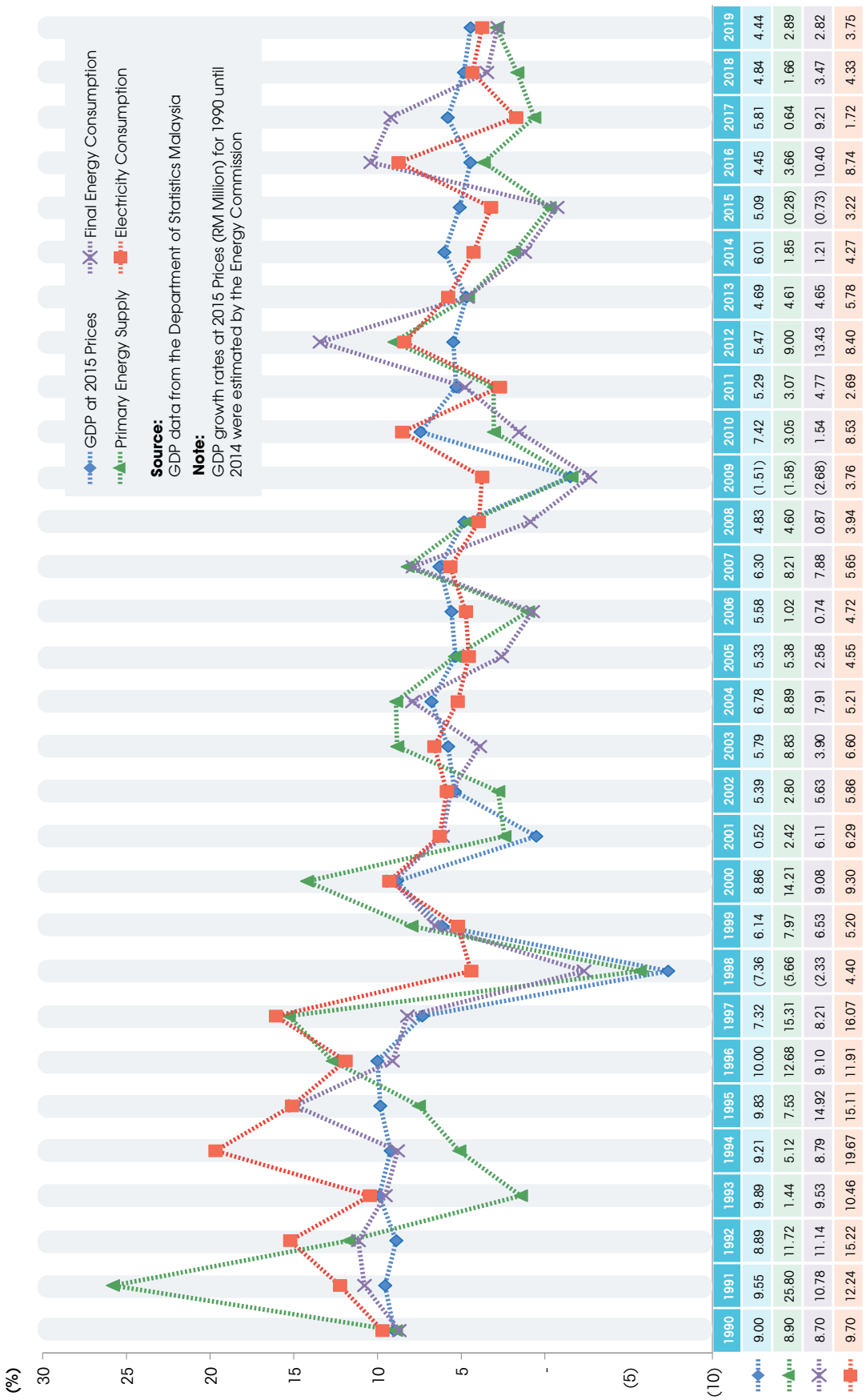
FIGURE 2: PRIMARY ENERGY SUPPLY, ELECTRICITY CONSUMPTION AND FINAL ENERGY CONSUMPTION PER CAPITA

FIGURE 3: TRENDS IN GDP AND ELECTRICITY CONSUMPTION



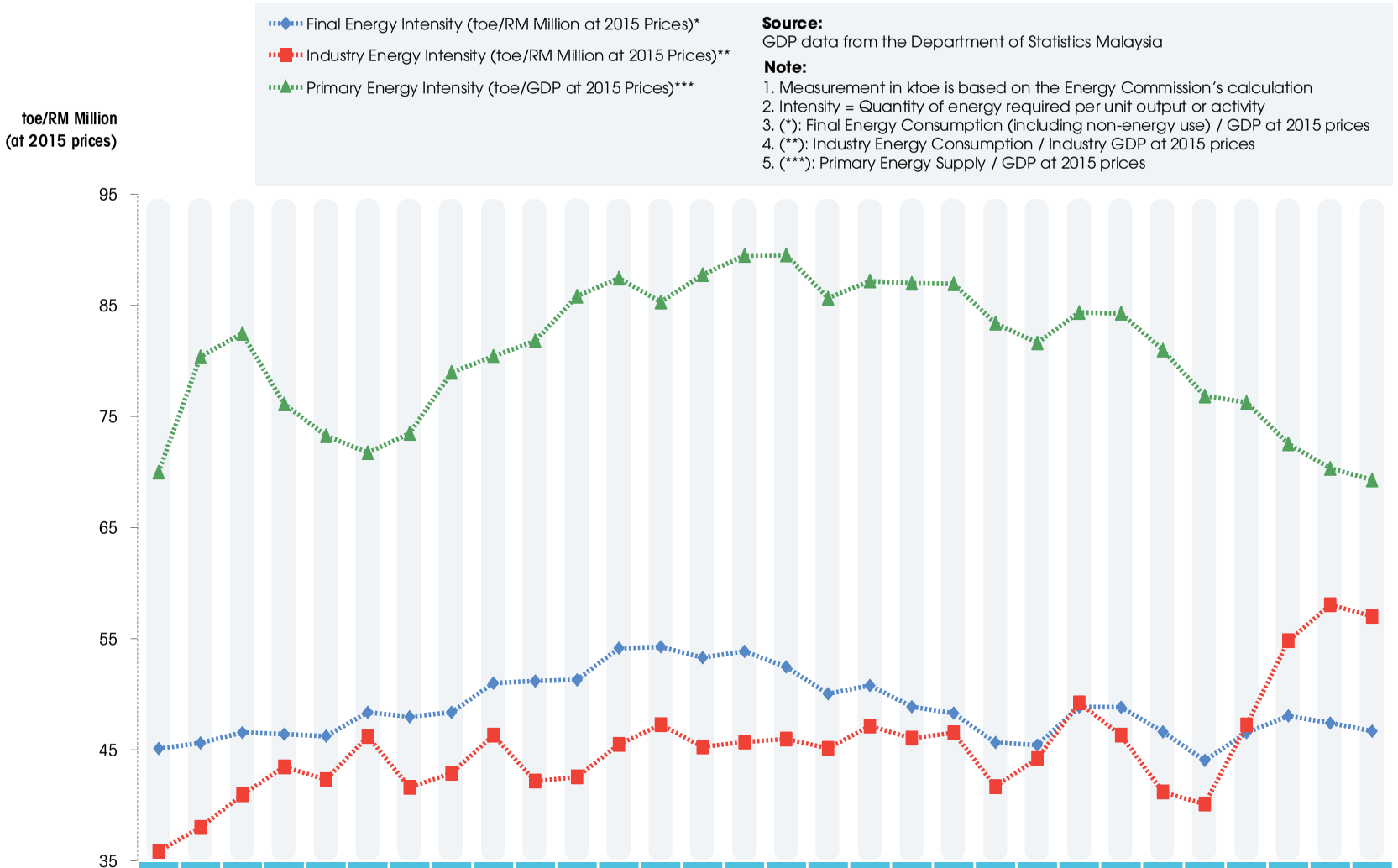
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
●	291,458	319,278	347,647	382,046	417,240	458,251	504,089	541,002	501,187	531,948	579,073	582,071	613,450	648,960	692,981	729,932	770,698	819,242	858,826	845,828	908,629	956,731	1,009,097	1,056,462	1,119,920	1,176,941	1,229,312	1,300,769	1,363,766	1,424,310
■	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	132,464	144,042	146,521	152,866	158,603

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	2018	2019
GDP at 2015 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	4.45	5.81	4.84	4.44
Primary Energy Supply	8.90	25.80	11.72	1.44	5.12	7.53	12.68	15.31	(5.66	7.97	14.21	2.42	2.80	8.83	8.89	5.38	1.02	8.21	4.60	(1.58)	3.05	3.07	9.00	4.61	1.85	(0.28)	3.66	0.64	1.66	2.89
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	2.68	0.74	7.88	0.87	(2.68)	1.54	4.77	13.43	4.65	1.21	(0.73)	10.40	9.21	3.47	2.82
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	4.33	3.75

FIGURE 5: PRIMARY AND FINAL ENERGY INTENSITY



Source:
GDP data from the Department of Statistics Malaysia

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. (*): Final Energy Consumption (including non-energy use) / GDP at 2015 prices
4. (**): Industry Energy Consumption / Industry GDP at 2015 prices
5. (***): Primary Energy Supply / GDP at 2015 prices

	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	2018	2019
Final Energy Intensity (toe/RM Million at 2015 Prices)*	45.10	45.61	46.56	46.40	46.23	48.37	47.97	48.37	50.99	51.19	51.29	54.14	54.27	53.29	53.86	52.45	50.04	50.79	48.87	48.29	45.65	45.42	48.85	48.83	46.62	44.04	46.55	48.04	47.41	46.68
Industry Energy Intensity (toe/RM Million at 2015 Prices)**	35.86	38.00	40.94	43.46	42.31	46.20	41.61	42.90	46.31	42.18	42.55	45.48	47.26	45.26	45.69	45.97	45.13	47.14	46.04	46.53	41.69	44.22	49.23	46.31	41.20	40.12	47.23	54.80	58.04	57.01
Primary Energy Intensity (toe/GDP at 2015 Prices)***	69.99	80.37	82.47	76.12	73.27	71.74	73.49	78.96	80.41	81.80	85.82	87.44	85.29	87.75	89.48	89.52	85.65	87.19	86.99	86.93	83.39	81.63	84.36	84.29	80.98	76.84	76.26	72.53	70.33	69.28

FIGURE 6: ELECTRICITY INTENSITY

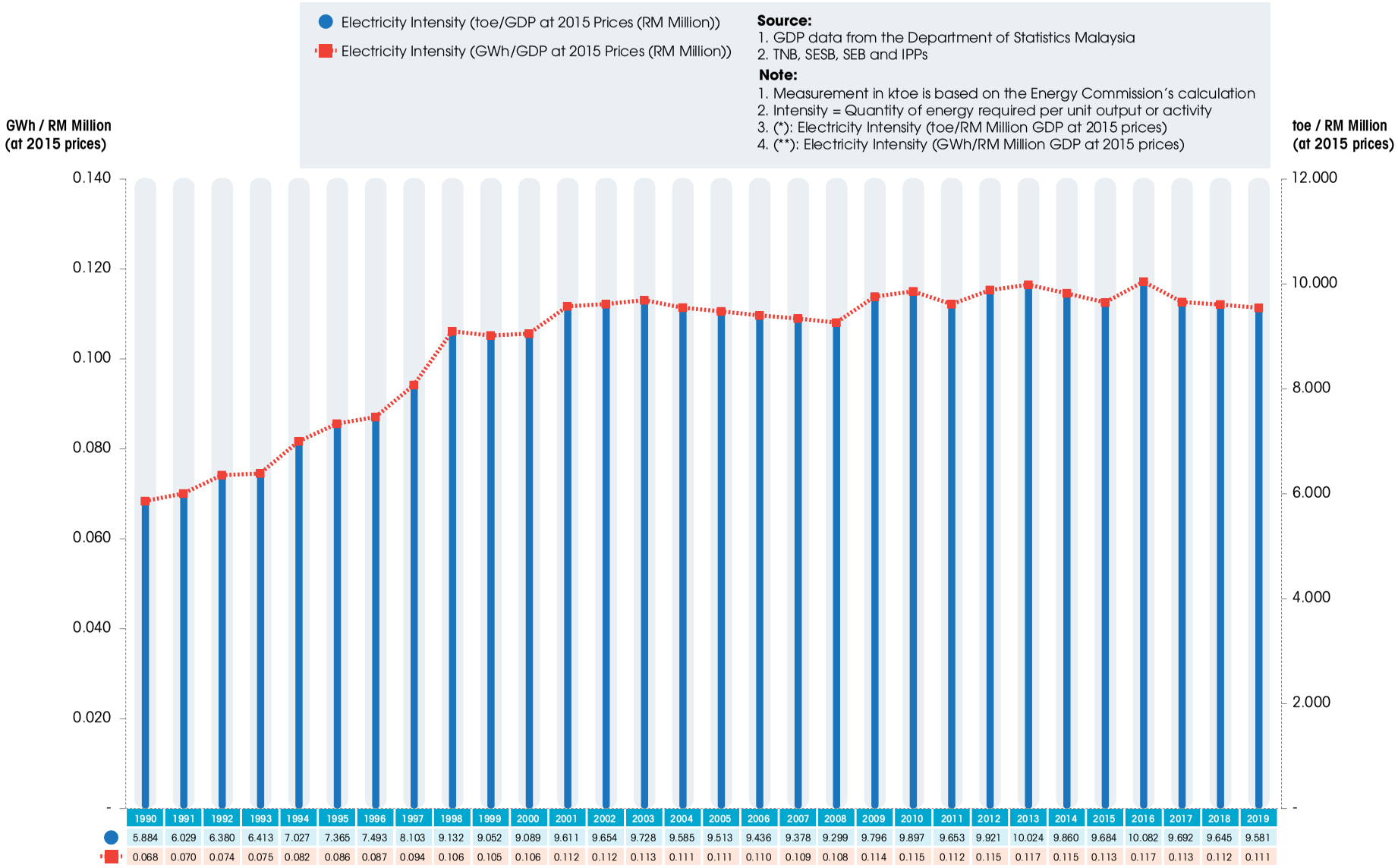


FIGURE 7: FINAL ENERGY AND ELECTRICITY ELASTICITY

Final Energy Elasticity
Electricity Elasticity
Growth Rates of GDP at 2015 Prices (%)

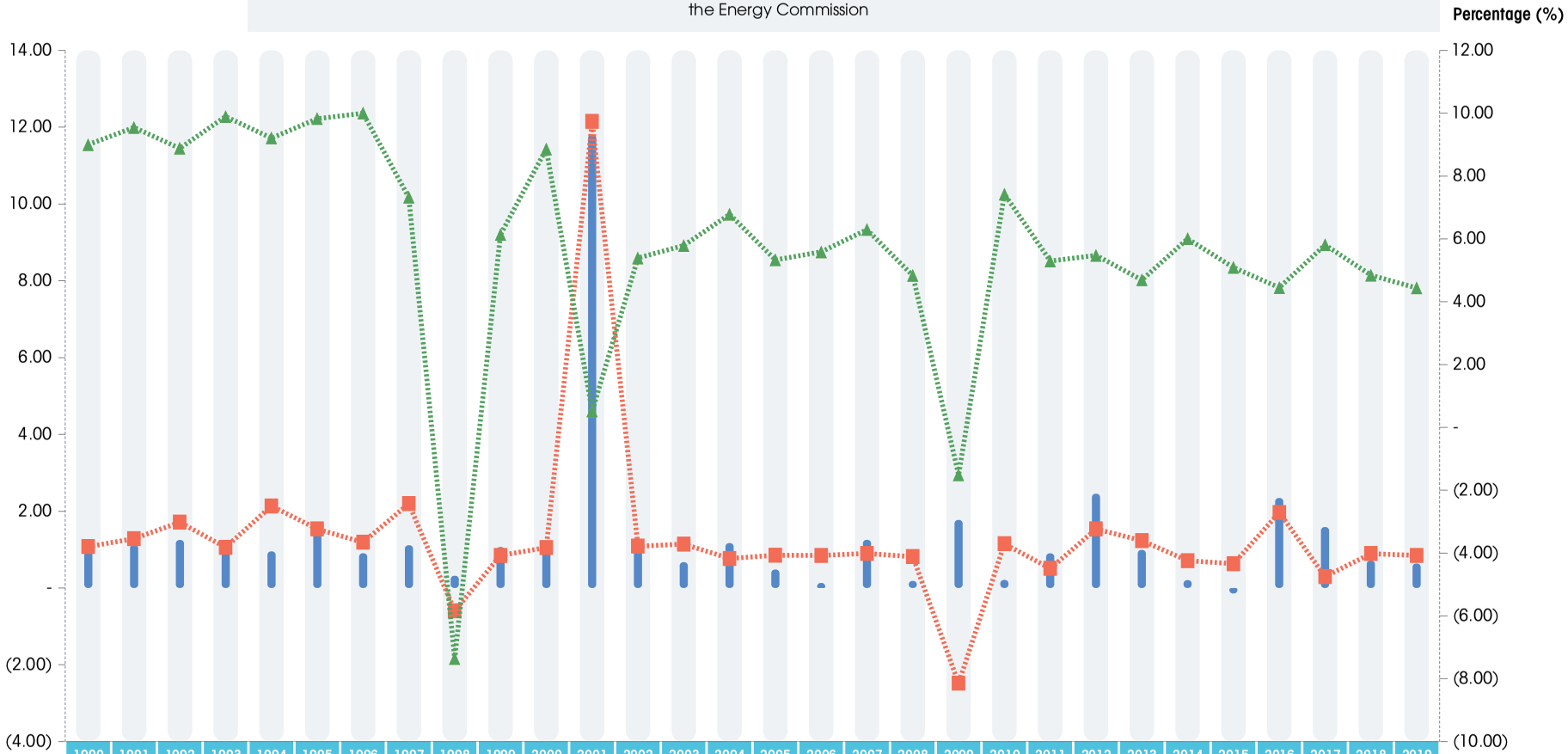
Note: 1) Final Energy Elasticity = Ratio between growths of energy consumption with economic growth

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

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

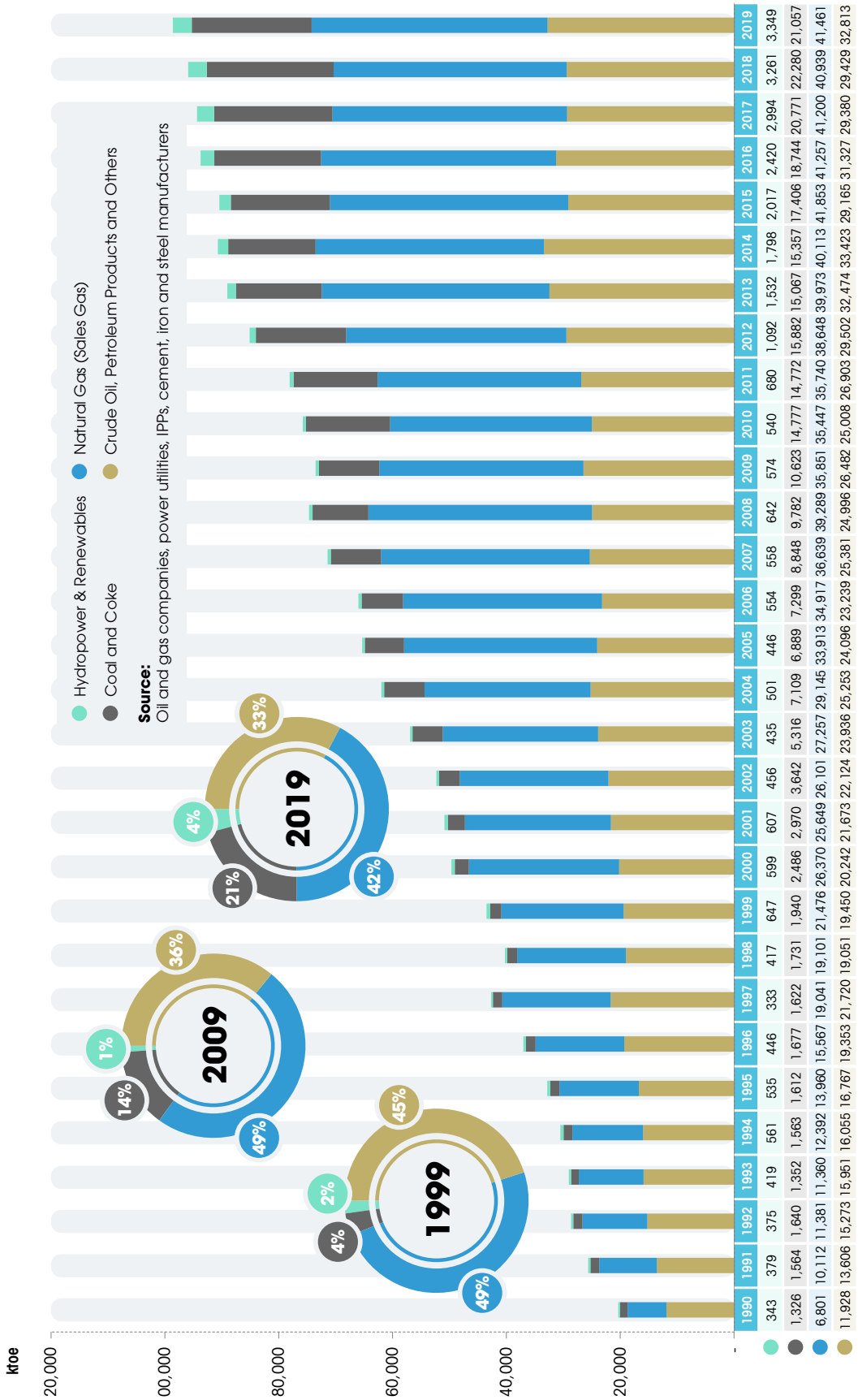
$$\text{Electricity Elasticity} = \frac{\text{Growth Rate of Electricity Consumption (\%)}}{\text{Growth Rate of GDP (\%)}}$$

3) GDP growth rates at 2015 prices (RM Million) for 1990 until 2014 was estimated by the Energy Commission



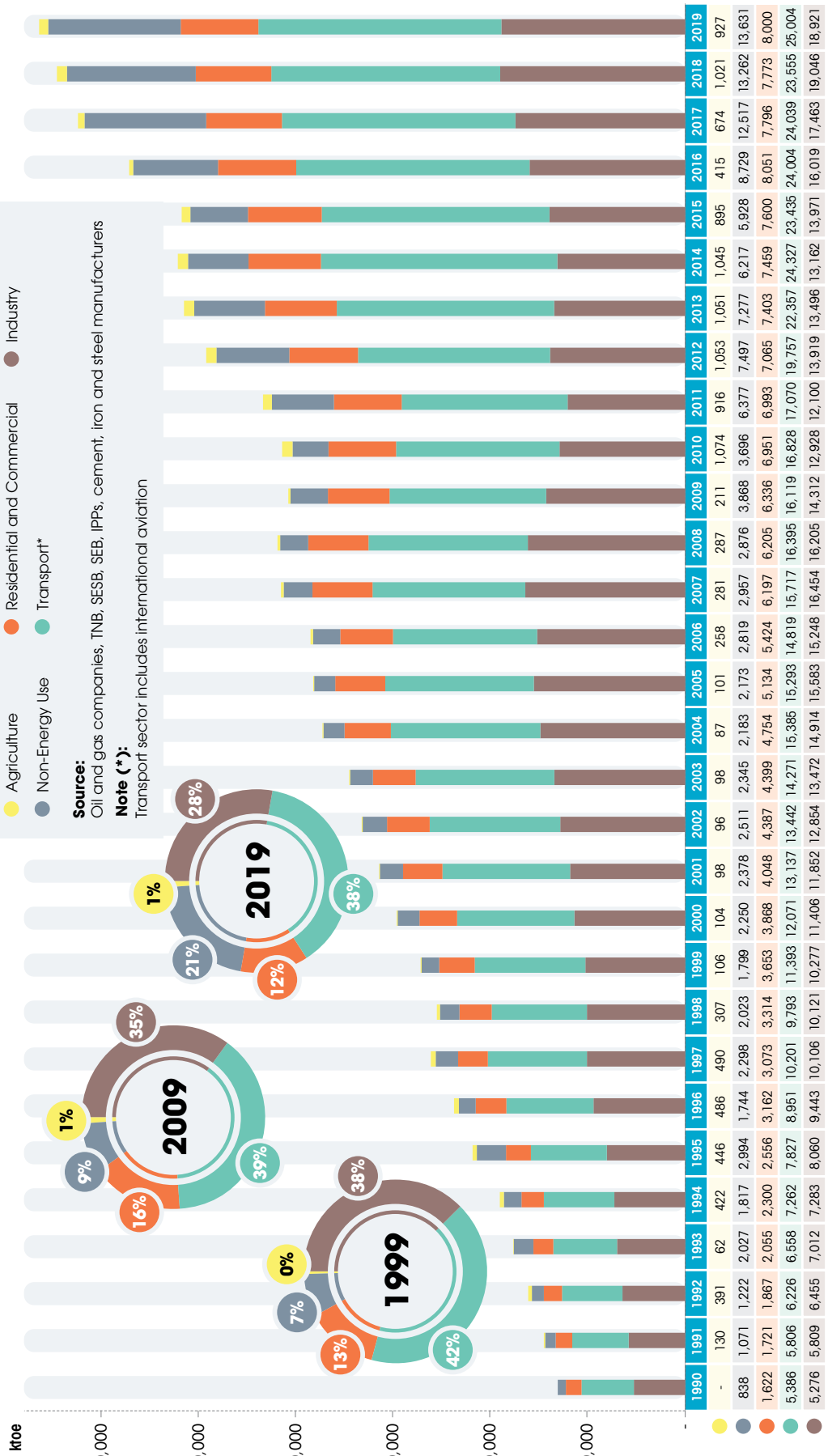
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
●	0.97	1.13	1.25	0.96	0.95	1.52	0.91	1.12	0.32	1.06	1.02	11.81	1.04	0.67	1.17	0.48	0.13	1.25	0.18	1.77	0.21	0.90	2.45	0.99	0.20	(0.14)	2.34	1.58	0.72	0.64
■	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	0.63	1.96	0.30	0.89	0.85
▲	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	4.45	5.81	4.84	4.44

FIGURE 8: PRIMARY ENERGY SUPPLY



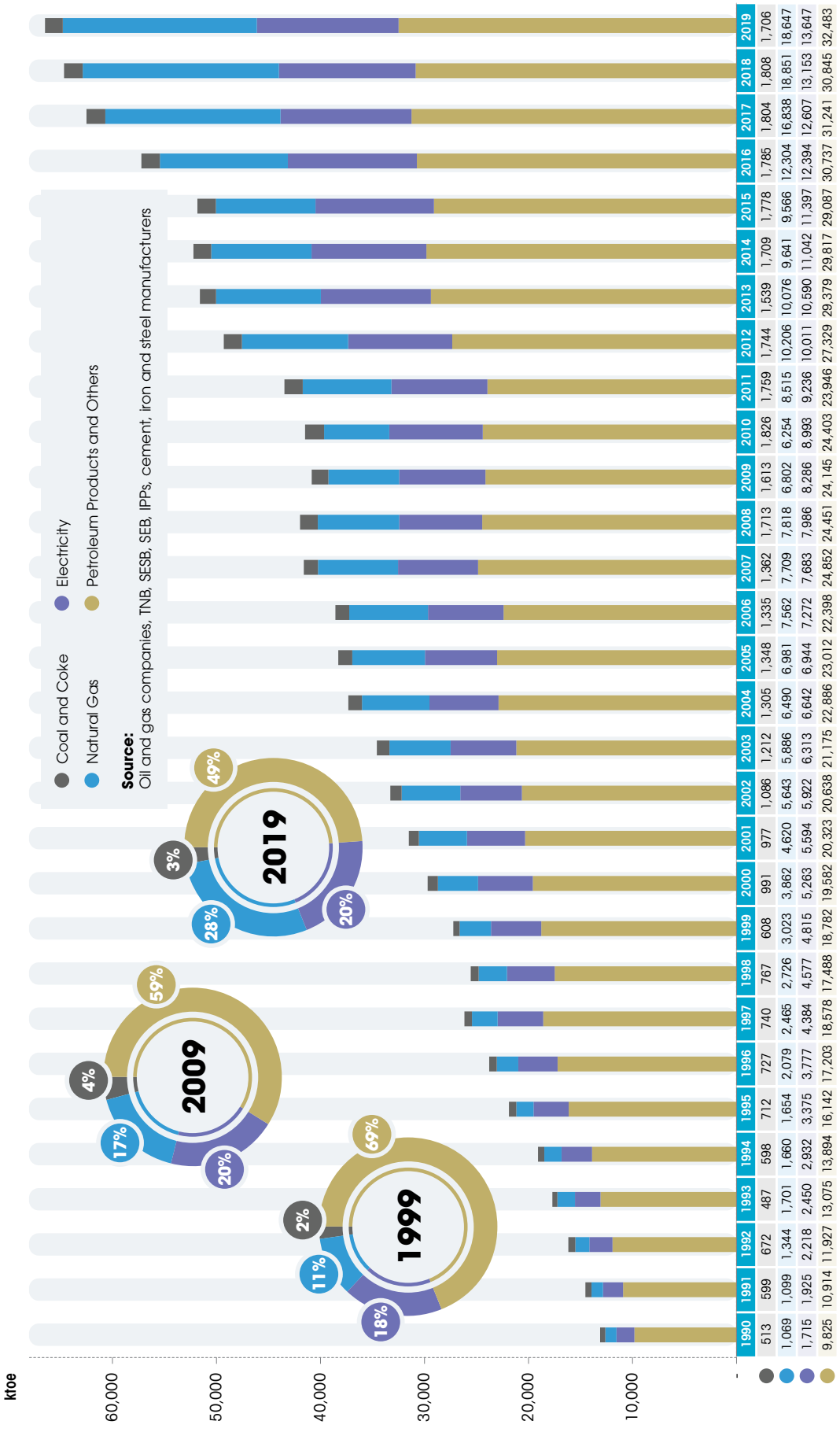
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Hydropower & Renewables	343	379	375	419	561	535	446	333	417	647	599	607	456	435	501	446	554	558	642	574	540	680	1,092	1,532	1,798	2,017	2,420	2,994	3,261	3,349
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	22,280	21,057
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	38,648	39,973	40,113	41,853	41,257	41,200	40,939	41,461
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	29,165	31,327	29,380	29,429	32,813

FIGURE 9: FINAL ENERGY CONSUMPTION BY SECTORS



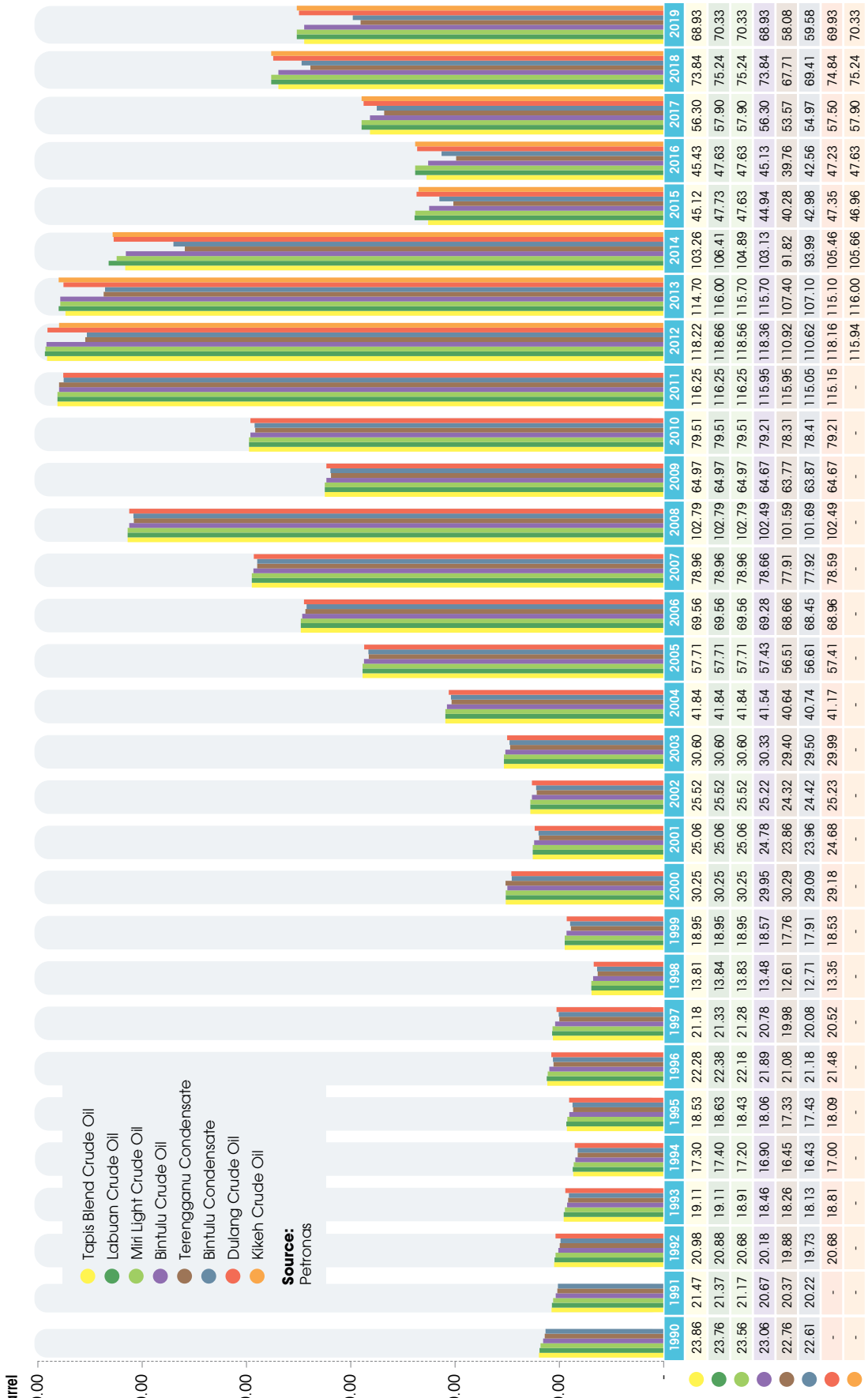
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Agriculture	-	130	391	62	422	446	486	490	307	106	104	98	96	98	87	101	258	281	287	211	1,074	916	1,053	1,051	1,045	895	415	674	1,021	927
Non-Energy Use	838	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	13,262	13,631
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	7,600	8,051	7,796	7,773	8,000
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	23,555	25,004
Industry	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	13,971	16,019	17,463	19,046	18,921

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	2018	2019
Coal and Coke	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	1,808	1,706
Natural Gas	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	18,851	18,647
Electricity	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	11,397	12,394	12,607	13,153	13,647
Petroleum Products and Others	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	30,845	32,483

FIGURE 11: OFFICIAL SELLING PRICES OF MALAYSIAN CRUDE OIL



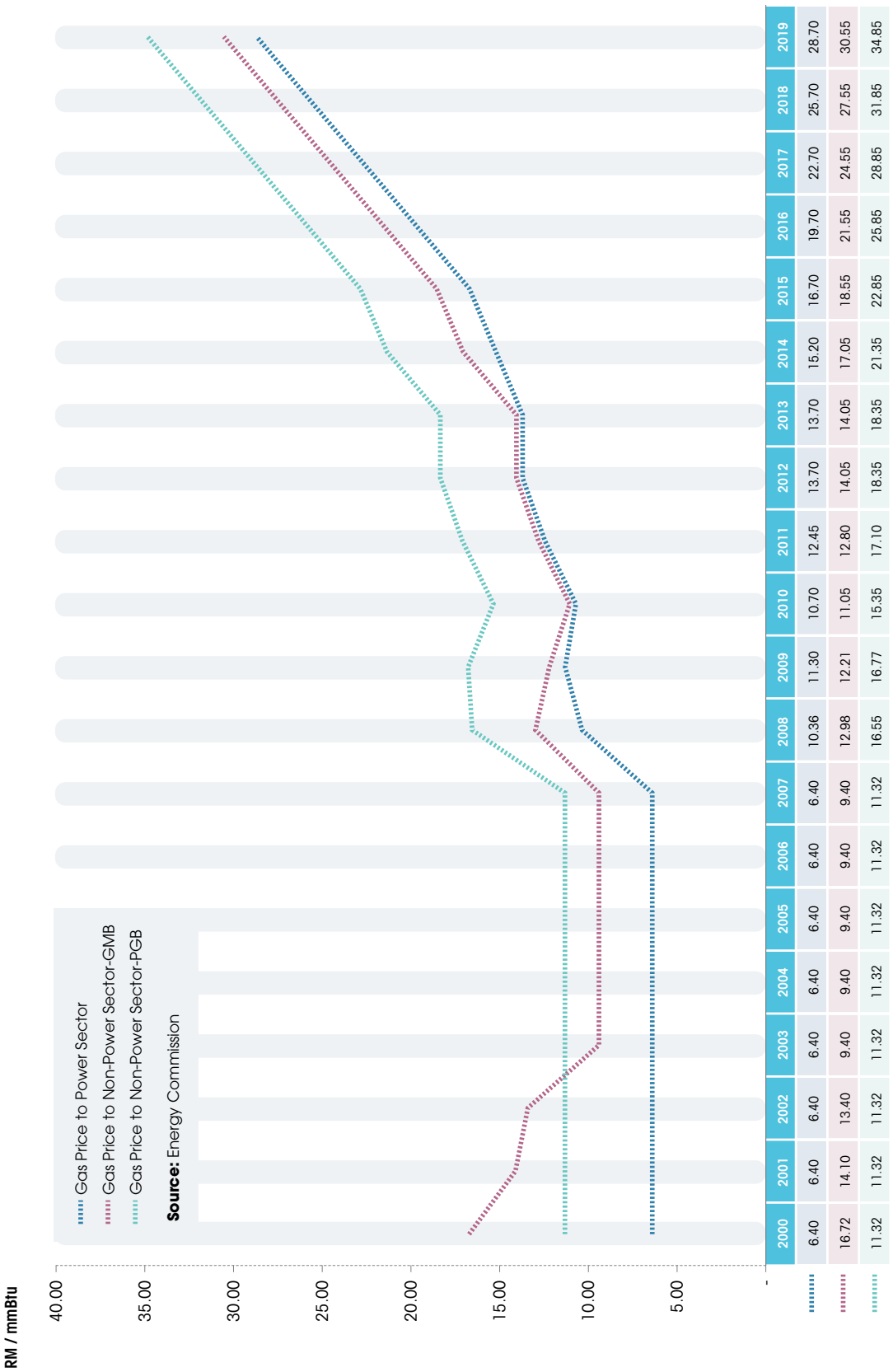
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Tapis Blend Crude Oil	23.86	21.47	20.98	19.11	17.30	18.53	22.28	21.18	13.81	18.95	30.25	25.06	25.52	30.60	41.84	57.71	69.56	78.96	102.79	64.97	79.51	116.25	118.22	114.70	103.26	45.12	45.43	56.30	73.84	68.93
Labuan Crude Oil	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	102.79	64.97	79.51	116.25	118.66	116.00	106.41	47.73	47.63	57.90	75.24	70.33
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	102.79	64.97	79.51	116.25	118.56	115.70	104.89	47.63	47.63	57.90	75.24	70.33
Bintulu Crude Oil	23.06	20.67	20.18	18.46	16.90	18.06	21.89	20.78	13.48	18.57	29.95	24.78	25.22	30.33	41.54	57.43	69.28	78.66	102.49	64.67	79.21	115.95	118.36	115.70	103.13	44.94	45.13	56.30	73.84	68.93
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	101.59	63.77	78.31	115.95	110.92	107.40	91.82	40.28	39.76	53.57	67.71	58.08
Bintulu Condensate	22.61	20.22	19.73	18.13	16.43	17.43	21.18	20.08	12.71	17.91	29.09	23.96	24.42	29.50	40.74	56.61	68.45	77.92	101.69	63.87	78.41	115.05	110.62	107.10	93.99	42.98	42.56	54.97	69.41	59.58
Dulang Crude Oil	-	-	20.68	18.81	17.00	18.09	21.48	20.52	13.35	18.53	29.18	24.68	25.23	29.99	41.17	57.41	68.96	78.59	102.49	64.67	79.21	115.15	118.16	115.10	105.46	47.35	47.23	57.50	74.84	69.93
Kikeh Crude Oil	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	115.94	116.00	105.66	46.96	47.63	57.90	75.24	70.33

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	2018	2019
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	80.23	72.49
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	84.33	77.23
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	65.98	57.63
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	85.04	77.24
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	67.29	56.90

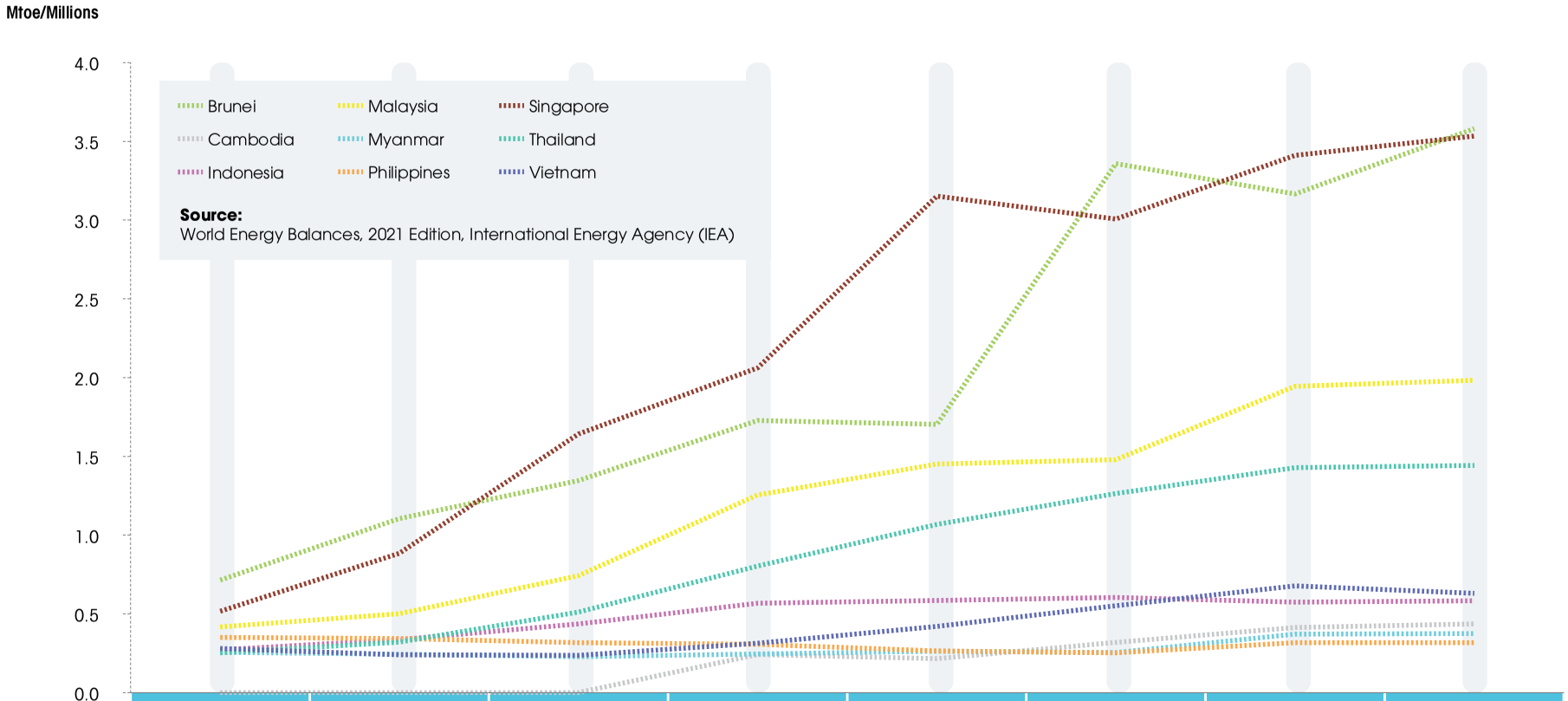
FIGURE 13: ANNUAL LIQUEFIED PETROLEUM GAS (LPG) CONTRACT PRICES – ARAB GULF

FIGURE 14: AVERAGE ANNUAL PRICES OF NATURAL GAS IN MALAYSIA



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
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	25.70	28.70
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	27.55	30.55
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	31.85	34.85

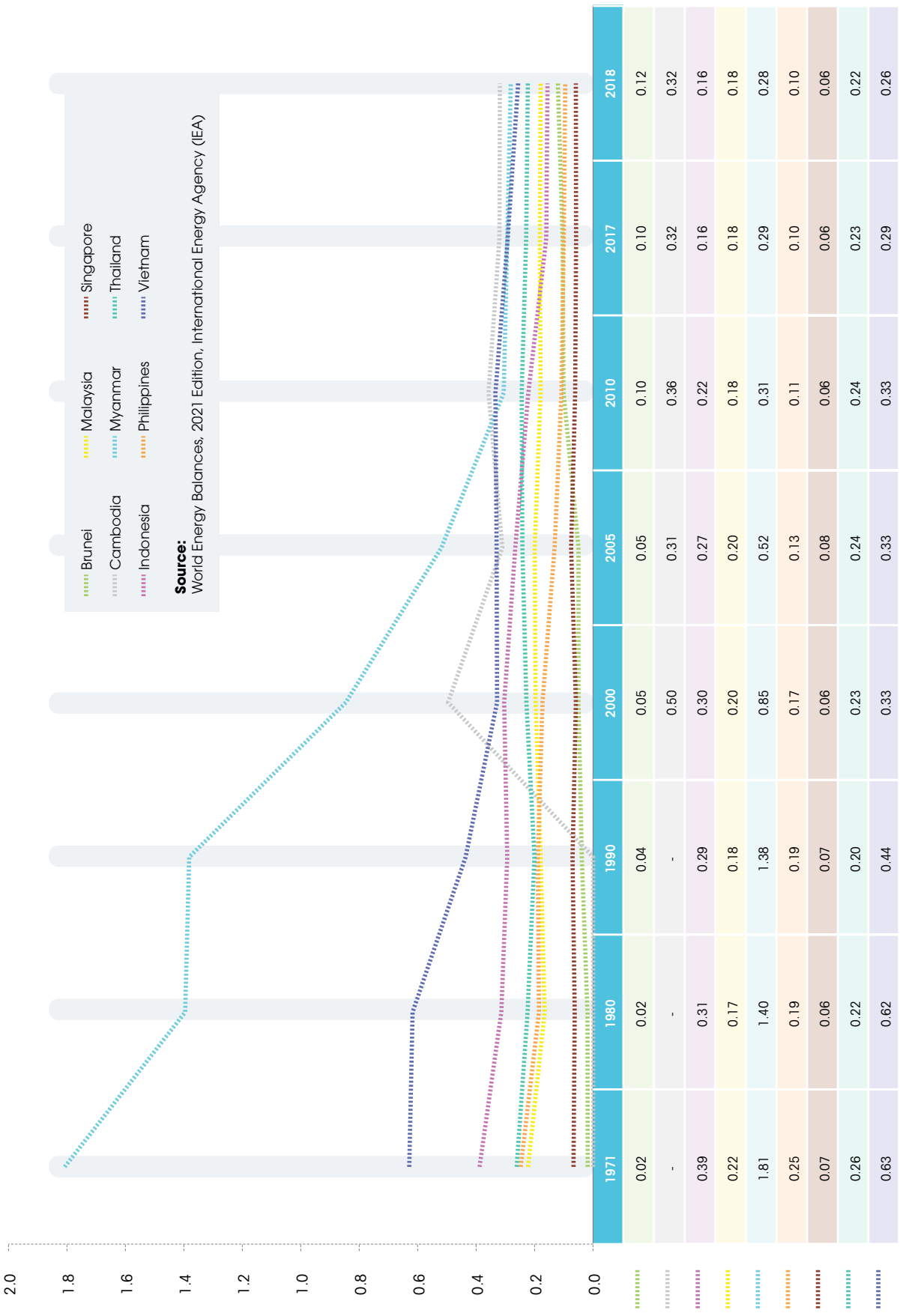
FIGURE 15: FINAL ENERGY CONSUMPTION PER CAPITA IN ASEAN



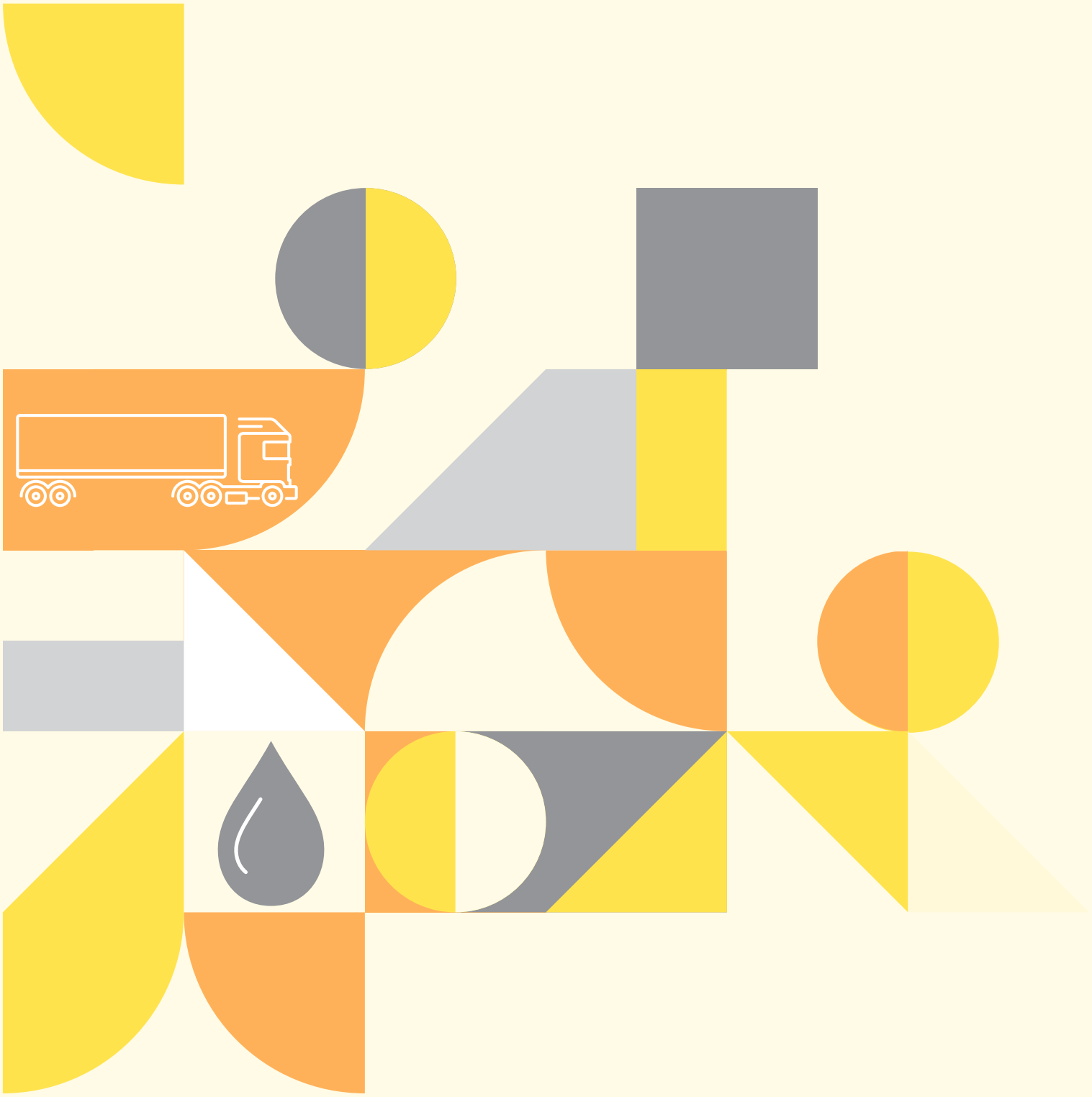
	1971	1980	1990	2000	2005	2010	2017	2018
Brunei	0.714	1.105	1.346	1.727	1.703	3.359	3.167	3.581
Cambodia	0.000	0.000	0.000	0.243	0.216	0.319	0.414	0.436
Indonesia	0.272	0.337	0.437	0.568	0.585	0.604	0.575	0.583
Malaysia	0.418	0.501	0.743	1.255	1.452	1.480	1.945	1.983
Myanmar	0.257	0.244	0.227	0.246	0.263	0.254	0.371	0.375
Philippines	0.350	0.344	0.317	0.307	0.264	0.252	0.318	0.317
Singapore	0.517	0.884	1.643	2.062	3.152	3.006	3.412	3.534
Thailand	0.252	0.320	0.511	0.803	1.068	1.263	1.428	1.443
Vietnam	0.280	0.241	0.236	0.314	0.420	0.551	0.677	0.631

FIGURE 16: FINAL ENERGY INTENSITY IN ASEAN

Mtoe/Billion US$ 2015



	1971	1980	1990	2000	2005	2010	2017	2018
Brunei	0.02	0.02	0.04	0.05	0.05	0.10	0.10	0.12
Cambodia	-	-	-	0.50	0.31	0.36	0.32	0.32
Indonesia	0.39	0.31	0.29	0.30	0.27	0.22	0.16	0.16
Malaysia	0.22	0.17	0.18	0.20	0.20	0.18	0.18	0.18
Myanmar	1.81	1.40	1.38	0.85	0.52	0.31	0.29	0.28
Philippines	0.25	0.19	0.19	0.17	0.13	0.11	0.10	0.10
Singapore	0.07	0.06	0.07	0.06	0.08	0.06	0.06	0.06
Thailand	0.26	0.22	0.20	0.23	0.24	0.24	0.23	0.22
Vietnam	0.63	0.62	0.44	0.33	0.33	0.33	0.29	0.26



OIL

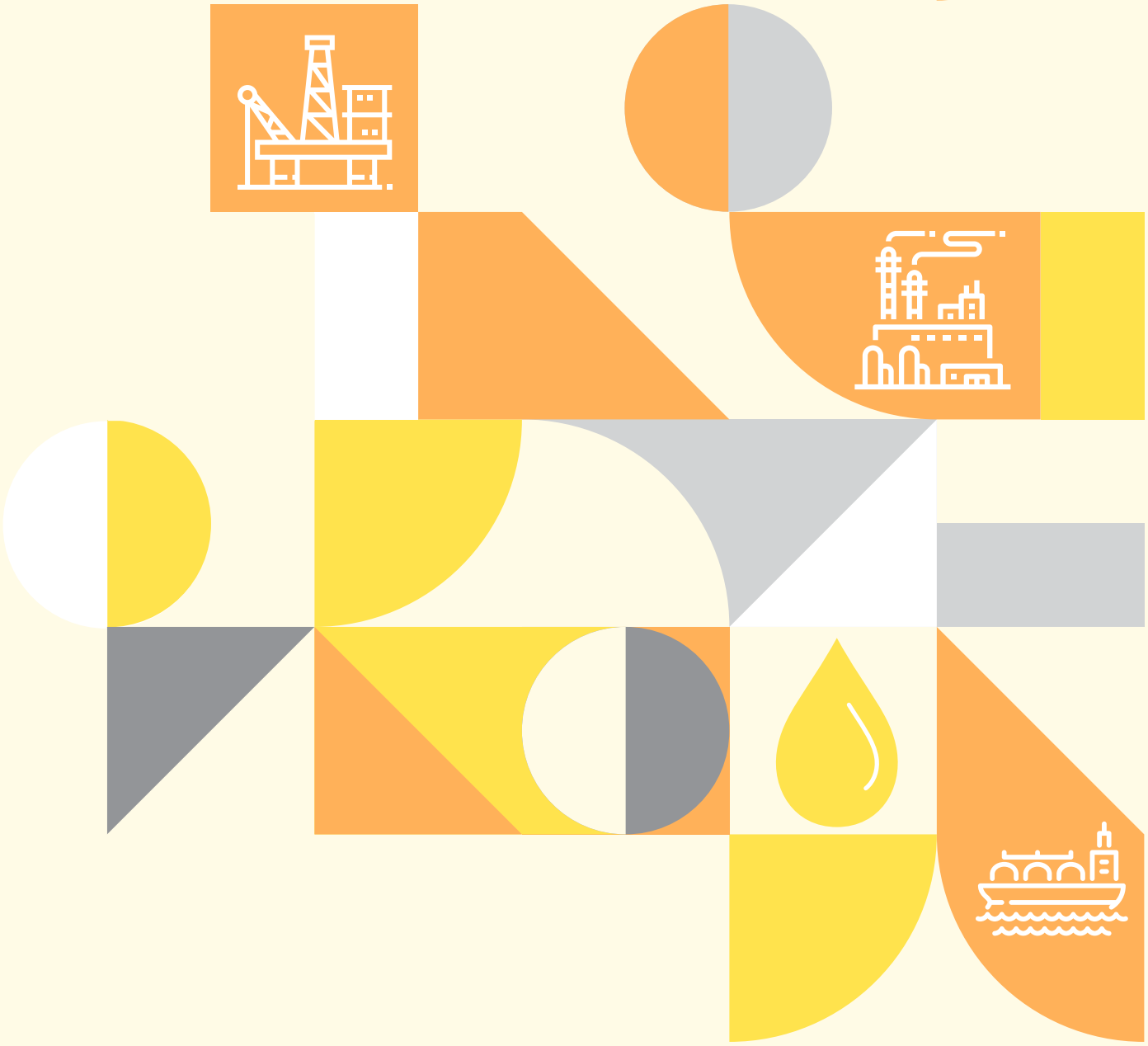


TABLE 3: RESOURCES AND PRODUCTION OF OIL AS OF 1 JANUARY 2019

REGION	RESOURCES (BILLION BARREL)			PRODUCTION (THOUSAND BARRELS PER DAY)		
	CRUDE OIL	CONDENSATES	TOTAL	CRUDE OIL	CONDENSATES	TOTAL
Peninsular Malaysia	1.228	0.248	**1.476**	165.14	31.04	**196.18**
Sabah	1.365	0.132	**1.497**	222.23	15.03	**237.26**
Sarawak	1.183	0.519	**1.702**	113.43	62.85	**176.29**
TOTAL	**3.776**	**0.899**	**4.675**	**500.80**	**108.92**	**609.72**

Source: PETRONAS

TABLE 4: REFINERY LICENSED CAPACITY, 2019

REFINERY PLANTS	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**

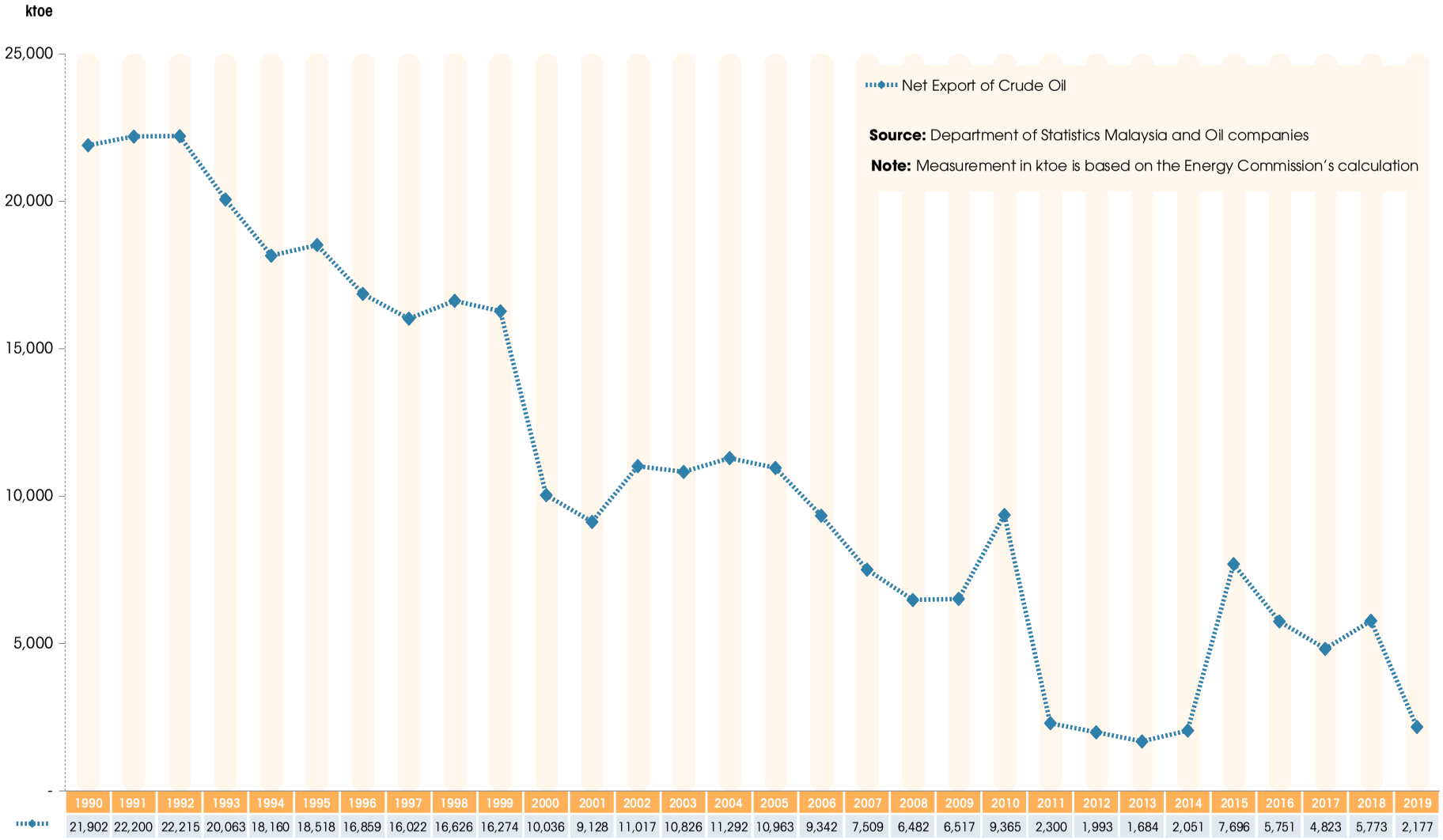
Source: PETRON, PETRONAS & HRC **Note (*):** Excludes condensate splitter of 74,300 bpd

TABLE 5: BREAKDOWN ON SALES OF PETROLEUM PRODUCTS IN THOUSAND BARRELS, 2019

PETROLEUM PRODUCTS	PENINSULAR MALAYSIA	SABAH	SARAWAK	TOTAL
Petrol	100,758	3,820	3,275	**107,853**
Diesel	60,560	8,759	5,399	**74,717**
Fuel Oil	2,945	67	3	**3,015**
Kerosene	81	0	1	**82**
LPG	14,539	909	895	**16,342**
ATF & AV GAS	23,731	737	484	**24,952**
Non-Energy	3,442	172	472	**4,087**
TOTAL	**206,054**	**14,465**	**10,530**	**231,049**

Source: Oil companies

FIGURE 17: NET EXPORT OF CRUDE OIL

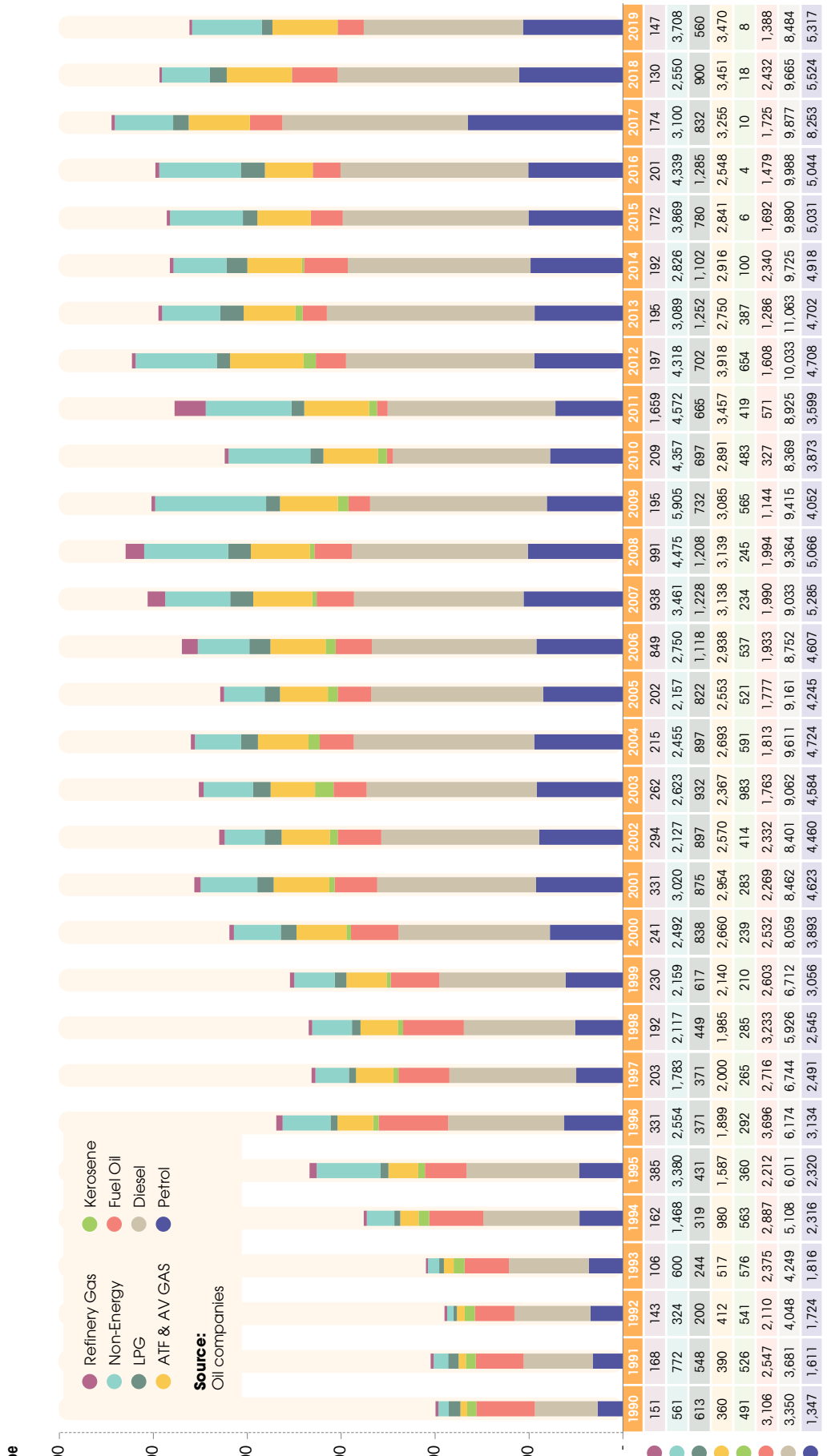


	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
	21,902	22,200	22,215	20,063	18,160	18,518	16,859	16,022	16,626	16,274	10,036	9,128	11,017	10,826	11,292	10,963	9,342	7,509	6,482	6,517	9,365	2,300	1,993	1,684	2,051	7,696	5,751	4,823	5,773	2,177

FIGURE 18: EXPORT AND IMPORT OF PETROLEUM PRODUCTS

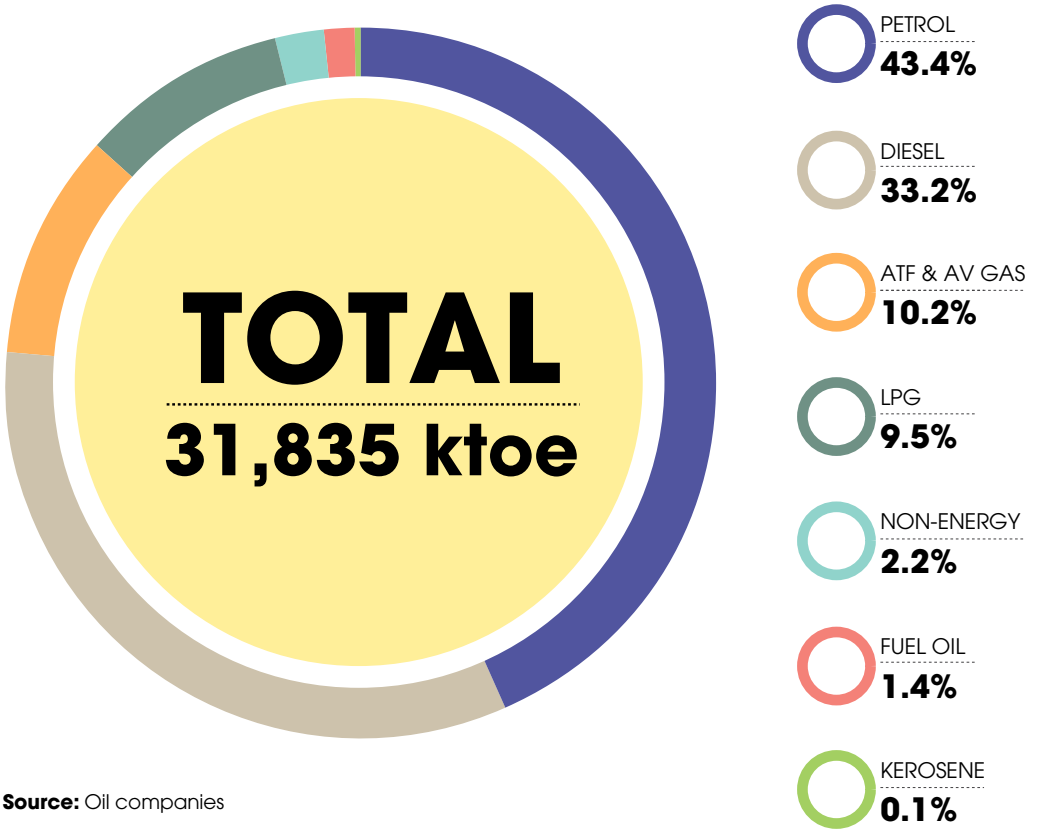
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
●	6,031	6,728	6,499	7,835	7,492	7,411	7,095	10,331	9,360	8,357	6,619	6,881	7,220	7,116	8,980	7,961	7,734	8,452	7,376	7,243	10,359	11,579	13,242	19,383	16,009	14,218	15,341	13,252	19,764	17,662
●	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	16,028	11,779

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	2018	2019
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	130	147
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	2,550	3,708
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	900	560
ATF & AV GAS	360	390	412	517	980	1,587	1,899	2,000	1,985	2,140	2,660	2,964	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	3,451	3,470
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	18	8
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	2,432	1,388
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	9,665	8,484
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	5,524	5,317

FIGURE 20: FINAL CONSUMPTION FOR PETROLEUM PRODUCTS



Source: Oil companies

NATURAL GAS

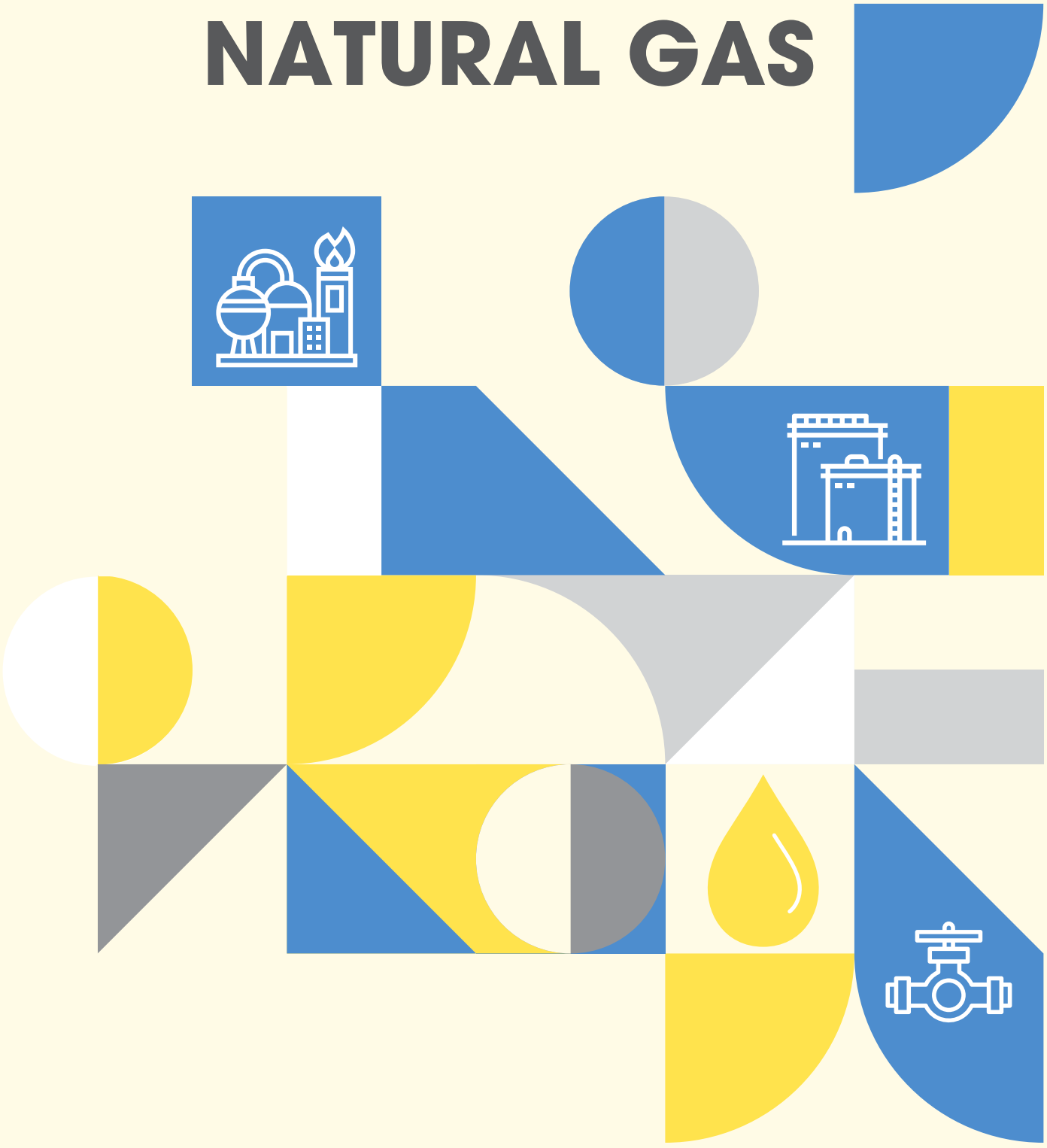


TABLE 6: RESOURCES AND PRODUCTION OF NATURAL GAS AS OF 1 JANUARY 2019

REGION	RESOURCES			PRODUCTION
	TRILLION STANDARD CUBIC FEET (TSCF)			MILLION STANDARD CUBIC FEET PER DAY (MMSCFD)
	ASSOCIATED	NON-ASSOCIATED	TOTAL	
Peninsular Malaysia	6.428	15.219	**21.648**	1,823.02
Sabah	2.054	9.611	**11.665**	740.34
Sarawak	1.419	44.436	**45.855**	4,085.76
Total	**9.901**	**69.267**	**79.168**	**6,649.12**

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

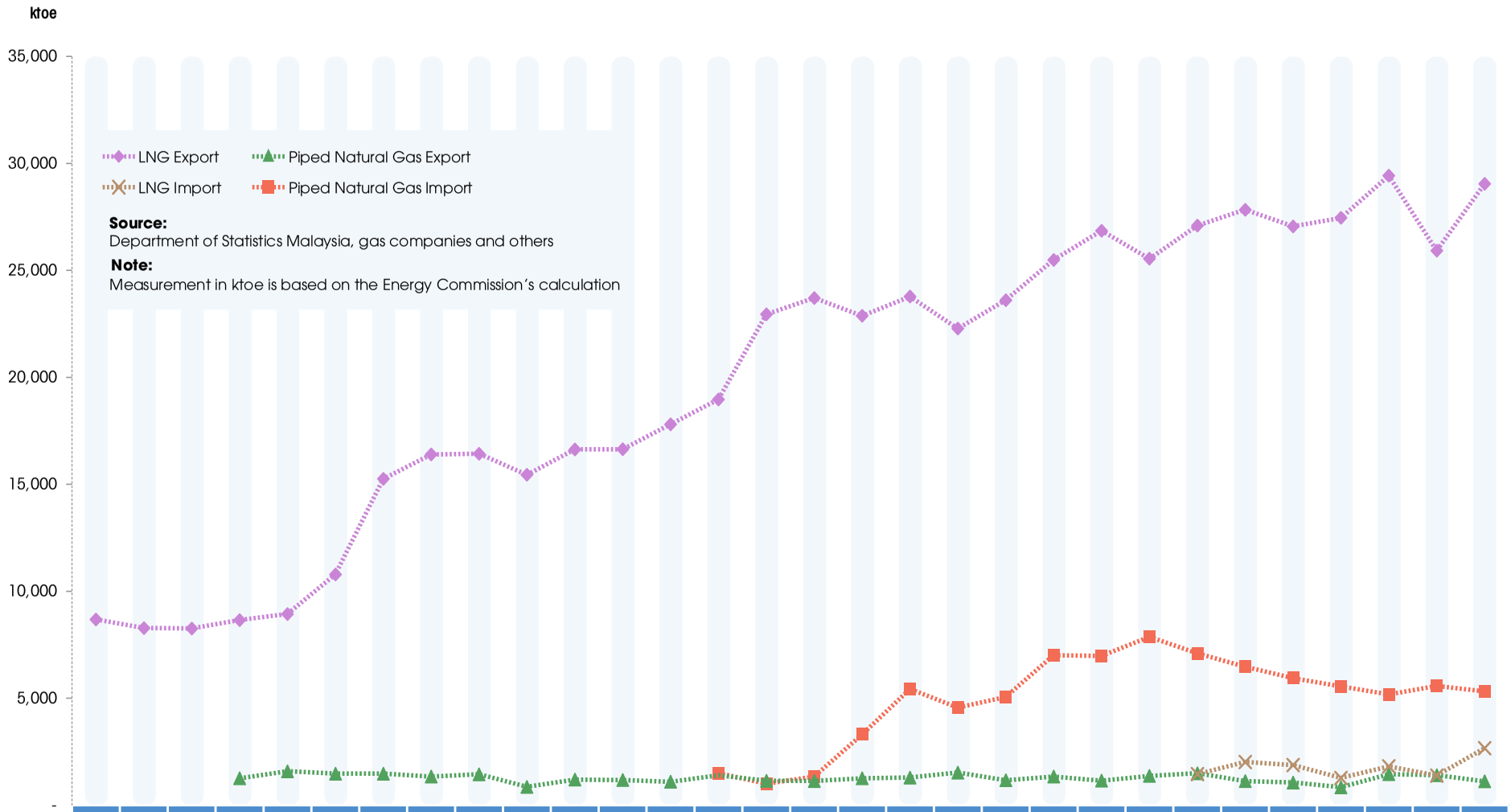
Source: PETRONAS

TABLE 7: CONSUMPTION OF NATURAL GAS IN MMSCF, 2019

SECTORS	PENINSULAR MALAYSIA	SABAH	SARAWAK	MALAYSIA
Residential	23	-	-	**23**
Commercial	862	25	-	**887**
Industry	197,602	95,202	1,100	**293,904**
Non-Energy	54,734	57,821	300,083	**412,638**
Transport	3,756	-	-	**3,756**
Power Stations	352,997	64,269	7,893	**425,160**
Co-Generation	35,723	-	2,193	**37,916**
Total	**645,697**	**217,317**	**311,269**	**1,174,284**

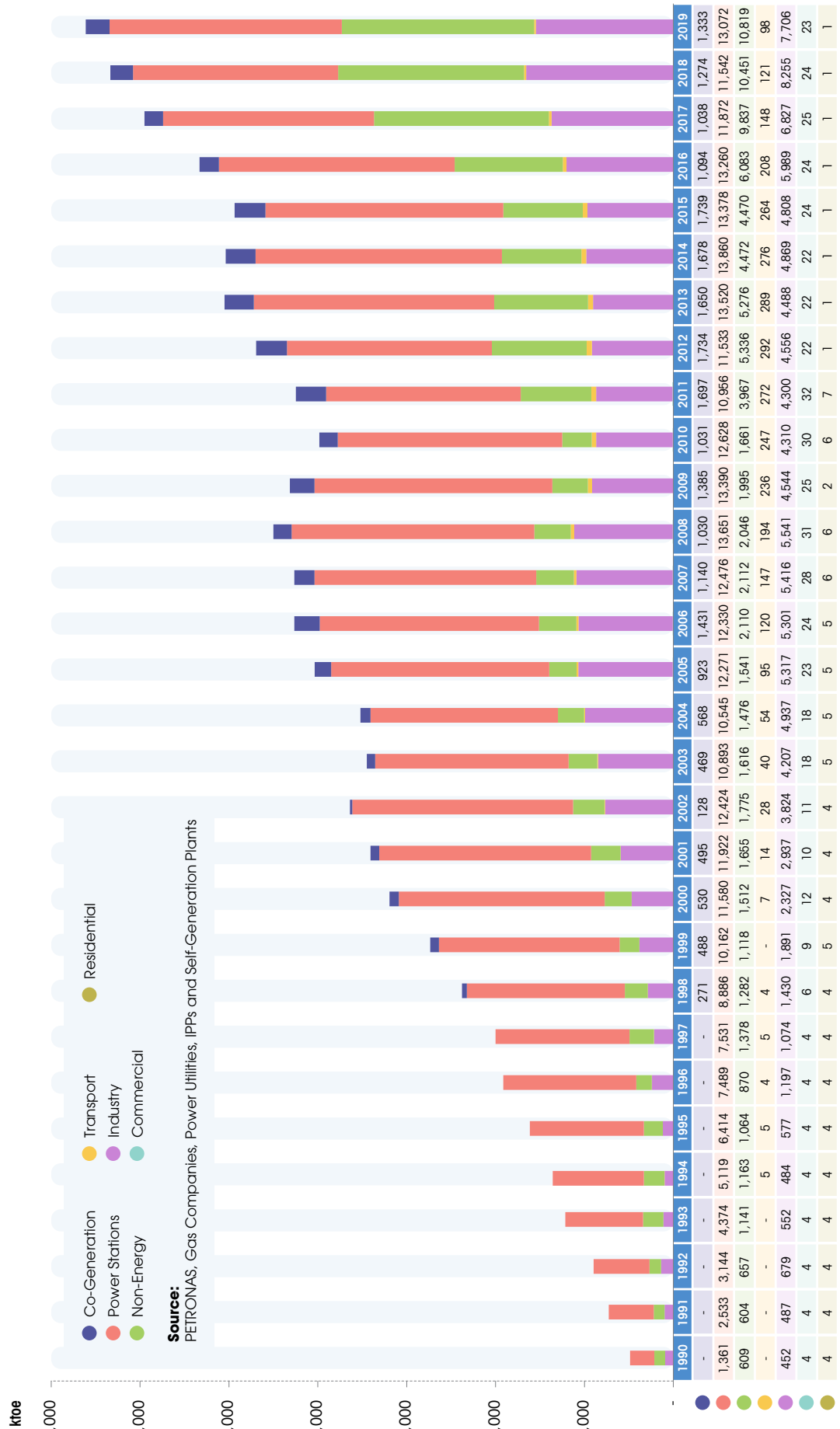
Source: Power utilities, IPPs, PETRONAS and gas distribution companies

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



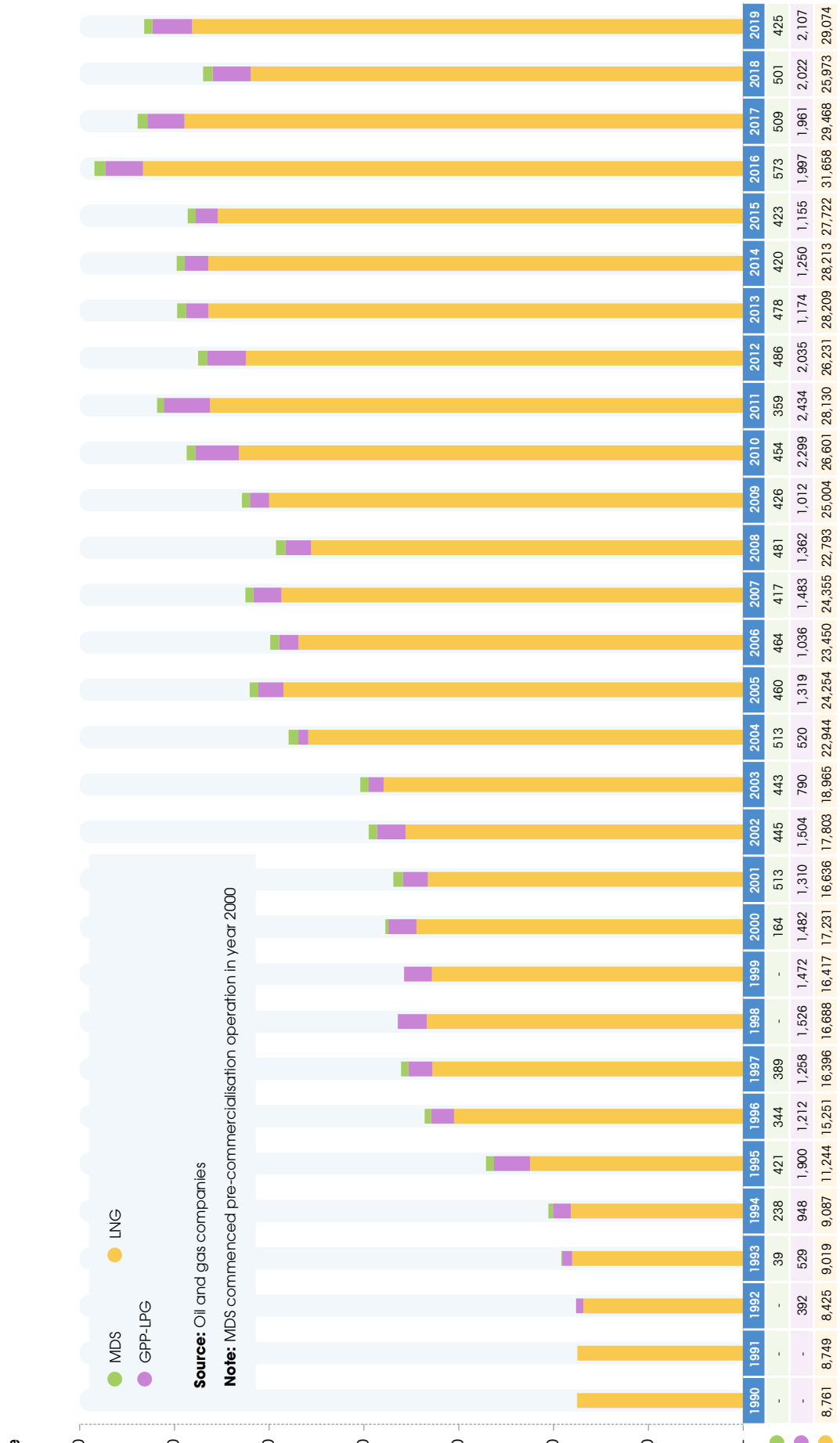
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
LNG Export	8,686	8,278	8,262	8,654	8,938	10,790	15,251	16,396	16,429	15,445	16,633	16,636	17,803	18,965	22,944	23,707	22,874	23,777	22,277	23,606	25,487	26,856	25,547	27,089	27,835	27,057	27,457	29,428	25,920	29,044
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	5,573	5,325
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	1,407	1,114
LNG Import	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,450	2,019	1,873	1,275	1,815	1,383	2,663

FIGURE 22: NATURAL GAS CONSUMPTION BY SECTORS

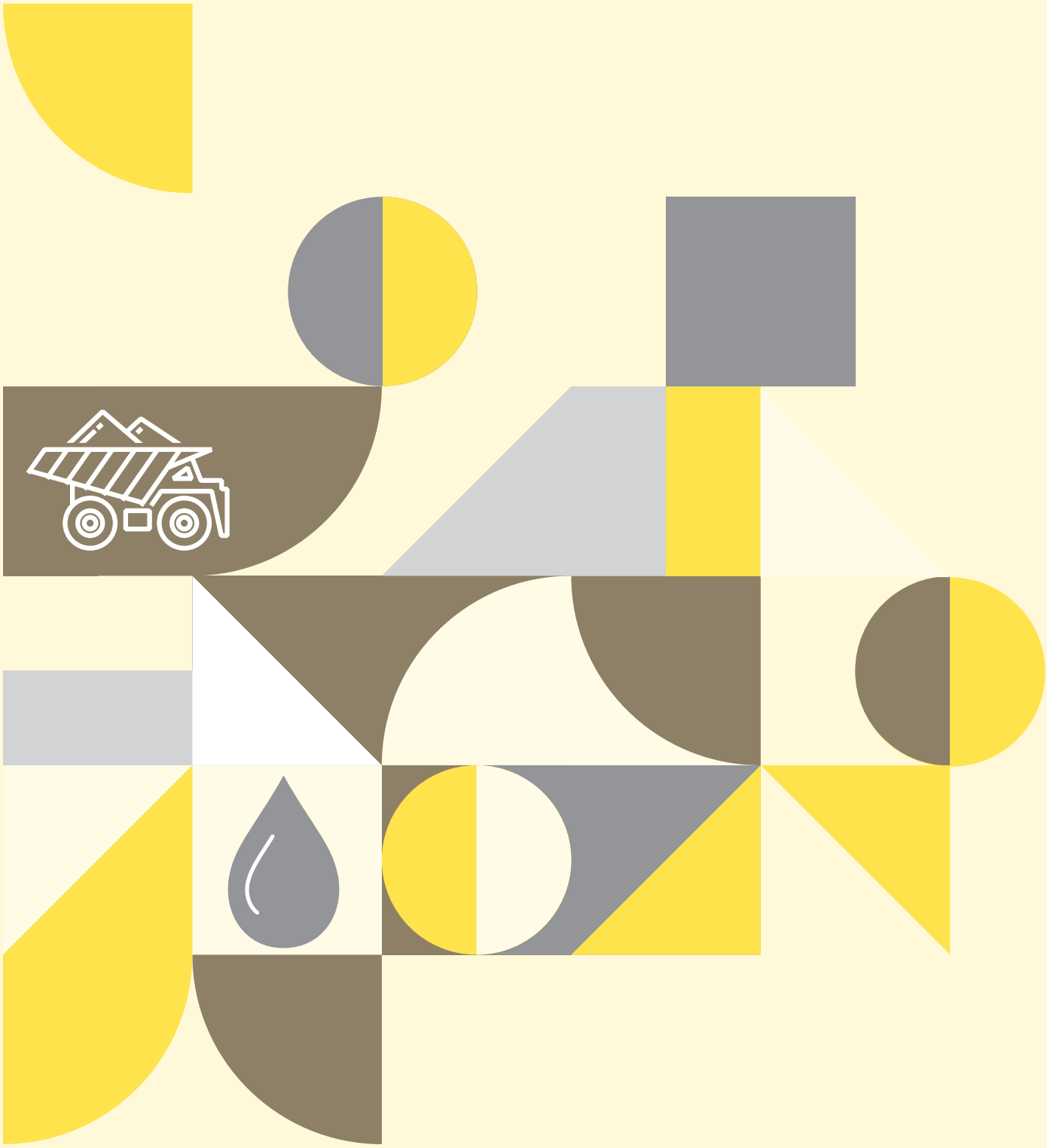


	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Co-Generation	-	-	-	-	-	-	-	-	271	488	530	495	128	469	568	923	1,431	1,140	1,030	1,385	1,031	1,697	1,734	1,650	1,678	1,739	1,094	1,038	1,274	1,333
Power 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	13,620	13,860	13,378	13,260	11,872	11,542	13,072
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	10,451	10,819
Transport	-	-	-	-	-	5	4	5	4	-	7	14	28	40	54	95	120	147	194	236	247	272	292	289	276	264	208	148	121	98
Industry	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	8,255	7,706
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	24	23
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	1	1

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	2018	2019
MDS	-	-	-	39	238	421	344	389	-	-	164	513	445	443	513	460	464	417	481	426	454	359	486	478	420	423	573	509	501	425
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	2,022	2,107
LNG	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	27,722	31,658	29,468	25,973	29,074



COAL

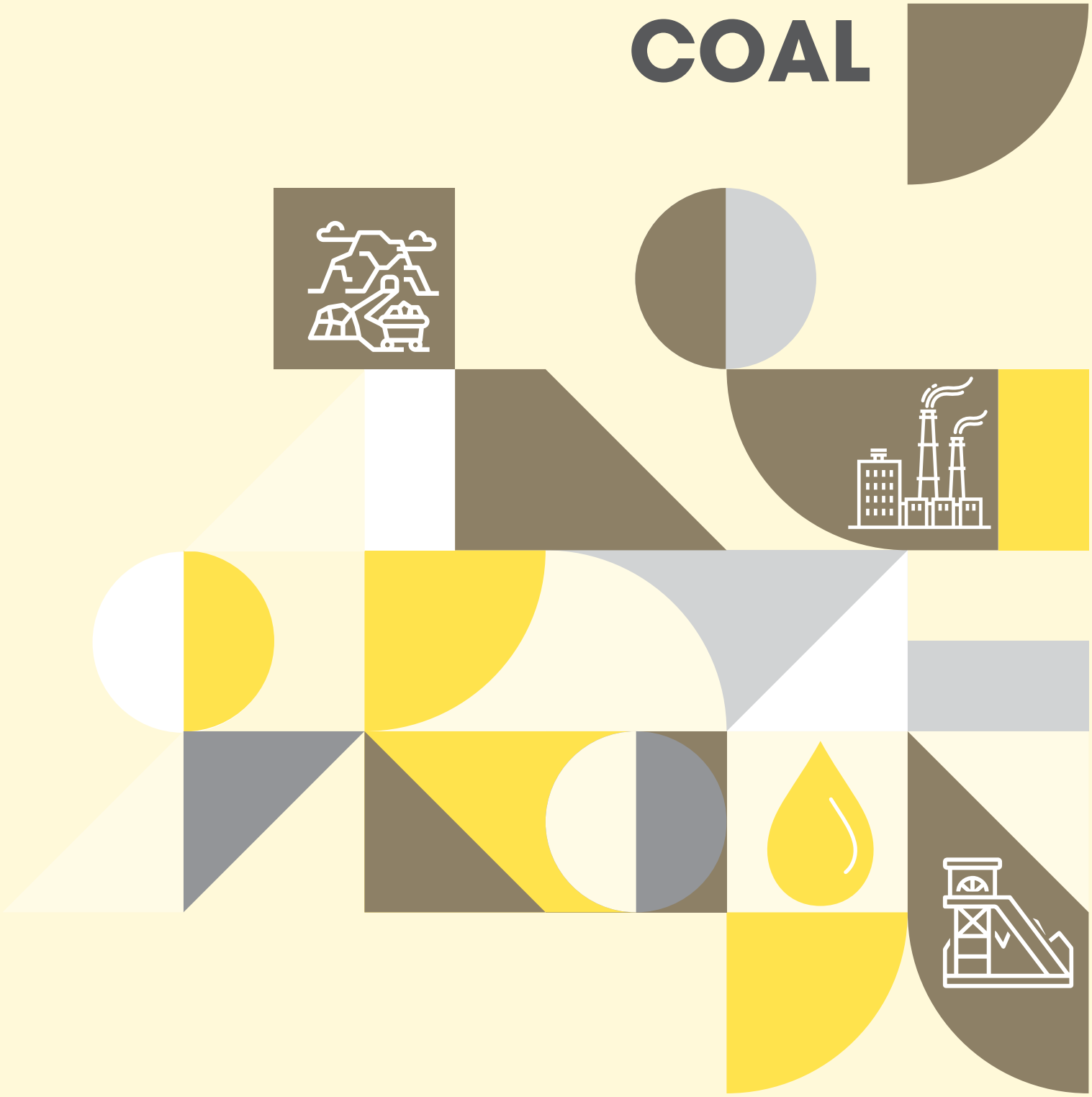


TABLE 8: RESOURCES AND PRODUCTION OF COAL AS OF 31 DECEMBER 2019

LOCATION	RESOURCES (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	168.89	107.02	91.65	Sub-Bituminous	449,002
3. Bintulu	6.00	0.00	14.00	Bituminous (partly coking coal)	-
4. Mukah - Balingian	84.15	170.73	646.53	Lignite, Hydrous Lignite and Sub-Bituminous	3,010,119
5. Tutoh Area	5.58	34.66	162.33	Sub-Bituminous	-
SUBTOTAL	**271.87**	**323.01**	**946.91**		**3,459,121**
SABAH					
1. Salimpopon	4.80	14.09	7.70	Sub-Bituminous	-
2. Labuan			8.90	Sub-Bituminous	-
3. Maliau			215.00	Bituminous	-
4. Malibau		17.90	25.00		-
5. SW Malibau		23.23			-
6. Pinangan West Middle Block			42.60	Bituminous	-
SUBTOTAL	**4.80**	**55.22**	**299.20**		-
SELANGOR					
1. Batu Arang	-	-	17.00	Sub-Bituminous	-
SUBTOTAL	**0.00**	**0.00**	**17.00**		-
TOTAL	**276.67**	**378.23**	**1,263.11**		
GRAND TOTAL		**1,918.01**			**3,459,121**

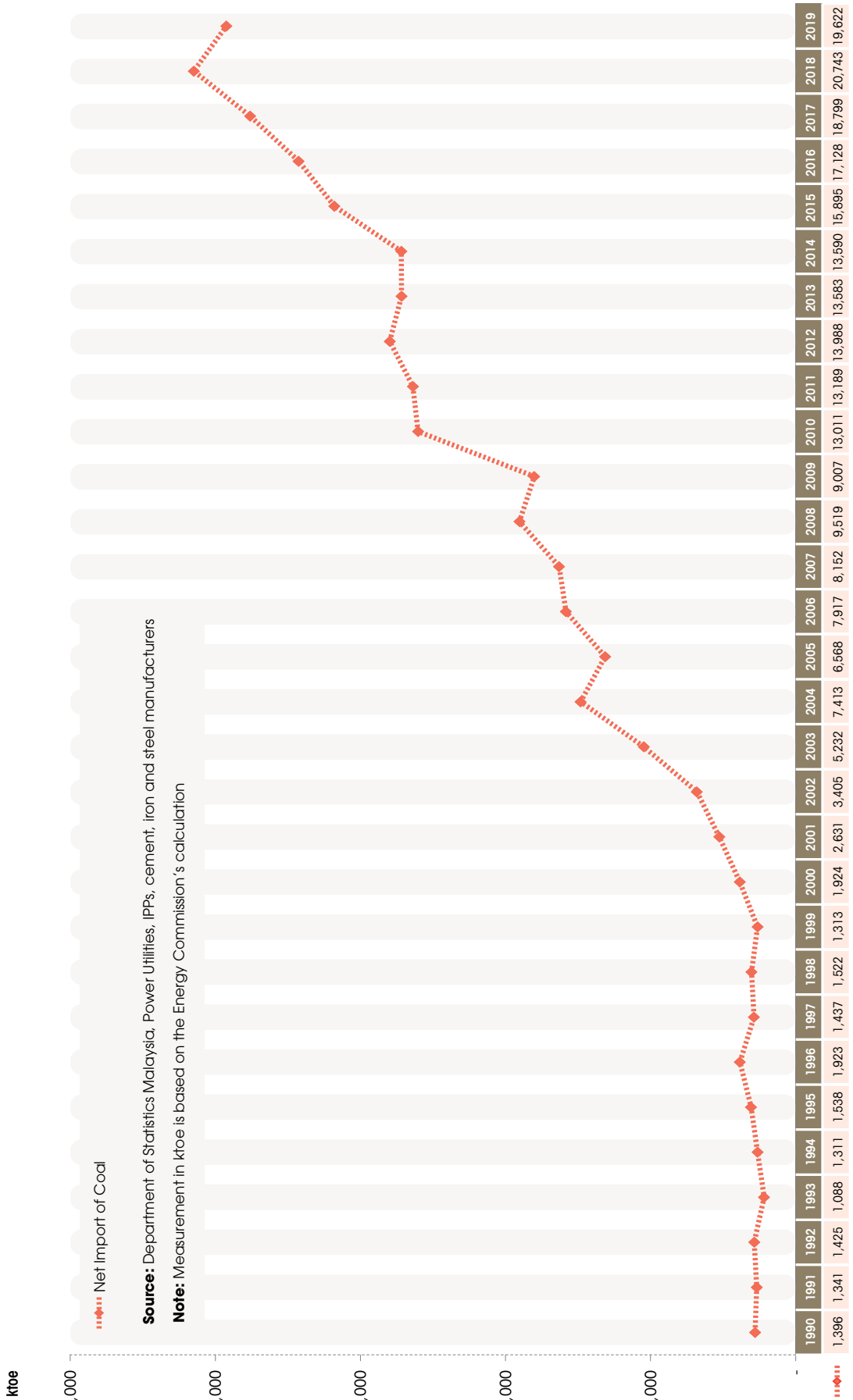
Source: Department of Mineral and Geosciences Malaysia

TABLE 9: CONSUMPTION OF COAL IN METRIC TONNES, 2019

SECTORS	PENINSULAR MALAYSIA	SABAH	SARAWAK	MALAYSIA
Industry	2,564,077	-	142,592	**2,706,669**
Power Stations	28,038,862	-	2,656,713	**30,695,575**
Total	**30,602,939**	**0**	**2,799,305**	**33,402,244**

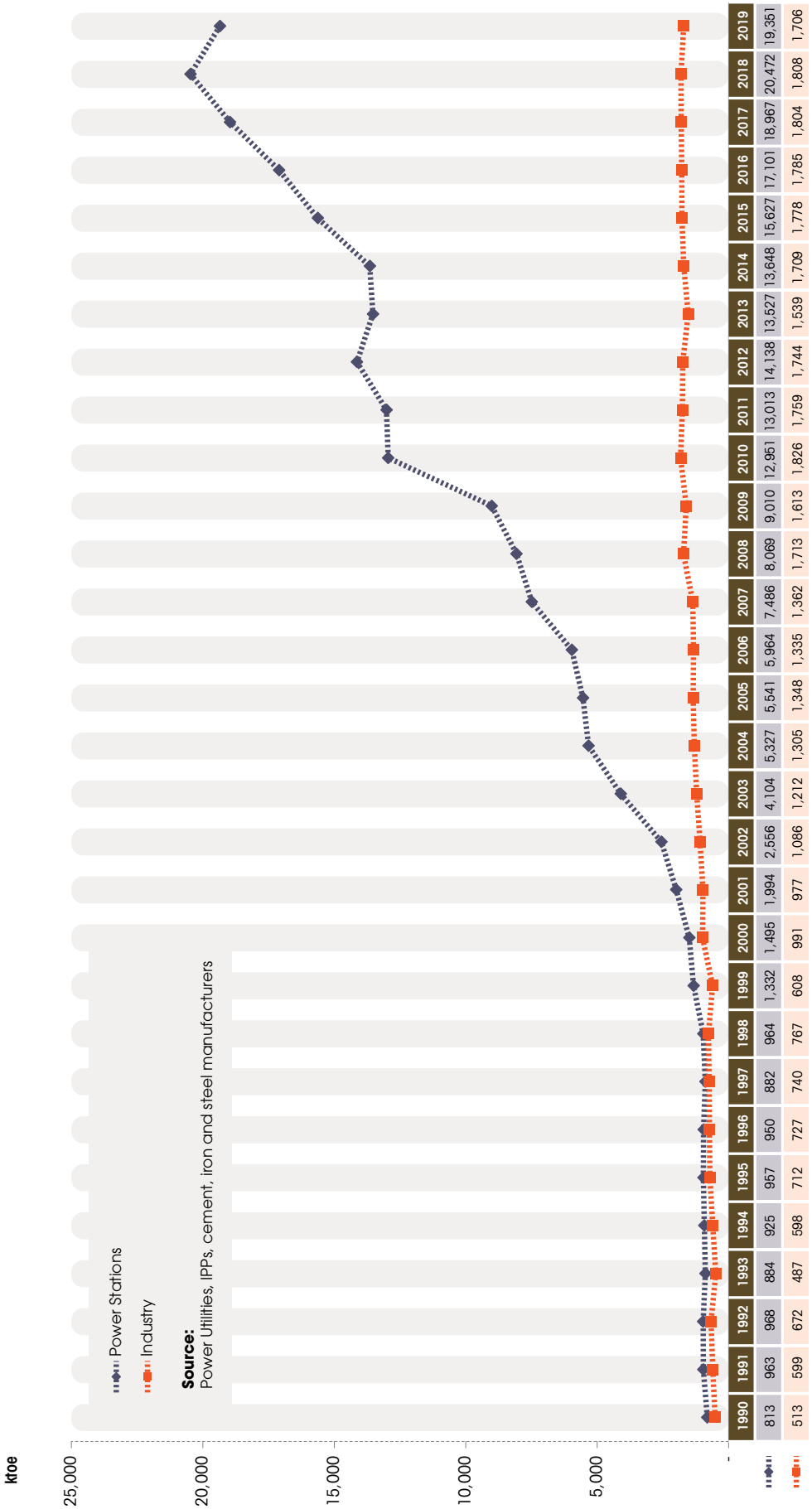
Source: Power utilities, IPPs, PETRONAS and gas distribution companies

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	2018	2019
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	17,128	18,799	20,743	19,622

FIGURE 25: COAL CONSUMPTION BY SECTORS



	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	2018	2019
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	20,472	19,351
Industry	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	1,808	1,706

ELECTRICITY

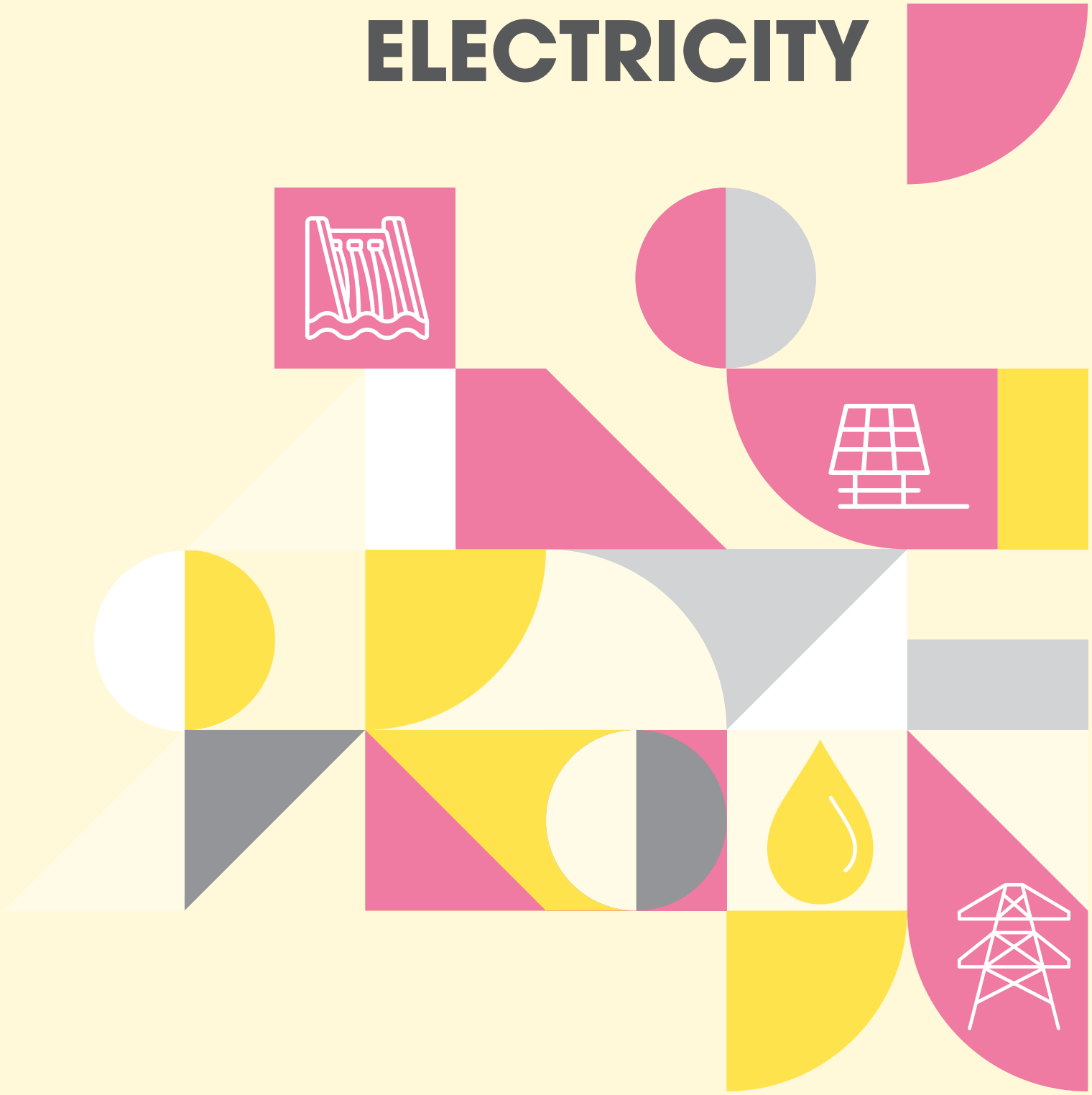
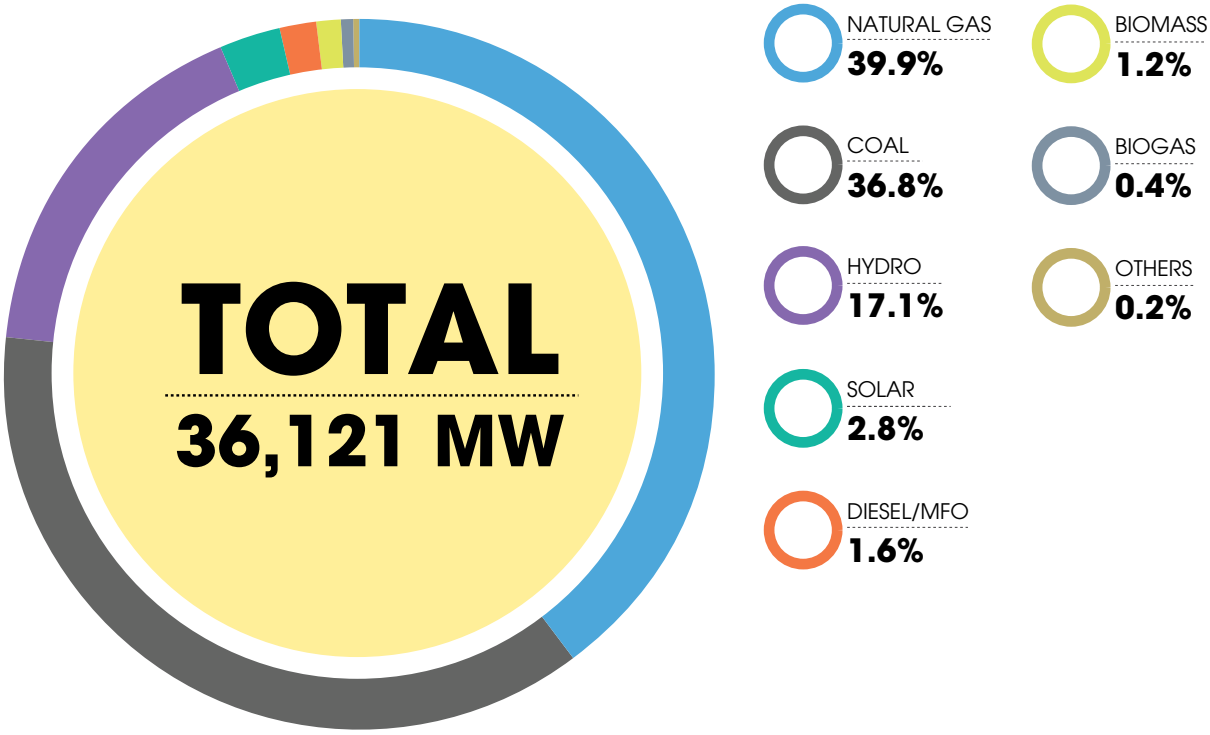


TABLE 10: INSTALLED CAPACITY AS OF 31 DECEMBER 2019, IN MW

		HYDRO	NATURAL GAS	COAL	DIESEL / MFO	BIOMASS	SOLAR	BIOGAS	OTHERS	TOTAL
PENINSULAR MALAYSIA	TNB	2,556.5	2,230.0	0.0	0.0	0.0	0.0	0.0	0.0	**4,786.5**
	IPPs	20.0	9,040.4	12,180.0	0.0	0.0	0.0	0.0	0.0	**21,240.4**
	Co-Generation	0.0	945.9	0.0	0.0	12.4	0.0	0.0	79.0	**1,037.3**
	Self-Generation	2.1	20.9	0.0	39.4	100.6	8.1	0.4	0.0	**171.5**
	FiT	63.8	0.0	0.0	0.0	44.9	240.1	93.2	0.0	**441.9**
	LSS	0.0	0.0	0.0	0.0	0.0	614.9	0.0	0.0	**614.9**
	NEM	0.0	0.0	0.0	0.0	0.0	31.3	0.0	0.0	**31.3**
	RE (Non-FiT)	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	**0.1**
	SUBTOTAL	**2,642.4**	**12,237.3**	**12,180.0**	**39.4**	**157.9**	**894.5**	**93.6**	**79.0**	**28,323.9**
SABAH	SESB	83.1	112.0	0.0	220.9	0.0	23.2	0.0	0.0	**439.2**
	IPPs	0.0	1,012.6	0.0	64.4	0.0	0.0	0.0	0.0	**1,077.0**
	Co-Generation	0.0	65.0	0.0	0.0	116.2	0.0	0.0	0.0	**181.2**
	Self-Generation	0.0	3.9	0.0	137.3	79.0	0.0	42.5	0.0	**262.7**
	FiT	6.5	0.0	0.0	0.0	25.8	28.7	9.6	0.0	**70.6**
	LSS	0.0	0.0	0.0	0.0	0.0	50.0	0.0	0.0	**50.0**
	NEM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
	SUBTOTAL	**89.6**	**1,193.5**	**0.0**	**422.6**	**221.0**	**101.9**	**52.1**	**0.0**	**2,080.7**
SARAWAK	SEB	3,458.1	583.6	1,103.9	97.5	0.0	0.1	0.0	0.0	**5,243.3**
	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	17.0	61.7	0.0	0.5	5.1	**84.3**
	SUBTOTAL	**3,458.1**	**972.6**	**1,103.9**	**114.5**	**61.7**	**0.1**	**0.5**	**5.1**	**5,716.6**
	TOTAL	**6,190.1**	**14,403.3**	**13,283.9**	**576.5**	**440.5**	**996.4**	**146.2**	**84.1**	**36,121.2**
	SHARE (%)	**17.1%**	**39.9%**	**36.8%**	**1.6%**	**1.2%**	**2.8%**	**0.4%**	**0.2%**	**100.0%**

Source: Energy Commission, Power Utilities, IPPs, SEDA Malaysia and Ministry of Utilities Sarawak **Note:** Exclude plants that are not in operation

FIGURE 26: INSTALLED CAPACITY AS OF 31 DECEMBER 2019



Source: Power Utilities and IPPs

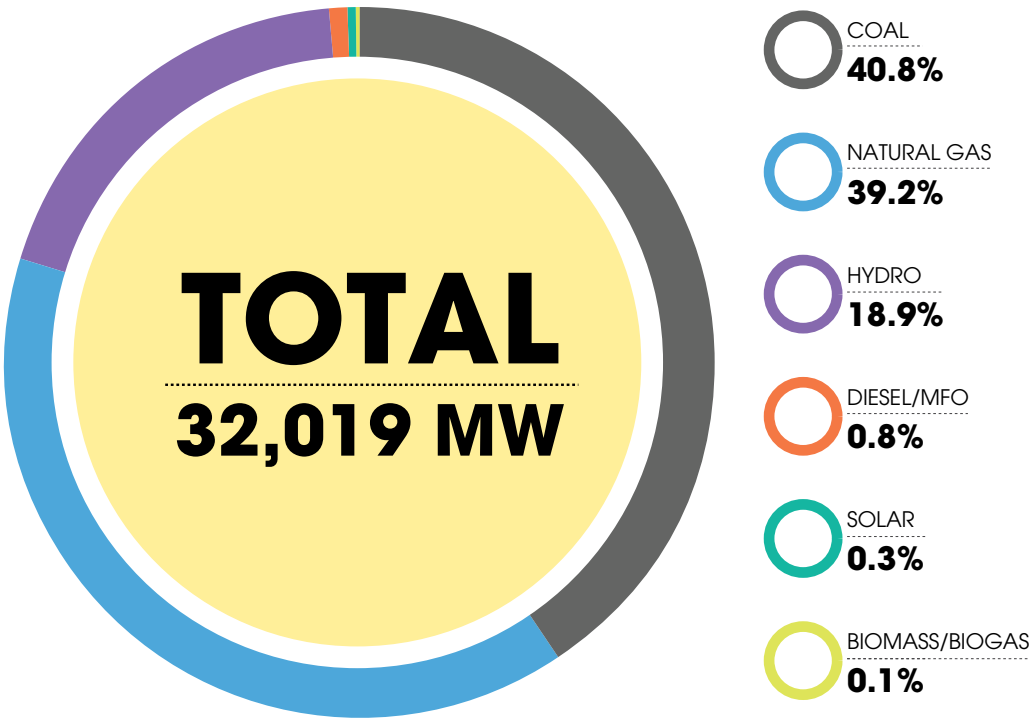
TABLE 11: AVAILABLE CAPACITY AS OF 31 DECEMBER 2019, IN MW

		HYDRO	NATURAL GAS	COAL	DIESEL / MFO	BIOMASS/ BIOGAS	SOLAR	TOTAL
PENINSULAR MALAYSIA	TNB	2,536.1	2,231.0	0.0	0.0	0.0	0.0	**4,767.1**
	IPPs	0.0	8,769.0	12,066.0	0.0	0.0	0.0	**20,835.0**
	LSS	0.0	0.0	0.0	0.0	0.0	72.9	**72.9**
	Subtotal	**2,536.1**	**11,000.0**	**12,066.0**	**0.0**	**0.0**	**72.9**	**25,675.0**
SABAH	SESB	74.9	103.4	0.0	149.7	0.0	0.0	**328.0**
	IPPs	0.0	865.0	0.0	0.0	0.0	0.0	**865.0**
	FiT	6.5	0.0	0.0	0.0	28.2	7.5	**42.2**
	Subtotal	**81.4**	**968.4**	**0.0**	**149.7**	**28.2**	**7.5**	**1,235.2**
SARAWAK	SEB	3,444.1	571.5	1,001.0	91.8	0.0	0.1	**5,108.5**
	Subtotal	**3,444.1**	**571.5**	**1,001.0**	**91.8**	**0.0**	**0.1**	**5,108.5**
	TOTAL	**6,061.6**	**12,539.9**	**13,067.0**	**241.5**	**28.2**	**80.5**	**32,018.7**

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: SHARE OF AVAILABLE CAPACITY AS OF 31 DECEMBER 2019



Source: Power Utilities and IPPs

TABLE 12: INSTALLED CAPACITY OF MAJOR HYDRO POWER STATIONS, 2019

STATION	INSTALLED CAPACITY (MW)	TOTAL (MW)
PENINSULAR MALAYSIA		
1. TERENGGANU		
- Stesen Jana Kuasa Sultan Mahmud Kenyir	4 x 100	**400.0**
- Stesen Jana Kuasa Hulu Terengganu	2 x 125	**250.0**
- Stesen Jana Kuasa Tembat	2 x 7.5	**15.0**
2. PERAK		
- Stesen Jana Kuasa Temenggor	4 x 87	**348.0**
- Stesen Jana Kuasa Bersia	3 x 24	**72.0**
- Stesen Jana Kuasa Kenering	3 x 40	**120.0**
- Chenderoh	3 x 10.7 + 1 x 8.4	**40.5**
- Sungai Piah Hulu	2 x 7.3	**14.6**
- Sungai Piah Hilir	2 x 27	**54.0**
3. PAHANG		
- Stesen Jana Kuasa Sultan Yussuf, Jor	4 x 25	**100.0**
- Stesen Jana Kuasa Sultan Idris II, Woh	3 x 50	**150.0**
- Stesen Jana Kuasa Ulu Jelai	2 x 186	**372.0**
4. KELANTAN		
- Pergau	4 x 150	**600.0**
SUBTOTAL		**2,536.1**
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

TABLE 13: INSTALLED CAPACITY OF MINI HYDRO POWER STATIONS, 2019

STATION	TOTAL (MW)
PENINSULAR MALAYSIA	
1. KEDAH	
- Sungai Tawar Besar	0.55
- Sungai Mempelam	0.38
- Sungai Mahang	0.45
2. PERAK	
- Sungai Tebing Tinggi	0.15
- Sungai Asap	0.11
- Sungai Kinjang	0.33
- Sungai Bil	0.23
- Sungai Kenas	0.50
- Sungai Chempias	0.12
- Sungai Temelong	0.80
3. PAHANG	
- Stesen Jana Kuasa Cameron Highlands Scheme	10.60
- Sungai Perdak	0.27
- Sungai Mentawak	0.50
- Sungai Pertang	0.34
- Sungai Sia	0.52
- Sungai Sempam	1.25
4. KELANTAN	
- Sungai Renyok G1	0.80
- Sungai Renyok G2	0.80
- Sungai Sok	0.56
- Sungai Lata Rek	0.25
5. TERENGGANU	
- Sungai Berang	0.36
- Sungai Cheralak	0.48
SUBTOTAL	**20.35**
SABAH	
- Sayap (Kota Belud)	1.00
- Melangkap (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
SUBTOTAL	**8.11**
SARAWAK	
- Sungai Pasir	0.40
- Penindin	0.28
- Sebako	0.16
- Lundu	0.14
- Kalamuku 1	0.50
- Kalamuku 2	0.50
- Sungai Kota	4.00
- Long Banga*	0.16
SUBTOTAL	**6.14**
TOTAL	**34.6**

Source: TNB, SESB and SEB

Note: 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, 2019

UTILITY	500 kV	275 kV	132 kV	66 kV
TNB	1,886	9,597	12,482	-
SESB	-	598	2,217	103
SEB	753	3,068	916	-

Source: TNB, SESB and SEB

TABLE 15: DISTRIBUTION NETWORK IN CIRCUIT – KILOMETRES, 2019

UTILITY	OVERHEAD LINES	UNDERGROUND CABLES
TNB	366,568	316,439
SESB	10,048	1,616
SEB	26,850	9,098

Source: TNB, SESB and SEB

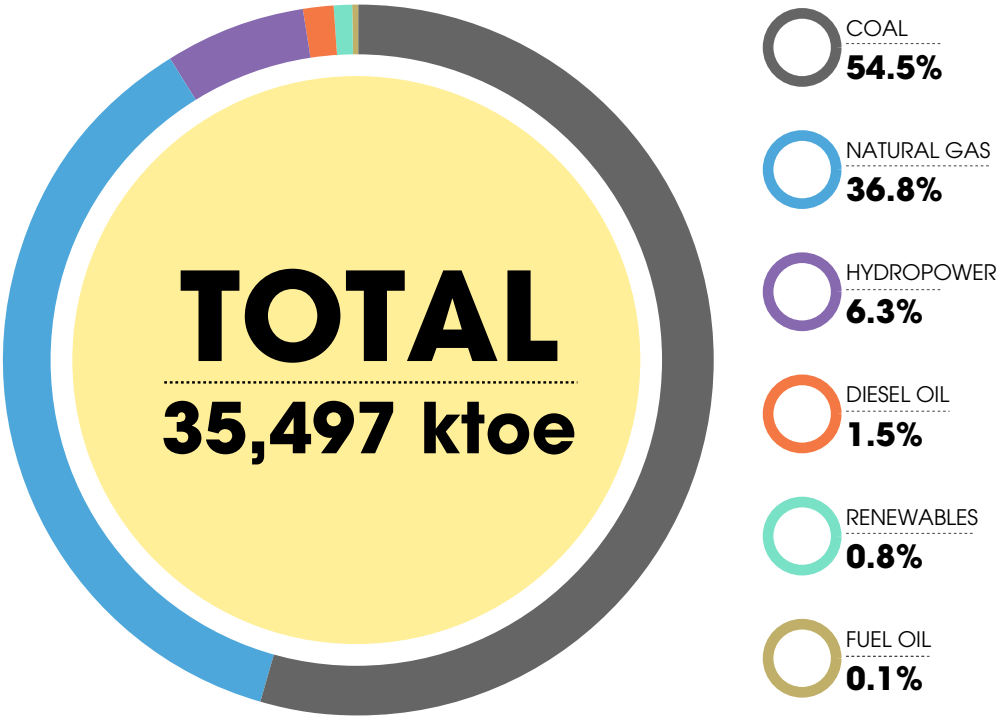
TABLE 16: GROSS GENERATION, CONSUMPTION, AVAILABLE CAPACITY, PEAK DEMAND AND RESERVE MARGIN FOR ELECTRICITY IN MALAYSIA, 2019

REGION	ELECTRICITY GROSS GENERATION		ELECTRICITY CONSUMPTION		AVAILABLE CAPACITY	PEAK DEMAND	RESERVE MARGIN
	GWh	%	GWh	%	MW	MW	%
PENINSULAR MALAYSIA	139,779	78.3	125,238	79.0	25,675	18,566	38.3
SARAWAK	31,351	17.6	27,386	17.3	5,109	3,777	35.3
SABAH	7,363	4.1	5,979	3.8	1,235	1,001	23.4
TOTAL	**178,492**	**100.0**	**158,603**	**100.0**	**32,019**		

Source: TNB and IPPs, SESB and SEB

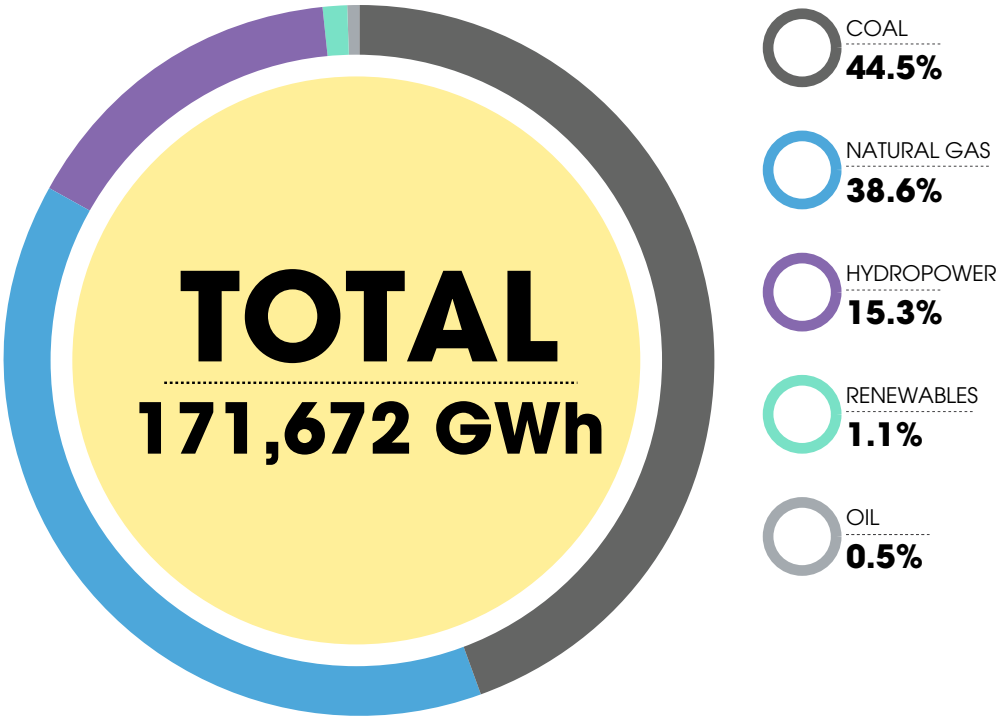
Notes :
1. Most diesel units in SESB are aged sets hence they are derated due to thermal limitations. Therefore, during operational state, some generating units are not available due to maintenance outages as well as random breakdowns; the actual operation capacity available to system operation for dispatch 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, 2019



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

FIGURE 29: GENERATION MIX BY FUEL TYPES, 2019



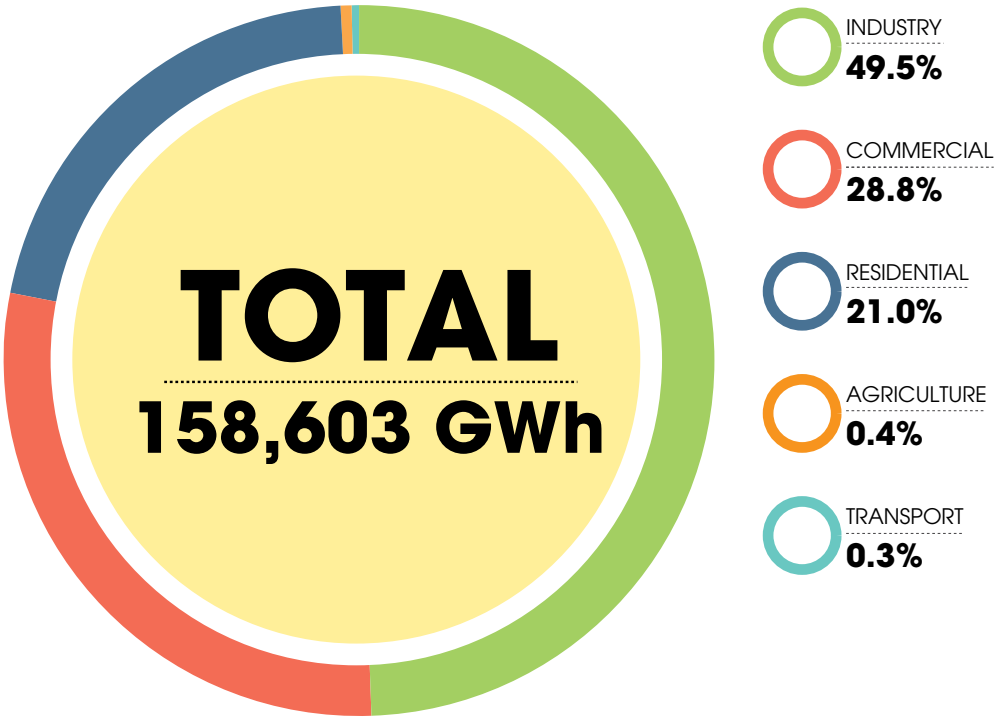
Note : Figures exclude electricity generation for self-generation plants
Source: Power utilities and IPPs

TABLE 17: ELECTRICITY CONSUMPTION BY SECTORS IN GWH, 2019

REGION	INDUSTRY		COMMERCIAL		RESIDENTIAL		TRANSPORT		AGRICULTURE		TOTAL
	GWh	%	GWh	%	GWh	%	GWh	%	GWh	%	GWh
PENINSULAR MALAYSIA	54,749	69.8	40,471	88.5	28,877	86.7	477	100.0	663.5	100.0	**125,238**
SARAWAK	22,128	28.2	2,753	6.0	2,505	7.5	-	-	-	-	**27,386**
SABAH	1,550	2.0	2,490	5.4	1,940	5.8	-	-	-	-	**5,979**
TOTAL	**78,427**	**100.0**	**45,713**	**100.0**	**33,322**	**100.0**	**477**	**100.0**	**663**	**100.0**	**158,603**

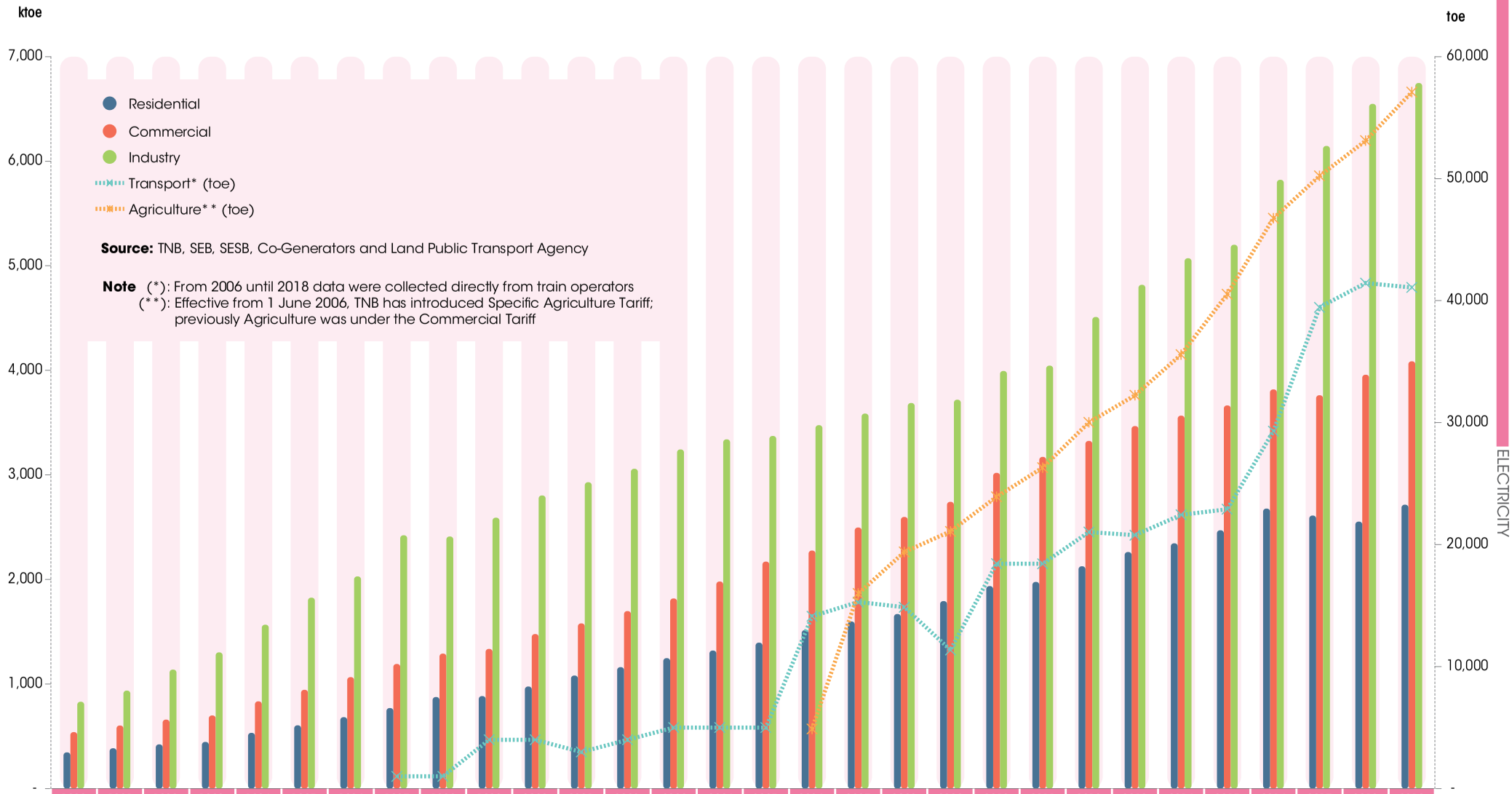
Source: Power utilities, IPPs and Self-Generators

FIGURE 30: ELECTRICITY CONSUMPTION BY SECTORS IN 2019



Source: Power utilities, IPPs and Self-Generators

FIGURE 31: ELECTRICITY CONSUMPTION BY SECTORS IN 2019



	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	2018	2019
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	2,679	2,610	2,553	2,715
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	3,817	3,762	3,958	4,086
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	6,547	6,748
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	41,439	41,080
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	53,113	57,088

TABLE 18: ELECTRICITY GENERATION AND INSTALLED CAPACITY OF RENEWABLE ENERGY BY PUBLIC LICENSEES BY REGION IN 2019

REGION	TYPE OF PRIME MOVER	INSTALLED CAPACITY (MW)	UNIT GENERATED (MWh)
PENINSULAR MALAYSIA	Major Hydro - TNB	2,536.10	3,952,891
	Mini Hydro - IPP	20.00	96,280
	Mini Hydro - FiT	63.80	213,976
	Mini Hydro - TNB	20.36	56,820
	Solar - Non-FiT	0.14	117
	Solar - FiT	240.08	417,911
	Solar - LSS	614.88	879,660
	Solar - NEM	31.27	7,084[2]
	Biogas - FiT	93.16	265,811
	Biomass - FiT	44.85	128,814
	SUBTOTAL	**3,664.64**	**6,019,364**
SABAH	Major Hydro - SESB	75.00	329,563
	Mini Hydro - SESB	8.11	14,359
	Mini Hydro - FiT	6.50	6,627
	Solar - FiT	28.66	53,989
	Solar - LSS	50.00	89,190
	Biogas - FiT	9.60	48,479
	Biomass - FiT	25.80	96,402
	SUBTOTAL	**203.67**	**638,609**
SARAWAK	Major Hydro - SEB	3,452.00	21,658,096
	Mini Hydro - SEB	6.14	11,217
	Solar	0.09	74
	SUBTOTAL	**3,458.23**	**21,669,387**
	GRAND TOTAL	**7,326.54**	**28,327,360**

Source: Energy Commission, TNB, SESB, SEB, Ministry of Utilities Sarawak and SEDA Malaysia
Note : 1. Public Licensee is a licensee that generates electricity for his own use as well as to supply to others
2. NEM Generation data is based on net generation exported to the grid

TABLE 19: ELECTRICITY GENERATION AND INSTALLED CAPACITY OF RENEWABLE ENERGY BY PRIVATE LICENSEES BY REGION IN 2019

REGION	TYPE OF PRIME MOVER	INSTALLED CAPACITY (MW)	UNIT GENERATED (MWh)
PENINSULAR MALAYSIA	Biomass - Co-Gen	12.41	13,802
	Biomass - Self-Gen	100.60	165,540
	Biogas - Self -Gen	0.40	170
	Solar - Self-Gen	8.06	11,140
	Mini Hydro - Self-Gen	2.13	5,130
	SUBTOTAL	**123.60**	**195,782**
SABAH	Solar - SESB	23.15	18,055
	Biomass - Co-Gen	116.20	49,068
	Biomass - Self-Gen	78.96	87,600
	Biogas - Self-Gen	42.54	74,160
	SUBTOTAL	**260.85**	**228,883**
SARAWAK	Biomass - Self-Gen	61.70	144,291
	Biogas - Self-Gen	0.50	1,674
	SUBTOTAL	**62.20**	**145,965**
	GRAND TOTAL	**446.65**	**570,630**

Source: Energy Commission and Ministry of Utilities Sarawak
Note : 1. Private Licensee is a licensee that generates electricity for his own use only

KEY ENERGY STATISTICS

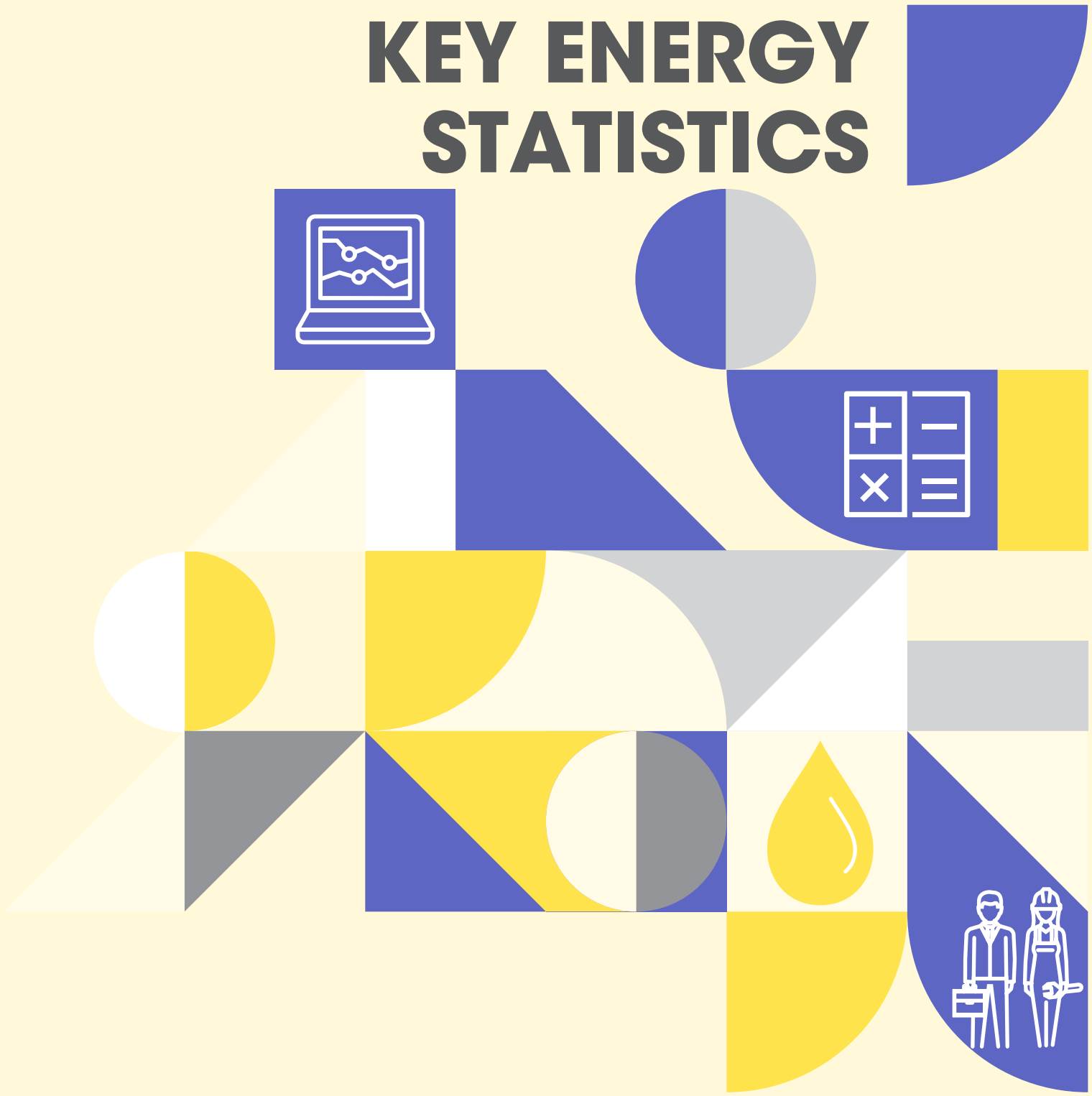


TABLE 20: PRIMARY ENERGY SUPPLY IN KTOE

	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	343	**20,398**	8.9	58.5	33.3	6.5	1.7
1991	9,443	4,163	10,112	1,564	379	**25,661**	25.8	53.0	39.4	6.1	1.5
1992	10,175	5,098	11,381	1,640	375	**28,669**	11.7	53.3	39.7	5.7	1.3
1993	10,135	5,816	11,360	1,352	419	**29,082**	1.4	54.8	39.1	4.6	1.4
1994	13,605	2,450	12,392	1,563	561	**30,571**	5.1	52.5	40.5	5.1	1.8
1995	16,159	608	13,960	1,612	535	**32,874**	7.5	51.0	42.5	4.9	1.6
1996	18,255	1,098	15,567	1,677	446	**37,043**	12.7	52.2	42.0	4.5	1.2
1997	17,917	3,803	19,041	1,622	333	**42,716**	15.3	50.8	44.6	3.8	0.8
1998	17,132	1,919	19,101	1,731	417	**40,300**	(5.7)	47.3	47.4	4.3	1.0
1999	17,643	1,807	21,476	1,940	647	**43,513**	8.0	44.7	49.4	4.5	1.5
2000	21,673	(1,431)	26,370	2,486	599	**49,697**	14.2	40.7	53.1	5.0	1.2
2001	23,590	(1,917)	25,649	2,970	607	**50,899**	2.4	42.6	50.4	5.8	1.2
2002	22,647	(523)	26,101	3,642	456	**52,323**	2.8	42.3	49.9	7.0	0.9
2003	25,344	(1,408)	27,257	5,316	435	**56,944**	8.8	42.0	47.9	9.3	0.8
2004	25,335	(82)	29,145	7,109	501	**62,008**	8.9	40.7	47.0	11.5	0.8
2005	24,339	(243)	33,913	6,889	446	**65,344**	5.4	36.9	51.9	10.5	0.7
2006	24,910	(1,671)	34,917	7,299	554	**66,009**	1.0	35.2	52.9	11.1	0.8
2007	26,571	(1,190)	36,639	8,848	558	**71,426**	8.2	35.5	51.3	12.4	0.8
2008	26,776	(1,780)	39,289	9,782	642	**74,709**	4.6	33.5	52.6	13.1	0.9
2009	26,386	96	35,851	10,623	574	**73,530**	(1.6)	36.0	48.8	14.4	0.8
2010	22,487	2,521	35,447	14,777	540	**75,772**	3.0	33.0	46.8	19.5	0.7
2011	24,679	2,224	35,740	14,772	680	**78,095**	3.1	34.4	45.8	18.9	0.9
2012	28,053	1,449	38,648	15,882	1,092	**85,124**	9.0	34.7	45.4	18.7	1.3
2013	27,154	5,320	39,973	15,067	1,532	**89,046**	4.6	36.5	44.9	16.9	1.7
2014	26,765	6,658	40,113	15,357	1,798	**90,691**	1.8	36.9	44.2	16.9	2.0
2015	24,971	4,194	41,853	17,406	2,017	**90,441**	(0.3)	32.2	46.3	19.2	2.2
2016	27,757	3,570	41,257	18,744	2,420	**93,747**	3.7	33.4	44.0	20.0	2.6
2017	27,471	1,909	41,200	20,771	2,994	**94,345**	0.6	31.1	43.7	22.0	3.2
2018	25,735	3,694	40,939	22,280	3,261	**95,909**	1.7	30.7	42.7	23.2	3.4
2019	25,523	7,290	41,461	21,057	3,349	**98,681**	2.9	33.3	42.0	21.3	3.4

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	25,145	(4,879)	(1)	3,998	15,895
2016	5,751	26,182	(4,716)	57	3,128	17,128
2017	4,823	27,613	(3,731)	96	2,189	18,799
2018	5,773	24,537	(4,167)	128	3,735	20,743
2019	2,177	26,381	(4,211)	143	5,882	19,622

TABLE 22: CONVERSION IN GAS PLANTS IN KTOE

	INPUT	GAS PLANTS			
	NATURAL GAS	LNG	GPP - LPG	MDS	RGT
1990	9,797	8,761	N.A	N.A	N.A
1991	11,715	8,749	N.A	N.A	N.A
1992	11,681	8,425	392	N.A	N.A
1993	13,005	9,019	529	39	N.A
1994	14,634	9,087	948	238	N.A
1995	17,088	11,244	1,900	421	N.A
1996	20,822	15,251	1,212	344	N.A
1997	24,945	16,396	1,258	389	N.A
1998	23,138	16,688	1,526	N.A	N.A
1999	24,116	16,417	1,472	N.A	N.A
2000	26,093	17,231	1,482	164	N.A
2001	25,703	16,636	1,310	513	N.A
2002	25,571	17,803	1,504	445	N.A
2003	27,940	18,965	790	443	N.A
2004	33,176	22,944	520	513	N.A
2005	36,447	24,254	1,319	460	N.A
2006	35,378	23,450	1,036	464	N.A
2007	38,141	24,355	1,483	417	N.A
2008	38,193	22,793	1,362	481	N.A
2009	37,098	25,004	1,012	426	N.A
2010	40,246	26,601	2,299	454	N.A
2011	40,737	28,130	2,434	359	N.A
2012	40,042	26,231	2,035	486	N.A
2013	39,678	28,209	1,174	478	N.A
2014	39,193	28,213	1,250	420	N.A
2015	40,773	39,957	1,826	862	1,873
2016	39,665	31,658	1,997	573	1,277
2017	38,296	29,468	1,961	509	1,815
2018	32,980	25,920	2,022	501	1,383
2019	33,968	29,044	2,107	425	2,663

Notes : 1. N.A means Not Applicable
2. Middle Distillate Synthesis (MDS) commenced pre-commercialisation operation in year 2000
3. LNG production in 2019 is from both MLNG and FLNG
4. LNG plant starts producing LPG in 2003
5. RGT stands for Regasification Gas Terminal

TABLE 23: CONVERSION IN REFINERIES IN KTOE

	Input:		Total Input	Output:								Total Output
	Local Crude Oil	Imported Crude Oil & Others		Petrol	Diesel	Fuel Oil	Kerosene	ATF & AV GAS	LPG	Non-Energy	Refinery Gas	
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	**24,575**	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**
2018	16,144	9,409	**25,553**	5,524	9,665	2,432	18	3,451	900	2,550	130	**24,669**
2019	17,209	7,999	**25,207**	5,317	8,484	1,388	8	3,470	560	3,708	147	**23,082**

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	343	813	-	**5,506**	21.2	54.3	24.7	6.2	14.8	-	**1,979**
1991	2,687	164	2,533	379	963	-	**6,726**	22.2	42.4	37.7	5.6	14.3	-	**2,283**
1992	2,352	160	3,144	375	968	-	**6,999**	4.1	35.9	44.9	5.4	13.8	-	**2,521**
1993	2,388	87	4,374	419	884	-	**8,152**	16.5	30.4	53.7	5.1	10.8	-	**2,987**
1994	1,957	249	5,119	561	925	-	**8,811**	8.1	25.0	58.1	6.4	10.5	-	**3,362**
1995	2,073	265	6,414	535	957	-	**10,244**	16.3	22.8	62.6	5.2	9.3	-	**3,909**
1996	2,354	284	7,489	446	950	-	**11,523**	12.5	22.9	65.0	3.9	8.2	-	**4,421**
1997	2,482	185	7,531	333	882	-	**11,413**	(1.0)	23.4	66.0	2.9	7.7	-	**4,977**
1998	2,130	275	8,886	417	964	-	**12,672**	11.0	19.0	70.1	3.3	7.6	-	**5,013**
1999	950	172	10,162	647	1,332	-	**13,263**	4.7	8.5	76.6	4.9	10.0	-	**5,409**
2000	592	191	11,580	599	1,495	-	**14,457**	9.0	5.4	80.1	4.1	10.3	-	**5,731**
2001	730	278	11,922	607	1,994	-	**15,531**	7.4	6.5	76.8	3.9	12.8	-	**5,940**
2002	1,363	476	12,424	456	2,556	-	**17,275**	11.2	10.6	71.9	2.6	14.8	-	**6,191**
2003	289	340	10,893	435	4,104	-	**16,061**	(7.0)	3.9	67.8	2.7	25.6	-	**6,568**
2004	274	272	10,545	501	5,327	-	**16,919**	5.3	3.2	62.3	3.0	31.5	-	**6,716**
2005	275	298	12,271	446	5,541	-	**18,831**	11.3	3.0	65.2	2.4	29.4	-	**6,706**
2006	171	617	12,524	554	5,964	-	**19,830**	5.3	4.0	63.2	2.8	30.1	-	**7,240**
2007	199	314	12,549	558	7,486	-	**21,106**	6.4	2.4	59.5	2.6	35.5	-	**8,385**
2008	181	299	13,651	642	8,069	-	**22,842**	8.2	2.1	59.8	2.8	35.3	-	**8,422**
2009	205	384	13,390	574	9,010	-	**23,563**	3.2	2.5	56.8	2.4	38.2	-	**8,531**
2010	125	415	12,628	540	12,951	-	**26,659**	13.1	2.0	47.4	2.0	48.6	-	**9,404**
2011	1,103	981	10,977	656	13,013	-	**26,730**	0.3	7.8	41.1	2.5	48.7	-	**10,193**
2012	550	811	11,533	779	14,138	80	**27,891**	4.3	4.9	41.4	2.8	50.7	0.3	**11,032**
2013	392	623	13,520	1,003	13,527	208	**29,273**	5.0	3.5	46.2	3.4	46.2	0.7	**11,630**
2014	269	622	13,860	1,152	13,648	171	**29,722**	1.5	3.0	46.6	3.9	45.9	0.6	**12,227**
2015	101	279	13,378	1,346	15,627	166	**30,898**	4.0	1.2	43.3	4.4	50.6	0.5	**12,393**
2016	155	165	13,260	1,723	17,101	168	**32,572**	5.4	1.0	40.7	5.3	52.5	0.5	**12,944**
2017	99	147	11,872	2,287	18,967	184	**33,556**	3.0	0.7	35.4	6.8	56.5	0.5	**13,375**
2018	17	187	11,542	2,265	20,472	276	**34,758**	3.6	0.6	33.2	6.5	58.9	0.8	**13,939**
2019	19	517	13,072	2,251	19,351	287	**35,497**	2.1	1.5	36.8	6.3	54.5	0.8	**13,127**

TABLE 25: FINAL ENERGY CONSUMPTION BY SECTORS 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 2015 Prices)
1990	5,276	5,386	1,622	838	-	**13,122**	11.0	6,114	170,501	35.86
1991	5,809	5,806	1,721	1,071	130	**14,537**	10.8	7,010	184,477	38.00
1992	6,455	6,226	1,867	1,222	391	**16,161**	11.2	8,068	197,050	40.94
1993	7,012	6,558	2,055	2,027	62	**17,714**	9.6	9,101	209,410	43.46
1994	7,283	7,262	2,300	1,817	422	**19,084**	7.7	9,522	225,040	42.31
1995	8,060	7,827	2,556	2,994	446	**21,883**	14.7	11,500	248,922	46.20
1996	9,443	8,951	3,162	1,744	486	**23,786**	8.7	11,673	280,536	41.61
1997	10,106	10,201	3,073	2,298	490	**26,168**	10.0	12,894	300,541	42.90
1998	10,121	9,793	3,314	2,023	307	**25,558**	(2.3)	12,451	268,834	46.31
1999	10,277	11,393	3,653	1,799	106	**27,228**	6.5	12,182	288,835	42.18
2000	11,406	12,071	3,868	2,250	104	**29,699**	9.1	13,760	323,348	42.55
2001	11,852	13,137	4,048	2,378	98	**31,513**	6.1	14,328	315,054	45.48
2002	12,854	13,442	4,387	2,511	96	**33,290**	5.6	15,461	327,133	47.26
2003	13,472	14,271	4,399	2,345	98	**34,585**	3.9	15,915	351,628	45.26
2004	14,914	15,385	4,754	2,183	87	**37,323**	7.9	17,184	376,085	45.69
2005	15,583	15,293	5,134	2,173	101	**38,284**	2.6	17,857	388,442	45.97
2006	15,248	14,819	5,424	2,819	258	**38,568**	0.7	18,325	406,056	45.13
2007	16,454	15,717	6,197	2,957	281	**41,606**	7.9	19,692	417,734	47.14
2008	16,205	16,395	6,205	2,876	287	**41,968**	0.9	19,368	420,639	46.04
2009	14,312	16,119	6,336	3,868	211	**40,846**	(2.7)	18,391	395,287	46.53
2010	12,928	16,828	6,951	3,696	1,074	**41,477**	1.5	17,698	424,530	41.69
2011	12,100	17,070	6,993	6,377	916	**43,456**	4.8	19,393	438,593	44.22
2012	13,919	19,757	7,065	7,497	1,053	**49,291**	13.4	22,469	456,449	49.23
2013	13,496	22,357	7,403	7,277	1,051	**51,584**	4.7	21,824	471,292	46.31
2014	13,162	24,327	7,459	6,217	1,045	**52,210**	1.2	20,424	495,773	41.20
2015	13,971	23,435	7,600	5,928	895	**51,829**	(0.7)	20,794	518,360	40.12
2016	16,019	24,004	8,051	8,729	415	**57,219**	10.4	25,164	532,752	47.23
2017	17,463	24,039	7,796	12,517	674	**62,489**	9.2	30,654	559,332	54.80
2018	19,046	23,555	7,773	13,262	1,021	**64,658**	3.5	33,329	574,231	58.04
2019	18,921	25,004	8,000	13,631	927	**66,483**	2.8	33,480	587,213	57.01

Note (*): 1. Defined as total GDP for Agriculture, Forestry and Fishing, Mining and Quarrying, Manufacturing and Construction
2. Industry GDP for year 1990-2014 was calculated by the Energy Commission

TABLE 26: FINAL ENERGY CONSUMPTION BY TYPE OF FUEL 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	11,397	*4,470*	*5,096*	9,566	1,778	**51,829**	47,359	(0.8)
2016	30,737	12,394	*6,083*	*6,221*	12,304	1,785	**57,219**	51,136	8.0
2017	31,241	12,607	*9,837*	*7,001*	16,838	1,804	**62,490**	52,653	3.0
2018	30,845	13,153	*10,451*	*8,400*	18,851	1,808	**64,658**	54,207	3.0
2019	32,483	13,647	*10,819*	*7,828*	18,647	1,706	**66,483**	55,664	2.7

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**
2018	9,756	13,041	387	3,309	6	3,121	789	**30,409**
2019	10,583	13,811	446	3,017	12	3,261	705	**31,835**

TABLE 28: SELECTED ENERGY AND ECONOMIC INDICATORS (1990-2019)

	GDP at Current Prices (RM Million) *	GDP at 2015 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 2015 Prices	Primary Energy Supply	Final Energy Consumption
1990	128,658	291,458	18,102	20,398	13,146	1,715	19,932	9.00	8.90	8.70
1991	145,991	319,278	18,547	25,661	14,563	1,925	22,373	9.55	25.80	10.78
1992	162,800	347,647	19,068	28,669	16,185	2,218	25,778	8.89	11.72	11.14
1993	186,042	382,046	19,602	29,082	17,728	2,450	28,474	9.89	1.44	9.53
1994	211,181	417,240	20,142	30,571	19,287	2,932	34,076	9.21	5.12	8.79
1995	240,365	458,251	20,682	32,874	22,164	3,375	39,225	9.83	7.53	14.92
1996	274,138	504,089	21,223	37,043	24,181	3,777	43,897	10.00	12.68	9.10
1997	304,458	541,002	21,769	42,716	26,167	4,384	50,952	7.32	15.31	8.21
1998	306,022	501,187	22,334	40,300	25,558	4,577	53,195	(7.36)	(5.66)	(2.33)
1999	324,952	531,948	22,910	43,513	27,228	4,815	55,961	6.14	7.97	6.53
2000	370,817	579,073	23,495	49,697	29,699	5,263	61,168	8.86	14.21	9.08
2001	366,841	582,071	24,031	50,899	31,515	5,594	65,015	0.52	2.42	6.11
2002	398,714	613,450	24,543	52,323	33,289	5,922	68,827	5.39	2.80	5.63
2003	435,708	648,960	25,038	56,944	34,586	6,313	73,371	5.79	8.83	3.90
2004	493,223	692,981	25,542	62,008	37,323	6,642	77,195	6.78	8.89	7.91
2005	543,578	729,932	26,046	65,344	38,285	6,944	80,705	5.33	5.38	2.58
2006	596,784	770,698	26,550	66,009	38,567	7,272	84,517	5.58	1.02	0.74
2007	665,340	819,242	27,058	71,426	41,606	7,683	89,294	6.30	8.21	7.88
2008	769,949	858,826	27,568	74,709	41,968	7,986	92,815	4.83	4.60	0.87
2009	712,857	845,828	28,082	73,530	40,845	8,286	96,302	(1.51)	(1.58)	(2.68)
2010	821,434	908,629	28,589	75,772	41,476	8,993	104,519	7.42	3.05	1.54
2011	911,733	956,731	29,062	78,095	43,455	9,235	107,331	5.29	3.07	4.77
2012	971,252	1,009,097	29,510	85,124	49,291	10,011	116,350	5.47	9.00	13.43
2013	1,018,614	1,056,462	30,214	89,046	51,583	10,590	123,079	4.69	4.61	4.65
2014	1,106,443	1,119,920	30,709	90,691	52,209	11,042	128,333	6.01	1.85	1.21
2015	1,176,941	1,176,941	31,186	90,441	51,829	11,397	132,464	5.09	(0.28)	(0.73)
2016	1,249,698	1,229,312	31,634	93,747	57,219	12,394	144,042	4.45	3.66	10.40
2017	1,372,310	1,300,769	32,023	94,345	62,489	12,607	146,521	5.81	0.64	9.21
2018	1,447,760	1,363,766	32,382	95,909	64,658	13,153	152,866	4.84	1.66	3.47
2019	1,513,157	1,424,310	32,523	98,681	66,483	13,647	158,603	4.44	2.89	2.82

Source: GDP and Population data is from the Department of Statistics, Malaysia
Note : GDP at 2010 Prices (RM Million) for 1990 until 2014 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 Supply (toe/GDP at 2015 Prices (RM Million))	Final Energy Consumption (toe/GDP at 2015 Prices (RM Million))	Electricity Consumption (toe/GDP at 2015 Prices (RM Million))	Electricity Consumption (GWh/GDP at 2015 Prices (RM Million))	Final Energy	Electricity
9.70	7,107	1.13	0.73	1,101	69.99	45.10	5.88	0.068	0.97	1.08
12.24	7,871	1.38	0.79	1,206	80.37	45.61	6.03	0.070	1.13	1.28
15.22	8,538	1.50	0.85	1,352	82.47	46.56	6.38	0.074	1.25	1.71
10.46	9,491	1.48	0.90	1,453	76.12	46.40	6.41	0.075	0.96	1.06
19.67	10,485	1.52	0.96	1,692	73.27	46.23	7.03	0.082	0.95	2.14
15.11	11,622	1.59	1.07	1,897	71.74	48.37	7.36	0.086	1.52	1.54
11.91	12,917	1.75	1.14	2,068	73.49	47.97	7.49	0.087	0.91	1.19
16.07	13,986	1.96	1.20	2,341	78.96	48.37	8.10	0.094	1.12	2.19
4.40	13,702	1.80	1.14	2,382	80.41	50.99	9.13	0.106	0.32	(0.60)
5.20	14,184	1.90	1.19	2,443	81.80	51.19	9.05	0.105	1.06	0.85
9.30	15,783	2.12	1.26	2,603	85.82	51.29	9.09	0.106	1.02	1.05
6.29	15,265	2.12	1.31	2,705	87.44	54.14	9.61	0.112	11.81	12.15
5.86	16,246	2.13	1.36	2,804	85.29	54.27	9.65	0.112	1.04	1.09
6.60	17,402	2.27	1.38	2,930	87.75	53.29	9.73	0.113	0.67	1.14
5.21	19,310	2.43	1.46	3,022	89.48	53.86	9.58	0.111	1.17	0.77
4.55	20,870	2.51	1.47	3,099	89.52	52.45	9.51	0.111	0.48	0.85
4.72	22,478	2.49	1.45	3,183	85.65	50.04	9.44	0.110	0.13	0.85
5.65	24,589	2.64	1.54	3,300	87.19	50.79	9.38	0.109	1.25	0.90
3.94	27,929	2.71	1.52	3,367	86.99	48.87	9.30	0.108	0.18	0.82
3.76	25,385	2.62	1.45	3,429	86.93	48.29	9.80	0.114	1.77	(2.48)
8.53	28,733	2.65	1.45	3,656	83.39	45.65	9.90	0.115	0.21	1.15
2.69	31,372	2.69	1.50	3,693	81.63	45.42	9.65	0.112	0.90	0.51
8.40	32,913	2.88	1.67	3,943	84.36	48.85	9.92	0.115	2.45	1.54
5.78	33,713	2.95	1.71	4,074	84.29	48.83	10.02	0.117	0.99	1.23
4.27	36,031	2.95	1.70	4,179	80.98	46.62	9.86	0.115	0.20	0.71
3.22	37,739	2.90	1.66	4,248	76.84	44.04	9.68	0.113	(0.14)	0.63
8.74	39,505	2.96	1.81	4,553	76.26	46.55	10.08	0.117	2.34	1.96
1.72	42,854	2.95	1.95	4,576	72.53	48.04	9.69	0.113	1.58	0.30
4.33	44,708	2.96	2.00	4,721	70.33	47.41	9.64	0.112	0.72	0.89
3.75	46,526	3.03	2.04	4,877	69.28	46.68	9.58	0.111	0.64	0.85

TABLE 29: ENERGY BALANCE TABLE IN 2019 (KILOTONNES OF OIL EQUIVALENT)

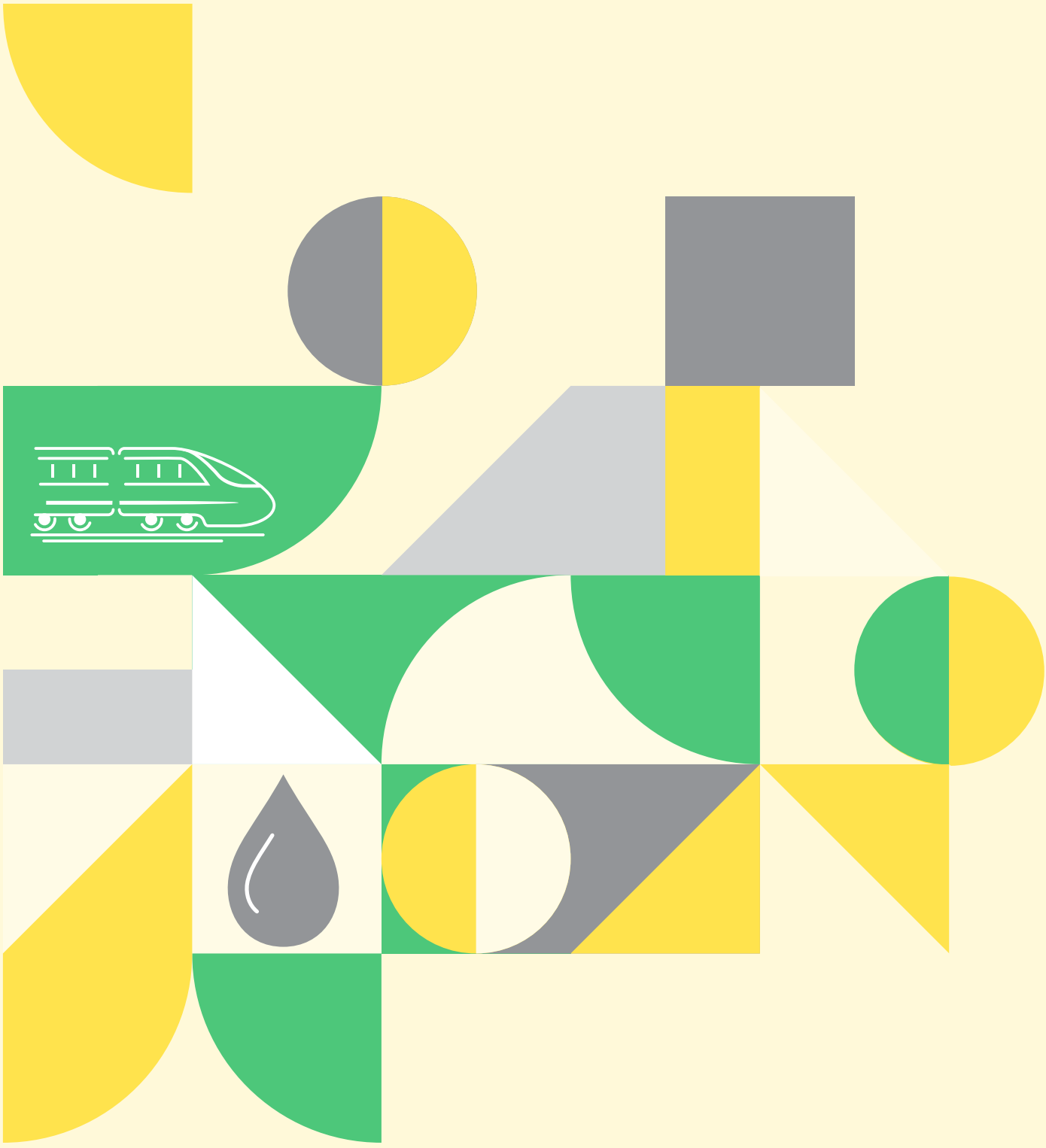
COMMERCIAL ENERGY BALANCE FOR MALAYSIA 2019 (KILOTONNES OF OIL EQUIVALENT)

ENERGY SOURCE	NATURAL GAS	LNG	CRUDE OIL (1/)	OTHERS (2/)	TOTAL PETROLEUM PRODUCTS	PETROLEUM			
						PETROL	DIESEL	FUEL OIL	LPG
PRIMARY SUPPLY									
1. Primary Production	73,230	0	29,878	0	**0**	0	0	0	0
2. Gas Flaring, Reinjection & Use	-9,599	0	0	0	**0**	0	0	0	0
3. Imports	5,325	2,663	10,306	84	**17,662**	8,782	6,216	79	443
4. Exports	-1,114	-29,044	-12,483	-11	**-11,779**	-348	-5,167	-403	-591
5. Bunkers	0	0	0	0	**-404**	0	-135	-269	0
6. Stock Change	0	0	-2,064	0	**1,881**	203	1,417	-213	545
7. Statistical Discrepancy	0	0	-115	0	**0**	0	0	0	0
8. Primary Supply	**67,842**	**-26,381**	**25,523**	**73**	**7,359**	**8,637**	**2,331**	**-806**	**397**
TRANSFORMATION									
9. Gas Plants									
9.1 MLNG	-33,554	29,044	0	0	**30**	0	0	0	30
9.2 MDS	-892	0	0	0	**425**	0	98	0	0
9.3 GPP-LPG (3&4/)	-2,186	0	0	0	**2,107**	0	0	0	2,107
9.4 RGT	2,663	-2,663	0	0	**0**	0	0	0	0
SUBTOTAL	**-33,968**	**26,381**	**0**	**0**	**2,562**	**0**	**98**	**0**	**2,137**
10. Refineries	0	0	-25,207	-73	**23,082**	5,317	8,484	1,388	560
11. Power Stations & Self-Generation									
11.1 Hydro Stations	0	0	0	0	**0**	0	0	0	0
11.2 Thermal Stations	-13,072	0	0	0	**-536**	0	-517	-19	0
11.3 Self-Generation (5/)	-1,333	0	0	0	**-71**	0	-71	0	0
SUBTOTAL	**-14,406**	**0**	**0**	**0**	**-606**	**0**	**-588**	**-19**	**0**
12. Losses & Own Use	-822	0	-315	0	**-605**	0	0	-13	0
13. Statistical Discrepancy	0	0	0	0	**43**	-142	258	-104	-76
14. Secondary Supply	**-49,195**	**26,381**	**-25,523**	**-73**	**24,476**	**5,174**	**8,252**	**1,252**	**2,621**
FINAL USE									
15. Residential	1	0	0	0	**623**	0	0	0	615
16. Commercial	23	0	0	0	**553**	0	340	50	163
17. Industry	7,706	0	0	0	**2,761**	90	2,145	391	131
18. Transport	98	0	0	0	**24,216**	13,664	7,290	0	0
19. Agriculture	0	0	0	0	**212**	0	207	5	0
20. Fishing	0	0	0	0	**658**	57	601	0	0
21. Non-Energy Use	10,819	0	0	0	**2,812**	0	0	0	2,107
22. Total Final Use	**18,647**	**0**	**0**	**0**	**31,835**	**13,811**	**10,583**	**446**	**3,017**
ELECTRICITY OUTPUT									
Main Activity Producer									
Gross Electricity Generation - GWh	66,306	0	0	0	**776**	0	686	90	0
Autoproducer									
Gross Electricity Generation - GWh	5,974	0	0	0	**234**	0	234	0	0

1/ Crude production includes Condensates comprising Pentane and Heavier Hydrocarbons.
2/ Others refer to Non-Crude Energy Forms (consist of Imported Light Diesel, Slop Reprocess, Crude Residuum & Middle East Residue) which are used as Refinery Intake.
3/ GPP-LPG extracts liquid products i.e Condensates, 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 2019.

Note: Total may not necessarily add up due to rounding

PRODUCTS				COAL & COKE	HYDRO POWER	SOLAR	BIOMASS	BIOGAS	BIODIESEL	ELECTRICITY	TOTAL
KEROSENE	ATF & AV GAS	NON-ENERGY	REFINERY GAS								
0	0	0	0	2,181	2,251	128	204	118	1,351	0	**109,340**
0	0	0	0	0	0	0	0	0	0	0	**-9,599**
0	577	1,564	0	19,624	0	0	0	0	0	3	**55,668**
-48	-665	-4,557	0	-3	0	0	0	0	-624	-146	**-55,205**
0	0	0	0	0	0	0	0	0	0	0	**-404**
6	-139	62	0	-658	0	0	0	0	-78	0	**-919**
0	0	0	0	-87	0	0	0	0	0	0	**-202**
-42	**-226**	**-2,931**	**0**	**21,057**	**2,251**	**128**	**204**	**118**	**648**	**-143**	**98,681**
0	0	0	0	0	0	0	0	0	0	0	**-4,480**
48	0	279	0	0	0	0	0	0	0	0	**-467**
0	0	0	0	0	0	0	0	0	0	0	**-79**
0	0	0	0	0	0	0	0	0	0	0	**0**
48	**0**	**279**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**-5,025**
8	3,470	3,708	147	0	0	0	0	0	0	0	**-2,199**
0	0	0	0	0	-2,251	0	0	0	0	2,251	**0**
0	0	0	0	-19,351	0	-125	-68	-95	0	12,540	**-20,707**
0	0	0	0	0	0	-3	-136	-23	0	587	**-980**
0	**0**	**0**	**0**	**-19,351**	**-2,251**	**-128**	**-204**	**-118**	**0**	**15,377**	**-21,687**
0	0	-444	-147	0	0	0	0	0	0	-1,311	**-3,053**
-2	17	92	0	0	0	0	0	0	0	-277	**-233**
53	**3,487**	**3,636**	**0**	**-19,351**	**-2,251**	**-128**	**-204**	**-118**	**0**	**13,789**	**-32,197**
8	0	0	0	0	0	0	0	0	0	2,715	**3,339**
0	0	0	0	0	0	0	0	0	0	4,086	**4,662**
4	0	0	0	1,706	0	0	0	0	0	6,748	**18,921**
0	3,261	0	0	0	0	0	0	0	648	41	**25,004**
0	0	0	0	0	0	0	0	0	0	57	**269**
0	0	0	0	0	0	0	0	0	0	0	**658**
0	0	705	0	0	0	0	0	0	0	0	**13,631**
12	**3,261**	**705**	**0**	**1,706**	**0**	**0**	**0**	**0**	**648**	**13,647**	**66,483**
0	0	0	0	76,411	26,196	1,448	223	312	0	0	**171,672**
0	0	0	0	0	0	11	525	76	0	0	**6,821**



ENERGY FLOW CHART

PRIMARY SUPPLY

PRIMARY SUPPLY* (98,681)

- 42.0% NATURAL GAS 41,461
- 7.4% PETROLEUM PRODUCTS & OTHERS 7,290
- 25.9% CRUDE OIL 25,523
- 2.3% HYDROPOWER 2,251
- 21.3% COAL AND COKE 21,057
- 1.1% RENEWABLES 1,098

PRIMARY PRODUCTION (109,340)

- 67.0% NATURAL GAS 73,230
- 2.0% COAL AND COKE 2,181
- 27.3% CRUDE OIL 29,878
- 1.6% RENEWABLES 1,801
- 2.1% HYDROPOWER 2,251

IMPORTS (55,668)

- 35.3% COAL AND COKE 19,624
- 18.7% CRUDE OIL & OTHERS 10,394
- 31.7% PETROLEUM PRODUCTS 17,662
- 14.4% NATURAL GAS & LNG 7,989

EXPORTS (55,205)

- 52.6% LNG 29,044
- 2.0% NATURAL GAS 1,114
- 22.9% CRUDE OIL & OTHERS 12,640
- 1.1% RENEWABLES 624
- 21.3% PETROLEUM PRODUCTS 11,779
- 0.0% COAL AND COKE 3

TRANSFORMATION

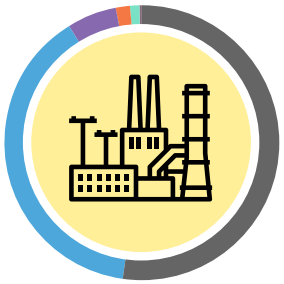
GAS PLANTS INPUT

- 33,554 LNG
- 2,186 GPP-LPG
- 892 MDS

OIL REFINERIES INPUT

- 17,209 LOCAL
- 7,999 IMPORT

POWER STATIONS & SELF GENERATION INPUT



- 19,351 COAL AND COKE
- 14,406 NATURAL GAS
- 2,251 HYDRO
- 588 DIESEL
- 450 RENEWABLES
- 19 FUEL OIL

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

FINAL USE

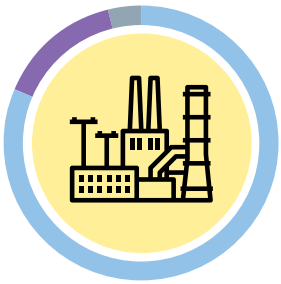
GAS PLANTS OUTPUT

- 29,044 LNG
- 2,107 LPG
- 279 NON-ENERGY
- 98 DIESEL
- 48 KEROSENE
- 30 LPG (FROM LNG)

OIL REFINERIES OUTPUT

- 8,484 DIESEL
- 5,317 PETROL
- 3,708 NON-ENERGY
- 3,470 ATF & AV GAS
- 1,388 FUEL OIL
- 560 LPG
- 147 REFINERY GAS
- 8 KEROSENE

POWER STATIONS & SELF GENERATION OUTPUT



- 12,540 THERMAL
- 2,251 HYDRO
- 587 SELF-GENERATION

FINAL USE BY SECTOR (66,483)

- 37.6% TRANSPORT 25,004
- 28.5% INDUSTRY 18,921
- 20.5% NON-ENERGY USE 13,631
- 7.0% COMMERCIAL 4,662
- 5.0% RESIDENTIAL 3,339
- 1.0% FISHERY 658
- 0.4% AGRICULTURE 269

FINAL USE BY FUEL (66,483)

- 48.9% PETROLEUM PRODUCTS 32,483
- 28.0% NATURAL GAS 18,647
- 20.5% ELECTRICITY 13,647
- 2.6% COAL AND COKE 1,706

NOTES ON 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)	refer 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.
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)	refer to the quantity of energy of all kinds delivered to the final user.
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.

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 Reserve Margin = Installed Capacity – Peak Demand / 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 labour, and NCI the net capital inflow. For example, if a country A's nominal GDP is $20,000, the domestic income from labour $3,000 and the foreign income from labour $5,000, and the country received a $10,000 donation from another country's charity organisation, 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

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.

SURUHANJAYA TENAGA (ENERGY COMMISSION)
No.12, Jalan Tun Hussein, Precinct 2
62100 Putrajaya, Malaysia.

+603 8870 8500 +603 8888 8637

www.st.gov.my