Suruhanjaya Tenaga
Energy Commission

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NATIONAL ENERGY BALANCE 2022

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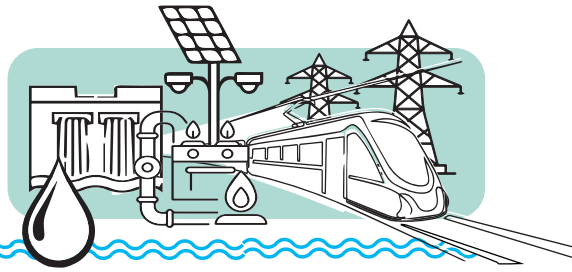

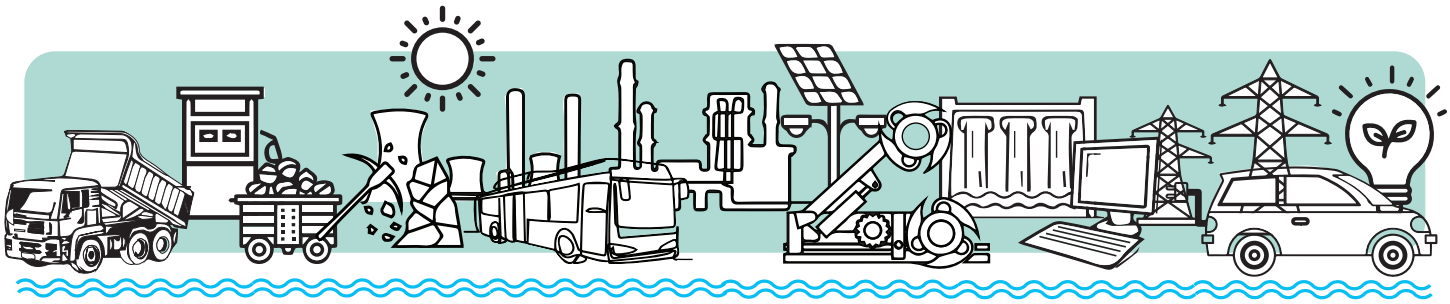

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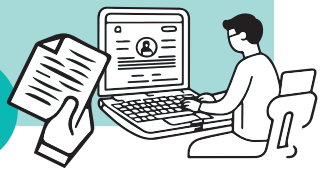

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Preface

Reliable energy data and statistics are crucial for policy and decision making in the country. Looking into the importance of energy data, the Energy Commission of Malaysia has taken the leading role to be the focal point for the compilation of energy data in Malaysia. As we are all aware, energy itself covers all types of sources and is not limited only to electricity and piped gas, but we managed to meet our goal to collect, compile and publish Malaysia's energy data within the stipulated timeline. The coverage or boundary of the energy sector in Malaysia needs to be as holistic as possible so that it will not only represent the Peninsular but also includes the Sabah and Sarawak region. The inclusivity of all Malaysian regions requires full commitment and support from all stakeholders in order to ensure the accuracy and timeliness of the data presented.

The National Energy Balance (NEB) is a publication with graphs and tabulated formats on data and statistics regarding the energy supply, transformation and final consumption for Malaysia for the period of 2005 to 2022 whereas the entire historical timeline from 1990 onwards can be found on the MyEnergyStats portal. NEB serves the nation with a reference and a set variable energy data to accommodate the needs for policy makers and researchers as well as the public to get to know more about the balance of energy in the country. A full supply chain of each energy available in Malaysia is represented in tables and graphs according to their specialty formats. The parameters that are available in NEB are widely used by other countries and follow international standards and classifications.

This comprehensive energy-data effort strengthens the Malaysia MADANI economic agenda, which is grounded in sustainability and innovation, and underpins national green growth strategies such as the National Energy Transition Roadmap (NETR). By providing transparent, standardized, and comprehensive data, the NEB enables evidence-based policy formulation that supports Malaysia's shift toward cleaner and more efficient energy systems. It empowers policymakers to monitor energy intensity, track carbon emissions, and evaluate the progress of renewable energy adoption—critical components of the country's low-carbon ambitions. The data from NEB is being used to produce the Biennial Transparency Report (BTR) for providing information on Greenhouse Gas (GHG) emissions for the energy sector. The BTR is a key reporting requirement for countries under the Enhanced Transparency Framework (ETF) established by the Paris Agreement to be submitted to UNFCCC as the official national data for climate change. Furthermore, the development of the SDG7 parameter is derived from the NEB data that was published by the Commission.

The NEB data is also being shared among other international agencies such as United Nations Statistics Division (UNSD), International Energy Agency (IEA), International Renewable Energy Agency (IRENA), Asia Pacific Energy Research Centre (APERC) and ASEAN Centre for Energy (ACE) to support our commitment in cooperating with international and regional organisations to develop potential regional energy policy such as the World Energy Outlook, APEC Energy Outlook and ASEAN Energy Outlook where the NEB will serve as a reference. This collaboration will benefit us in return through other related energy data analysis especially if it is related to our country.

On behalf of the Commission, I wish to express my utmost appreciation and thanks to all data providers for your invaluable data contributions all these years, making possible the publication of the NEB 2022 report.

Thank you.

Tan Sri Shamsul Azri bin Abu Bakar
Chairman of Energy Commission
Malaysia

Introduction

The National Energy Balance 2022 (NEB 2022) which was documented by the Energy Commission of Malaysia provides a comprehensive overview of Malaysia's energy production, consumption, and trade across various energy sources, including oil, natural gas, coal and renewables. This report offers crucial insights into Malaysia's energy dynamics, covering everything from primary energy supply to final energy consumption by sector and fuel type. It reflects Malaysia's reliance on fossil fuels while indicating the country's steps toward renewable energy integration and energy security.

In 2022, Malaysia's energy sector experienced significant developments, driven by its reliance on various energy sources and a focus on achieving a balance in supply and consumption. The country's primary energy supply, recorded at approximately 104,566 kilotons of oil equivalent (ktoe), reflected an emphasis on maintaining an adequate supply for domestic demand. This supply was influenced by factors including imports, exports, and changes in stock levels, contributing to a stable energy balance despite external market fluctuations and local energy demands. Electricity generation remained a central component of Malaysia's energy landscape, with a total generation of about 192,455 GWh across the nation. Peninsular Malaysia accounted for the bulk of this output, contributing 148,895 GWh, while Sabah and Sarawak produced smaller but substantial portions. The peak electricity demand and reserve margins varied across regions, with the Peninsular maintaining a 43.8% reserve margin, indicating a focus on resilience within the power grid. Sarawak, with its large hydroelectric capacity, displayed a generation output of 35,408 GWh, highlighting regional diversity in energy production methods.

Malaysia's final energy consumption totalled 60,019 ktoe, distributed across residential, industrial, commercial, and agricultural sectors. The industrial sector was a major consumer, particularly in Peninsular Malaysia, reflecting the country's industrial growth. The residential and commercial sectors also showed significant energy usage, driven by urbanisation and rising living standards. These consumption patterns underscored the growing energy demands in urban areas and a need for efficient energy distribution systems.

Renewable energy shows an expanding growth under the energy mix, although fossil fuels like natural gas and coal continued to dominate. The installed renewable energy capacity included solar, hydro, and biomass, with a substantial portion of hydroelectric power from Sarawak. Solar power initiatives, such as the Large-Scale Solar (LSS) program, added approximately 2,400 MW to the grid, supporting the country's goal to diversify its energy sources. Despite these efforts, coal and natural gas remained essential for power generation, accounting for most of the energy input in power stations across the nation.

Overall, Malaysia's energy sector started a transitional phase, balancing traditional energy sources with emerging renewables. With the increasing demand for electricity and industrial energy, the country faces the challenge of ensuring energy security while progressing toward sustainability. Government initiatives and private sector involvement in renewable energy projects highlights Malaysia's commitment to diversifying its energy portfolio and reducing dependency on fossil fuels over time.

In 2022, Malaysia faced challenges and opportunities in energy management. Global energy markets were volatile due to post-pandemic demand recovery and geopolitical tensions, particularly impacting oil and gas prices. For Malaysia, a net exporter of LNG but a net importer of coal, these shifts in the international market influenced energy costs, electricity prices, and the broader economy. This report details Malaysia's strategy to balance economic growth with energy security and environmental sustainability, focusing on diversifying its energy mix, enhancing renewable energy infrastructure, and managing energy intensity as a pathway toward greater resilience and sustainable development. We are hopeful to present the NEB 2022 as a comprehensive document for energy policy creation, further research and future energy sector strategic planning.

Currently, Malaysia is navigating a complex energy transition: while fossil fuels remain a dominant pillar of both supply and demand, renewables are experiencing rapid expansion supported by clear policy frameworks. The critical need to balance the trilemma is more profound than ever. Phasing out coal, safeguarding gas supply resilience (highlighted by events like the 2025 pipeline fire), and stepping up cross-border integration are key. If targets are met, renewables could account for nearly one-third of Malaysia's power capacity by the end of 2025 - poised to drive further decarbonization through the 2030s and beyond.

Siti Safinah binti Salleh
Chief Executive Officer
Energy Commission Malaysia

Data Compilation

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

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

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

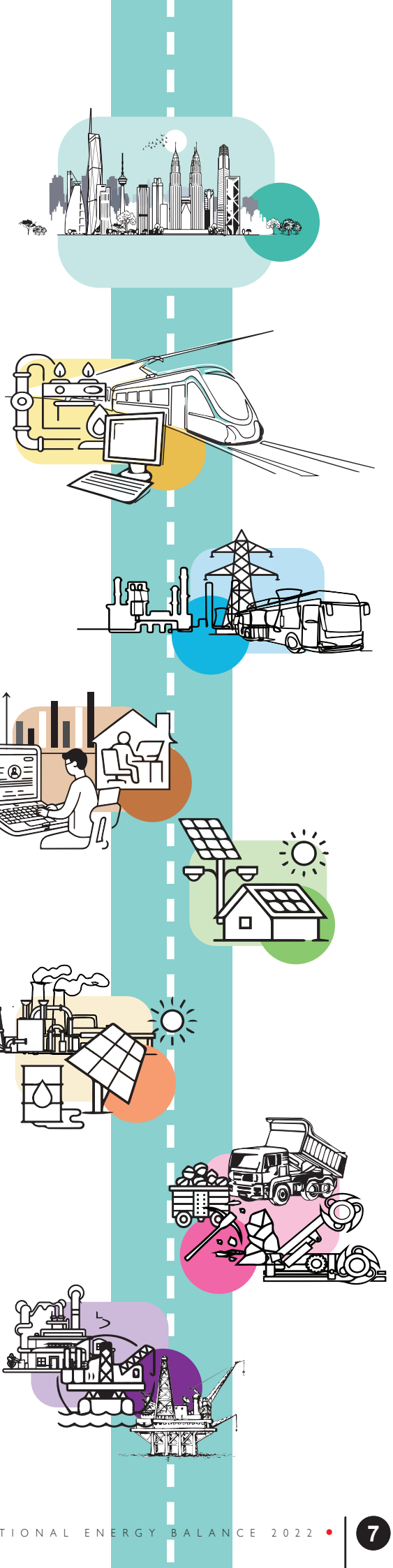
In addition, the statistical discrepancies also act as a balancing tool to minimise possible errors. In the case of oil and oil products, losses in transportation and distribution, as well as statistical errors are included in the statistical discrepancies. However, for electricity, distribution losses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

Stock changes are not fully accounted for in the balance because it is not possible to obtain accurate stock data of energy commodities at the distributors' and users' levels. Only oil companies' stocks are readily available, and these would include stocks at refineries and depots. Therefore, the statistical discrepancy might also include unrecorded stock changes. Coal stocks at TNB power stations and at a producer in Sarawak are also considered in this report.

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

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

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



Executive Summary

ENERGY OVERVIEW

Malaysia's economic performance in 2022 was strong, driven by post-pandemic recovery, robust domestic demand, and high export growth. Malaysia's economy grew by 8.7% in 2022, the highest annual growth rate since 2000, supported by strong private consumption, improved labor market conditions, and increased investment. Overall, Malaysia experienced a solid economic rebound in 2022, benefiting from strong domestic demand and external trade, despite global uncertainties such as inflation and geopolitical tensions.

Strong growth of energy supply and consumption was recorded in 2022 for Malaysia. Total primary energy supply and final energy consumption recorded a growth of 10.8% and 4.8% respectively when compared with that of the previous year. The higher growth rate of final energy consumption compared to the previous year indicates that our economic activities were highly related to high energy consumption based on transportation activities.

PRIMARY ENERGY SUPPLY

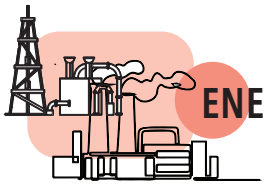
In 2022, the total primary energy supply increased by 10.8% compared to 0.2% only during the previous year. The growth was motivated by higher production of natural gas of 79,727 ktoe, an increase of 5.2% from 75,819 ktoe in 2021. The growth was mainly driven by the rising of domestic consumption especially from power sector as well as the increase of export opportunity through LNG particularly due to geopolitical tensions such as Russia-Ukraine conflict. Furthermore, Malaysia's commitment to maintaining natural gas as a significant component of its energy mix has led to strategic investments and policy support aimed at enhancing production capabilities.

The production of coal and coke steadily increased in 2022 by 10.0% to settle at 2,157 ktoe. Our local coal and coke were mainly produced from Mukah – Balingian area in Sarawak. This area alone produced about 67.8% of the total production of coal and coke in Malaysia. In Peninsular Malaysia the power sector gets their supply of coal and coke from importation mainly from Indonesia and other countries. Total imported coal and coke in 2022 increased by 4.9% to register at 21,346 ktoe. The total production of hydropower in Malaysia posted a positive trend with an increase of 2.7% to register at 2,748 ktoe compared to the previous year at 2,676 ktoe.

All other renewables including solar, biomass, biogas and biodiesel posted a growth of primary production with 25.8% in total as Malaysia set ambitious renewable energy targets as part of its National Renewable Energy Policy and Action Plan. The government aimed to increase the share of renewables to 31% by 2025 and 40% by 2035 under the Malaysia Renewable Energy Roadmap (MyRER). Solar production leading the growth with 57.9% as the government's Large-Scale Solar (LSS) bidding program, initiated by the Energy Commission, encouraged private investments in solar farms. By 2022, several LSS projects (especially LSS4) became operational, boosting Malaysia's solar energy capacity. Furthermore, Malaysia's NEM 3.0 allowed businesses and homeowners to install solar panels and sell excess electricity back to the grid, making solar energy adoption more attractive. Only crude oil recorded a negative growth of production in 2022 with -1.8% to register at 24,944 ktoe. The reduction may be due to the OPEC+ agreement compliance as part of the agreement as Malaysia agreed to voluntary production cuts to help stabilize global oil prices. This agreement limited the country's ability to ramp up production.

In terms of total share of primary energy supply, crude oil and petroleum products shares jumped from 26.7% in 2021 to 29.2% in 2022. The share of natural gas, however, decreased slightly to 43.8% from 44.8% during the same period. The share of coal and coke has decreased from 24.3% to 22.6%, compared to the previous year. Hydro and renewables have increased from 8.4% to 16.7% in 2022.

As of 1st January 2022, Malaysia's crude oil resources stood at 4.482 billion barrels compared to 4.430 billion barrels in the previous year. This increase was anticipated by Sarawak with total resources at 1.830 billion barrels compared to that in the previous year at 1.796 billion barrels. The largest oil discovery was achieved by PETRONAS Carigali at the Nahara-1 well in Block SK306, located within Sarawak's Balingian province. Meanwhile, as of 1st January 2022, Malaysia's natural gas resources increased to 76.177 trillion standard cubic feet (tscf), from the 2021 level of 76.032 tscf. Shell made significant discoveries at Inai-1 and Temu-1 wells in the MLNG Block within Central Luconia, Sarawak. Additionally, Mubadala Energy discovered additional gas resources in Block SK320 at the Cengkih-1 well, also situated in Central Luconia. While in Sabah, TotalEnergies achieved an oil and gas discovery at the Tepat-2 well in Block N, situated in the emerging Sabah Trough province.



ENERGY TRANSFORMATION

Since the commencement of the PETRONAS's third LNG plant (MLNG) in Bintulu on March 2003, conversion of natural gas to Liquefied Natural Gas (LNG) has continuously increased. In the year 2022, the LNG production produced was higher by about 12.1% from the previous year at 26,798 ktoe due to higher production of total natural gas in the country. In 2022, PETRONAS Liquefied Natural Gas (LNG) operations achieved notable milestones including the successfully delivery of 405 LNG cargoes from the Bintulu LNG export facility in Sarawak. Additionally, PETRONAS completed 2,619 deliveries via its virtual pipeline system and LNG bunkering services, underscoring its commitment to meeting diverse customer needs. In 2022, about 43.1% of total LNG exported was shipped to Japan, 27.4% to China, 19.5% to Republic of Korea, and the remaining are to the rest of the world. The total petroleum products produced from the Gas to Liquid plant recorded an increase of 0.2% to settle at 1,685 ktoe. Out of this total, 73.7% was LPG, 16.0% is non-energy, 7.7% is diesel and 2.6% is kerosene.

Malaysia's total refinery capacity currently is 520 kilo barrels per day (kbpd), not including the condensates splitter capacity of 74.3 kbpd. In 2022, the total refinery output had increased by 15.2% to register at 24,754 ktoe (2021: 21,482 ktoe). Diesel registered the highest share (42.5%), followed by petrol (28.1%), non-energy (9.7%), fuel oil (8.8%), ATF and AV GAS (5.9%), LPG (4.2%), refinery gas (0.7%) and kerosene (0.0%).

ELECTRICITY

Malaysia's total installed capacity as of the end of 2022 was 39,799 MW, an increase of 6.4% from 37,422 MW in 2021. This was attributed to the additional capacity of 2,242 MW combined cycle gas turbine (CCGT) of the Edra Melaka Power Plant located in Alor Gajah, Malacca became fully operational in March 2022. It is one of the largest CCGT plants in Southeast Asia and contributes approximately 10% of Peninsular Malaysia's electricity needs. Electricity gross generation registered 192,455 GWh, an increase of 7.8% from the previous year (2021: 178,580 GWh). On the other hand, the electricity consumption was 168,120 GWh, an increase of 8.7% from the previous year (2021: 154,705 GWh). The peak demand for Peninsular Malaysia was recorded at 19,183 MW in the second quarter of the year (2Q 2022), Sarawak at 4,398 MW (in 3Q 2022) and Sabah at 1,029 MW (2Q 2022). The calculated reserve margin for Peninsular Malaysia in 2022 was 43.8%, 29.3% for Sarawak and Sabah at 29.8%.

The total energy input in power stations has increased slightly by 5.1% in 2022 to 38,015 ktoe. Coal and coke continued to remain the main fuel source for electricity generation, with a share of 58.1% of total fuel inputs, followed by natural gas at 32.4%, hydropower at 7.2%, renewables at 1.2%, while diesel and fuel oil were at 1.1%

Electricity consumption by the residential sector decreased by 1.0% to register at 3,142 ktoe (36,517 GWh) compared to the previous year. The drop was due to the end of COVID-19 lockdowns as in 2020 and 2021, residential electricity consumption surged due to movement restrictions, work-from-home policies, and online learning. By 2022, with the reopening of offices, schools, and businesses, people spent less time at home, reducing residential electricity consumption. Consumption of electricity in the commercial sector however recorded a remarkable increased by 15.2% to reach 3,967 ktoe (46,105 GWh). The sharp increase in electricity consumption in the commercial sector was primarily driven by economic recovery and a rise in commercial activities after the pandemic. Electricity consumption in the industrial sector recorded an increase of 9.9% (2021: 3.1%) to register at 7,260 ktoe (84,377 GWh). The higher rate of electricity consumption in the industry sector compared to the previous year was in line with the GDP growth rate in the manufacturing sector. The manufacturing GDP in 2022 increased by 8.1% compared to 9.5% in the previous year. The electricity consumption from the transport sector increased from 30 ktoe (353 GWh) in 2021 to 38 ktoe (443 GWh). This was due to the expansion of electrified rail networks including Mass Rapid Transit (MRT) Putrajaya Line (Phase 1), which started operations in 2022. Other electric rail services, such as the KTM Komuter, Light Rail Transit (LRT), and Electric Train Service (ETS), also experienced increased operations. Overall, the total electricity consumption recorded a growth of 8.7% compared to the previous year to register at 14,465 ktoe (168,120 GWh).

FINAL ENERGY CONSUMPTION

The final energy consumption in 2022 expanded, albeit at a much higher pace by 4.8% to settle at 60,019 ktoe compared to only 0.1% in 2021. The share in energy consumption was highest for the transport sector at 40.1%, followed by the industrial sector at 31.7%, 12.0% from the non-energy sector, the commercial sector at 7.3%, residential sector at 6.8% and 2.0% from the agriculture and fishery sectors. Most of the sectors showed an upward trend except for residential, industry, agriculture and non-energy. In 2022, Malaysia's energy consumption showed notable growth due to economic recovery post-pandemic and increased economic activities. In addition, the New Investment Policy (NIP) was launched on October 6, 2022, to serves as a forward-looking framework designed to position Malaysia as the preferred investment destination in Southeast Asia. The policy focuses on reform initiatives to strengthen the fundamentals of Malaysia's investment ecosystem, emphasizing improvements in the ease of doing business and fostering communication channels with investors.

The industrial GDP for Malaysia in 2022 registered a slightly higher growth of 6.0% compared to the year at 4.9%. Malaysia's industrial energy intensity for 2022 was 44.6 toe/RM Million, a decrease of 16.7% from the previous year due to lower growth of final energy consumption compared to the growth of GDP.

Analysis of total final energy consumption by type of fuel showed that petroleum products constituted about 50.5% of total energy consumption, followed by electricity at 24.1%, natural gas at 22.8% and 2.6% for coal and coke. All others fuel types showed an upward trend compared to the previous year except for natural gas. Final consumption of natural gas decreased 23.3% compared to previous year to register at 13,670 ktoe due to lower input to non-energy sector. Final consumption of coal and coke increased by 11.6% in 2022 to 1,153 ktoe due to the increase in construction activities as the GDP of construction posted a growth of 5.1% compared to previous year.

In 2022, the total final energy consumption for petroleum products increased by 22.6% with the major increase coming from ATF & AV GAS and Petrol. Final consumption for ATF & AV GAS increased by 84.7% while final consumption for petrol increases by 33.3%. In 2022, Malaysia's aviation industry exhibited significant recovery as the country emerged from the COVID-19 pandemic. Passenger traffic was projected to increase between 316% and 525% year-on-year, translating to approximately 32.6 million to 49.0 million passengers. This represented a 30% to 45% recovery compared to pre-pandemic levels in 2019. While for road traffic volume experienced a significant increase surpassing pre-pandemic level. PLUS Malaysia Berhad reported that daily traffic on its highways reached 1.8 million vehicles, up from 1.6 million in 2019. During the year-end festive holidays, traffic was reported to escalate to two million vehicles daily. In terms of share, petrol (48.2%) and diesel (32.5%) continued to be the largest contributors to the total consumption for petroleum products. This was followed by LPG (9.1%), ATF and AVGAS (6.2%), fuel oil (1.8%), non-energy (2.1%) and kerosene (0.1%).

CONCLUSION

In 2022, Malaysia's energy sector experienced significant developments driven by sustainability goals and economic recovery efforts. The government reinforced its commitment to renewable energy (RE) through policies such as the National Energy Policy 2022-2040, which aims to enhance energy security and sustainability. Solar energy remained the dominant renewable source, with increased adoption of large-scale solar (LSS) projects and net energy metering (NEM) schemes. Additionally, Malaysia explored green hydrogen and carbon capture technologies as part of its long-term decarbonization strategy. The government also introduced energy efficiency initiatives, encouraging businesses and industries to optimize energy use while reducing carbon emissions.

On the fossil fuel front, Malaysia continued to leverage its strong oil and gas sector, with PETRONAS maintaining its role as a key global player. The nation saw increased LNG exports amid high global demand, particularly from Europe and Asia. However, volatility in oil prices and geopolitical tensions posed challenges. Domestically, fuel subsidies were a major topic of discussion as the government sought to balance economic relief for citizens with fiscal sustainability. The push for electric vehicles (EVs) also gained traction, supported by tax incentives and infrastructure development, signaling Malaysia's shift toward a low-carbon future.

National Energy Balance 2022

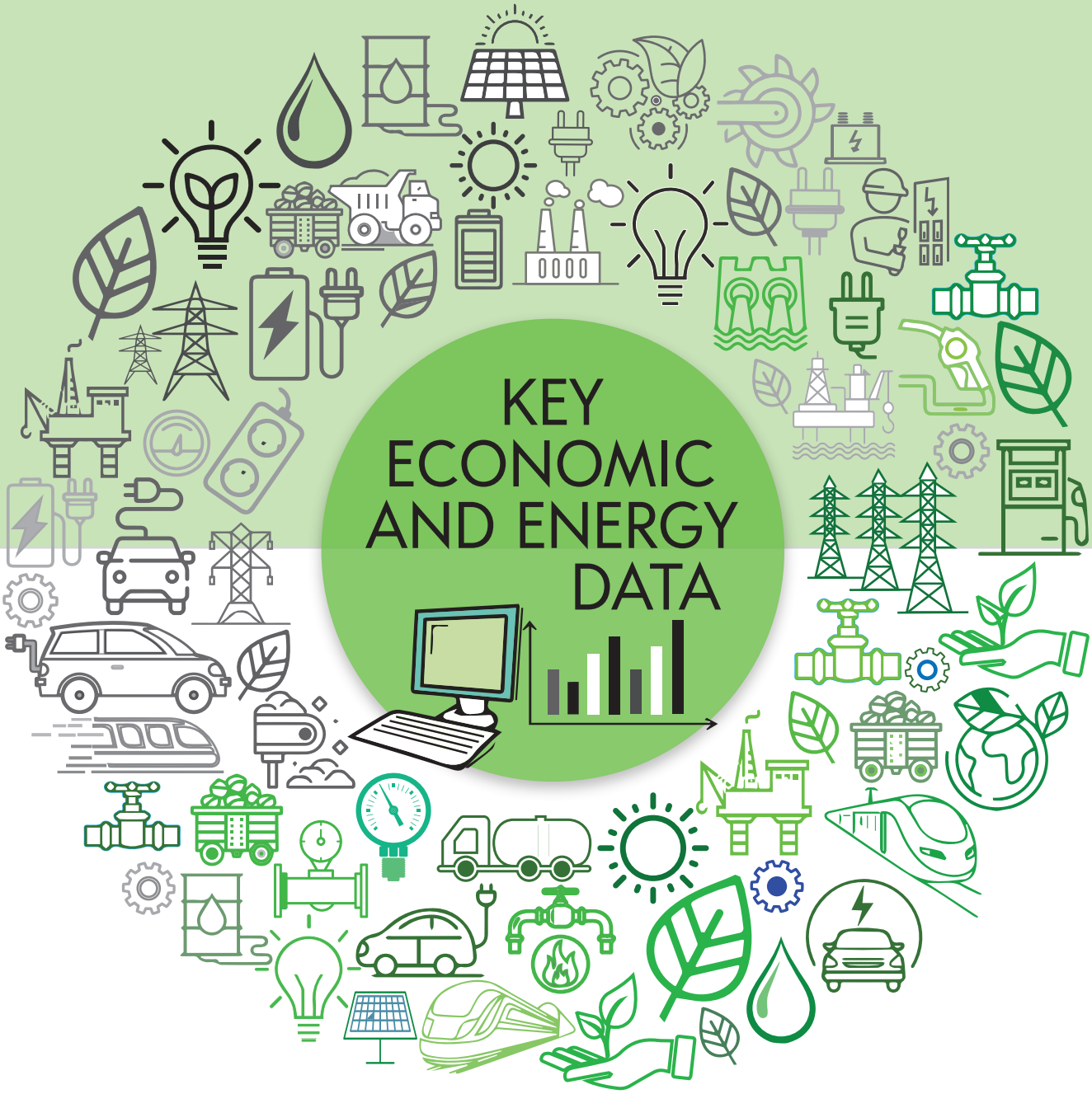


Table 1 : Key Economic and Energy Data

	2022				
	Q1	Q2	Q3	Q4	Total
GDP at Current Prices (RM million)*	422,454	445,013	458,256	468,181	**1,793,903**
GDP at 2015 Prices (RM million)*	361,453	368,117	385,880	398,691	**1,514,139**
GNI at Current Prices (RM million)*	405,256	429,296	445,298	457,110	**1,736,960**
Population ('000 people)**	32,668	32,698	32,868	33,039	**32,698**
Primary Energy Supply (ktoe)	25,356	26,095	26,172	26,943	**104,566**
Final Energy Consumption (ktoe)	14,370	14,598	15,997	15,054	**60,019**
Electricity Consumption (ktoe)	3,499	3,653	3,692	3,621	**14,465**
Electricity Consumption (GWh)	40,667	42,460	42,907	42,085	**168,120**
Per Capita					
GDP at Current Prices (RM)*	51,727	54,439	55,768	56,682	**54,863**
Primary Energy Supply (toe)	0.776	0.798	0.796	0.815	**3.198**
Final Energy Consumption (toe)	0.440	0.446	0.487	0.456	**1.836**
Final Energy Consumption (TJ)	0.018	0.019	0.020	0.019	**0.0768**
Electricity Consumption (kWh)	1,245	1,299	1,305	1,274	**5,142**
Energy Intensity					
Primary Energy Intensity (toe/GDP at 2015 prices (RM million))	70.15	70.89	67.83	67.58	**69.06**
Final Energy Intensity (toe/GDP at 2015 prices (RM million))	39.8	39.7	41.5	37.8	**39.6**
Final Energy Intensity (TJ/GDP at 2015 prices (RM million))	1.66	1.66	1.73	1.58	**1.66**
Electricity Intensity (toe/GDP at 2015 prices (RM million))	9.7	9.9	9.6	9.1	**9.6**
Electricity Intensity (GWh/GDP at 2015 prices (RM million))	0.113	0.115	0.111	0.106	**0.111**

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

Table 2 : Key Economic and Energy Data by Region

Peninsular Malaysia	2015	2016	2017	2018	2019	2020	2021	2022
GDP at Current Prices (RM million)*	975,581	1,038,585	1,131,602	1,193,460	1,255,700	1,189,351	1,276,387	1,461,979
GDP at 2015 Prices (RM million)*	975,581	1,020,869	1,080,017	1,138,500	1,193,928	1,133,239	1,172,638	1,283,372
Population ('000 people)**	24,669	24,995	25,303	25,593	25,713	26,480	26,602	26,713
Final Energy Consumption (ktoe)	43,011	45,872	46,520	47,446	48,085	41,313	41,364	47,677
Final Energy Consumption (PJ)	1,800	1,919	1,946	1,985	2,012	1,729	1,731	1,995
Electricity Consumption (ktoe)	9,531	10,026	10,004	10,378	10,776	10,172	10,184	11,036
Electricity Consumption (GWh)	110,770	116,529	116,272	120,617	125,241	118,221	118,365	128,262
Per Capita								
GDP at Current Prices (RM)*	39,547	41,551	44,722	46,632	48,835	44,915	47,981	54,729
Final Energy Consumption (toe)	1.74	1.84	1.84	1.85	1.87	1.56	1.55	1.78
Final Energy Consumption (TJ)	0.073	0.077	0.077	0.078	0.078	0.065	0.065	0.075
Electricity Consumption (kWh)	4,490	4,662	4,595	4,713	4,871	4,465	4,449	4,801
Electricity Consumption (toe)	0.386	0.401	0.395	0.406	0.419	0.384	0.383	0.413
Energy Intensity								
Final Energy Consumption (toe/GDP at 2015 prices (RM million))	44.1	44.9	43.1	41.7	40.3	36.5	35.3	37.1
Final Energy Consumption (TJ/GDP at 2015 prices (RM million))	1.84	1.88	1.80	1.74	1.69	1.53	1.48	1.55
Electricity Consumption (toe/GDP at 2015 prices (RM million))	9.8	9.8	9.3	9.1	9.0	9.0	8.7	8.6
Electricity Consumption (GWh/GDP at 2015 prices (RM million))	0.114	0.114	0.108	0.106	0.105	0.104	0.101	0.100

Notes (*): 1. GDP data by States is from the Department of Statistics Malaysia
2. GDP for Peninsular Malaysia includes Supra State (Supra State covers production activities that beyond the centre of predominant economic interest for any state)

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

Table 2: Key Economic and Energy Data by Region

Sabah	2015	2016	2017	2018	2019	2020	2021	2022
GDP at Current Prices (RM million)*	79,775	86,924	101,904	108,053	106,773	91,963	110,203	130,728
GDP at 2015 Prices (RM million)*	79,775	83,930	90,583	92,257	93,265	85,453	86,650	90,069
Population ('000 people)**	3,816	3,900	3,954	3,997	4,004	3,514	3,509	3,512
Final Energy Consumption (ktoe)	3,845	5,015	9,512	6,598	6,561	5,655	5,578	5,376
Final Energy Consumption (PJ)	161	210	398	276	275	237	233	225
Electricity Consumption (ktoe)	499	487	477	484	514	505	507	562
Electricity Consumption (GWh)	5,805	5,665	5,545	5,630	5,974	5,869	5,894	6,534
Per Capita								
GDP at Current Prices (RM)*	20,908	22,291	25,776	27,031	26,669	26,171	31,409	37,225
Final Energy Consumption (toe)	1.008	1.286	2.406	1.651	1.639	1.609	1.590	1.531
Final Energy Consumption (TJ)	0.042	0.054	0.101	0.069	0.069	0.067	0.067	0.064
Electricity Consumption (kWh)	1,521	1,453	1,402	1,408	1,492	1,670	1,680	1,861
Electricity Consumption (toe)	0.131	0.125	0.121	0.121	0.128	0.144	0.145	0.160
Energy Intensity								
Final Energy Consumption (toe/GDP at 2015 prices (RM million))	48.2	59.8	105.0	71.5	70.3	66.2	64.4	59.7
Final Energy Consumption (TJ/GDP at 2015 prices (RM million))	2.02	2.50	4.39	2.99	2.94	2.77	2.69	2.50
Electricity Consumption (toe/GDP at 2015 prices (RM million))	6.3	5.8	5.3	5.3	5.5	5.9	5.9	6.2
Electricity Consumption (GWh/GDP at 2015 prices (RM million))	0.073	0.067	0.061	0.061	0.064	0.069	0.068	0.073

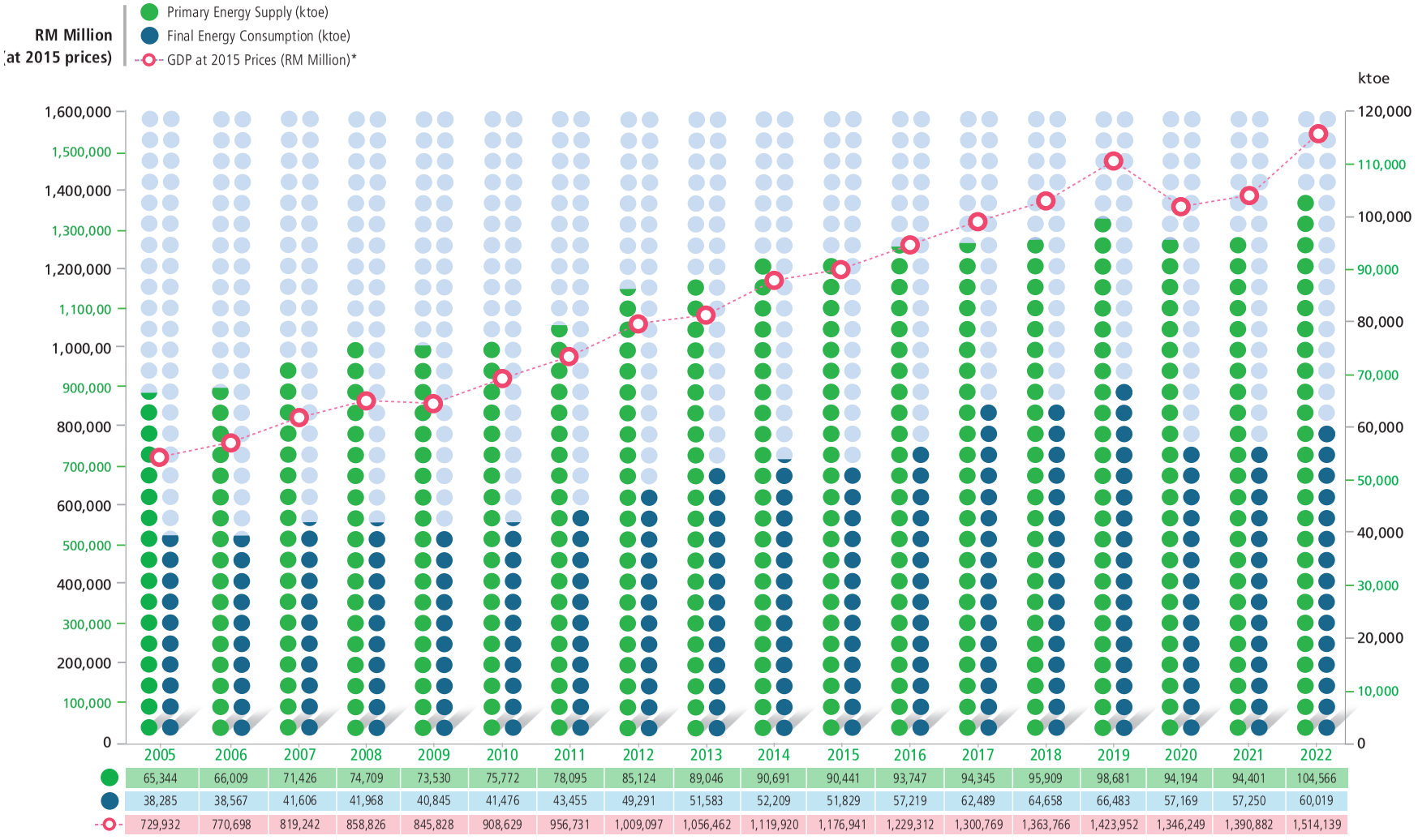
Notes (*): 1. GDP data by States is from the Department of Statistics Malaysia
2. GDP and population for Sabah includes WP Labuan
(**): Mid-year population is from the Department of Statistics Malaysia

Table 2: Key Economic and Energy Data by Region

Sarawak	2015	2016	2017	2018	2019	2020	2021	2022
GDP at Current Prices (RM million)*	121,585	124,189	138,804	146,246	150,265	137,177	162,111	201,197
GDP at 2015 Prices (RM million)*	121,585	124,513	130,169	133,010	136,759	127,556	131,594	140,699
Population ('000 people)**	2,702	2,739	2,766	2,792	2,806	2,454	2,466	2,474
Final Energy Consumption (ktoe)	4,951	6,331	6,458	10,614	11,838	10,201	10,307	6,965
Final Energy Consumption (PJ)	207	265	270	444	495	427	431	291
Electricity Consumption (ktoe)	1,344	1,878	2,126	2,290	2,356	2,423	2,620	2,867
Electricity Consumption (GWh)	15,624	21,831	24,703	26,618	27,382	28,161	30,446	33,324
Per Capita								
GDP at Current Prices (RM)*	45,007	45,346	50,177	52,386	53,551	55,906	65,749	81,341
Final Energy Consumption (toe)	1.833	2.312	2.335	3.802	4.219	4.157	4.181	2.816
Final Energy Consumption (TJ)	0.077	0.097	0.098	0.159	0.177	0.174	0.175	0.118
Electricity Consumption (kWh)	5,784	7,971	8,930	9,535	9,758	11,477	12,348	13,472
Electricity Consumption (toe)	0.498	0.686	0.768	0.820	0.840	0.987	1.062	1.159
Energy Intensity								
Final Energy Consumption (toe/GDP at 2015 prices (RM million))	40.7	50.8	49.6	79.8	86.6	80.0	78.3	49.5
Final Energy Consumption (TJ/GDP at 2015 prices (RM million))	1.70	2.13	2.08	3.34	3.62	3.35	3.28	2.07
Electricity Consumption (toe/GDP at 2015 prices (RM million))	11.1	15.1	16.3	17.2	17.2	19.0	19.9	20.4
Electricity Consumption (GWh/GDP at 2015 prices (RM million))	0.129	0.175	0.190	0.200	0.200	0.221	0.231	0.237

Notes (*): 1. GDP data by States is from the Department of Statistics Malaysia
(**): Mid-year population is from the Department of Statistics Malaysia

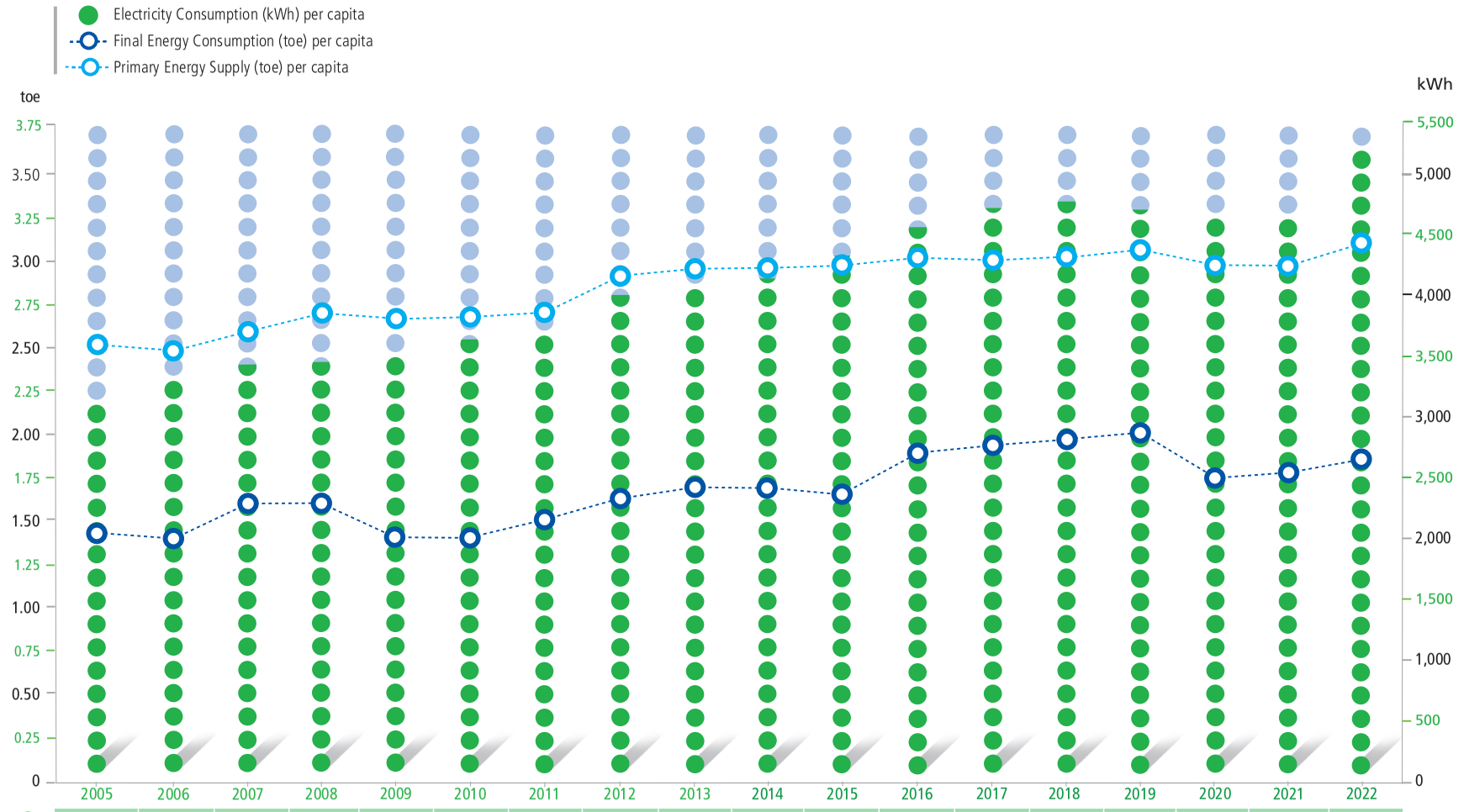
Figure 1 : Trends in GDP, Primary Energy Supply and Final Energy Consumption



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Primary Energy Supply (ktoe)	65,344	66,009	71,426	74,709	73,530	75,772	78,095	85,124	89,046	90,691	90,441	93,747	94,345	95,909	98,681	94,194	94,401	104,566
Final Energy Consumption (ktoe)	38,285	38,567	41,606	41,968	40,845	41,476	43,455	49,291	51,583	52,209	51,829	57,219	62,489	64,658	66,483	57,169	57,250	60,019
GDP at 2015 Prices (RM Million)*	729,932	770,698	819,242	858,826	845,828	908,629	956,731	1,009,097	1,056,462	1,119,920	1,176,941	1,229,312	1,300,769	1,363,766	1,423,952	1,346,249	1,390,882	1,514,139

Source: GDP data is from the Department of Statistics Malaysia
Note: GDP at 2015 Prices (RM Million) for 2005 until 2014 were estimated by the Energy Commission

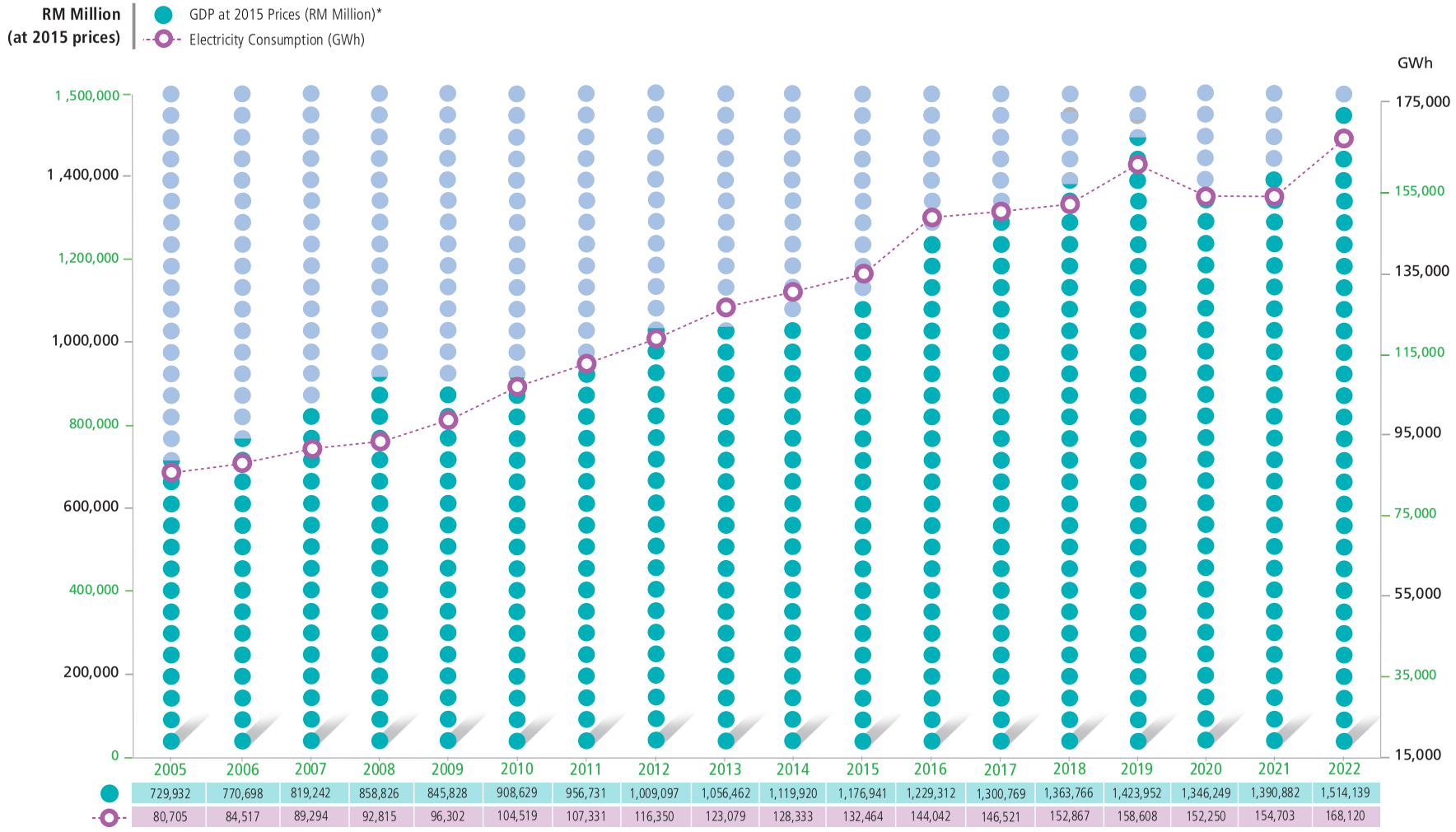
Figure 2 : Primary Energy Supply, Electricity Consumption and Final Energy Consumption Per Capita



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Electricity Consumption (kWh) per capita	3,099	3,183	3,300	3,367	3,429	3,656	3,693	3,943	4,074	4,179	4,248	4,553	4,576	4,721	4,877	4,673	4,749	5,142
Final Energy Consumption (toe) per capita	1.47	1.45	1.54	1.52	1.45	1.45	1.50	1.67	1.71	1.70	1.66	1.81	1.95	2.00	2.04	1.75	1.76	1.84
Primary Energy Supply (toe) per capita	2.51	2.49	2.64	2.71	2.62	2.65	2.69	2.88	2.95	2.95	2.90	2.96	2.95	2.96	3.03	2.89	2.90	3.20

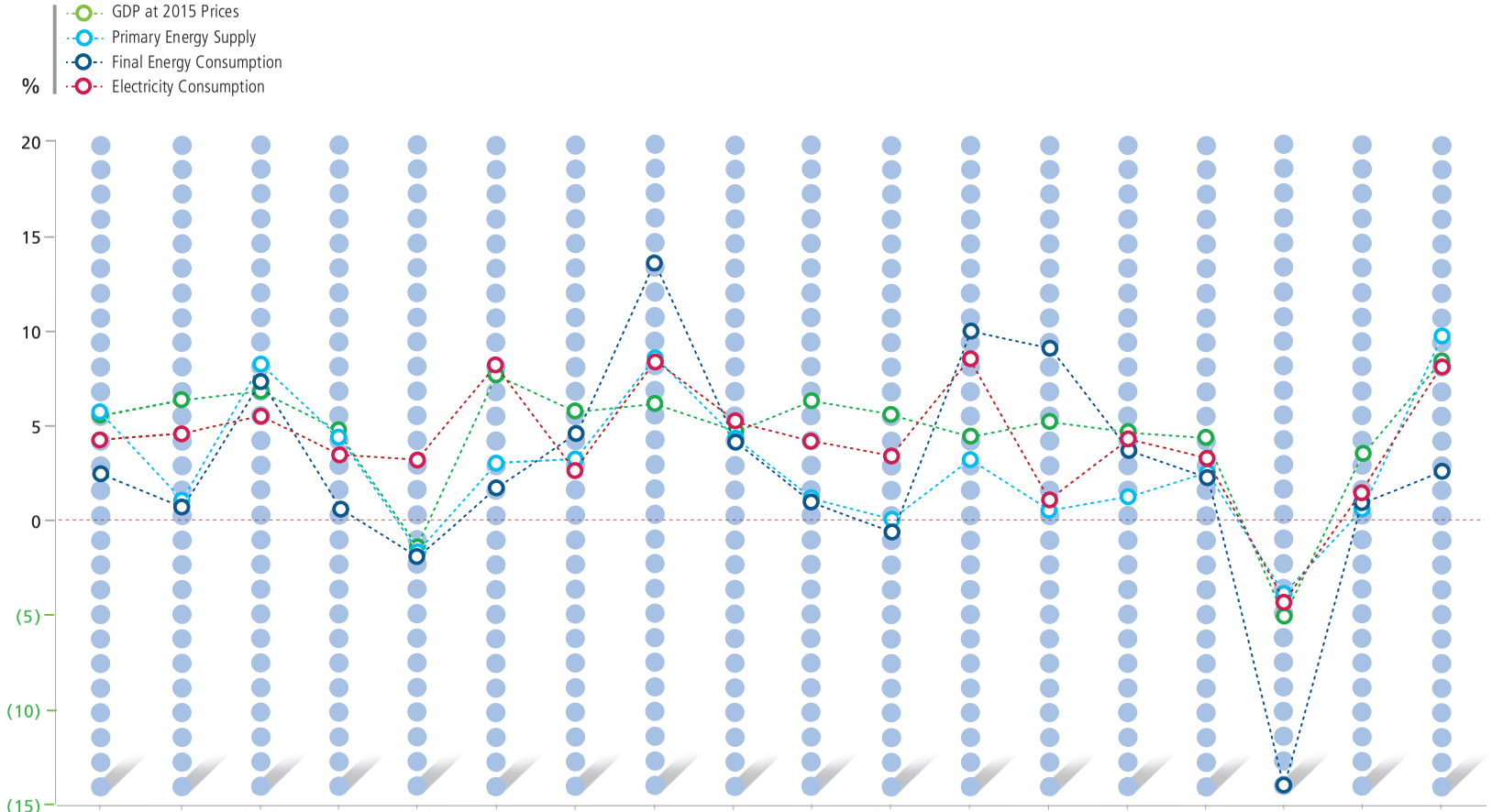
Source: Population data is from the Department of Statistics Malaysia
Note: Data shown is based on the Energy Commission's calculation

Figure 3: Trends in GDP and Electricity Consumption



Source: GDP data is from the Department of Statistics Malaysia
Note: GDP at 2015 Prices (RM Million) for 2005 until 2014 were estimated by the Energy Commission

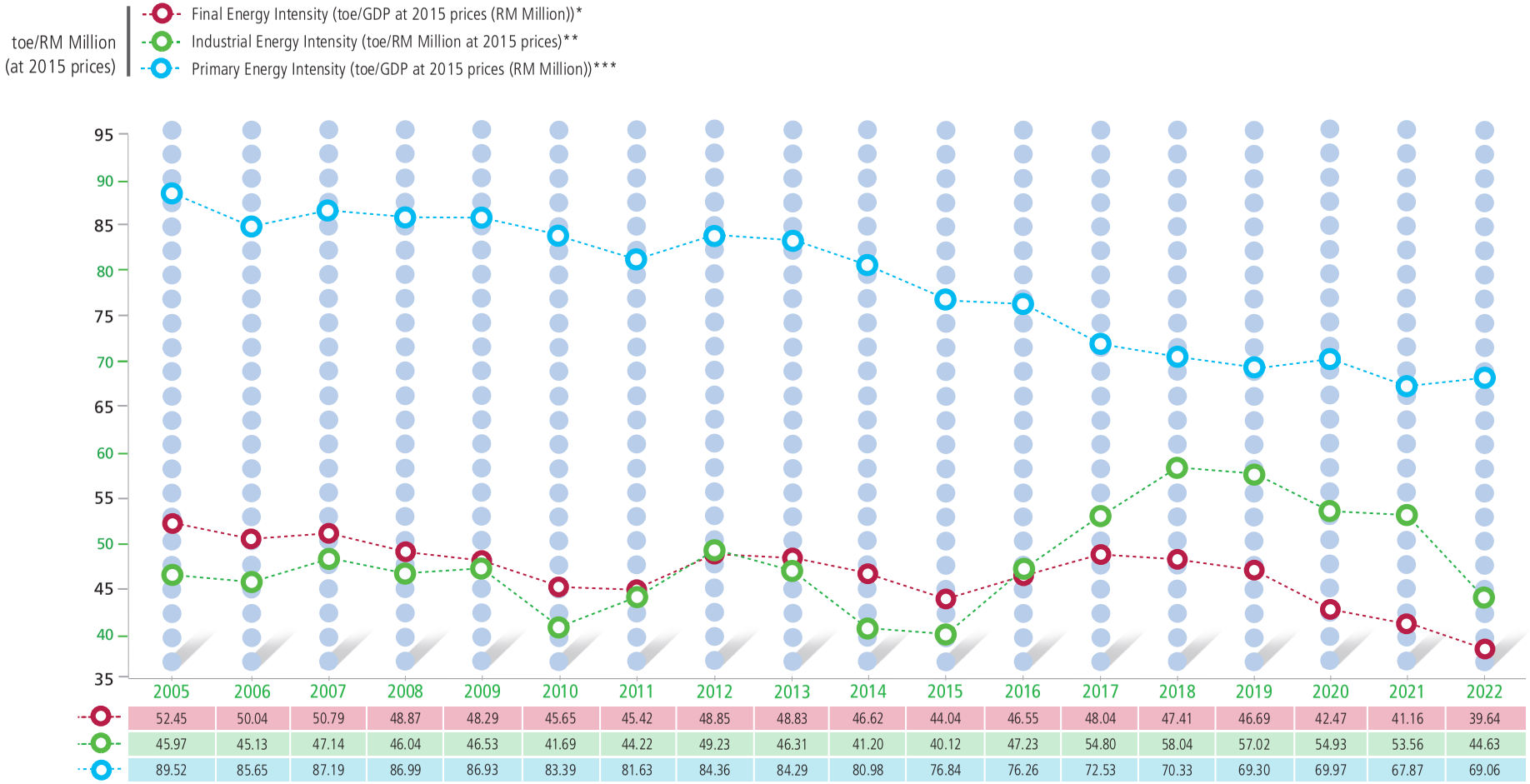
Figure 4: Annual Growth Rates of GDP, Primary Energy Supply, Final Energy Consumption and Electricity Consumption



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
GDP at 2015 Prices	5.33	5.58	6.30	4.83	(1.51)	7.42	5.29	5.47	4.69	6.01	5.09	4.45	5.81	4.84	4.41	(5.46)	3.32	8.86
Primary Energy Supply	5.38	1.02	8.21	4.60	(1.58)	3.05	3.07	9.00	4.61	1.85	(0.28)	3.66	0.64	1.66	2.89	(4.55)	0.22	10.77
Final Energy Consumption	2.58	0.74	7.88	0.87	(2.68)	1.54	4.77	13.43	4.65	1.21	(0.73)	10.40	9.21	3.47	2.82	(14.01)	0.14	4.84
Electricity Consumption	4.55	4.72	5.65	3.94	3.76	8.53	2.69	8.40	5.78	4.27	3.22	8.74	1.72	4.33	3.76	(4.01)	1.61	8.67

Source: GDP data is from the Department of Statistics Malaysia
Note: GDP at 2015 Prices (RM Million) for 2005 until 2014 were estimated by the Energy Commission

Figure 5: Primary and Final Energy Intensity

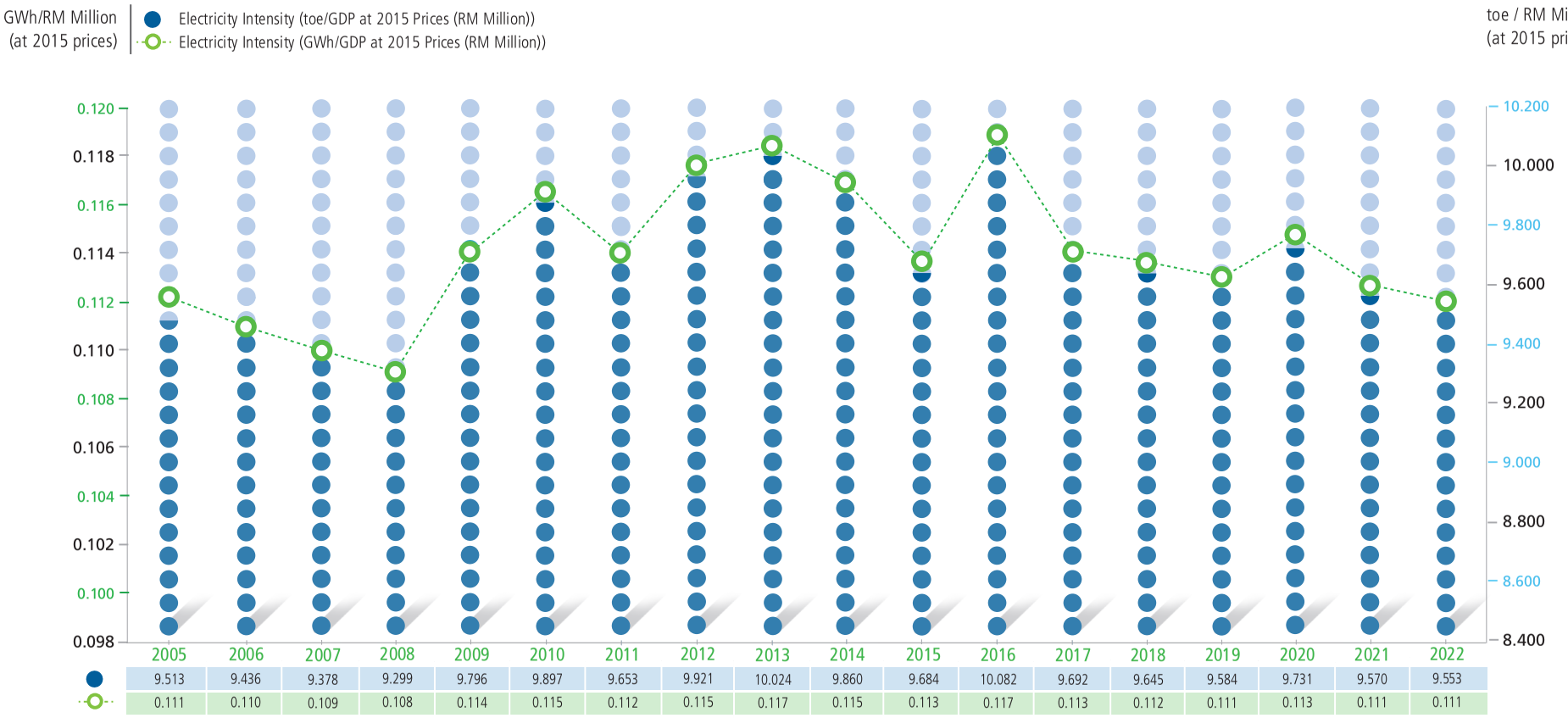


	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Final Energy Intensity (toe/GDP at 2015 prices (RM Million))*	52.45	50.04	50.79	48.87	48.29	45.65	45.42	48.85	48.83	46.62	44.04	46.55	48.04	47.41	46.69	42.47	41.16	39.64
Industrial Energy Intensity (toe/RM Million at 2015 prices)**	45.97	45.13	47.14	46.04	46.53	41.69	44.22	49.23	46.31	41.20	40.12	47.23	54.80	58.04	57.02	54.93	53.56	44.63
Primary Energy Intensity (toe/GDP at 2015 prices (RM Million))***	89.52	85.65	87.19	86.99	86.93	83.39	81.63	84.36	84.29	80.98	76.84	76.26	72.53	70.33	69.30	69.97	67.87	69.06

Source: GDP data is from the Department of Statistics Malaysia

Notes:
1. Measurement in ktoe is based on the Energy Commission's calculations
2. Intensity = Quantity of energy required per unit output or activity
3. (*): Final Energy Intensity = Final Energy Consumption (including non-energy use) / GDP at 2015 prices
4. (**): Industrial Energy Intensity = Industry Energy Consumption / Industry GDP at 2015 prices
5. (***) Primary Energy Intensity = Primary Energy Supply / GDP at 2015 prices

Figure 6: Electricity Intensity

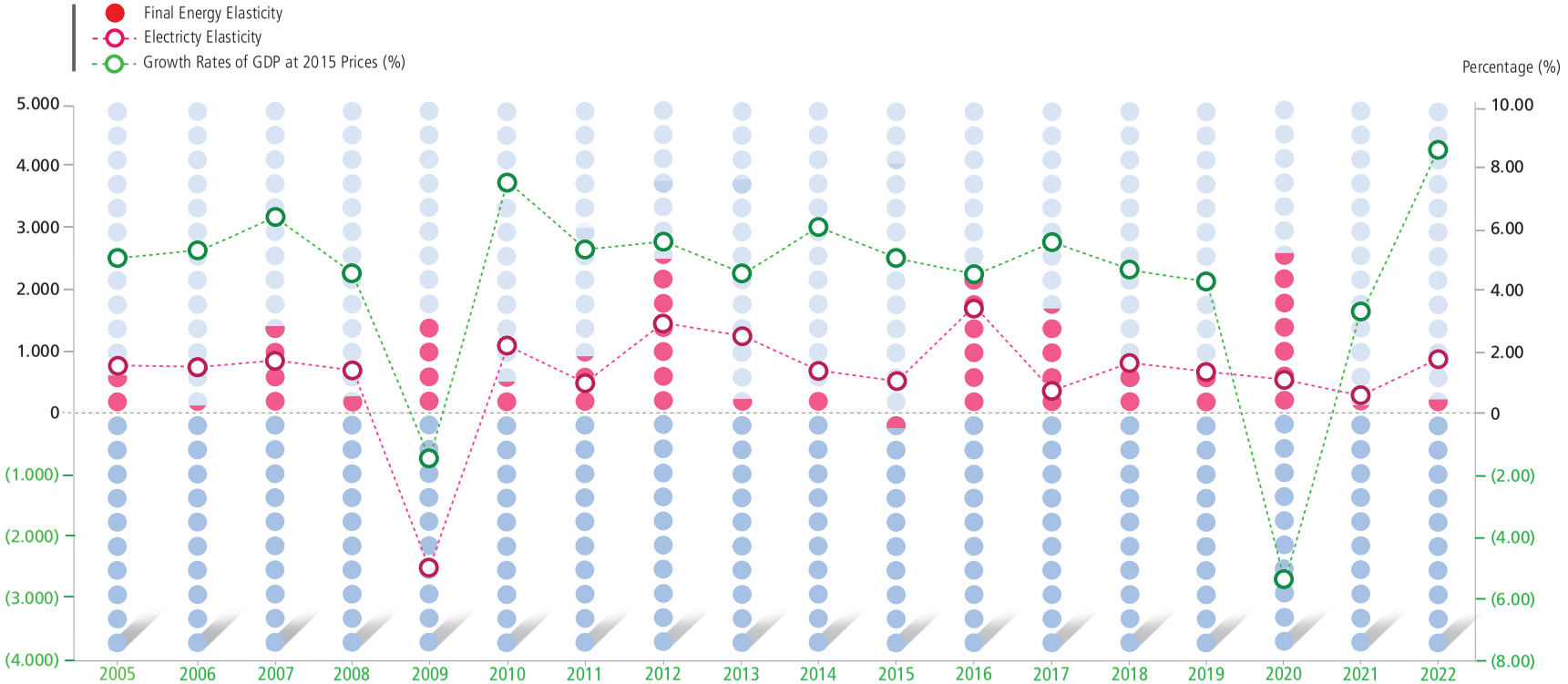


	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
●	9.513	9.436	9.378	9.299	9.796	9.897	9.653	9.921	10.024	9.860	9.684	10.082	9.692	9.645	9.584	9.731	9.570	9.553
○	0.111	0.110	0.109	0.108	0.114	0.115	0.112	0.115	0.117	0.115	0.113	0.117	0.113	0.112	0.111	0.113	0.111	0.111

Source: 1. GDP data is from the Department of Statistics Malaysia
2. Regulators, Utilities and IPPs

Notes: 1. Measurement in ktoe is based on the Energy Commission's calculations
2. Intensity = Quantity of energy required per unit output or activity

Figure 7: Final Energy and Electricity Elasticity



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Final Energy Elasticity	0.483	0.132	1.251	0.180	1.768	0.208	0.901	2.454	0.991	0.202	(0.143)	2.337	1.584	0.717	0.640	2.567	0.043	0.546
Electricty Elasticity	0.853	0.846	0.897	0.816	(2.482)	1.149	0.508	1.535	1.232	0.711	0.632	1.964	0.296	0.894	0.851	0.735	0.486	0.979
Growth Rates of GDP at 2015 Prices (%)	5.33	5.58	6.30	4.83	(1.51)	7.42	5.29	5.47	4.69	6.01	5.09	4.45	5.81	4.84	4.41	(5.46)	3.32	8.86

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

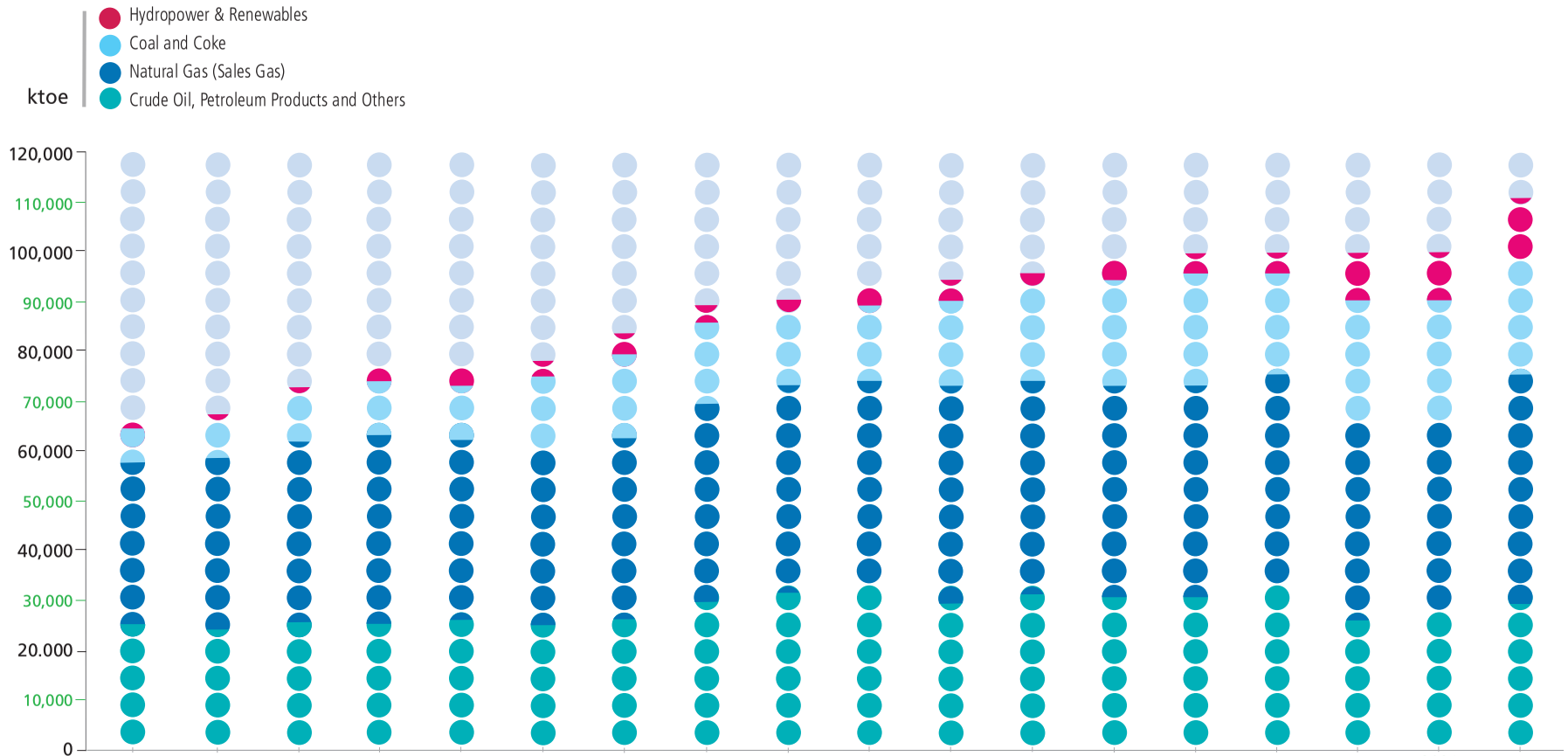
$$\text{Final Energy Elasticity} = \frac{\text{Growth Rate of Energy Consumption (\%)}}{\text{Growth Rate of GDP (\%)}}$$

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

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

3) GDP growth rates at 2015 prices (RM Million) for 2005 until 2014 was estimated by the Energy Commission

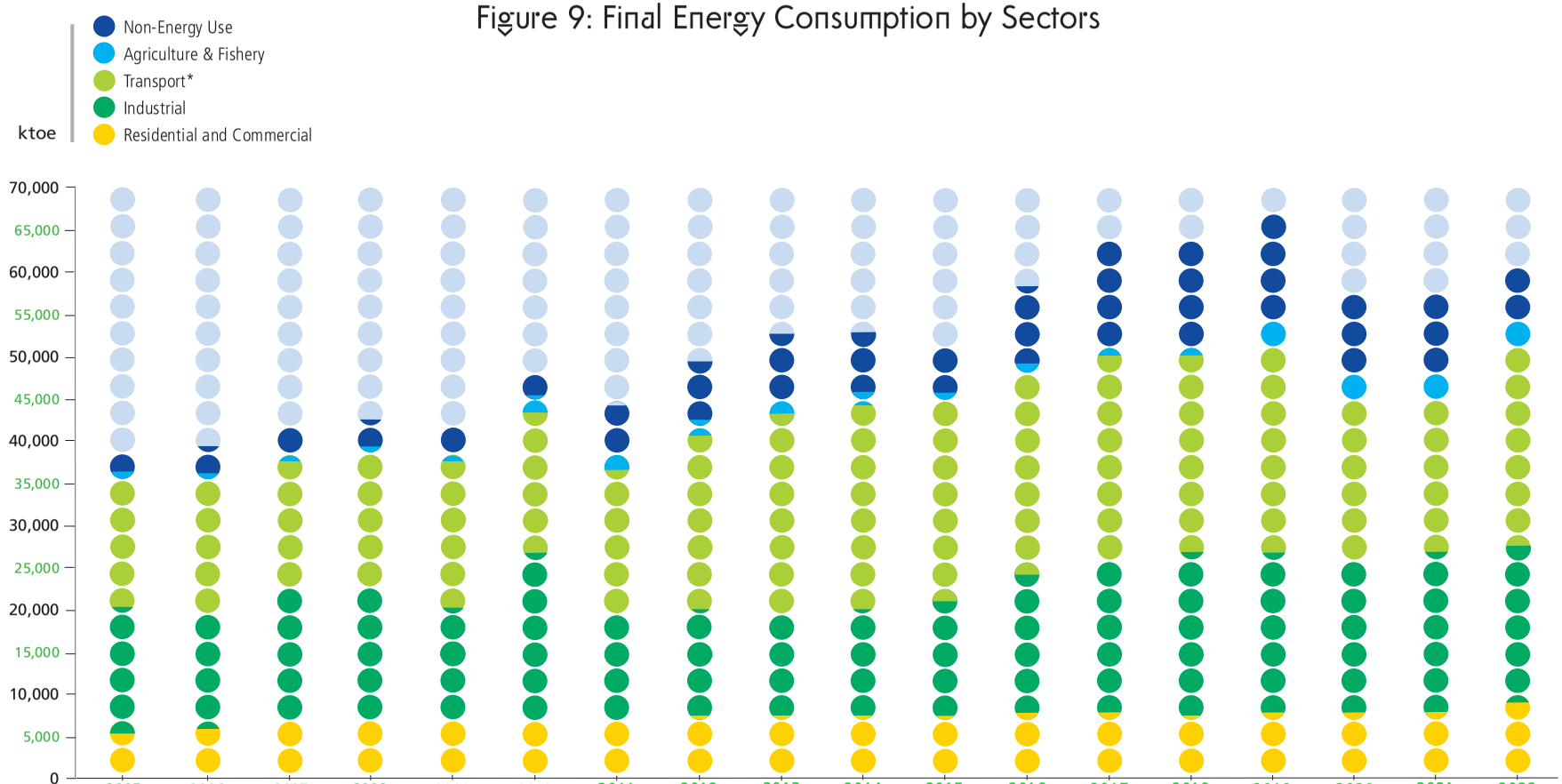
Figure 8: Primary Energy Supply



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Hydropower & Renewables	446	554	558	642	574	540	680	1,092	1,532	1,798	2,017	2,420	2,994	3,261	3,349	3,693	3,937	4,594
Coal and Coke	6,889	7,299	8,848	9,782	10,623	14,777	14,772	15,882	15,067	15,357	17,406	18,744	20,771	22,280	21,057	24,788	22,917	23,655
Natural Gas (Sales Gas)	33,913	34,917	36,639	39,289	35,851	35,447	35,740	38,647	39,973	40,113	41,853	41,257	41,200	40,939	41,461	39,939	42,296	45,834
Crude Oil, Petroleum Products and Others	24,096	23,239	25,381	24,996	26,482	25,008	26,903	29,502	32,474	33,423	29,836	31,327	29,380	29,429	32,813	25,773	25,251	30,483

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

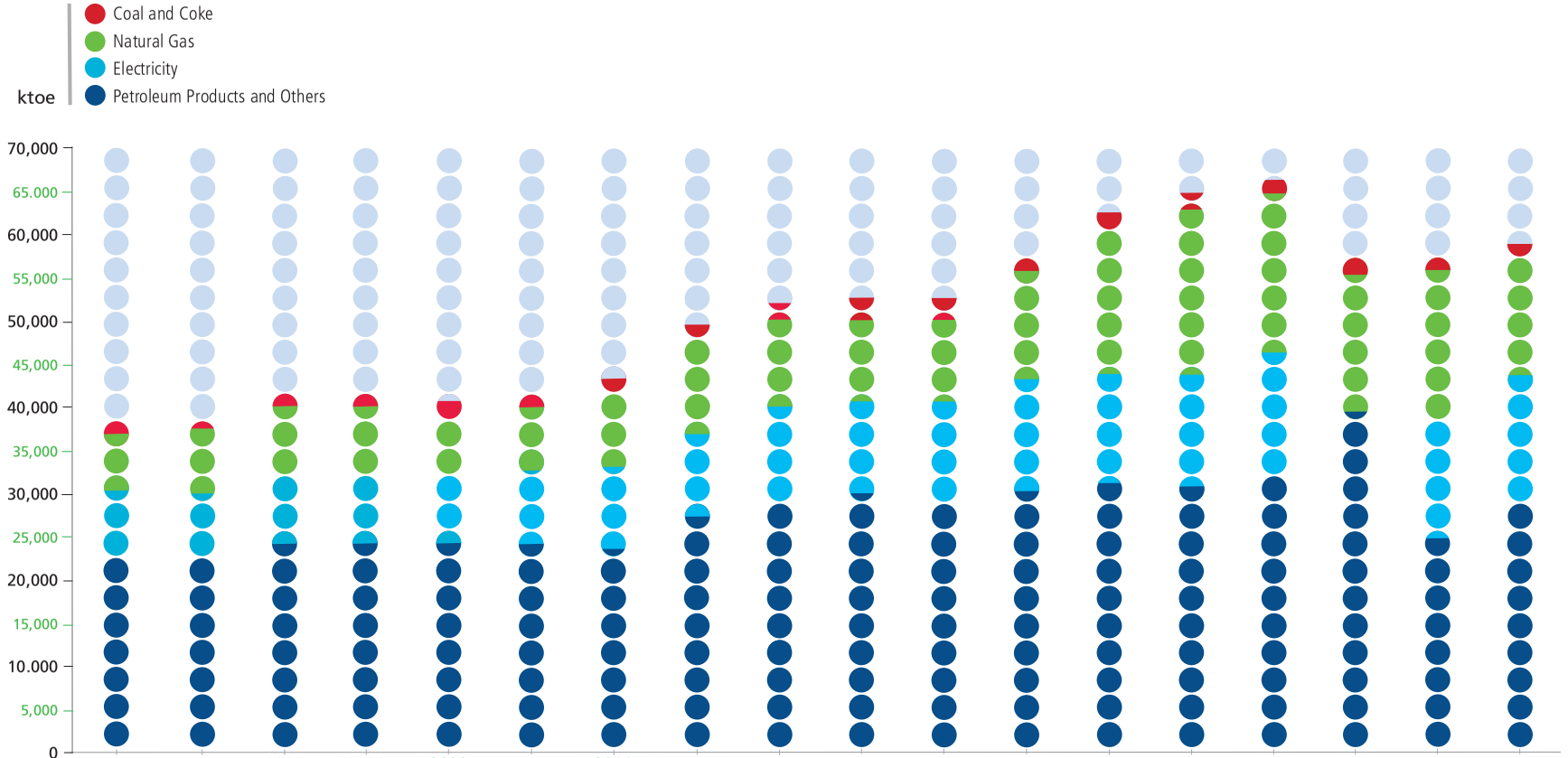
Figure 9: Final Energy Consumption by Sectors



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Non-Energy Use	2,173	2,819	2,957	2,876	3,868	3,696	6,377	7,497	7,277	6,217	5,928	8,729	12,517	13,262	13,63 1	11,805	10,869	7,183
Agriculture & Fishery	101	258	281	287	211	1,074	916	1,053	1,051	1,045	895	415	674	1,021	927	867	1,045	1,215
Transport*	15,293	14,819	15,717	16,395	16,119	16,828	17,070	19,757	22,357	24,327	23,435	24,004	24,039	23,555	25,004	18,660	18,095	24,091
Industrial	15,583	15,258	16,454	16,205	14,312	19,298	12,100	13,919	13,496	13,162	13,971	16,019	17,463	19,046	18,921	17,714	19,157	19,033
Residential and Commercial	5,134	5,424	6,197	6,205	6,336	6,951	6,993	7,065	7,403	7,459	7,600	8,051	7,796	7,773	8,000	8,123	8,084	8,537

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

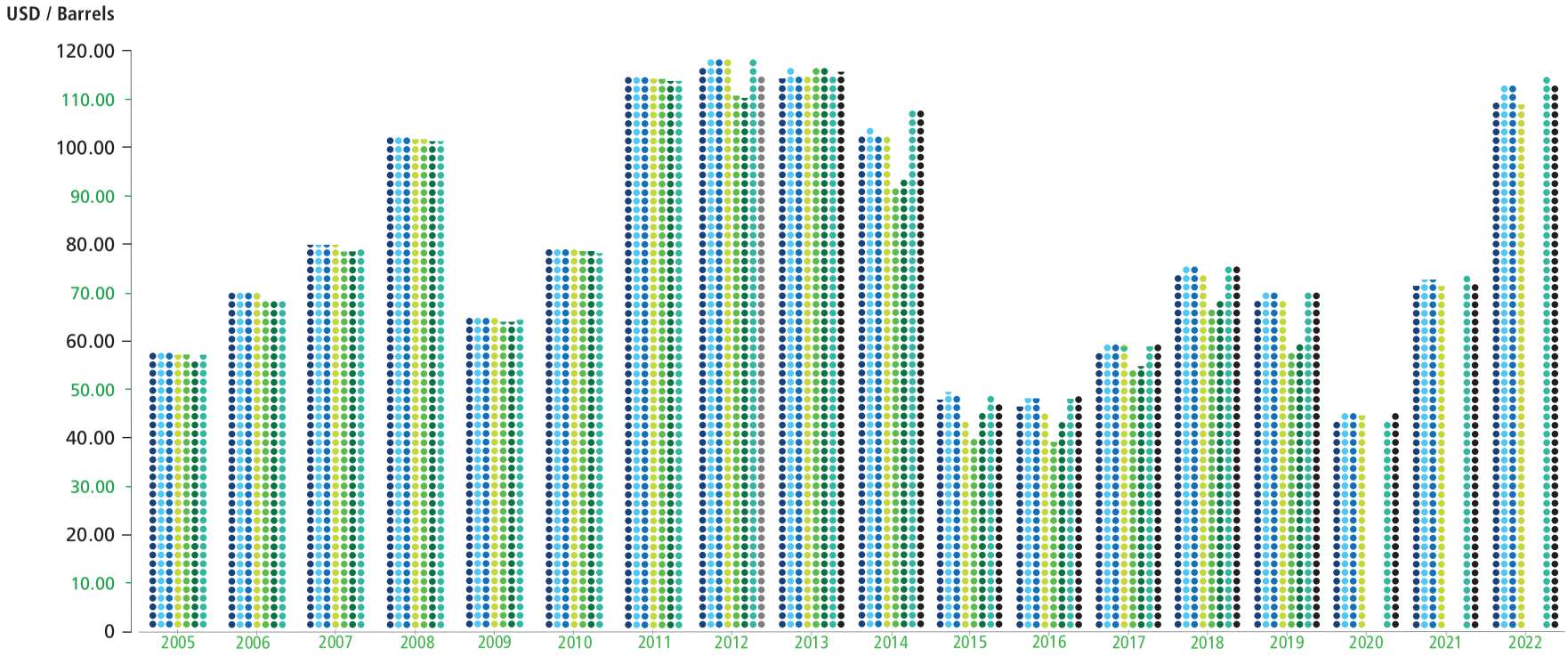
Figure 10: Final Energy Consumption by Fuel Type



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Coal and Coke	1,348	1,335	1,362	1,713	1,613	1,826	1,759	1,744	1,539	1,709	1,778	1,785	1,804	1,808	1,706	1,338	1,392	1,553
Natural Gas	6,981	7,562	7,709	7,818	6,802	6,254	8,515	10,206	10,076	9,641	9,566	12,304	16,838	18,851	18,647	16,631	17,815	13,670
Electricity	6,944	7,272	7,683	7,986	8,286	8,993	9,236	10,011	10,590	11,042	11,397	12,394	12,607	13,153	13,647	13,100	13,311	14,465
Petroleum Products and Others	23,012	22,398	24,852	24,451	24,145	24,403	23,946	27,329	29,379	29,817	29,087	30,737	31,241	30,845	32,483	26,100	24,731	30,331

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

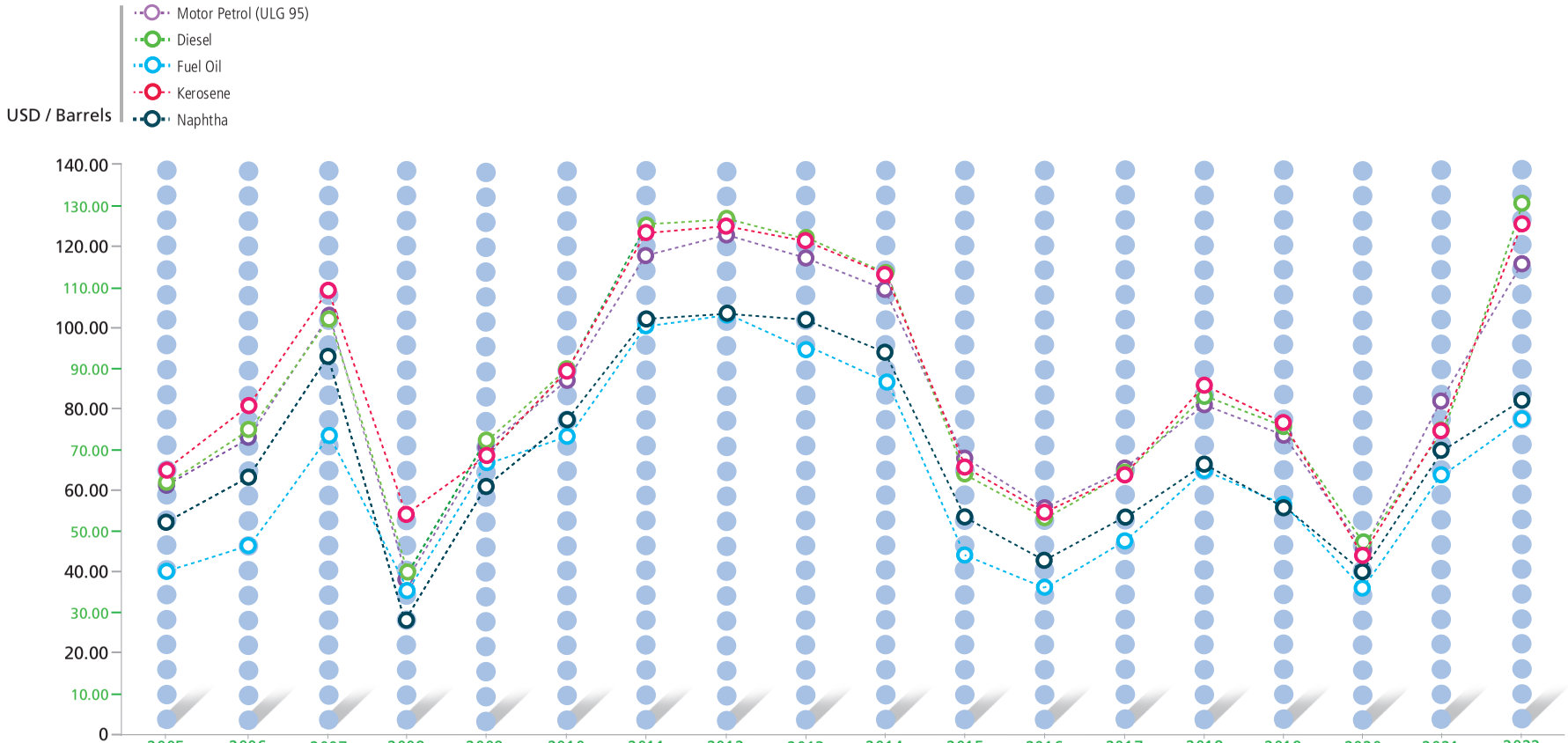
Figure 11: Official Selling Prices of Malaysian Crude Oil



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Tapis Blend Crude Oil	57.71	69.56	78.96	102.79	64.97	79.51	116.25	118.22	114.70	103.26	45.12	45.43	56.30	73.84	68.93	43.65	72.30	108.08
Labuan Crude	57.71	69.56	78.96	102.79	64.97	79.51	116.25	118.66	116.00	106.41	47.73	47.63	57.90	75.24	70.33	45.05	73.43	112.06
Miri Light Crude Oil	57.71	69.56	78.96	102.79	64.97	79.51	116.25	118.56	115.70	104.89	47.63	47.63	57.90	75.24	70.33	45.05	73.43	112.06
Bintulu Crude Oil	57.43	69.28	78.66	102.49	64.67	79.21	115.95	118.36	115.70	103.13	44.94	45.13	56.30	73.84	68.93	44.85	72.88	109.67
Terengganu Condensate	56.51	68.66	77.91	101.59	63.77	78.31	115.95	110.92	107.40	91.82	40.28	39.76	53.57	67.71	58.08	-	-	-
Bintulu Condensate	56.61	68.45	77.92	101.69	63.87	78.41	115.05	110.62	107.10	93.99	42.98	42.56	54.97	69.41	59.58	-	-	-
Dulang Crude Oil	57.41	68.96	78.59	102.49	64.67	79.21	115.15	118.16	115.10	105.46	47.35	47.23	57.50	74.84	69.93	42.85	74.14	114.08
Kikeh Crude Oil	-	-	-	-	-	-	-	115.94	116.00	105.66	46.96	47.63	57.90	75.24	70.33	45.05	73.43	112.06

Source: PETRONAS

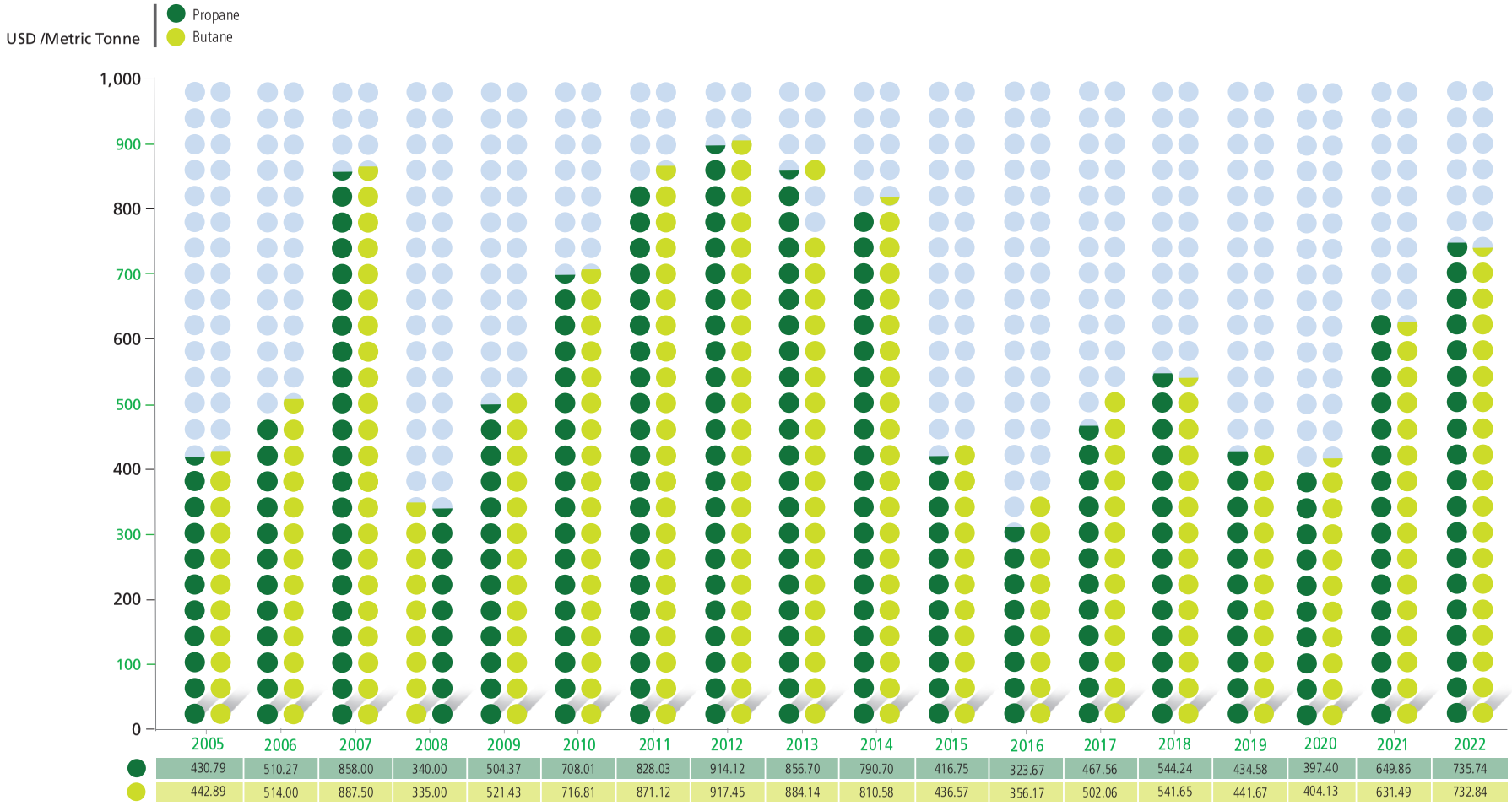
Figure 12: Prices of Major Petroleum Products



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Motor Petrol (ULG 95)	62.38	73.20	104.05	39.25	70.38	88.41	119.79	123.42	119.00	110.97	69.17	56.26	67.99	80.23	72.49	46.70	80.50	115.12
Diesel	64.35	76.93	103.74	39.32	70.42	90.35	126.28	128.10	123.27	112.69	64.47	52.24	65.65	84.33	77.23	48.42	76.12	130.87
Fuel Oil	40.32	48.84	74.60	31.40	58.12	72.85	100.68	103.92	96.35	87.31	44.52	35.62	49.99	65.98	57.63	38.21	63.21	77.65
Kerosene	67.99	80.72	110.50	53.90	70.14	90.18	125.71	126.79	122.85	112.50	64.69	53.00	65.27	85.04	77.24	44.82	75.25	126.89
Naphtha	51.04	62.13	93.98	29.90	60.96	79.24	102.49	103.57	100.99	94.40	52.62	42.65	53.79	67.29	56.90	40.55	70.77	82.93

Note: Data shown are prices Ex-Singapore, in USD per Barrel, taken from Industry Sources
Source: PETRONAS

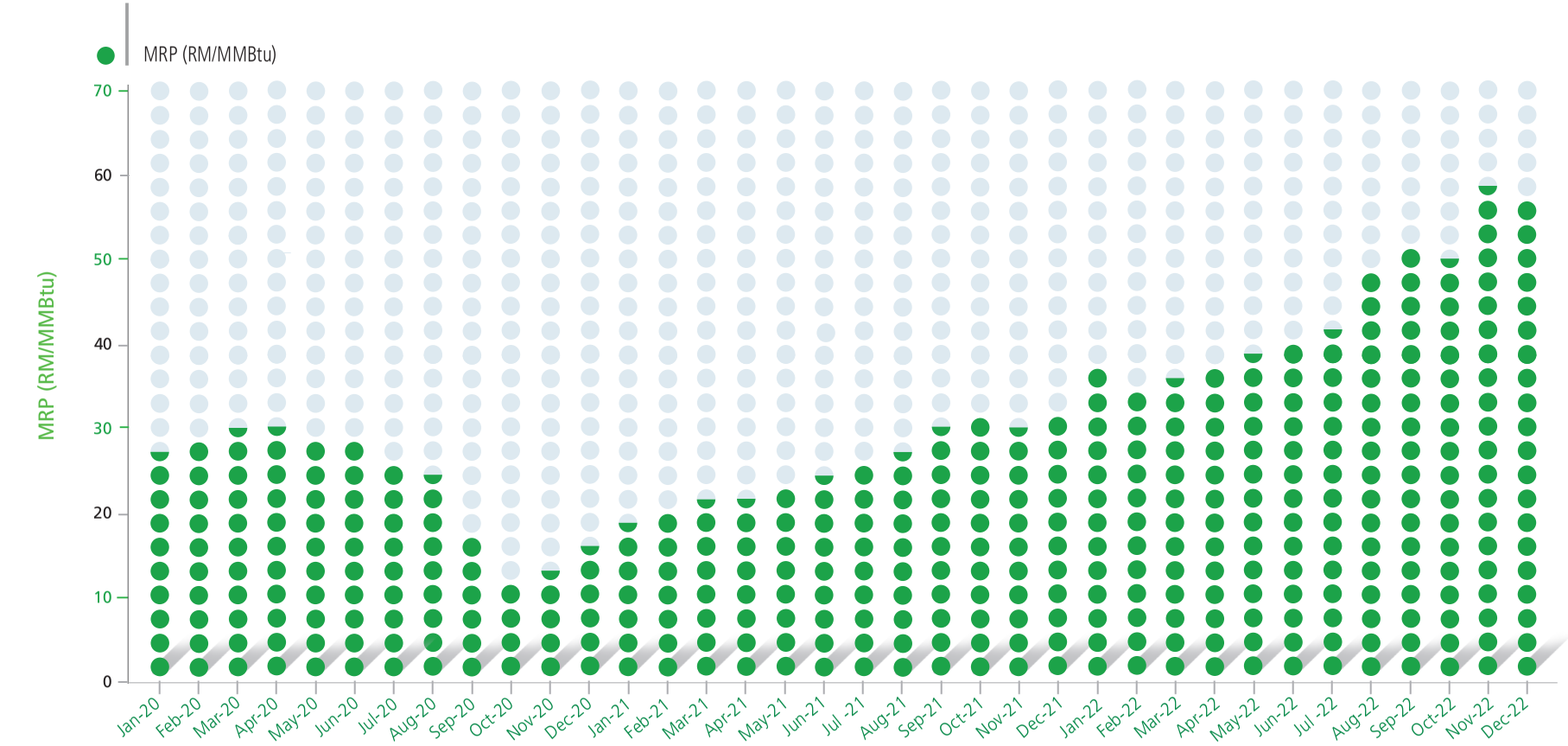
Figure 13: Annual Liquefied Petroleum Gas (LPG) Contract Prices – Arab Gulf



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Propane	430.79	510.27	858.00	340.00	504.37	708.01	828.03	914.12	856.70	790.70	416.75	323.67	467.56	544.24	434.58	397.40	649.86	735.74
Butane	442.89	514.00	887.50	335.00	521.43	716.81	871.12	917.45	884.14	810.58	436.57	356.17	502.06	541.65	441.67	404.13	631.49	732.84

Note: Yearly LPG contract prices - Arab Gulf, in USD per Metric Tonne, taken from Industry Sources.
Source: PETRONAS

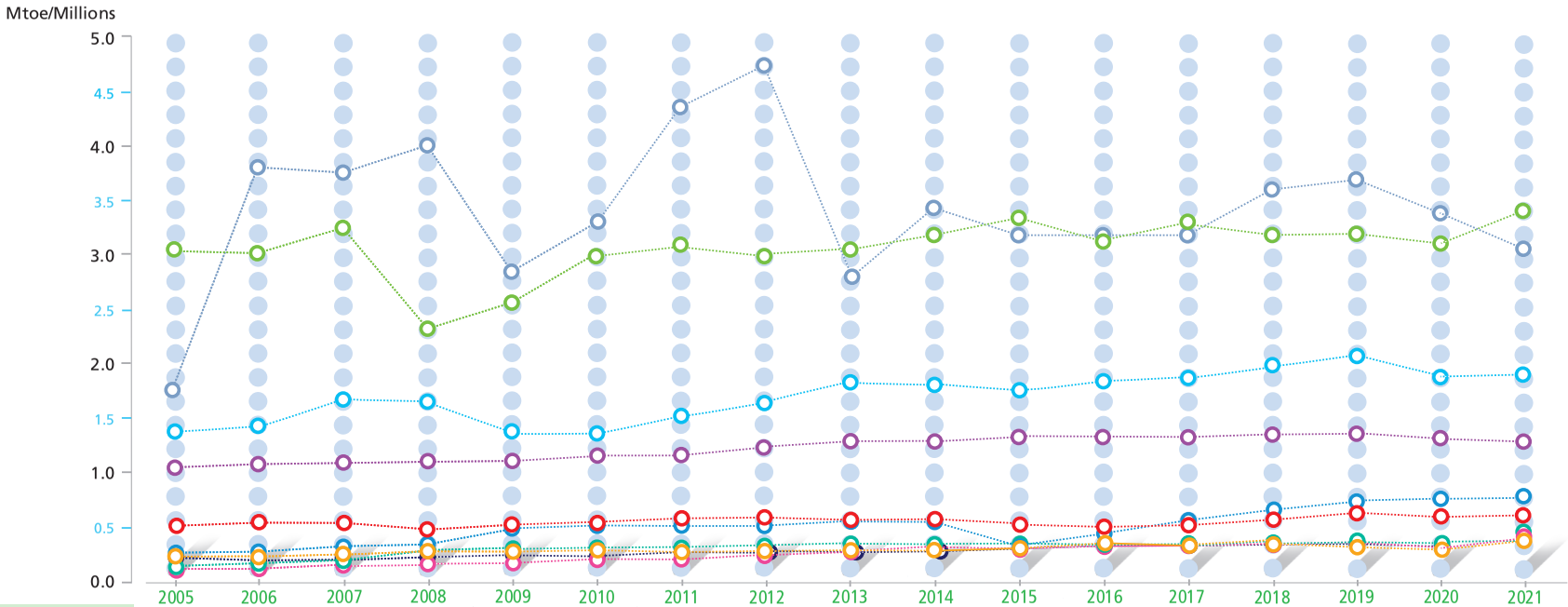
Figure 14: Malaysia Reference Price (MRP) of Natural Gas



	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22
MRP (RM/MMBtu)	29.0	29.1	29.6	29.6	29.1	29.1	25.4	24.3	17.4	14.5	14.7	15.6	19.9	20.1	21.4	21.1	22.5	23.5	25.0	27.5	30.3	31.9	31.5	32.7	36.9	34.0	35.4	36.4	37.9	40.1	42.9	47.6	52.1	51.3	58.5	58.1

Source: Energy Commission

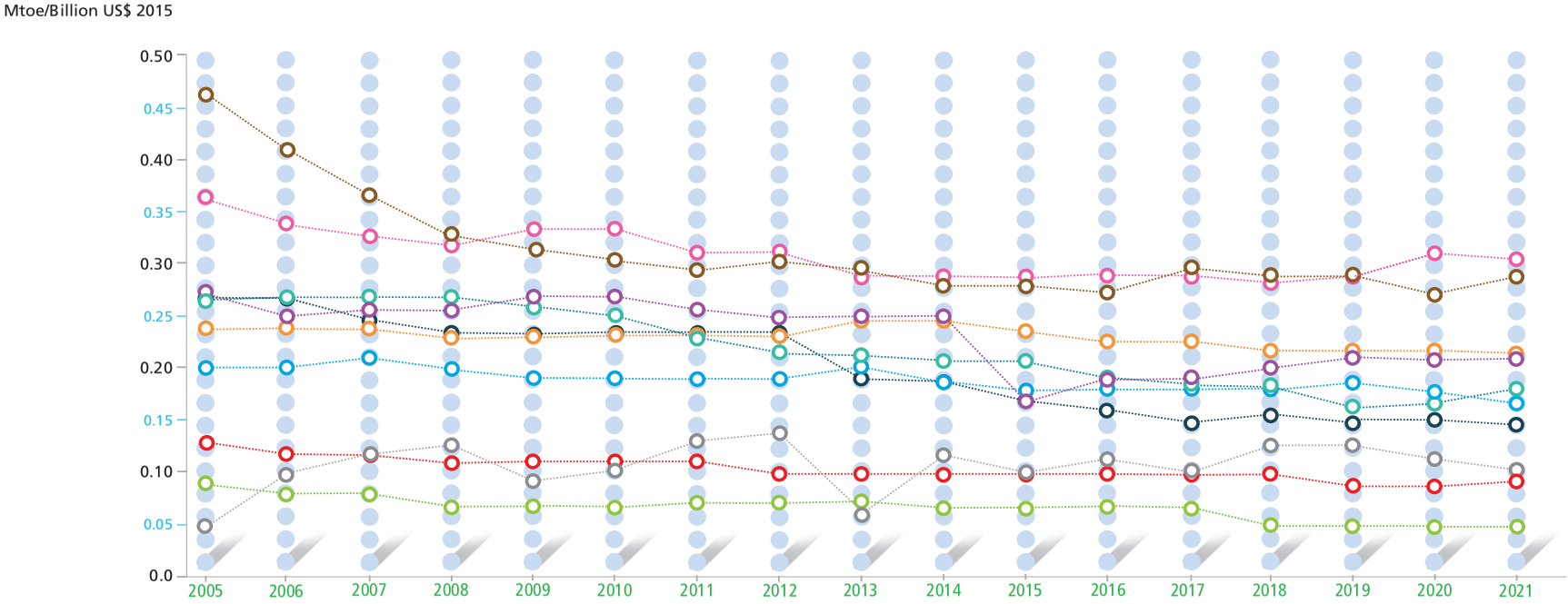
Figure 15: Final Energy Consumption Per Capita in ASEAN



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Brunei Darussalam	1.700	3.819	3.795	3.903	2.815	3.280	4.328	4.617	2.676	3.419	3.088	3.086	3.091	3.581	3.584	3.434	3.093
Cambodia	0.252	0.254	0.262	0.264	0.279	0.291	0.294	0.303	0.309	0.320	0.340	0.361	0.372	0.388	0.428	0.435	0.437
Indonesia	0.578	0.593	0.590	0.568	0.578	0.608	0.635	0.647	0.596	0.597	0.574	0.544	0.547	0.584	0.603	0.557	0.557
Lao People's Democratic Republic	0.304	0.328	0.349	0.382	0.389	0.390	0.385	0.386	0.410	0.419	0.443	0.430	0.431	0.434	0.414	0.419	0.446
Malaysia	1.439	1.479	1.623	1.595	1.416	1.453	1.499	1.572	1.753	1.698	1.629	1.747	1.890	1.928	1.948	1.686	1.670
Myanmar	0.272	0.268	0.270	0.254	0.255	0.253	0.258	0.278	0.289	0.302	0.312	0.323	0.371	0.374	0.380	0.370	0.342
Philippines	0.264	0.255	0.262	0.256	0.258	0.265	0.262	0.263	0.274	0.282	0.301	0.320	0.331	0.329	0.329	0.289	0.308
Singapore	3.152	3.142	3.247	2.456	2.613	3.006	3.158	3.013	3.133	3.273	3.395	3.178	3.296	3.230	3.289	3.142	3.441
Thailand	1.071	1.090	1.094	1.098	1.150	1.237	1.239	1.317	1.369	1.372	1.396	1.385	1.406	1.421	1.447	1.357	1.319
Vietnam	0.422	0.424	0.453	0.481	0.517	0.553	0.554	0.555	0.578	0.610	0.507	0.533	0.558	0.635	0.685	0.704	0.713

Source: World Energy Balances, 2023 Edition, International Energy Agency (IEA)

Figure 16: Final Energy Intensity in ASEAN



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Brunei Darussalam	0.050	0.108	0.110	0.118	0.087	0.101	0.128	0.139	0.082	0.111	0.100	0.105	0.104	0.120	0.119	0.113	0.105
Cambodia	0.361	0.334	0.319	0.305	0.328	0.327	0.313	0.306	0.295	0.289	0.290	0.292	0.285	0.280	0.292	0.310	0.306
Indonesia	0.270	0.266	0.252	0.229	0.225	0.226	0.225	0.219	0.193	0.186	0.173	0.157	0.152	0.156	0.155	0.147	0.143
Lao People's Democratic Republic	0.263	0.264	0.265	0.274	0.263	0.248	0.230	0.217	0.216	0.208	0.209	0.192	0.183	0.176	0.163	0.168	0.177
Malaysia	0.200	0.199	0.210	0.201	0.185	0.179	0.178	0.18	0.195	0.181	0.168	0.175	0.181	0.179	0.175	0.163	0.158
Myanmar	0.465	0.406	0.367	0.323	0.312	0.297	0.289	0.295	0.287	0.280	0.271	0.266	0.290	0.278	0.266	0.252	0.286
Philippines	0.127	0.119	0.116	0.111	0.112	0.110	0.106	0.102	0.101	0.099	0.101	0.102	0.101	0.096	0.092	0.090	0.093
Singapore	0.075	0.071	0.070	0.055	0.060	0.062	0.062	0.058	0.059	0.060	0.061	0.056	0.055	0.053	0.054	0.053	0.051
Thailand	0.244	0.239	0.229	0.228	0.242	0.243	0.243	0.243	0.247	0.247	0.244	0.236	0.231	0.224	0.224	0.225	0.215
Vietnam	0.269	0.255	0.256	0.261	0.268	0.273	0.273	0.259	0.248	0.249	0.196	0.194	0.192	0.206	0.208	0.210	0.209

Source: World Energy Balances, 2023 Edition, International Energy Agency (IEA)

National Energy Balance 2022

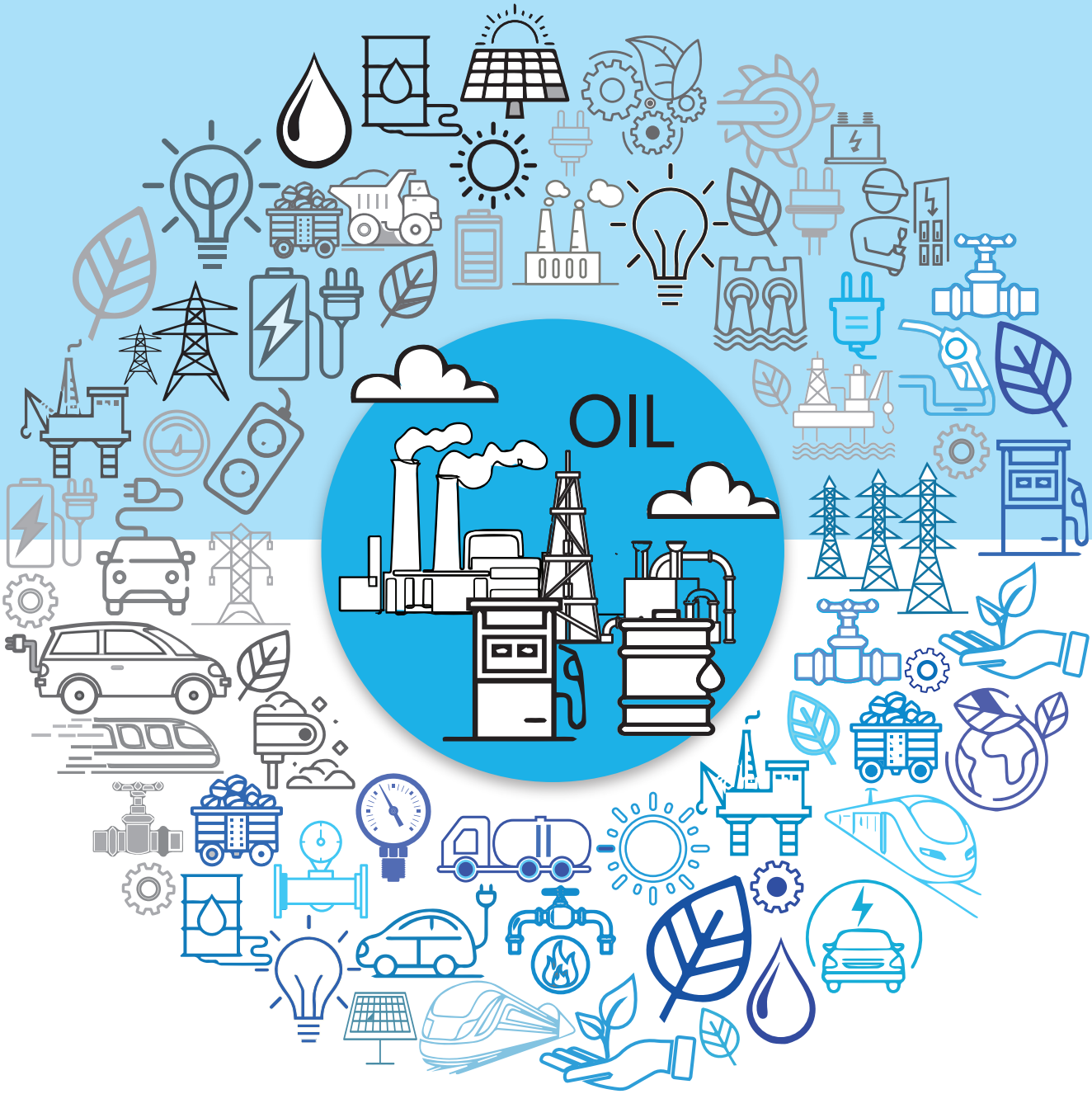


Table 3 : Resources and Production of Oil as of 1st January 2022

Region	Resources (Billion Barrel)			Production (Thousand Barrels per day)		
	Crude Oil	Condensates	Total	Crude Oil	Condensates	Total
Peninsular Malaysia	1.121	0.254	**1.375**	129.38	32.71	**162.09**
Sabah	1.154	0.122	**1.276**	181.32	11.15	**192.47**
Sarawak	1.256	0.575	**1.830**	87.94	70.48	**158.42**
Total	**3.531**	**0.951**	**4.482**	**398.63**	**114.34**	**512.97**

Source : PETRONAS

Table 4 : Refinery Licensed Capacity, 2022

Refinery Plants	Location	Start-up date	Thousand Barrels/Day
Petron Malaysia (previously owned by ESSO Malaysia Bhd)	Port Dickson, Negeri Sembilan	1960	**88**
Hengyuan Refining Company (formerly known as Shell Refining Co. (FOM) Bhd)	Port Dickson, Negeri Sembilan	1963	**155**
PETRONAS	Kertih, Terengganu*	1983	**49**
PETRONAS	Melaka	1994	**100**
Malaysia Refining Company Sdn Bhd (PETRONAS / ConocoPhillips)	Melaka	1998	**100**
Kemaman Bitumen Company	Kemaman, Terengganu	2003	**28**
Pengerang RAPID	Pengerang, Johor	NA	**279**
Total			**799**

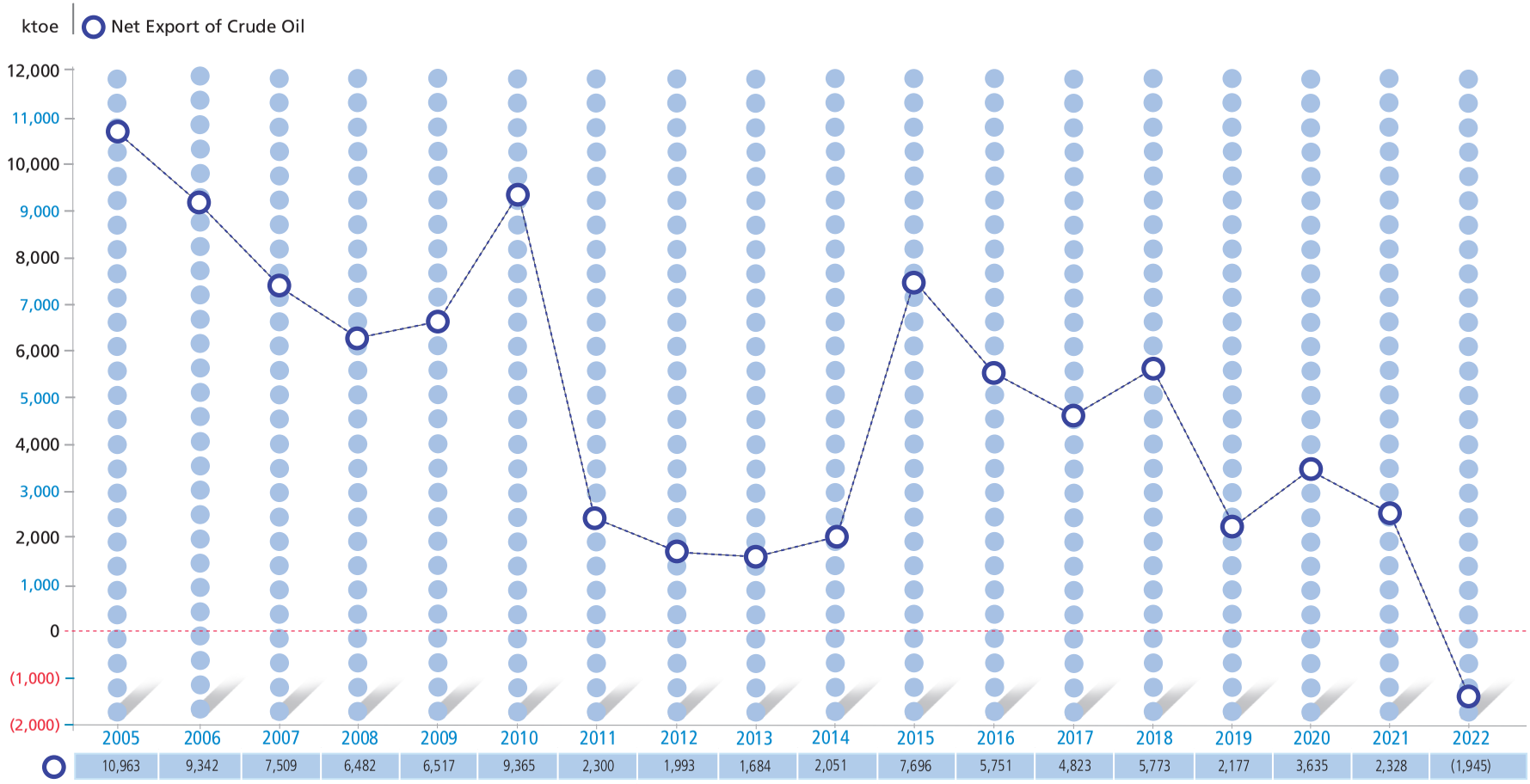
Source : PETRON, PETRONAS & SHELL
Note (*): Excludes condensate splitter of 74,300 bpd

Table 5 : Breakdown on Sales of Petroleum Products in Thousand Barrels, 2022

Petroleum Products	Peninsular Malaysia	Sabah	Sarawak	Total
Petrol	101,798	5,824	5,581	**113,203**
Diesel	63,312	10,457	9,050	**82,818**
Fuel Oil	3,252	3	148	**3,403**
Kerosene	272	18	21	**310**
LPG	13,861	928	288	**15,077**
ATF & AV Gas	12,898	553	412	**13,863**
Non-Energy	3,794	278	260	**4,332**
Total	**199,186**	**18,060**	**15,760**	**233,007**

Source: Oil companies

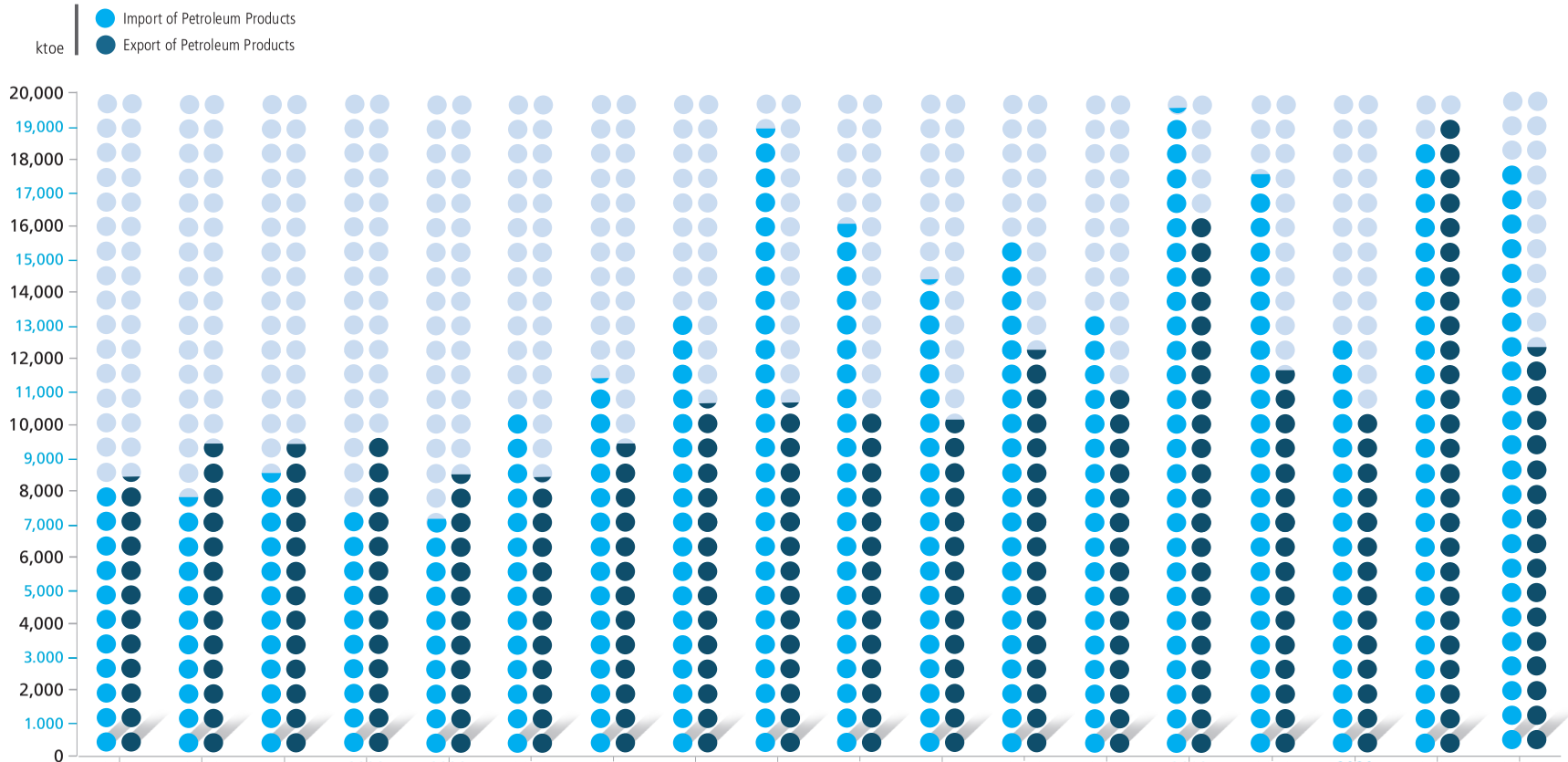
Figure 17: Net Export of Crude Oil



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Net Export of Crude Oil	10,963	9,342	7,509	6,482	6,517	9,365	2,300	1,993	1,684	2,051	7,696	5,751	4,823	5,773	2,177	3,635	2,328	(1,945)

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

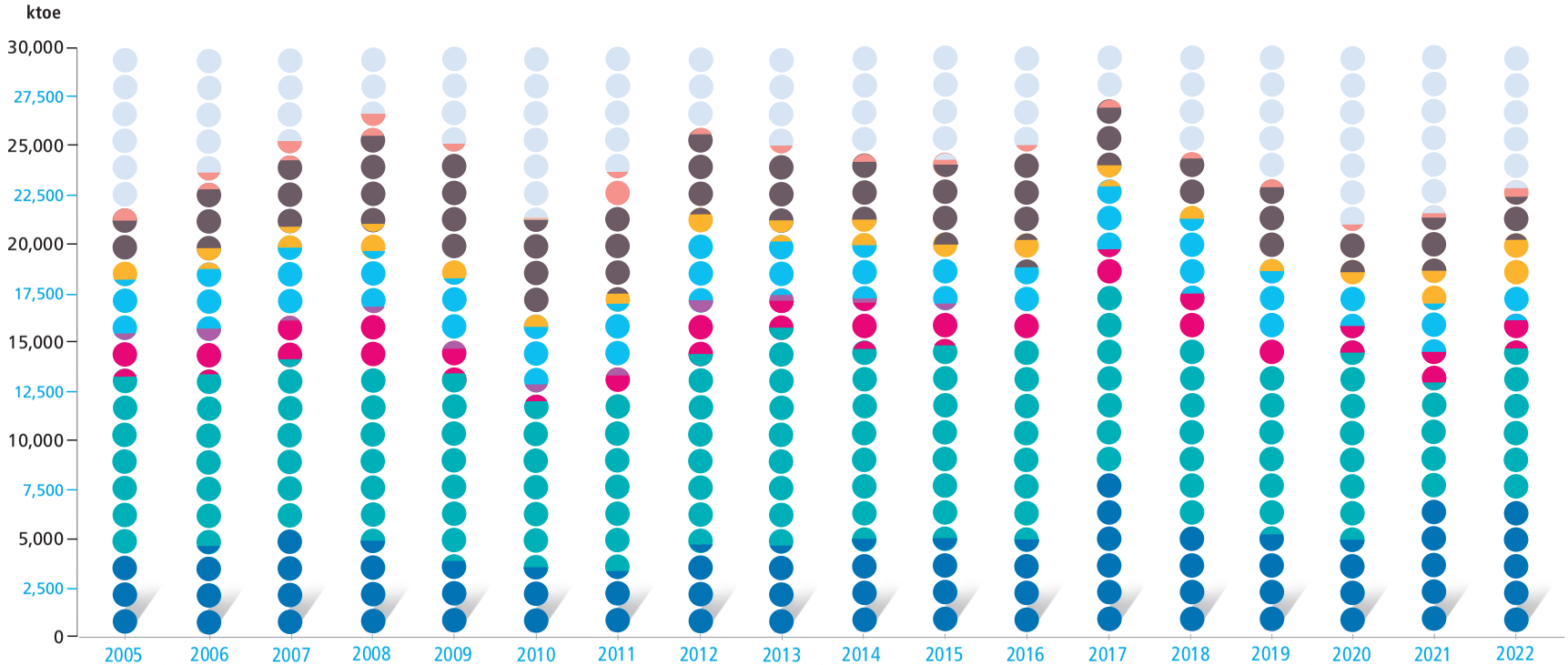
Figure 18: Export and Import of Petroleum Products



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Import of Petroleum Products	7,961	7,734	8,452	7,376	7,243	10,359	11,579	13,242	19,383	16,009	14,218	15,341	13,252	19,764	17,662	12,586	18,329	16,029
Export of Petroleum Products	8,435	9,535	9,780	9,527	8,419	8,431	9,421	10,784	11,877	10,399	10,220	12,214	11,063	16,028	11,779	10,590	19,260	11,877

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

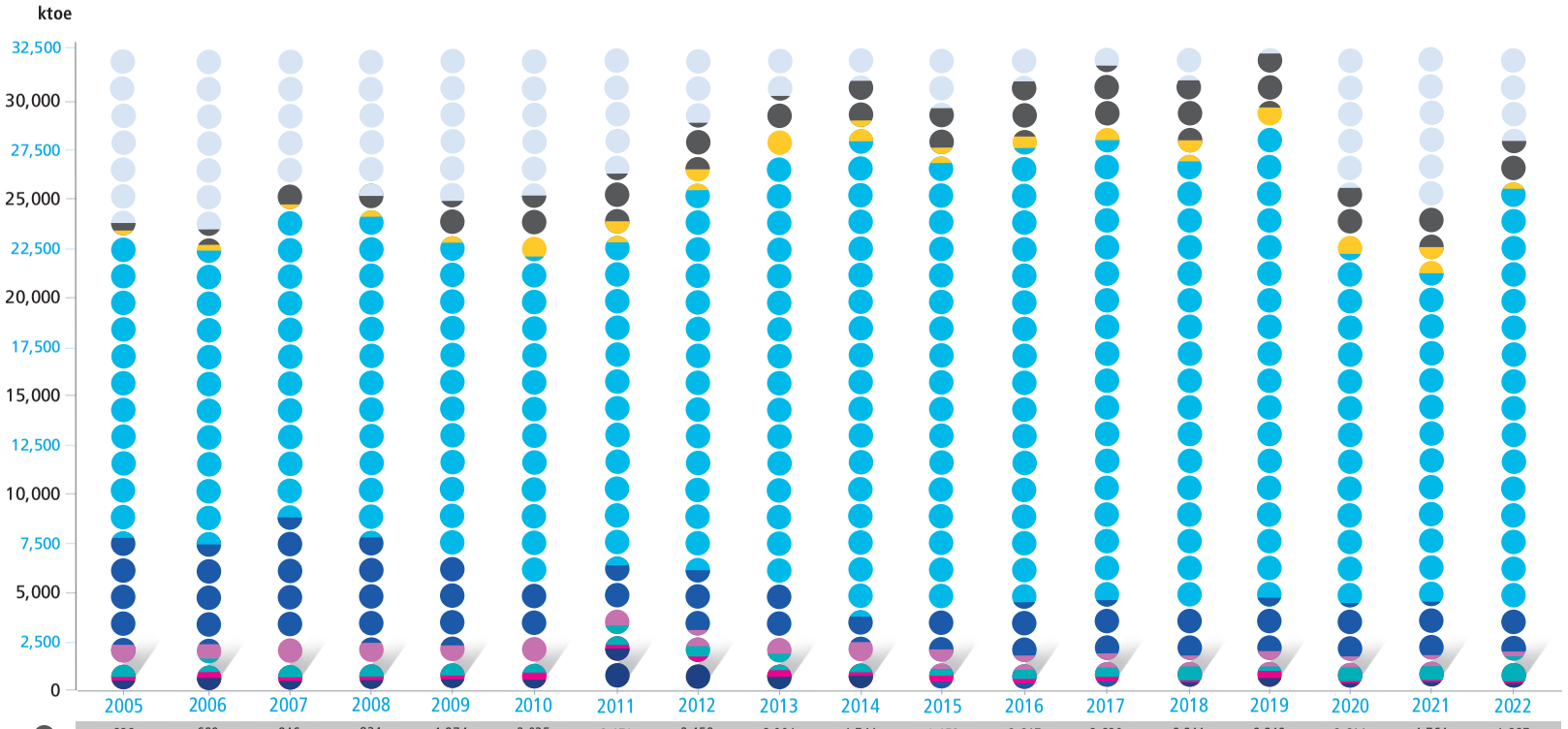
Figure 19: Production of Petroleum Products from Refineries



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Refinery Gas	202	849	938	991	195	209	1,659	197	195	192	172	201	174	130	147	156	155	164
Non-Energy	2,157	2,750	3,461	4,475	5,905	4,357	4,572	4,318	3,089	2,826	3,869	4,339	3,100	2,550	3,708	1,954	2,762	2,409
LPG	822	1,118	1,228	1,208	732	697	665	702	1,252	1,102	780	1,285	832	900	560	672	1,755	1,049
ATF & AV Gas	2,553	2,938	3,138	3,139	3,085	2,891	3,457	3,918	2,750	2,916	2,841	2,548	3,255	3,451	3,470	2,459	2,386	1,461
Kerosene	521	537	234	245	565	483	419	654	387	100	6	4	10	18	8	12	10	2
Fuel Oil	1,777	1,933	1,990	1,994	1,144	327	571	1,608	1,286	2,340	1,692	1,479	1,725	2,432	1,388	1,204	1,497	2,185
Diesel	9,161	8,752	9,033	9,364	9,415	8,369	8,925	10,033	11,063	9,725	9,890	9,988	9,877	9,665	8,484	9,199	6,157	10,525
Petrol	4,245	4,607	5,285	5,066	4,052	3,873	3,599	4,708	4,702	4,918	5,031	5,044	8,253	5,524	5,317	5,089	6,760	6,958

Source : Oil companies

Figure 20: Final Consumption for Petroleum Products



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Non-Energy	632	699	846	831	1,874	2,035	2,471	2,159	2,001	1,744	1,458	2,647	2,680	2,811	2,812	2,611	1,764	1,867
Agriculture	101	254	266	267	189	1,049	890	1,023	1,019	988	854	368	625	968	870	808	986	1,158
Transport	15,193	14,700	15,566	16,186	15,871	16,562	16,756	19,329	21,859	23,750	22,760	23,379	23,473	22,957	24,215	17,771	17,203	22,823
Industrial	5,547	5,136	6,089	5,265	4,437	2,798	1,996	3,108	2,660	1,511	2,186	2,423	2,688	2,437	2,761	2,616	2,498	1,941
Commercial	756	765	1,266	894	1,026	1,246	1,019	877	915	877	767	925	601	448	553	543	461	408
Residential	783	844	820	1,009	750	712	791	715	736	647	674	605	798	789	623	960	993	940
CO-Generations	87	34	83	63	92	201	199	25	23	25	51	46	226	154	71	56	37	546
Power Stations	573	788	513	480	589	540	2,084	1,361	1,015	891	380	320	246	204	536	166	244	412

Source : Oil companies

National Energy Balance 2022

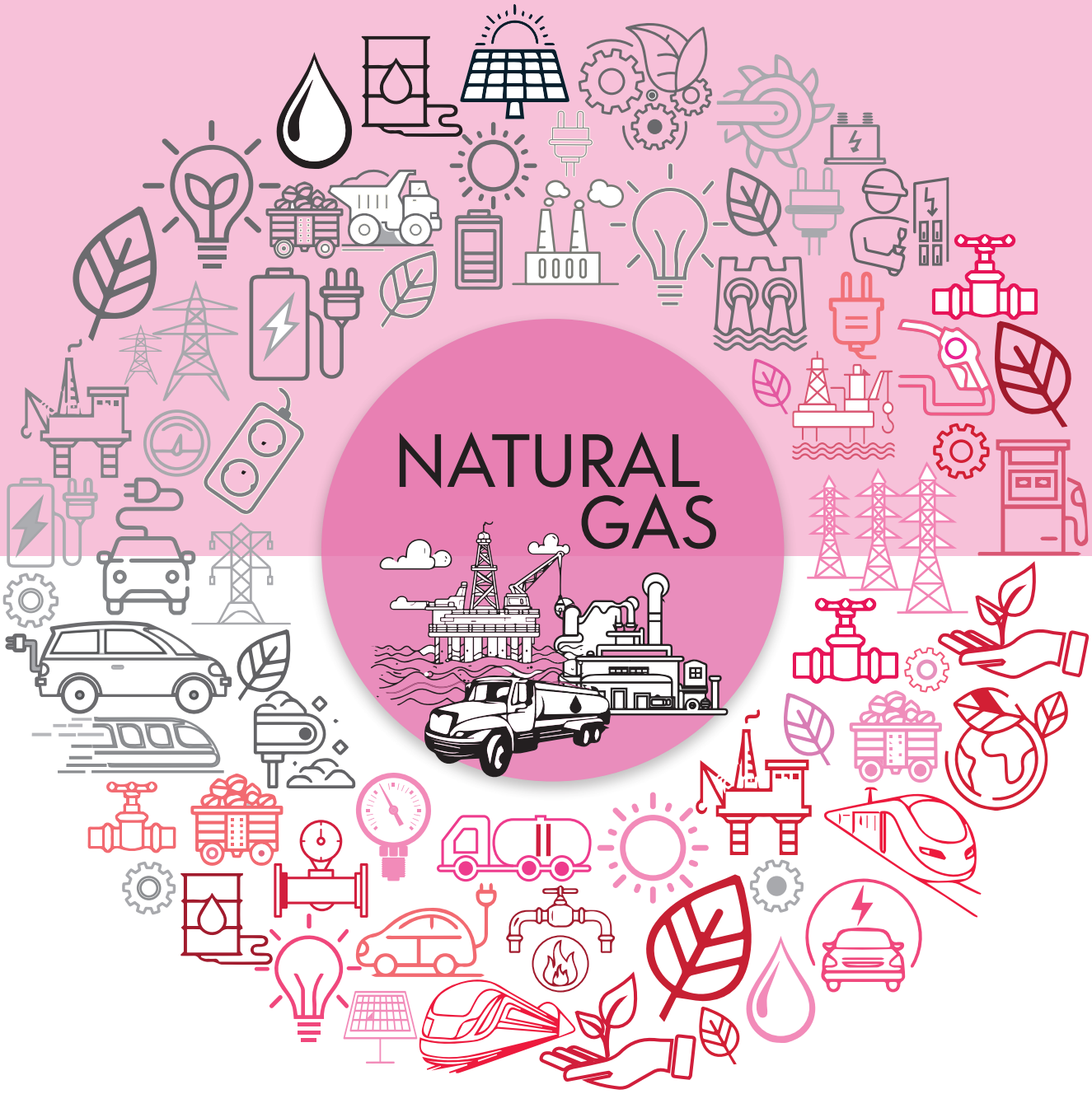


Table 6: Resources and Production of Natural Gas as of 1st January 2022

Region	Resources			Production
	Trillion standard cubic feet (Tscf)			Million standard cubic feet per day (MMscf/d)
	Associated	Non-Associated	Total	
Peninsular Malaysia	4.757	14.302	**19.058**	1,865.41
Sabah	1.721	8.405	**10.125**	860.34
Sarawak	2.956	44.037	**46.993**	4,225.69
Total	**9.434**	**66.743**	**76.177**	**6,951.43**

Source : PETRONAS
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

Table 7: Gas Processing Plants Capacity, 2022

Refinery Plants	Location	Start-up date	Plant Capacity
PETRONAS LNG Complex	Bintulu, Sarawak	1978	29.3 million tonnes per annum (MTPA)
PETRONAS Gas Processing Plant (GPP)	Kerteh, Terengganu	1984	2,000 million standard cubic feet/day (MMscfd)
Shell Middle Distillate Synthesis (SMDS)	Bintulu, Sarawak	1993	500,000 thousand tonnes/year
PETRONAS Regasification Terminal Sungai Udang (RGTSU)	Sungai Udang, Melaka	2013	500 million standard cubic feet/day (MMscfd)
PETRONAS Floating LNG SATU	Offshore Sabah	2016	1.2 million tonnes per annum (MTPA)
PETRONAS Regasification Terminal Pengerang (RGTP)	Pengerang, Johor	2017	490 million standard cubic feet/day (MMscfd)
PETRONAS Floating LNG DUA	Offshore Sabah	2021	1.5 million tonnes per annum (MTPA)

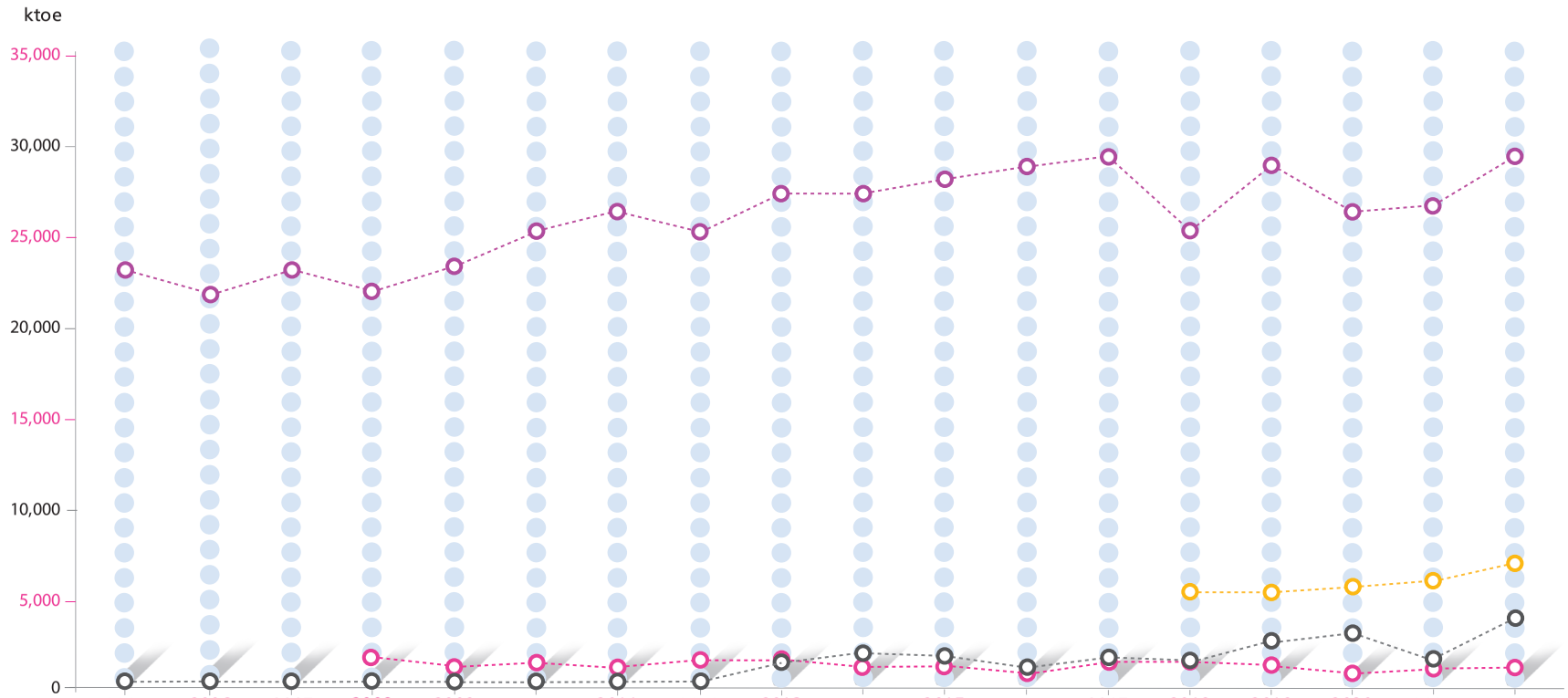
Source : PETRONAS, Shell MDS

Table 8: Consumption of Natural Gas in MMscf, 2022

Sectors	Peninsular Malaysia	Sabah	Sarawak	Malaysia
Residential	22	-	212	**234**
Commercial	696	37	561	**1,294**
Industry	287,882	8,192	19,655	**315,730**
Non-energy	51,060	91,628	60,055	**202,743**
Transport	1,382	-	-	**1,382**
Power Stations	378,842	49,880	40,360	**469,081**
Co-Generation	32,419	1,957	11,763	**46,140**
Total	**752,303**	**151,694**	**132,606**	**1,036,603**

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

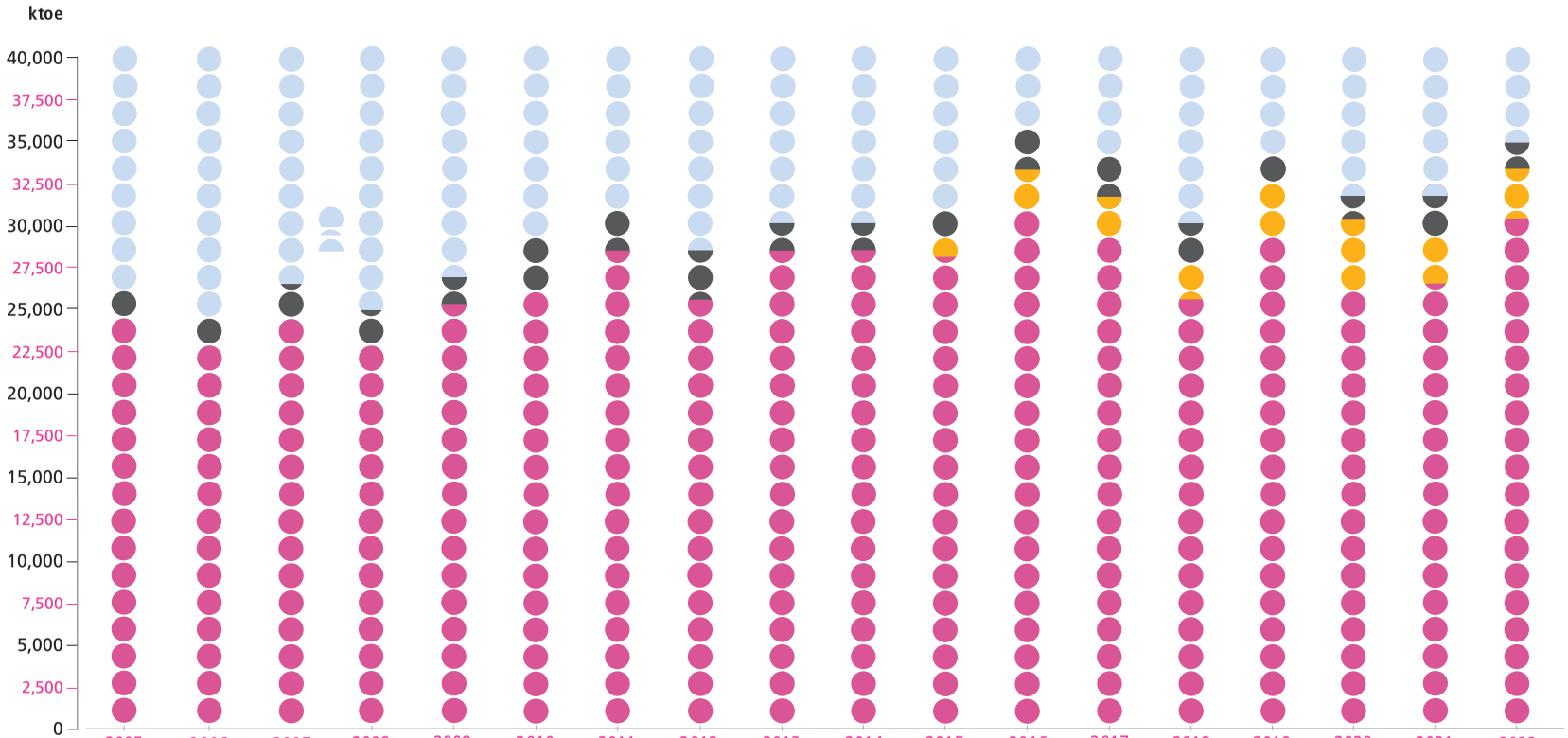
Figure 21: Export and Import of Piped Natural Gas and LNG



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
LNG Export	23,707	22,874	23,777	22,277	23,606	25,487	26,856	25,547	27,089	27,835	27,057	27,457	29,428	25,920	29,044	26,155	26,798	29,487
Piped Natural Gas Import	1,340	3,313	5,435	4,565	5,055	7,013	6,979	7,866	7,098	6,472	5,941	5,557	5,183	5,573	5,325	5,519	6,049	6,625
Piped Natural Gas Export	1,134	1,257	1,295	1,524	1,166	1,340	1,147	1,368	1,497	1,129	1,062	841	1,452	1,407	1,114	1,179	1,569	1,629
LNG Import	-	-	-	-	-	-	-	-	1,450	2,019	1,873	1,275	1,815	1,383	2,663	2,939	1,996	3,801

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

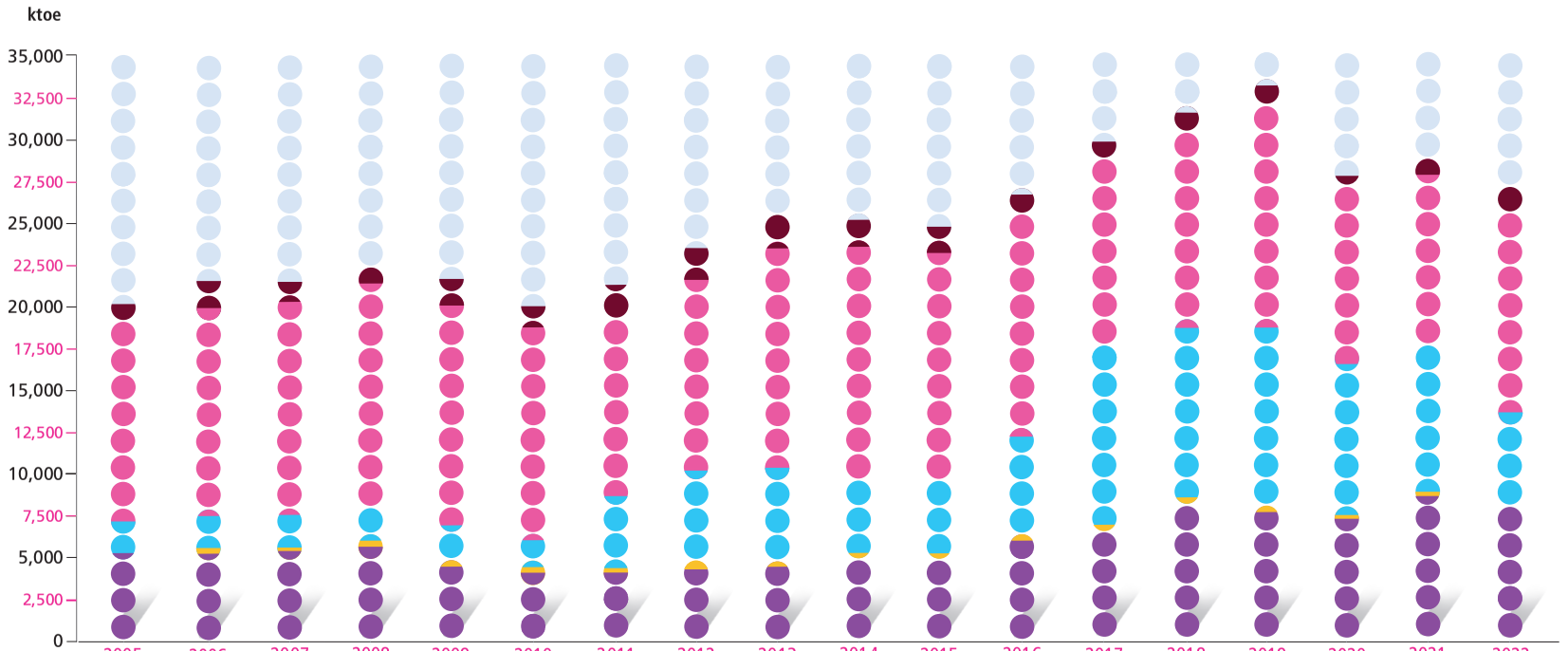
Figure 22: Conversion in Gas Plants



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Gas-to-Liquid	1,779	1,500	1,900	1,843	1,438	2,753	2,793	2,521	1,652	1,670	1,578	2,570	2,470	2,523	2,532	2,439	1,681	1,685
Regasification	-	-	-	-	-	-	-	-	-	-	1,873	1,277	1,815	1,383	2,663	2,939	1,996	2,506
Liquefaction	24,254	23,450	24,355	22,793	25,004	26,601	28,130	26,231	28,209	28,213	27,722	31,658	29,468	25,920	29,044	26,155	26,798	30,088

Source: Oil and gas companies

Figure 23: Natural Gas Consumption by Sectors



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Co-Generation	923	1,431	1,140	1,030	1,385	1,031	1,697	1,734	1,650	1,678	1,739	1,094	1,038	1,274	1,333	1,395	1,185	1,210
Power Stations	12,271	12,330	12,476	13,651	13,390	12,628	10,956	11,533	13,520	13,860	13,378	13,260	11,872	11,542	13,072	9,841	9,936	12,299
Non-Energy	1,541	2,110	2,112	2,046	1,995	1,661	3,967	5,336	5,276	4,472	4,470	6,083	9,837	10,451	10,819	9,193	9,105	5,316
Transport	95	120	147	194	236	247	272	292	289	276	264	208	148	121	98	65	35	36
Industrial	5,317	5,301	5,416	5,541	4,544	4,310	4,300	4,556	4,488	4,869	4,808	5,989	6,827	8,255	7,706	7,358	8,663	8,278
Commercial	23	24	28	31	25	30	32	22	22	22	24	24	25	24	23	14	11	34
Residential	5	5	6	6	2	6	7	1	1	1	1	1	1	1	1	1	1	6

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

National Energy Balance 2022

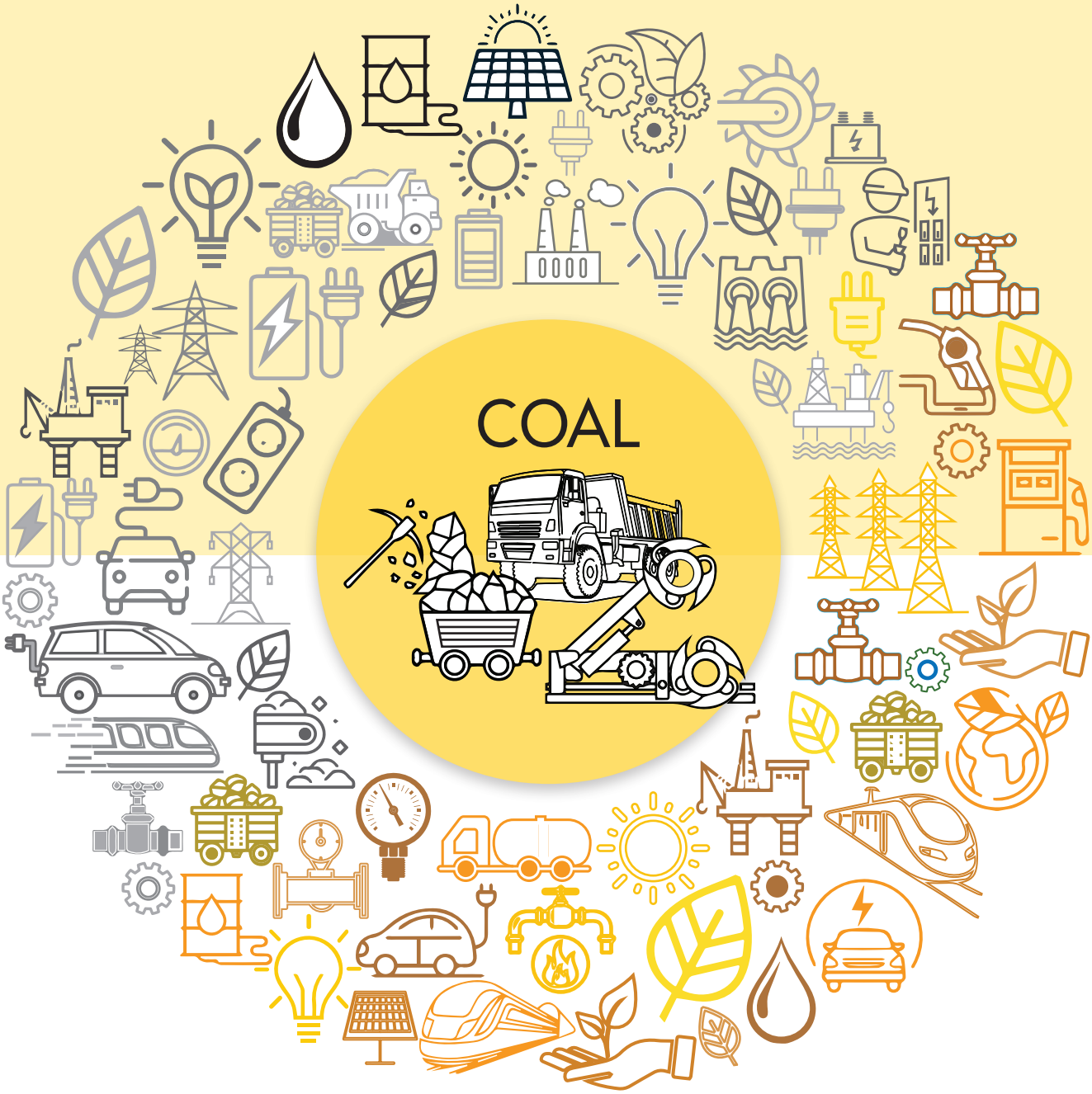


Table 9 : Resources and Production of Coal as of 31st December 2022

Location	Resources (Million Tonnes) Measured	Coal Type	Production (metric tonnes)
	Measured		
SARAWAK			
1. Abok & Silantek, Sri Aman	7.25	Coking coal, semi-anthracite & anthracite	68,553
2. Merit-Pila, Kapit	170.20	Bituminous, Sub-Bituminous	481,282
3. Mukah - Balingian	86.95	Sub-bitumen & lignite	2,871,814
4. Bintulu	6.00	Bituminous (partly coking coal)	-
5. Tutoh Area	5.58	Sub-Bituminous	-
Total	**275.98**		**3,421,649**

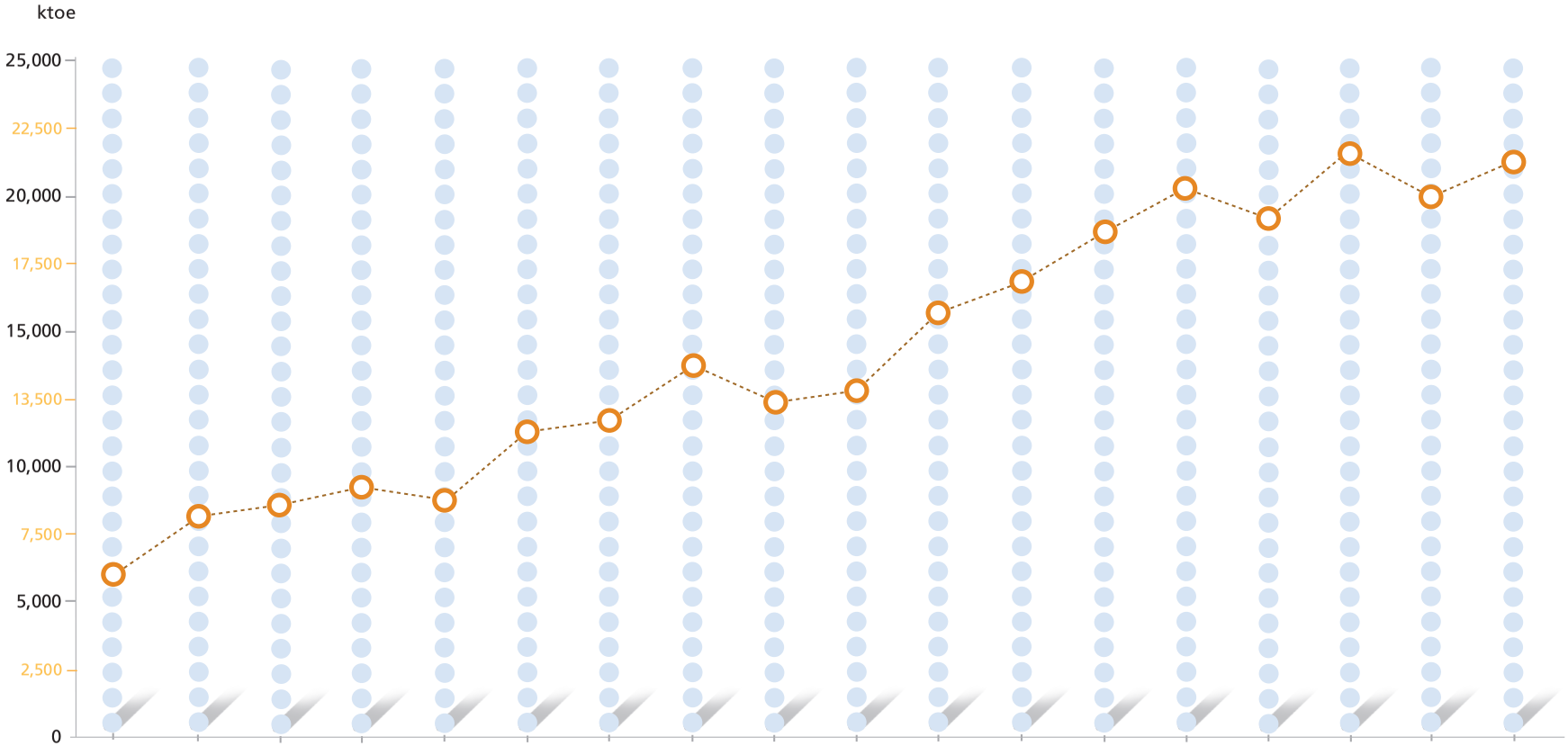
Source: Department of Mineral and Geosciences Malaysia

Table 10: Consumption of Coal in Metric Tonnes, 2022

Sectors	Peninsular Malaysia	Sabah	Sarawak	Malaysia
Industry	2,314,214	-	148,926	**2,463,140**
Power Stations	31,972,243	-	3,087,236	**35,059,479**
Total	**34,286,457**	**0**	**3,236,162**	**37,522,619**

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

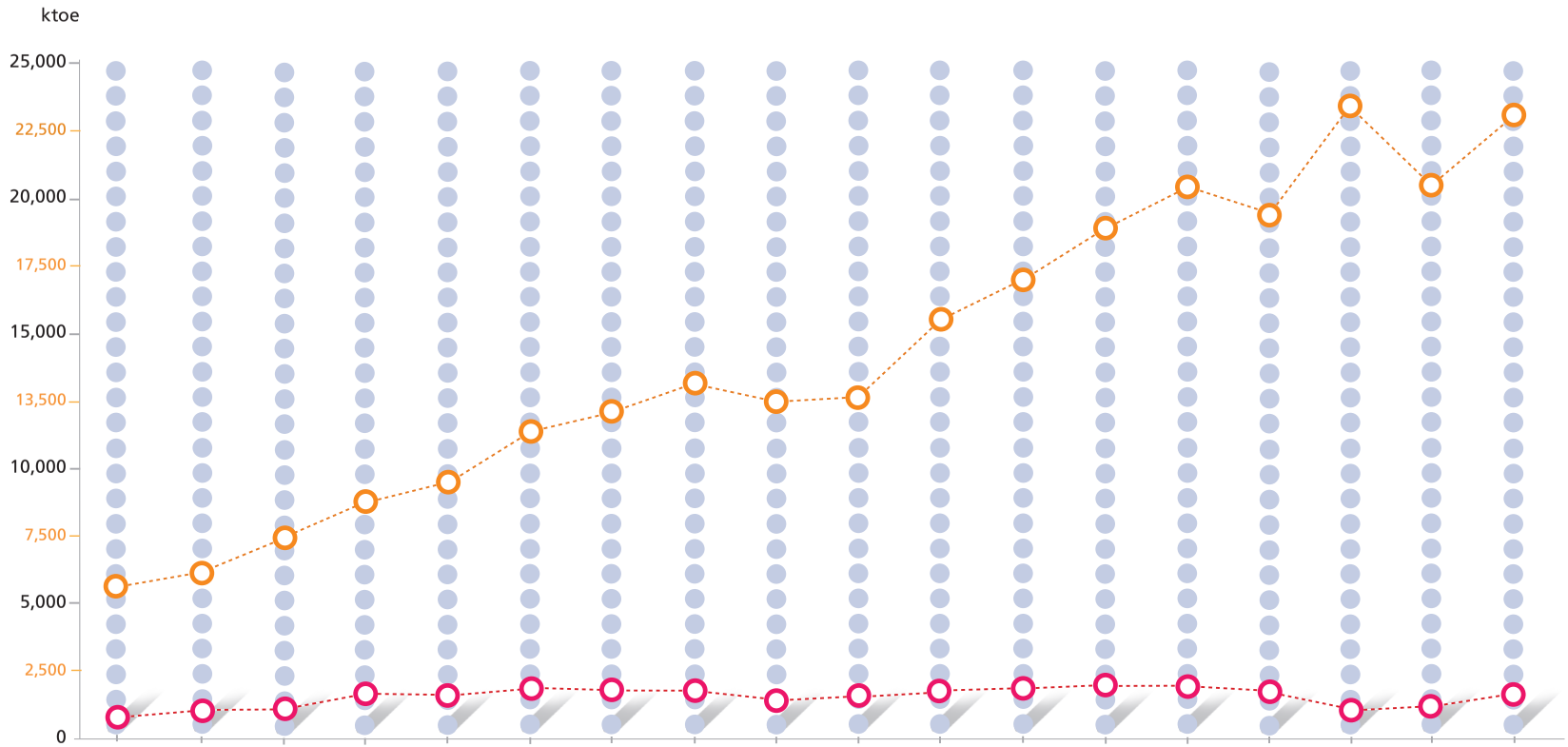
Figure 24: Net Import of Coal



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Net Import of Coal	6,568	7,917	8,152	9,519	9,007	13,011	13,189	13,988	13,583	13,590	15,895	17,128	18,799	20,743	19,622	22,235	20,355	21,346

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

Figure 25: Coal Consumption by Sectors



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Power Stations	5,541	5,964	7,486	8,069	9,010	12,951	13,013	14,138	13,527	13,648	15,627	17,101	18,967	20,472	19,351	23,451	21,525	22,102
Industry	1,348	1,335	1,362	1,713	1,613	1,826	1,759	1,744	1,539	1,709	1,778	1,785	1,804	1,808	1,706	1,338	1,392	1,553

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

National Energy Balance 2022

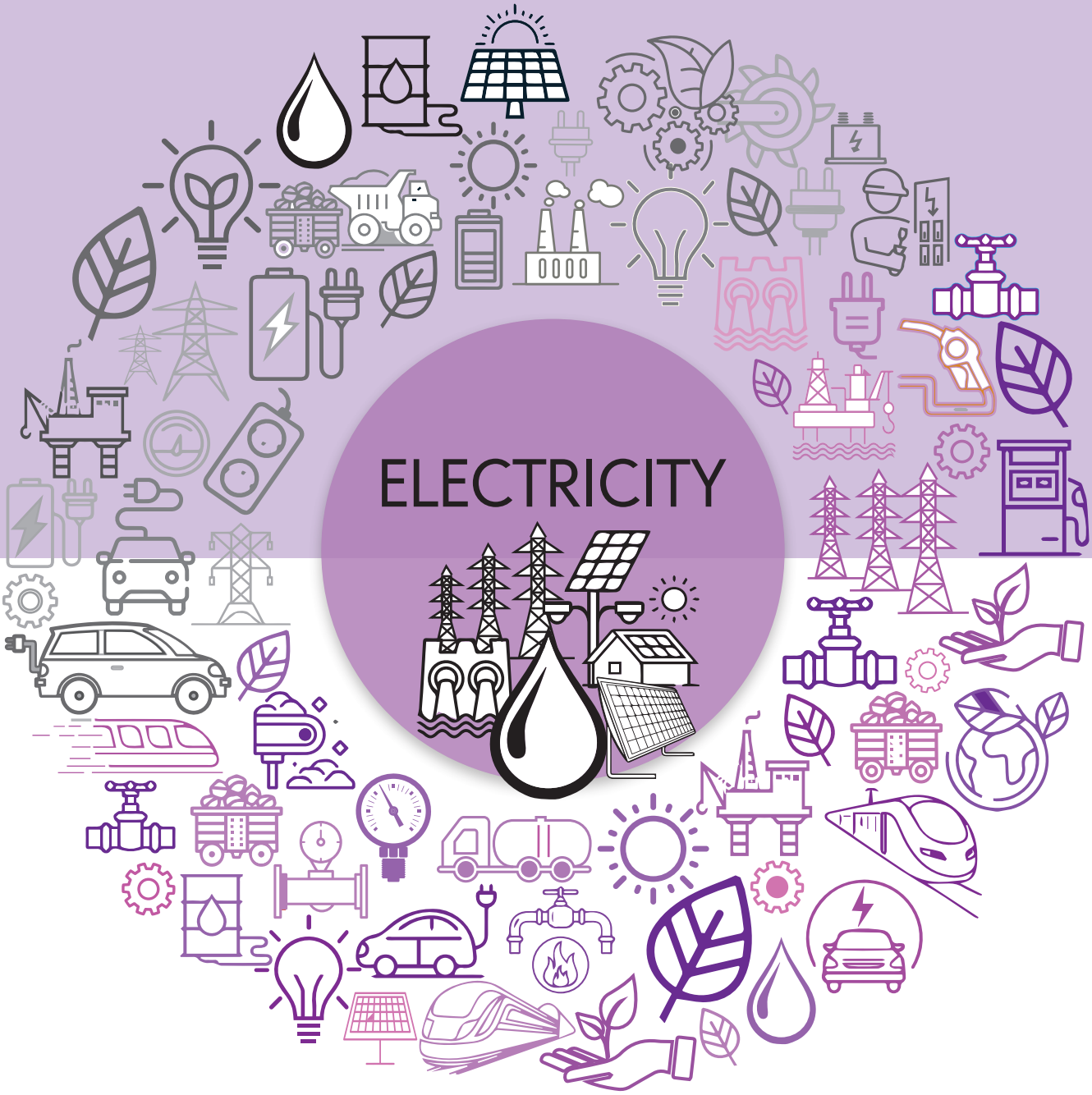


Table 11 : Installed Capacity as of 31st December 2022, in MW

		Major Hydro	Mini Hydro	Natural Gas	Coal	Diesel / MFO	Biomass	Solar	Biogas	Others	Total
Peninsular Malaysia	TNB	2,536.1	15.9	1,973.0	0.0	0.0	0.0	0.0	0.0	0.0	**4,525.0**
	IPPs	0.0	20.0	10,886.6	12,180.0	0.0	0.0	0.0	0.0	0.0	**23,086.6**
	Co-Generation	0.0	0.0	742.7	0.0	0.0	5.6	0.0	0.0	226.9	**975.1**
	Self-Generation	0.0	0.5	6.7	0.0	35.2	104.8	21.5	0.9	9.8	**179.4**
	FiT	0.0	76.8	0.0	0.0	0.0	44.9	288.1	128.0	0.0	**537.7**
	LSS	0.0	0.0	0.0	0.0	0.0	0.0	1,330.3	0.0	0.0	**1,330.3**
	NEM	0.0	0.0	0.0	0.0	0.0	0.0	697.5	0.0	0.0	**697.5**
	Sub Total	**2,536.1**	**113.2**	**13,608.9**	**12,180.0**	**35.2**	**155.2**	**2,337.3**	**128.9**	**236.7**	**31,331.5**
Sabah	SESB	75.0	3.0	112.0	0.0	267.9	0.0	0.0	0.0	0.0	**457.9**
	IPPs	0.0	0.0	941.0	0.0	65.2	0.0	0.0	0.0	0.0	**1,006.2**
	Co-Generation	0.0	0.0	65.0	0.0	0.0	29.8	0.0	0.0	0.0	**94.8**
	Self-Generation	0.0	3.8	64.4	0.0	106.5	95.2	1.4	9.2	25.7	**306.2**
	FiT	0.0	20.0	0.0	0.0	0.0	13.8	34.4	9.6	0.0	**77.8**
	LSS	0.0	0.0	0.0	0.0	0.0	0.0	50.0	0.0	0.0	**50.0**
	NEM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.03**
	Sub Total	**75.0**	**26.8**	**1,182.5**	**0.0**	**439.6**	**138.8**	**85.8**	**18.8**	**25.7**	**1,992.9**
Sarawak	SEB	3,452.0	1.7	1,425.6	1,054.0	64.0	0.0	0.1	0.0	0.0	**5,997.4**
	Co-Generation	0.0	0.0	381.0	0.0	0.0	0.0	0.0	0.0	0.0	**381.0**
	Self-Generation	0.0	4.5	0.0	0.0	57.1	32.6	0.0	0.5	1.1	**95.8**
	Sub Total	**3,452.0**	**6.2**	**1,806.6**	**1,054.0**	**121.1**	**32.6**	**0.1**	**0.5**	**1.1**	**6,474.2**
Total		**6,063.1**	**146.2**	**16,598.0**	**13,234.0**	**595.9**	**326.6**	**2,423.1**	**148.2**	**263.4**	**39,798.6**
Share (%)		**15.2%**	**0.4%**	**41.7%**	**33.3%**	**1.5%**	**0.8%**	**6.1%**	**0.4%**	**0.7%**	**100.0%**

Source: Power Utilities, IPPs, SEDA Malaysia and Ministry of Utility and Telecommunication Sarawak
Note: Excluding plants that are not in operation

Figure 26 : Installed Capacity As of 31st December 2022

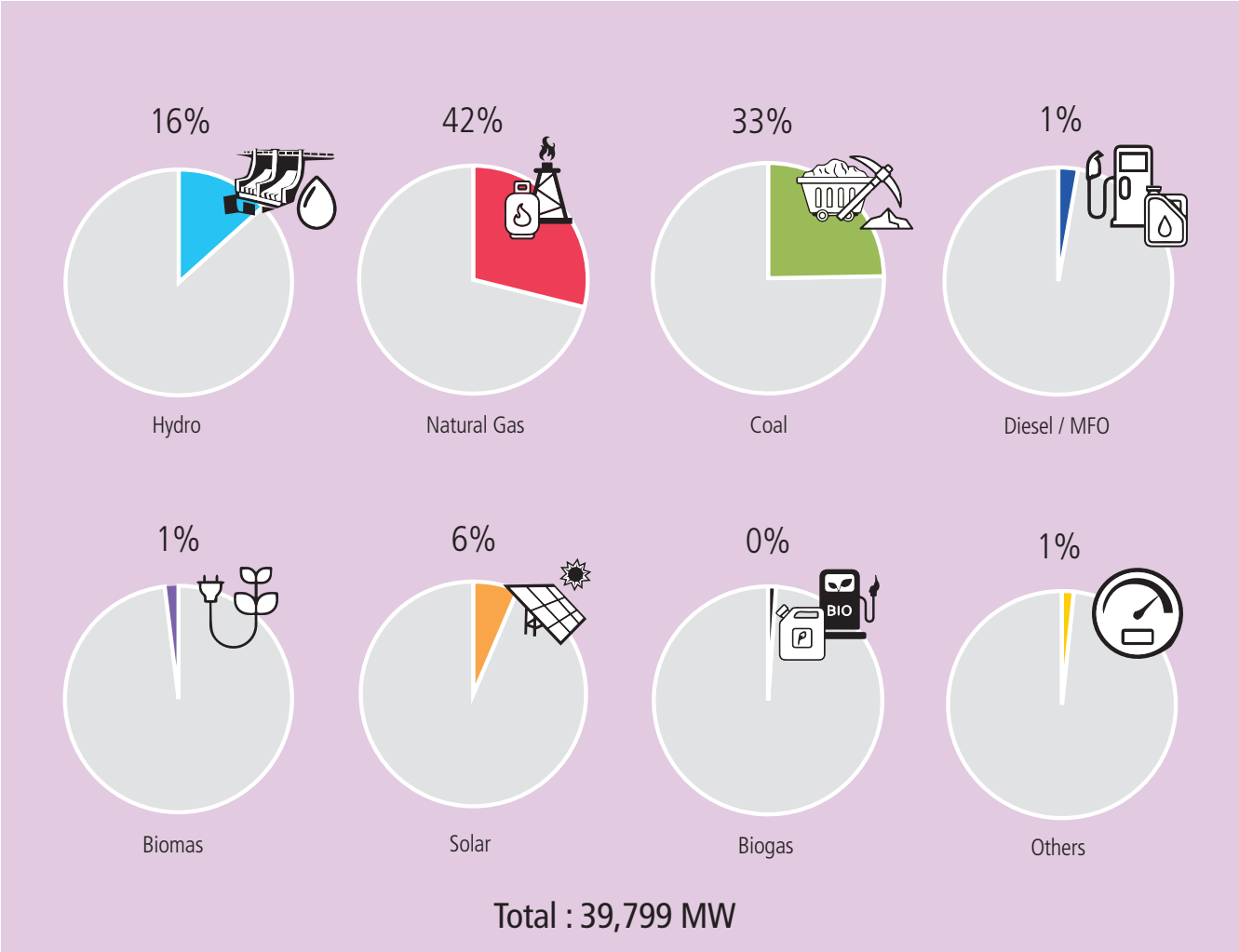
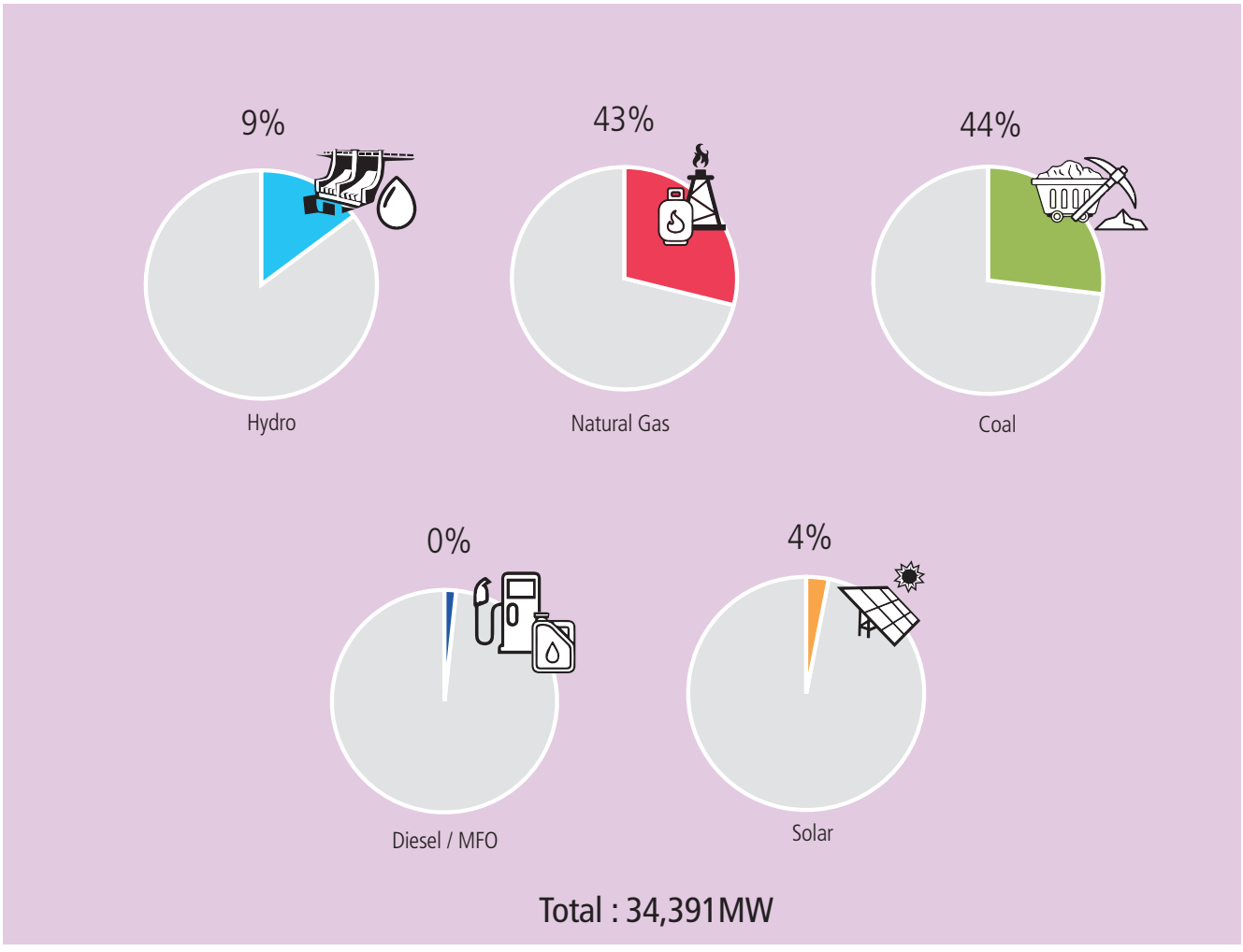


Table 12 : Available Capacity As of 31st December 2022, in MW

	Hydro	Natural Gas	Coal	Diesel / MFO	Biomass / Biogas	Solar	Total
Peninsular Malaysia	2,536	11,990	12,002	-	-	1,060	**27,588**
Sabah	22	963	-	205	23	84	**1,298**
Sarawak	3,440	1,190	820	56	-	0	**5,505**
Total	**5,998**	**14,143**	**12,822**	**261**	**23**	**1,145**	**34,391**

Notes: 1. Available Capacity for Peninsular Malaysia is based on Tested Annual Available Capacity (TAAC),
2. Available Capacity for Sabah is based on Dependable Capacity
Source: Power Utilities and IPPs

Figure 27 : Available Capacity As of 31st December 2022



Source: Power Utilities and IPPs

Table 13 : 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
- Stesen Janakuasa Hulu Terengganu & Tembat	2 x 125 + 2 x 7.5	265
2. Perak		
- Stesen Janakuasa Temenggor	4 x 87	348
- Stesen Janakuasa Bersia	3 x 24	72
- Stesen Janakuasa Kenering	3 x 40	120
- Chenderoh	3 x 10.7 + 1 x 8.4	41
- Sg. Piah Hulu	2 x 7.3	15
- Sg. Piah Hilir	2 x 27	54
3. Pahang		
- Stesen Janakuasa Sultan Yussuf, Jor	4 x 25	100
- Stesen Janakuasa Sultan Idris II, Woh	3 x 50	150
- Stesen Janakuasa Ulu Jelai	2 x 186	372
4. Kelantan		
- Pergau	4 x 150	600
Subtotal		**2,536**
Sabah		
- Tenom Pangi	3 x 25	75
Subtotal		**75**
Sarawak		
- Batang Ai	4 x 27	108
- Bakun	8 x 300	2,400
- Murum	4 x 236	944
Subtotal		**3,452**
Total		**6,063**

Source: TNB, SESB and SEB
Notes: Exclude plants that are not in operation or in rehabilitation.

Table 14: Installed Capacity of Mini Hydro Power Stations as of 31st December 2022

Station	Total(MW)
Peninsular Malaysia	
1. Kedah	
- Sungai Mempelam	0.4
2. Kelantan	
- Fit	15.2
- MUSTEQ Kenerong Hydro	20
- Sungai Lata Rek	0.25
- Sungai Renyok	1
3. Pahang	
- FiT	26.6
- Sungai Mentawak	0.5
- Sungai Sia	0.4
- Stesen Janakuasa Cameron Highlands Scheme 2 -Odak, Habu, Kg Raja, Kg Terla, Robinson Falls	11.9
4. Perak	
- FiT	29
- Sungai Rui (Pong Dam)	0.53
- Sungai Asap	0.1
- Sungai Bil	0.2
- Sungai Chempias	0.1
- Sungai Kinjang	0.4
- Sungai Tebing Tinggi	0.16
5. Selangor	0.36
- FiT	2
6. Terengganu	
- Sungai Cheralak	0.5
- FiT	4
Subtotal	**113.24**
Sabah	
- Bombalai (Tawau)	1
- Carabau (Ranau)	2
- Merotai (Tawau)	1
- Naradau (Ranau)	1.76
- FiT	20
- Sayap (Kota Belud)	1
Subtotal	**26.76**
Sarawak	
- Lundu	0.3
- Peninden	0.3
- Sebako	0.3
- Sungai Kejin	0.48
- Sungai Kota	4
- Sungai Pasir	0.8
Subtotal	**6.18**
Total	**146.18**

Source: : TNB, SESB, SEB and SEDA
Notes: 1. Exclude plants that are not in operation, or in rehabilitation.

Table 15 : Transmission Network in Circuit – Kilometres, 2022

Utility	500 kV	275 kV	132 kV	66 kV
TNB	3,045	9,588	12,877	-
SESB	-	807	2,214	103
SEB	892	3,634	1,153	-

Source: TNB, SESB and SEB

Table 16 : Distribution Network in Circuit – Kilometres, 2022

Utility	Overhead Lines	Underground Cables
TNB	405,610	336,154
SESB	11,326	1,710
SEB	29,492	12,181

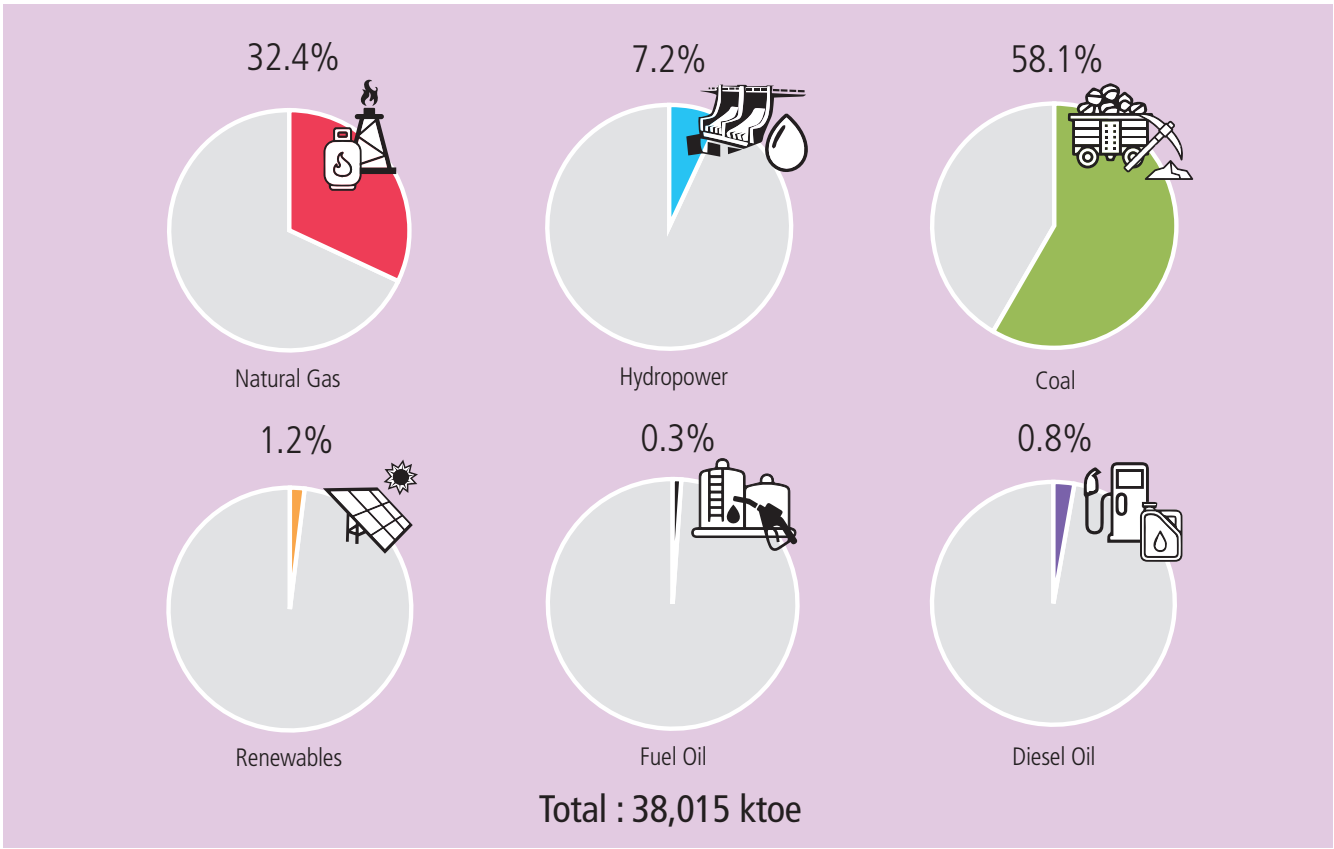
Source: TNB, SESB and SEB

Table 17 : Gross Generation, Consumption, Available Capacity, Peak Demand and Reserve Margin for Electricity in Malaysia, 2022

Region	Electricity Gross Generation		Electricity Consumption		Available Capacity	Peak Demand	Reserve Margin
	GWh	%	GWh	%	MW	MW	%
Peninsular Malaysia	148,790	77.4	127,876	76.1	27,588	19,183	43.8
Sabah	8,249	4.2	6,871	4.1	1,298	1,029	26.1
Sarawak	35,417	18.4	33,372	19.8	5,505	4,398	25.2
Total	**192,455**	**100**	**168,120**	**100**	**34,391**	**-**	**-**

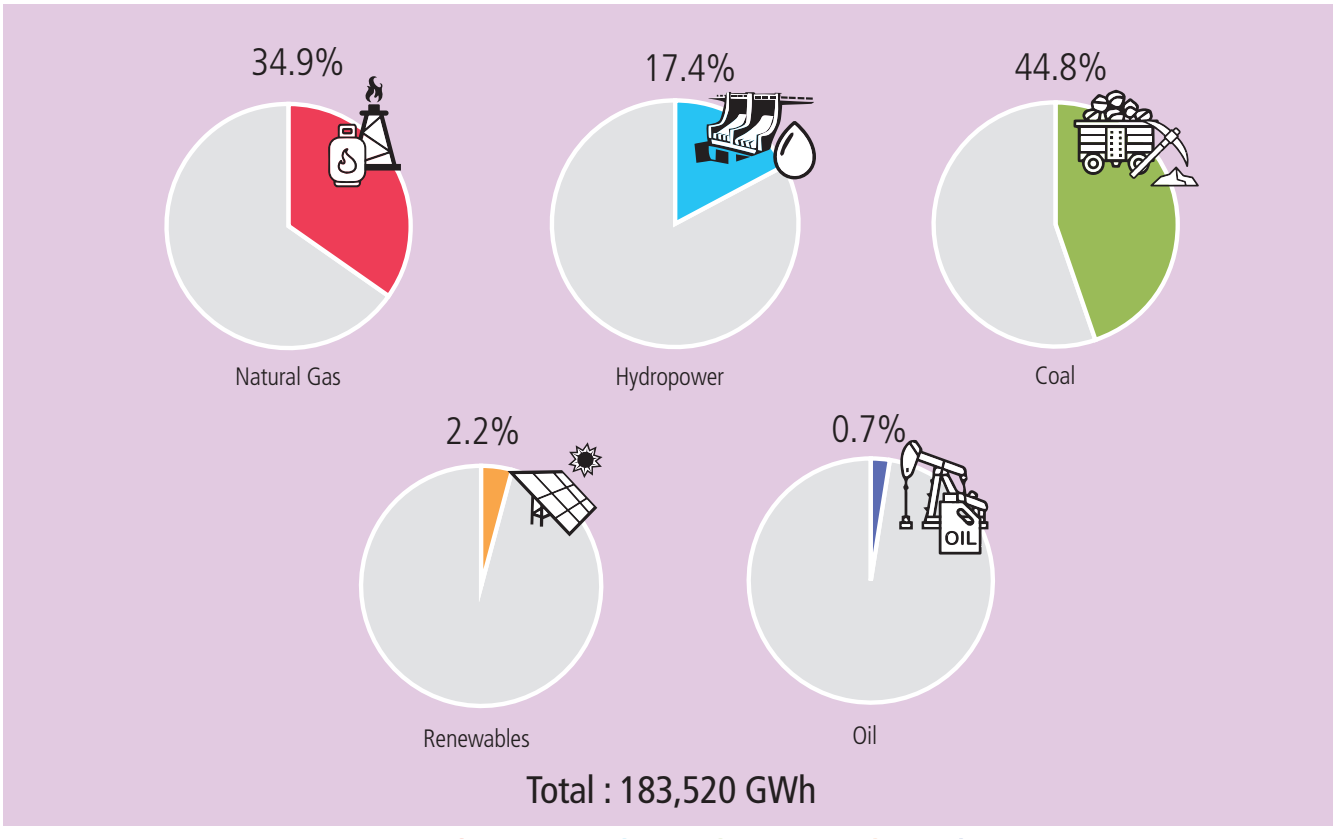
Source: TNB and IPPs, SESB and SEB
Notes: 1. Most diesel units in SESB are aged sets hence they are derated due to thermal limitations. Therefore, during operational state, some generating units are not available due to maintenance outages as well as random breakdowns; the actual operation capacity available to system operation for dispatch was very limited
2. Available Capacity for Peninsular Malaysia was based on Tested Annual Available Capacity (TAAC), Available Capacity for Sabah is based on Dependable Capacity
3. Peak demand for Sarawak is the co-incidental peak

Figure 28: Energy Input in Power Stations, 2022



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

Figure 29: Generation Mix by Fuel Types, 2022



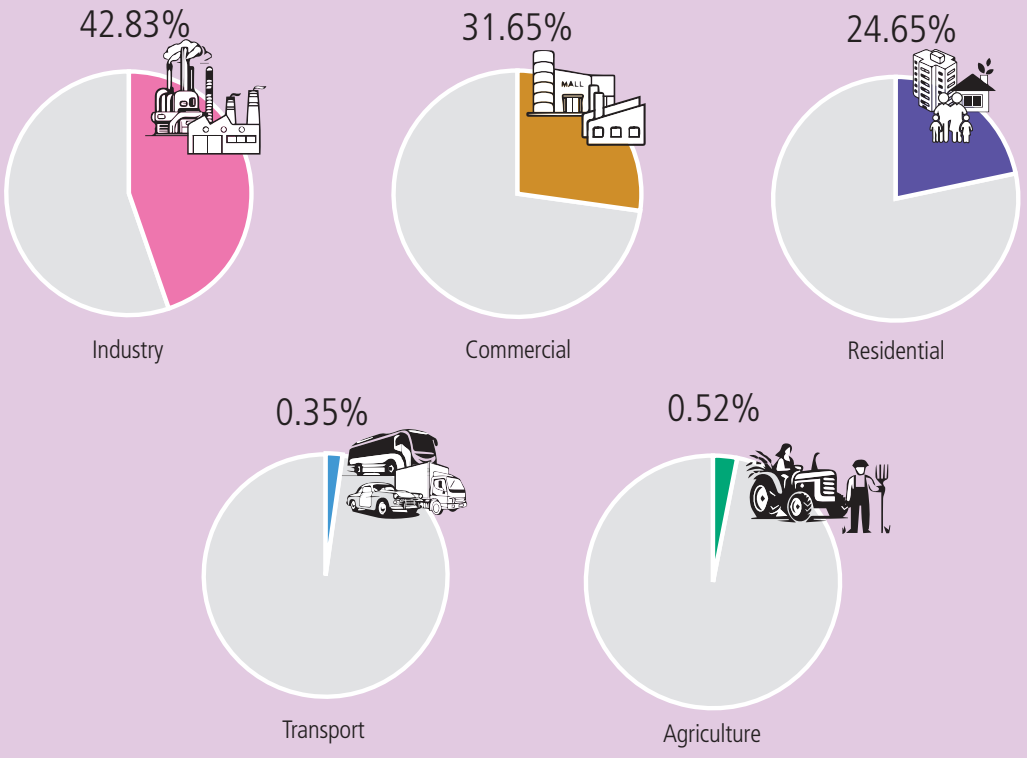
Note: Figures exclude electricity generation for self-generation plants • **Source:** Power utilities and IPPs

Table 18 : Electricity Consumption by Sectors in GWh

Region	Industry		Commercial		Residential		Transport		Agriculture		Total
	GWh	%	GWh	%	GWh	%	GWh	%	GWh	%	GWh
Peninsular Malaysia	54,768	64.9	40,473	87.8	31,523	86.3	443	100.0	669	100.0	**127,876**
Sarawak	27,385	32.5	3,060	6.6	2,926	8.0	-	-	-	-	**33,372**
Sabah	2,230	2.6	2,570	5.6	2,072	5.7	-	-	-	-	**6,871**
Total	**84,383**	**100.0**	**46,104**	**100.0**	**36,521**	**100.0**	**443**	**100.0**	**669**	**100.0**	**168,120**

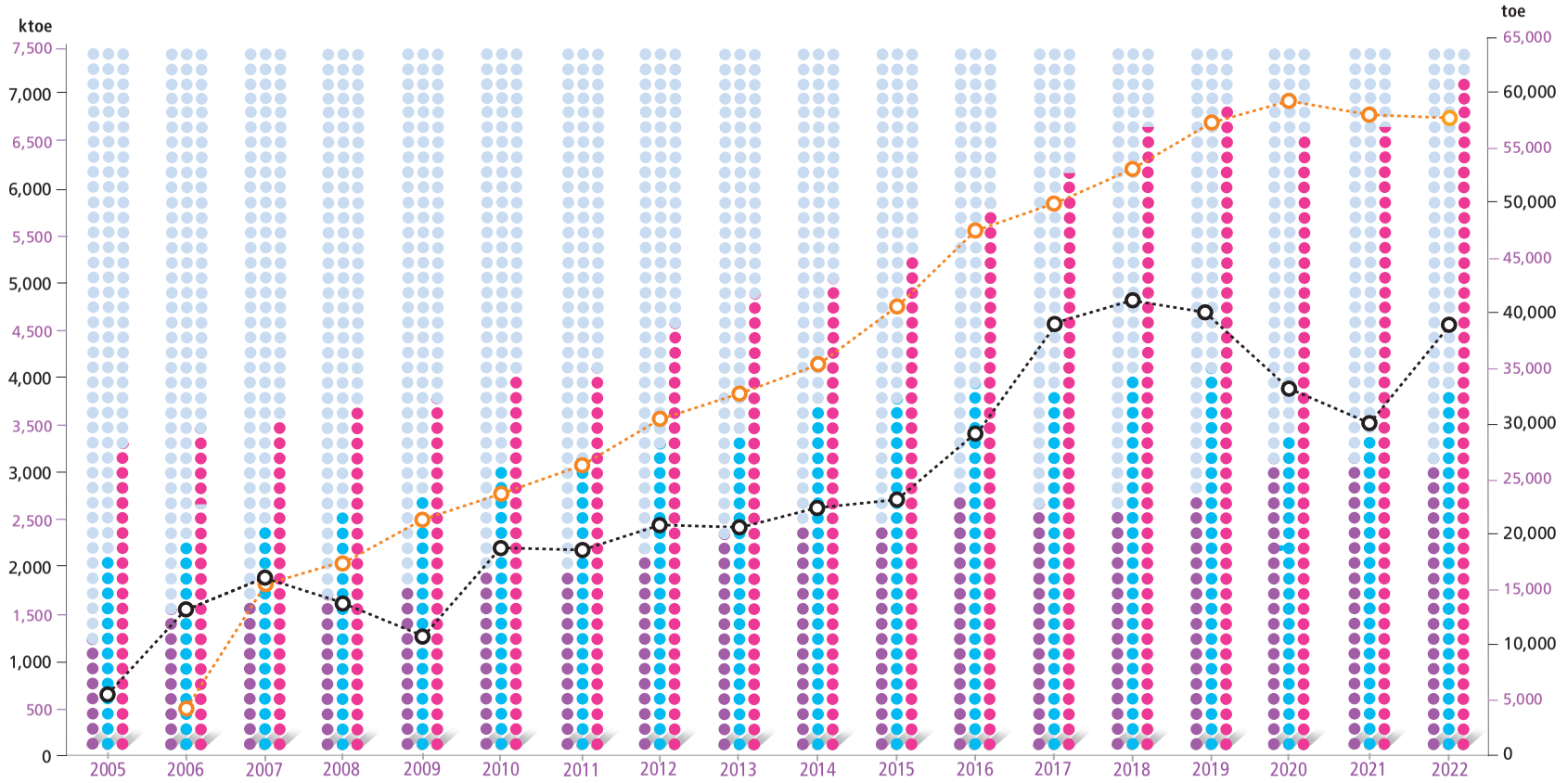
Source: Power utilities, IPPs and Self-Generators

Figure 30 : Electricity Consumption by Sectors in 2022



Source: Power utilities, IPPs and Self-Generators

Figure 31 : Electricity Consumption by Sectors



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Residential (ktoe)	1,395	1,515	1,598	1,668	1,792	1,937	1,974	2,126	2,262	2,346	2,471	2,679	2,610	2,553	2,715	3,124	3,174	3,142
Commercial (ktoe)	2,172	2,277	2,496	2,598	2,743	3,020	3,172	3,325	3,466	3,566	3,663	3,817	3,762	3,958	4,086	3,480	3,443	3,967
Industrial (ktoe)	3,371	3,475	3,587	3,687	3,719	3,994	4,045	4,509	4,818	5,072	5,200	5,822	6,145	6,547	6,748	6,403	6,604	7,260
Transport*(toe)	5,000	14,117	15,295	14,862	11,358	18,439	18,428	21,027	20,774	22,443	22,901	29,291	39,451	41,439	41,080	33,540	30,380	38,151
Agriculture**(toe)	-	4,886	15,991	19,393	21,080	23,920	26,312	30,014	32,240	35,578	40,526	46,747	50,228	53,113	57,088	59,167	58,757	57,525

Source : TNB, SEB, SESB, Co-Generators and Land Public Transport Agency (APAD)
Note (*): From 2006 until 2018 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 19 : Electricity Generation and Installed Capacity of Renewable Energy by Public Licensee by Region in 2022

Region	Type of Prime Mover	Installed Capacity (MW)	Unit Generated (MWh)
Peninsular Malaysia	Major Hydro - TNB	2,536.10	6,792,568
	Mini Hydro - IPP	20.00	116,272
	Mini Hydro - FiT	76.80	320,362
	Mini Hydro - TNB	15.91	31,130
	Solar - FiT	288.05	372,836
	Solar - LSS	1,330.25	2,035,220
	Solar - NEM	697.45	855,357
	Biogas - FiT	128.01	503,394
	Biomass - FiT	44.85	116,649
	Subtotal	**5,137.42**	**11,143,788**
Sabah	Major Hydro - SESB	75.00	296,725
	Mini Hydro-SESB	3.00	8,209
	Mini Hydro - FiT	20.00	9,009
	Solar - FiT	34.38	46,060
	Solar - LSS	50.00	74,904
	Solar -NEM	0.03	42
	Biogas - FiT	9.60	31,532
	Biomass - FiT	13.80	26,465
	Biomass - Public Co-Gen	22.25	36,756
	Subtotal	**228.06**	**529,703**
Sarawak	Major Hydro - SEB	3,452.00	24,314,738
	Mini Hydro -SEB	1.70	1,450
	Solar	0.09	66
	Subtotal	**3,453.79**	**24,316,254**
	Grand Total	**8,819.27**	**35,989,745**

Source: Energy Commission, TNB, SESB, SEB, Ministry of Utility and Telecommunication Sarawak and SEDA Malaysia
Notes: 1. Public Licensee is a licensee generates for his own use as well as to supply to others
2. NEM Generation data is calculated using a capacity factor of 14%

Table 20 : Electricity Generation and Installed Capacity of Renewable Energy by Private Licensee by Region in 2022

Region	Type of Prime Mover	Installed Capacity (MW)	Unit Generated (MWh)
Peninsular Malaysia	Biomass - Private Co-Gen	5.56	10,940
	Biomass - Self-Gen	104.82	505,220
	Biogas - Self-Gen	0.94	60
	Solar - Self-Gen	21.50	25,185
	Mini Hydro-Self-Gen	0.53	1,280
	Subtotal	**133.35**	**542,685**
Sabah	Biomass - Private Co-Gen	7.50	9,847
	Biomass - Self-Gen	95.23	135,210
	Biogas - Self-Gen	9.19	8,776
	Solar - Self-Gen	1.38	2,366
	Mini Hydro - Self-Gen	3.76	10,911
	Subtotal	**117**	**167,110**
Sarawak	Mini Hydro - Self-Gen	4.48	32,005
	Biomass - Self-Gen	32.60	78,424
	Biogas-Self -Gen	0.50	1,117
	Subtotal	**37.58**	**111,546**
Grand Total		**287.99**	**821,341**

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

National Energy Balance 2022

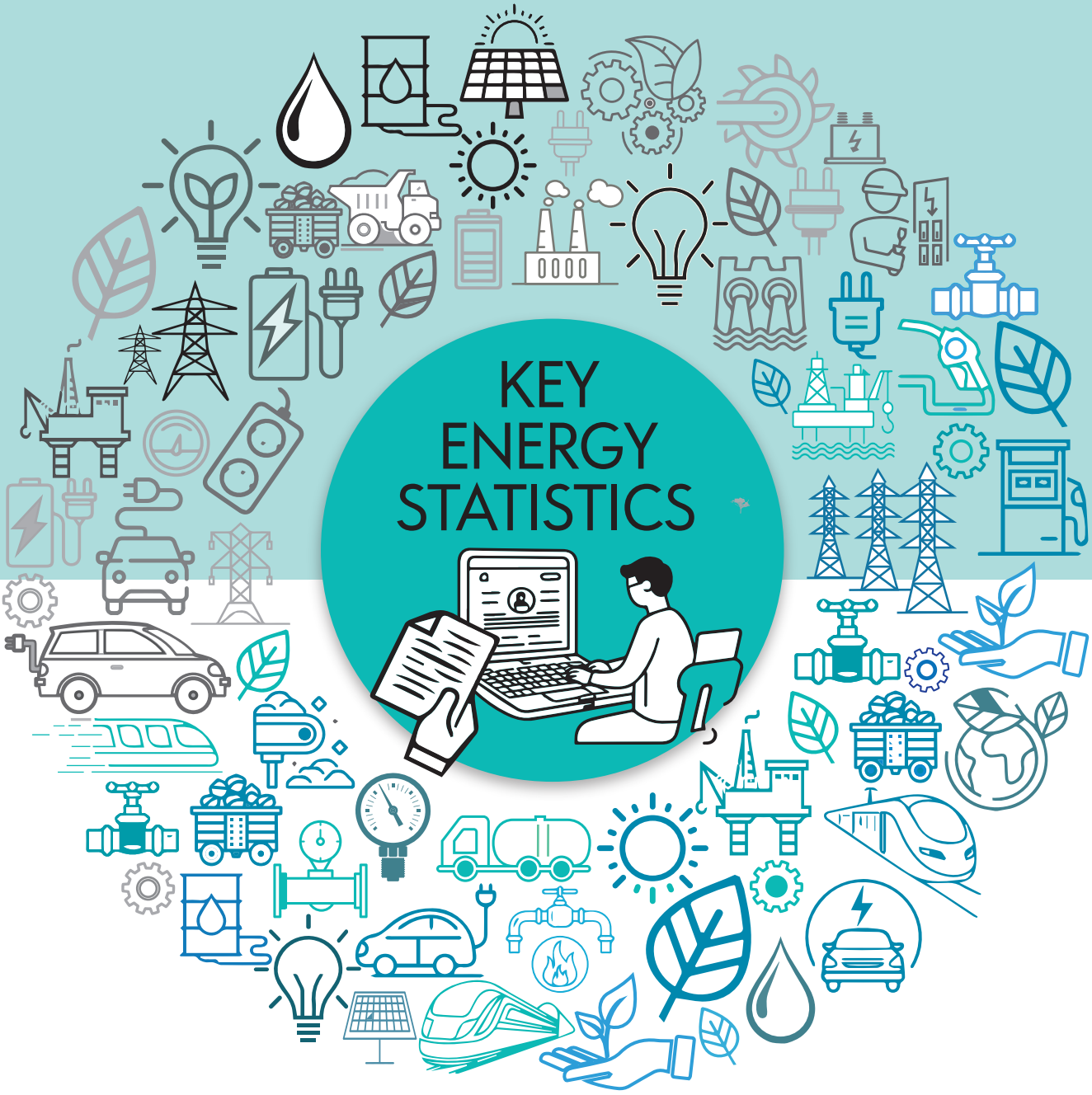


Table 21 : Primary Energy Supply in ktoe

	Crude Oil	Petroleum Products & Others	Natural Gas	Coal & Coke	Hydropower & Renewables	Total	Annual Growth Rate (%)	Share (%)			
								Crude Oil and Petroleum Products & Others	Natural Gas	Coal & Coke	Hydropower & Renewables
2005	24,339	(243)	33,913	6,889	446	**65,344**	5.4	36.9	51.9	10.5	0.7
2006	24,910	(1,671)	34,917	7,299	554	**66,009**	1.0	35.2	52.9	11.1	0.8
2007	26,571	(1,190)	36,639	8,848	558	**71,426**	8.2	35.5	51.3	12.4	0.8
2008	26,776	(1,780)	39,289	9,782	642	**74,709**	4.6	33.5	52.6	13.1	0.9
2009	26,386	96	35,851	10,623	574	**73,530**	(1.6)	36.0	48.8	14.4	0.8
2010	22,487	2,521	35,447	14,777	540	**75,772**	3.0	33.0	46.8	19.5	0.7
2011	24,679	2,224	35,740	14,772	680	**78,095**	3.1	34.4	45.8	18.9	0.9
2012	28,053	1,449	38,647	15,882	1,092	**85,123**	9.0	34.7	45.4	18.7	1.3
2013	27,154	5,320	39,973	15,067	1,532	**89,046**	4.6	36.5	44.9	16.9	1.7
2014	26,765	6,658	40,113	15,357	1,798	**90,691**	1.8	36.9	44.2	16.9	2.0
2015	24,971	4,865	41,853	17,406	2,017	**91,112**	0.5	32.7	45.9	19.1	2.2
2016	27,757	3,570	41,257	18,744	2,420	**93,747**	2.9	33.4	44.0	20.0	2.6
2017	27,471	1,909	41,200	20,771	2,994	**94,345**	0.6	31.1	43.7	22.0	3.2
2018	25,735	3,694	40,939	22,280	3,261	**95,909**	1.7	30.7	42.7	23.2	3.4
2019	25,523	7,290	41,461	21,057	3,349	**98,680**	2.9	33.3	42.0	21.3	3.4
2020	23,101	2,672	39,939	24,788	3,693	**94,194**	(4.5)	27.4	42.4	26.3	3.9
2021	23,913	1,338	42,296	22,917	3,937	**94,401**	0.2	26.7	44.8	24.3	4.2
2022	27,081	3,402	45,834	23,655	4,594	**104,566**	10.8	29.2	43.8	22.6	4.4

Table 22 : 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
2005	10,963	22,299	(206)	192	(474)	6,568
2006	9,342	22,873	(2,404)	200	(1,798)	7,917
2007	7,509	23,777	(4,140)	195	(1,329)	8,152
2008	6,482	22,277	(3,041)	41	(1,609)	9,519
2009	6,517	23,606	(3,889)	8	(1,177)	9,007
2010	9,365	26,857	(4,183)	(32)	1,930	13,011
2011	2,300	26,856	(5,832)	(31)	2,159	13,189
2012	1,993	25,547	(6,498)	(7)	2,458	13,988
2013	1,684	25,639	(5,602)	(16)	7,400	13,583
2014	2,051	25,816	(5,343)	-	5,611	13,590
2015	7,696	25,145	(4,879)	(1)	3,998	15,895
2016	5,751	26,182	(4,716)	57	3,128	17,128
2017	4,823	27,613	(3,731)	96	2,189	18,799
2018	5,773	24,537	(4,167)	128	3,735	20,743
2019	2,177	26,381	(4,211)	143	5,882	19,622
2020	3,635	23,216	(4,340)	298	1,997	22,235
2021	2,328	24,802	(4,480)	246	(930)	20,355
2022	(1,945)	25,686	(4,996)	70	4,152	21,346

Table 23 : Conversion in Gas Plants in ktoe

	Input:	Gas Plants		
	Natural Gas	Liquefaction	Regasification	Gas-to-Liquid
2005	36,447	24,254	NA	1,779
2006	35,378	23,450	NA	1,500
2007	38,141	24,355	NA	1,900
2008	38,193	22,793	NA	1,843
2009	37,098	25,004	NA	1,438
2010	40,246	26,601	NA	2,753
2011	40,737	28,130	NA	2,793
2012	40,042	26,231	NA	2,521
2013	39,678	28,209	NA	1,652
2014	39,193	28,213	NA	1,670
2015	40,773	27,722	1,873	1,578
2016	39,665	31,658	1,277	2,570
2017	38,296	29,468	1,815	2,470
2018	32,980	25,920	1,383	2,523
2019	33,968	29,044	2,663	2,532
2020	34,410	26,155	2,939	2,439
2021	37,002	26,798	1,996	1,681
2022	43,282	30,088	2,506	1,685

Note: 1. NA means not applicable
2. Liquefaction refers to quantities of natural gas used for liquefaction to LNG and the amount of LNG produced.
3. Regasification refers to quantities of LNG used for vaporization to natural gas and the amount of natural gas produced.
4. Gas-to-liquid refers to a refinery process to convert natural gas or other gaseous hydrocarbons into liquid hydrocarbons such as petroleum products.

Table 24 : Conversion in Refineries in ktoe

	Input:			Output:									
	Local Crude Oil	Imported Crude Oil & Others	Total Input	Petrol	Diesel	Fuel Oil	Kerosene	ATF & AV GAS	LPG	Non - Energy	Refinery Gas	Total Output
2005	18,216	6,271	**24,487**	4,245	9,161	1,777	521	2,553	822	2,157	202	**21,438**
2006	16,797	8,113	**24,910**	4,607	8,752	1,933	537	2,938	1,118	2,750	849	**23,484**
2007	17,320	9,251	**26,571**	5,285	9,033	1,990	234	3,138	1,228	3,461	938	**25,307**
2008	18,638	8,138	**26,776**	5,066	9,364	1,994	245	3,139	1,208	4,475	991	**26,482**
2009	20,685	5,812	**26,497**	4,052	9,415	1,144	565	3,085	732	5,905	195	**25,093**
2010	14,003	8,706	**22,709**	3,873	8,369	327	483	2,891	697	4,357	209	**21,206**
2011	14,874	9,904	**24,777**	3,599	8,925	571	419	3,457	665	4,572	1,659	**23,867**
2012	17,213	10,347	**27,560**	4,708	10,033	1,608	654	3,918	702	4,318	197	**26,138**
2013	17,365	9,289	**26,654**	4,702	11,063	1,286	387	2,750	1,252	3,089	195	**24,724**
2014	16,351	10,066	**26,417**	4,918	9,725	2,340	100	2,916	1,102	2,826	192	**24,119**
2015	17,249	7,327	**24,575**	5,031	9,890	1,692	6	2,841	780	3,869	172	**24,281**
2016	18,170	9,353	**27,524**	5,044	9,988	1,479	4	2,548	1,285	4,339	201	**24,888**
2017	17,647	9,605	**27,252**	8,253	9,877	1,725	10	3,255	832	3,100	174	**27,226**
2018	16,144	9,409	**25,553**	5,524	9,665	2,432	18	3,451	900	2,550	130	**24,670**
2019	17,209	7,999	**25,208**	5,317	8,484	1,388	8	3,470	560	3,708	147	**23,082**
2020	15,739	7,235	**22,974**	5,089	9,199	1,204	12	2,459	672	1,954	156	**20,745**
2021	17,828	6,069	**23,897**	6,760	6,157	1,497	10	2,386	1,755	2,762	155	**21,482**
2022	20,183	6,848	**27,030**	6,958	10,525	2,185	2	1,461	1,049	2,409	164	**24,754**

Table 25 : Conversion in Power Stations (Exclude Co-Generation & Private Licensed Plants) in ktoe

	Input						Total Input	Annual Growth Rate (%)	Input Share%					Output
	Fuel Oil	Diesel Oil	Natutral Gas	Hydro Power	Coal	Renewables			Fuel and Diesel Oil	Natural Gas	Hydo Power	Coal & Coke	Renewables	Total Electricity Generated
2005	275	298	12,271	446	5,541	-	18,831	11.3	3.0	65.2	2.4	29.4	-	6,706
2006	171	617	12,524	554	5,964	-	19,830	5.3	4.0	63.2	2.8	30.1	-	7,240
2007	199	314	12,549	558	7,486	-	21,106	6.4	2.4	59.5	2.6	35.5	-	8,385
2008	181	299	13,651	642	8,069	-	22,842	8.2	2.1	59.8	2.8	35.3	-	8,422
2009	205	384	13,390	574	9,010	-	23,563	3.2	2.5	56.8	2.4	38.2	-	8,531
2010	125	415	12,628	540	12,951	-	26,659	13.1	2.0	47.4	2.0	48.6	-	9,404
2011	1,103	981	10,977	656	13,013	-	26,730	0.3	7.8	41.1	2.5	48.7	-	10,193
2012	550	811	11,533	779	14,138	80	27,891	4.3	4.9	41.4	2.8	50.7	0.3	11,032
2013	392	623	13,520	1,003	13,527	208	29,273	5.0	3.5	46.2	3.4	46.2	0.7	11,630
2014	269	622	13,860	1,152	13,648	171	29,722	1.5	3.0	46.6	3.9	45.9	0.6	12,227
2015	101	279	13,378	1,346	15,627	166	30,898	4.0	1.2	43.3	4.4	50.6	0.5	12,393
2016	155	165	13,260	1,723	17,101	168	32,572	5.4	1.0	40.7	5.3	52.5	0.5	12,944
2017	99	147	11,872	2,287	18,967	184	33,556	3.0	0.7	35.4	6.8	56.5	0.5	13,375
2018	17	187	11,542	2,265	20,472	276	34,759	3.6	0.6	33.2	6.5	58.9	0.8	13,939
2019	19	517	13,072	2,251	19,351	287	35,497	2.1	1.5	36.8	6.3	54.5	0.8	13,127
2020	12	154	9,841	2,348	23,451	367	36,172	1.9	0.5	27.2	6.5	64.8	1.0	14,433
2021	8	236	9,936	2,676	21,525	314	34,695	(4.1)	0.7	28.6	7.7	62.0	0.9	14,828
2022	99	313	12,299	2,744	22,102	458	38,015	9.6	1.1	32.4	7.2	58.1	1.2	15,790

Table 26 : Final Energy Consumption by Sectors in ktoe

	Industrial	Transport	Residential and Commercial	Non-Energy Use	Agriculture & Fishery	Total	Annual Growth Rate (%)	Industrial including Agiculture, Fishery & Non - Energy	Industry GDP*	Industry Energy Intensity (toe/RM Million at 2015 Prices)
2005	15,583	15,293	5,134	2,173	101	**38,284**	2.6	17,857	388,442	**45.97**
2006	15,248	14,819	5,424	2,819	258	**38,568**	0.7	18,325	406,056	**45.13**
2007	16,454	15,717	6,197	2,957	281	**41,606**	7.9	19,692	417,734	**47.14**
2008	16,205	16,395	6,205	2,876	287	**41,968**	0.9	19,368	420,639	**46.04**
2009	14,312	16,119	6,336	3,868	211	**40,846**	(2.7)	18,391	395,287	**46.53**
2010	12,928	16,828	6,951	3,696	1,074	**41,477**	1.5	17,698	424,530	**41.69**
2011	12,100	17,070	6,993	6,377	916	**43,456**	4.8	19,393	438,593	**44.22**
2012	13,919	19,757	7,065	7,497	1,053	**49,291**	13.4	22,469	456,449	**49.23**
2013	13,496	22,357	7,403	7,277	1,051	**51,584**	4.7	21,824	471,292	**46.31**
2014	13,162	24,327	7,459	6,217	1,045	**52,210**	1.2	20,424	495,773	**41.20**
2015	13,971	23,435	7,600	5,928	895	**51,829**	(0.7)	20,794	518,360	**40.12**
2016	16,019	24,004	8,051	8,729	415	**57,219**	10.4	25,164	532,752	**47.23**
2017	17,463	24,039	7,796	12,517	674	**62,489**	9.2	30,654	559,332	**54.80**
2018	19,046	23,555	7,773	13,262	1,021	**64,657**	3.5	33,329	574,231	**58.04**
2019	18,921	25,004	8,000	13,631	927	**66,483**	2.8	33,479	587,196	**57.02**
2020	17,714	18,660	8,123	11,805	867	**57,169**	(14.0)	**3**0,386	553,211	**54.93**
2021	19,157	18,095	8,084	10,869	1,045	**57,250**	0.1	31,071	580,123	**53.56**
2022	19,033	24,091	8,498	7,183	1,215	**60,019**	4.8	27,431	614,669	**44.63**

Note (*): 1. Defined as total GDP for Agriculture, Forestry and Fishing, Mining and Quarrying, Manufacturing and Construction
2. Industry GDP for year 2005-2014 was calculated by the Energy Commission

Table 27 : Final Energy Consumption by Type of Fuel in ktoe

	Petroleum Products and Others	Electricity	Gas for Non-Energy	Gas for Heating	Natural Gas	Coal & Coke	Total	Total (excl. Non-Energy)	Annual Growth Rate (%)
2005	23,012	6,944	*1,541*	*5,440*	6,981	1,348	**38,285**	36,744	**2.5**
2006	22,398	7,272	*2,120*	*5,442*	7,562	1,335	**38,567**	36,447	**(0.8)**
2007	24,852	7,683	*2,112*	*5,597*	7,709	1,362	**41,606**	39,494	**8.4**
2008	24,451	7,986	*2,046*	*5,772*	7,818	1,713	**41,968**	39,922	**1.1**
2009	24,145	8,286	*1,995*	*4,807*	6,802	1,613	**40,846**	38,851	**(2.7)**
2010	24,403	8,993	*1,661*	*4,593*	6,254	1,826	**41,476**	39,815	**2.5**
2011	23,946	9,236	*3,906*	*4,609*	8,515	1,759	**43,456**	39,550	**(0.7)**
2012	27,329	10,011	*5,336*	*4,870*	10,206	1,744	**49,290**	43,954	**11.1**
2013	29,379	10,590	*5,276*	*4,800*	10,076	1,539	**51,584**	46,308	**5.4**
2014	29,817	11,042	*4,472*	*5,168*	9,641	1,709	**52,209**	47,737	**3.1**
2015	29,087	11,397	*4,470*	*5,096*	9,566	1,778	**51,829**	47,359	**(0.8)**
2016	30,737	12,394	*6,083*	*6,221*	12,304	1,785	**57,219**	51,136	**8.0**
2017	31,241	12,607	*9,837*	*7,001*	16,838	1,804	**62,490**	52,653	**3.0**
2018	30,845	13,153	*10,451*	*8,400*	18,851	1,808	**64,657**	54,206	**2.9**
2019	32,483	13,647	*10,819*	*7,828*	18,647	1,706	**66,483**	55,664	**2.7**
2020	26,100	13,100	*9,193*	*7,438*	16,631	1,338	**57,169**	47,976	**(13.8)**
2021	24,731	13,311	*9,105*	*8,710*	17,815	1,392	**57,249**	48,144	**0.4**
2022	30,331	14,465	5,316	8,354	13,670	1,553	**60,019**	54,703	**13.6**

Table 28 : Final Consumption for Petroleum Products in ktoe

	Diesel	Petrol	Fuel Oil	LPG	Kerosene	ATF & AV Gas	Non-Energy & Others	Total
2005	8,672	8,211	1,953	1,510	81	2,010	574	**23,011**
2006	8,540	7,517	1,901	1,520	79	2,152	684	**22,393**
2007	9,512	8,600	2,202	1,474	76	2,155	832	**24,851**
2008	9,167	8,842	1,963	1,475	75	2,112	818	**24,452**
2009	8,634	8,766	1,291	2,506	30	2,120	799	**24,146**
2010	8,388	9,560	478	2,920	19	2,380	657	**24,402**
2011	8,712	8,155	414	2,892	19	2,553	1,178	**23,923**
2012	9,410	10,843	768	2,892	38	2,521	743	**27,215**
2013	9,568	12,656	329	2,946	31	2,998	662	**29,190**
2014	10,161	12,705	246	2,632	23	3,158	592	**29,517**
2015	9,377	12,804	498	2,261	4	3,134	621	**28,699**
2016	9,254	13,411	513	3,497	5	3,019	650	**30,348**
2017	9,388	13,437	579	3,514	5	3,220	719	**30,862**
2018	9,756	13,041	387	3,309	6	3,121	789	**30,409**
2019	10,583	13,811	446	3,017	12	3,261	705	**31,835**
2020	8,516	11,188	338	3,423	32	1,199	613	**25,309**
2021	8,800	10,529	342	2,637	59	985	552	**23,904**
2022	9,478	14,030	510	2,637	38	1,819	625	**29,138**

Table 29 : Selected Energy and Economic Indicators (2005-2022)

	GDP at Current Prices (RM Million)*	GDP at 2015 Prices (RM Million)*	Population ('000 people)*	Primary Energy Supply (ktoe)	Final Energy Consumption (ktoe)	Electricity Consumption (ktoe)	Electricity Consumption (GWh)	Average Annual Growth (%)			
								GDP at 2015 Prices	Primary Energy Supply	Final Energy Consumption	Electricity Consumption
2005	543,578	729,932	26,046	65,344	38,285	6,944	80,705	5.33	5.38	2.58	4.55
2006	596,784	770,698	26,550	66,009	38,567	7,272	84,517	5.58	1.02	0.74	4.72
2007	665,340	819,242	27,058	71,426	41,606	7,683	89,294	6.30	8.21	7.88	5.65
2008	769,949	858,826	27,568	74,709	41,968	7,986	92,815	4.83	4.60	0.87	3.94
2009	712,857	845,828	28,082	73,530	40,845	8,286	96,302	(1.51)	(1.58)	(2.68)	3.76
2010	821,434	908,629	28,589	75,772	41,476	8,993	104,519	7.42	3.05	1.54	8.53
2011	911,733	956,731	29,062	78,095	43,455	9,235	107,331	5.29	3.07	4.77	2.69
2012	971,252	1,009,097	29,510	85,124	49,291	10,011	116,350	5.47	9.00	13.43	8.40
2013	1,018,614	1,056,462	30,214	89,046	51,583	10,590	123,079	4.69	4.61	4.65	5.78
2014	1,106,443	1,119,920	30,709	90,691	52,209	11,042	128,333	6.01	1.85	1.21	4.27
2015	1,176,941	1,176,941	31,186	90,441	51,829	11,397	132,464	5.09	(0.28)	(0.73)	3.22
2016	1,249,698	1,229,312	31,634	93,747	57,219	12,394	144,042	4.45	3.66	10.40	8.74
2017	1,372,310	1,300,769	32,023	94,345	62,489	12,607	146,521	5.81	0.64	9.21	1.72
2018	1,447,760	1,363,766	32,382	95,909	64,658	13,153	152,867	4.84	1.66	3.47	4.33
2019	1,512,738	1,423,952	32,523	98,681	66,483	13,647	158,608	4.41	2.89	2.82	3.76
2020	1,418,491	1,346,249	32,584	94,194	57,169	13,100	152,250	(5.46)	(4.55)	(14.01)	(4.01)
2021	1,548,701	1,390,882	32,576	94,401	57,250	13,311	154,703	3.32	0.22	0.14	1.61
2022	1,793,903	1,514,139	32,698	104,566	60,019	14,465	168,120	8.86	10.77	4.84	8.67

Source (*): GDP and Population data is from the Department of Statistics Malaysia
Note: GDP at 2015 Prices (RM Million) for 2005 until 2014 was calculated by the Energy Commission

Per Capita				Energy Intensity				Energy Elasticity	
GDP at Current Prices (RM) per Capita	Primary Energy Supply (toe) per Capita	Final Energy Consumption (toe) per Capita	Electricity Consumption (kWh) per Capita	Primary Energy Supply (toe/GDP at 2015 Prices (RM Million))	Final Energy Consumption (toe/GDP at 2015 Prices (RM Million))	Electricity Consumption (toe/GDP at 2015 Prices (RM Million))	Electricity Consumption (GWh/GDP at 2015 Prices (RM Million))	Final Energy	Electricity
20,870	2.51	1.47	3,099	89.52	52.45	9.51	0.111	0.48	0.85
22,478	2.49	1.45	3,183	85.65	50.04	9.44	0.110	0.13	0.85
24,589	2.64	1.54	3,300	87.19	50.79	9.38	0.109	1.25	0.90
27,929	2.71	1.52	3,367	86.99	48.87	9.30	0.108	0.18	0.82
25,385	2.62	1.45	3,429	86.93	48.29	9.80	0.114	1.77	(2.48)
28,733	2.65	1.45	3,656	83.39	45.65	9.90	0.115	0.21	1.15
31,372	2.69	1.50	3,693	81.63	45.42	9.65	0.112	0.90	0.51
32,913	2.88	1.67	3,943	84.36	48.85	9.92	0.115	2.45	1.54
33,713	2.95	1.71	4,074	84.29	48.83	10.02	0.117	0.99	1.23
36,031	2.95	1.70	4,179	80.98	46.62	9.86	0.115	0.20	0.71
37,739	2.90	1.66	4,248	76.84	44.04	9.68	0.113	(0.14)	0.63
39,505	2.96	1.81	4,553	76.26	46.55	10.08	0.117	2.34	1.96
42,854	2.95	1.95	4,576	72.53	48.04	9.69	0.113	1.58	0.30
44,708	2.96	2.00	4,721	70.33	47.41	9.64	0.112	0.72	0.89
46,513	3.03	2.04	4,877	69.30	46.69	9.58	0.111	0.64	0.85
43,533	2.89	1.75	4,673	69.97	42.47	9.73	0.113	2.57	0.73
47,541	2.90	1.76	4,749	67.87	41.16	9.57	0.111	0.04	0.49
54,863	3.20	1.84	5,142	69.06	39.64	9.55	0.111	0.55	0.98

Table 30 : Energy Balance Table in 2022 (kilotonnes of oil equivalent)

Energy Balance for Malaysia 2022 (kilotonnes of oil equivalent)									
Energy Source	Natural Gas	LNG	Crude Oil (1/)	Others (2/)	Total Petroleum Products	Petroleum			
						Petrol	Diesel	Fuel Oil	LPG
Primary Supply									
1. Primary Production	79,727	0	24,944	0	0	0	0	0	0
2. Gas Flaring, Reinjection & Use	-13,202	0	0	0	0	0	0	0	0
3. Imports	6,625	3,801	11,819	76	16,029	9,021	3,549	580	851
4. Exports	-1,629	-29,487	-9,874	-47	-11,877	-2,188	-3,984	-1,670	-616
5. Bunkers	0	0	0	0	-845	0	-42	-804	0
6. Stock Change	0	0	290	0	137	81	100	101	1
7. Statistical Discrepancy	0	0	-97	0	0	0	0	0	0
8. Primary Supply	**71,521**	**-25,686**	**27,081**	**29**	**3,443**	**6,913**	**-377**	**-1,793**	**236**
Transformation									
9. Gas Plants									
9.1 Liquefaction (3/)	-42,503	30,045	0	0	43	0	0	0	43
9.2 Regasification (4/)	2,506	-3,801	0	0	0	0	0	0	0
9.3 Gas-to-Liquid (5/)	-3,285	0	0	0	1,685	0	129	0	1,242
Subtotal	**-43,282**	**26,244**	**0**	**0**	**1,728**	**0**	**129**	**0**	**1,285**
10. Refineries	0	0	-27,030	-29	24,754	6,958	10,525	2,185	1,049
11. Power Stations & Self-Generation									
11.1 Hydro Stations	0	0	0	0	0	0	0	0	0
11.2 Themal Stations	-12,299	0	0	0	-412	0	-313	-99	0
11.3 Self-Generation (6/)	-1,210	0	0	0	-546	0	-546	0	0
Subtotal	**-13,509**	**0**	**0**	**0**	**-958**	**0**	**-859**	**-99**	**0**
12. Losses & Own Use	-1,061	-557	-51	0	-438	0	0	-19	0
13. Statistical Discrepancy	1	-0	0	0	609	159	59	236	68
14. Secondary Supply	**-57,851**	**25,686**	**-27,081**	**-29**	**25,695**	**7,117**	**9,855**	**2,303**	**2,401**
Final Use									
15. Residential	6	0	0	0	940	0	0	0	930
16. Commercial	34	0	0	0	408	0	87	31	290
17. Industry	8,278	0	0	0	1,941	161	1,097	479	175
18. Transport	36	0	0	0	22,823	13,820	7,185	0	0
19. Agriculture	0	0	0	0	355	0	355	0	0
20. Fishery	0	0	0	0	803	49	754	0	0
21. Non-Energy Use	5,316	0	0	0	1,867	0	0	0	1,242
22. Total Final Use	**13,670**	**0**	**0**	**0**	**29,138**	**14,030**	**9,478**	**510**	**2,637**
Electricity Output									
Main Activity Producer									
Gross Electricity Generation-GWh	**63,994**	**0**	**0**	**0**	**1,351**	**0**	**1,020**	**331**	**0**
Autoproducer									
Gross Electricity Generation-GWh	**6,295**	**0**	**0**	**0**	**1,783**	**0**	**1,783**	**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 Refinary Intake.
3. Report quantities of natural gas used for liquefaction to LNG and the amount of LNG produced.
4. Report quantities of LNG used for vaporization to natural gas and the amount of natural gas produced.
5. Gas-to-liquid is a refinery process to convert natural gas or other gaseous hydrocarbons into liquid hydrocarbons such as petroleum products.
6. Estimated figures based from the Energy Commission, Statistics of Electricity Supply Industry in Malaysia 2022.

Note: Total may not necessarily add up due to rounding

Products				Coal & Coke	Hydro Power	Solar	Biomass	Biogas	Biodiesel	Electricity	Total
Kerosene	ATF & AV Gas	Non-Energy	Refinery Gas								
0	0	0	0	2,157	2,748	294	226	134	1,153	0	111,382
0	0	0	0	0	0	0	0	0	0	0	-13,202
13	1,431	585	0	21,346	0	0	0	0	0	0	59,696
-19	-997	-2,402	0	0	0	0	0	0	-177	-70	-53,162
0	0	0	0	0	0	0	0	0	0	0	-845
-2	-68	-76	0	149	0	0	0	0	217	0	792
0	0	0	0	3	0	0	0	0	0	0	-94
-8	**365**	**-1,892**	**0**	**23,655**	**2,748**	**294**	**226**	**134**	**1,193**	**-70**	**104,566**
0	0	0	0	0	0	0	0	0	0	0	-12,415
0	0	0	0	0	0	0	0	0	0	0	1,295
44	0	270	0	0	0	0	0	0	0	0	-1,600
44	**0**	**270**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**-15,311**
2	1,461	2,409	164	0	0	0	0	0	0	0	-2,305
0	0	0	0	0	-2,744	0	0	0	0	2,744	0
0	0	0	0	-22,102	0	-291	-35	-131	0	13,046	-22,224
0	0	0	0	0	-4	-2	-191	-2	0	769	-1,186
0	**0**	**0**	**0**	**-22,102**	**-2,748**	**-294**	**-226**	**-134**	**0**	**16,559**	**-23,411**
0	0	-255	-164	0	0	0	0	0	0	-1,323	-3,429
1	-7	93	0	0	0	0	0	0	0	-701	-91
47	**1,454**	**2,517**	**0**	**-22,102**	**-2,748**	**-294**	**-226**	**-134**	**0**	**14,535**	**-44,547**
10	0	0	0	0	0	0	0	0	0	3,142	4,088
0	0	0	0	0	0	0	0	0	0	3,967	4,409
29	0	0	0	1,553	0	0	0	0	0	7,260	19,033
0	1,819	0	0	0	0	0	0	0	1,193	38	24,091
0	0	0	0	0	0	0	0	0	0	58	412
0	0	0	0	0	0	0	0	0	0	0	803
0	0	625	0	0	0	0	0	0	0	0	7,183
38	**1,819**	**625**	**0**	**1,553**	**0**	**0**	**0**	**0**	**1,193**	**14,465**	**60,019**
0	**0**	**0**	**0**	**82,222**	**31,890**	**3,384**	**143**	**535**	**0**	**0**	**183,520**
0	**0**	**0**	**0**	**0**	**44**	**28**	**776**	**10**	**0**	**0**	**8,935**

Table 31 : Energy Balance Table in 2022 (Petajoules)

Energy Balance for Malaysia 2022 (Petajoules)

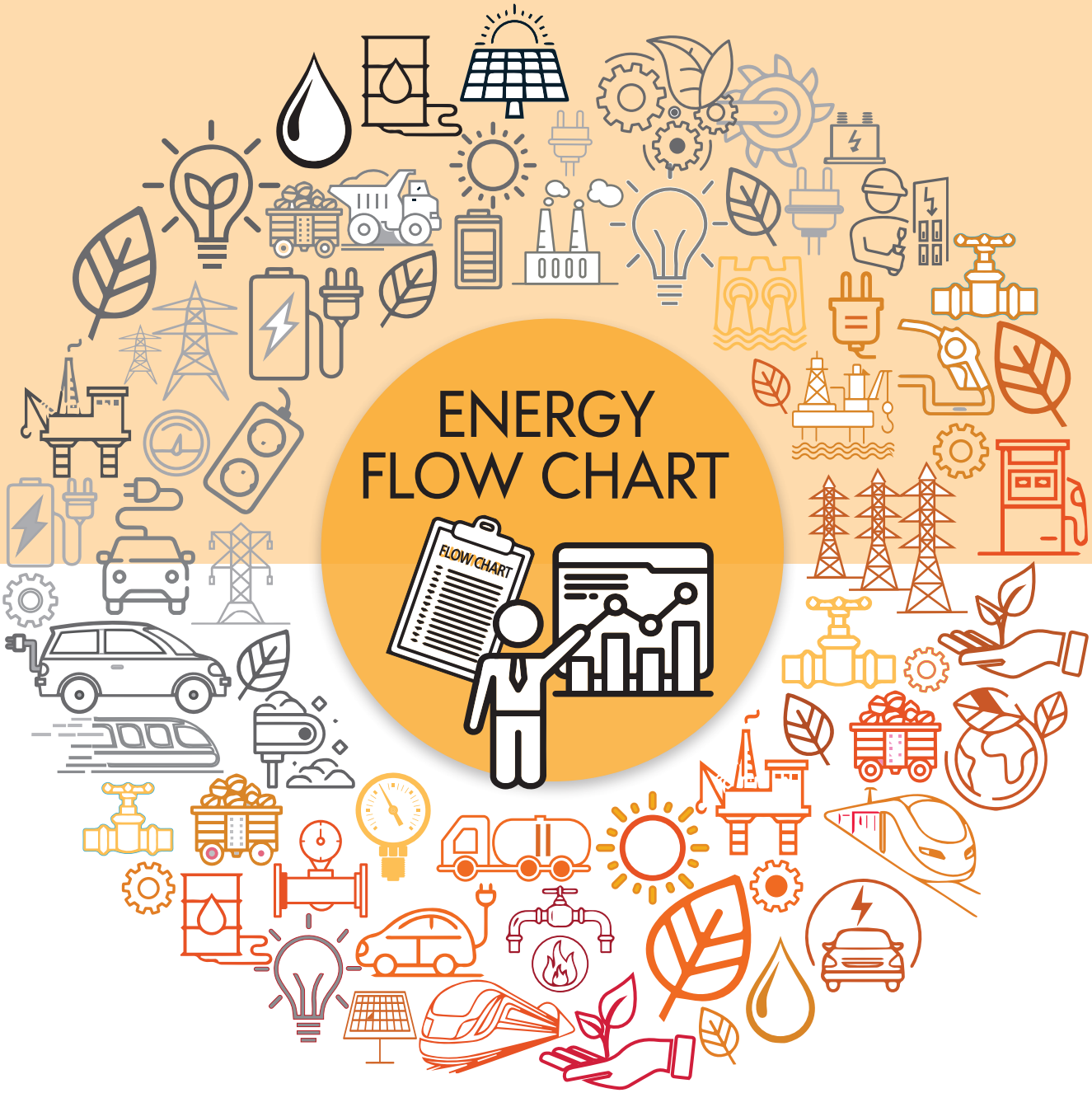
Energy Source	Natural Gas	LNG	Crude Oil (1/)	Others (2/)	Total Petroleum Products	Petroleum			
						Petrol	Diesel	Fuel Oil	LPG
Primary Supply									
1. Primary Production	3,336	0	1,044	0	0	0	0	0	0
2. Gas Flaring, Reinjection & Use	-552	0	0	0	0	0	0	0	0
3. Imports	277	159	495	3	671	377	148	24	36
4. Exports	-68	-1,234	-413	-2	-497	-92	-167	-70	-26
5. Bunkers	0	0	0	0	-35	0	-2	-34	0
6. Stock Change	0	0	12	0	6	3	4	4	0
7. Statistical Discrepancy	0	0	-4	0	0	0	0	0	0
8. Primary Supply	**2,992**	**-1,075**	**1,133**	**1**	**144**	**289**	**-16**	**-75**	**10**
Transformation									
9. Gas Plants									
9.1 Liquefaction (3/)	-1,778	1,257	0	0	2	0	0	0	2
9.2 Regasification (4/)	105	-159	0	0	0	0	0	0	0
9.3 Gas-to-Liquid (5/)	-137	0	0	0	70	0	5	0	52
Subtotal	**-1,811**	**1,098**	**0**	**0**	**72**	**0**	**5**	**0**	**54**
10. Refineries	0	0	-1,131	-1	1,036	291	440	91	44
11. Power Stations & Self-Generation	0	0	0	0	0	0	0	0	0
11.1 Hydro Stations	0	0	0	0	0	0	0	0	0
11.2 Themal Stations	-515	0	0	0	-17	0	-13	-4	0
11.3 Self-Generation (6/)	-51	0	0	0	-23	0	-23	0	0
Subtotal	**-565**	**0**	**0**	**0**	**-40**	**0**	**-36**	**-4**	**0**
12. Losses & Own Use	-44	-23	-2	0	-18	0	0	-1	0
13. Statistical Discrepancy	-0	-0	0	0	25	7	2	10	3
14. Secondary Supply	**-2,420**	**1,075**	**-1,133**	**-1**	**1,075**	**298**	**412**	**96**	**100**
Final Use									
15. Residential	0	0	0	0	39	0	0	0	39
16. Commercial	1	0	0	0	17	0	4	1	12
17. Industry	346	0	0	0	81	7	46	20	7
18. Transport	2	0	0	0	955	578	301	0	0
19. Agriculture	0	0	0	0	15	0	15	0	0
20. Fishery	0	0	0	0	34	2	32	0	0
21. Non-Energy Use	222	0	0	0	78	0	0	0	52
22. Total Final Use	**572**	**0**	**0**	**0**	**1,219**	**587**	**397**	**21**	**110**
Electricity Output									
Main Activity Producer									
Gross Electricity Generation-GWh	**63,994**	**0**	**0**	**0**	**1,351**	**0**	**1,020**	**331**	**0**
Autoproducer									
Gross Electricity Generation-GWh	**6,295**	**0**	**0**	**0**	**1,783**	**0**	**1,783**	**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 Refinary Intake.
3. Report quantities of natural gas used for liquefaction to LNG and the amount of LNG produced.
4. Report quantities of LNG used for vaporization to natural gas and the amount of natural gas produced.
5. Gas-to-liquid is a refinery process to convert natural gas or other gaseous hydrocarbons into liquid hydrocarbons such as petroleum products.
6. Estimated figures based from the Energy Commission, Statistics of Electricity Supply Industry in Malaysia 2022.

Note: Total may not necessarily add up due to rounding

Products				Coal & Coke	Hydro Power	Solar	Biomass	Biogas	Biodiesel	Electricity	Total
Kerosene	ATF & AV Gas	Non-Energy	Refinery Gas								
0	0	0	0	90	115	12	9	6	48	0	4,660
0	0	0	0	0	0	0	0	0	0	0	-552
1	60	24	0	893	0	0	0	0	0	0	2,498
-1	-42	-100	0	0	0	0	0	0	-7	-3	-2,224
0	0	0	0	0	0	0	0	0	0	0	-35
-0	-3	-3	0	6	0	0	0	0	9	0	33
0	0	0	0	0	0	0	0	0	0	0	-4
-0	**15**	**-79**	**0**	**990**	**115**	**12**	**9**	**6**	**50**	**-3**	**4,375**
0	0	0	0	0	0	0	0	0	0	0	-519
0	0	0	0	0	0	0	0	0	0	0	-54
2	0	11	0	0	0	0	0	0	0	0	-67
2	**0**	**11**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**-641**
0	61	101	7	0	0	0	0	0	0	0	-96
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	-115	0	0	0	0	115	0
0	0	0	0	-925	0	-12	-1	-5	0	546	-930
0	0	0	0	0	-0	-0	-8	-0	0	32	-50
0	**0**	**0**	**0**	**-925**	**-115**	**-12**	**-9**	**-6**	**0**	**693**	**-980**
0	0	-11	-7	0	0	0	0	0	0	-55	-143
0	-0	4	0	0	0	0	0	0	0	-29	-4
2	**61**	**105**	**0**	**-925**	**-115**	**-12**	**-9**	**-6**	**0**	**608**	**-1,864**
0	0	0	0	0	0	0.	0	0	0	131	171
0	0	0	0	0	0	0	0	0	0	166	184
1	0	0	0	65	0	0	0	0	0	304	796
0	76	0	0	0	0	0	0	0	50	2	1,008
0	0	0	0	0	0	0	0	0	0	2	17
0	0	0	0	0	0	0	0	0	0	0	34
0	0	26	0	0	0	0	0	0	0	0	301
2	**76**	**26**	**0**	**65**	**0**	**0**	**0**	**0**	**50**	**605**	**2,511**
0	**0**	**0**	**0**	**82,222**	**31,890**	**3,384**	**143**	**535**	**0**	**0**	**183,520**
0	**0**	**0**	**0**	**0**	**44**	**28**	**776**	**10**	**0**	**0**	**8,935**

National Energy Balance 2022

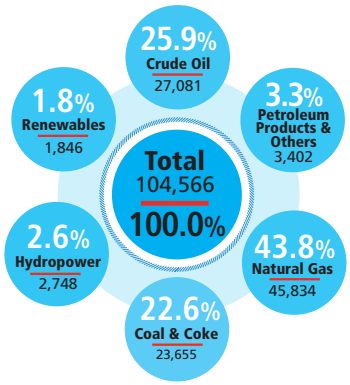


ENERGY FLOW CHART

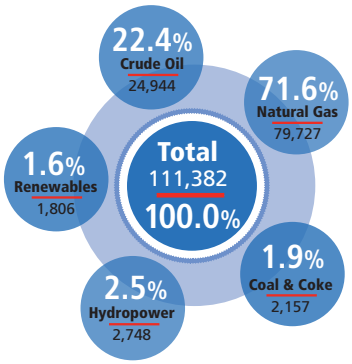
All units in the Energy Flow Chart are in ktoe

PRIMARY SUPPLY

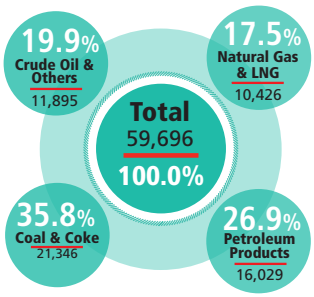
Primary Supply



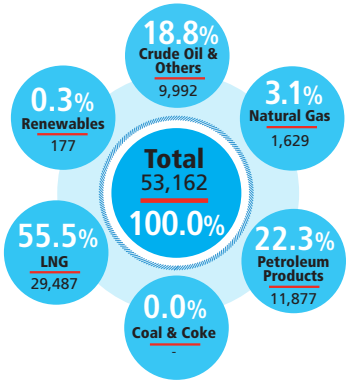
Primary Production



Imports

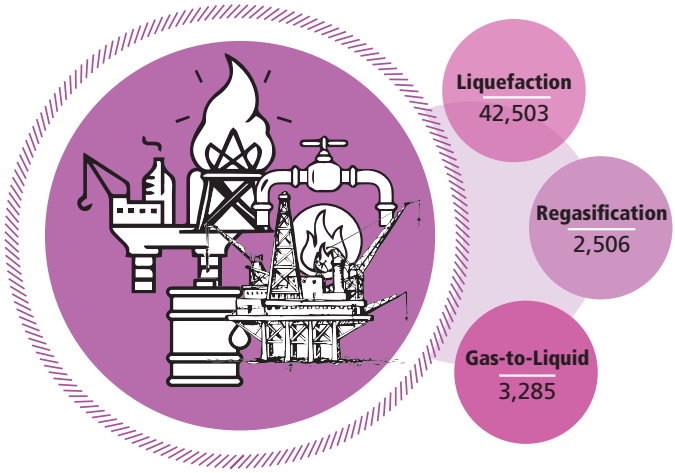


Exports

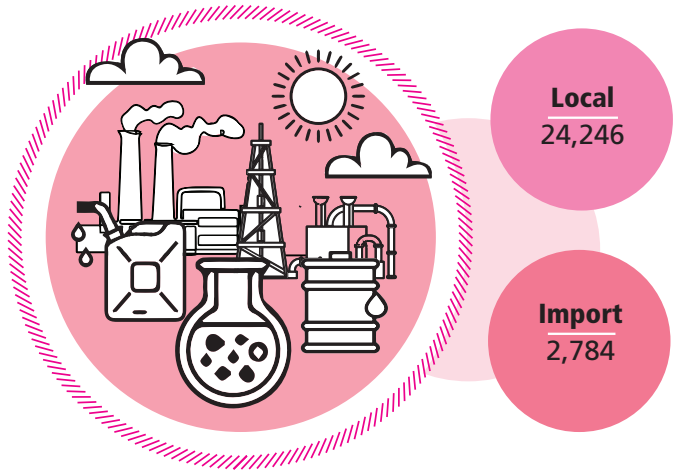


TRANSFORMATION

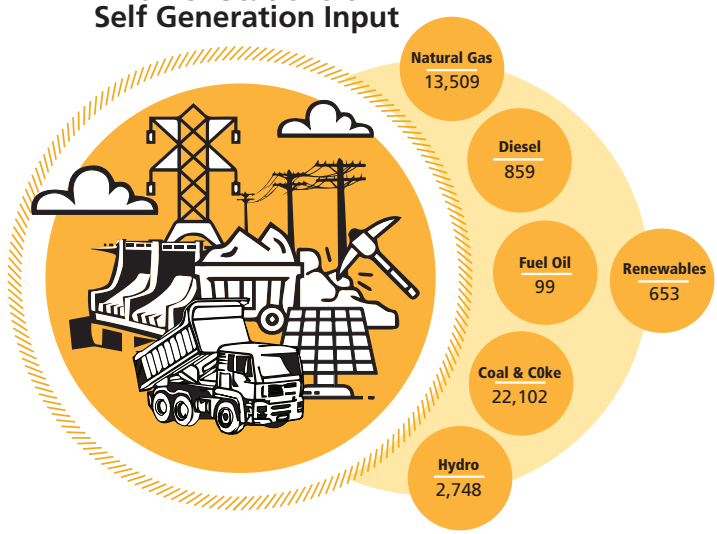
Gas Plant Input



Oil Refineries Input

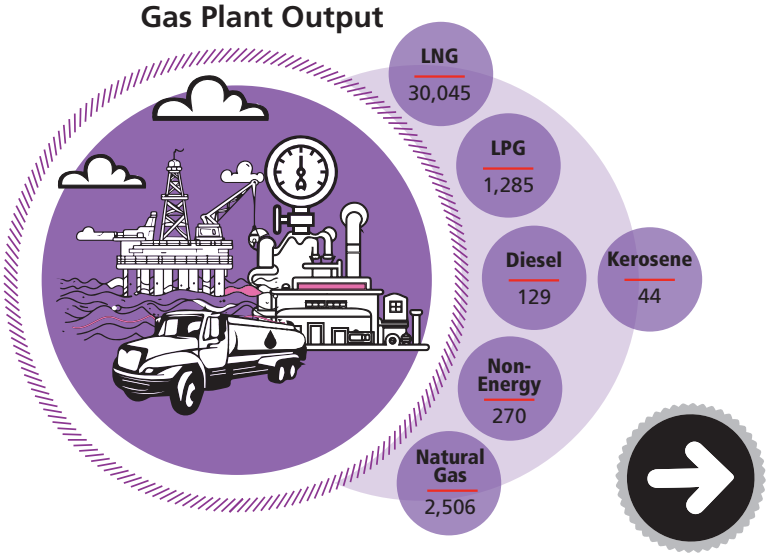


Power Stations & Self Generation Input

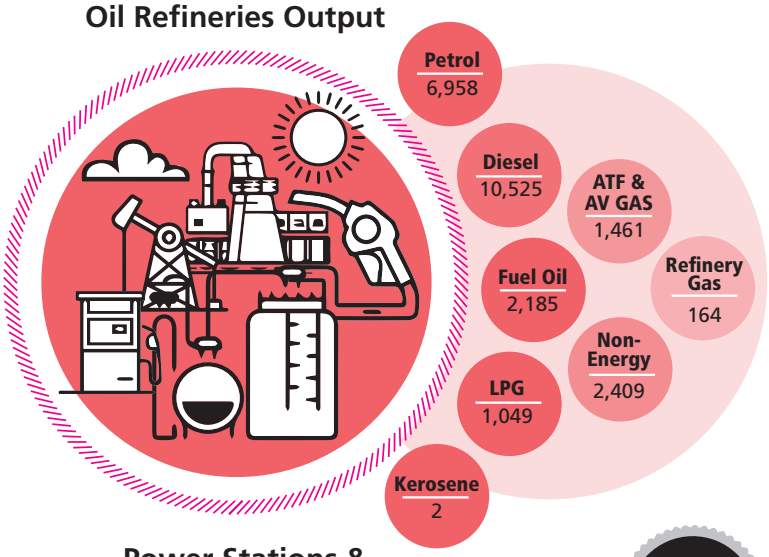


FINAL USE

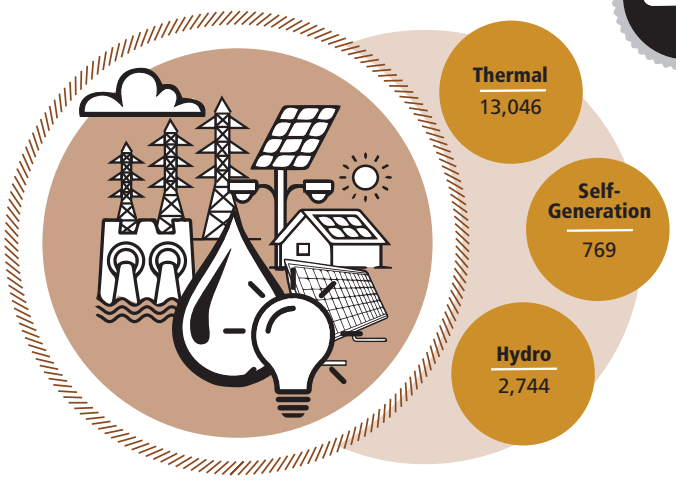
Gas Plant Output



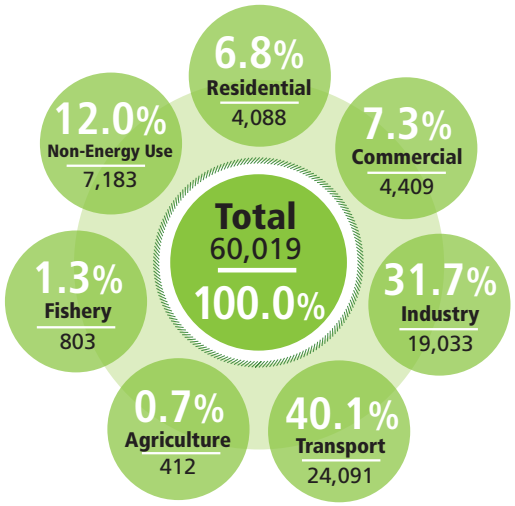
Oil Refineries Output



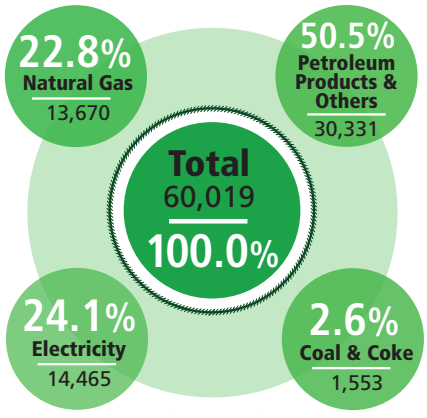
Power Stations & Self Generation Output



Final Use by Sector

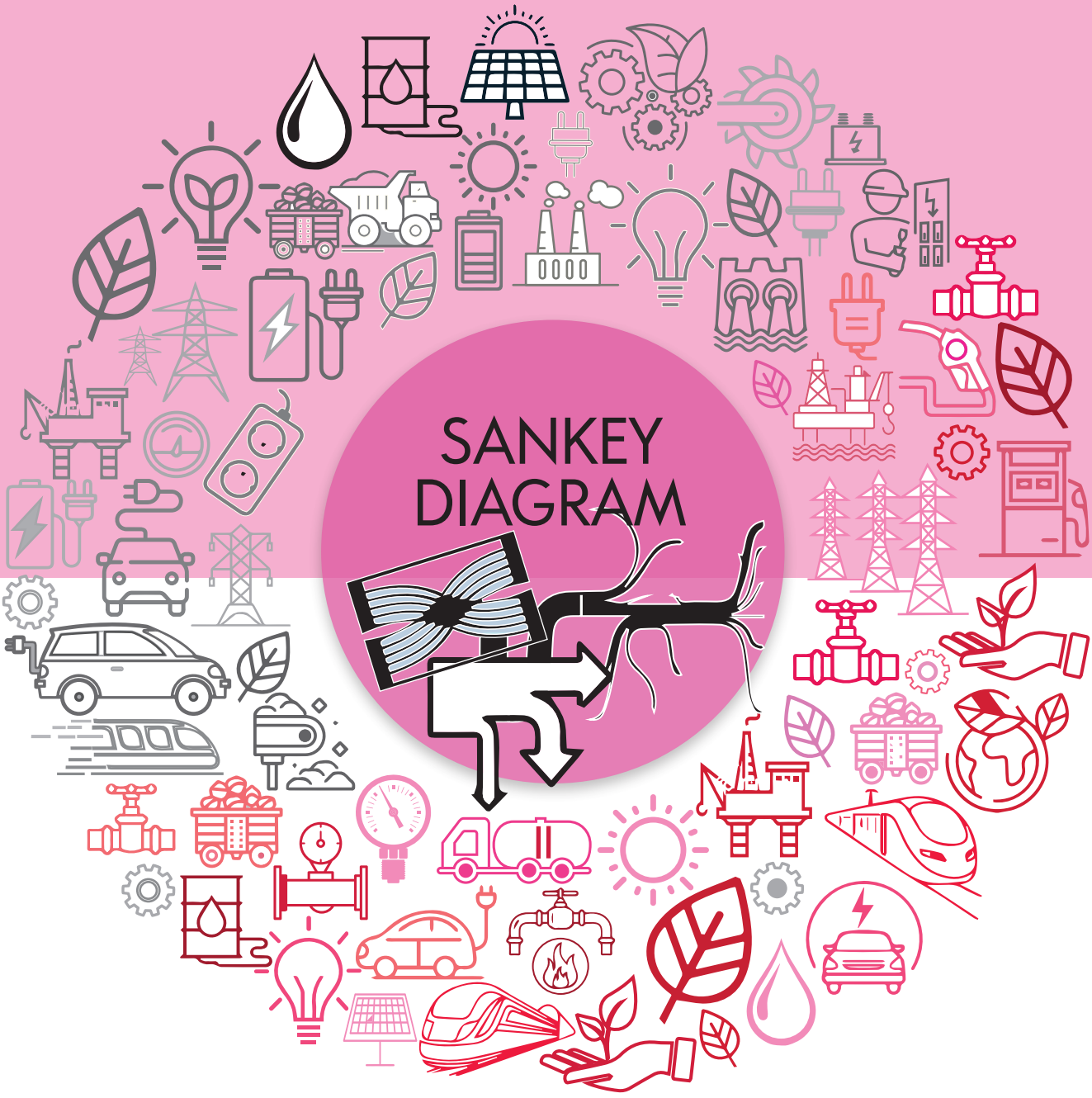


Final Use by Fuel



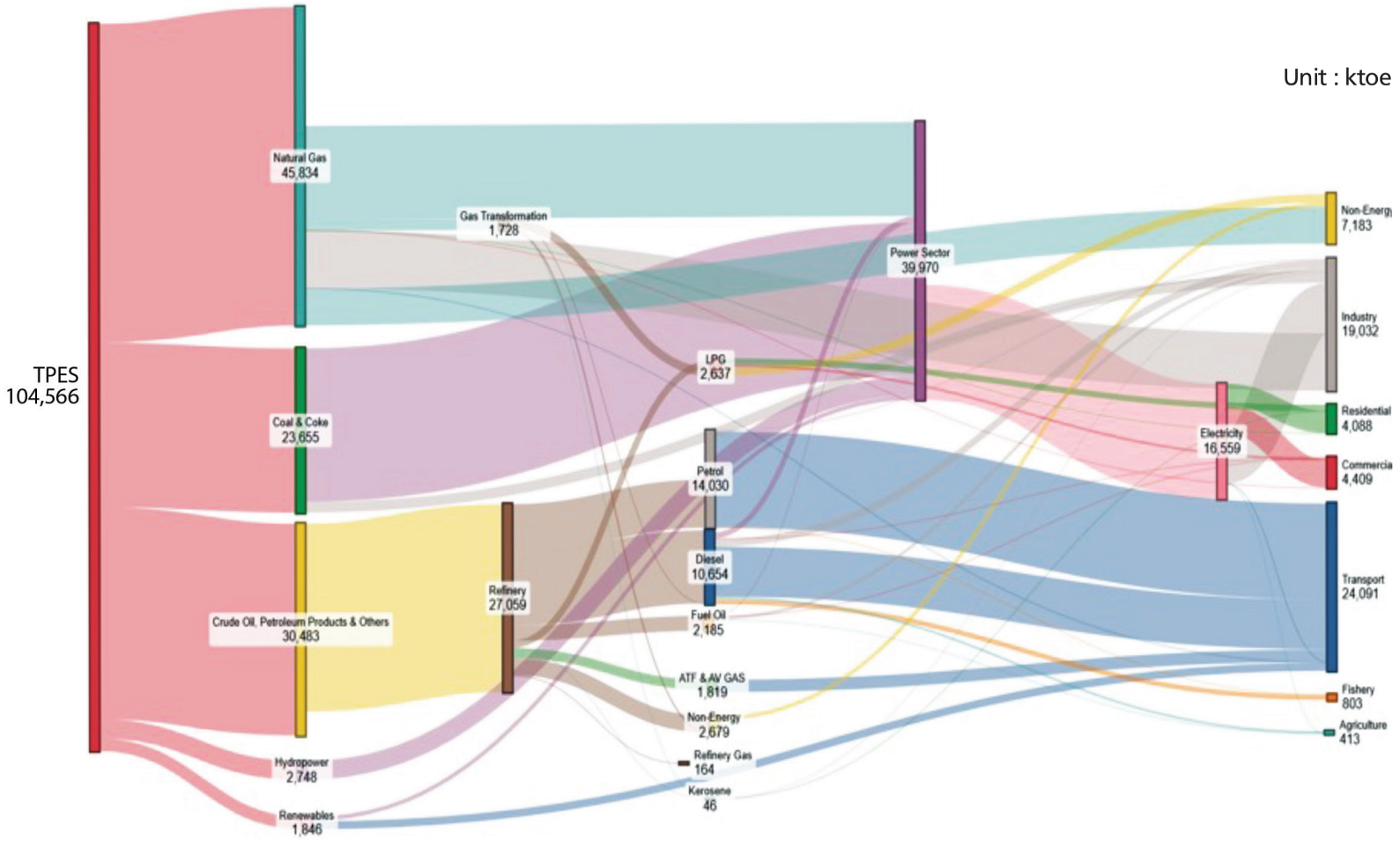
Note*: Primary Supply = Primary Production - Flaring + Imports - Exports - Bunkers (+ -) Stock Change (+ -) Statistical Discrepancy

National Energy Balance 2022

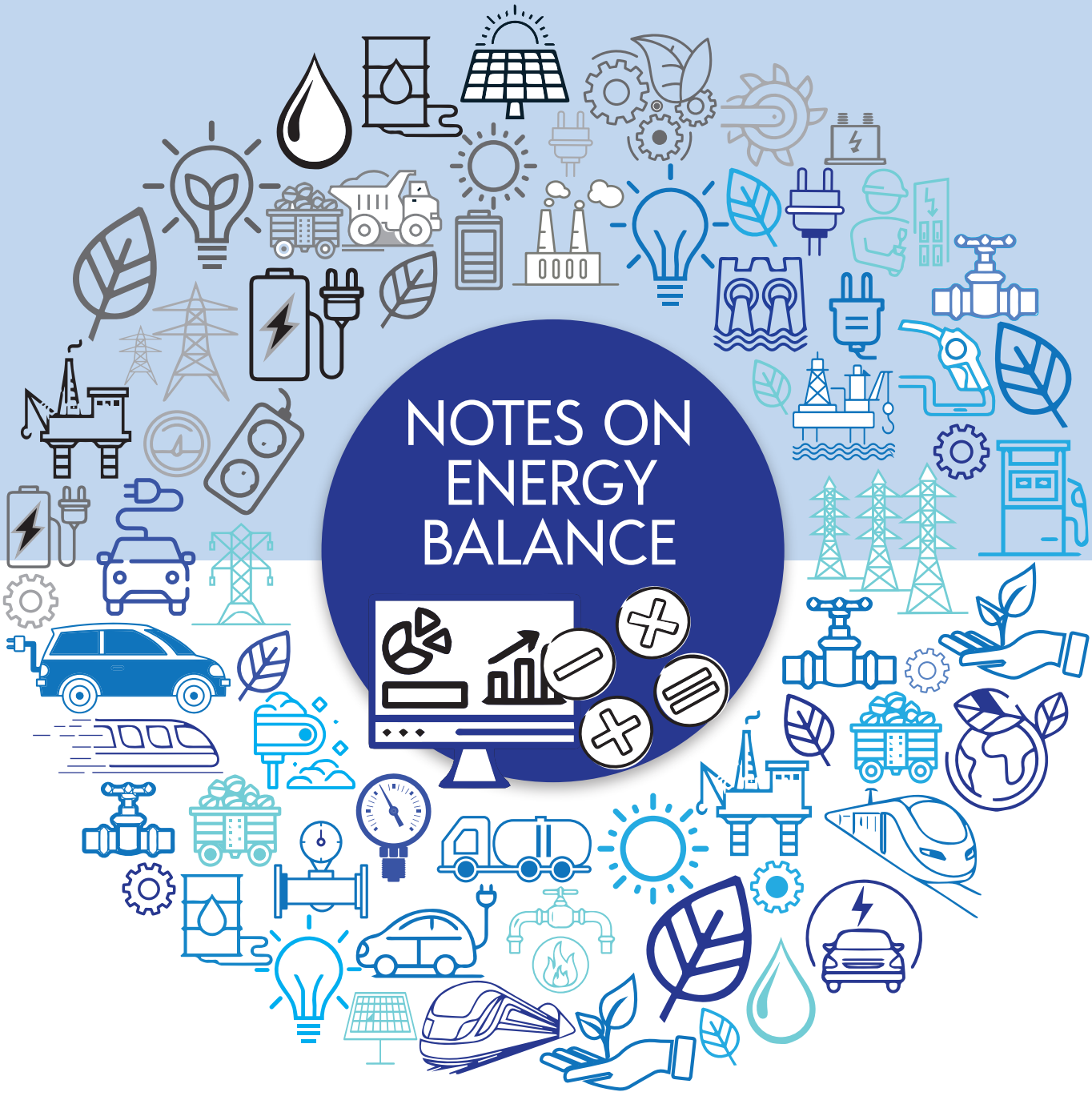


Sankey Diagram

Unit : ktoe



National Energy Balance 2022



Notes On Energy Balance

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

Energy Balance Format

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

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

I) Non-commercial energy such as firewood and other biomass fuels have been excluded in the energy balance until more reliable data are made available.
II) The output side of the final user's equipment of device i.e. useful energy will not be dealt with in the balance as it will involve assessing the efficiencies of end - use equipment operating under various different conditions.

Notes On Electricity

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

Notes On Coal

Measured 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

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

Notes On GNI

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

National Energy Balance 2022

Conversion Coefficients and Equivalence

Solid Fuels (TJ/1000 Tonnes')

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

Natural Gas Products (TJ/1000 Tonnes)

Liquefied Natural Gas (LNG)	45.1923	Natural Gas	1.097 TJ / MMscf 0.9479 MMBtu/GJ
Butane	50.393	Ethane	1,067.82 GJ/MMscf
Propane	49.473	Methane	1,131.31 GJ/MMscf

Electricity

Electricity	3.6TJ/GWh

Petroleum Products (TJ/1000 Tonnes)

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

1,000 Tonnes Oil Equivalent (toe) = 41.84 TJ

Notes: 1. Unless otherwise indicated
2. Assuming 9.7 TJ/1000 cu m

Crude Oil and Petroleum Products (Barrels to Tonnes)

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

Definition

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

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

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