Chapter 11

Malaysia Country Report

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Chapter 11

Malaysia Country Report

ZAHARIN ZULKIFLI, MALAYSIA ENERGY INFORMATION UNIT, ENERGY COMMISSION OF MALAYSIA

1. Background

Malaysia is located in Southeast Asia. Its 329,847 square kilometres of territory consist of Peninsular Malaysia and the Sabah and Sarawak States on the island of Borneo. Malaysia has a tropical, humid climate with temperatures averaging 30°C. Malaysia's gross domestic product (GDP) grew steadily over the last 24 years, at an annual average rate of 5.8 percent from 1990 to 2013, except for sluggish growth in 1998 due to the Asian Financial Crisis and in 2001 due to slow growth of export demand for electronic products. Malaysia also experienced a downturn as a result of the global financial crisis in 2009.

Malaysia is well endowed with conventional energy resources such as oil, gas, and coal, as well as renewables such as hydro, biomass, and solar energy. As of January 2013, reserves included 5.85 billion barrels of crude oil and condensates, 98.32 trillion cubic feet of natural gas, and 1,483.1 million tons of coal. In terms of energy equivalent, Malaysia has gas reserves four times the size of its crude oil reserves. Natural gas reserves off the east coast of Peninsular Malaysia are dedicated for domestic consumption, whereas those in Sarawak are allocated as revenue earner in the form of liquefied natural gas (LNG) exports. Malaysia is a net energy exporter. Mineral fuels, lubricants, etc., contributed 22.3 percent of the economy's export earnings in 2013 or RM[1] 160,348 million.

[1] Malaysian ringgit.

The country's current energy policy was formulated in 1979. Since then, not only has the Malaysian economy undergone fundamental structural changes, but more importantly, the energy landscape, both domestic and international, has changed significantly. A review of the existing core policy has to be conducted and a more comprehensive energy policy and a master plan for the implementation of energy policy have to be formulated.

During the last 10 years, some of the barriers to the uptake of energy efficiency and renewable energy have been removed. But there is room for further improvement and progress. The challenge would be to give renewable energy the necessary lift to greater heights in the next 5 years. Efforts to promote energy efficiency need to be intensified. In addition, climate change, which is inextricably linked with energy use, has become increasingly important, as people begin to appreciate the implications of an increased risk of unpredictable, severe weather and rapid changes to the ecosystem. Thus, the need to work towards a truly sustainable energy future becomes more compelling. A sustainable energy system is central to meeting the economic goals of Malaysia. Malaysia's levels of energy use per unit of production (intensity) are high compared with other nations. A national strategy aimed at reducing energy intensity has to be drawn up. Energy Planning has to recognise that the place to begin is not only with supply, but also the management of demand for energy services, by increasing energy efficiency and the use of renewable energy sources to meet any remaining demand.

Over the years, the Government of Malaysia has formulated various policies and programmes on energy to ensure the long-term reliability and security of energy supply for sustainable social-economic development in the country. The major energy policies implemented in the country are as follows:

- Petroleum Development Act (1974)
- National Petroleum Policy (1975)
- National Energy Policy (1979)
- National Depletion Policy (1980)
- Four-Fuel Diversification Policy (1981)
- Fifth Fuel Policy (2000)
- Biofuel Policy (2006)

- National Green Technology Policy (2009)
- National Renewable Energy Policy and Action Plan (2010)
- New Energy Policy and 10th Malaysia Plan (2010)
- 11th Malaysia Plan (2015)

2. Modelling Assumptions

In determining the forecast of final energy consumption, an econometrics approach was applied by using the historical correlation between energy demands as well as macroeconomic and activity indicators. Final energy consumption equations were derived by regression analysis.

Future energy demand for various energy sources were estimated using assumed values of the macroeconomic and activity indicators. Future values of these indicators were also derived using historical data depending on their sufficiency for such analysis. In the model structure, energy demand is modelled as a function of activity such as income, industrial production, number of vehicles, number of households, number of appliances, floor area of buildings, etc. In the residential sector for example, the demand for electricity could be a function of number of households, disposable income, and penetration rate of electrical appliances. In the commercial sector, energy consumption could be driven by building floor areas, private consumption, and other factors that encourage commercial activities. However, due to unavailability of information on the activity indicators, macroeconomic parameters, i.e. gross domestic product (GDP) and population, were the best variables to use to establish the relationship with the energy demand trend. These macroeconomic indicators were mainly used to generate the model equations. In some cases, where regression analysis was not applicable due to insufficiency of data or there was failure to derive a statistically sound equation, other methods, such as share or percentage approach, were used.

One of the main drivers of the modelling assumption is the GDP growth rate. The GDP growth rates assumption forecast was based on Tenaga Nasional Berhad (TNB) assumptions. Most of all the energy demand equations for Malaysia were using GDP as the key factor to determine future projections. This was due to high correlation between energy demand and GDP. The assumptions for GDP growth rates are as follows:

Table 11-1. GDP Growth Assumptions to 2040, in Percent per Year

	GDP Growth Rate (%)
2013–2020	4.60
2021–2030	3.80
2030–2040	3.20

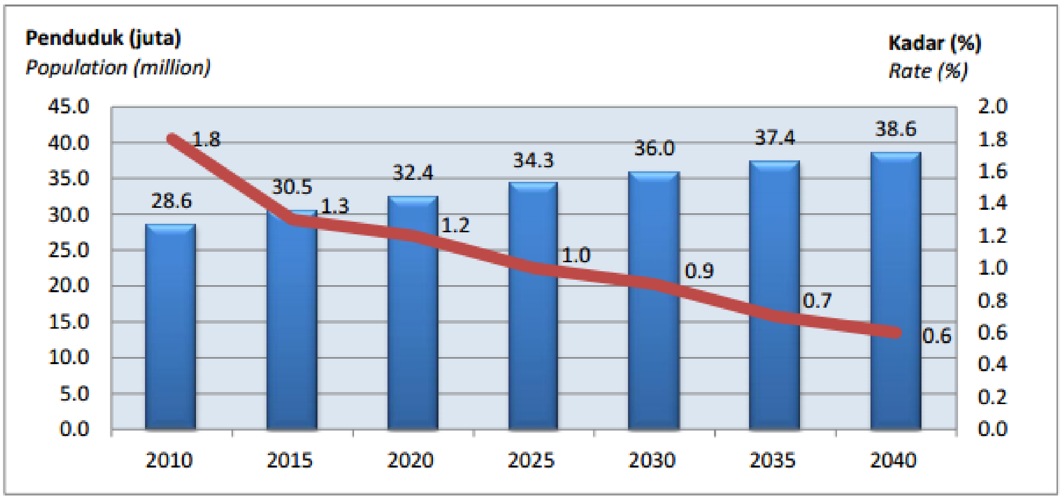
Source: ERIA.

Another important parameter in projecting future energy demand is population growth rates. Apart from future GDP growth rates, annual average population growth was considered as one of the key drivers for future energy growth. In 2013, Malaysia's population was 29.5 million and it is projected to increase by 9.4 million (31.9 percent) to 38.9 million in 2040. However, the annual population growth rate is expected to decrease from 1.4 per cent between 2013 and 2020, to 1.1 percent between 2020 and 2030, and 0.8 percent from 2030 to 2040. This situation is in tandem with the targeted decline in the fertility rate and expected international migration. The assumptions for future population growth rates, obtained from the Department of Statistics Malaysia, can be seen in Figure 11-1.

In the process of accelerating its economic and social development, supported by its current position as a net energy exporter, Malaysia provides subsidies on energy use for various users. The amount of energy subsidies offered to various energy users in the country has been growing from year to year, corresponding with the volatility of global energy prices and growing demand for energy.

The amount of subsidies has reached a worrisome level, stretching government expenditure capacity beyond its limits and eating into the share of other developmental budget allocations.

Figure 11-1. Population Growth Assumption to 2040



Source: Department of Statistics Malaysia.

This situation has prompted the Malaysian Government to review its policies related to energy subsidies and to take action to manage energy subsidies with proper mitigation measures. In this regard, energy efficiency offers a sound solution to mitigating the effects of the gradual removal of energy subsidies.

In promoting energy efficiency, the Ministry of Energy, Green Technology and Water (MEGTW) had enacted a number of legal instruments. The main legal instrument on energy efficiency promotion is the Electricity Supply Act (Amendment) 2001 also known as Act A1116. The Act empowers the MEGTW, under Sections 23A, 23B, and 23C of the Act, to promote efficient use of electricity in the country. Based on the Act, MEGTW issued the Efficient Management of Electrical Energy Regulation 2008. Under that regulation, all installations that consume or generate 3 million kWh or more of electricity over a period of 6 months will be required to engage an electrical energy manager who shall, among others, be responsible for analysing total consumption of electrical energy, advise on the development and implementation of measures to ensure efficient management of electrical energy, and monitor the effectiveness of the measures taken. The Energy Commission is empowered to enforce the Energy Efficiency Regulations.

The latest regulatory instrument to promote energy efficiency improvement is the Electricity Regulations (Amendment) 2013. The regulation has been amended to allow the implementation of Minimum Energy Performance Standards (MEPS) on selected electrical appliances and lighting. Under the new regulation, refrigerators, air-conditioners, televisions, fans, and lamps (fluorescent, compact fluorescent, light emitting diode, and incandescent) that enter the Malaysian market or are sold to consumers must meet the minimum energy performance standards as prescribed in the regulation. Furthermore, information related to MEPS of those products must be made available to consumers by labelling. Labelling of appliances covered by MEPS will became a mandatory requirement. The regulation will pave the way for the phasing out of inefficient electrical appliances and lighting.

Malaysia has developed a reasonably well-designed renewable support mechanism that includes a set of legislation; published Feed-in-Tariff (FiT) with annual digression rates from 2013 onwards, quota mechanisms, a Renewable Energy Master Plan, and an implementing agency – the Sustainable Energy Development Authority (SEDA). Malaysia has opted for FiT to drive the development of renewable capacity. FiT is guaranteed by the Renewable Energy Act 2011 and the levels are set by SEDA. The scheme is intended to provide a reasonable level of return for investors over a fixed period to give a level of certainty. FiTs are available for biogas, biomass, solar PV, and small hydro, and support duration is 16 years for biomass and biogas and 21 years for small hydropower and solar PV.

There is a capacity quota system in place to manage the new capacity added to the system. This mechanism enables Malaysia to shape the amount of new capacity to be added in the system from the different technologies and make it economically sustainable. Similar systems have been applied, for example for solar PV in deregulated markets including Italy and Spain, in response to a rush for new installations. FiT levels adjust to the cost of the technology. With the exception of small hydro, FiTs have been revised every year according to different digression rates since 2013. This system is used in countries like Germany as a way to adjust the level of remuneration to technology cost evolutions. However, as these digression rates have to be correctly calculated to avoid a slowdown in capacity build out, such mechanisms have worked well only in relatively experienced markets, with a more of a track record and greater know-how.

The Malaysian government is seeking to promote the wider use of public transport through the development of mass transit systems. The current focus is on Kuala Lumpur and the Klang Valley, where around 7.6 million people live (about a third of the population). The existing light transit rail (LRT) system was developed in the late 1990s to early 2000s and consists of 124 km of track carrying 150 million passengers per year, around 1.2 billion passenger-km (0.5 percent of Peninsular Malaysia's total transport demand in passenger-km). The current plans call for an expansion of the LRT system with an additional 150 km of track to be developed between 2016 and 2022. The new network will transport around 330 million passengers a year and account for around 1 percent of the Peninsula's total transport passenger-km. In addition to the LRT, there are also plans to develop the East Coast rail route. This would serve around 3.3 million people in Kelantan, Terengganu, Pahang, and Selangor via a 620 km line. It is also anticipated that it will carry 37 million tons of freight annually.

The implementation of the Nuclear Power Infrastructure Development Plan and the Nuclear Power Regulatory Infrastructure Development Plan would be an important step towards developing nuclear power for Malaysia's future electricity supply. This will support the multiple goals of improving energy security, spurring economic development, as well as reducing greenhouse gas (GhG) emission. A new independent atomic energy regulatory commission will be established. A 10-Year Comprehensive Communication Plan and Strategies on Nuclear Power for electricity will be continued to increase awareness and public acceptance.

In setting up the scenarios for this project, several assumptions and scenarios have been identified. They are as follows:

- APS1 – Improved efficiency of final energy consumption
- APS2 – Higher efficiency of thermal electricity generation
- APS3 – Higher contribution of NRE (here NRE for electricity generation and biofuels for the transport sector are assumed)
- APS4 – Introduction of nuclear energy

- APS5 – Combined impact of scenarios APS1 to APS4

The details of the assumptions in their respective scenarios are mentioned in the following tables:

Table 11-2. Energy Efficiency Assumptions

Scenarios	Assumptions
APS1	1. Electricity Demand in Industrial Sector (INEL)
	Potential reduction of electricity demand in industrial sector from 2015 to 2040 by 1.35 percent per year
	2. Total Energy Demand in Industrial Sector (INTT)
	Potential reduction of total energy demand (electricity + petroleum products + coal + natural gas) in industrial sector by 1.0 percent per year from 2015 to 2040
	3. Total Energy Demand in Commercial Sector
	Potential reduction of total energy demand in commercial sector by 1.0 percent per year from 2015 until 2040.

APS = Alternative Policy Scenario.
Source: Author.

Table 11-3. Higher Efficiency of Thermal Electricity Generation

Scenarios	Assumptions
APS2	1.Higher efficiency of coal power plant by 40.0 percent in 2040
	2. Higher efficiency of natural gas power plant by 46.3 percent in 2040.

Source: Author.

Table 11-4. Renewable Energy Assumptions

Scenarios	Assumptions						
APS2	1. By 2030, Malaysia is expected to have the following renewable energy capacities in power generation:						
	Cumulative Capacity (MW)						
	Year	Biomass	Biogas	Mini-Hydro	Solar PV	Solid Waste	Total
	2015	330	100	290	55	200	975
	2020	800	240	490	175	360	2,065
	2025	1,190	350	490	399	380	2,809
	2030	1,340	410	490	854	390	3,484
	2. In 2020, 7 percent of Malaysia's share of diesel consumption in the transport sector will come from biodiesel.						

MW = megawatt; APS = Alternative Policy Scenario; PV = photovoltaic.
Source: Author.

Table 11-5. Nuclear Energy Assumption

Scenarios	Assumption
APS4	1. By 2027, a 2000 MW nuclear plant is expected to be commissioned.

APS = Alternative Policy Scenario.
Source: Author.

Table 11-6. APS Assumption

Scenarios	Assumption
APS5	APS1 + APS2 + APS3 + APS4

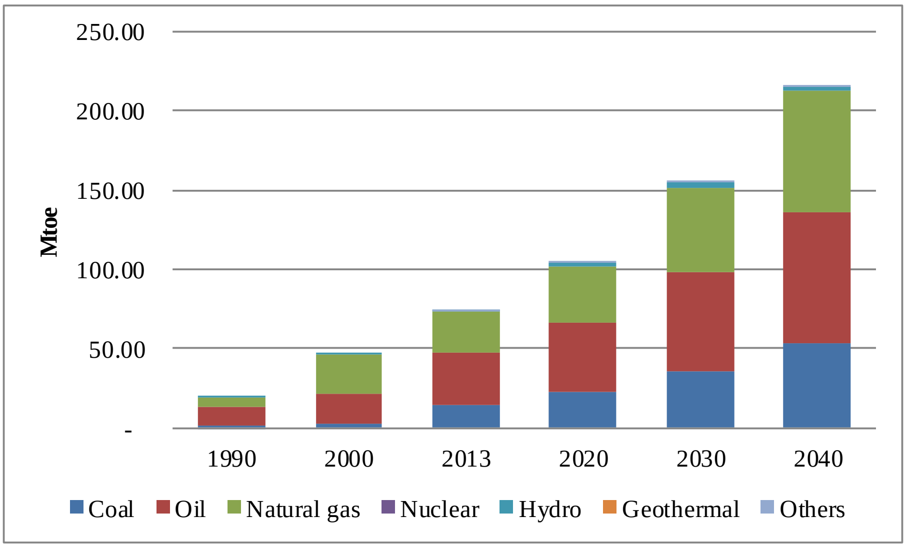
APS = Alternative Policy Scenario.
Source: Author.

3. Outlook Results

3.1. Business-as-Usual (BAU) Scenario

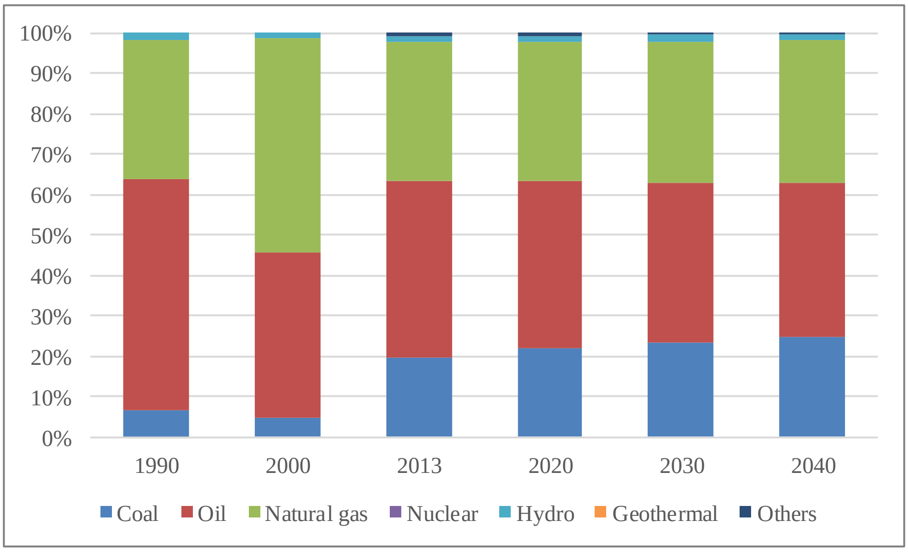
Primary energy supply in the Business-as-Usual (BAU) scenario registered average annual growth of 5.9 percent from 1990 to 2013 and is projected to increase by 4.0 percent per year from 2013 to 2040. Hydro is expected to increase from 0.91 Mtoe in 2013 to 2.75 Mtoe in 2040, at an average annual growth rate of 4.2 percent. Oil supply will increase at 3.5 percent per year from 2013 to 2040; coal supply, consumed mainly by the power sector, is forecast to increase by 4.9 percent per year from 2013 to 2040. Natural gas is projected to increase from 25.62 Mtoe in 2013 to 76.55 Mtoe in 2040, or at an average annual growth rate of 4.1 percent. Biomass for power generation will increase at an average annual rate of 7.3 percent from 2013 to 2040 and biofuel use for land transportation at 1.0 percent per year.

Figure 11-2. Primary Energy Supply by Source, BAU



BAU = Business-as-Usual scenario; Mtoe = million tons of oil equivalent.
Source: Author's own calculation.

Figure 11-3. Share of Primary Energy Supply by Source, BAU



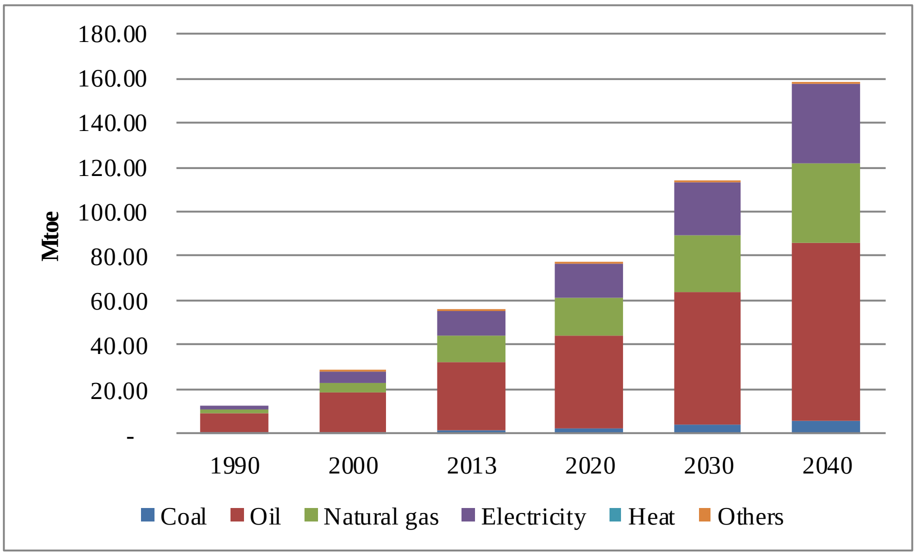
BAU = Business-as-Usual scenario.
Source: Author's own calculation.

In terms of share by source, oil's share will fall from 43.7 percent in 2013 to 38.3 percent in 2040, the share of natural gas will increase from 34.4 percent to 35.4 percent, coal's share will increase from 19.7 percent to 24.7 percent, and the share of hydro will increase from 1.2 percent to 1.3 percent over the projection period.

Final energy consumption in the BAU will increase from 55.29 Mtoe in 2013 to 157.37 Mtoe in 2040, or at an average annual growth rate of 4.0 percent. Final demand for coal and electricity will see the highest average annual growth rates of 4.8 percent and 4.4 percent from 2013 to 2040, respectively. Oil demand will grow from 30.60 Mtoe in 2013 to 80.83 Mtoe in 2040, or by 3.7 percent per year. Electricity demand will increase by 4.4 percent per year from 2013 until 2040 and other fuels will grow from 0.19 Mtoe in 2013 to 0.25 Mtoe in 2040, or by 1.0 percent per year.

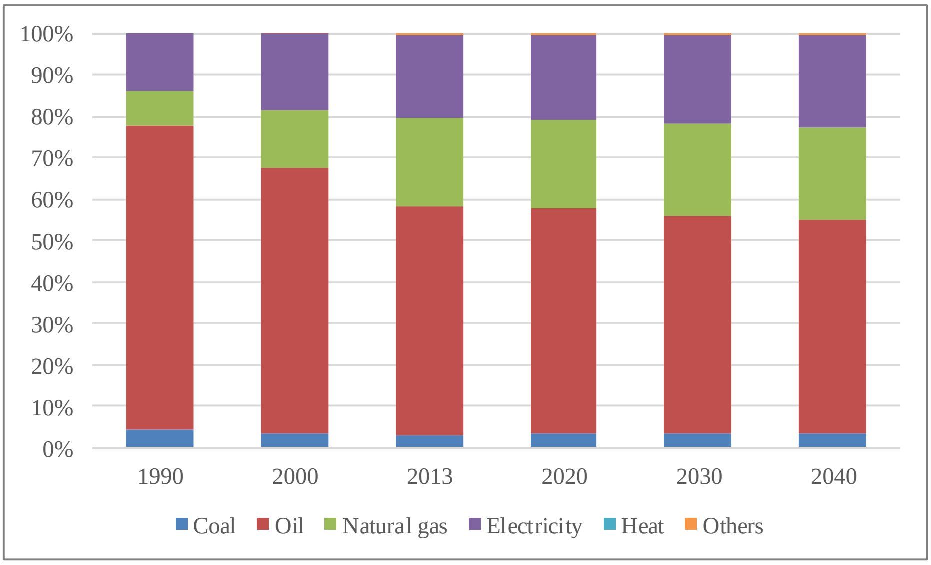
Analysis by share shows that oil will still dominate with 51.4 percent in 2040, slightly lower than its share in 2013 (55.3 percent), followed by natural gas and electricity, both 22.5 percent, in 2040. The share of coal will increase from 2.8 percent in 2013 to 3.5 percent in 2040.

Figure 11-4. Final Energy Consumption by Energy Sources, BAU



BAU = Business-as-Usual scenario; Mtoe = million tons of oil equivalent.
Source: Author's own calculation.

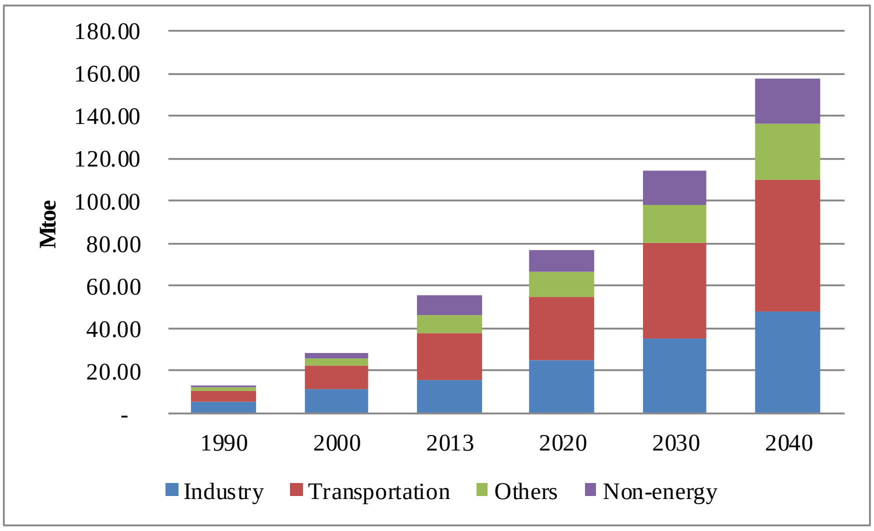
Figure 11-5. Share of Final Energy Consumption by Energy Sources, BAU



BAU = Business-as-Usual scenario.
Source: Author's own calculation.

Final energy consumption by sector showed that industry and the 'others' sector will lead growth with 4.3 percent per year from 2013 to 2040, followed by the transport sector, projected to grow from 22.36 Mtoe in 2013 to 62.26 Mtoe in 2040, or by 3.9 percent per year. Non-energy use is expected to increase from 9.22 Mtoe in 2013 to 21.02 Mtoe in 2040, or at a rate of 3.1 percent per year.

Figure 11-6. Final Energy Consumption by Sector, BAU

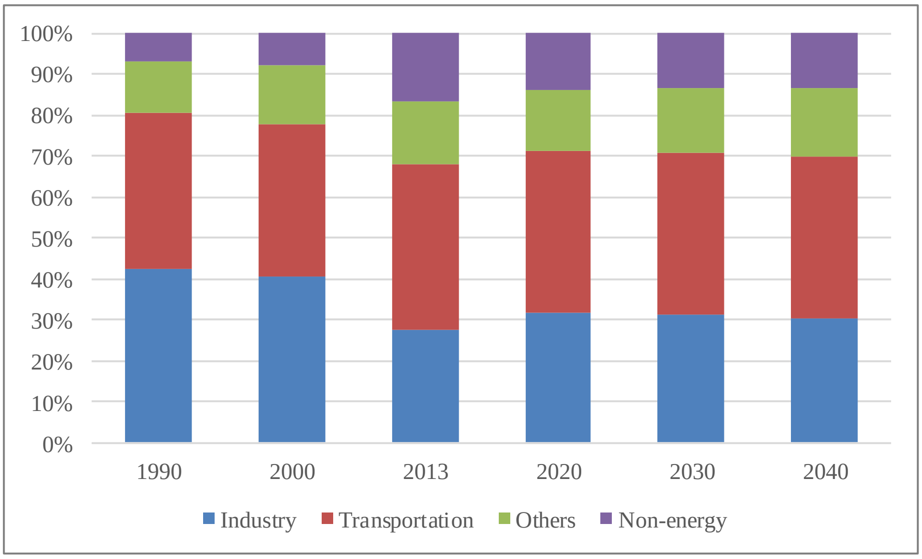


BAU = Business-as-Usual scenario; Mtoe = million tons of oil equivalent.
Source: Author's own calculation.

Analysis by share shows that the transport sector will still dominate energy usage in 2040 with 39.6 percent compared with 40.4 percent in 2013. This will be followed by the industry sector with a 30.4 percent share in 2040 as compared with 27.6 percent in 2013. The non-energy use share will be 13.4 percent of total final energy consumption (TFEC) in 2040, decreasing from its 2013 share of 16.7 percent. The share of the others sector is expected to be at 16.6 percent in 2040.

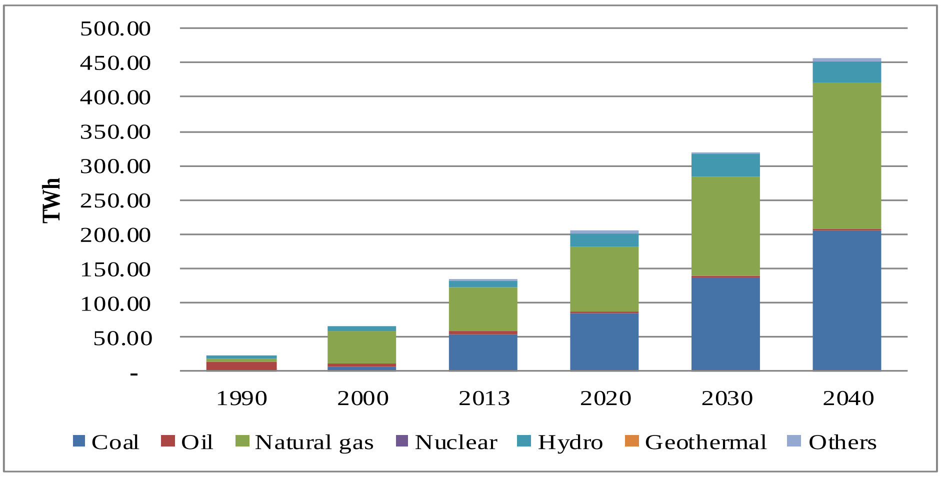
In the BAU, total power generation is expected to grow by around 4.7 percent per year from 2013 to 2040, reaching 456.89 TWh. Power generation from others will see the fastest growth at 6.6 percent per year from 2013 until 2040, followed by power generation from coal, projected to increase to almost 206.14 TWh in 2040 compared with 53.37 TWh in 2013.

Figure 11-7. Share of Final Energy Consumption by Sector, BAU



BAU = Business-as-Usual scenario; Mtoe = million tons of oil equivalent.
Source: Author's calculation.

Figure 11-8. Power Generation by Fuel, BAU

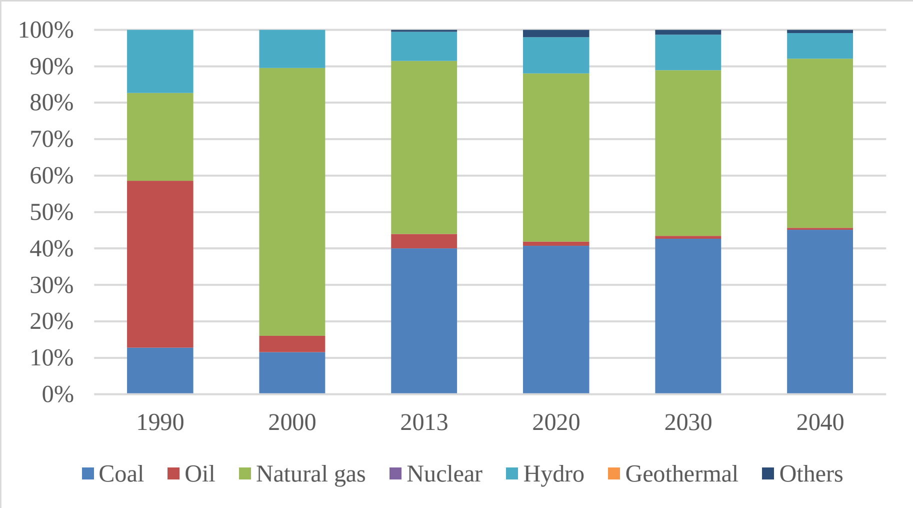


BAU = Business-as-Usual scenario; TWh = terawatt-hour.
Source: Author's calculation.

Power generation from natural gas is expected to see annual average growth of 4.6 percent, or from 63.32 TWh in 2013 to 211.93 TWh in 2040. Power generation from oil is expected to decline by 2.6 percent per year to 2.61 TWh in 2040 compared with 5.26 TWh in 2013.

In terms of shares, the power generation mix will be dominated by natural gas and coal in 2040 with shares of 46.4 percent and 45.1 percent, respectively. Hydro follows with a share of 7.0 percent in 2040 from 7.9 percent in 2013. The share of others will be 0.9 percent of total power generation in 2040 and oil's share will be at 0.6 percent in 2040 compared with 3.9 percent in 2013.

Figure 11-9. Share of Power Generation by Fuel, BAU

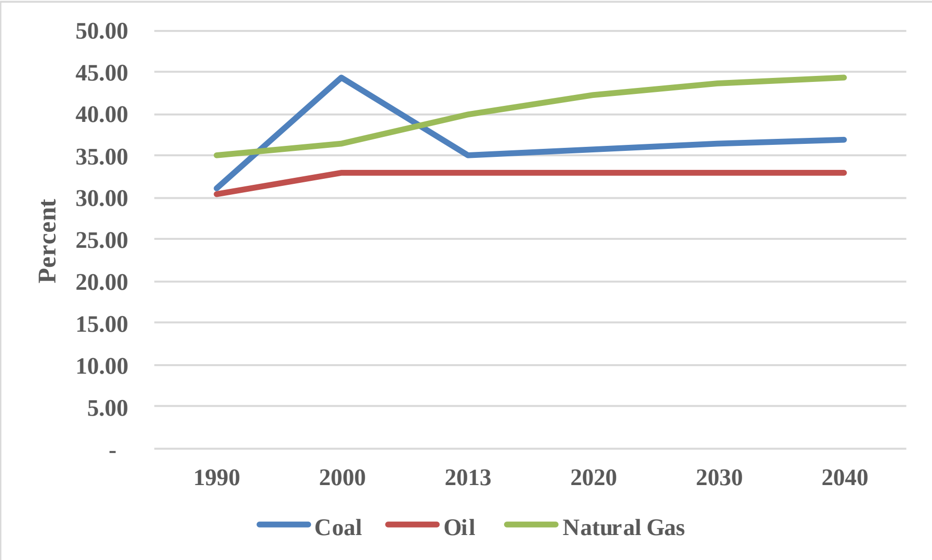


BAU = Business-as-Usual scenario.
Source: Author's own calculation.

In the BAU, the thermal efficiency of coal power plants is expected to improve to 37.0 percent in 2040 from 35.0 percent in 2013. Oil power plants are projected to remain more or less at the same level over the projection period, at around 33.0 percent. Natural gas power plants will further improve to almost 44.3 percent by 2040 from their 2013 level of 40.0 percent.

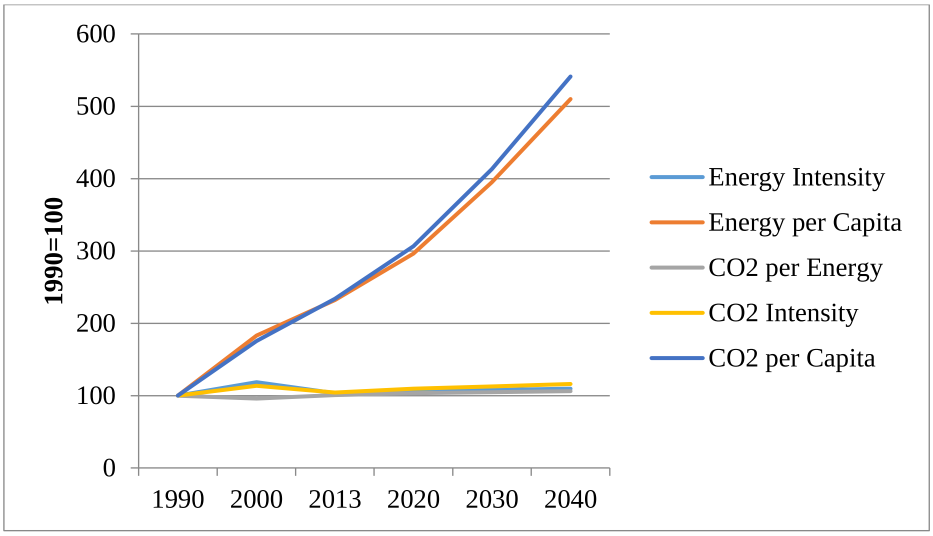
Malaysia's primary energy intensity is expected to increase to 379 toe/million 2005 US$ in 2040 from 358 toe/million 2005 US$ in 2013. Final energy intensity is projected to increase to 276 toe/million 2005 US$ in 2040 from 266 toe/million 2005 US$ in 2013. Primary energy per capita is projected to increase to 5.56 toe/person in 2040 from 2.53 toe/person in 2013. CO_2 intensity is expected to increase to 275 t-C/million 2005 US$ in 2040 from 266 t-C/million 2005 US$ in 2013. CO_2 per primary energy will increase slightly by 2040 to 0.73 t-C/toe from 0.69 t-C/toe in 2013.

Figure 11-10. Thermal Efficiency by Fuel, BAU



BAU = Business-as-Usual scenario.
Source: Author's calculation.

Figure 11-11. Energy Indicators, BAU



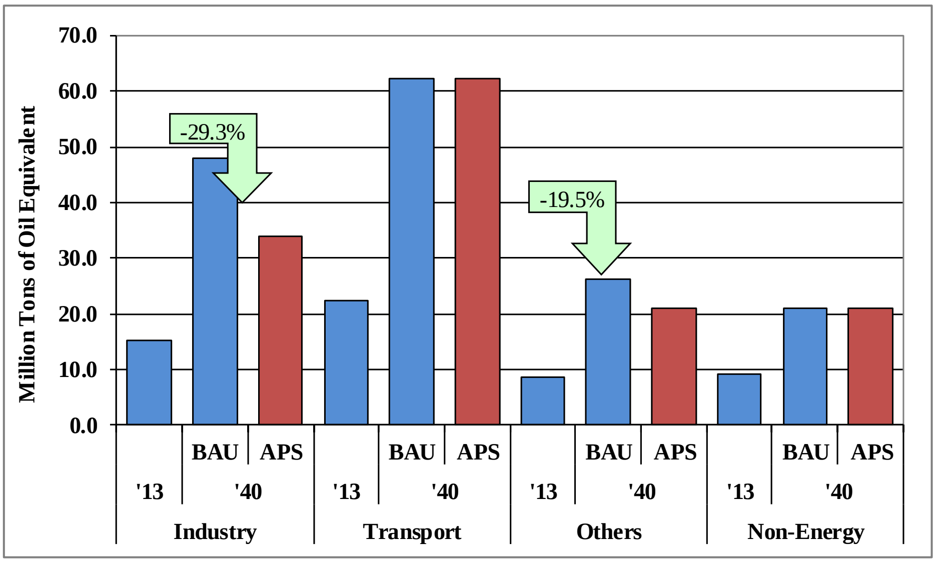
BAU = Business-as-Usual scenario; CO_2 = carbon dioxide.
Source: Author's own calculation.

3.2. Alternative Policy Scenario (APS)

In the Alternative Policy Scenario (APS), average annual growth in final energy consumption will be 3.5 percent from 2013 until 2040, slightly lower than in the BAU. The slower rate of increase in the APS will be the result of projected improvements in manufacturing technologies as well as efforts to improve energy efficiency, particularly in the industrial and commercial sectors. As a result, savings of 29.3 percent by 2040 are expected in the industry sector. In the others sector, the growth rate of energy consumption is projected to be slower than in the BAU, increasing at an average rate of 3.4 percent per year as compared with 4.3 percent per year in the BAU. The potential saving of 19.5 percent in 2040 can be achieved through implementing energy efficiency measures (Figure 11-12).

In the APS, primary energy supply is projected to increase at a slower rate than in the BAU, by 3.3 percent per year, from 74.48 Mtoe in 2013 to 176.87 Mtoe in 2040. Solar and biomass will be growing fastest, at average rates of 18.0 percent per year and 10.3 percent per year, respectively. This is due to the implementation of Feed-in-Tariff (FiT) in power generation, which is expected to have a big impact on the primary energy supply in 2040 as more renewable energy for power generation is expected to be commissioned.

Figure 11-12. Final Energy Consumption by Sector, BAU and APS



BAU = Business-as-Usual scenario; APS = Alternative Policy Scenario.
Source: Author's calculation.

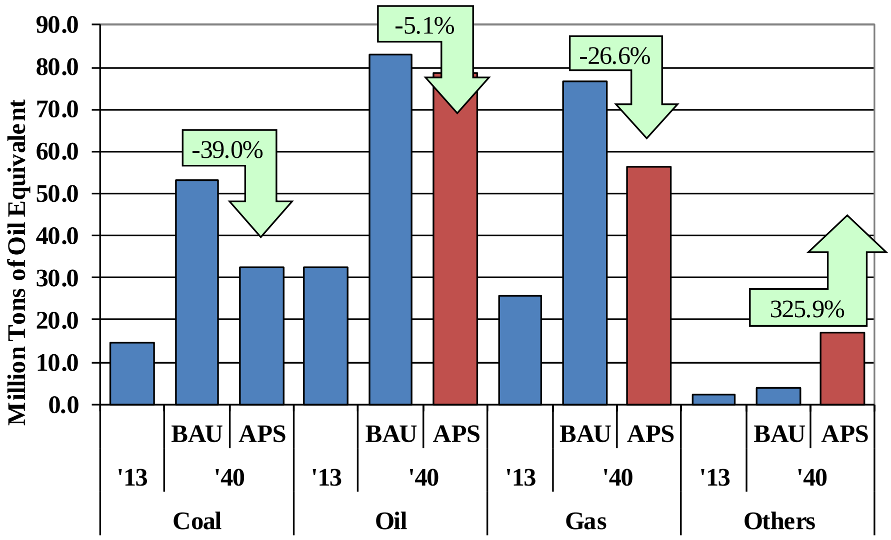
Hydro will also increase fast, but at a slower rate of 4.4 percent per year from 2013 to 2040. Oil will have a slower growth rate of 3.3 percent per year from 2013 until 2040 than in the BAU. Natural gas is projected to increase at 3.0 percent per year over the projection period and coal is projected to increase at the same rate

(Figure 11-13). Nuclear power will be introduced as a new energy source after 2025.

3.3. Projected Energy Saving

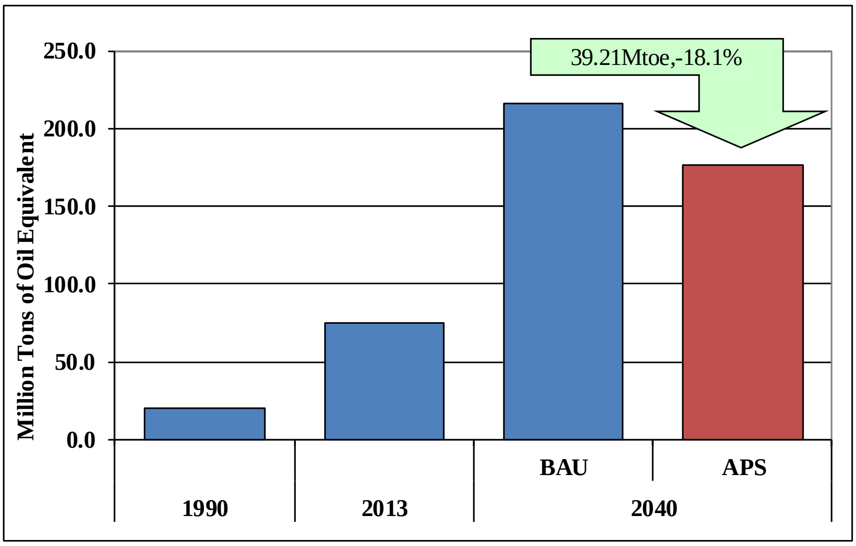
The energy savings that can be achieved under the APS, relative to the BAU, as a result of efforts to improve energy efficiency in the industrial and commercial sectors, more efficient thermal power supply, and a higher contribution from renewable energy, are estimated at 39.21 Mtoe in 2040 (Figure 11-14). The major saving that can be achieved from that total primary energy supply is by switching from coal or natural gas to renewable energy and nuclear power. For final energy consumption, the saving of 19.1 Mtoe that can be achieved in 2040 will be made up of savings of 14.0 Mtoe in the industrial sector and 5.1 Mtoe in the 'others' sector.

Figure 11-13. Primary Energy Supply by Source, BAU and APS5



BAU = Business-as-Usual scenario; APS = Alternative Policy Scenario.
Source: Author's calculation.

Figure 11-14. Total Primary Energy Supply, BAU and APS



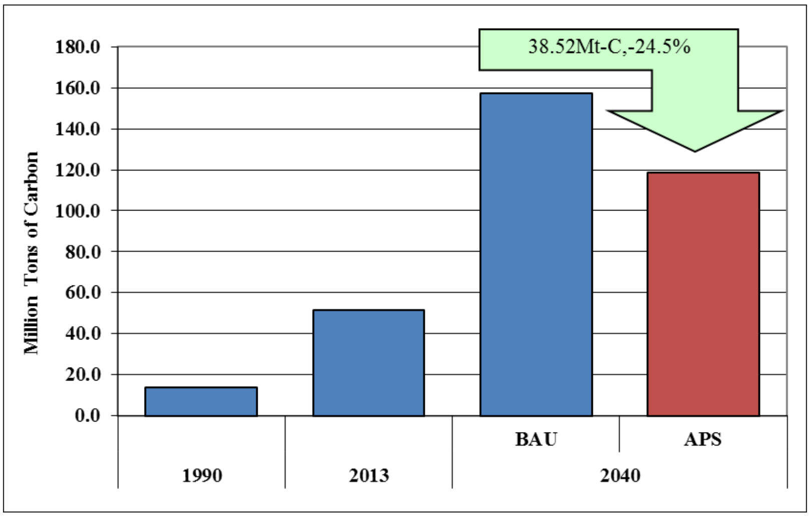
BAU = Business-as-Usual scenario; APS = Alternative Policy Scenario; Mtoe = million tons of oil equivalent.
Source: Author's own calculation.

3.4. CO_2 Emissions

In the BAU, total carbon dioxide (CO_2) emissions from energy consumption are projected to increase by 4.2 percent per year from their 2013 level to 2040. In 2013, the CO_2 emissions level was 51.4 million tons of carbon (Mt-C) and it is expected to increase to 157.1 Mt-C in 2040 under the BAU.

In the APS, the projected annual increase in CO_2 emissions from 2013 to 2040 will be 3.1 percent per year lower than in the BAU, which is fairly consistent with the expected growth in primary energy supply. The reduction in CO_2 emissions in the APS of 38.5 Mt-C or 24.5 percent relative to the BAU is due to a significant decrease in coal consumption for power generation in the APS, relative to the BAU, as coal consumption is being replaced by natural gas and other clean energy sources such as nuclear and renewable energy. Furthermore, the projected lower energy usage in the industrial and commercial sectors, and fuel switching in the transport sector will also contribute to the expected reduction. This indicates that Malaysia's energy saving effort and renewable energy action plan would be effective in reducing CO_2 emissions.

Figure 11-15. CO_2 Emissions from Energy Consumption, BAU and APS



CO_2 = carbon dioxide; BAU = Business-as-Usual scenario; APS = Alternative Policy Scenario; Mt-C = million tons of carbon.
Source: Author's own calculation.

4. Conclusions

Malaysia's primary energy intensity in the APS is expected to be 18.2 percent lower in 2040 than in the BAU. The reduction of primary energy intensity will be due to Malaysia's energy saving measures, promoting energy efficiency and renewable energy. A contribution will also be made by the programmes and activities under the Eleventh Malaysia Plan, as the main strategies for the energy sector will be focused on improving infrastructure and service deliveries. Specific strategies for tackling governance and public communication issues will be undertaken. The oil and gas subsector will be strengthened by improving security and reliability of supply, instituting a regulatory framework for the gas market, enhancing downstream business, and eliminating market distortions. The strategies for the electricity subsector will focus on creating a sustainable tariff framework, better management of resources, and enhancing rural electrification. Demand Side Management (DSM) also marks an important paradigm shift for Malaysia towards efficient management of energy sources.

Malaysia faces several energy issues and challenges that can be addressed in a holistic manner. Reformulation of the sustainable energy plan can help to achieve future economic targets. One major challenge is managing public perception about the development of coal-fired and nuclear power plants, which is crucial for overcoming negative perceptions. The public must be kept informed about the availability of new clean coal and emission control technologies to protect the environment. This includes communication and public awareness programmes to build buy-in for the development of coal and nuclear power plants required to secure the electricity supply. As the country is preparing to embark on the use of nuclear power, a communication plan needs to be rolled out immediately. The government will spearhead a coordinated communication plan for this purpose. This initiative will include public communication, stakeholder management strategies, and action plans. Specific strategies will be designed to target civil society, non-governmental organisations (NGOs), mass media, teachers, community leaders, and other relevant groups.

Sustained efforts to institute market-based energy pricing will be made to reduce energy subsidies. Initiatives to review the pricing structure of gas supply will be continued to gradually align current piped gas prices towards market parity. In addition, Incentive Based Regulation (IBR) for gas will be introduced to ensure efficient resource allocation, usage, and sustainable financial performance. Fuel cost is the largest input in the electricity tariff and the generation fuel mix needs to be optimised to ensure low cost of supply and affordable tariffs. In line with the policy to gradually remove energy subsidies, the tariff requires periodical adjustments. Therefore, the electricity tariff will be reviewed to achieve market parity. Based on the current tariff structure, the first 300 kilowatt hours (kWh) of electricity consumption, which is the lifeline band, will not be affected by the tariff increase. The price for RON95 petrol, RON97 petrol, and diesel will continue to be regulated using a managed-float system to stem leakages. The Compressed Natural Gas (CNG) prices will also be reviewed accordingly, to gradually remove subsidies and encourage expansion of CNG retail infrastructure.

Studies will be conducted to identify new renewable energy sources to diversify the generation mix. New renewable energy sources such as wind, geothermal, and ocean energy will be explored. Currently, a national wind mapping exercise expected to be completed by 2016 is underway and will enable a study on the feasibility of wind energy to be carried out. Geothermal potential will also be further explored following the discovery of a 12 square kilometre geothermal field in Apas Kiri, Sabah. The viability of ocean energy will be explored to take advantage of Malaysia's geographical position of being surrounded by sea.

As for energy efficiency initiatives, Minimum Energy Performance Standards (MEPS) and energy labelling will help to improve the energy efficiency of appliances enabling consumers to choose products that use less energy. An additional four domestic appliances – vacuum cleaners, instant water heaters, irons, and electric ovens – will be included in the MEPS and labelling programme. There will be 14 appliances under this programme and the scope of MEPS for air-conditioners and refrigerators will be expanded.