

National Energy Balance 2015



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Table Of Contents

4 PREFACE

5 INTRODUCTION

6 DATA COMPILATION

7 EXECUTIVE SUMMARY

10 KEY ECONOMIC AND ENERGY DATA

- 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 Type of Fuels
- 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: Retail Fuel Prices in Malaysia
- 30 Figure 15: Average Annual Prices of Natural Gas in Malaysia
- 31 Figure 16: Final Energy Consumption per Capita in ASEAN
- 32 Figure 17: Final Energy Intensity in ASEAN

33 OIL

- 34 Table 3: Production and Reserves of Oil as of 1st January, 2015
- 34 Table 4: Refinery Licensed Capacity, 2015
- 34 Table 5: Breakdown on Sales of Petroleum Products in Thousand Barrels, 2015
- 35 Figure 18: Net Export of Crude Oil
- 36 Figure 19: Export and Import of Petroleum Products
- 37 Figure 20: Production of Petroleum Products from Refineries
- 38 Figure 21: Final Consumption for Petroleum Products

39 NATURAL GAS

- 40 Table 6: Reserves and Production of Natural Gas as of 1st January, 2015
- 40 Table 7: Consumption of Natural Gas in MMscf, 2015
- 41 Figure 22: Export and Import of Piped Natural Gas and LNG
- 42 Figure 23: Natural Gas Consumption by Sectors
- 43 Figure 24: Conversion in Gas Plants

44 COAL

- 46 Table 8: Production and Reserves of Coal as of 31st December, 2015
- 46 Table 9: Consumption of Coal in Metric Tonnes, 2015
- 47 Figure 25: Net Import of Coal
- 48 Figure 26: Coal Consumption by Sectors

49 ELECTRICITY

- 50 Table 10: Installed Capacity as of 31st December 2015, in MW
- 51 Figure 27: Share of Installed Capacity as of 31st December, 2015
- 51 Table 11: Available Capacity as of 31st December 2015, in MW
- 52 Figure 28: Share of Available Capacity as of 31st December, 2015
- 53 Table 12: Installed Capacity of Major Hydro Power Stations, 2015

- 54 Table 13: Installed Capacity of Mini Hydro Power Stations, 2015
- 55 Table 14: Transmission Network in Circuit – kilometres, 2015
- 55 Table 15: Distribution Network in Circuit – kilometres, 2015
- 55 Table 16: Gross Generation, Consumption, Available Capacity, Peak Consumption and Reserve Margin for Electricity in Malaysia, 2015
- 56 Figure 29: Energy Input in Power Stations, 2015
- 56 Table 17: Electricity Consumption by Sectors in GWh, 2015
- 57 Figure 30: Electricity Consumption by Sectors, 2015
- 58 Figure 31: Electricity Consumption by Sectors
- 59 Table 18: Electricity Generation and Installed Capacity of Renewable Energy by Public Licensee by Region in 2015
- 60 Table 19: Electricity Generation and Installed Capacity of Renewable Energy by Private Licensee by Region in 2015

61 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 Fuels in ktoe
- 69 Table 27: Final Consumption for Petroleum Products in ktoe
- 70 Table 28: Selected Energy and Economic Indicators (1990-2015)
- 72 Table 29: Energy Balance Table in 2015 (kilotonnes of oil equivalent)
- 74 Table 30: Energy Balance Table in First Quarter (1Q) of 2015 (kilotonnes of oil equivalent)
- 76 Table 31: Energy Balance Table in Second Quarter (2Q) of 2015 (kilotonnes of oil equivalent)
- 78 Table 32: Energy Balance Table in Third Quarter (3Q) of 2015 (kilotonnes of oil equivalent)
- 80 Table 33: Energy Balance Table in Fourth Quarter (4Q) of 2015 (kilotonnes of oil equivalent)

82 ENERGY FLOW CHART

85 MANUFACTURING INDUSTRY IN PENINSULAR MALAYSIA

- 87 Table 34: Final Energy Consumption by Sub-Sectors in Manufacturing Sector, 2010
- 88 Table 35: Final Energy Consumption by Sub-Sectors in Manufacturing Sector, 2011
- 89 Table 36: Final Energy Consumption by Sub-Sectors in Manufacturing Sector, 2012
- 90 Table 37: Final Energy Consumption by Sub-Sectors in Manufacturing Sector, 2013
- 91 Table 38: Final Energy Consumption by Sub-Sectors in Manufacturing Sector, 2014
- 92 Table 39: Final Energy Consumption by Sub-Sectors in Manufacturing Sector, 2015

93 RESIDENTIAL SECTOR IN PENINSULAR MALAYSIA

- 95 Table 40: Final Energy Consumption by Aggregated Categories in Residential Sector, 2011
- 95 Table 41: Final Energy Consumption by Aggregated Categories in Residential Sector, 2012
- 96 Table 42: Final Energy Consumption by Aggregated Categories in Residential Sector, 2013
- 96 Table 43: Final Energy Consumption by Aggregated Categories in Residential Sector, 2014
- 97 Table 44: Final Energy Consumption by Aggregated Categories in Residential Sector, 2015

98 NOTES OF ENERGY BALANCE

- 98 Energy Balance Format
- 99 Notes on Electricity
- 99 Notes on Coal
- 100 Notes on GDP
- 100 Notes on GNI

101 CONVERSION COEFFICIENTS AND EQUIVALENCE

102 DEFINITION

Preface



The energy landscape in Malaysia has gradually grown and evolved in aspects of efficiency, diversity and sustainability in line with our economic transformation programme goals. The energy sector has matured considerably from merely relying on fossil fuels to diversifying the energy mix with new and renewable energy sources. Alternative sources of energy including renewables is the game changer and is expected to continue and gain momentum into the future. This is important because our indigenous energy resources are fast depleting and we are heavily dependent on energy imports. Inevitably, this will expose our economy to international energy prices and security challenges. Thus, careful planning is urgently required to ensure continued sustainability, affordability and security and mitigate any risks anticipated.

Despite the challenging economic environment in 2015, the Malaysian economy grew by 5.0% (2014: 6.0%), supported by the continued expansion of domestic demand. Interestingly, our primary energy supply and final energy demand posted a negative growth of 2.5% and 0.8% respectively.

For the first time since 2006, the transportation sector's final energy consumption declined by 3.7% in 2015 compared to the previous year. The transportation sector continues to be the country's largest consumer of energy with 45.2%, followed by the industry sector at 27.0%. The total final energy consumption of the industry sector increased by 6.1% at 13,971 ktoe. However, despite the increase, the energy intensity in the industry sector showed improvement in 2015, with a reduction of 2.5% compared to the previous year. In terms of final energy consumption by fuel type, petroleum products consumption showed a reduction of 2.4% to register at 29,087 ktoe. Final consumption of natural gas has also reduced by 0.8% to settle at 9,566 ktoe; while for coal and coke, the final energy consumption which were mostly consumed by cement manufacturers posted an increase of 4.1% from 2014 to register at 1,778 ktoe. Following the trend, electricity consumption recorded an increase of 3.0% to register at 11,375 ktoe in 2015.

The country's total electricity consumption grew rapidly from 1990 to 2015 with average annual growth rate of 7.9%. The share of natural gas in electricity generation mix

in 2015 increased by 2.7% to 46.6%, with coal at 42.28%, hydro at 9.28%, fuel oil and diesel at 1.16%, and renewables at 0.68%. Total installed capacity at the end of 2015 was 30,439 MW, an increase of 1.5% from 29,974 MW in 2014. The demand for electricity is heavily influenced by strong demand from the industry sector. Of the total electricity consumed in 2015, about 45% came from the industry sector, while 32.1% and 21.7% were consumed by the commercial and residential sector, respectively.

Malaysia has pledged in COP21 to reduce its greenhouse gas emissions intensity of Gross Domestic Product (GDP) by 45% by year 2030, compared to 2005 levels. This consists of 35% on an unconditional basis and a further 10% is conditional upon receipt of climate funding, technology transfer and capacity building from developed countries. Malaysia must now embark on serious effort to reduce CO₂ emission particularly for Energy Sector which has deemed to the highest emitter under the national portfolio. With our electricity intensity has improved significantly from 0.127 GWh/RM million GDP in 2014 to 0.125 GWh/RM million GDP, equivalent to a reduction of 1.7%. This is a post development progress towards National Determined Contribution to Paris Agreement. It is my fervent hope with the energy sector transformation initiatives in place, improvements in energy intensity indicators will be able to be sustained in the future to realise our goal of decoupling energy demand from economic growth and decarbonising the country.

I would like to take this opportunity to thank everyone involved in the preparation of this report, namely the relevant government agencies, power utilities, independent power producers, oil and gas companies, coal producers as well as the cement and iron and steel manufacturers for your continuous support in providing relevant and accurate data for the report.

Thank you.

**Y.B. Datuk Seri Panglima
Dr. Maximus Johnity Ongkili**
*Minister of Energy, Green Technology
and Water Malaysia*

Introduction

Malaysia's energy sector has matured considerably compared to 30 years ago, from merely relying on fossil fuel to diversifying its energy mix with renewable energy. Malaysia is working towards the new era of sustainable energy which is in line with the commitment made by Malaysia as we submitted the Intended Nationally Determined Contribution (INDC) report to the United Nations Framework Convention on Climate Change (UNFCCC) in November 2015. The INDC stipulates that Malaysia intends to reduce its greenhouse gas (GHG) emissions intensity of Gross Domestic Products (GDP) by 45 percent by 2030 relative to the emissions intensity of GDP in 2005. This consists of 35 percent on an unconditional basis and a further 10 percent is conditional upon receipt of climate finance, technology transfer and capacity building from developed countries.

Renewable energy made its debut in Malaysia in early 2000s when biomass plants were introduced commercially. Now, the generation of electricity from renewable energy such as solar, biomass and biogas has expanded to a bigger scale, attaining about 1 percent in the energy generation mix in 2015. Going forward, the percentage of renewable energy is expected to increase gradually to accommodate the environment and climate change concerns. The Energy Commission places an important emphasis in ensuring the security and reliability of electricity and piped gas supply in Peninsular Malaysia and Sabah, delicately balancing affordability and the effect on the environment. Renewable energy will feature more prominently in the country's energy mix in the foreseeable future.

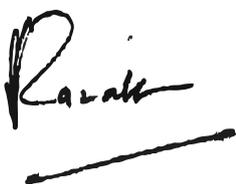
In 2015, the oil and gas industry was still battling with low crude oil price that had started to dip in the fourth quarter of 2014. Although the global crude oil price improved to USD68 per barrel (Brent) in the second quarter of 2015, it subsequently fell to a six-year low of USD42 per barrel in the third quarter. During that period, households adjusted their spending to the higher cost of living arising from the implementation of Goods and Services Tax (GST), adjustments in administrative prices, and the depreciation in the ringgit. Nevertheless, households received some support from the higher cash transfers under the Bantuan Rakyat 1Malaysia (BR1M) scheme, and quite significantly, electricity consumers continued to enjoy rebates from the scheduled tariffs, consequent to downward adjustments of fuel gas prices.

Many events that have taken place in 2015 have affected the supply and demand of energy in 2015. This is reflected in data presented in the National Energy Balance (NEB) 2015. As the hub for energy information in Malaysia, Energy Commission strives to enhance the energy data every year. Since 2014, the Energy Commission has undertaken three survey projects to study the energy consumption trends of the manufacturing, residential and commercial sector in Peninsular Malaysia respectively.

In continuing this effort, the Energy Commission will embark on a project to study and collect the data on energy consumption in the transportation sector in Malaysia. It is expected to provide insights on energy consumption trends for road, rail, water and air transport in Malaysia. This project is much anticipated by relevant government agencies because it will provide a platform for creating an energy database for the transportation sector, and the result from this survey will be beneficial for the government of Malaysia to initiate an effective energy policy for the transportation sector.

I would like to thank the Honourable Minister and the Ministry of Energy, Green Technology and Water for their guidance and support in realising the NEB publication every year. We would also like to acknowledge and thank the data providers for providing data in a timely and systematic manner, and others who have directly or indirectly assisted us in publishing the NEB 2015. We look forward to a greater cooperation and involvement from everyone.

Thank you.



Dato' Abdul Razak Bin Abdul Majid
*Chairman of 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: -

$$\text{Production} + \text{Imports} - \text{Exports} \pm \text{Stock change} = \text{Apparent inland deliveries (or consumption)}$$

In practice, however, "Apparent inland deliveries" deduced from supply statistics hardly ever match 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 actual stock change data and difference in data compilation at source and the second 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 in the "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 distributors and final users. 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 station and a producer in Sarawak are taken into account in this report.

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



Executive Summary

ECONOMY OVERVIEW

higher economy

growth
in 2015

5.0%

PRIMARY ENERGY SUPPLY



was
90,188 ktoe
compared to
92,487 ktoe



Energy Overview

The Malaysian economy grew by 5.0 percent in 2015 (2014: 6.0 percent), supported by the continued expansion of domestic demand. Domestic demand was primarily driven by the private sector. Modest improvements in external demand in the second half of the year also provided additional impetus to economic growth.

Despite the economic growth in 2015, overall energy supply and demand for Malaysia registered a negative growth. In the supply side, total primary energy supply posted a decrease of 2.5 percent to register at 90,188 ktoe. On the other hand, final energy consumption declined by 0.8 percent in 2015 as compared to the previous year.

Primary Energy Supply

The primary energy supply was 90,188 ktoe compared to 92,487 ktoe during the previous year, a reduction of 2.5 percent. The decline was led by lower production of natural gas. The export of Liquefied Natural Gas (LNG), has dropped marginally by 2.8 percent in 2015 because of lower input of natural gas into LNG plants. The export of crude oil and total petroleum products, however, increased in 2015, affected by the decrease and subsequent reversal in commodity prices. Crude oil production registered an increase of 9.8 percent from 2014 to 32,440 ktoe in 2015. The higher production was contributed by an increase in crude oil output in Sabah to 212.79 kilo barrels per day (kbpd) (2014: 158.20 kbpd). Sabah now accounts for 32.2 percent of total oil output. In keeping with the production limits set by the National Depletion Policy, production in Peninsular Malaysia increased by only 0.8 percent to 254.53 kbpd, to account for 38.4 percent of total output of crude oil of the country. The primary supply of natural gas in 2015 decreased by 1.9 percent to 39,364 ktoe while last year it increased by 0.4 percent. Coal production, mainly from Sarawak, decreased by 4.7 percent to 1,614 ktoe from the previous year. Continuous demand of coal from the power sector has increased the coal import in 2015 by 17.1 percent to register at 16,051 ktoe. This has resulted in the increase of total supply of coal and coke by 13.3 percent to 17,406 ktoe in the year 2015. The primary supply of hydropower posted an increase of 17.9 percent to register at 3,582 ktoe. Crude oil and condensates reserves in the country increased to 5.9 billion barrels or 24 years of lifespan as of 1st January 2015, supported by the rising reserves from the deepwater discoveries in offshore Sabah. Meanwhile, natural gas reserve is at 100.41 trillion standard cubic feet (Tscf), sufficient to cover 42 years of gas output at current production levels.

In terms of total shares, crude oil and petroleum products shares decreased slightly from 36.7 percent in 2014 to 33.1 percent in 2015. The share of natural gas marginally increased to 43.6 percent from 43.4 percent during the same period. The share of coal and coke has registered strong growth at 19.3 percent compared to 16.6 percent in 2014. The share of hydro has also increased from 3.3 percent to 4.0 percent in 2015.

Total refinery output

has increased by



0.7%

to register at

24,281 ktoe

Energy Transformation

In 2015, the total refinery output has increased by 0.7 percent to register at 24,281 ktoe (2014: 24,119 ktoe). Diesel took up the highest share (40.7 percent), followed by Petrol (20.7 percent), Non-Energy (15.9 percent), ATF and AV Gas (11.7 percent), Fuel Oil (7.0 percent), LPG (3.2 percent) Refinery Gas (0.7 percent) and Kerosene (0.1 percent). Malaysia's total refinery capacity currently is 566.3 thousand barrels per day (kbpd) including condensates splitter.

Natural gas was mainly transformed into Liquefied Natural Gas (LNG) for export purposes. In 2015, natural gas input into the LNG plants reduced by 2.3 percent to register at 35,635 ktoe. Liquefied Petroleum Gas (LPG) production from LNG plants decreased to 49 ktoe due to lower input of natural gas into LNG plants. Thus, the LPG production from Gas Processing Plant (GPP) also decreased, affected by a marginal decline of natural gas production. The GPP-LPG production dropped from 1,250 ktoe in 2014 to 1,155 ktoe in 2015. The Middle Distillate Synthesis (MDS) plant output showed an upward trend of 0.7 percent to register at 423 ktoe compared to the previous year. The petroleum products from MDS plant consisted of 61.8 percent non-energy, 27.8 percent Diesel and 10.4 percent Kerosene.

INSTALLED CAPACITY

end of 2015

was constituted at

30,439 MW

an increase of



1.5%

Electricity

Malaysia's total installed capacity as of the end of 2015 was 30,439 MW, an increase of 1.5 percent from 29,974 MW in 2014. Electricity gross generation registered 150,190 GWh, an increase of 1.8 percent (2014: 147,480 GWh). The electricity consumption was 132,199 GWh, an increase of 3.0 percent from the previous year (2014: 128,330 GWh). The peak demand for Peninsular Malaysia was recorded at 16,822 MW in the second quarter of the year (2Q 2015), Sarawak at 2,288 MW (in 4Q 2015) and Sabah at 913 MW (2Q 2015). The calculated reserve margin for Peninsular Malaysia in 2015 was 22.7 percent and 66.0 percent for Sarawak with Sabah at 47.8 percent.

The total energy input in power stations has increased slightly by 4.8 percent in 2015 to 33,134 ktoe. Coal and coke remained as the main fuel source of electricity generation, with a share of 47.2 percent of total fuel inputs, followed by natural gas at 40.4 percent, hydropower at 10.8 percent, diesel and fuel oil at 1.1 percent and renewables at 0.5 percent.

Electricity consumption from the residential sector increased by 3.8 percent to register at 2,435 ktoe (28,301 GWh) compared to the previous year. The consumption of electricity in the commercial sector increased to reach 3,659 ktoe (42,524 GWh) or 2.6 percent increment. Data sourced from the National Property Information Centre (NAPIC) shows that there are currently 55 shopping malls under construction in Malaysia, with 35 of these in the Klang Valley, Pulau Pinang and Johor. In 2016 to 2018, an additional 30.9 million square feet of retail space will be completed in these locations, equivalent to about 40 percent of existing retail space. The electricity consumption in the Industry sector recorded an increase of 2.9 percent (2014: 5.3 percent) to register at 5,218 ktoe (60,641 GWh). The electricity consumption from the rail transport sector, increased moderately from 22.4 ktoe (260 GWh) in 2014 to 22.9 ktoe (266 GWh). The lower growth due mainly as towards the end of the year, LRT and Monorail railway charges fares increase by average of 10 percent depending on length of commute. Overall, the total electricity consumption recorded a growth of 3.0 percent compared to the previous year to register at 11,375 ktoe (132,199 GWh).

petroleum products
constituted about



followed by
electricity



Final Energy Consumption

The final energy consumption in 2015 recorded a negative growth of 0.8 percent to settle at 51,806 ktoe compared to 52,209 ktoe in 2014. The decline was mainly due to the performance of transportation sector that was affected by the economy slowdown during the year. The total energy consumption in transportation sector decrease 3.7 percent to settle at 23,435 ktoe with its share from total energy consumption is 45.2 percent as the largest consumer of total energy in Malaysia. This was followed by Industry sector with its share of 27.0 percent with growth rate of 6.3 percent compared to previous year. Residential and commercial sector constituted about 14.6 percent of share in 2015 with growth rate of 1.3 percent from last year. The total consumption in non-energy use in 2015 was 5,928 ktoe with share of 11.4 percent from total energy consumption. Agriculture sector the most least consume of energy register a negative growth of 14.4 percent to settle at 895 ktoe. This was due to lower crude palm oil (CPO) output following unfavourable weather conditions. This includes excessive rains in the first quarter of 2015, causing floods in the east coast of Peninsular Malaysia, and the strong haze and El Nino weather phenomenon in the second half of the year, which led to lower yields.

The Industry GDP for Malaysia in 2015 registered a growth of 4.4 percent compared to the previous year due mainly to construction sector as growth in the civil engineering sub-sector picked up, reflecting the progress of existing infrastructure projects as well as the commencement of a large petrochemical project in Johor. Growth in the construction sector was also supported by the non-residential sub-sector, which was underpinned by projects in both the Industry and commercial property segments. Malaysia's Industry energy intensity for 2015 was 43 toe/RM Million, a decrease of 2.4 percent from the previous year due to lower growth of final energy consumption in Industry sector compared to the growth of Industry GDP.

Total energy consumption by type of fuel showed that petroleum products constituted about 56.1 percent of total energy consumption, followed by electricity at 22.0 percent, 18.5 percent for natural gas and 3.4 percent for coal and coke. All type of fuel reported a downward trend except for electricity and coal.

Conclusion

Overall, in 2015, our energy supply and consumption trend showed signs of decoupling from the country's economic growth. Our GDP growth remained strong whilst total energy supply and consumption showed a downward trend. This indicates that initiatives to promote energy efficiency has started to show encouraging results. In the near future, Malaysia as a producer and exporter of crude oil will be facing challenges in terms of export revenue reduction if the world crude oil prices remain low. The decline in global commodity prices, especially crude oil, continued to exert pressure on global exchange rates, particularly on the currencies of commodity-exporting countries like Malaysia.

Total electricity demand in 2015 recorded an increase of 3.0 percent from previous year to register at 11,375 ktoe. Coal and coke final consumption also show an upward trend with growth of 4.1 percent to settle at 1,778 ktoe. Natural gas consumption decreased by 0.8 percent in 2015 to 9,566 ktoe due to the economic condition especially in manufacturing industry during the year.

The final energy consumption in transportation sector was decreased by 3.7 percent to register at 23,435 ktoe in 2015 compared to the previous year where it stood at 24,327 ktoe. The declined in growth was reflected by the lower consumption of petroleum products especially from diesel and Aviation Turbine Fuel (ATF) & Aviation Gasoline (AV Gas). Diesel consumption in the transportation sector decreased by 14.4 percent to settle at 7,068 ktoe, while ATF and AV Gas dropped at 0.7 percent. This was due to tourist arrivals into Malaysia were lower, while there was an increase in outbound travel. However, the petrol consumption in 2015 increased by 1.8 percent as households received some support from the higher cash transfers under the Bantuan Rakyat 1Malaysia (BR1M) scheme, the reduction in individual income tax rates for the 2015 assessment year and savings derived from lower domestic fuel prices during the year.

Total final energy consumption of residential and commercial sectors continued to increase, with the increased attributed mainly from electricity consumption with growth of 1.3 percent. These sectors are also highly dependable on LPG, which is supplied to households, government buildings, hotels, hospitals and even airports as well as food courts and restaurants especially for cooking purpose. However, in 2015, the LPG usage in these sectors decreased marginally at 4.4 percent to register at 1,301 ktoe.

Non-energy use is the use of products resulting from the transformation process for non-energy purpose such as bitumen, lubricants etc. and use of energy products such as natural gas as Industry feedstocks. As of 2015, the non-energy consumption for energy showed a slight decrease of 4.7 percent, of which a total of 4,470 ktoe of natural gas has been supplied for this non-energy use application. However, the total of non-energy (bitumen and lubricants) increased by 4.9 percent to register at 621 ktoe.



01.

Key Economic And Energy Data



Table 1: Key Economic and Energy Data

	2015				
	1Q	2Q	3Q	4Q	Total
GDP at current prices (RM million)*	277,456	283,175	292,552	303,955	1,157,138
GDP at 2010 prices (RM million)*	254,524	260,972	269,384	277,924	1,062,804
GNI at current prices (RM million)*	269,751	278,569	281,960	294,848	1,125,128
Population ('000 people)**	30,896	30,996	31,095	31,196	30,996
Primary Energy Supply (ktoe)	22,050	22,820	22,953	22,365	90,188
Final Energy Consumption (ktoe)	12,790	13,028	13,240	12,748	51,806
Electricity Consumption (ktoe)	2,731	2,885	2,884	2,875	11,375
Electricity Consumption (GWh)	31,737	33,533	33,513	33,415	132,199
PER CAPITA					
GDP at Current Prices (RM)*	35,921	36,543	37,633	38,974	37,332
Primary Energy Supply (toe)	0.714	0.736	0.738	0.717	2.910
Final Energy Consumption (toe)	0.414	0.420	0.426	0.409	1.671
Electricity Consumption (kWh)	1,027	1,082	1,078	1,071	4,265
ENERGY INTENSITY					
Primary Energy Supply (toe/GDP at 2010 prices (RM million))	86.6	87.4	85.2	80.5	84.9
Final Energy Consumption (toe/GDP at 2010 prices (RM million))	50.3	49.9	49.2	45.9	48.7
Electricity Consumption (toe/GDP at 2010 prices (RM million))	10.7	11.1	10.7	10.3	10.7
Electricity Consumption (GWh/GDP at 2010 prices (RM million))	0.125	0.128	0.124	0.120	0.124

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

Table 2: Key Economic and Energy Data by Region

PENINSULAR MALAYSIA	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
GDP at Current Prices (RM million)*	464,431	507,814	562,522	641,175	600,630	672,787	739,349	793,280	835,888	910,073	959,245
GDP at 2010 Prices (RM million)*	537,441	567,920	603,537	634,266	621,915	672,787	709,030	752,858	789,217	839,023	881,202
Population ('000 people)**	20,785	21,180	21,577	21,970	22,363	22,754	23,099	23,417	23,868	24,157	24,458
Final Energy Consumption (ktoe)	32,195	34,390	37,921	38,530	34,521	35,593	35,968	36,683	41,859	42,470	43,011
Electricity Consumption (ktoe)	6,366	6,669	7,030	7,307	7,567	8,145	8,427	8,791	9,108	9,315	9,531
Electricity Consumption (GWh)	73,987	77,504	81,710	84,924	87,950	94,666	97,939	102,174	105,861	108,259	110,770
PER CAPITA											
GDP at Current Prices (RM)*	22,344	23,976	26,071	29,185	26,858	29,569	32,008	33,876	35,021	37,674	39,221
Final Energy Consumption (toe)	1,549	1,624	1,757	1,754	1,544	1,564	1,557	1,567	1,754	1,758	1,759
Electricity Consumption (kWh)	3,560	3,659	3,787	3,866	3,933	4,161	4,240	4,363	4,435	4,482	4,529
ENERGY INTENSITY											
Final Energy Consumption (toe/GDP at 2010 prices (RM million))	59.9	60.6	62.8	60.7	55.5	52.9	50.7	48.7	53.0	50.6	48.8
Electricity Consumption (toe/GDP at 2010 prices (RM million))	11.8	11.7	11.6	11.5	12.2	12.1	11.9	11.7	11.5	11.1	10.8
Electricity Consumption (GWh/GDP at 2010 prices (RM million))	0.138	0.136	0.135	0.134	0.141	0.141	0.138	0.136	0.134	0.129	0.126

Note (*): 1. GDP data by States from Department of Statistics Malaysia

2. GDP for Peninsular Malaysia including Supra State (Supra State covers production activities that beyond the centre of predominant economic interest for any state)

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

SABAH	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
GDP at Current Prices (RM million)*	36,258	40,649	48,129	60,312	55,102	61,516	69,672	71,347	72,361	77,593	78,993
GDP at 2010 prices (RM million)*	47,529	50,552	52,235	57,029	59,763	61,516	63,191	65,390	67,775	71,166	75,540
Population ('000 people)**	2,978	3,045	3,116	3,190	3,267	3,348	3,435	3,523	3,703	3,767	3,831
Final Energy Consumption (ktoe)	2,806	2,587	2,879	3,068	3,046	2,758	3,466	4,671	4,097	4,128	3,845
Electricity Consumption (ktoe)	238	255	285	299	329	355	368	425	439	423	499
Electricity Consumption (GWh)	2,766	2,969	3,317	3,474	3,818	4,127	4,275	4,943	5,097	4,919	5,805
PER CAPITA											
GDP at Current Prices (RM)*	12,176	13,350	15,448	18,909	16,864	18,373	20,284	20,250	19,542	20,601	20,620
Final Energy Consumption (toe)	0.942	0.850	0.924	0.962	0.932	0.824	1.009	1.326	1.106	1.096	1.004
Electricity Consumption (kWh)	929	975	1,065	1,089	1,169	1,233	1,245	1,403	1,377	1,306	1,515
ENERGY INTENSITY											
Final Energy Consumption (toe/GDP at 2010 prices (RM million))	59.0	51.2	55.1	53.8	51.0	44.8	54.8	71.4	60.4	58.0	50.9
Electricity Consumption (toe/GDP at 2010 prices (RM million))	5.0	5.1	5.5	5.2	5.5	5.8	5.8	6.5	6.5	5.9	6.6
Electricity Consumption (GWh/GDP at 2010 prices (RM million))	0.058	0.059	0.064	0.061	0.064	0.067	0.068	0.076	0.075	0.069	0.077

Note (*): 1. GDP data by States from Department of Statistics Malaysia

2. GDP for Sabah including WP Labuan

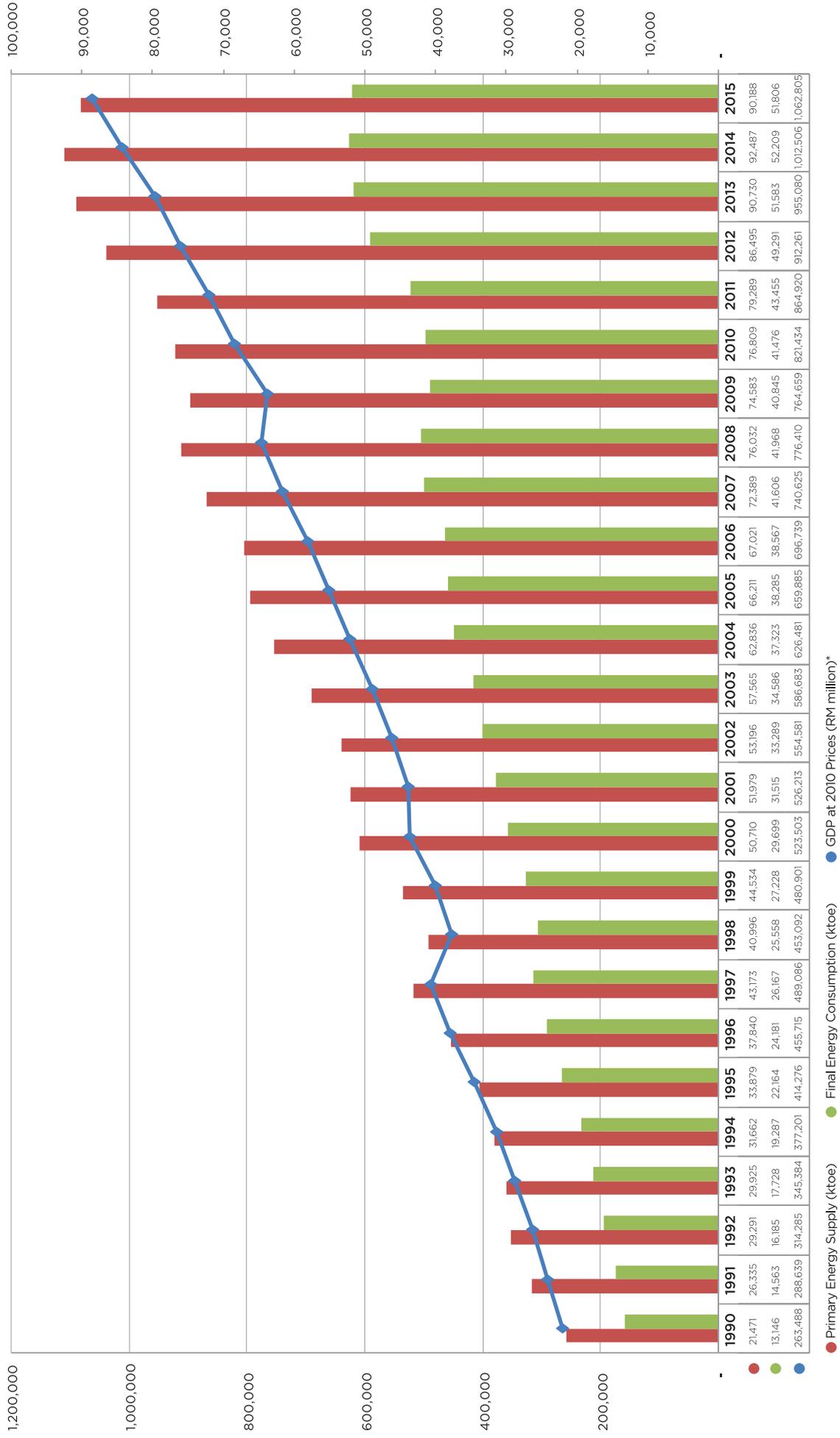
(**): Mid-year population from Department of Statistics Malaysia

SARAWAK	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
GDP at Current Prices (RM million)*	59,218	66,262	74,739	91,739	78,680	87,131	102,713	106,625	110,365	118,801	118,900
GDP at 2010 prices (RM million)*	75,096	78,434	84,965	85,209	83,521	87,131	92,700	94,013	98,089	102,318	106,063
Population ('000 people)**	2,282	2,325	2,366	2,408	2,451	2,487	2,528	2,570	2,643	2,675	2,708
Final Energy Consumption (ktoe)	3,274	3,330	3,461	3,302	3,277	3,125	4,086	5,358	5,628	5,612	4,951
Electricity Consumption (ktoe)	339	348	368	380	391	493	445	795	1,043	1,304	1,344
Electricity Consumption (GWh)	3,940	4,045	4,277	4,416	4,544	5,730	5,172	9,237	12,118	15,152	15,624
PER CAPITA											
GDP at Current Prices (RM)*	32,902	33,737	35,909	35,380	34,079	35,033	36,671	36,585	37,120	38,253	39,172
Final Energy Consumption (toe)	1,434	1,432	1,463	1,371	1,337	1,256	1,616	2,085	2,130	2,098	1,828
Electricity Consumption (kWh)	1,726	1,740	1,808	1,834	1,854	2,304	2,046	3,594	4,586	5,665	5,771
ENERGY INTENSITY											
Final Energy Consumption (toe/ GDP at 2010 prices (RM million))	43.6	42.5	40.7	38.8	39.2	35.9	44.1	57.0	57.4	54.8	46.7
Electricity Consumption (toe/ GDP at 2010 prices (RM million))	4.5	4.4	4.3	4.5	4.7	5.7	4.8	8.5	10.6	12.7	12.7
Electricity Consumption (GWh/ GDP at 2010 prices (RM million))	0.052	0.052	0.050	0.052	0.054	0.066	0.056	0.098	0.124	0.148	0.147

Note (*): GDP data by States from Department of Statistics Malaysia
(**): Mid-year population from Department of Statistics Malaysia

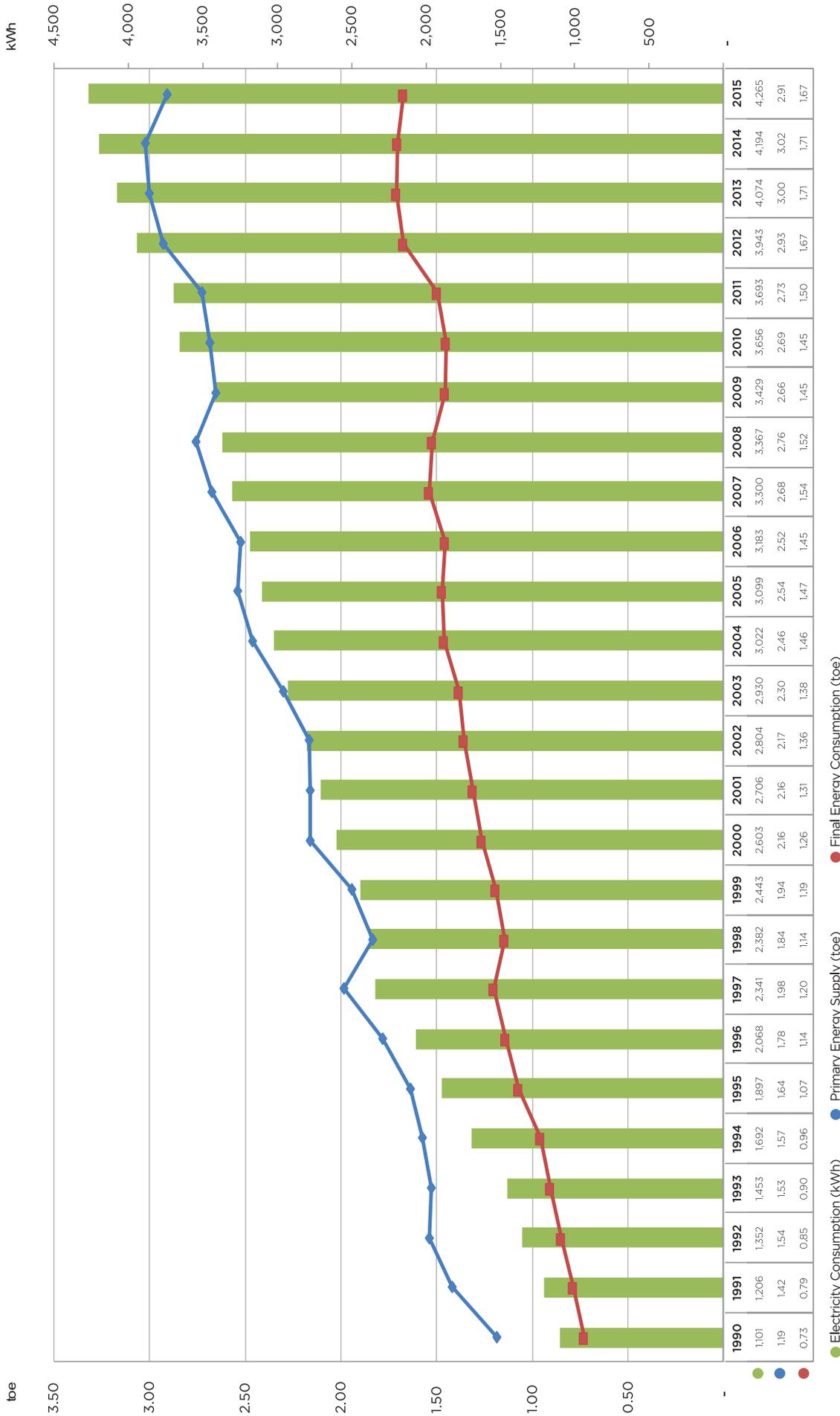
Figure 1: Trends in GDP, Primary Energy Supply and Final Energy Consumption

RM Million (at 2010 prices)



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

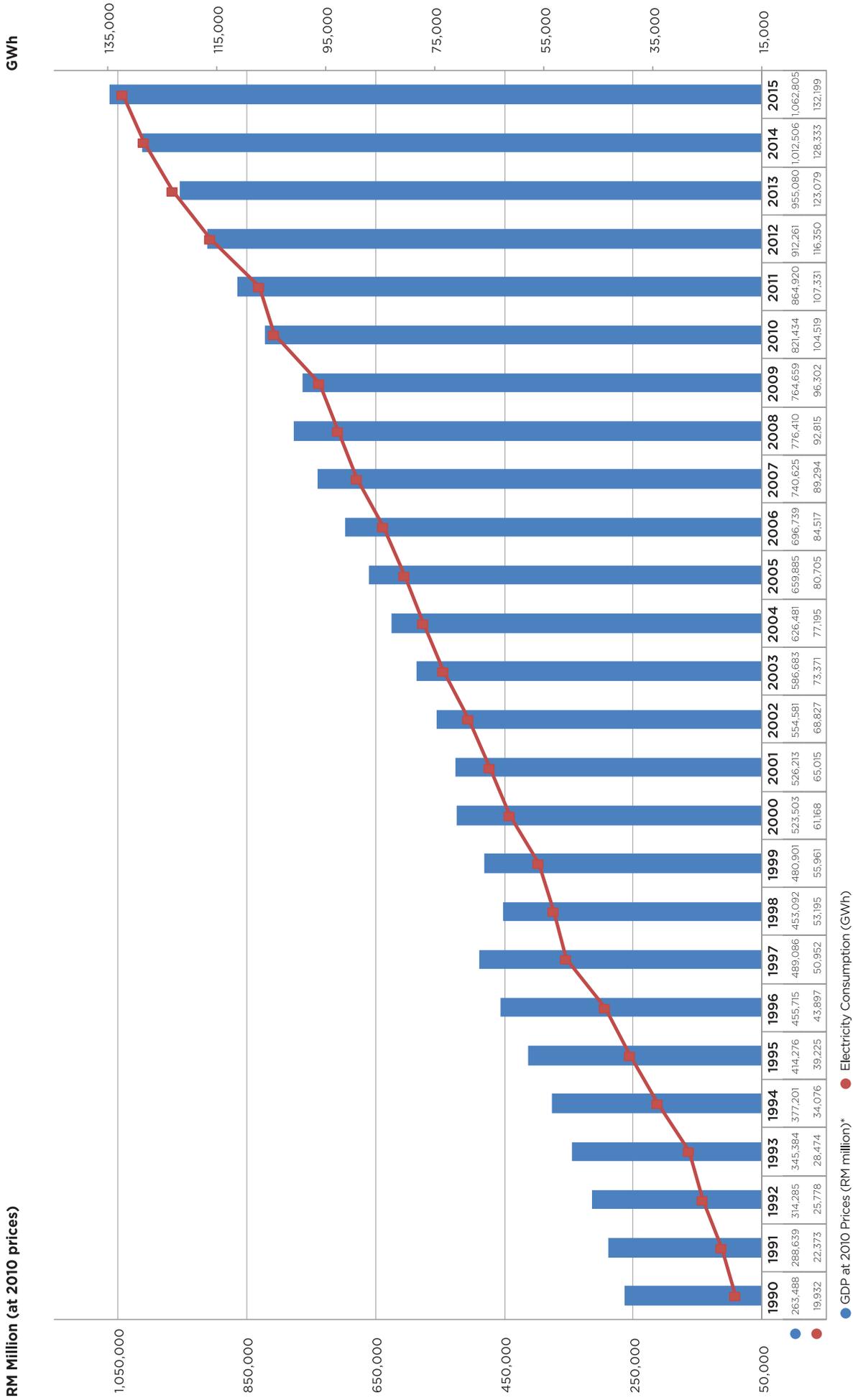
Figure 2: Primary Energy Supply, Electricity Consumption and Final Energy Consumption Per Capita



Source: Population data from Department of Statistics Malaysia
 Note: Based on Energy Commission calculation

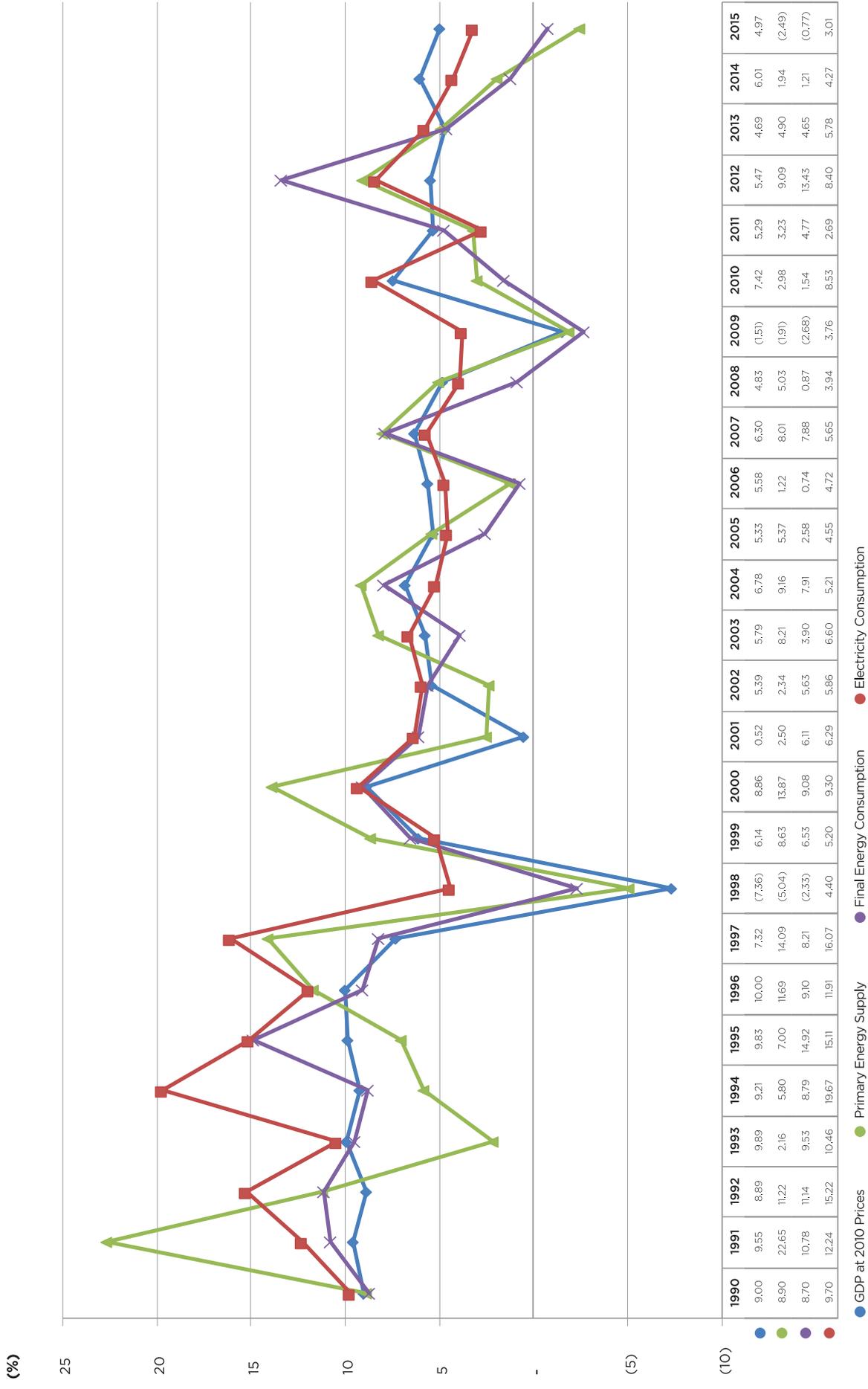
Figure 3: Trends in GDP and Electricity Consumption

RM Million (at 2010 prices)



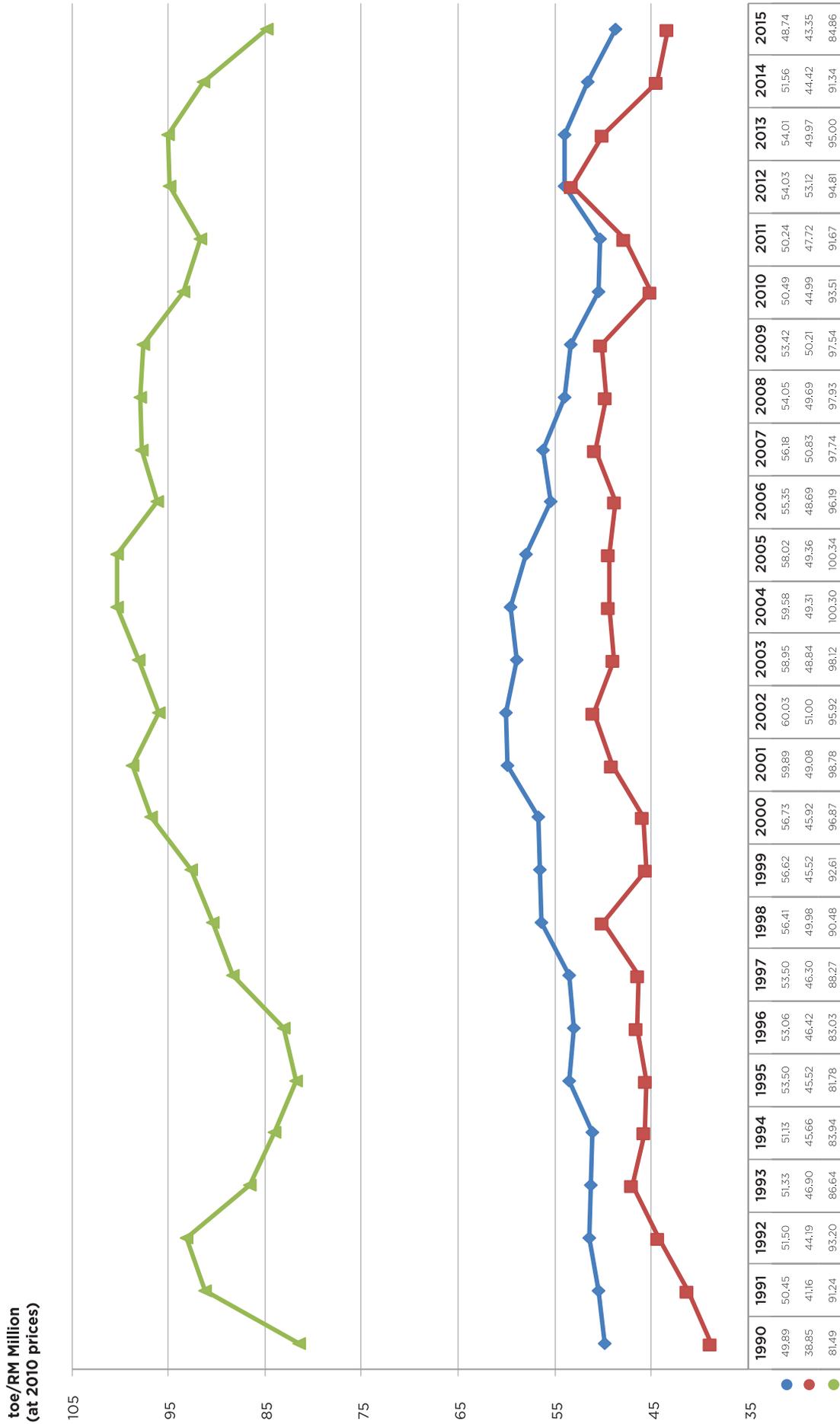
Source: GDP data by Department of Statistics Malaysia
 Note: GDP at 2010 Prices (RM Million) for 1990 until 2009 was calculated by Energy Commission

Figure 4: Annual Growth Rates of GDP, Primary Energy Supply, Final Energy Consumption and Electricity Consumption



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

Figure 5: Primary and Final Energy Intensity



Source: GDP data from Department of Statistics Malaysia

Note: 1. Measurement on kt0e is based on Energy Commission calculation

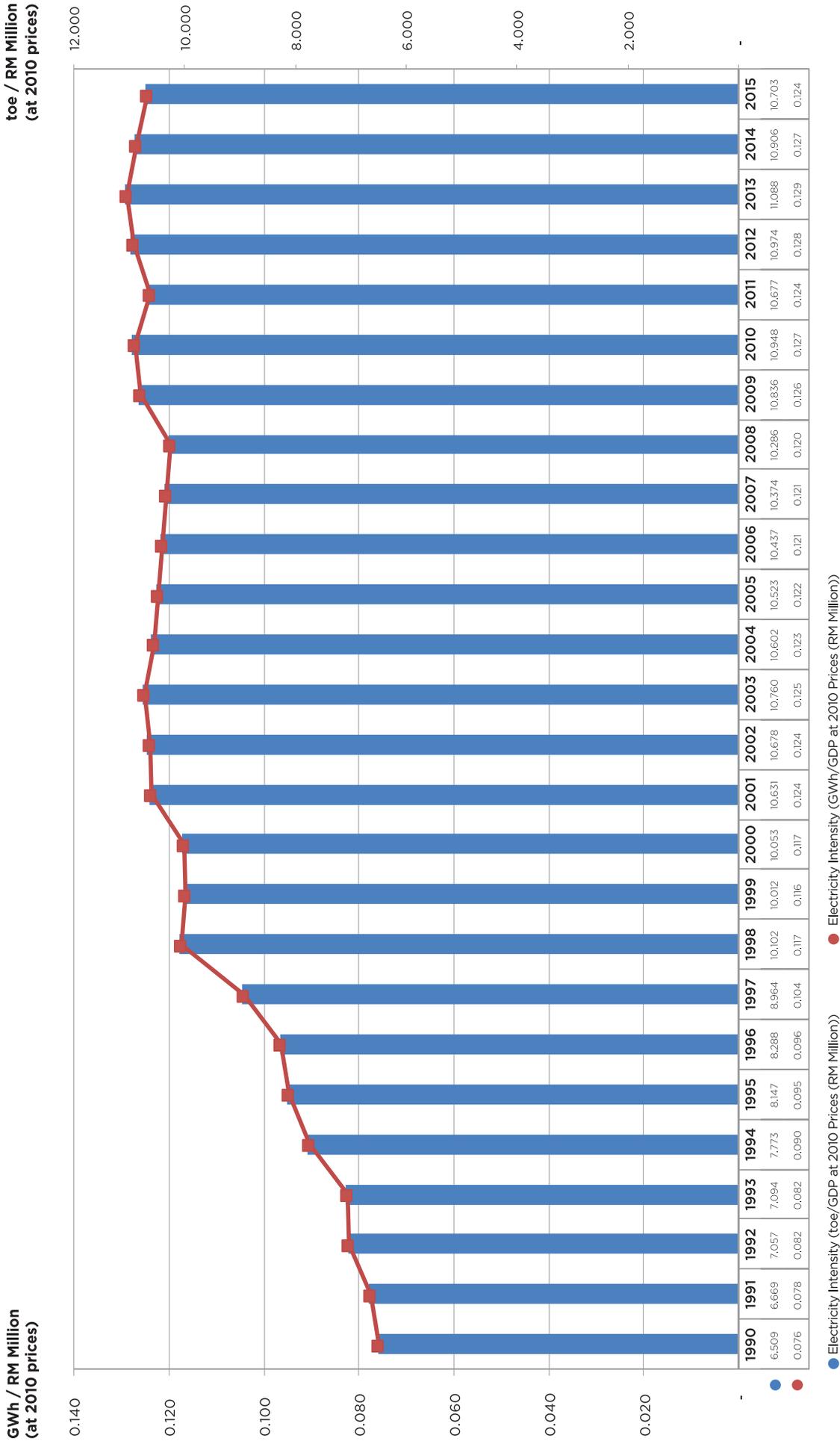
2. Intensity = Quantity of energy required per unit output or activity

3. (*): Final Energy Consumption (including non-energy use) / GDP at 2010 prices

4. (**): Industrial Energy Consumption / Industrial GDP at 2010 prices

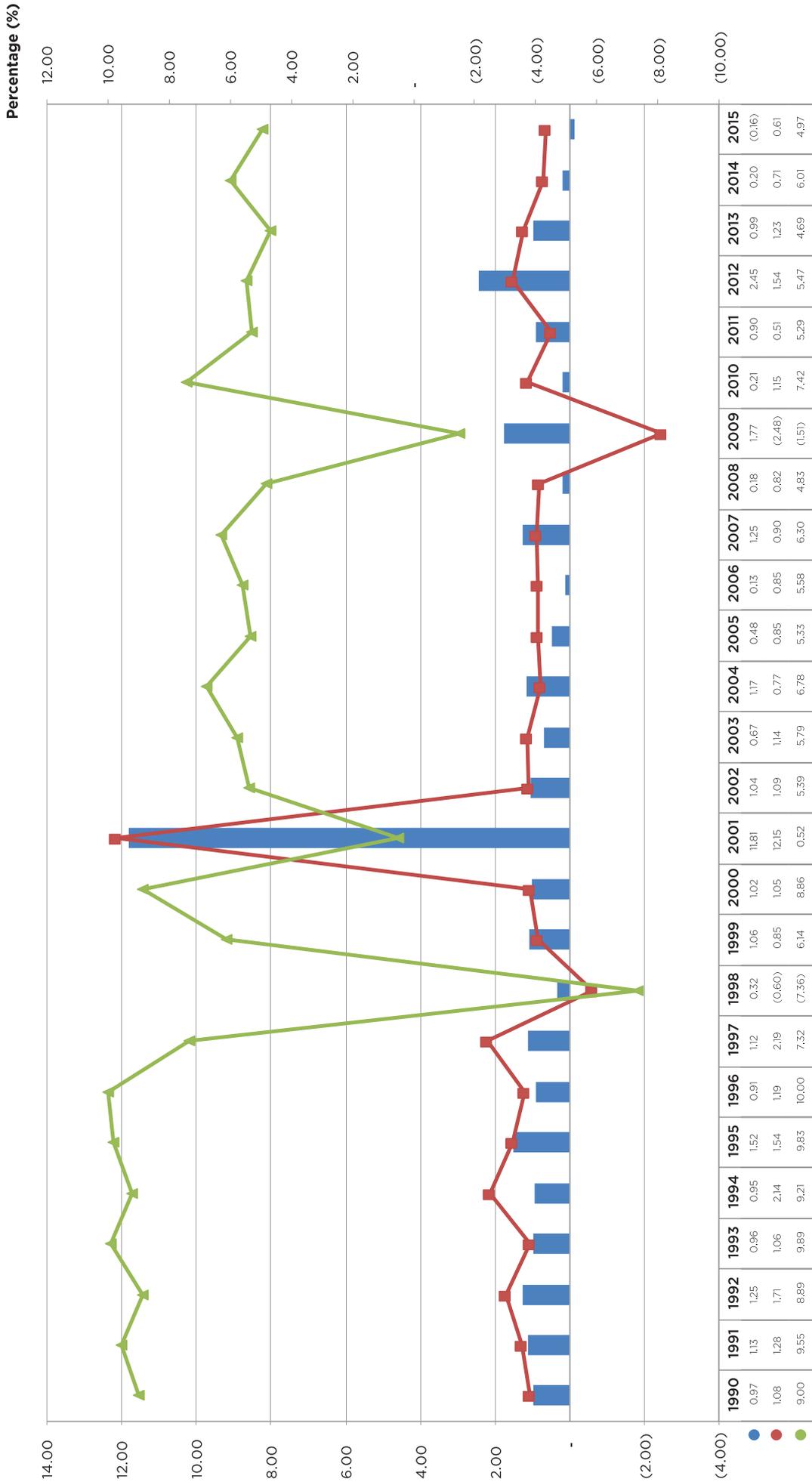
5. (***) Primary Energy Supply / GDP at 2010 prices

Figure 6: Electricity Intensity



Sources: 1. GDP data from Department of Statistics Malaysia
 2. TNB, SESB, SEB and IPPs
 Note: 1. Measurement on ktoe is based on Energy Commission calculation
 2. Intensity = Quantity of energy required per unit output or activity
 3. (*): Electricity Intensity (toe/RM Million GDP at 2010 prices)
 4. (**): Electricity Intensity (GWh/RM Million GDP at 2010 prices)

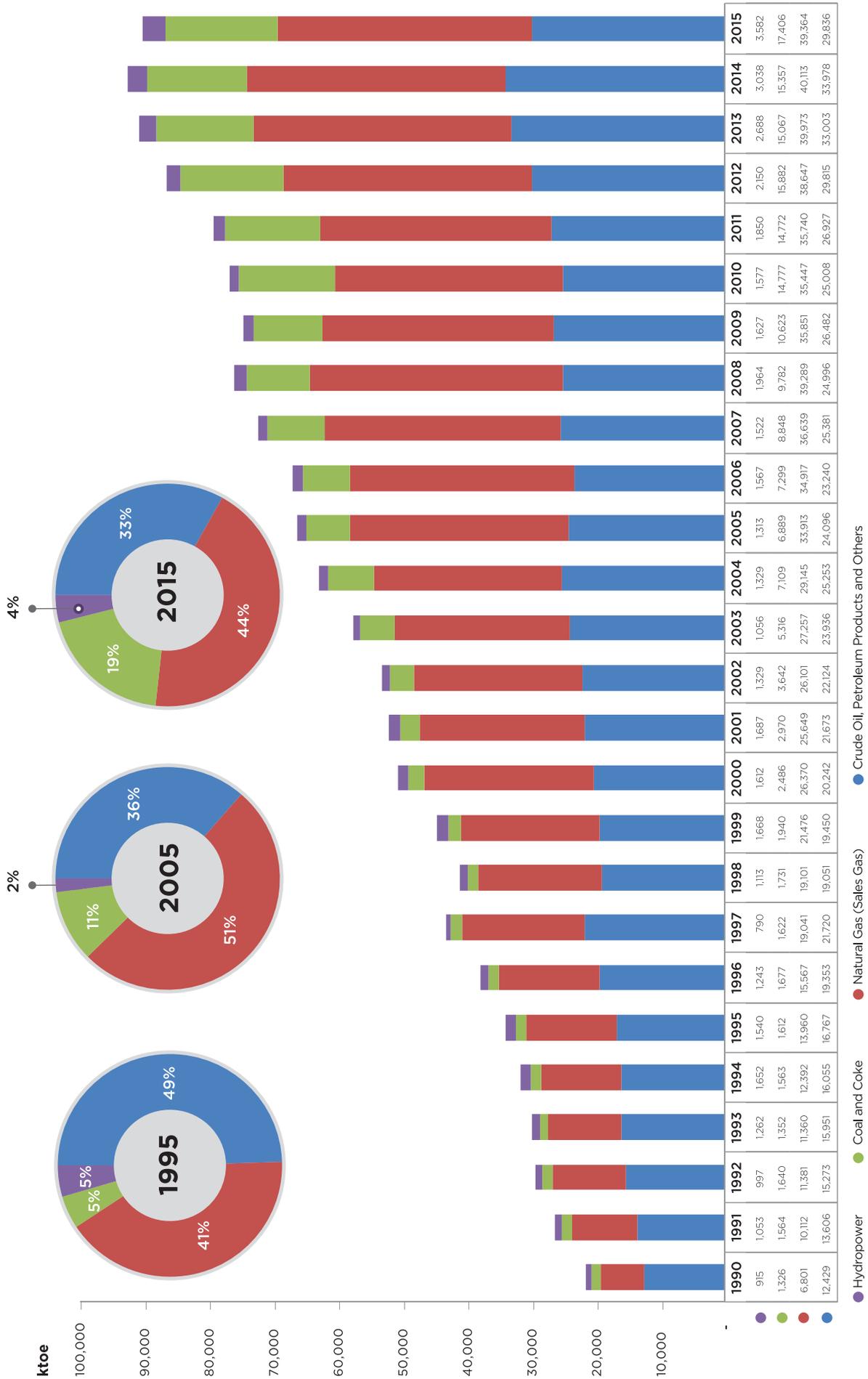
Figure 7: Final Energy and Electricity Elasticity



Note: 1) $\text{Final Energy Elasticity} = \frac{\text{Ratio between growths of energy consumption with economic growth}}{\text{Growth Rate of Energy Consumption (\%)}}$

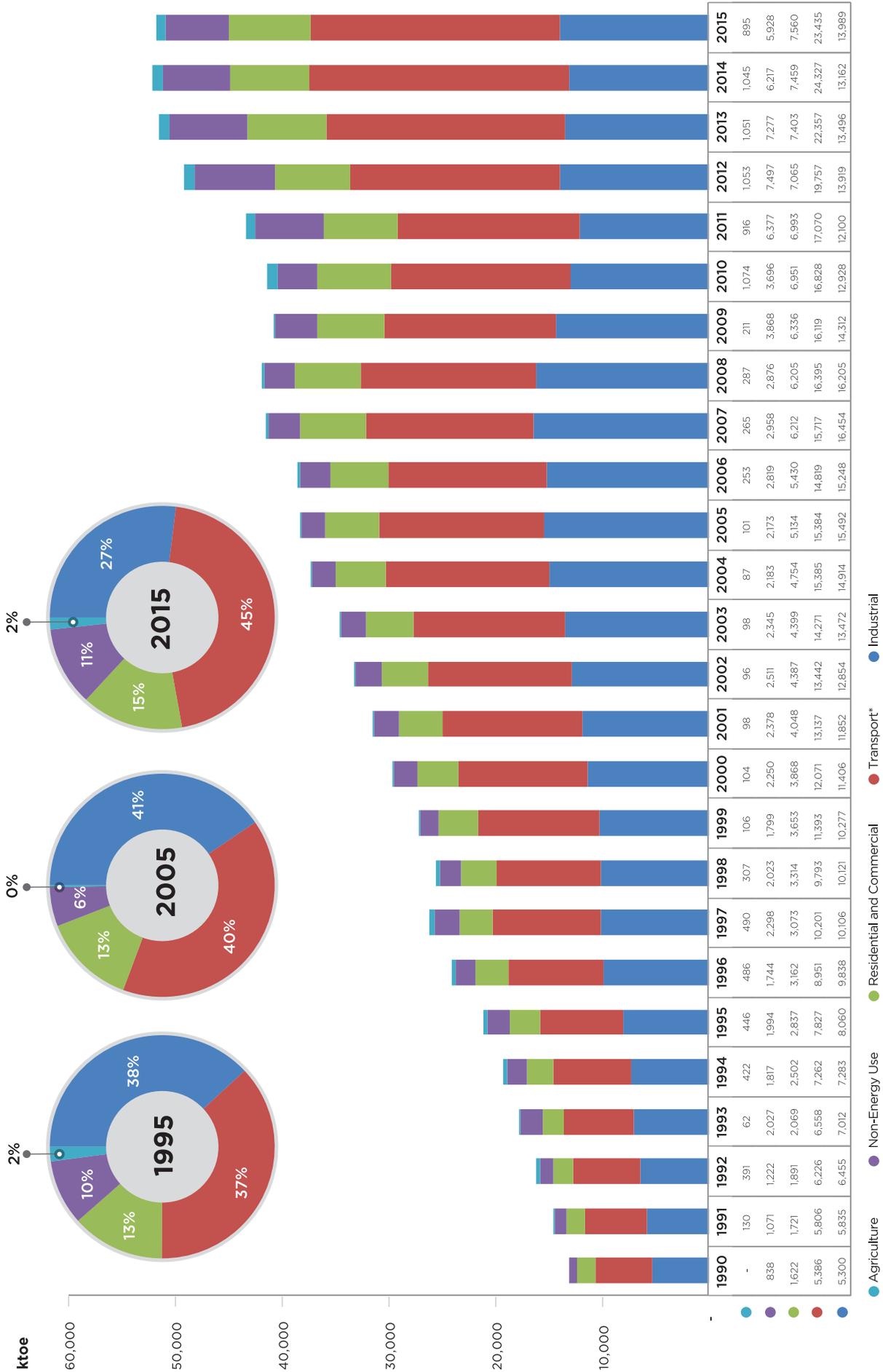
2) $\text{Electricity Elasticity} = \frac{\text{Ratio between growths of electricity consumption with economic growth}}{\text{Growth Rate of Electricity Consumption (\%)}}$

Figure 8: Primary Energy Supply



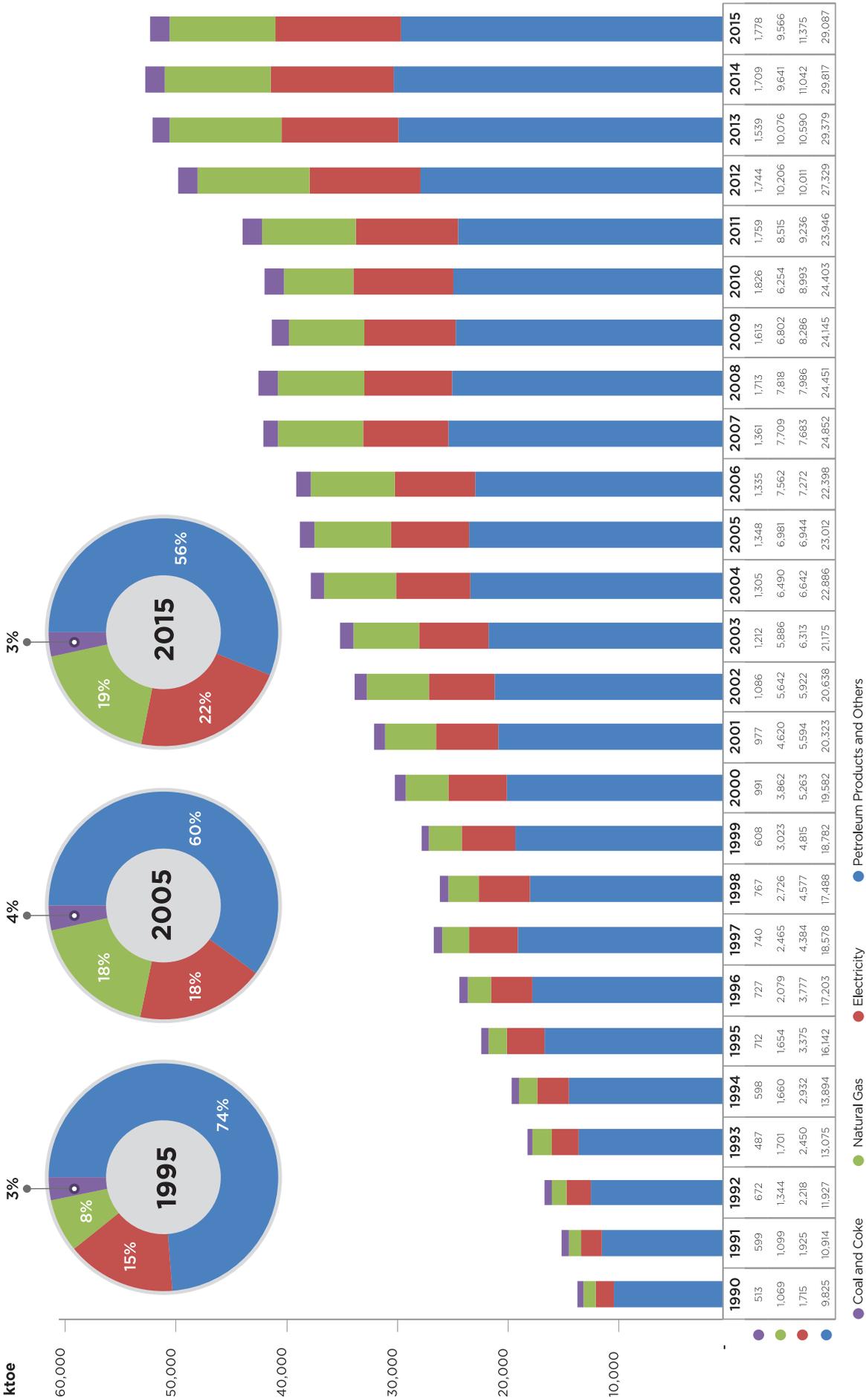
Source: Oil and gas companies, power utilities, IPPs, cement, iron and steel manufacturers

Figure 9: Final Energy Consumption by Sectors



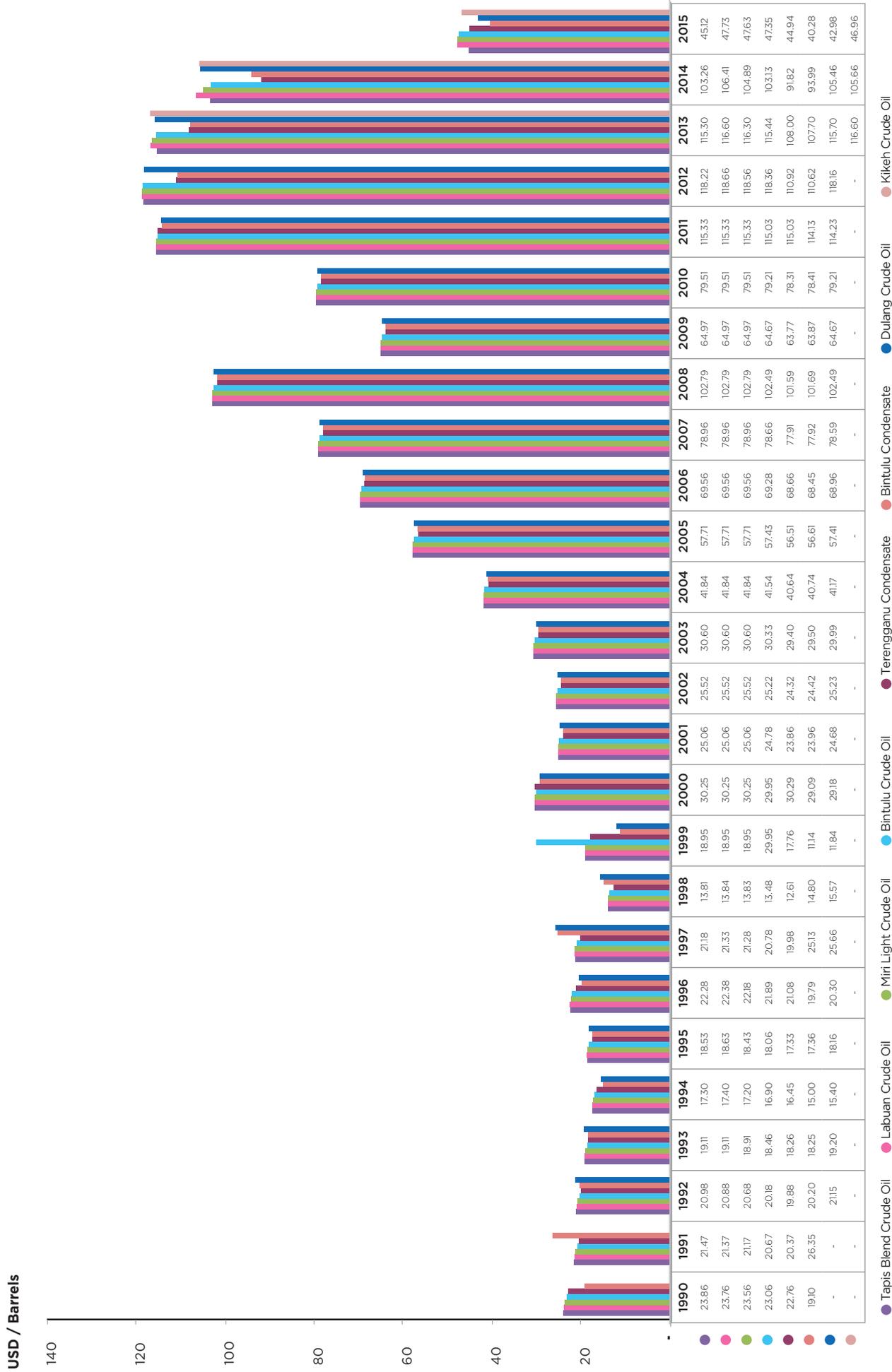
Source: Oil and gas companies, TNB, SESB, SEB, IPPs, cement, iron and steel manufacturers
 Note (*): Transport including international aviation

Figure 10: Final Energy Consumption by Type of Fuels



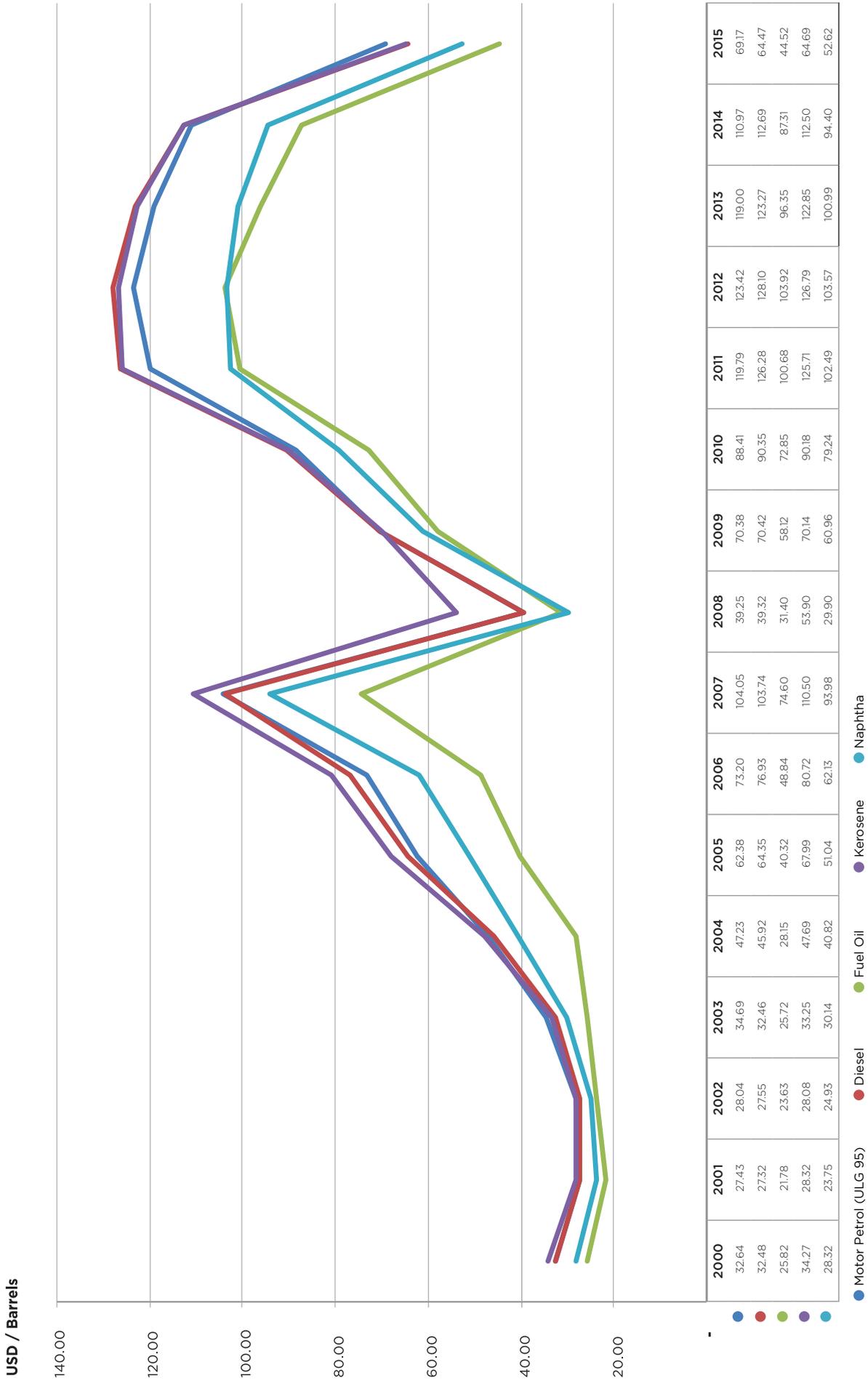
Source: Oil and gas companies, TNB, SESB, SEB, IPPs, cement, iron and steel manufacturers

Figure 11: Official Selling Prices of Malaysian Crude Oil



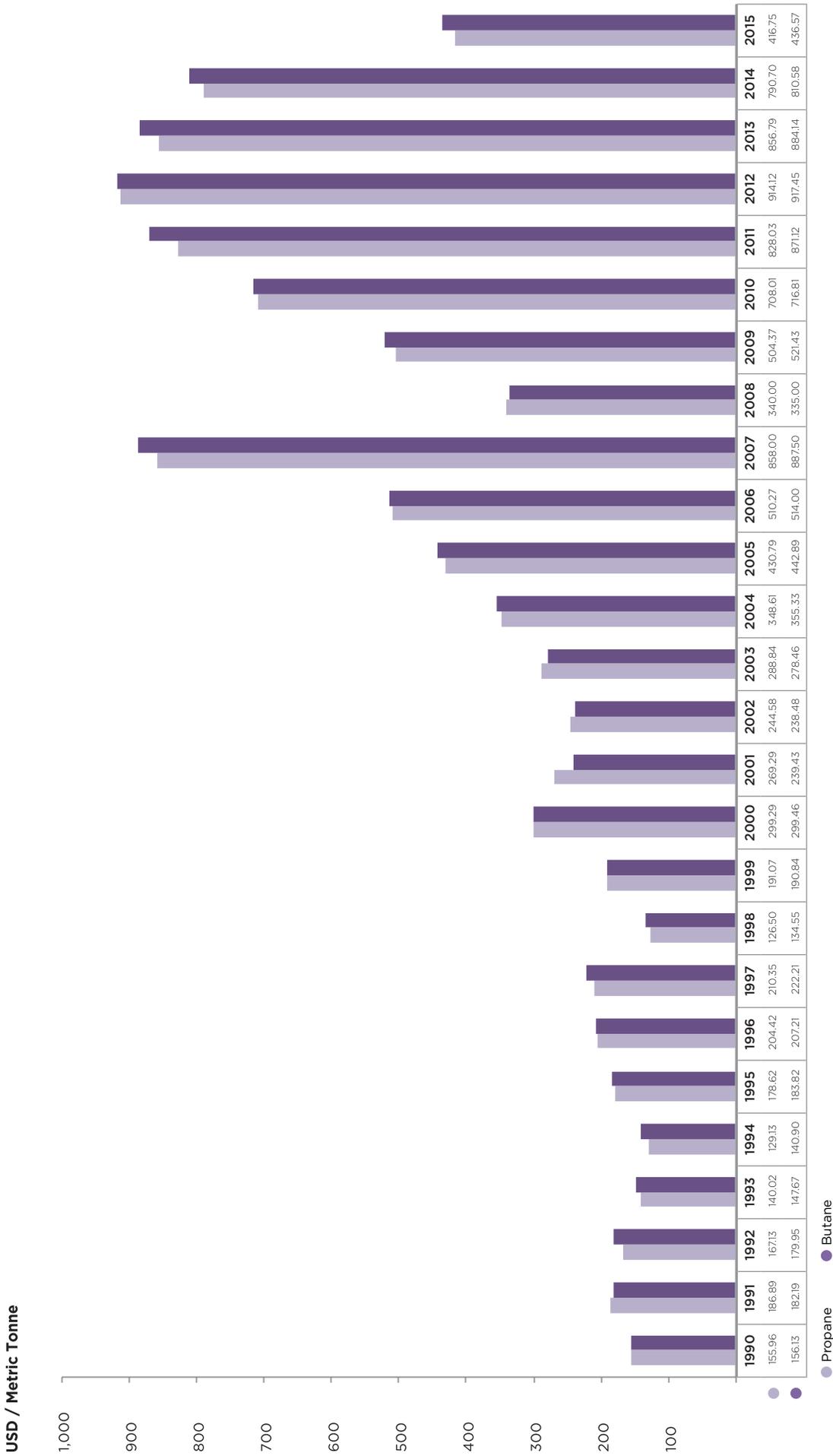
Source: PETRONAS

Figure 12: Ex-Singapore Prices of Major Petroleum Products



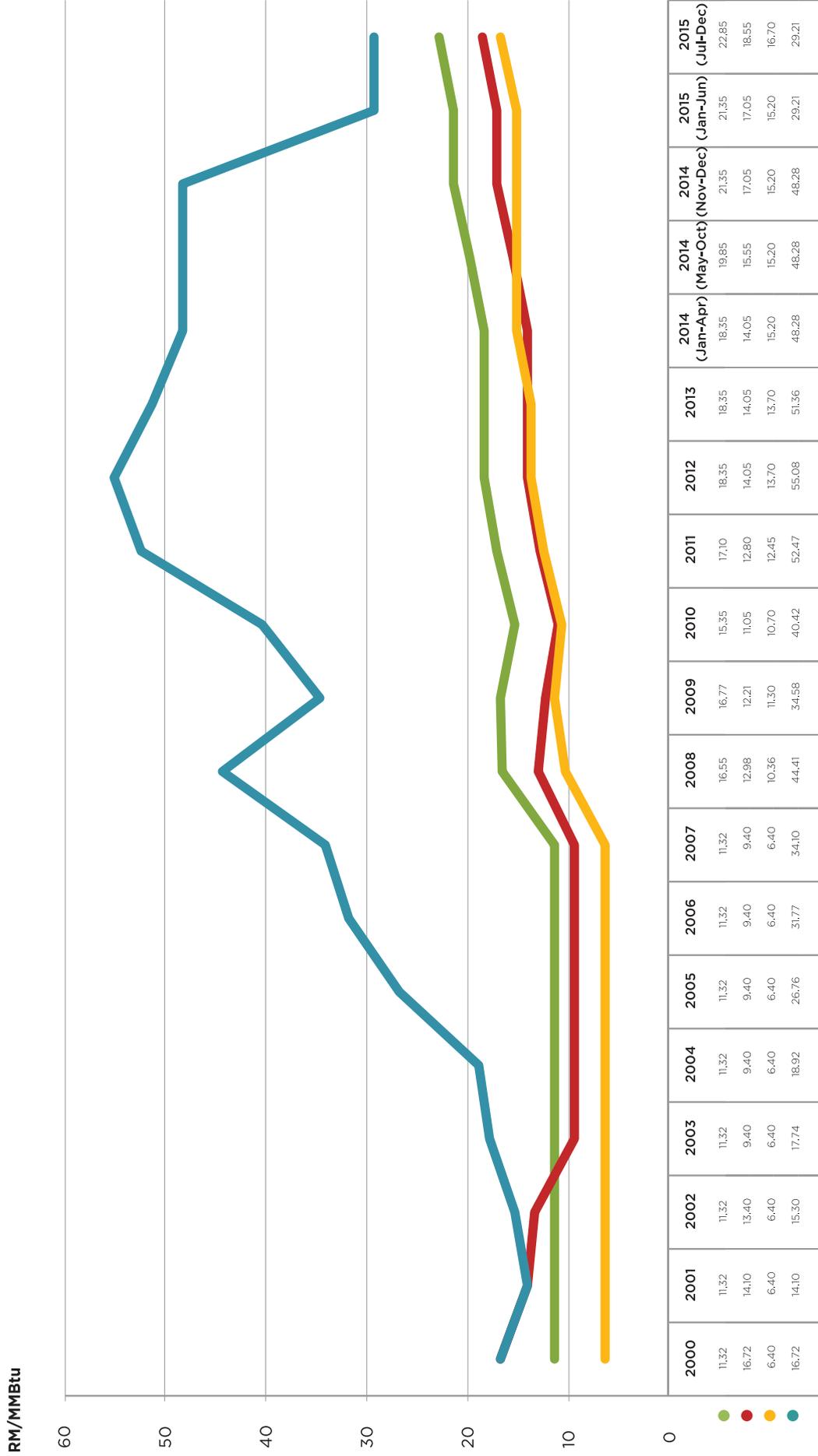
Note: Historical prices have been revised as per revision by Platts
 Source: Platts

Figure 13: Annual Liquefied Petroleum Gas (LPG) Contract Prices – Arab Gulf



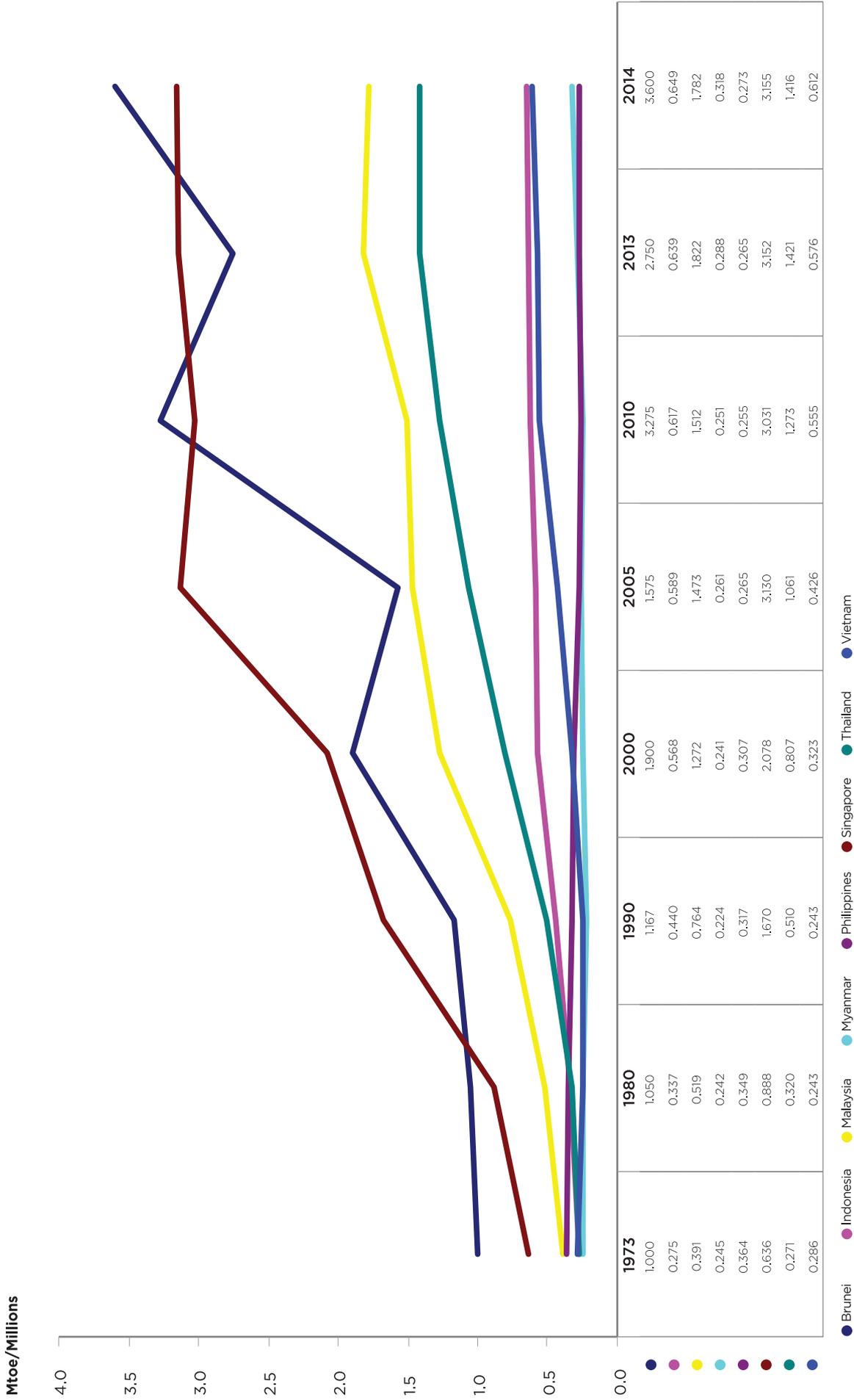
Note: Historical prices have been revised as per revision by Platts
 Source: Platts

Figure 15: Average Annual Natural Gas Price in Malaysia



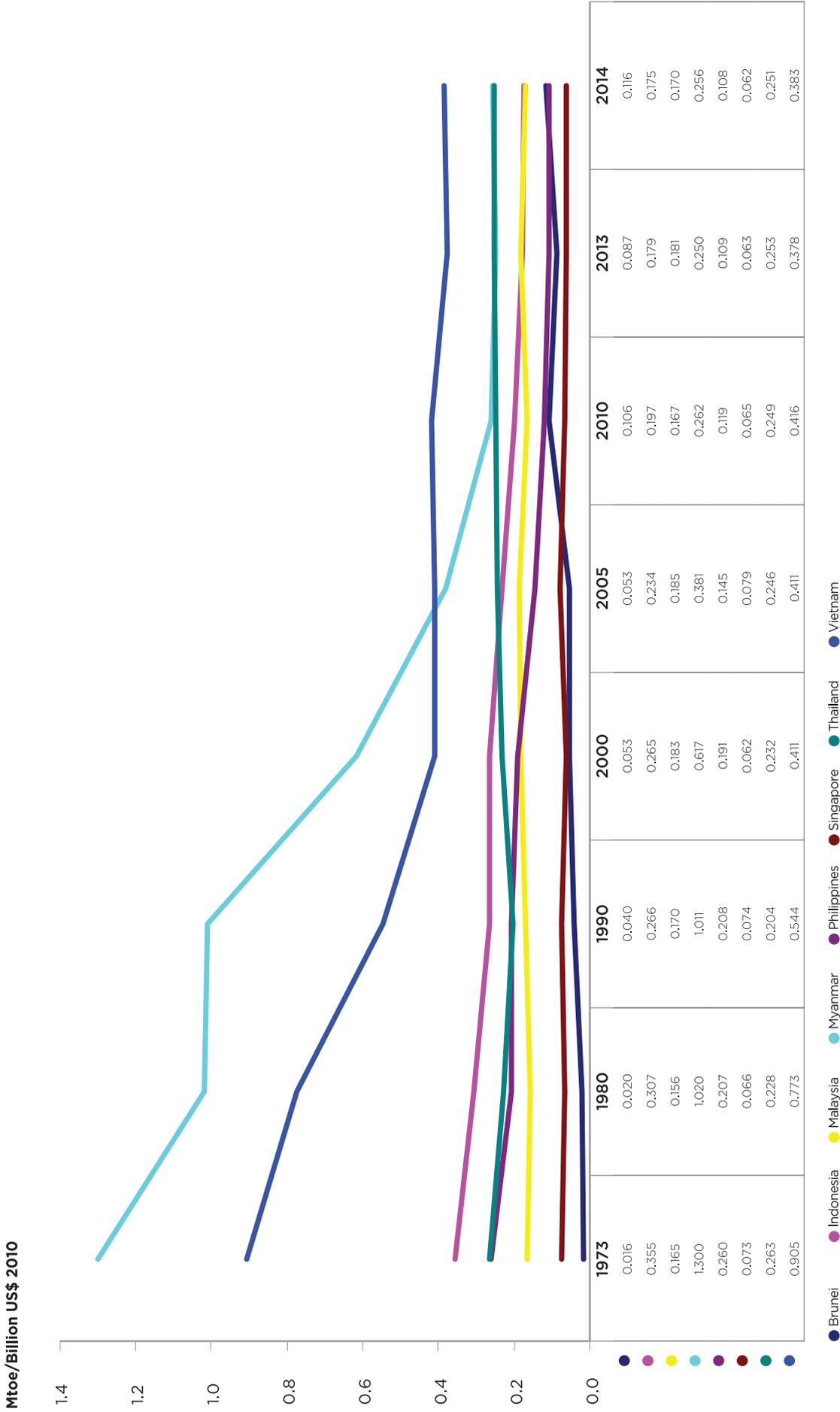
Source: Energy Commission of Malaysia

Figure 16: Final Energy Consumption Per Capita in ASEAN



Source: Energy Balances of Non-OECD Countries, 2016 Edition, International Energy Agency (IEA)

Figure 17: Final Energy Intensity in ASEAN



Source: Energy Balances of Non-OECD Countries, 2016 Edition, International Energy Agency (IEA)



02.

Oil

Table 3: Production and Reserves of Oil as of 1st January 2015

REGION	RESERVES (BILLION BARRELS)			PRODUCTION (THOUSAND BARRELS PER DAY)		
	CRUDE OIL	CONDENSATES	TOTAL	CRUDE OIL	CONDENSATES	TOTAL
Peninsular Malaysia	1.843	0.362	2.205	220.02	34.21	254.23
Sabah	1.897	0.112	2.009	210.15	2.63	212.79
Sarawak	1.239	0.454	1.693	125.54	69.07	194.60
TOTAL	4.979	0.928	5.907	555.70	105.91	661.62

Source: PETRONAS

Table 4: Refinery Licensed Capacity

	LOCATION	START-UP DATE	THOUSAND BARRELS/DAY
SHELL Refining Co. (FOM) Bhd	Port Dickson, Negeri Sembilan	1963	155
Petron Malaysia (previously owned by ESSO Malaysia Bhd)	Port Dickson, Negeri Sembilan	1960	88
PETRONAS	Kertih, Terengganu*	1983	49
PETRONAS	Melaka	1994	100
Malaysia Refining Company Sdn Bhd (PETRONAS / ConocoPhillips)	Melaka	1998	100
TOTAL			492

Source: PETRON, PETRONAS & SHELL

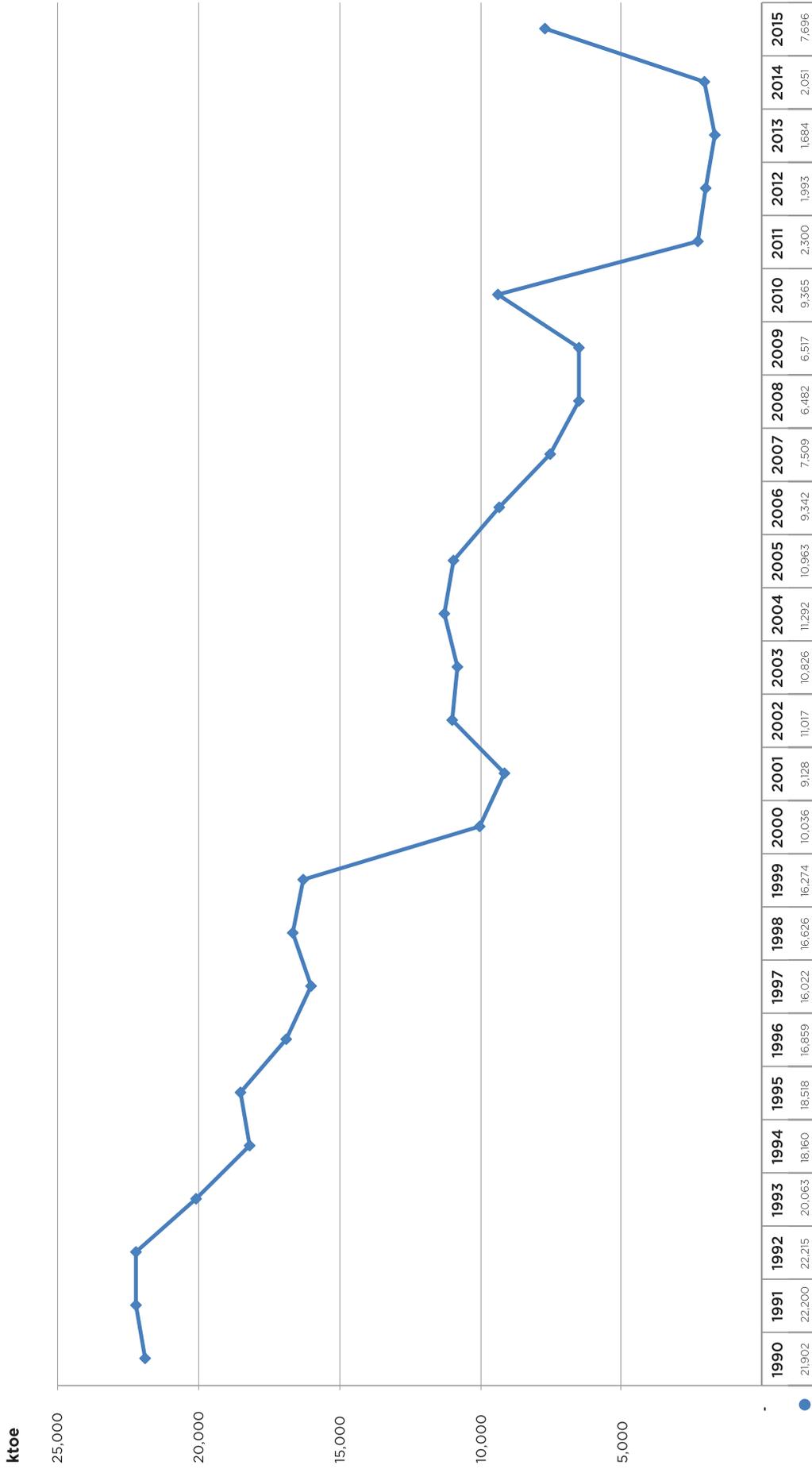
Note (*): Excludes condensate splitter of 74,300 bpd

Table 5: Breakdown on Sales of Petroleum Products in Thousand Barrels

PETROLEUM PRODUCTS	PENINSULAR MALAYSIA	SABAH	SARAWAK	TOTAL
Petrol	93,338	4,932	4,767	103,038
Diesel	56,593	8,184	9,785	74,563
Fuel Oil	3,067	159	10	3,236
Kerosene	26	0	4	30
LPG	14,331	874	851	16,056
ATF & AV Gas	23,315	281	295	23,891
Non-Energy	3,044	265	603	3,913
TOTAL	193,715	14,695	16,316	224,726

Source: Oil companies

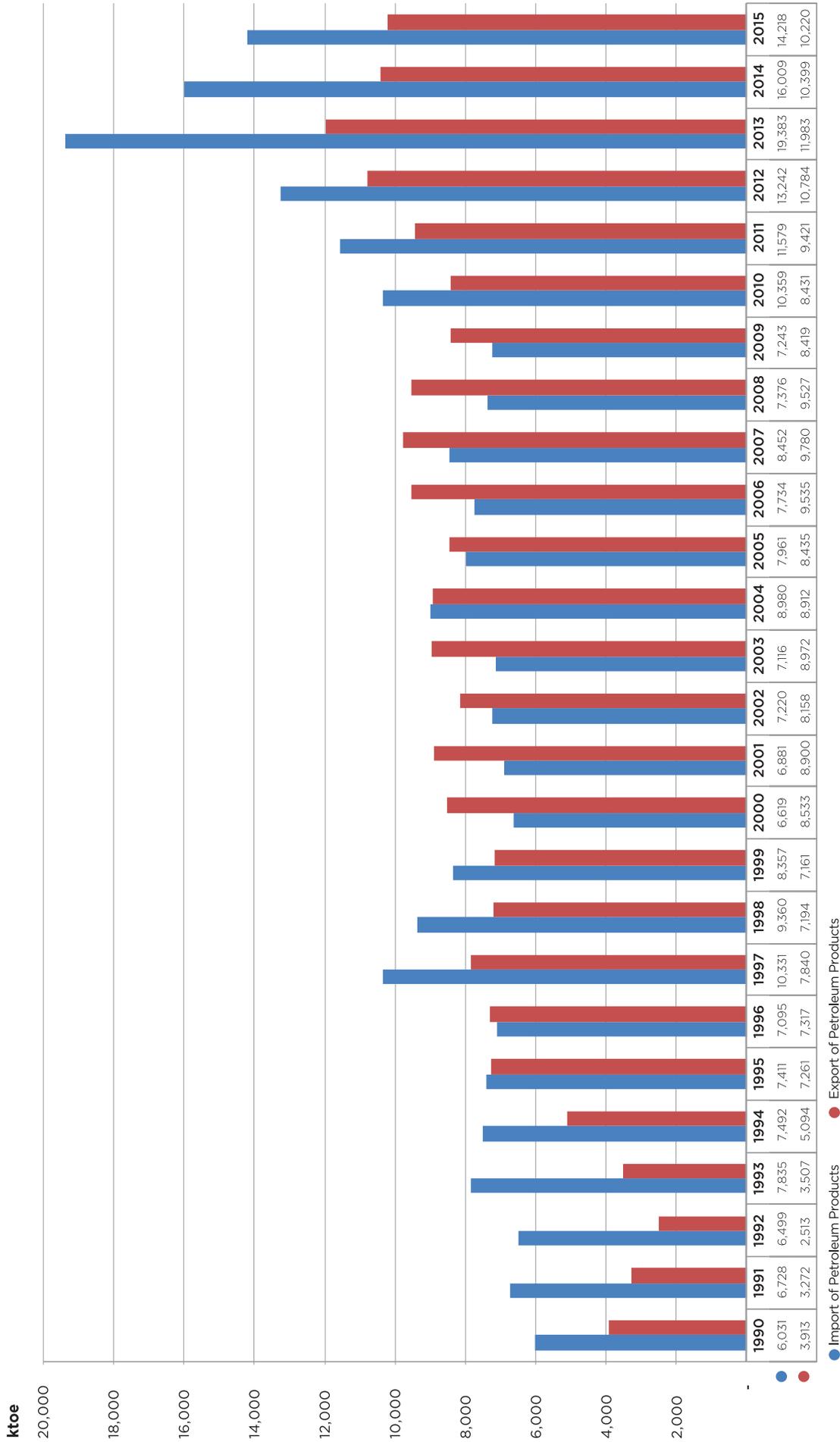
Figure 18: Net Export of Crude Oil



● Net Export of Crude Oil

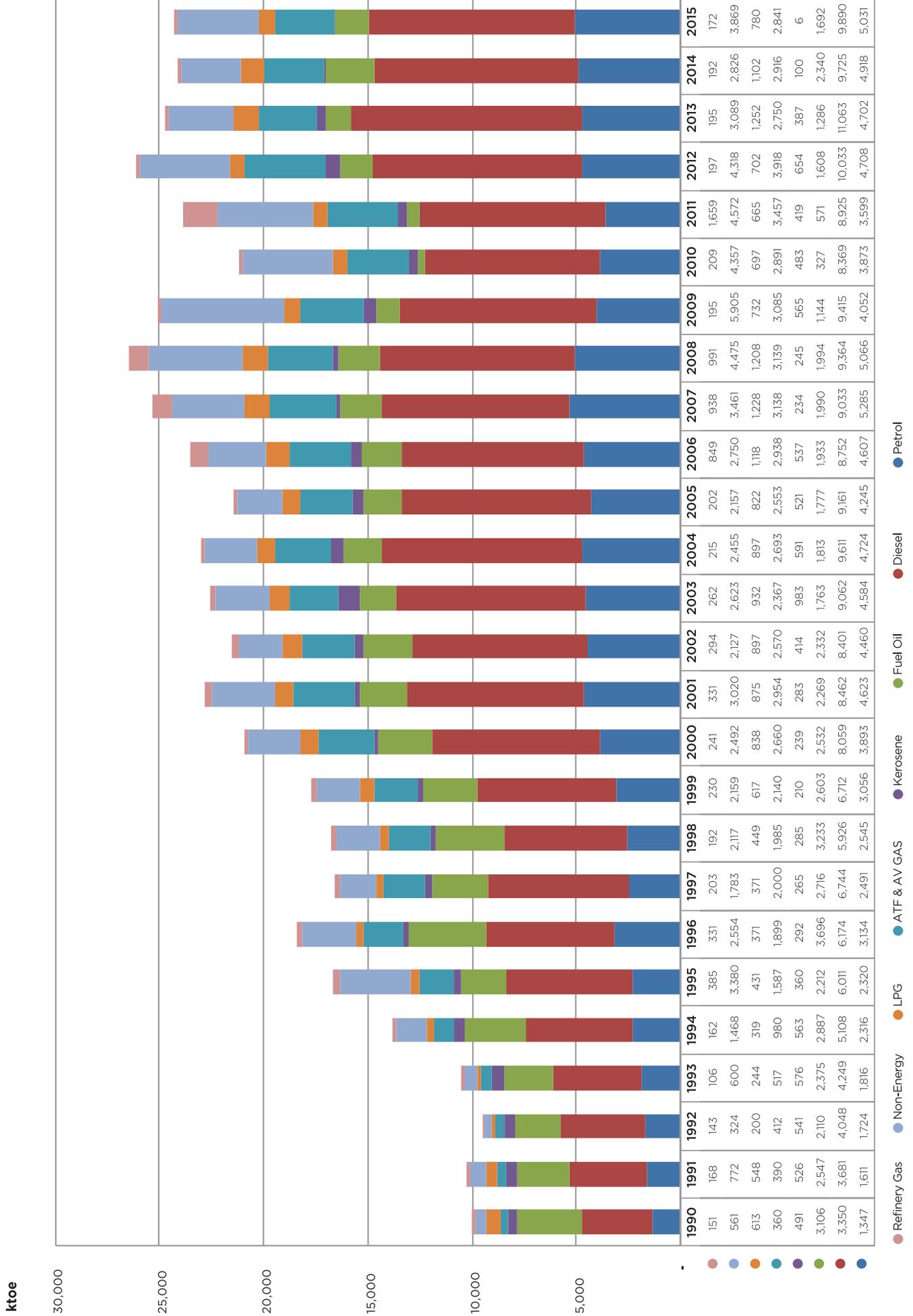
Source: Department of Statistics Malaysia and Oil companies
 Note: Measurement on ktoe is based on Energy Commission calculation

Figure 19: Export and Import of Petroleum Products

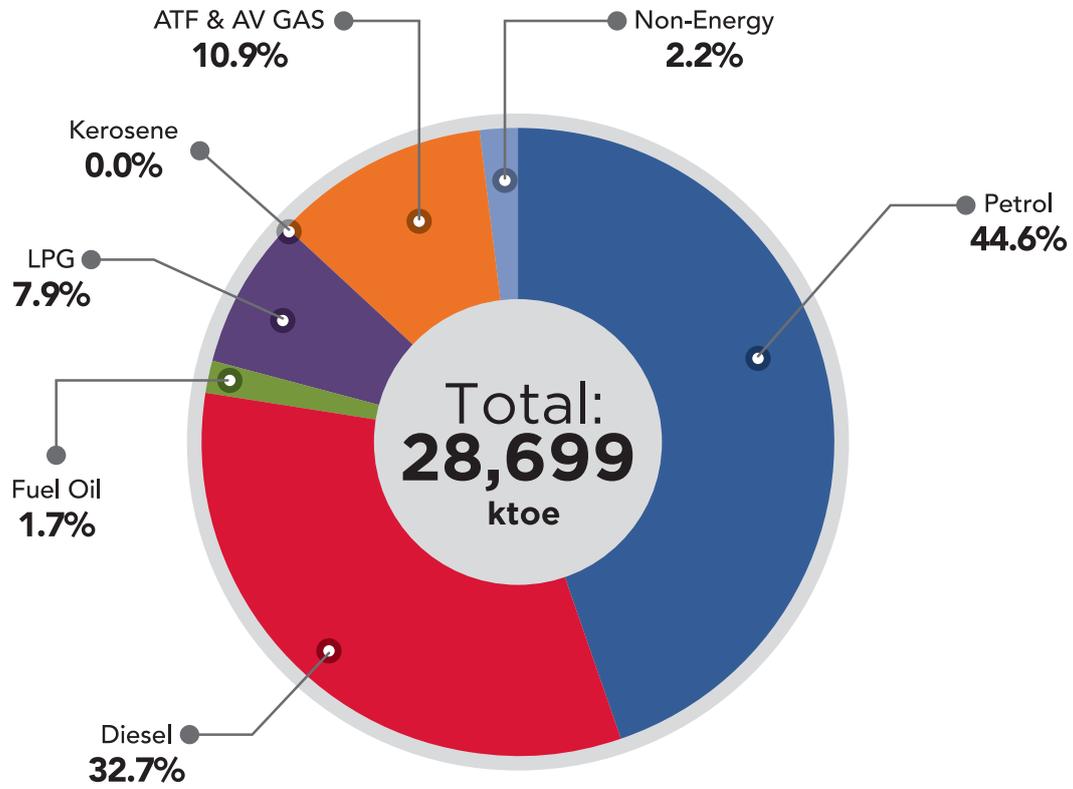


Source: Department of Statistics Malaysia and Oil companies
 Note: Measurement on ktoe is based on Energy Commission calculation

Figure 20: Production of Petroleum Products from Refineries



Source: Oil companies

Figure 21: Final Consumption for Petroleum Products



03.

Natural Gas

Table 6: Reserves and Production of Natural Gas as of 1st January 2015

REGION	RESERVES			PRODUCTION
	TRILLION STANDARD CUBIC FEET (TSCF)			MILLION STANDARD CUBIC FEET PER DAY (MMscf/d)
	ASSOCIATED	NON-ASSOCIATED	TOTAL	
Peninsular Malaysia	8.471	24.022	32.493	1,949.69
Sabah	3.149	11.884	15.032	376.02
Sarawak	2.853	50.034	52.888	4,147.00
TOTAL	14.473	85.940	100.413	6,472.71

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

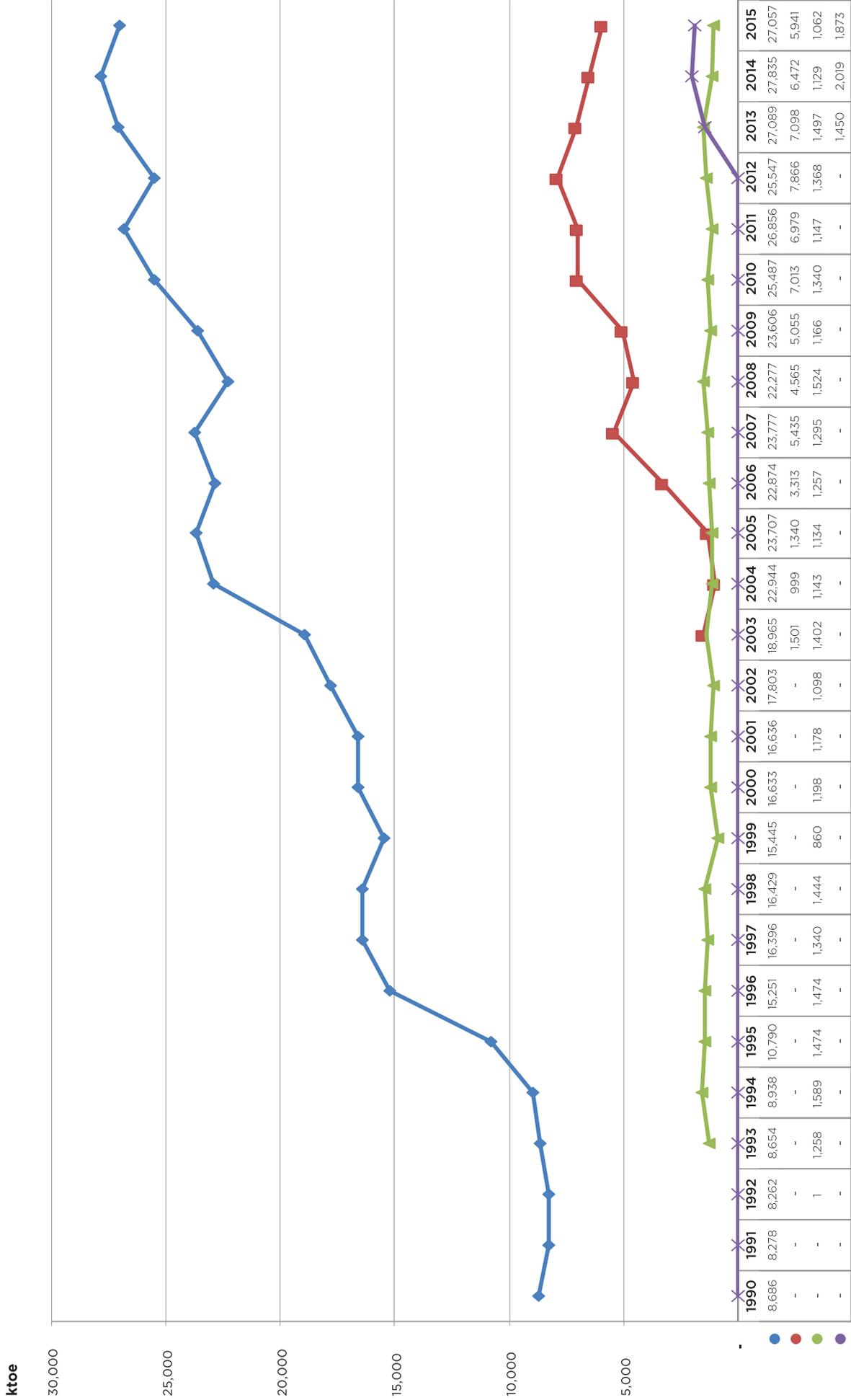
Source: PETRONAS

Table 7: Consumption of Natural Gas in MMscf

SECTORS	PENINSULAR MALAYSIA	SABAH	SARAWAK	MALAYSIA
Residential	25	-	-	25
Commercial	884	16	-	900
Industry	177,568	3,854	1,944	183,366
Non-energy	65,034	52,447	53,019	170,500
Transport	10,060	-	-	10,060
Power Stations	441,587	36,853	33,344	511,785
Co-Generation	62,228	-	4,290	66,518
TOTAL	757,387	93,170	92,597	943,154

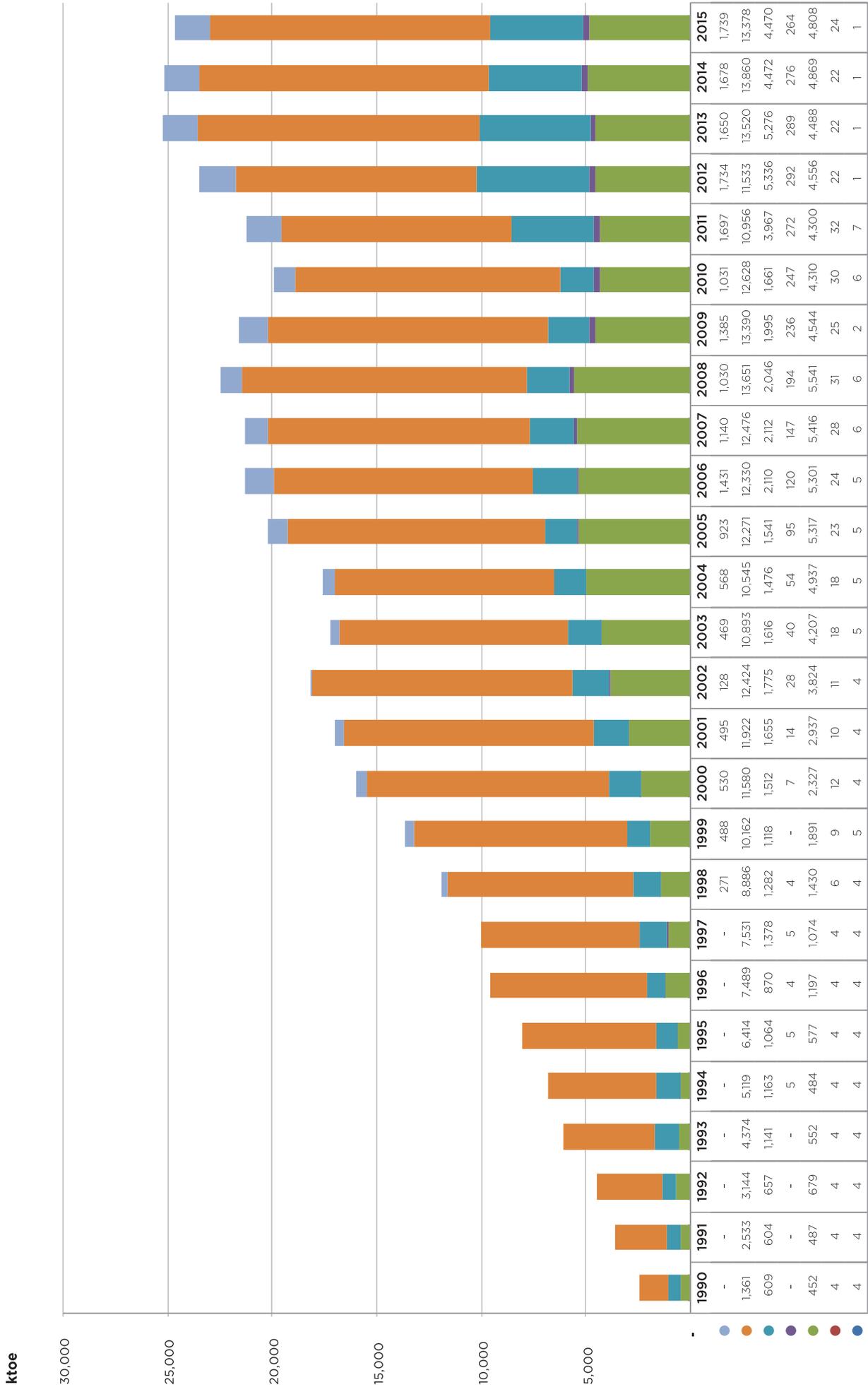
Source: Power utilities, IPPs, PETRONAS and gas distribution companies

Figure 22: Export and Import of Piped Natural Gas and LNG



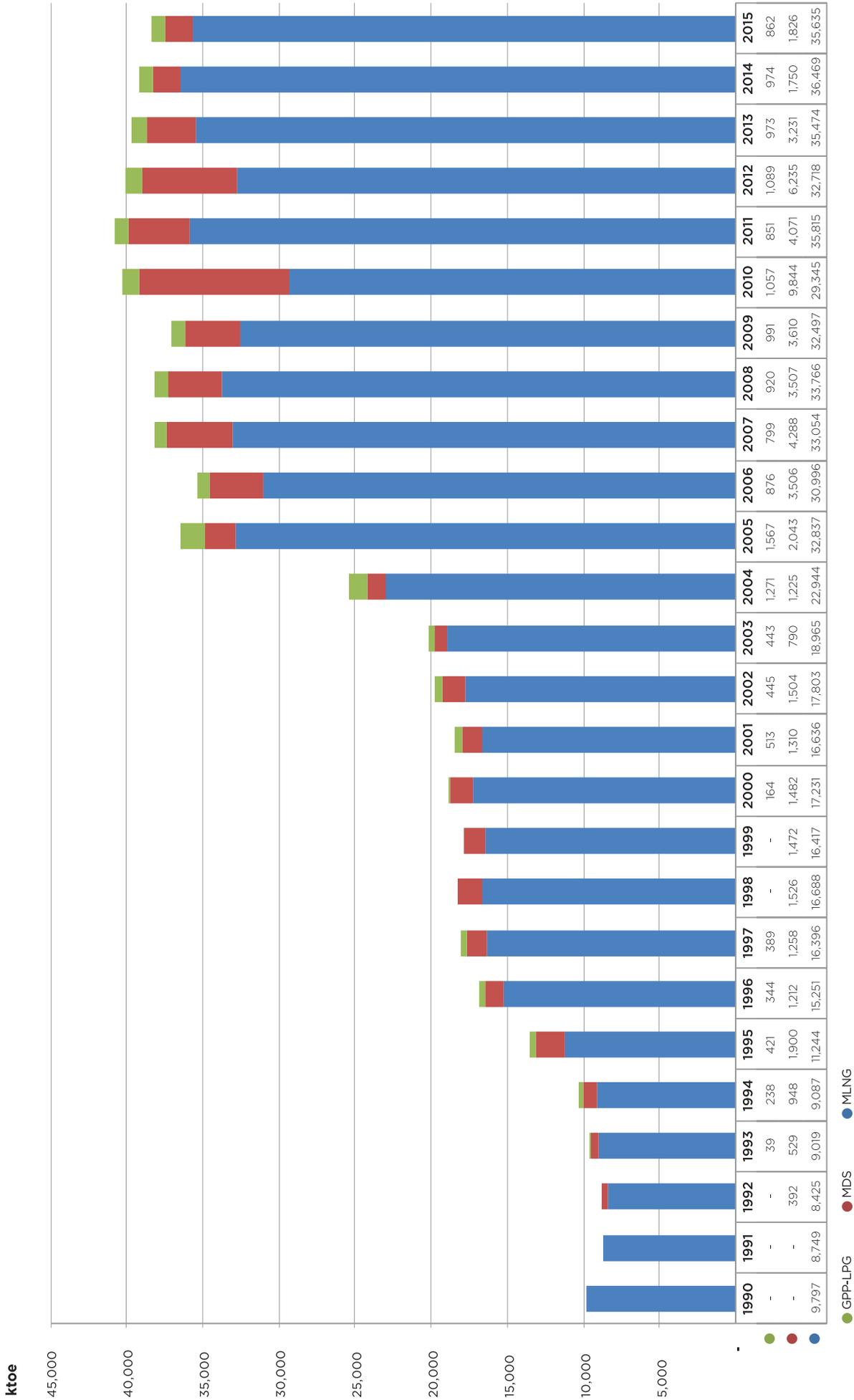
Source: Department of Statistics Malaysia, gas companies and others
 Note: Measurement on ktoe is based on Energy Commission calculation

Figure 23: Natural Gas Consumption by Sectors

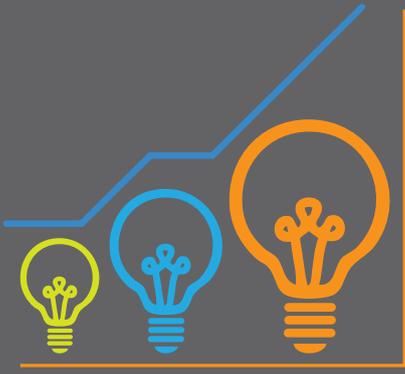


Source: PETRONAS, Gas Companies, Power Utilities, IPPs and Self-Generation Plants

Figure 24: Conversion in Gas Plants



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



04.

Coal



Table 8: Production and Reserves of Coal as of 31st December 2015

LOCATION	RESERVES (MILLION TONNES)			COAL TYPE	PRODUCTION
	MEASURED	INDICATED	INFERRED		(METRIC TONNES)
SARAWAK					
1. Abok & Silantek, Sri Aman	7.25	10.60	32.40	Coking Coal, Semi-Anthracite and Anthracite	25,842
2. Merit-Pila, Kapit	170.26	107.02	107.84	Sub-Bituminous	693,457
3. Bintulu	6.00	0.00	14.00	Bituminous (partly coking coal)	-
4. Mukah - Balingian	86.95	170.73	646.53	Lignite, Hydrous Lignite and Sub-Bituminous	1,840,145
5. Tutoh Area	5.58	34.66	162.33	Sub-Bituminous	-
SUBTOTAL	276.04	323.01	963.10		2,559,444
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	280.84	378.23	1,279.30		
GRAND TOTAL	1,938.37				2,559,444

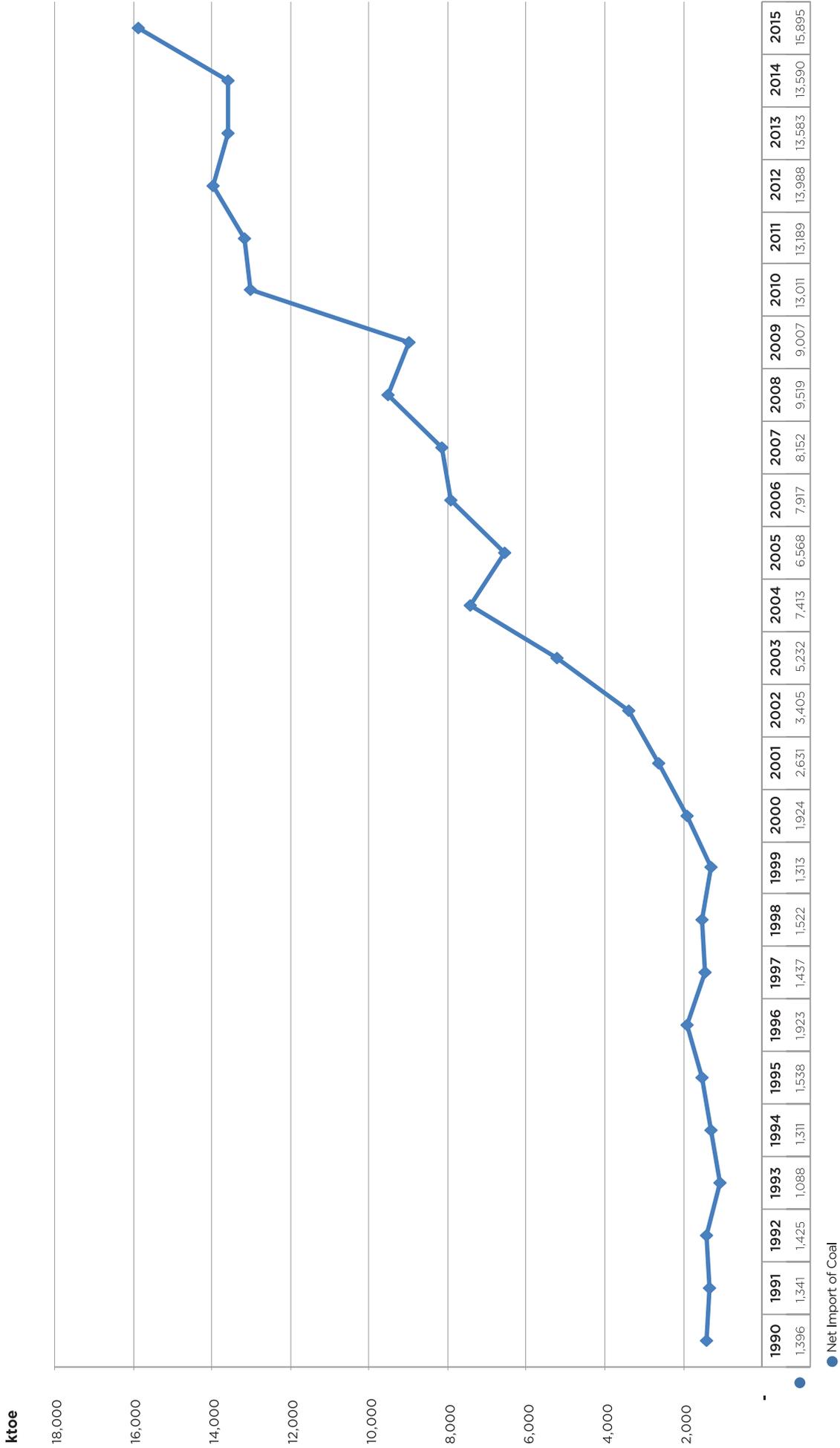
Source: Department of Mineral and Geosciences Malaysia

Table 9: Consumption of Coal in metric tonnes

SECTORS	PENINSULAR MALAYSIA	SABAH	SARAWAK	MALAYSIA
Industry	2,684,838	-	136,149	2,820,987
Power Stations	22,858,325	-	1,930,132	24,788,457
TOTAL	25,543,163	0	2,066,281	27,609,444

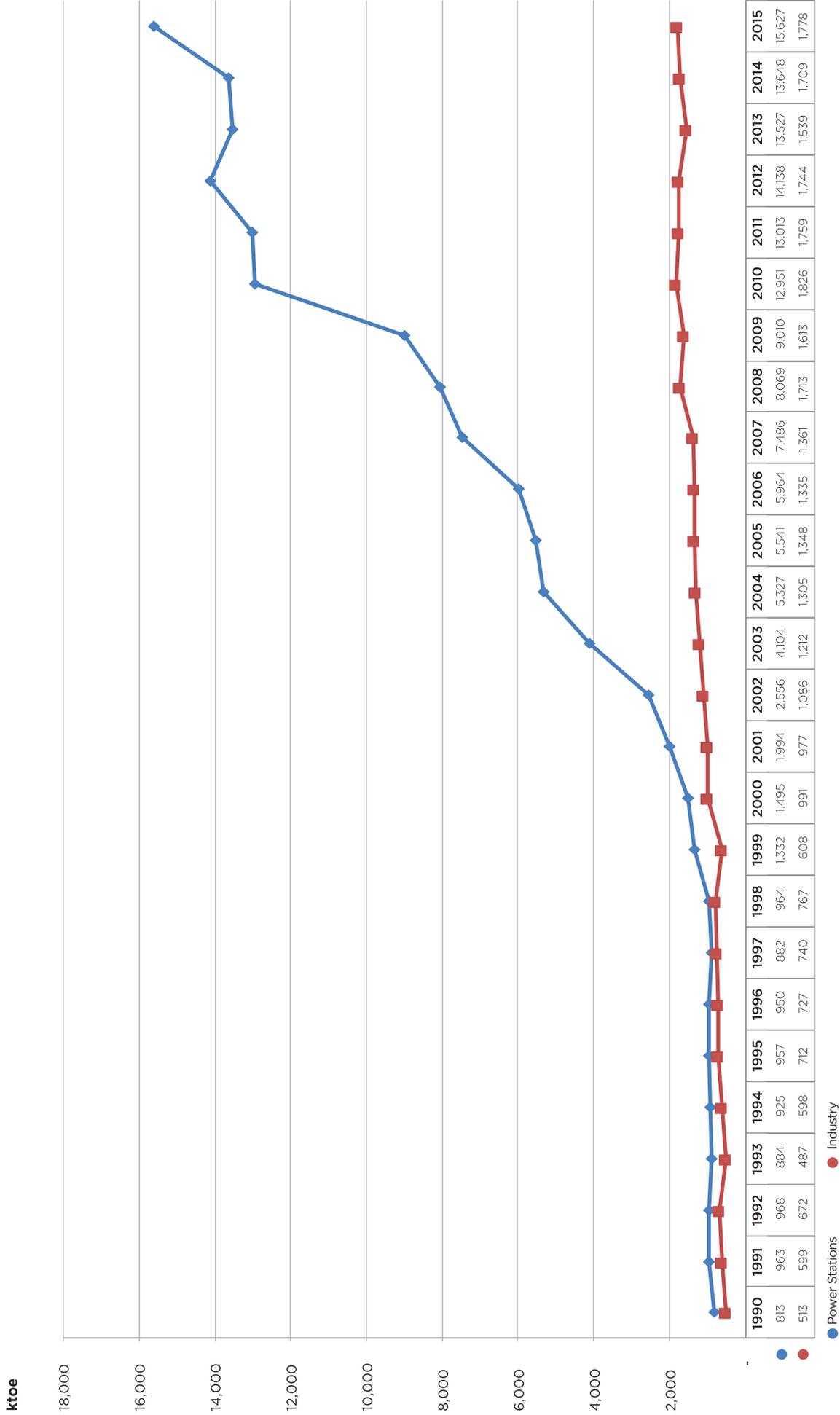
Source: Power Utilities, IPPs, cement, iron and steel manufacturers

Figure 25: Net Import of Coal



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

Figure 26: Coal Consumption by Sectors



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



05.

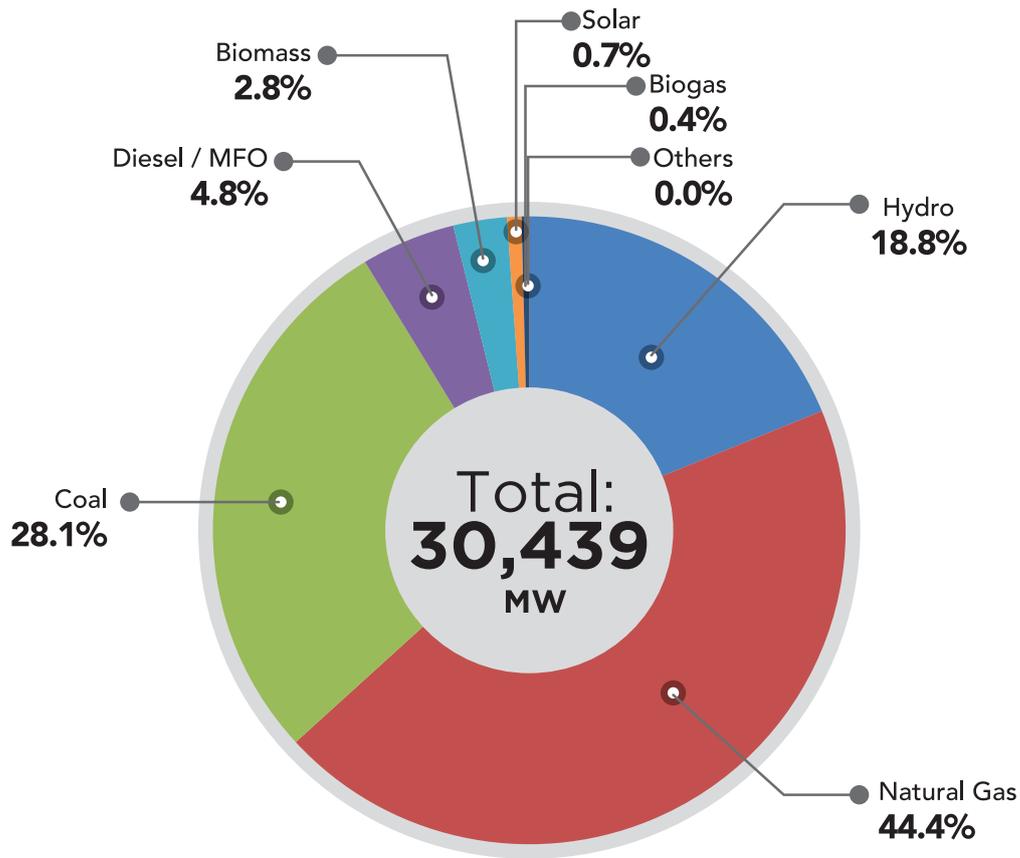
Electricity

Table 10: Installed Capacity as of 31st December 2015 in MW

		HYDRO	NATURAL GAS	COAL	DIESEL / MFO	BIOMASS	SOLAR	BIOGAS	OTHERS	TOTAL
PENINSULAR MALAYSIA	TNB	2,149.1	4,150.0	0.0	0.0	0.0	0.0	0.0	0.0	6,299.1
	IPPs	0.0	6,344.5	8,066.0	0.0	0.0	0.0	0.0	0.0	14,410.5
	Co-Generation	0.0	876.1	0.0	0.0	90.7	0.0	69.5	0.0	1,036.2
	Self-Generation	2.1	0.0	0.0	399.0	351.8	1.0	4.9	0.0	758.8
	FiT	23.6	0.0	0.0	0.0	44.4	206.7	30.4	0.0	305.1
	Subtotal	2,174.8	11,370.6	8,066.0	399.0	486.9	207.7	104.7	0.0	22,809.8
SABAH	SESB	76.0	112.0	0.0	180.9	0.0	0.0	0.0	0.0	368.9
	IPPs	0.0	1,012.6	0.0	189.9	0.0	0.0	0.0	0.0	1,202.5
	Co-Generation	0.0	106.8	0.0	0.0	122.7	0.0	0.0	0.0	229.5
	Self-Generation	0.0	0.0	0.0	526.8	135.8	0.1	3.4	0.0	666.1
	FiT	6.5	0.0	0.0	0.0	43.0	18.1	2.7	0.0	70.3
	Subtotal	82.5	1,231.4	0.0	897.6	301.5	18.3	6.1	0.0	2,537.3
SARAWAK	SEB	1,058.8	614.6	480.0	158.3	0.0	0.0	0.0	0.0	2,311.7
	IPPs	2,400.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2,400.0
	Co-Generation	0.0	289.0	0.0	0.0	0.0	0.0	0.0	0.0	289.0
	Self-Generation	0.0	0.0	0.0	11.6	74.1	0.3	0.5	5.1	91.5
	Subtotal	3,458.8	903.6	480.0	169.9	74.1	0.3	0.5	5.1	5,092.2
Total	5,716.1	13,505.6	8,546.0	1,466.5	862.5	226.3	111.3	5.1	30,439.3	
Share (%)	18.8%	44.4%	28.1%	4.8%	2.8%	0.7%	0.4%	0.0%	100.0%	

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

Figure 27: Installed Capacity as of 31st December 2015

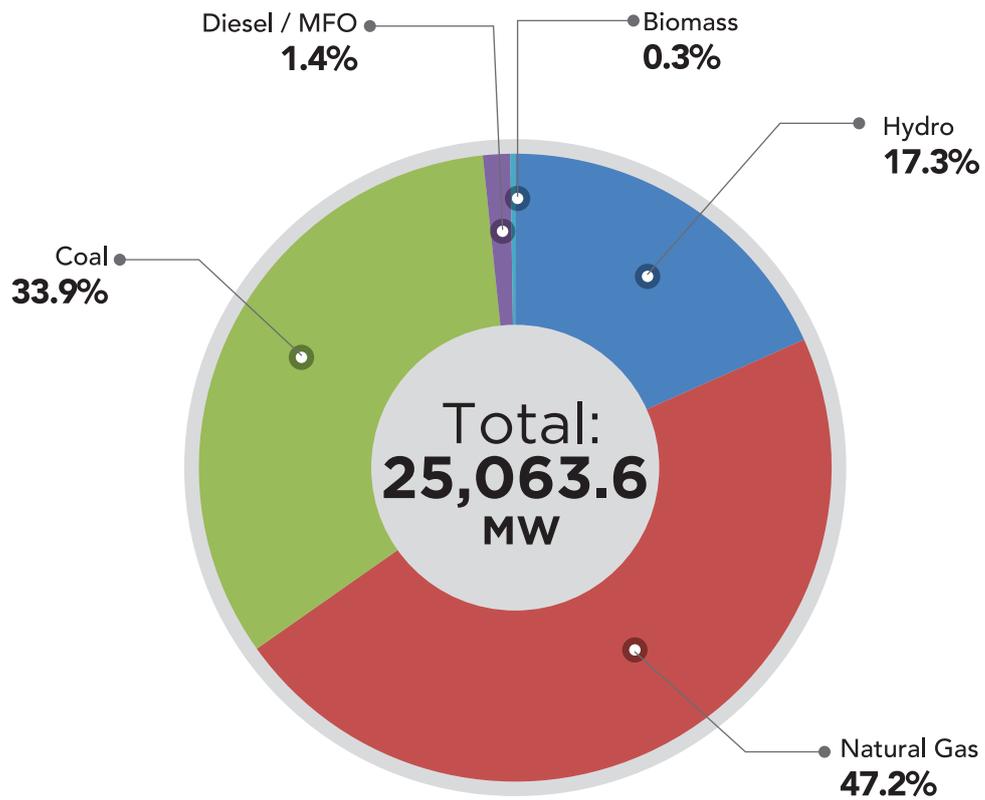


Source: Power Utilities and IPPs

Table 11: Available Capacity as of 31st December 2015 in MW

		HYDRO	NATURAL GAS	COAL	DIESEL / MFO	BIOMASS	TOTAL
PENINSULAR MALAYSIA	TNB	2,114.0	4,084.0	0.0	0.0	0.0	6,198.0
	IPPs	0.0	6,368.2	8,070.0	0.0	0.0	14,438.2
	SUBTOTAL	2,114.0	10,452.2	8,070.0	0.0	0.0	20,636.2
SABAH*	SESB	75.2	104.5	0.0	150.9	0.0	330.6
	IPPs	0.0	870.4	0.0	77.8	0.0	948.2
	FiT	6.5	0.0	0.0	0.0	63.8	70.3
	SUBTOTAL	81.7	974.9	0.0	228.7	63.8	1,349.1
SARAWAK	SEB	365.4	397.5	423.0	121.4	0.0	1,307.3
	IPPs	1,771.0	0.0	0.0	0.0	0.0	1,771.0
	SUBTOTAL	2,136.4	397.5	423.0	121.4	0.0	3,078.3
TOTAL	4,332.1	11,824.6	8,493.0	350.1	63.8	25,063.6	

Note: * Dependable Capacity
Source: Power Utilities and IPPs

Figure 28: Available Capacity as of 31st December 2015

Source: Power Utilities and IPPs

Table 12: Installed Capacity of Major Hydro Power Stations

STATION	INSTALLED CAPACITY (MW)	TOTAL (MW)
PENINSULAR MALAYSIA		
1. TERENGGANU		
- Stesen Janakuasa Sultan Mahmud Kenyir	4 x 100	400.0
2. PERAK		
- Stesen Janakuasa Temenggor	4 x 87	348.0
- Stesen Janakuasa Bersia	3 x 24	72.0
- Stesen Janakuasa Kenering	3 x 40	120.0
- Chenderoh	3 x 10.7 + 1 x 8.4	40.5
- Sg. Piah Hulu	2 x 7.3	14.6
- Sg. Piah Hilir	2 x 27	54.0
3. PAHANG		
- Stesen Janakuasa Sultan Yussuf, Jor	4 x 25	100.0
- Stesen Janakuasa Sultan Idris II, Woh	3 x 50	150.0
- Cameron Highland Scheme*		11.9
4. KELANTAN		
- Pergau	4 x 150	600.0
- Kenerong Upper	2 x 6	12.0
- Kenerong Lower	2 x 4	8.0
SUBTOTAL		1,931.0
SABAH		
- Tenom Pangj	3 x 22	66.0
SUBTOTAL		66.0
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		5,449.0

Source: TNB, SESB and SEB

Note (*): Cameron Highland Scheme includes Odak, Habu, Kg. Raja, Kg. Terla and Robinson Falls stations

Table 13: Installed Capacity of Mini Hydro Power Stations

STATION	TOTAL (MW)
PENINSULAR MALAYSIA	
1. KEDAH	
- Sg Tawar Besar	0.552
- Sg Mempelam	0.381
- Sg Mahang	0.454
2. PERAK	
- Sg Tebing Tinggi	0.152
- Sg Asap	0.110
- Sg Kinjang	0.325
- Sg Bil	0.225
- Sg Kenas	0.500
- Sg Chempias	0.120
- Sg Temelong	0.800
3. PAHANG	
- Sg Sempam G2	1.250
- Sg Pertang	0.340
- Sg Perdak	0.342
- Sg Sia	0.520
4. KELANTAN	
- Sg Renyok G1	0.800
- Sg Renyok G2	0.800
- Sg Sok	0.560
- Sg Rek	0.252
5. TERENGGANU	
- Sg Berang	0.364
- Sg Cheralak	0.480
SUB TOTAL	9.327
SABAH	
- Melangkap (Kota Belud)	1.000
- Sayap (Kota Belud)	1.000
- Bombalai (Tawau)	1.000
- Merotai (Tawau)	1.000
- Kiau (Kota Belud)	0.350
- Naradau (Ranau)	1.760
- Kedamaian (Kota Belud)	2.103
- Pengapuyan (Kota Marudu)	4.830
SUB TOTAL	13.043
SARAWAK	
- Sg Pasir	0.760
- Penindin	0.352
- Sebako	0.333
- Lundu	0.352
- Kalamuku 1	0.500
- Kalamuku 2	0.500
- Sg Keijin	0.500
- Sg Kota 1	2.000
- Sg Kota 2	2.000
SUB TOTAL	7.297
TOTAL	29.667

Table 14: Transmission Network in Circuit – kilometres

UTILITY	500 KV	275 KV	132 KV	66 KV
TNB	866	8,028	11,245	-
SESB	-	493	1,921	119
SEB	-	1,204	384	-

Source: TNB, SESB and SEB

Table 15: Distribution Network in Circuit – kilometres

UTILITY	OVERHEAD LINES	UNDERGROUND CABLES
TNB	532,403	697,159
SESB	9,350	764
SEB	24,031	7,688

Source: TNB, SESB and SEB

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

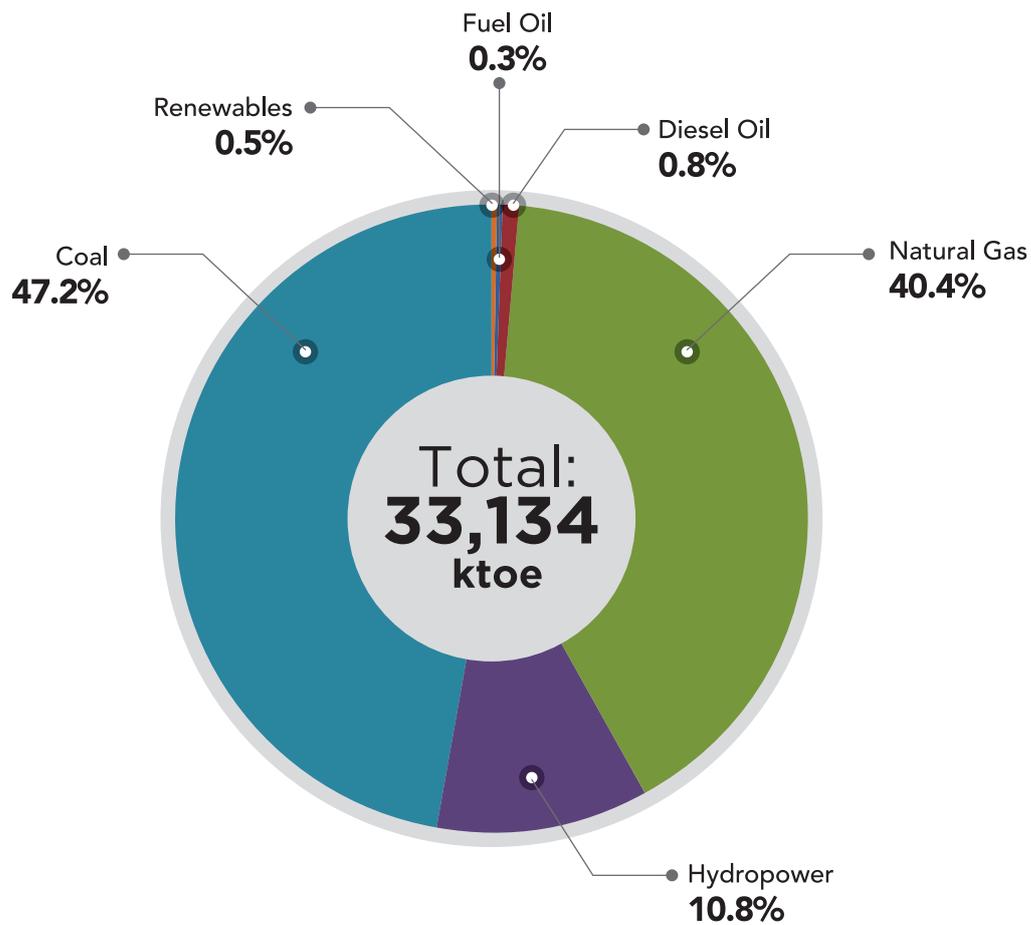
REGION	ELECTRICITY GROSS GENERATION		ELECTRICITY CONSUMPTION		AVAILABLE CAPACITY**	PEAK DEMAND	RESERVE MARGIN
	GWh	%	GWh	%	MW	MW	%
Peninsular Malaysia	126,470	84.2	110,770	83.8	20,636	16,822	22.7
Sarawak	17,333	11.5	15,624	11.8	3,078	2,288	34.6
Sabah*	6,387	4.3	5,805	4.4	1,349	913	47.8
TOTAL	150,190	100.0	132,199	100.0	25,064		

Source: TNB and IPPs, SESB and SEB

Note

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

(**): Available Capacity for Peninsular Malaysia was based on Tested Annual Available Capacity (TAAC), Available Capacity for Sabah was based on Dependable Capacity

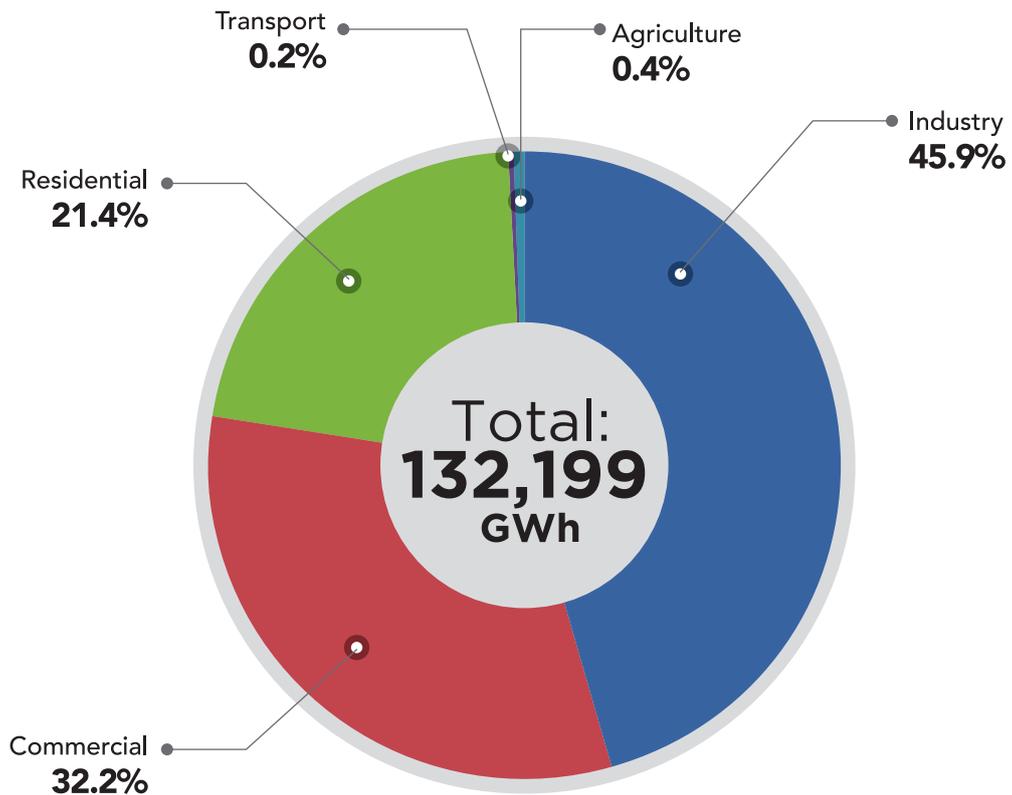
Figure 29: Energy Input in Power Stations

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

Table 17: Electricity Consumption by Sectors in GWh

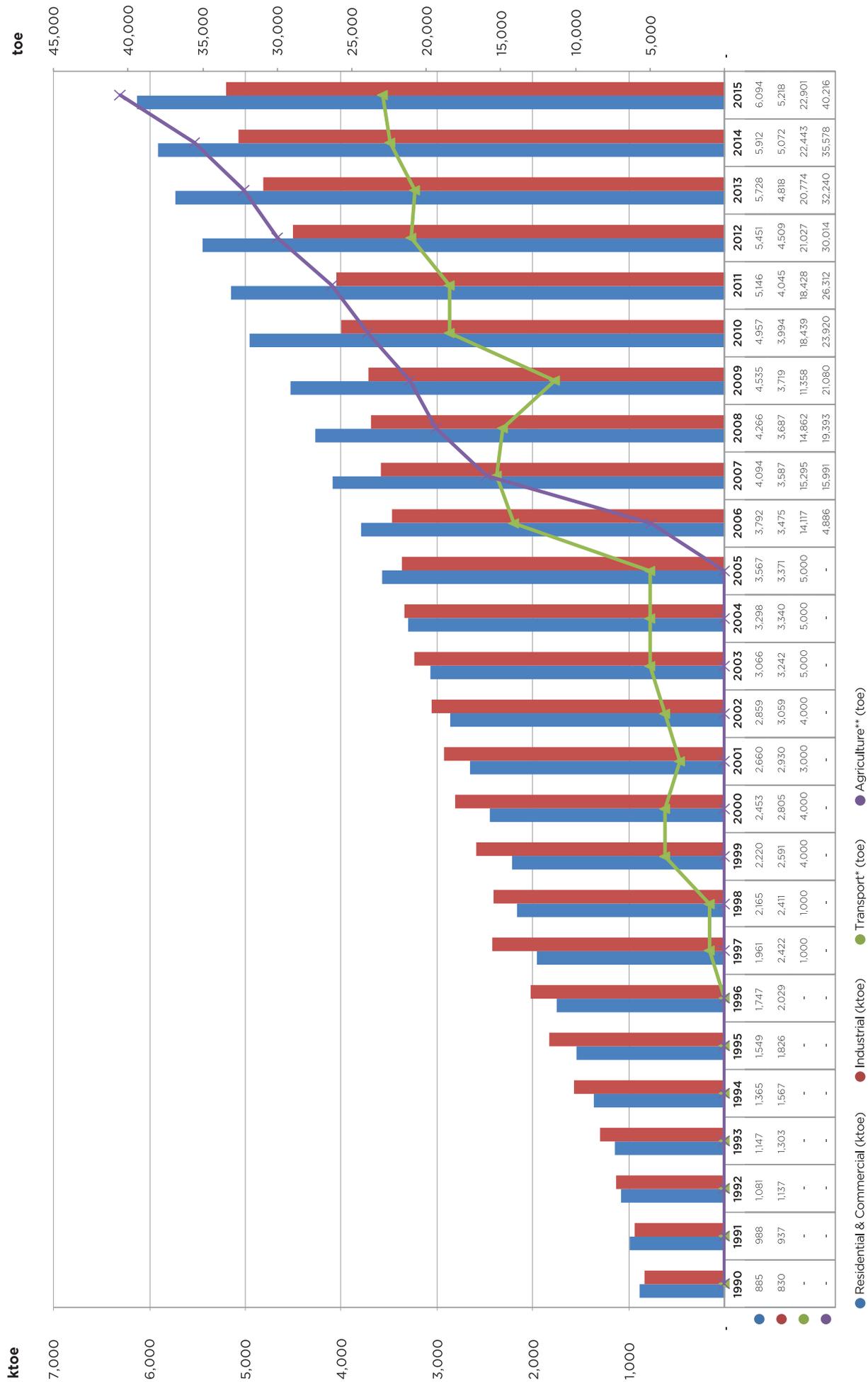
REGION	INDUSTRY		COMMERCIAL		RESIDENTIAL		TRANSPORT		AGRICULTURE		TOTAL
	GWh	%	GWh	%	GWh	%	GWh	%	GWh	%	
Peninsular Malaysia	47,572	78.4	37,877	89.1	24,587	86.9	266	100.0	467.4	100.0	110,770
Sarawak	11,202	18.5	2,390	5.6	2,032	7.2	-	-	-	-	15,624
Sabah	1,867	3.1	2,256	5.3	1,682	5.9	-	-	-	-	5,805
TOTAL	60,641	100.0	42,524	100.0	28,301	100.0	266	100.0	467	100.0	132,199

Source: Power utilities, IPPs and Self-Generators

Figure 30: Electricity Consumption by Sectors in 2015

Source: Power utilities, IPPs and Self-Generators

Figure 31: Electricity Consumption by Sectors



Source: TNB, SEB, SESB, Co-Generators and Land Public Transport Commission

Note (*): From 2006 until 2014 data were collected directly from train operators

(**): Effective from 1st June 2006, TNB has introduced Specific Agriculture Tariff; previously Agriculture was under the Commercial Tariff

Table 18: Electricity Generation and Installed Capacity of Renewable Energy by Public Licensee by Region in 2015

REGION	TYPE OF PRIME MOVER	INSTALLED CAPACITY (MW)	UNIT GENERATED (MWH)
PENINSULAR MALAYSIA	Mini Hydro - FiT	9.2	41,976
	Mini Hydro - IPP	20.0	52,880
	Mini Hydro - Cameron Highlands Scheme	11.9	30,321
	Mini Hydro - TNB	9.3	8,753
	Solar - Non-FiT	1.3	797
	Solar - FiT	159.7	158,870
	Biogas - FiT	11.7	43,624
	Biomass - FiT	19.0	5,245
	SUBTOTAL	242.2	342,467
SABAH	Mini Hydro-SESB	6.1	19,943
	Mini Hydro - FiT	6.9	16,650
	Biomass - FiT	41.0	230
	Biomass - Co-Gen	24.2	92,400
	SUBTOTAL	78.2	129,223
SARAWAK	Mini Hydro -SEB	7.3	11,540
	Solar	0.3	122
	SUBTOTAL	7.6	11,662
	GRAND TOTAL	328.0	483,352

Source: Energy Commission, TNB, SESB, SEB, Ministry of Public Utilities Sarawak and SEDA Malaysia
Note: Public Licence is the licensee generates for his own use and for supply to other persons

Table 19: Electricity Generation and Installed Capacity of Renewable Energy by Private Licensee by Region in 2015

REGION	TYPE OF PRIME MOVER	INSTALLED CAPACITY (MW)	UNIT GENERATED (MWH)
PENINSULAR MALAYSIA	Biomass - Self-Gen	293.3	110,137
	SUBTOTAL	293.3	110,137
SABAH	Biomass - Co-Gen	93.5	63,450
	Biomass - Self-Gen	118.2	178,000
	SUBTOTAL	211.7	241,450
SARAWAK	Biomass	60.0	43,260
	SUBTOTAL	60.0	43,260
GRAND TOTAL		565.1	394,847

Source: Energy Commission, TNB, SESB, SEB and Ministry of Public Utilities Sarawak

Note: Private Licence is the licensee generates for his own use only



06.

Key Energy Statistics

Table 20: Primary Energy Supply in ktoe

	CRUDE OIL	PETROLEUM PRODUCTS & OTHERS	NATURAL GAS	COAL AND COKE	HYDROPOWER	TOTAL	ANNUAL GROWTH RATE (%)	Share (%)			
								CRUDE OIL AND PETROLEUM PRODUCTS & OTHERS	NATURAL GAS	COAL AND COKE	HYDROPOWER
1990	8,783	3,646	6,801	1,326	915	21,471	8.9	57.9	31.7	6.2	4.3
1991	9,443	4,163	10,112	1,564	1,053	26,335	22.7	51.7	38.4	5.9	4.0
1992	10,175	5,098	11,381	1,640	997	29,291	11.2	52.1	38.9	5.6	3.4
1993	10,135	5,816	11,360	1,352	1,262	29,925	2.2	53.3	38.0	4.5	4.2
1994	13,605	2,450	12,392	1,563	1,652	31,662	5.8	50.7	39.1	4.9	5.2
1995	16,159	608	13,960	1,612	1,540	33,879	7.0	49.5	41.2	4.8	4.5
1996	18,255	1,098	15,567	1,677	1,243	37,840	11.7	51.1	41.1	4.4	3.3
1997	17,917	3,803	19,041	1,622	790	43,173	14.1	50.3	44.1	3.8	1.8
1998	17,132	1,919	19,101	1,731	1,113	40,996	(5.0)	46.5	46.6	4.2	2.7
1999	17,643	1,807	21,476	1,940	1,668	44,534	8.6	43.7	48.2	4.4	3.7
2000	21,673	(1,431)	26,370	2,486	1,612	50,710	13.9	39.9	52.0	4.9	3.2
2001	23,590	(1,917)	25,649	2,970	1,687	51,979	2.5	41.7	49.3	5.7	3.2
2002	22,647	(523)	26,101	3,642	1,329	53,196	2.3	41.6	49.1	6.8	2.5
2003	25,344	(1,408)	27,257	5,316	1,056	57,565	8.2	41.6	47.3	9.2	1.8
2004	25,335	(82)	29,145	7,109	1,329	62,836	9.2	40.2	46.4	11.3	2.1
2005	24,339	(243)	33,913	6,889	1,313	66,211	5.4	36.4	51.2	10.4	2.0
2006	24,910	(1,670)	34,917	7,299	1,567	67,023	1.2	34.7	52.1	10.9	2.3
2007	26,571	(1,190)	36,639	8,848	1,522	72,390	8.0	35.1	50.6	12.2	2.1
2008	26,776	(1,780)	39,289	9,782	1,964	76,031	5.0	32.9	51.7	12.9	2.6
2009	26,386	96	35,851	10,623	1,627	74,583	(1.9)	35.5	48.1	14.2	2.2
2010	22,487	2,521	35,447	14,777	1,577	76,809	3.0	32.6	46.1	19.2	2.1
2011	24,679	2,248	35,740	14,772	1,850	79,289	3.2	34.0	45.1	18.6	2.3
2012	28,053	1,762	38,647	15,882	2,150	86,494	9.1	34.5	44.7	18.4	2.5
2013	27,154	5,849	39,973	15,067	2,688	90,731	4.9	36.4	44.1	16.5	3.0
2014	26,765	7,213	40,113	15,357	3,038	92,486	1.9	36.7	43.4	16.5	3.3
2015	24,971	4,865	39,364	17,406	3,582	90,188	(2.5)	33.1	43.6	19.3	4.0

Table 21: Net Import and Export of Energy in ktoe

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

Source: Power utilities, IPPs and Self-Generators

Table 22: Conversion in Gas Plants in ktoe

	INPUT:		GAS PLANTS		
	NATURAL GAS	MLNG	GPP - LPG	MDS	
1990	9,797	9,797	na	na	
1991	8,749	8,749	na	na	
1992	8,817	8,425	392	na	
1993	9,587	9,019	529	39	
1994	10,273	9,087	948	238	
1995	13,565	11,244	1,900	421	
1996	16,807	15,251	1,212	344	
1997	18,043	16,396	1,258	389	
1998	18,214	16,688	1,526	na	
1999	17,889	16,417	1,472	na	
2000	18,877	17,231	1,482	164	
2001	18,459	16,636	1,310	513	
2002	19,752	17,803	1,504	445	
2003	20,198	18,965	790	443	
2004	25,440	22,944	1,225	1,271	
2005	36,447	32,837	2,043	1,567	
2006	35,378	30,996	3,506	876	
2007	38,141	33,054	4,288	799	
2008	38,193	33,766	3,507	920	
2009	37,098	32,497	3,610	991	
2010	40,246	29,345	9,844	1,057	
2011	40,737	35,815	4,071	851	
2012	40,042	32,718	6,235	1,089	
2013	39,678	35,474	3,231	973	
2014	39,193	36,469	1,750	974	
2015	38,323	35,635	1,826	862	

Note: na means not applicable

Middle Distillate Synthesis (MDS) commenced pre-commercialization operation in year 2000

MLNG plant produced LPG in the year 2003

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

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

	INPUT:					TOTAL INPUT	ANNUAL GROWTH RATE (%)	INPUT SHARE (%)				OUTPUT: TOTAL ELECTRICITY GENERATED		
	FUEL OIL	DIESEL OIL	NATURAL GAS	HYDRO POWER*	COAL & COKE			RENEWABLES	FUEL AND DIESEL OIL	NATURAL GAS	HYDRO POWER*		COAL & COKE	RENEWABLES
1990	2,873	116	1,361	915	813	-	6,078	21.2	49.2	22.4	15.1	13.4	-	1,979
1991	2,687	164	2,533	1,053	963	-	7,400	21.8	38.5	34.2	14.2	13.0	-	2,283
1992	2,352	160	3,144	997	968	-	7,621	3.0	33.0	41.3	13.1	12.7	-	2,521
1993	2,388	87	4,374	1,262	884	-	8,995	18.0	27.5	48.6	14.0	9.8	-	2,987
1994	1,957	249	5,119	1,652	925	-	9,902	10.1	22.3	51.7	16.7	9.3	-	3,362
1995	2,073	265	6,414	1,540	957	-	11,249	13.6	20.8	57.0	13.7	8.5	-	3,909
1996	2,354	284	7,489	1,243	950	-	12,320	9.5	21.4	60.8	10.1	7.7	-	4,421
1997	2,482	185	7,531	790	882	-	11,870	(3.7)	22.5	63.4	6.7	7.4	-	4,977
1998	2,130	275	8,886	1,113	964	-	13,368	12.6	18.0	66.5	8.3	7.2	-	5,013
1999	950	172	10,162	1,668	1,332	-	14,284	6.9	7.9	71.1	11.7	9.3	-	5,409
2000	592	191	11,580	1,612	1,495	-	15,470	8.3	5.1	74.9	10.4	9.7	-	5,731
2001	730	278	11,922	1,687	1,994	-	16,611	7.4	6.1	71.8	10.2	12.0	-	5,940
2002	1,363	476	12,424	1,329	2,556	-	18,148	9.3	10.1	68.5	7.3	14.1	-	6,191
2003	289	340	10,893	1,056	4,104	-	16,682	(8.1)	3.8	65.3	6.3	24.6	-	6,568
2004	274	272	10,545	1,329	5,327	-	17,747	6.4	3.1	59.4	7.5	30.0	-	6,716
2005	275	298	12,271	1,313	5,541	-	19,698	11.0	2.9	62.3	6.7	28.1	-	6,706
2006	171	617	12,524	1,567	5,964	-	20,843	5.8	3.8	60.1	7.5	28.6	-	7,240
2007	199	314	12,549	1,522	7,486	-	22,070	5.9	2.3	56.9	6.9	33.9	-	8,385
2008	181	299	13,651	1,964	8,069	-	24,164	9.5	2.0	56.5	8.1	33.4	-	8,422
2009	205	384	13,390	1,627	9,010	-	24,616	1.9	2.4	54.4	6.6	36.6	-	8,531
2010	125	415	12,628	1,577	12,951	-	27,696	12.5	1.9	45.6	5.7	46.8	-	9,404
2011	1,103	981	10,977	1,850	13,013	-	27,924	0.8	7.5	39.3	6.6	46.6	-	10,193
2012	550	811	11,533	2,150	14,138	80	29,262	4.8	4.7	39.4	7.3	48.3	0.3	11,032
2013	392	623	13,520	2,688	13,527	208	30,958	5.8	3.3	43.7	8.7	43.7	0.7	11,630
2014	269	622	13,860	3,038	13,648	171	31,608	2.1	2.8	43.8	9.6	43.2	0.5	12,227
2015	101	279	13,378	3,582	15,627	166	33,134	4.8	1.1	40.4	10.8	47.2	0.5	12,393

Note (*): Figures calculated from average efficiency of thermal stations of respective year

Table 25: Final Energy Consumption by Sectors in ktoe

	INDUSTRIAL	TRANSPORT	RESIDENTIAL AND COMMERCIAL	NON-ENERGY USE	AGRICULTURE	TOTAL	ANNUAL GROWTH RATE (%)	INDUSTRIAL INCLUDING AGRICULTURE & NON-ENERGY	INDUSTRIAL GDP*	INDUSTRIAL ENERGY INTENSITY (TOE/ RM MILLION AT 2010 PRICES)
1990	5,300	5,386	1,622	838	-	13,146	11.0	6,138	157,991	39
1991	5,835	5,806	1,721	1,071	130	14,563	10.8	7,036	170,942	41
1992	6,455	6,226	1,891	1,222	391	16,185	11.1	8,068	182,592	44
1993	7,012	6,558	2,069	2,027	62	17,728	9.5	9,101	194,045	47
1994	7,283	7,262	2,502	1,817	422	19,286	8.8	9,522	208,528	46
1995	8,060	7,827	2,837	1,994	446	21,164	9.7	10,500	230,658	46
1996	9,838	8,951	3,162	1,744	486	24,181	14.3	12,068	259,952	46
1997	10,106	10,201	3,073	2,298	490	26,168	8.2	12,894	278,490	46
1998	10,121	9,793	3,314	2,023	307	25,558	(2.3)	12,451	249,109	50
1999	10,277	11,393	3,653	1,799	106	27,228	6.5	12,182	267,643	46
2000	11,406	12,071	3,868	2,250	104	29,699	9.1	13,760	299,623	46
2001	11,852	13,137	4,048	2,378	98	31,513	6.1	14,328	291,938	49
2002	12,854	13,442	4,387	2,511	96	33,290	5.6	15,461	303,130	51
2003	13,472	14,271	4,399	2,345	98	34,585	3.9	15,915	325,828	49
2004	14,914	15,385	4,754	2,183	87	37,323	7.9	17,184	348,491	49
2005	15,492	15,384	5,134	2,173	101	38,284	2.6	17,766	359,941	49
2006	15,248	14,819	5,430	2,819	253	38,569	0.7	18,320	376,262	49
2007	16,454	15,717	6,212	2,958	265	41,606	7.9	19,677	387,084	51
2008	16,205	16,395	6,205	2,876	287	41,968	0.9	19,368	389,775	50
2009	14,312	16,119	6,336	3,868	211	40,846	(2.7)	18,391	366,284	50
2010	12,928	16,828	6,951	3,696	1,074	41,477	1.5	17,698	393,381	45
2011	12,100	17,070	6,993	6,377	916	43,456	4.8	19,393	406,412	48
2012	13,919	19,757	7,065	7,497	1,053	49,291	13.4	22,469	422,958	53
2013	13,496	22,357	7,403	7,277	1,051	51,584	4.7	21,824	436,712	50
2014	13,162	24,327	7,459	6,217	1,045	52,210	1.2	20,424	459,798	44
2015	13,989	23,435	7,560	5,928	895	51,806	(0.8)	20,812	480,116	43

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

Table 26: Final Energy Consumption by Type of Fuels 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	3,867	5,642	1,086	33,288	31,513	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	1,361	41,605	39,493	8.4
2008	24,451	7,986	2,046	5,772	7,818	1,713	41,968	39,922	1.1
2009	24,145	8,286	1,995	4,807	6,802	1,613	40,846	38,851	(2.7)
2010	24,403	8,993	1,661	4,593	6,254	1,826	41,476	39,815	2.5
2011	23,946	9,236	3,906	4,609	8,515	1,759	43,456	39,550	(0.7)
2012	27,329	10,011	5,336	4,870	10,206	1,744	49,290	43,954	11.1
2013	29,379	10,590	5,276	4,800	10,076	1,539	51,584	46,308	5.4
2014	29,817	11,042	4,472	5,168	9,641	1,709	52,209	47,737	3.1
2015	29,087	11,375	4,470	5,096	9,566	1,778	51,806	47,336	(0.8)

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	6,827	8,116	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	7,360	8,539	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

Table 28: Selected Energy and Economic Indicators (1990-2015)

	GDP AT CURRENT PRICES (RM MILLION)*	GDP AT 2010 PRICES (RM MILLION)*	POPULATION ('000 PEOPLE)*	PRIMARY ENERGY SUPPLY (KTOE)	FINAL ENERGY CONSUMPTION (KTOE)	ELECTRICITY CONSUMPTION (KTOE)	ELECTRICITY CONSUMPTION (GWH)	AVERAGE ANNUAL GROWTH (%)		
								GDP AT 2010 PRICES	PRIMARY ENERGY SUPPLY	FINAL ENERGY CONSUMPTION
1990	128,658	263,488	18,102	21,471	13,146	1,715	19,932	9.00	8.9 0	8.70
1991	145,991	288,639	18,547	26,335	14,563	1,925	22,373	9.55	22.65	10.78
1992	162,800	314,285	19,068	29,291	16,185	2,218	25,778	8.89	11.22	11.14
1993	186,042	345,384	19,602	29,925	17,728	2,450	28,474	9.89	2.16	9.53
1994	211,181	377,201	20,142	31,662	19,287	2,932	34,076	9.21	5.80	8.79
1995	240,365	414,276	20,682	33,879	22,164	3,375	39,225	9.83	7.00	14.92
1996	274,138	455,715	21,223	37,840	24,181	3,777	43,897	10.00	11.69	9.10
1997	304,458	489,086	21,769	43,173	26,167	4,384	50,952	7.32	14.09	8.21
1998	306,022	453,092	22,334	40,996	25,558	4,577	53,195	(7.36)	(5.04)	(2.33)
1999	324,952	480,901	22,910	44,534	27,228	4,815	55,961	6.14	8.63	6.53
2000	370,817	523,503	23,495	50,710	29,699	5,263	61,168	8.86	13.87	9.08
2001	366,841	526,213	24,031	51,979	31,515	5,594	65,015	0.52	2.50	6.11
2002	398,714	554,581	24,543	53,196	33,289	5,922	68,827	5.39	2.34	5.63
2003	435,708	586,683	25,038	57,565	34,586	6,313	73,371	5.79	8.21	3.90
2004	493,223	626,481	25,542	62,836	37,323	6,642	77,195	6.78	9.16	7.91
2005	543,578	659,885	26,046	66,211	38,285	6,944	80,705	5.33	5.37	2.58
2006	596,784	696,739	26,550	67,021	38,567	7,272	84,517	5.58	1.22	0.74
2007	665,340	740,625	27,058	72,389	41,606	7,683	89,294	6.30	8.01	7.88
2008	769,949	776,410	27,568	76,032	41,968	7,986	92,815	4.83	5.03	0.87
2009	712,857	764,659	28,082	74,583	40,845	8,286	96,302	(1.51)	(1.91)	(2.68)
2010	821,434	821,434	28,589	76,809	41,476	8,993	104,519	7.42	2.98	1.54
2011	911,733	864,920	29,062	79,289	43,455	9,235	107,331	5.29	3.23	4.77
2012	971,252	912,261	29,510	86,495	49,291	10,011	116,350	5.47	9.09	13.43
2013	1,018,614	955,080	30,214	90,730	51,583	10,590	123,079	4.69	4.90	4.65
2014	1,106,466	1,012,506	30,598	92,487	52,209	11,042	128,333	6.01	1.94	1.21
2015	1,157,139	1,062,805	30,996	90,188	51,806	11,375	132,199	4.97	(2.49)	(0.77)

Source (*): GDP and Population data from Department of Statistics, Malaysia

Note: GDP at 2010 Prices (RM Million) for 1990 until 2009 was calculated by Energy Commission

ELECTRICITY CONSUMPTION	PER CAPITA				ENERGY INTENSITY				ENERGY ELASTICITY	
	GDP AT CURRENT PRICES (RM)	PRIMARY ENERGY SUPPLY (TOE)	FINAL ENERGY CONSUMPTION (TOE)	ELECTRICITY CONSUMPTION (KWH)	PRIMARY ENERGY SUPPLY (TOE/GDP AT 2010 PRICES (RM MILLION))	FINAL ENERGY CONSUMPTION (TOE/GDP AT 2010 PRICES (RM MILLION))	ELECTRICITY CONSUMPTION (TOE/GDP AT 2010 PRICES (RM MILLION))	ELECTRICITY CONSUMPTION (GWH/GDP AT 2010 PRICES (RM MILLION))	FINAL ENERGY	ELECTRICITY
9.70	7,107	1.19	0.73	1,101	81.49	49.89	6.51	0.076	0.97	1.08
12.24	7,871	1.42	0.79	1,206	91.24	50.45	6.67	0.078	1.13	1.28
15.22	8,538	1.54	0.85	1,352	93.20	51.50	7.06	0.082	1.25	1.71
10.46	9,491	1.53	0.90	1,453	86.64	51.33	7.09	0.082	0.96	1.06
19.67	10,485	1.57	0.96	1,692	83.94	51.13	7.77	0.090	0.95	2.14
15.11	11,622	1.64	1.07	1,897	81.78	53.50	8.15	0.095	1.52	1.54
11.91	12,917	1.78	1.14	2,068	83.03	53.06	8.29	0.096	0.91	1.19
16.07	13,986	1.98	1.20	2,341	88.27	53.50	8.96	0.104	1.12	2.19
4.40	13,702	1.84	1.14	2,382	90.48	56.41	10.10	0.117	0.32	(0.60)
5.20	14,184	1.94	1.19	2,443	92.61	56.62	10.01	0.116	1.06	0.85
9.30	15,783	2.16	1.26	2,603	96.87	56.73	10.05	0.117	1.02	1.05
6.29	15,266	2.16	1.31	2,706	98.78	59.89	10.63	0.124	11.81	12.15
5.86	16,246	2.17	1.36	2,804	95.92	60.03	10.68	0.124	1.04	1.09
6.60	17,402	2.30	1.38	2,930	98.12	58.95	10.76	0.125	0.67	1.14
5.21	19,311	2.46	1.46	3,022	100.30	59.58	10.60	0.123	1.17	0.77
4.55	20,870	2.54	1.47	3,099	100.34	58.02	10.52	0.122	0.48	0.85
4.72	22,478	2.52	1.45	3,183	96.19	55.35	10.44	0.121	0.13	0.85
5.65	24,589	2.68	1.54	3,300	97.74	56.18	10.37	0.121	1.25	0.90
3.94	27,929	2.76	1.52	3,367	97.93	54.05	10.29	0.120	0.18	0.82
3.76	25,385	2.66	1.45	3,429	97.54	53.42	10.84	0.126	1.77	(2.48)
8.53	28,733	2.69	1.45	3,656	93.51	50.49	10.95	0.127	0.21	1.15
2.69	31,372	2.73	1.50	3,693	91.67	50.24	10.68	0.124	0.90	0.51
8.40	32,913	2.93	1.67	3,943	94.81	54.03	10.97	0.128	2.45	1.54
5.78	33,713	3.00	1.71	4,074	95.00	54.01	11.09	0.129	0.99	1.23
4.27	36,161	3.02	1.71	4,194	91.34	51.56	10.91	0.127	0.20	0.71
3.01	37,332	2.91	1.67	4,265	84.86	48.74	10.70	0.124	(0.16)	0.61

Table 29: Energy Balance Table in 2015 (kilo tonnes of oil equivalent)

COMMERCIAL ENERGY BALANCE FOR MALAYSIA 2015 (THOUSAND TONNES OF OIL EQUIVALENT)									
ENERGY SOURCE	NATURAL GAS	LNG	CRUDE OIL (1/)	OTHERS (2/)	TOTAL PETROLEUM PRODUCTS	PETROLEUM PRODUCTS			
						PETROL	DIESEL	FUEL OIL	LPG
PRIMARY SUPPLY									
1. Primary Production	62,119	0	32,440	0	0	0	0	0	0
2. Gas Flaring, Reinjection & Use	-2,450	0	0	0	0	0	0	0	0
3. Imports	5,941	1,873	8,379	13	14,218	7,582	4,558	958	351
4. Exports	-1,062	-27,057	-16,075	-39	-10,220	-401	-5,385	-1,408	-272
5. Bunkers	0	0	0	0	-346	0	-2	-344	0
6. Stock Change	0	0	57	0	567	79	491	-81	161
7. Statistical Discrepancy	0	0	170	0	0	0	0	0	0
8. Primary Supply	64,549	-25,184	24,971	-26	4,219	7,259	-338	-876	239
TRANSFORMATION									
9. Gas Plants									
9.1 MLNG	-35,635	27,634	0	0	49	0	0	0	49
9.2 MDS	-862	0	0	0	423	0	118	0	0
9.3 GPP-LPG (3&4/)	-1,826	0	0	0	1,155	0	0	0	1,155
Subtotal	-38,323	27,634	0	0	1,627	0	118	0	1,204
10. Refineries	0	0	-24,575	26	24,281	5,031	9,890	1,692	780
11. Power Stations & Self-Generation									
11.1 Hydro Stations	0	0	0	0	0	0	0	0	0
11.2 Thermal Stations	-13,378	-1,873	0	0	-380	0	-279	-101	0
11.3 Self-Generation (5/)	-1,739	0	0	0	-51	0	-51	0	0
Subtotal	-15,118	-1,873	0	0	-431	0	-330	-101	0
12. Losses & Own Use	-1,542	-577	-396	0	-1,404	0	0	-16	0
13. Statistical Discrepancy	0	-0	0	0	407	514	37	-201	38
14. Secondary Supply	-54,983	25,184	-24,971	26	24,480	5,545	9,715	1,373	2,021
FINAL USE									
15. Residential	1	0	0	0	675	0	0	0	674
16. Commercial	24	0	0	0	767	0	140	0	627
17. Industrial	4,808	0	0	0	2,185	181	1,387	491	123
18. Transport	264	0	0	0	22,760	12,554	7,068	4	0
19. Agriculture	0	0	0	0	190	0	187	3	0
20. Fishery	0	0	0	0	664	69	595	0	0
21. Non-Energy Use	4,470	0	0	0	1,458	0	0	0	837
22. Total Final Use	9,566	0	0	0	28,699	12,804	9,377	498	2,261
ELECTRICITY OUTPUT									
Main Activity Producer									
Gross Electricity Generation - GWh	65,580	0	0	0	1,556	0	767	789	0
Autoproducer									
Gross Electricity Generation - GWh	4,382	0	0	0	183	0	183	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 2015.

Note: Total may not necessarily add up due to rounding

				COAL & COKE	HYDRO POWER	SOLAR	BIOMASS	BIOGAS	BIODIESEL	ELECTRICITY	TOTAL
KEROSENE	ATF & AV GAS	NON-ENERGY	REFINERY GAS								
0	0	0	0	1,614	3,582	75	189	18	684	0	100,721
0	0	0	0	0	0	0	0	0	0	0	-2,450
0	554	216	0	16,051	0	0	0	0	0	1	46,477
-42	-549	-2,162	0	-156	0	0	0	0	-182	-0	-54,791
0	0	-0	0	0	0	0	0	0	0	0	-346
-4	96	-174	0	10	0	0	0	0	-114	0	520
0	0	0	0	-112	0	0	0	0	0	0	58
-46	101	-2,120	0	17,406	3,582	75	189	18	389	1	90,188
0	0	0	0	0	0	0	0	0	0	0	-7,953
44	0	262	0	0	0	0	0	0	0	0	-439
0	0	0	0	0	0	0	0	0	0	0	-671
44	0	262	0	0	0	0	0	0	0	0	-9,063
6	2,841	3,869	172	0	0	0	0	0	0	0	-269
0	0	0	0	0	-3,582	0	0	0	0	1,346	-2,235
0	0	0	0	-15,627	0	-75	-74	-17	0	11,047	-20,378
0	0	0	0	0	0	-107	-115	-1	0	317	-1,695
0	0	0	0	-15,627	-3,582	-182	-189	-18	0	12,711	-24,308
0	0	-1,216	-172	0	0	0	0	0	0	-1,079	-4,998
0	192	-173	0	0	0	0	0	0	0	-258	255
50	3,033	2,741	0	-15,627	-3,582	-182	-189	-18	0	11,374	-38,489
0	0	0	0	0	0	0	0	0	0	2,435	3,110
0	0	0	0	0	0	0	0	0	0	3,659	4,449
4	0	0	0	1,778	0	0	0	0	0	5,218	13,989
0	3,134	0	0	0	0	0	0	0	389	23	23,435
0	0	0	0	0	0	0	0	0	0	40	231
0	0	0	0	0	0	0	0	0	0	0	664
0	0	621	0	0	0	0	0	0	0	0	5,928
4	3,134	621	0	1,778	0	0	0	0	389	11,375	51,806
0	0	0	0	63,474	13,924	273	268	62	0	0	145,137
0	0	0	0	0	0	0	418	3	0	0	4,986

Table 30: Energy Balance Table in First Quarter (1Q) of 2015 (kilo tonnes of oil equivalent)

COMMERCIAL ENERGY BALANCE FOR MALAYSIA QUARTER 1 2015 (THOUSAND TONNES OF OIL EQUIVALENT)									
ENERGY SOURCE	NATURAL GAS	LNG	CRUDE OIL (1/)	OTHERS (2/)	TOTAL PETROLEUM PRODUCTS	PETROLEUM PRODUCTS			
						PETROL	DIESEL	FUEL OIL	LPG
PRIMARY SUPPLY									
1. Primary Production	15,976	0	8,720	0	0	0	0	0	0
2. Gas Flaring, Reinjection & Use	-631	0	0	0	0	0	0	0	0
3. Imports	1,459	471	2,484	10	2,965	1,800	632	273	111
4. Exports	-283	-7,312	-4,199	-19	-2,704	-116	-1,152	-240	-69
5. Bunkers	0	0	0	0	-76	0	-1	-75	0
6. Stock Change	0	0	-128	0	255	-60	381	-37	75
7. Statistical Discrepancy	0	0	-185	0	0	0	0	0	0
8. Primary Supply	16,521	-6,842	6,691	-9	441	1,624	-139	-79	117
TRANSFORMATION									
9. Gas Plants									
9.1 MLNG	-9,623	7,286	0	0	17	0	0	0	17
9.2 MDS	-228	0	0	0	92	0	30	0	0
9.3 GPP-LPG (3&4/)	-404	0	0	0	304	0	0	0	304
Subtotal	-10,254	7,286	0	0	414	0	30	0	321
10. Refineries	0	0	-6,626	9	6,599	1,475	2,362	424	173
11. Power Stations & Self-Generation									
11.1 Hydro Stations	0	0	0	0	0	0	0	0	0
11.2 Thermal Stations	-3,009	-471	0	0	-69	0	-55	-15	0
11.3 Self-Generation (5/)	-458	0	0	0	-14	0	-14	0	0
Subtotal	-3,467	-471	0	0	-83	0	-69	-15	0
12. Losses & Own Use	-376	27	-65	0	-189	0	0	-4	0
13. Statistical Discrepancy	0	0	0	0	-93	62	-20	-170	64
14. Secondary Supply	-14,098	6,842	-6,691	9	6,648	1,537	2,303	237	559
FINAL CONSUMPTION									
15. Residential	0	0	0	0	197	0	0	0	197
16. Commercial	6	0	0	0	163	0	21	0	142
17. Industrial	1,187	0	0	0	524	28	307	155	33
18. Transport	70	0	0	0	5,593	3,118	1,681	2	0
19. Agriculture	0	0	0	0	1	0	0	1	0
20. Fishing	0	0	0	0	170	14	155	0	0
21. Non-Energy Use	1,160	0	0	0	441	0	0	0	304
22. Total Final Consumption	2,423	0	0	0	7,088	3,161	2,164	157	676
ELECTRICITY OUTPUT									
Main Activity Producer									
Gross Electricity Generation - GWh	15,134	0	0	0	293	0	138	155	0
Autoproducer									
Gross Electricity Generation - GWh	1,128	0	0	0	54	0	54	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 2015.

Note: Total may not necessarily add up due to rounding

				COAL & COKE	HYDRO POWER	SOLAR	BIOMASS	BIOGAS	BIODIESEL	ELECTRICITY	TOTAL
KEROSENE	ATF & AV GAS	NON-ENERGY	REFINERY GAS								
0	0	0	0	352	931	18	47	5	149	0	26,197
0	0	0	0	0	0	0	0	0	0	0	-631
0	99	49	0	3,515	0	0	0	0	0	0	10,903
-7	-213	-907	0	-38	0	0	0	0	-40	-0	-14,594
0	0	-0	0	0	0	0	0	0	0	0	-76
-4	23	-122	0	388	0	0	0	0	-12	0	502
0	0	0	0	-67	0	0	0	0	0	0	-252
-10	-91	-981	0	4,151	931	18	47	5	97	0	22,050
0	0	0	0	0	0	0	0	0	0	0	-2,321
11	0	51	0	0	0	0	0	0	0	0	-135
0	0	0	0	0	0	0	0	0	0	0	-99
11	0	51	0	0	0	0	0	0	0	0	-2,555
2	861	1,255	47	0	0	0	0	0	0	0	-18
0	0	0	0	0	-931	0	0	0	0	365	-566
0	0	0	0	-3,700	0	-18	-17	-4	0	2,654	-4,635
0	0	0	0	0	0	-107	-30	-1	0	0	-609
0	0	0	0	-3,700	-931	-124	-47	-5	0	3,019	-5,810
0	0	-138	-47	0	0	0	0	0	0	-236	-839
-1	23	-51	0	0	0	0	0	0	0	-52	-39
11	884	1,117	0	-3,700	-931	-124	-47	-5	0	2,731	-9,367
0	0	0	0	0	0	0	0	0	0	572	769
0	0	0	0	0	0	0	0	0	0	858	1,027
1	0	0	0	451	0	0	0	0	0	1,286	3,447
0	793	0	0	0	0	0	0	0	97	6	5,766
0	0	0	0	0	0	0	0	0	0	9	10
0	0	0	0	0	0	0	0	0	0	0	170
0	0	137	0	0	0	0	0	0	0	0	1,601
1	793	137	0	451	0	0	0	0	97	2,731	12,790
0	0	0	0	15,801	4,242	68	67	16	0	0	35,620
0	0	0	0	0	0	0	115	3	0	0	1,300

Table 31: Energy Balance Table in Second Quarter (2Q) of 2015 (kilo tonnes of oil equivalent)

COMMERCIAL ENERGY BALANCE FOR MALAYSIA QUARTER 2 2015 (THOUSAND TONNES OF OIL EQUIVALENT)									
ENERGY SOURCE	NATURAL GAS	LNG	CRUDE OIL (1/)	OTHERS (2/)	TOTAL PETROLEUM PRODUCTS	PETROLEUM PRODUCTS			
						PETROL	DIESEL	FUEL OIL	LPG
PRIMARY SUPPLY									
1. Primary Production	15,147	0	8,146	0	0	0	0	0	0
2. Gas Flaring, Reinjection & Use	-564	0	0	0	0	0	0	0	0
3. Imports	1,501	535	2,282	0	3,352	1,862	959	289	95
4. Exports	-233	-6,178	-3,727	-15	-2,940	-136	-1,595	-802	-41
5. Bunkers	0	0	0	0	-74	0	0	-74	0
6. Stock Change	0	0	30	0	168	-54	116	4	1
7. Statistical Discrepancy	0	0	50	0	0	0	0	0	0
8. Primary Supply	15,851	-5,643	6,781	-15	506	1,672	-520	-582	55
TRANSFORMATION									
9. Gas Plants									
9.1 MLNG	-8,245	6,543	0	0	11	0	0	0	11
9.2 MDS	-282	0	0	0	127	0	32	0	0
9.3 GPP-LPG (3&4/)	-450	0	0	0	282	0	0	0	282
Subtotal	-8,976	6,543	0	0	420	0	32	0	293
10. Refineries	0	0	-6,664	15	6,608	1,453	2,992	593	174
11. Power Stations & Self-Generation									
11.1 Hydro Stations	0	0	0	0	0	0	0	0	0
11.2 Thermal Stations	-3,612	-535	0	0	-102	0	-80	-22	0
11.3 Self-Generation (5/)	-434	0	0	0	-6	0	-6	0	0
Subtotal	-4,046	-535	0	0	-108	0	-86	-22	0
12. Losses & Own Use	-394	-365	-117	0	-506	0	0	-4	0
13. Statistical Discrepancy	0	0	0	0	234	125	-36	58	-1
14. Secondary Supply	-13,417	5,643	-6,781	15	6,649	1,578	2,903	625	466
FINAL CONSUMPTION									
15. Residential	0	0	0	0	122	0	0	0	122
16. Commercial	6	0	0	0	235	0	79	0	157
17. Industrial	1,182	0	0	0	446	77	301	42	26
18. Transport	66	0	0	0	5,775	3,154	1,843	1	0
19. Agriculture	0	0	0	0	1	0	0	1	0
20. Fishing	0	0	0	0	178	18	160	0	0
21. Non-Energy Use	1,180	0	0	0	396	0	0	0	217
22. Total Final Consumption	2,434	0	0	0	7,154	3,249	2,383	43	521
ELECTRICITY OUTPUT									
Main Activity Producer									
Gross Electricity Generation - GWh	17,774	0	0	0	509	0	353	156	0
Autoproducer									
Gross Electricity Generation - GWh	1,018	0	0	0	23	0	23	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 2015.

Note : Total may not necessarily add up due to rounding

				COAL & COKE	HYDRO POWER	SOLAR	BIOMASS	BIOGAS	BIODIESEL	ELECTRICITY	TOTAL
KEROSENE	ATF & AV GAS	NON-ENERGY	REFINERY GAS								
0	0	0	0	433	821	18	40	4	172	0	24,781
0	0	0	0	0	0	0	0	0	0	0	-564
0	122	24	0	4,552	0	0	0	0	0	0	12,222
-12	-91	-264	0	-40	0	0	0	0	-25	-0	-13,158
0	0	0	0	0	0	0	0	0	0	0	-74
-4	81	24	0	-648	0	0	0	0	-51	0	-501
0	0	0	0	64	0	0	0	0	0	0	114
-16	112	-216	0	4,360	821	18	40	4	97	0	22,820
0	0	0	0	0	0	0	0	0	0	0	-1,691
12	0	83	0	0	0	0	0	0	0	0	-155
0	0	0	0	0	0	0	0	0	0	0	-168
12	0	83	0	0	0	0	0	0	0	0	-2,013
1	564	783	47	0	0	0	0	0	0	0	-41
0	0	0	0	0	-821	0	0	0	0	302	-519
0	0	0	0	-3,904	0	-18	-18	-4	0	2,812	-5,381
0	0	0	0	0	0	0	-22	0	0	97	-365
0	0	0	0	-3,904	-821	-18	-40	-4	0	3,210	-6,266
0	0	-454	-47	0	0	0	0	0	0	-249	-1,631
4	100	-17	0	0	0	0	0	0	0	-76	158
17	665	396	0	-3,904	-821	-18	-40	-4	0	2,885	-9,793
0	0	0	0	0	0	0	0	0	0	623	745
0	0	0	0	0	0	0	0	0	0	938	1,179
1	0	0	0	456	0	0	0	0	0	1,309	3,394
0	777	0	0	0	0	0	0	0	97	6	5,944
0	0	0	0	0	0	0	0	0	0	10	10
0	0	0	0	0	0	0	0	0	0	0	178
0	0	180	0	0	0	0	0	0	0	0	1,576
1	777	180	0	456	0	0	0	0	97	2,885	13,028
0	0	0	0	14,564	1,780	68	67	16	0	0	34,778
0	0	0	0	0	0	0	83	0	0	0	1,123

Table 32: Energy Balance Table in Third Quarter (3Q) of 2015 (kilo tonnes of oil equivalent)

COMMERCIAL ENERGY BALANCE FOR MALAYSIA QUARTER 3 2015 (THOUSAND TONNES OF OIL EQUIVALENT)									
ENERGY SOURCE	NATURAL GAS	LNG	CRUDE OIL (1/)	OTHERS (2/)	TOTAL PETROLEUM PRODUCTS	PETROLEUM PRODUCTS			
						PETROL	DIESEL	FUEL OIL	LPG
PRIMARY SUPPLY									
1. Primary Production	15,117	0	7,530	0	0	0	0	0	0
2. Gas Flaring, Reinjection & Use	-597	0	0	0	0	0	0	0	0
3. Imports	1,480	452	1,978	0	3,472	2,008	848	289	132
4. Exports	-274	-6,265	-3,559	0	-2,039	-144	-851	-192	-82
5. Bunkers	0	0	0	0	-96	0	-1	-95	0
6. Stock Change	0	0	264	0	-151	-43	20	-71	37
7. Statistical Discrepancy	0	0	71	0	0	0	0	0	0
8. Primary Supply	15,726	-5,813	6,284	0	1,187	1,822	16	-70	88
TRANSFORMATION									
9. Gas Plants									
9.1 MLNG	-8,290	6,515	0	0	10	0	0	0	10
9.2 MDS	-207	0	0	0	98	0	25	0	0
9.3 GPP-LPG (3&4/)	-507	0	0	0	315	0	0	0	315
Subtotal	-9,005	6,515	0	0	423	0	25	0	325
10. Refineries	0	0	-6,173	0	6,062	1,453	2,258	325	300
11. Power Stations & Self-Generation									
11.1 Hydro Stations	0	0	0	0	0	0	0	0	0
11.2 Thermal Stations	-3,487	-452	0	0	-121	0	-75	-46	0
11.3 Self-Generation (5/)	-468	0	0	0	-15	0	-15	0	0
Subtotal	-3,955	-452	0	0	-136	0	-90	-46	0
12. Losses & Own Use	-394	-251	-112	0	-170	0	0	-3	0
13. Statistical Discrepancy	0	-0	0	0	85	4	137	-18	-35
14. Secondary Supply	-13,353	5,813	-6,284	0	6,264	1,457	2,330	259	590
FINAL CONSUMPTION									
15. Residential	0	0	0	0	150	0	0	0	150
16. Commercial	6	0	0	0	185	0	6	0	179
17. Industrial	1,219	0	0	0	635	34	379	187	33
18. Transport	67	0	0	0	5,836	3,226	1,824	1	0
19. Agriculture	0	0	0	0	1	0	0	1	0
20. Fishing	0	0	0	0	155	18	137	0	0
21. Non-Energy Use	1,081	0	0	0	489	0	0	0	315
22. Total Final Consumption	2,373	0	0	0	7,451	3,279	2,346	189	678
ELECTRICITY OUTPUT									
Main Activity Producer									
Gross Electricity Generation - GWh	17,037	0	0	0	444	0	167	277	0
Autoproducer									
Gross Electricity Generation - GWh	1,129	0	0	0	53	0	53	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 2015.

Note : Total may not necessarily add up due to rounding

				COAL & COKE	HYDRO POWER	SOLAR	BIOMASS	BIOGAS	BIODIESEL	ELECTRICITY	TOTAL
KEROSENE	ATF & AV GAS	NON-ENERGY	REFINERY GAS								
0	0	0	0	423	865	19	50	4	208	0	24,217
0	0	0	0	0	0	0	0	0	0	0	-597
0	120	75	0	3,980	0	0	0	0	0	0	11,362
-9	-100	-660	0	-26	0	0	0	0	-96	-0	-12,257
0	0	-0	0	0	0	0	0	0	0	0	-96
1	-52	-43	0	151	0	0	0	0	-15	0	249
0	0	0	0	3	0	0	0	0	0	0	75
-8	-32	-628	0	4,532	865	19	50	4	97	0	22,953
0	0	0	0	0	0	0	0	0	0	0	-1,765
10	0	63	0	0	0	0	0	0	0	0	-110
0	0	0	0	0	0	0	0	0	0	0	-191
10	0	63	0	0	0	0	0	0	0	0	-2,066
0	811	886	28	0	0	0	0	0	0	0	-111
0	0	0	0	0	-865	0	0	0	0	323	-543
0	0	0	0	-4,097	0	-19	-19	-4	0	2,846	-5,352
0	0	0	0	0	0	0	-31	0	0	111	-403
0	0	0	0	-4,097	-865	-19	-50	-4	0	3,280	-6,298
0	0	-139	-28	0	0	0	0	0	0	-349	-1,275
-2	6	-8	0	0	0	0	0	0	0	-48	38
9	817	802	0	-4,097	-865	-19	-50	-4	0	2,883	-9,712
0	0	0	0	0	0	0	0	0	0	631	781
0	0	0	0	0	0	0	0	0	0	933	1,124
1	0	0	0	435	0	0	0	0	0	1,305	3,594
0	785	0	0	0	0	0	0	0	97	5	6,005
0	0	0	0	0	0	0	0	0	0	11	11
0	0	0	0	0	0	0	0	0	0	0	155
0	0	174	0	0	0	0	0	0	0	0	1,570
1	785	174	0	435	0	0	0	0	97	2,884	13,240
0	0	0	0	16,426	3,751	68	67	16	0	0	37,808
0	0	0	0	0	0	0	110	0	0	0	1,293

Table 33: Energy Balance Table in Fourth Quarter (4Q) of 2015 (kilo tonnes of oil equivalent)

COMMERCIAL ENERGY BALANCE FOR MALAYSIA QUARTER 4 2015 (THOUSAND TONNES OF OIL EQUIVALENT)									
ENERGY SOURCE	NATURAL GAS	LNG	CRUDE OIL (1/)	OTHERS (2/)	TOTAL PETROLEUM PRODUCTS	PETROLEUM PRODUCTS			
						PETROL	DIESEL	FUEL OIL	LPG
PRIMARY SUPPLY									
1. Primary Production	15,879	0	8,044	0	0	0	0	0	0
2. Gas Flaring, Reinjection & Use	-659	0	0	0	0	0	0	0	0
3. Imports	1,502	415	1,635	3	4,430	1,912	2,119	107	12
4. Exports	-272	-7,302	-4,590	-5	-2,538	-6	-1,787	-174	-80
5. Bunkers	0	0	0	0	-101	0	-1	-101	0
6. Stock Change	0	0	-108	0	295	236	-26	23	48
7. Statistical Discrepancy	0	0	234	0	0	0	0	0	0
8. Primary Supply	16,450	-6,886	5,215	-2	2,086	2,142	305	-144	-20
TRANSFORMATION									
9. Gas Plants									
9.1 MLNG	-9,477	7,289	0	0	12	0	0	0	12
9.2 MDS	-145	0	0	0	106	0	31	0	0
9.3 GPP-LPG (3&4/)	-466	0	0	0	253	0	0	0	253
Subtotal	-10,088	7,289	0	0	371	0	31	0	265
10. Refineries	0	0	-5,112	2	5,011	650	2,278	349	133
11. Power Stations & Self-Generation									
11.1 Hydro Stations	0	0	0	0	0	0	0	0	0
11.2 Thermal Stations	-3,270	-415	0	0	-88	0	-69	-19	0
11.3 Self-Generation (5/)	-379	0	0	0	-16	0	-16	0	0
Subtotal	-3,649	-415	0	0	-104	0	-85	-19	0
12. Losses & Own Use	-378	12	-103	0	-540	0	0	-6	0
13. Statistical Discrepancy	-0	0	0	0	181	324	-44	-72	8
14. Secondary Supply	-14,115	6,886	-5,215	2	4,919	974	2,179	252	406
FINAL USE									
15. Residential	0	0	0	0	206	0	0	0	206
16. Commercial	6	0	0	0	183	0	34	0	149
17. Industrial	1,219	0	0	0	580	41	400	107	31
18. Transport	61	0	0	0	5,555	3,056	1,720	0	0
19. Agriculture	0	0	0	0	188	0	187	1	0
20. Fishing	0	0	0	0	161	19	142	0	0
21. Non-Energy Use	1,049	0	0	0	131	0	0	0	0
22. Total Final Use	2,335	0	0	0	7,005	3,116	2,485	108	386
ELECTRICITY OUTPUT									
Main Activity Producer									
Gross Electricity Generation - GWh	15,634	0	0	0	310	0	110	200	0
Autoproducer									
Gross Electricity Generation - GWh	1,107	0	0	0	53	0	53	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 2015.

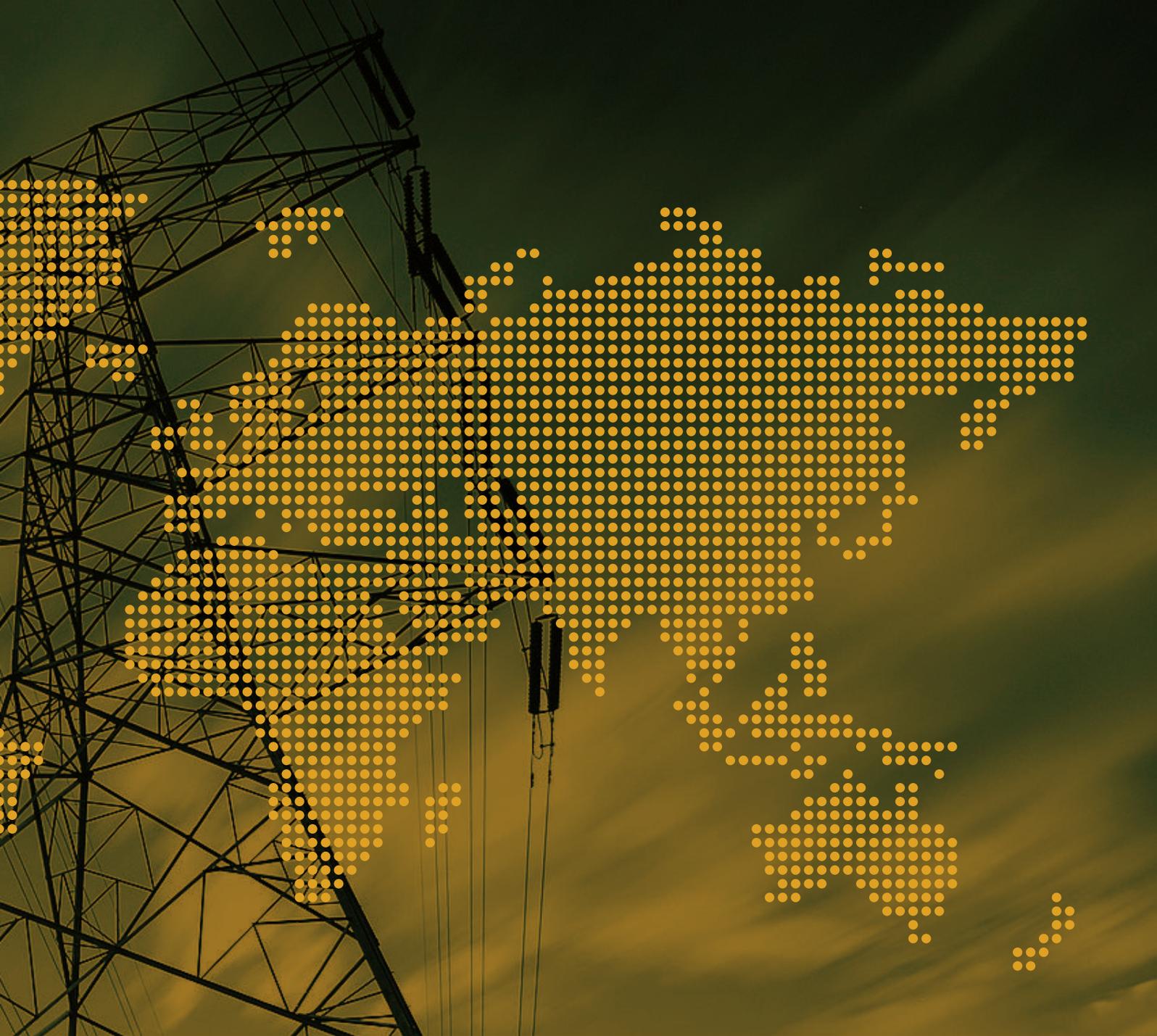
Note : Total may not necessarily add up due to rounding

				COAL & COKE	HYDRO POWER	SOLAR	BIOMASS	BIOGAS	BIODIESEL	ELECTRICITY	TOTAL
KEROSENE	ATF & AV GAS	NON-ENERGY	REFINERY GAS								
0	0	0	0	406	965	20	52	5	155	0	25,525
0	0	0	0	0	0	0	0	0	0	0	-659
0	212	68	0	4,005	0	0	0	0	0	0	11,990
-15	-145	-330	0	-53	0	0	0	0	-22	-0	-14,782
0	0	-0	0	0	0	0	0	0	0	0	-101
3	44	-33	0	119	0	0	0	0	-36	0	270
0	0	0	0	-113	0	0	0	0	0	0	121
-13	112	-296	0	4,363	965	20	52	5	97	0	22,365
0	0	0	0	0	0	0	0	0	0	0	-2,176
11	0	65	0	0	0	0	0	0	0	0	-39
0	0	0	0	0	0	0	0	0	0	0	-213
11	0	65	0	0	0	0	0	0	0	0	-2,428
3	605	944	49	0	0	0	0	0	0	0	-99
0	0	0	0	0	-965	0	0	0	0	357	-608
0	0	0	0	-3,927	0	-20	-20	-5	0	2,735	-5,009
0	0	0	0	0	0	0	-32	0	0	109	-318
0	0	0	0	-3,927	-965	-20	-52	-5	0	3,202	-5,935
0	0	-485	-49	0	0	0	0	0	0	-245	-1,253
-1	63	-98	0	0	0	0	0	0	0	-82	98
14	668	426	0	-3,927	-965	-20	-52	-5	0	2,875	-9,617
0	0	0	0	0	0	0	0	0	0	610	816
0	0	0	0	0	0	0	0	0	0	930	1,120
1	0	0	0	436	0	0	0	0	0	1,318	3,554
0	779	0	0	0	0	0	0	0	97	6	5,720
0	0	0	0	0	0	0	0	0	0	10	198
0	0	0	0	0	0	0	0	0	0	0	161
0	0	131	0	0	0	0	0	0	0	0	1,180
1	779	131	0	436	0	0	0	0	97	2,875	12,748
0	0	0	0	16,684	4,152	68	67	16	0	0	36,931
0	0	0	0	0	0	0	110	0	0	0	1,270



07.

Energy Flow Chart



Energy Flow Chart

Primary Supply

PRIMARY SUPPLY*			
Natural Gas	39,364	43.6%	
Crude Oil	24,971	27.7%	
Coal and Coke	17,406	19.3%	
Petroleum Products & Others	4,194	4.7%	
Hydropower	3,582	4.0%	
Renewables	671	0.7%	
Total	90,188	100.0%	

IMPORTS			
Coal and Coke	16,051	34.5%	
Petroleum Products	14,218	30.6%	
Crude Oil & Others	8,393	18.1%	
Natural Gas & LNG	7,814	16.8%	
Total	46,477	100.0%	

PRIMARY PRODUCTION			
Natural Gas	62,119	61.7%	
Crude Oil	32,440	32.2%	
Hydropower	3,582	3.6%	
Coal and Coke	1,614	1.6%	
Renewables	966	1.0%	
Total	100,721	100.0%	

EXPORTS			
LNG	27,057	49.4%	
Crude Oil & Others	16,114	29.4%	
Petroleum Products	10,220	18.7%	
Natural Gas	1,062	1.9%	
Renewables	182	0.3%	
Coal and Coke	156	0.3%	
Total	54,791	100.0%	

Transformation

GAS PLANT INPUT			
LNG	35,635		
GPP	1,826		
MDS	862		

GAS PLANT OUTPUT			
LNG	27,634		
LPG	1,155		
Non-Energy	262		
Diesel	118		
LPG (from LNG)	49		
Kerosene	44		

OIL REFINERIES INPUT			
LOCAL	17,249		
IMPORT	7,327		

OIL REFINERIES OUTPUT			
Diesel	9,890		
Petrol	5,031		
Non-Energy	3,869		
ATF & AV GAS	2,841		
Fuel Oil	1,692		
Refinery Gas	172		
Kerosene	6		

POWER STATIONS & SELF GENERATION INPUT			
Natural Gas	16,990		
Coal and Coke	15,627		
Hydro	3,582		
Renewables	389		
Diesel	330		
Fuel Oil	101		

POWER STATIONS & SELF GENERATION OUTPUT			
Thermal	11,047		
Hydro	1,346		
Self-Generation	317		

Final Use

FINAL USE BY SECTOR			
Transport	23,435	45.2%	
Industry	13,989	27.0%	
Non-Energy Use	5,928	11.4%	
Commercial	4,449	8.6%	
Residential	3,110	6.0%	
Fishery	664	1.3%	
Agriculture	231	0.4%	
Total	51,806	100.0%	

FINAL USE BY FUEL			
Petroleum Products	29,087	56.1%	
Electricity	11,375	22.0%	
Natural Gas	9,566	18.5%	
Coal and Coke	1,778	3.4%	
Total	51,806	100.0%	

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



08.

Manufacturing Industry in Peninsular Malaysia

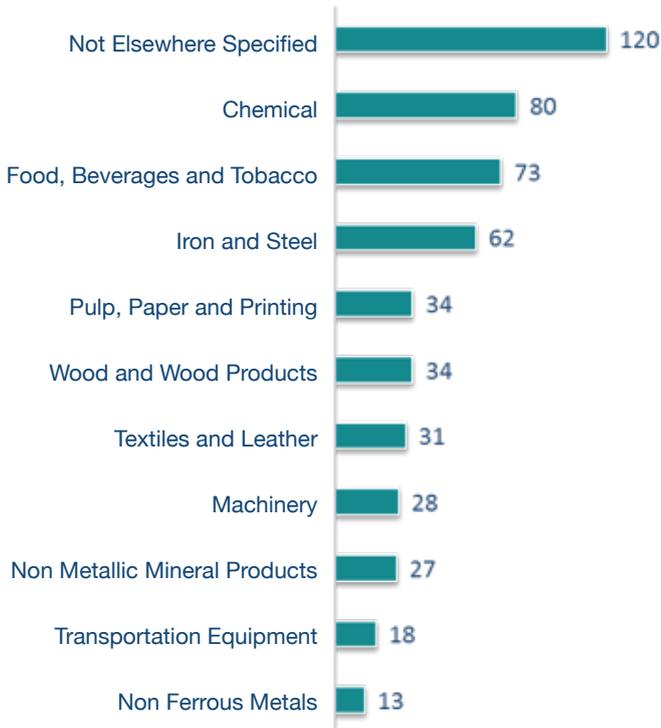


Introduction

CONDUCTED
with
520
manufacturing
companies in
**Peninsular
Malaysia**

A survey was conducted with 520 manufacturing companies in Peninsular Malaysia to understand the energy consumption pattern of manufacturing industry in Peninsular Malaysia. Monthly data of energy consumption was collected for the year 2010 to 2013 for eight types of energy; electricity, natural gas, petrol, diesel, fuel oil, LPG, kerosene and coal. Manufacturing industry sub-sectors included are; Iron and Steel, Chemical (including Petro-Chemical), Non Ferrous Metals, Non Metallic Mineral Products, Transportation Equipment, Machinery, Food, Beverages and Tobacco, Pulp, Paper and Printing, Wood and Wood Products, Textiles and Leather and Not Elsewhere Specified (Industry). This is in accordance to the breakdown of the manufacturing sub-sectors by the International Energy Agency (IEA) and APEC format of classification of the industrial sector. The gathered data on energy consumption in the manufacturing industry will then be an input to the National Energy Balance (NEB).

Manufacturing Sub-Sectors



Location of Manufacturing Companies

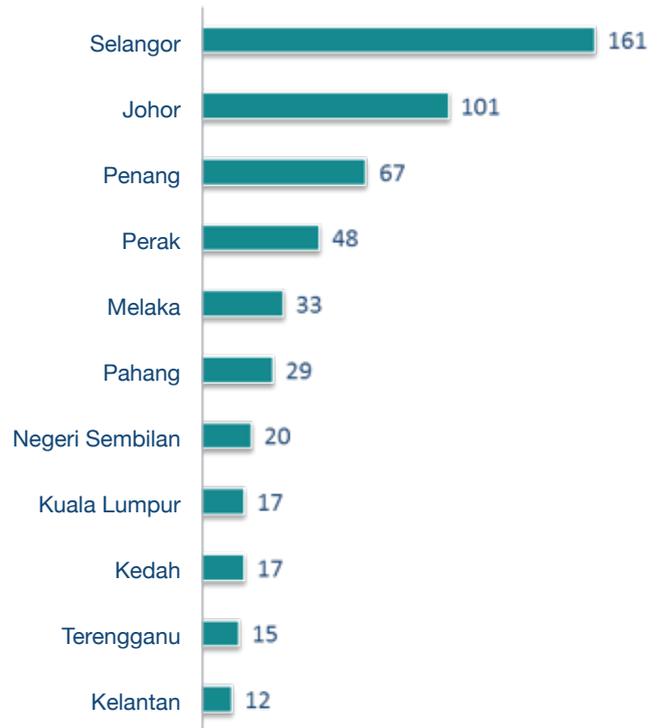


Table 34: Final Energy Consumption by Sub-Sectors in Manufacturing Sector, 2010

YEAR: 2010 / UNIT: KTOE	NATURAL GAS	PETROL	DIESEL	FUEL OIL	LPG	KEROSENE	COAL & COKE	ELECTRICITY	TOTAL
Iron and Steel	1,463	-	363	59	143	-	-	558	2,586
Chemical	378	21	132	68	7	-	-	470	1,077
Non Ferrous Metals	20	-	-	-	-	-	-	277	297
Non Metallic Mineral Products	114	-	65	71	-	-	1,716	514	2,480
Transportation Equipment	29	-	407	-	1	5	-	241	682
Machinery	2	24	35	-	-	-	-	127	188
Food, Beverages and Tobacco	1,227	15	32	9	1	-	-	196	1,481
Pulp, Paper and Printing	192	7	154	-	-	-	-	504	857
Wood and Wood Products	40	3	61	89	-	-	-	234	426
Textiles and Leather	132	4	206	7	2	-	-	255	606
Not Elsewhere Specified	50	3	8	24	60	-	-	292	437
Total	3,646	76	1,465	326	214	5	1,716	3,669	11,117

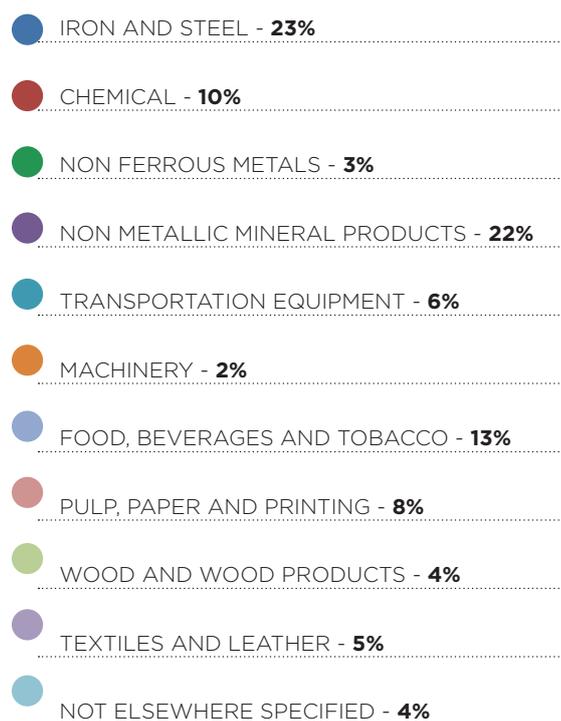
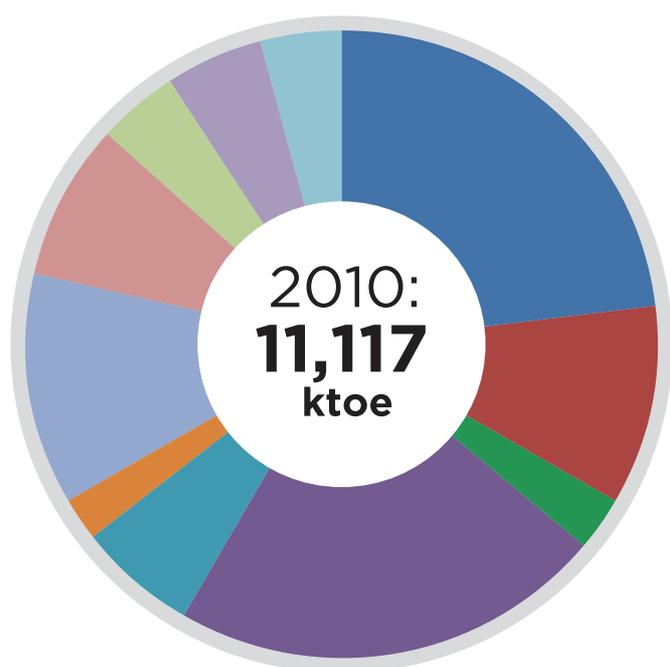


Table 35: Final Energy Consumption by Sub-Sectors in Manufacturing Sector, 2011

YEAR: 2011 / UNIT: KTOE	NATURAL GAS	PETROL	DIESEL	FUEL OIL	LPG	KEROSENE	COAL & COKE	ELECTRICITY	TOTAL
Iron and Steel	1,673	-	230	34	121	-	-	559	2,617
Chemical	429	37	88	62	6	-	-	501	1,125
Non Ferrous Metals	57	-	-	-	-	-	-	296	353
Non Metallic Mineral Products	126	-	45	59	-	-	1,565	525	2,320
Transportation Equipment	45	-	296	-	2	8	-	243	593
Machinery	2	43	19	-	-	-	-	125	188
Food, Beverages and Tobacco	1,347	27	16	10	1	-	-	204	1,605
Pulp, Paper and Printing	150	13	61	-	-	-	-	539	763
Wood and Wood Products	56	6	40	74	-	-	-	215	390
Textiles and Leather	151	8	91	6	1	-	-	275	533
Not Elsewhere Specified	62	8	5	20	69	-	-	311	474
Total	4,099	141	890	264	200	8	1,565	3,794	10,961

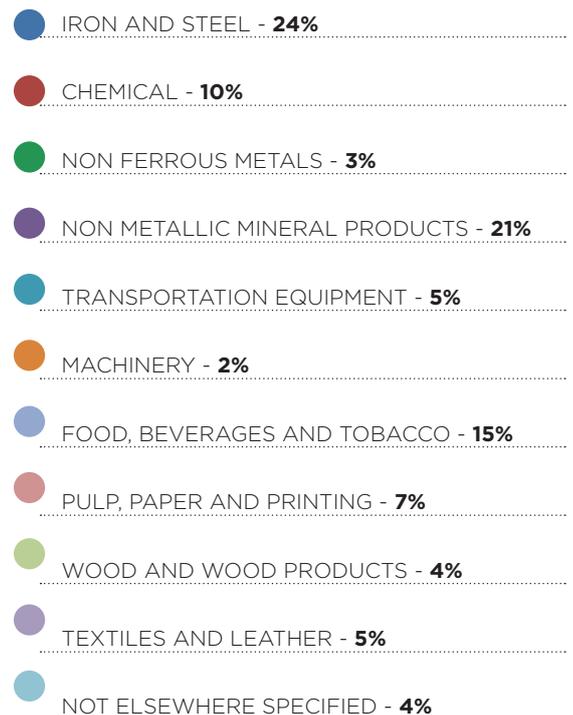
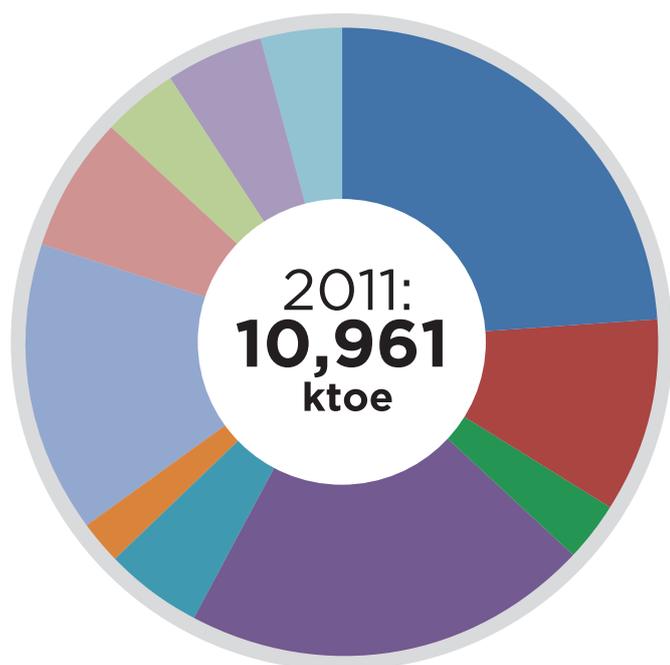


Table 36: Final Energy Consumption by Sub-Sectors in Manufacturing Sector, 2012

YEAR: 2012 / UNIT: KTOE	NATURAL GAS	PETROL	DIESEL	FUEL OIL	LPG	KEROSENE	COAL & COKE	ELECTRICITY	TOTAL
Iron and Steel	1,724	-	337	50	84	-	-	576	2,770
Chemical	511	53	132	160	4	-	-	520	1,380
Non Ferrous Metals	107	-	-	-	-	-	-	294	401
Non Metallic Mineral Products	114	-	66	123	-	-	1,589	543	2,435
Transportation Equipment	51	-	461	-	1	12	-	267	792
Machinery	2	65	31	-	-	-	-	138	236
Food, Beverages and Tobacco	1,416	26	31	22	1	-	-	212	1,708
Pulp, Paper and Printing	191	20	113	-	-	-	-	546	871
Wood and Wood Products	56	8	43	154	-	-	-	220	482
Textiles and Leather	141	10	99	13	1	-	-	265	528
Not Elsewhere Specified	64	6	10	42	26	-	-	322	471
Total	4,379	188	1,322	564	117	12	1,589	3,903	12,073

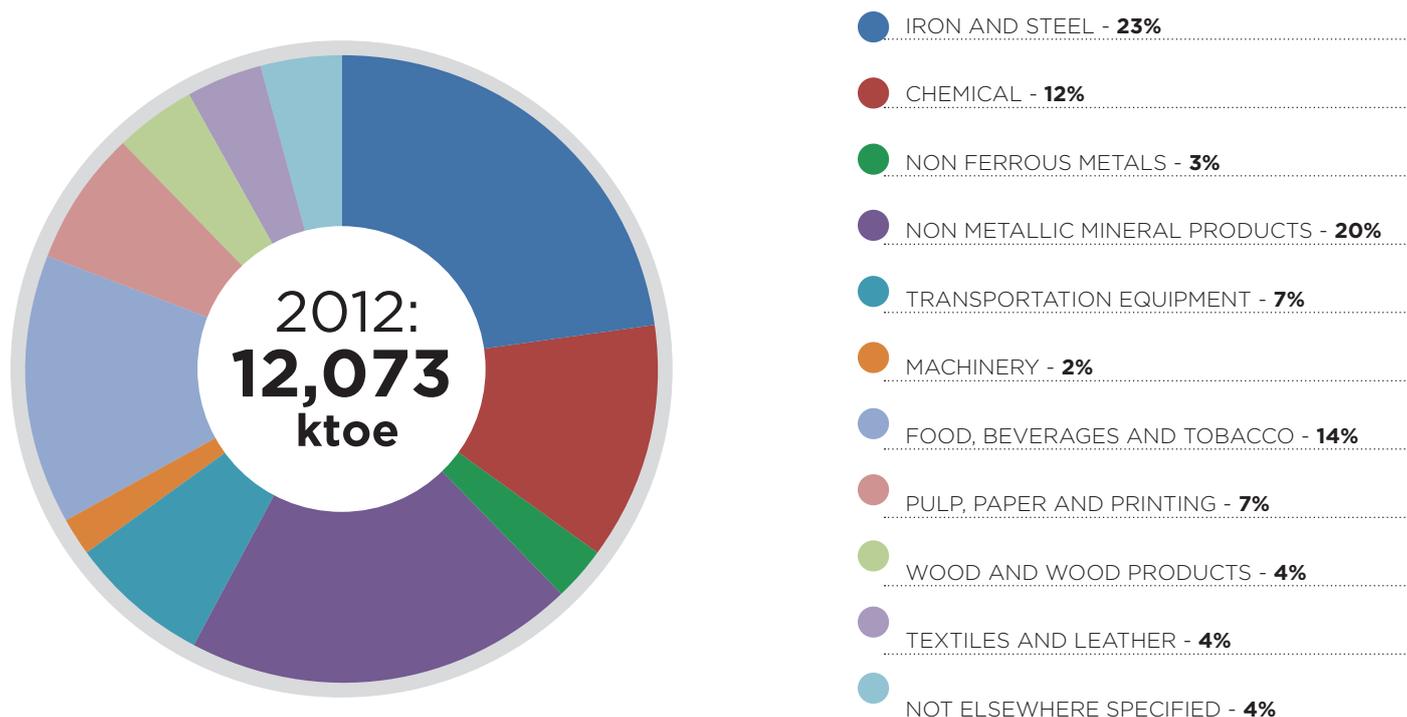


Table 37: Final Energy Consumption by Sub-Sectors in Manufacturing Sector, 2013

YEAR: 2013 / UNIT: KTOE	NATURAL GAS	PETROL	DIESEL	FUEL OIL	LPG	KEROSENE	COAL & COKE	ELECTRICITY	TOTAL
Iron and Steel	1,702	-	402	22	107	-	-	612	2,845
Chemical	568	64	157	67	6	-	-	536	1,397
Non Ferrous Metals	74	-	-	-	-	-	-	303	377
Non Metallic Mineral Products	116	-	59	52	-	-	1,387	560	2,173
Transportation Equipment	55	-	528	-	1	13	-	271	869
Machinery	3	69	36	-	-	-	-	150	258
Food, Beverages and Tobacco	1,429	60	37	11	2	-	-	220	1,758
Pulp, Paper and Printing	128	21	90	-	-	-	-	443	682
Wood and Wood Products	17	7	49	29	-	-	-	280	381
Textiles and Leather	143	12	41	6	1	-	-	270	473
Not Elsewhere Specified	61	8	15	18	30	-	-	335	467
Total	4,296	240	1,414	204	145	13	1,387	3,979	11,679

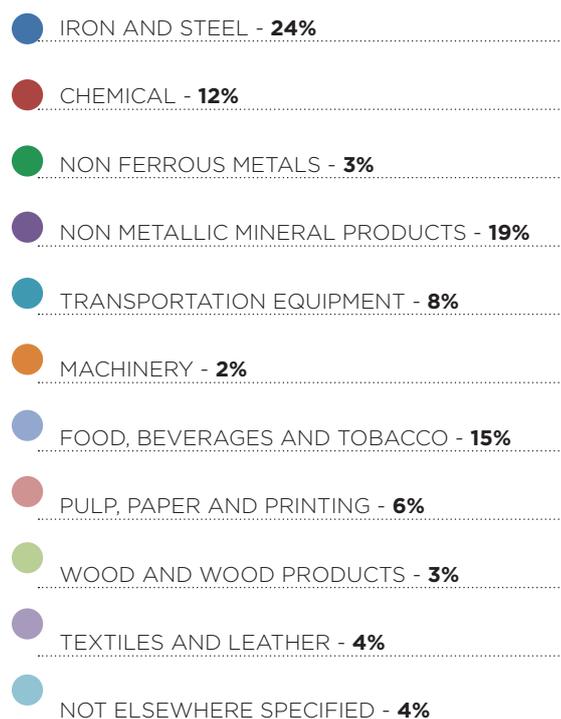
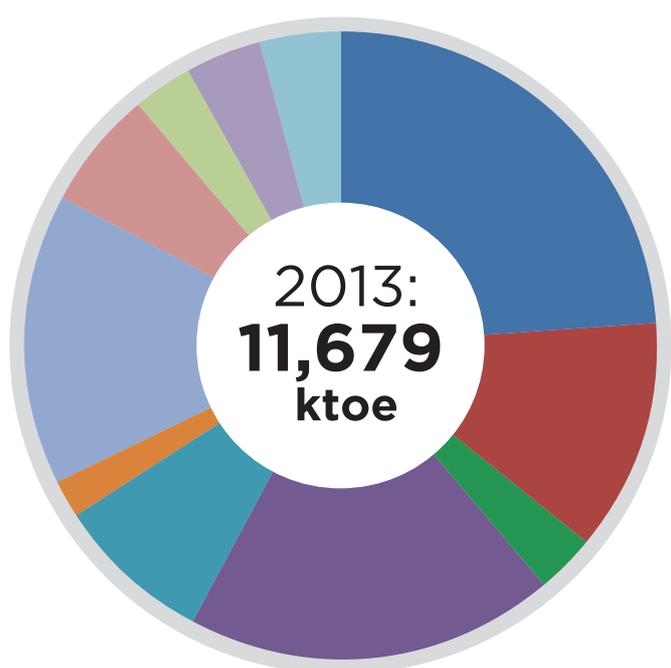


Table 38: Final Energy Consumption by Sub-Sectors in Manufacturing Sector, 2014

YEAR: 2014 / UNIT: KTOE	NATURAL GAS	PETROL	DIESEL	FUEL OIL	LPG	KEROSENE	COAL & COKE	ELECTRICITY	TOTAL
Iron and Steel	1,849	-	174	25	78	-	-	619	2,744
Chemical	617	65	68	73	4	-	-	542	1,368
Non Ferrous Metals	80	-	-	-	-	-	-	306	386
Non Metallic Mineral Products	126	-	25	57	-	-	1,541	566	2,315
Transportation Equipment	60	-	229	-	0	10	-	274	574
Machinery	3	69	16	-	-	-	-	152	239
Food, Beverages and Tobacco	1,552	60	16	12	1	-	-	222	1,863
Pulp, Paper and Printing	139	21	39	-	-	-	-	448	647
Wood and Wood Products	18	7	21	31	-	-	-	283	361
Textiles and Leather	156	12	18	7	1	-	-	273	465
Not Elsewhere Specified	66	8	6	20	22	-	-	339	461
Total	4,665	241	614	225	106	10	1,541	4,023	11,424

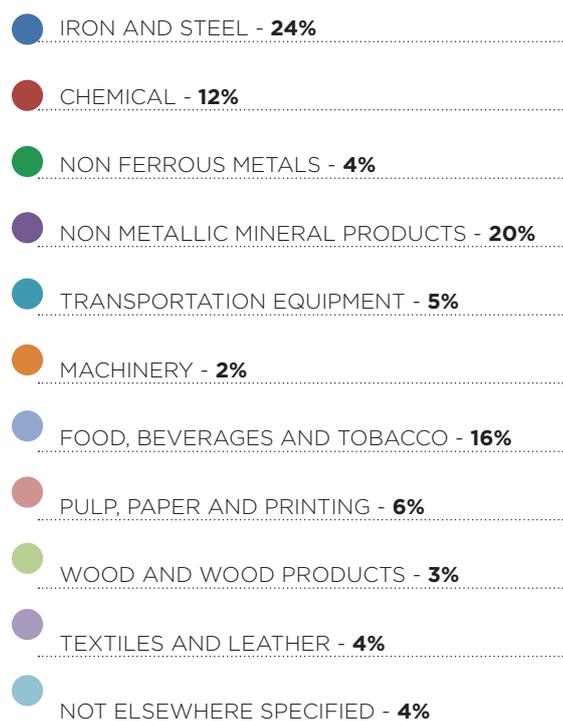
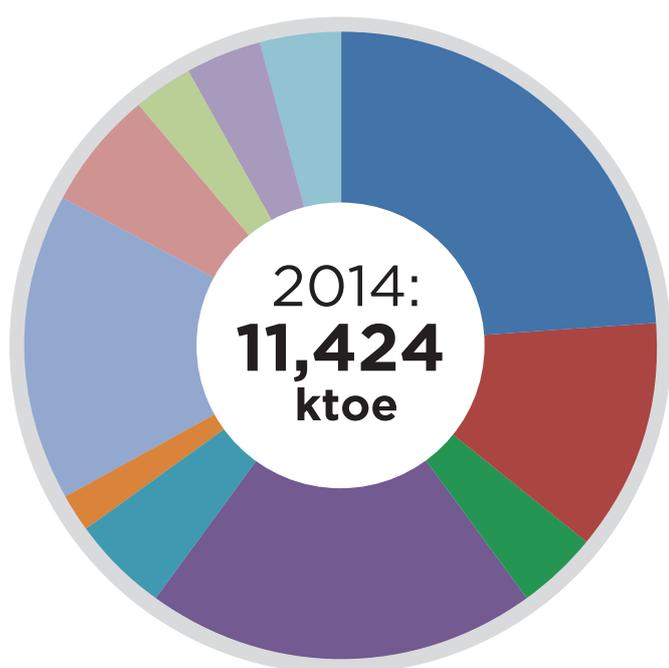
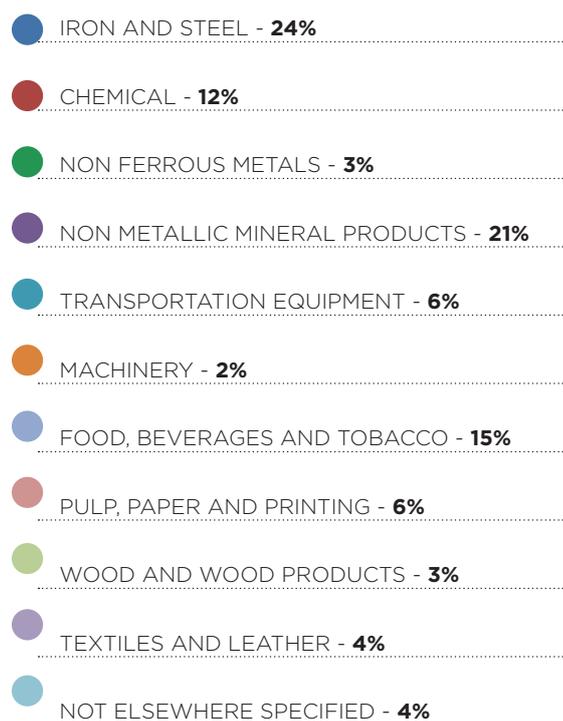
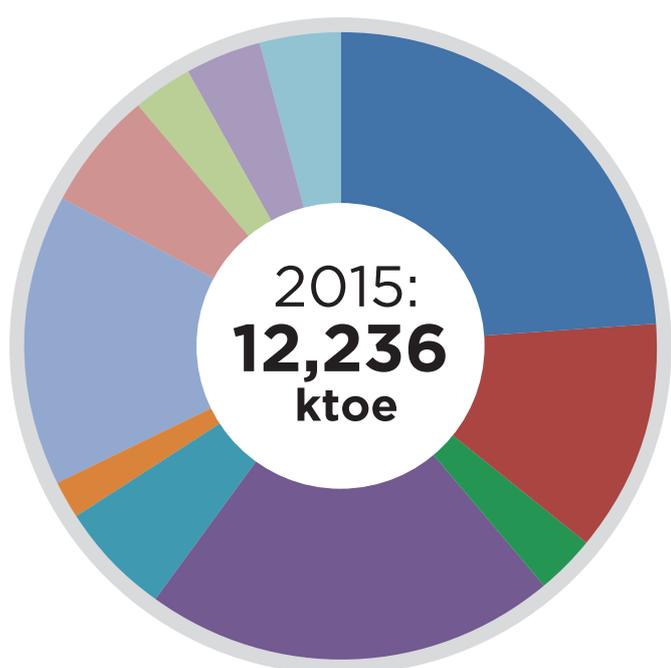


Table 39: Final Energy Consumption by Sub-Sectors in Manufacturing Sector, 2015

YEAR: 2015 / UNIT: KTOE	NATURAL GAS	PETROL	DIESEL	FUEL OIL	LPG	KEROSENE	COAL & COKE	ELECTRICITY	TOTAL
Iron and Steel	1,845	-	299	51	80	-	-	629	2,905
Chemical	615	44	117	152	4	-	-	551	1,483
Non Ferrous Metals	80	-	-	-	-	-	-	312	391
Non Metallic Mineral Products	125	-	44	118	-	-	1,693	576	2,556
Transportation Equipment	60	-	393	-	0	3	-	279	736
Machinery	3	47	27	-	-	-	-	154	231
Food, Beverages and Tobacco	1,549	41	28	24	1	-	-	226	1,868
Pulp, Paper and Printing	139	14	67	-	-	-	-	456	676
Wood and Wood Products	18	5	36	65	-	-	-	288	413
Textiles and Leather	155	8	31	14	1	-	-	277	486
Not Elsewhere Specified	66	5	11	41	23	-	-	345	491
Total	4,656	164	1,052	465	110	3	1,693	4,093	12,236





09.

Residential Sector in Peninsular Malaysia



Introduction

Energy Commission has successfully conducted a survey with 2,000 households in Peninsular Malaysia with the aim to have an in-depth understanding of energy consumption pattern within households. There are many variables and factors that affect a household's energy consumption of which were not properly identified before. This survey enabled us to have a better view of where, when and how the energy is consumed within households.

The number of samples is calculated based on the actual number of households in Malaysia. Hence, 2,000 households were selected across Peninsular Malaysia for this survey. The samples were broken down to four (4) main regions, namely Central, South, East Coast, and North, and then further broken down to ten (10) types of houses. The energy consumption for each household is categorised into fuel types (natural gas, LPG, kerosene and electricity) and five (5) end-uses as described by the IEA (International Energy Agency).

Overall, electricity, LPG and natural gas are the major form of energy used in households in Peninsular Malaysia, where electricity accounted for more than 80% of energy consumption. Electricity consumption is distributed evenly among the four regions of Peninsular Malaysia, whereas LPG showed a slightly bigger contribution from the central region. In terms of end-uses, appliances have the biggest share in energy consumption, followed by air-conditioning system, cooking, lighting, and water heating. Appliances category covers a wide range of item which explains the high percentage of appliances in household's energy consumption.



2000 households



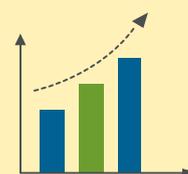
10 types of house



5 end-uses



53 electrical appliances



Historical trend from 2011 to 2014

Table 40: Final Energy Consumption by Aggregated Categories in Residential Sector, 2011

YEAR: 2011 / UNIT: KTOE	NATURAL GAS	LPG	KEROSENE	ELECTRICITY	TOTAL
Space Cooling	-	-	-	242	242
Water Heating	-	-	-	52	52
Lighting	-	-	9	173	181
Cooking	-	693	-	86	779
Appliances	-	-	-	1,173	1,173
Total	-	693	9	1,726	2,427

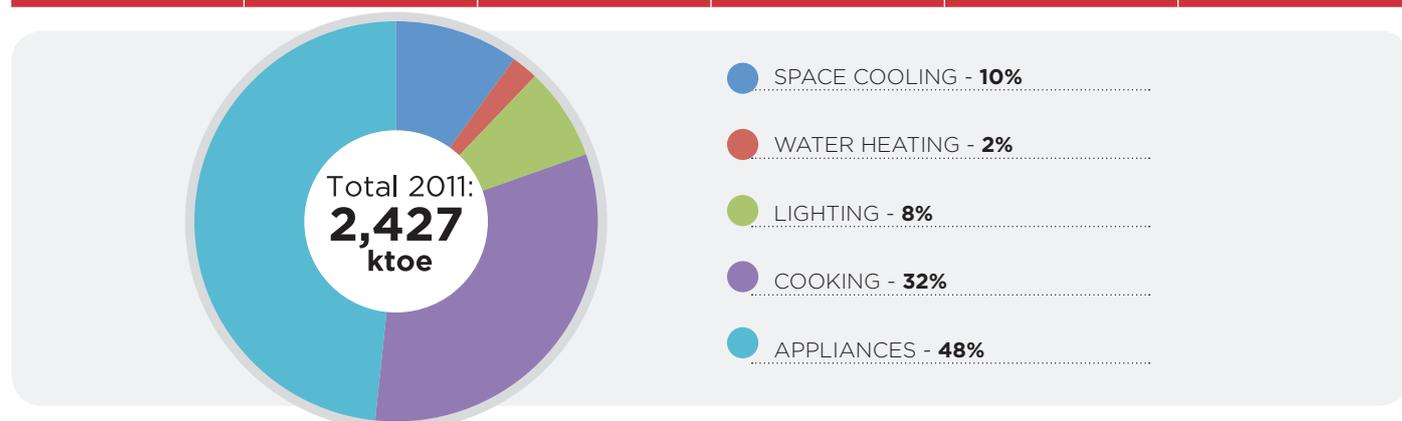


Table 41: Final Energy Consumption by Aggregated Categories in Residential Sector, 2012

YEAR: 2012 / UNIT: KTOE	NATURAL GAS	LPG	KEROSENE	ELECTRICITY	TOTAL
Space Cooling	-	-	-	259	259
Water Heating	-	-	-	56	56
Lighting	-	-	5	185	190
Cooking	1	593	-	93	686
Appliances	-	-	-	1,260	1,260
Total	1	593	5	1,853	2,451

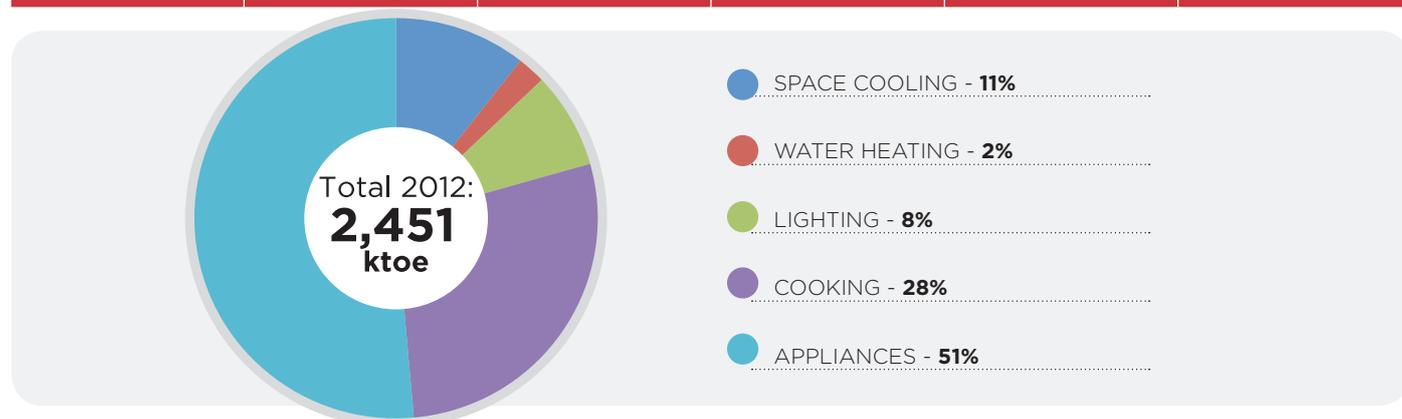
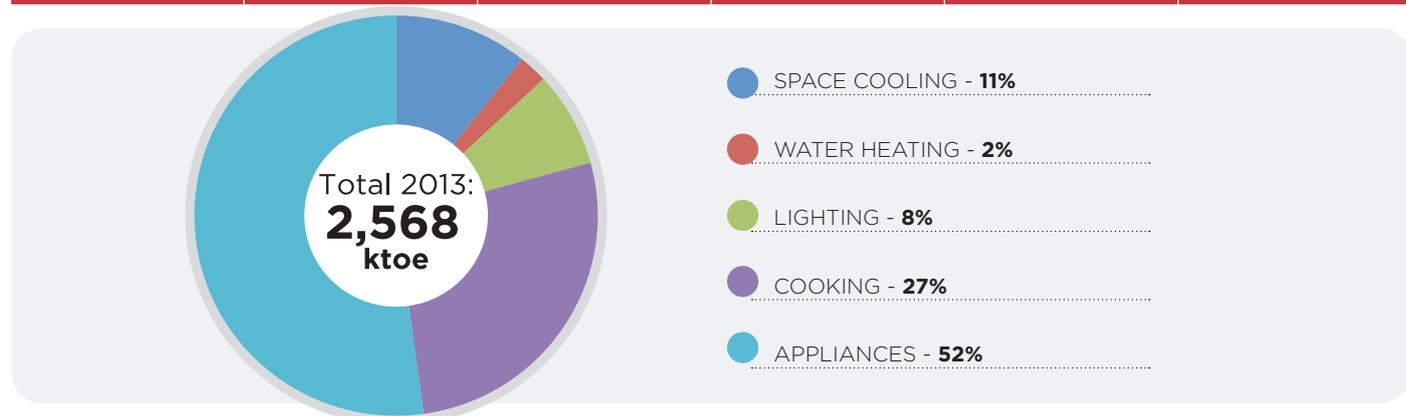


Table 42: Final Energy Consumption by Aggregated Categories in Residential Sector, 2013

YEAR: 2013 / UNIT: KTOE	NATURAL GAS	LPG	KEROSENE	ELECTRICITY	TOTAL
Space Cooling	-	-	-	276	276
Water Heating	-	-	-	59	59
Lighting	-	-	1	197	198
Cooking	1	596	-	99	695
Appliances	-	-	-	1,340	1,340
TOTAL	1	596	1	1,971	2,568

**Table 43: Final Energy Consumption by Aggregated Categories in Residential Sector, 2014**

YEAR: 2014 / UNIT: KTOE	NATURAL GAS	LPG	KEROSENE	ELECTRICITY	TOTAL
Space Cooling	-	-	-	286	286
Water Heating	-	-	-	61	61
Lighting	-	-	4	204	209
Cooking	1	571	-	102	674
Appliances	-	-	-	1,388	1,388
TOTAL	1	571	4	2,041	2,617

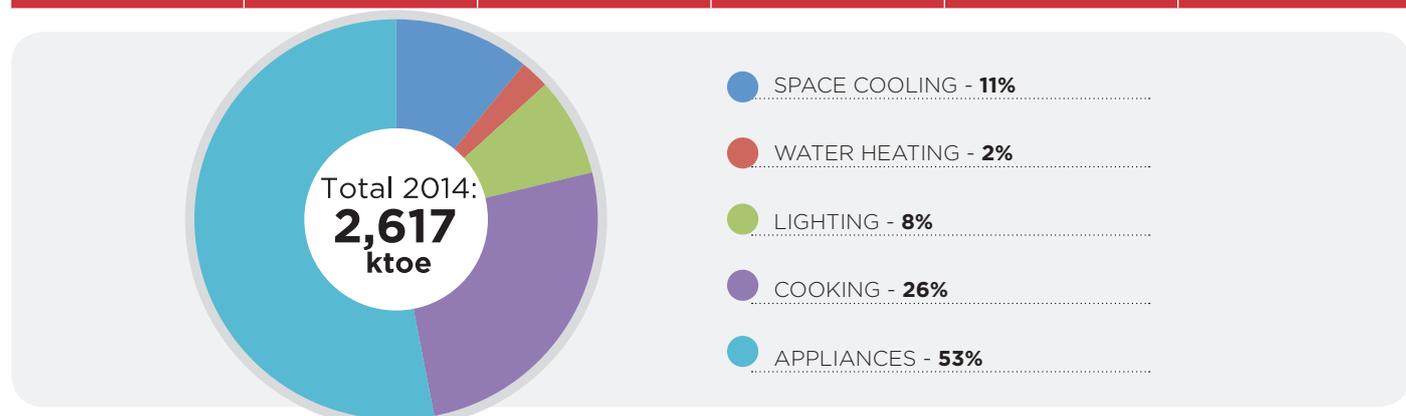
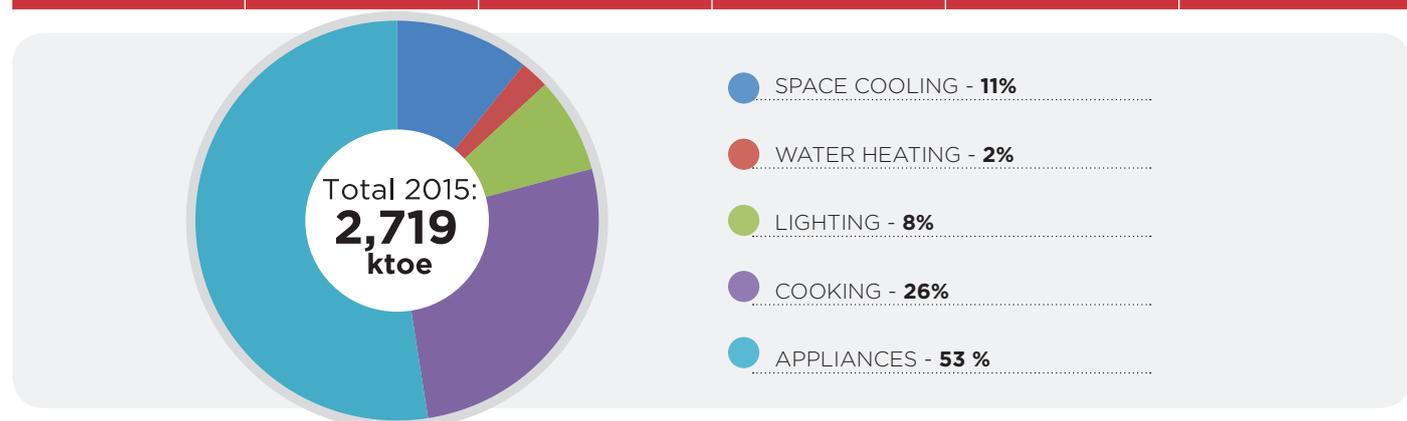


Table 44: Final Energy Consumption by Aggregated Categories in Residential Sector, 2015

YEAR: 2015 / UNIT: KTOE	Natural Gas	LPG	Kerosene	Electricity	Total
Space Cooling	-	-	-	296.24	296
Water Heating	-	-	-	63.48	63
Lighting	-	-	0	211.60	212
Cooking	1	602	-	105.80	708
Appliances	-	-	-	1,438.88	1,439
TOTAL	1	602	0	2,116	2,719



Notes Of Energy Balance

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

ENERGY BALANCE FORMAT

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

Primary Supply	Refers to supply of energy that has not undergone the transformations / conversion process within the country.
Primary Production (1)	Refers to the quantity of fuels extracted. Data for natural gas excludes the amount of reinjected and flared gas. Gross production of hydro is shown in conventional fuel equivalent input.
Gas Flaring, Reinjection & Use (2)	Refers to the quantity of gas flared, reinjected into the gas fields and use for production purpose.
Imports (3) and Exports (4)	Refer to the amount of primary and secondary energy obtained from, or supplied to other countries. In the energy balance format, imports always carry a positive and export a negative sign.
Bunkers (5)	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 industrial consumers. At this stage, however, only oil companies' stock are taken into account. A negative sign indicates net increase while a positive sign indicates net decrease in stocks.
Total	Under primary supply, 'total' is the addition of columns to obtain total availability. Under transformation, 'total' is the addition of columns to obtain transformation and conversion losses.
Gas Plants (9)	Shows the input of natural gas into the lng, mds and gpp-lpg plants and their respective outputs.
Refineries (10), power stations and Co-generation & Private licensees (11)	Show the input of any energy product (negative sign) for the purpose of converting it to one or more secondary products (positive sign).
Losses and Own Use (12)	Refers to losses of electrical energy and natural gas which occur outside the utilities and plants (i.e. Distribution losses) and the consumption of energy by utilities and plants for operating their installation (i.e. Electricity for operating auxiliary equipment and petroleum products used in the crude distillation process respectively). It does not, however, include conversion loss that is accounted for in the 'total' column.
Secondary Supply (14)	Refers to the supply of energy from the transformation process and after deducting the energy sector's own use and losses, including power station use.
Residential and Commercial (15 & 16)	Not only refers to energy used within households and commercial establishments but includes government buildings and institutions.
Industrial (17)	Is a very broad-based sector ranging from manufacturing to mining and construction. Diesel sales through distributors are assumed to be to industrial 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 industrial feedstocks
Final use (22)	Refer to the quantity of energy of all kinds delivered to the final user.

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

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

NOTES ON ELECTRICITY

Reserve Margin	<p>Total capacity margin is defined as the amount of installed generation available over and above system peak load</p> <p>Reserve Margin = $\frac{\text{Installed Capacity} - \text{Peak Consumption}}{\text{Peak Consumption}}$</p>
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 Resources	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 Resources	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 Resources	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

Definition

GDP is a measure of the total value of production of all resident producing units of a country in a specified period, before deducting allowances for consumption of fixed capital. A producing unit is considered as resident in a country if it maintains a centre of economic interest in the economic territory of that country. The economic territory of a country consists of the geographic territory administered by a government within which persons, goods and capital circulate freely. GDP can be measured in three but equivalent ways, namely, the sum of value added the sum of final expenditures and the sum of incomes. In Malaysia, Department of Statistics Malaysia (DOSM) compiles annual GDP estimates by using three approaches namely Production, Expenditure and Income Approach.

Measuring GDP

The sum of value added (or production) based GDP is the sum of the differences between the values of the gross output of resident producing units measured in producers' values and the values of their intermediate consumption measured in purchasers' values plus import duties. The difference between gross output and intermediate consumption is value added. This approach shows the contribution of individual economic activities to the total GDP.

Income based estimates – summing up the incomes generated (i.e salaries and wages, gross operating surplus of enterprises and mixed income generated by households that engage in production)

The sum of final expenditures (expenditure) approach is to sum up the expenditure values of the final users of goods and services measured in purchasers' values, less the c.i.f. values of the import of goods and services. It is calculated by estimating the values of private consumption expenditure, government consumption expenditure, gross fixed capital formation, change in stocks and exports of goods and services, less imports of goods and services. These are termed 'final Consumption' or 'final expenditure' categories.

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:

$$\text{GNI} = \text{GDP} + (\text{FL} - \text{DL}) + \text{NCI}$$

When FL and DL are respectively the foreign and domestic income from labor, and NCI the net capital inflow. For example, if a country A's nominal GDP is \$20,000, the domestic income from labor \$3,000 and the foreign income from labor \$5,000, and the country received a \$10,000 donation from another country's charity organization, the GNI of country A would be \$32,000.

CONVERSION COEFFICIENTS AND EQUIVALENCE

TTJ/1000 Tonnes ¹			
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/Industrial Spirit	43.2078
Liquefied Petroleum Gas (LPG)	45.5440	Lubricants	42.1401
Petrol	43.9614	Bitumen (Asphalt)	41.8000
Natural Gasoline	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 from 150°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 partly refined light distillate, which is further, blended into motor gasoline or used as feed-stock in the chemical industry. Bitumen is a viscous liquid or solid, non-volatile and possesses waterproofing and adhesive properties. Lubricating oil is used for lubricating purposes and has distillation range within 380°C to 500°C.
Refinery Gas	The gas released during the distillation of crude oil and comprises methane, ethane, propane and butane. Most refinery gas is retained in the refinery and used as fuel in plant operations.
Coal and Coke	Solid fuels consisting essentially of carbon, hydrogen, oxygen sulphur. Coal in the energy balances is mainly bituminous coal (medium grade in terms of energy content) and some anthracite (high quality hard coal). Coke is obtained from coal by heating at high temperature in the absence of air.
Hydropower	Is the inferred primary energy available for electricity production and is shown in terms of conventional fossil fuel equivalent using the average thermal efficiency of conversion for the year, i.e. the hypothetical amount of fossil fuel, which would be needed to produce the same amount of electricity in existing thermal power plants.
Electricity Production	Production of electricity refers to production from public utilities as well as independent power producers (IPPs) and private installations & co-generation plants which obtain licenses from the Electricity Supply and Market Regulation Department. Figures for 'fuel input' into power stations & co-generation plants were only available for TNB, SEB, SESB, IPPs as well as GDC Sdn Bhd. Estimates were made using average conversion efficiency to obtain the fuel input into private installations.

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