

Chapter 1

Oil in Southeast Asia

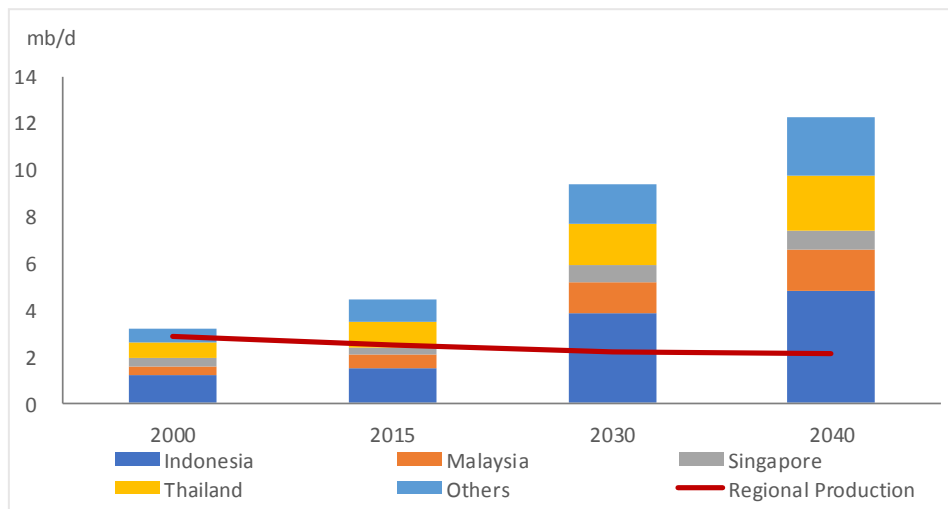
1.1 ASEAN

1.1.1 Demand and Supply

Oil demand in the Association of Southeast Asian Nations (ASEAN) is expected to grow rapidly for the foreseeable future. At 4.4 million barrels per day (mb/d) in 2015, oil demand in the region is projected to increase by 4.1% per year to reach 12.2 mb/d in 2040, according to the Economic Research Institute for ASEAN and East Asia (ERIA, 2016). The biggest growth will happen in Indonesia, where demand will increase by 4.8% per year to reach 4.8 mb/d in 2040. Thailand will see a steady increase in demand too, with an annual growth rate of 4.5% to reach 2.3 mb/d, while Malaysia will have annual growth of 3.0% to reach 1.7 mb/d in 2040. Singapore also shows strong demand growth, at 4.0% per year, though it will plateau at about 0.8 mb/d from 2030 onward. Demand in other countries in the region will grow significantly, but the share of these four countries will remain at about 80% until 2040.

By contrast, regional production is expected to decline steadily towards 2040. ASEAN countries produced 2.9 mb/d of crude in 2015. With 0.8 mb/d, Indonesia is the largest producer in the region, followed by Malaysia (0.7 mb/d) and Thailand (0.5 mb/d). ASEAN production, according to The Institute of Energy Economics, Japan (IEEJ) estimates, is likely to decrease to 2.1 mb/d in 2040. The region's import dependency was 44% in 2015, which is already significant, and it could rise to 83% in 2040 (Figure 1.1).

Figure 0.1. Oil Demand and Supply in ASEAN (2000–2040)



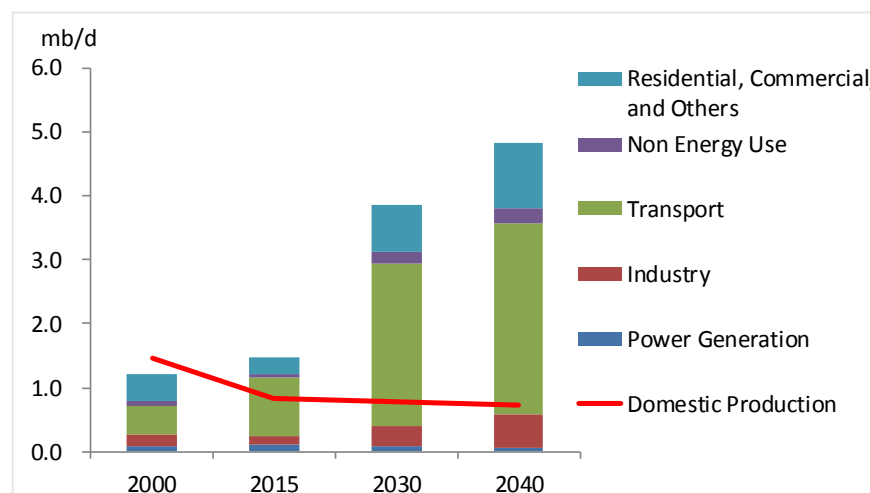
ASEAN = Association of Southeast Asian Nations; mb/d = million barrels per day.
Sources: ERIA (2016) and IEEJ (2017).

1.2. Indonesia

1.2.1 Demand and Supply

Indonesia is the largest consumer of oil in the ASEAN region, with demand growing steadily from 1.2 mb/d in 2010 to 1.6 mb/d in 2015. The increase is expected to accelerate in the future and ERIA (2016) predicts that demand will reach 4.8 mb/d in 2040. Most of the growth will happen in the transport sector. Although Indonesia is still the largest crude producing country in the region, production peaked in the early 1990s and the country produced 0.8 mb/d in 2015. (Figure 1.2) As a result, Indonesia has been a net importer since 2007, and import dependency in 2015 stood at 57%. The country is highly likely to become increasingly dependent on oil imports to satisfy its demand.

Figure 0.2. Oil Demand and Supply in Indonesia (2010–2040)



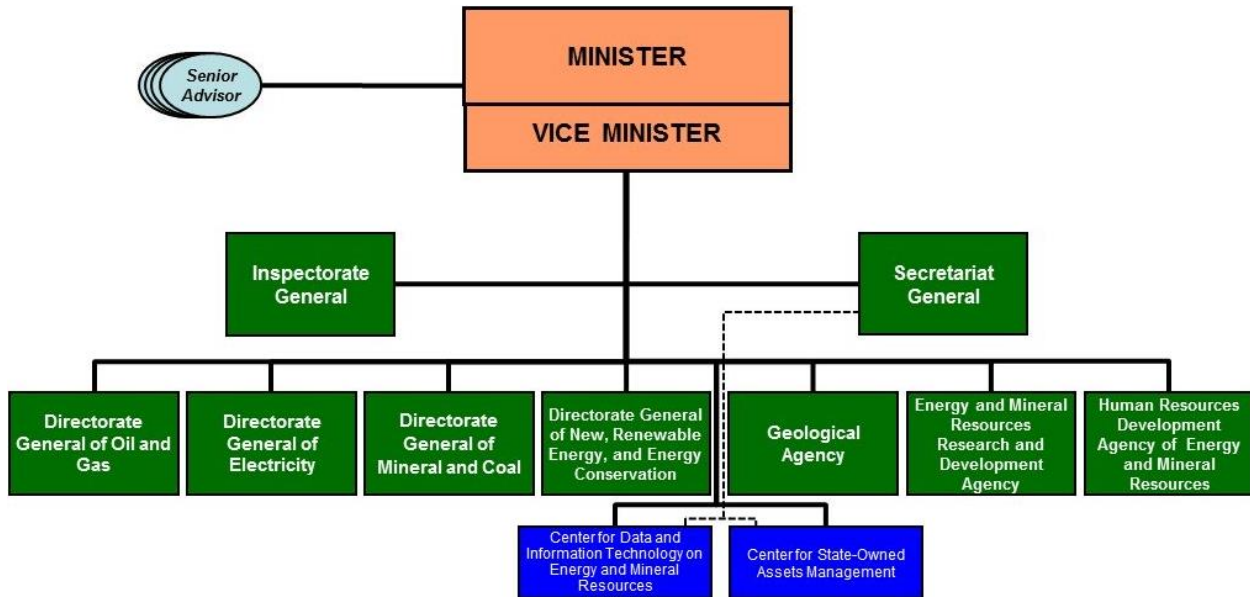
mb/d = million barrels per day.

Sources: ERIA (2016) and IEEJ (2017).

1.2.2 Governance and Industry

In Indonesia, the National Energy Council (NEC), established in 2007, is the main coordination body of energy policy. The NEC is cochaired by the President and vice president of Indonesia, and comprises ministers, industry executives, and academics. While the NEC outlines the basic energy policy, the Ministry of Energy and Mineral Resources (MEMR) executes energy and mineral resources policy. The MEMR is made up of seven main sections, including the Directorate General of Oil and Gas, which is the main body that implements oil and gas policy in Indonesia. (Figure 1.3)

Figure 0-3: Organisation Chart of MEMR



MEMR = Ministry of Energy and Mineral Resources.

Source: MEMR (2018a).

Other government agencies in the energy sector include the Special Task Force for Upstream Oil and Gas Business Activities (i.e. exploration and production) and the Governing Body for Downstream Oil and Gas (i.e. transportation and supply). The task force manages upstream oil and gas activities by signing and monitoring upstream development contracts, while the governing body regulates the downstream oil and gas sectors.

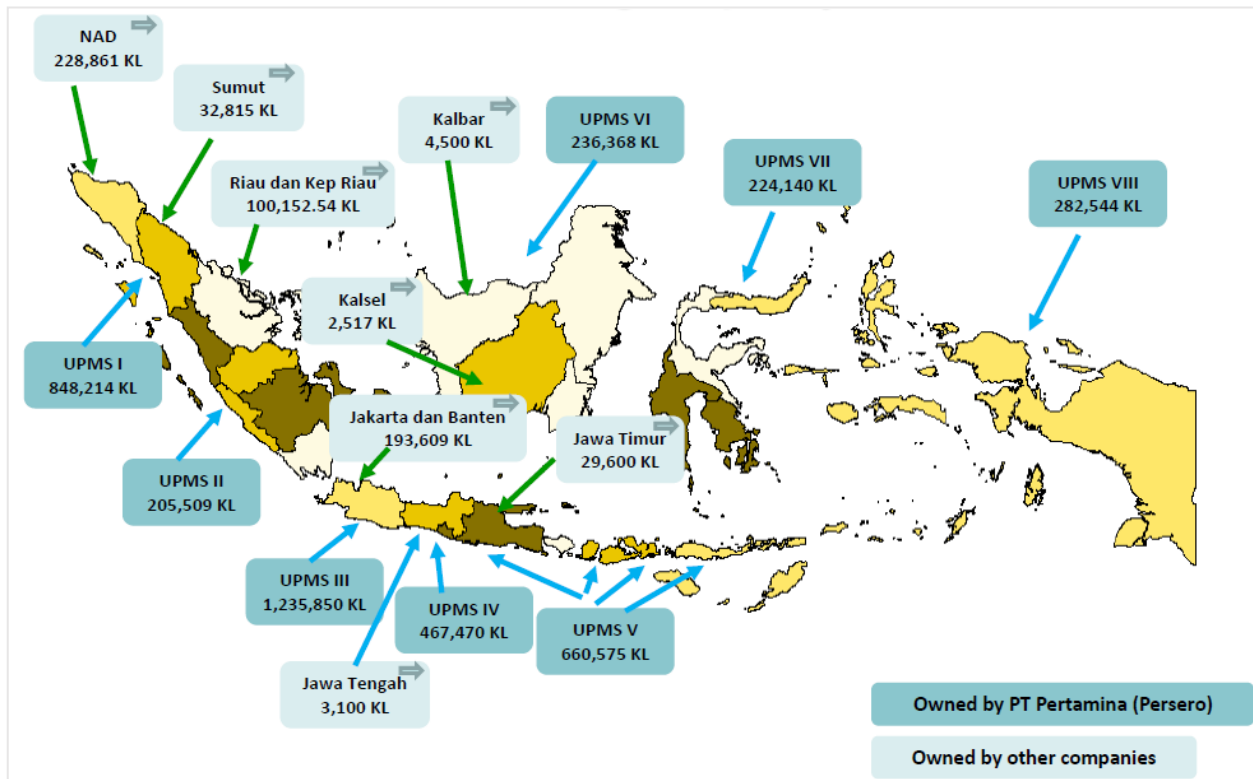
The oil and gas industry in Indonesia has long been dominated by state-owned Pertamina. Following Law No. 20 of 2001, Pertamina was reorganised as a public liability company without regulatory authority over the oil and gas sectors in Indonesia. The downstream sector is liberalised, and companies such as Shell and Petronas entered the retail business in 2004. Pertamina owns all six refineries in Indonesia, with a total capacity of 1.1 mb/d. Several plans are in place to upgrade or expand those refineries, and Pertamina is open to foreign partners. One of the partners is Saudi Aramco, which formed a joint venture with Pertamina to upgrade Cilacap refinery in Java. This upgrade is scheduled to complete in 2023 and increase capacity to 0.40 mb/d from 0.35 mb/d (Reuters, 2017).

1.2.3 Oil Stockpiling

According to the MEMR,¹ Indonesia has a total oil storage capacity of 4.8 million kilolitres (kl) or 30 mb. This is equivalent to 5% or 19 days of the annual demand in the country, which is probably the lowest ratio of the four countries in this study. Pertamina owns 87% of the capacity while other companies own the rest (Figure 1.4).

While over 40% of the capacity is in Java, which has the greatest demand, the Riau Islands close to Singapore have significant capacity growth. For example, Pertamina added 500,000 kl (3 mb) capacity in Sambu and Tanjung Uban in 2016. Foreign oil tank firms are already present in the area and adding more capacity because of the Special Economic Zone. Tank developments in the zone are not directly related to the government’s oil stockpiling policy, but are primarily for commercial activities such as blending and trading, partly replacing the role of Singapore. Nevertheless, capacity additions are expected to contribute to Indonesia’s oil supply security, albeit indirectly.

Figure 0.4. Oil Storage Capacity in Indonesia



MEMR = Ministry of Energy and Mineral Resources.

Source: MEMR (2018b).

¹ Direct communication with the MEMR.

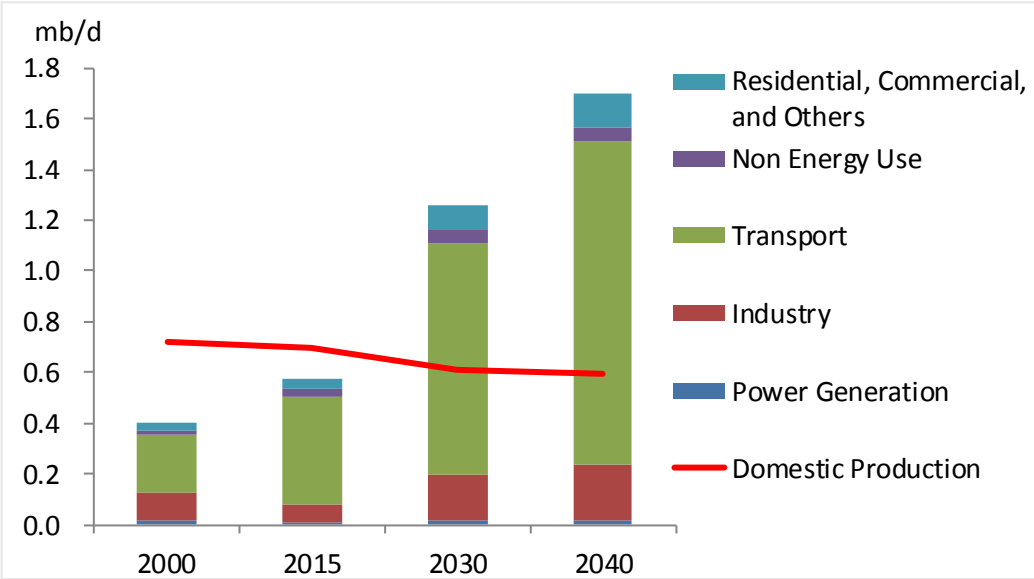
Indonesia imposes no oil stocking obligations. Pertamina holds 22 days of operational stocks based on domestic oil consumption. The MEMR is developing laws on stockpiling obligations for private companies (i.e. other than Pertamina) to hold 25 days of stock based on a ministerial decree, as well as government stocks of 30 days based on a presidential decree, although no specific target year has been set to enact the laws.

1.3 Malaysia

1.3.1 Demand and Supply

Malaysia is the fourth largest consumer and second largest producer of oil in Southeast Asia. Demand in 2015 was 0.6 mb/d, mostly for transport. As in Indonesia, demand growth is expected to accelerate, reaching 1.7 mb/d in 2040. (Figure 1-5) Malaysia is one of the few countries in the region with net oil exports since 2015. However, the country is expected to turn into a net importer around 2020 because of the robust demand growth and declining domestic production. Import dependency is expected to reach 65% in 2040.

Figure 0.5. Oil Demand and Supply in Malaysia (2010–2040)



mb/d = million barrels per day.

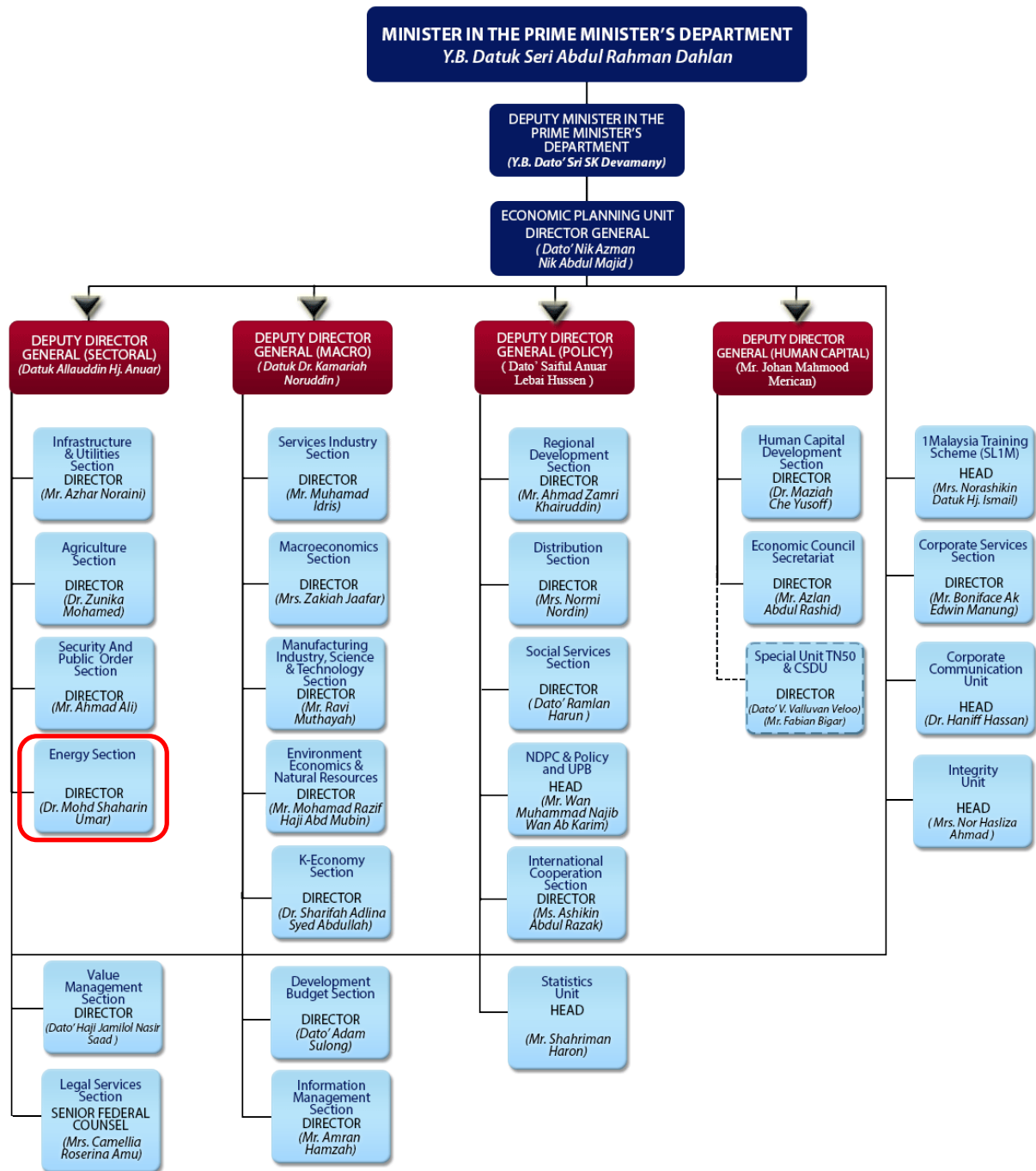
Sources: ERIA (2016) and IEEJ (2017).

1.3.2 Governance and Industry

The Energy Section of the Economic Planning Unit (EPU), under the Minister of Economic Affairs, is responsible for most energy governance in Malaysia, especially in the oil and gas sectors (Figure 1.5). The key functions of the Energy Section are to (i) formulate policies and strategies for sustainable development of the energy sector; (ii) promote the development of the oil and gas industries; (iii) ensure

adequate, secure, quality, and cost-effective energy supply; and (iv) promote increased use of renewable energy and energy efficiency in the energy sector.

Figure 0-6: Economic Planning Unit Organisation Chart



Source: EPU (2018).

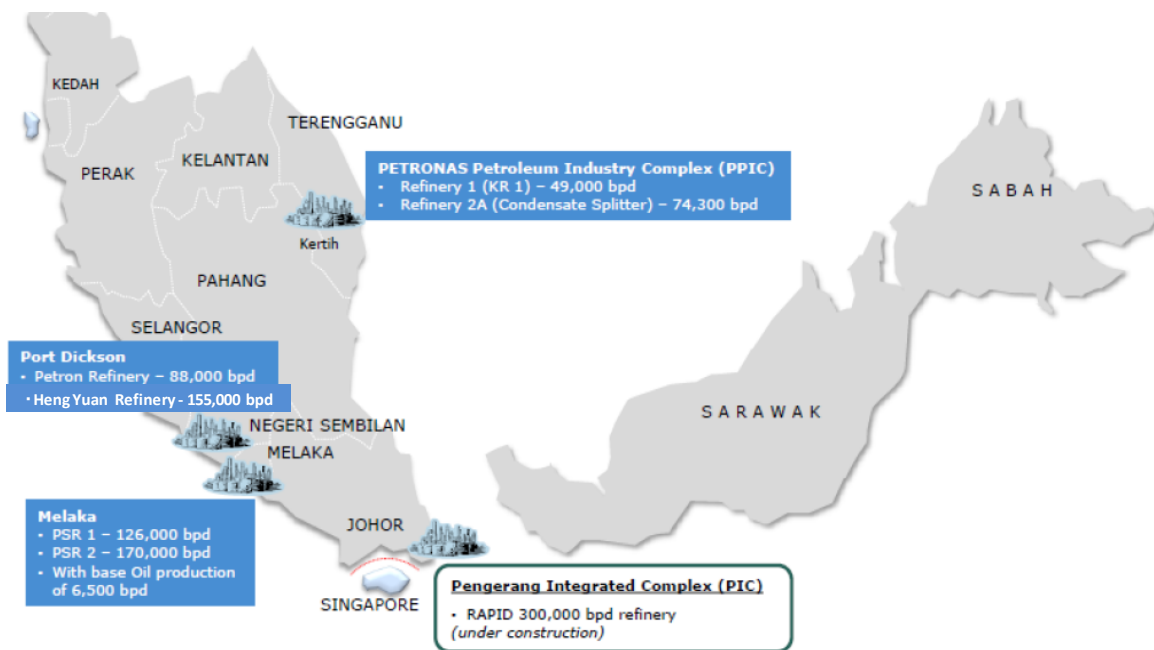
The Ministry of Energy, Green Technology and Water is mainly in charge of the power industry, renewables, and energy efficiency as well as water supply. The Energy Commission is an independent regulatory body responsible for the electricity and piped gas supply industries.

Established in 1974, Petronas, a wholly state-owned entity, has the authority to own, develop, and operate oil and gas resources and facilities. Although foreign investment in the upstream sector is subject to forming joint ventures with Petronas, downstream sectors (e.g. refinery and retail) are open to 100% ownership by foreign entities. Malaysia has eight refineries, with a total capacity of 0.72 mb/d. Petronas owns three of them, and is developing a major oil and petrochemical complex (Pengerang Integrated Complex) with Saudi Aramco in Johor. With refinery capacity of 0.3 mb/d, this is scheduled to commence operations in 2019.

1.3.3 Oil Stockpiling

Figure 1-7 depicts refinery profiles in Malaysia, but no official figures are available for oil storage capacity. Storage capacity for Johor could increase from 3.5 million cubic meters (m³) to 10.0 million m³ (22 mb to 63 mb) when Petronas Petroleum Industry Complex is fully developed (*Tank Storage Magazine* 2017). This means that the current capacity in Johor alone meets 10% of the annual demand of 2015.

Figure 0-7: Refinery Profiles in Malaysia



bpd = barrels per day.

Source: EPU (2017).

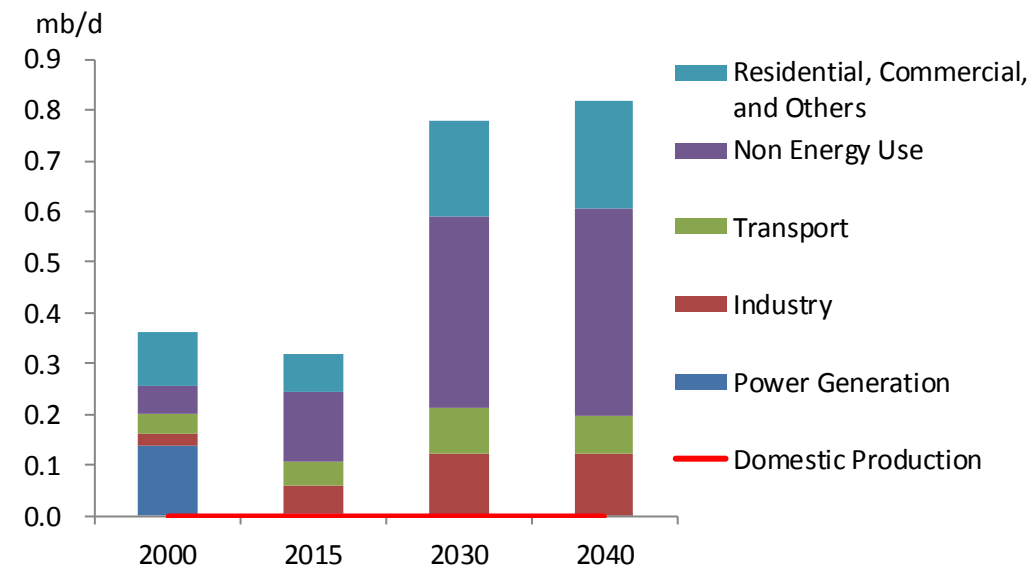
Malaysia has no oil stockpiling obligation. The government is aware of the need for the obligations, but it has given policy priority to the review of subsidies, modal shift, and demand control rather than oil stockpiling.

1.4 Singapore

1.4.1 Demand and Supply

Singapore is the third largest consumer of oil in the region. It is unique because it has no domestic production but has excess refinery capacity. Singapore has been the regional oil refining and trading hub for decades. Although demand decreased from 2000 to 2015 as natural gas replaced oil for power generation, Singapore’s oil demand growth is forecast to be very strong in the future. ERIA (2016) projects demand to more than double by 2030, driven by non-energy use (i.e. mostly petrochemical feedstock). (Figure 1-8) However, this will depend on the expansion of petrochemical plants in the country.

Figure 0-8: Oil Demand and Supply in Singapore (2010–2040)



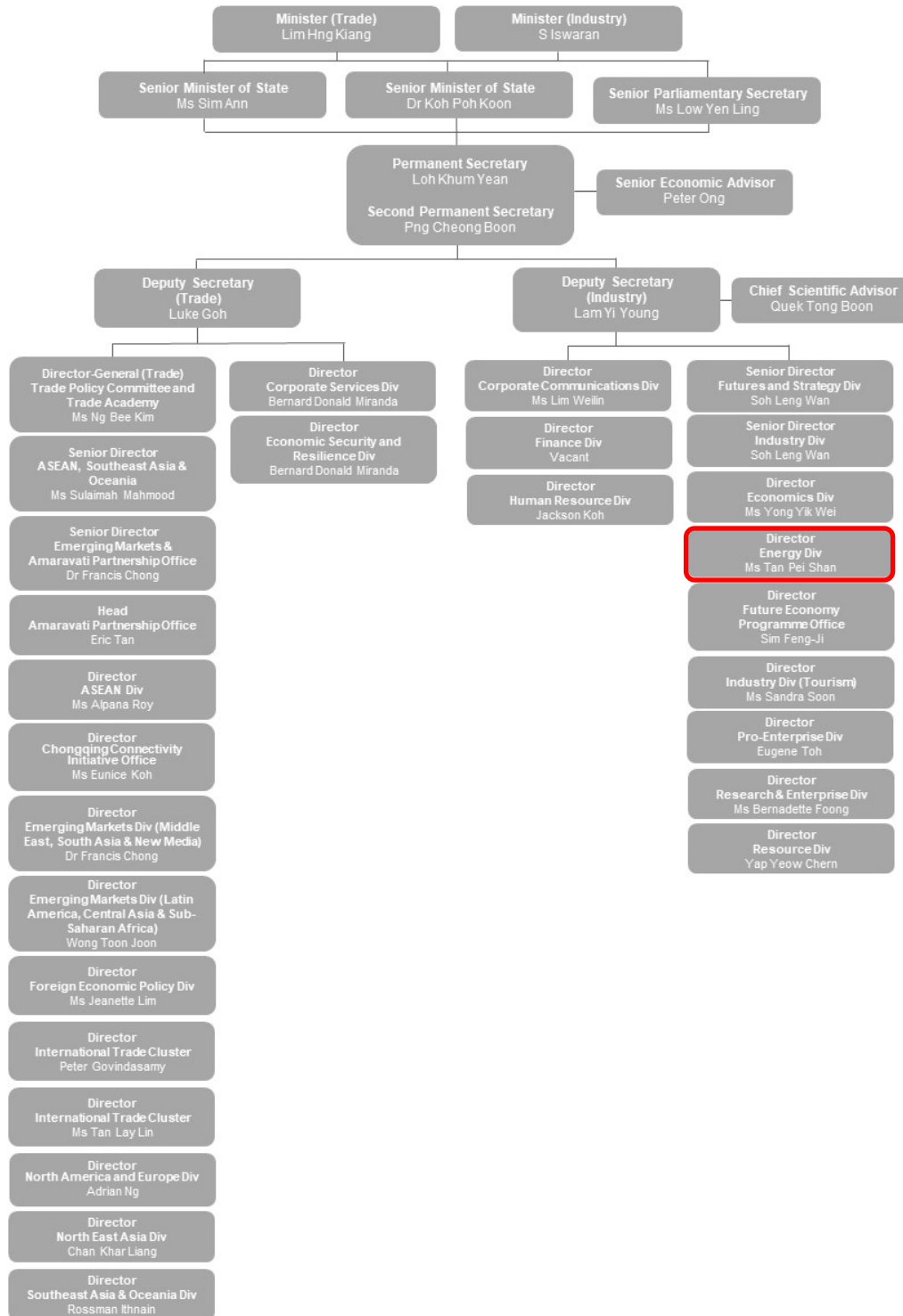
mb/d = million barrels per day.

Sources: ERIA (2016) and IEEJ (2017).

1.4.2 Governance and Industry

The Ministry of Trade and Industry (MTI) is the principal body for energy policy in Singapore. The Energy Market Authority is a market regulator tasked with ensuring competition in the power and gas supply industries. (Figure 1-9) Singapore has always been open for foreign investment in its energy sector. It has three refineries, owned by ExxonMobil, Shell, and Singapore Refining Company (joint venture of Singapore Petroleum Company and Chevron). The total refining capacity is 1.3 mb/d, which well exceeds domestic demand.

Figure 0-9: Organisation Chart of Ministry of Trade and Industry

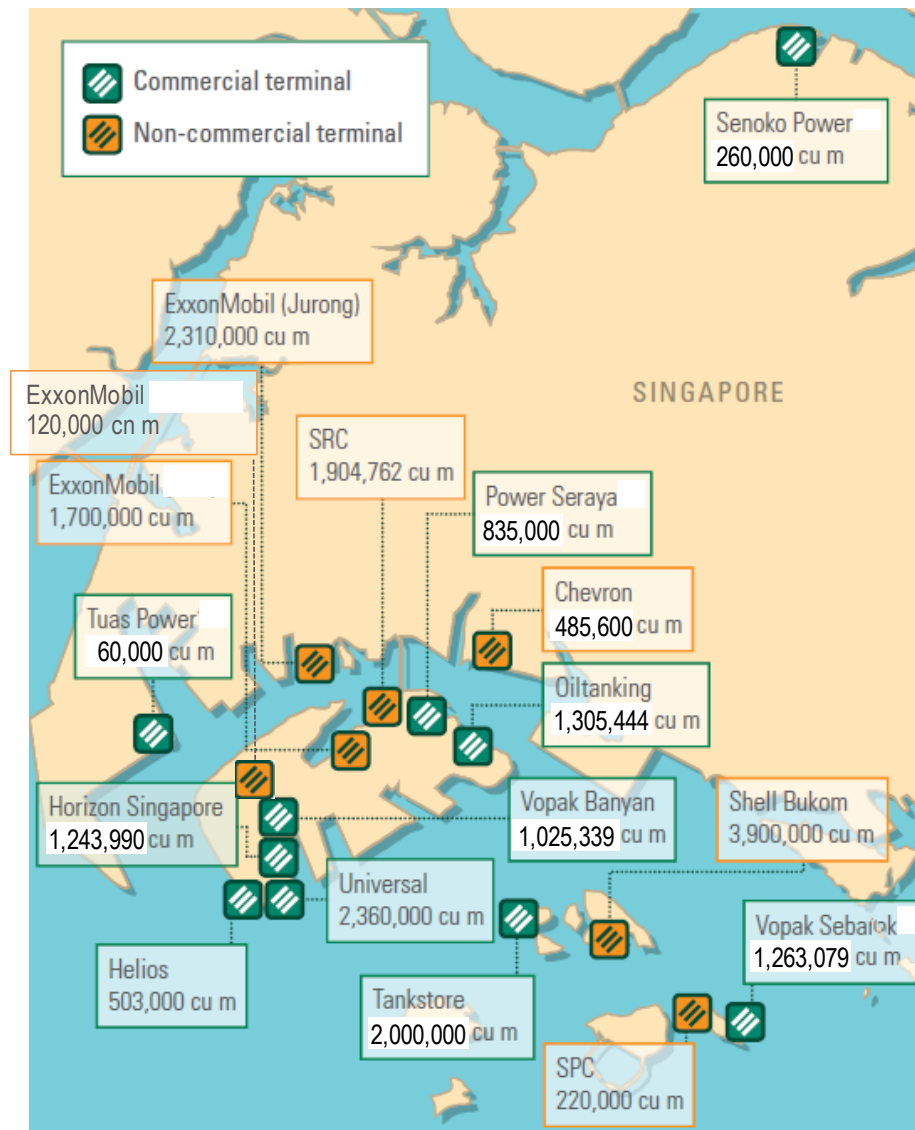


Source: MTI (2018)

1.4.3 Oil Stockpiling

As Asia's trading hub, Singapore has large oil storage capacity, at 21.5 million m³ (135 mb) in 2018. (Figure 1-10) This is equivalent to 123% or 451 days of annual domestic demand, and has been mainly developed commercially by independent tank companies and refineries. Independent tank companies such as Vopak, Tankstore, and Helios Energy are particularly active in Singapore, providing capacity for blending and trading.

Figure 1-10: Oil Storage Capacity in Singapore



Sources: Platts (2014, 2018).

Singapore has no official oil stockpiling obligation, but electricity generators hold 90 days of back-up fuel to meet the generator license condition. Gas-fired power generates most electricity in Singapore, but it is very costly to store natural gas. Thus, generators install a dual fuel unit to burn natural gas and oil

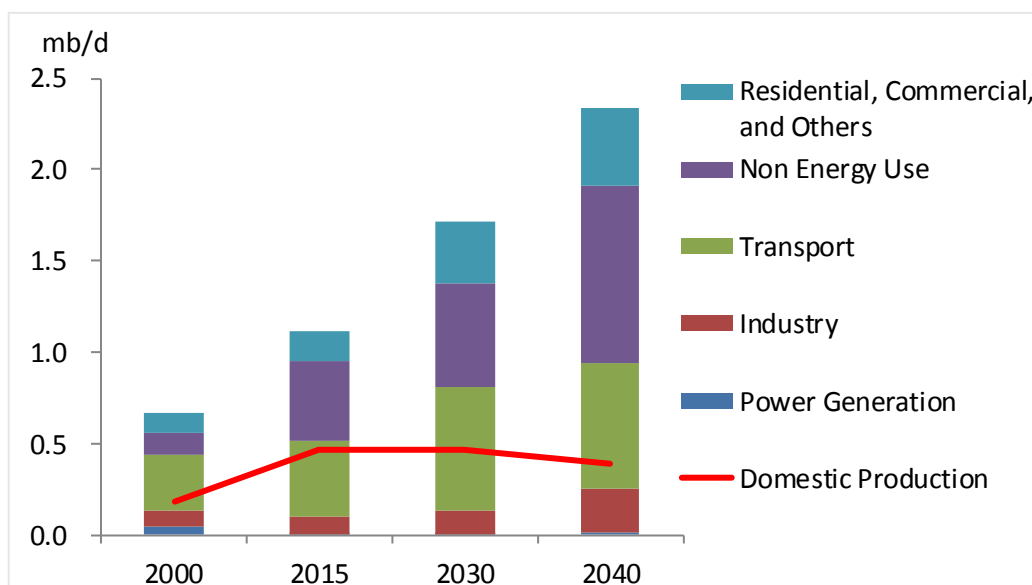
products, and oil products are the back-up fuel. However, this is different from the oil stockpiling in IEA member countries, which involves stockpiling obligations on oil companies and government stockpiling.\

1.5 Thailand

1.5.1 Demand and Supply

Thailand is the second largest consumer and the third largest producer of oil in Southeast Asia. It consumed 1.1 mb/d in 2015, mainly in transport and non-energy use (mostly petrochemical feedstock). According to ERIA (2016), demand is expected to increase steadily to reach 2.3 mb/d in 2040, with transport and non-energy use still the two biggest demand sectors. Domestic production in Thailand has increased, reaching 0.5 mb/d in 2015, almost all of which was consumed domestically. However, the IEEJ forecasts that production will start declining around 2030 and hover around 0.4 mb/d until 2040. (Figure 1-11) Thus, like Indonesia and Malaysia, rising import dependency is inevitable. Thailand’s import dependency is expected to reach 83% in 2040.

Figure 0-11: Oil Demand and Supply in Thailand (2010–2040)



mb/d = million barrels per day.

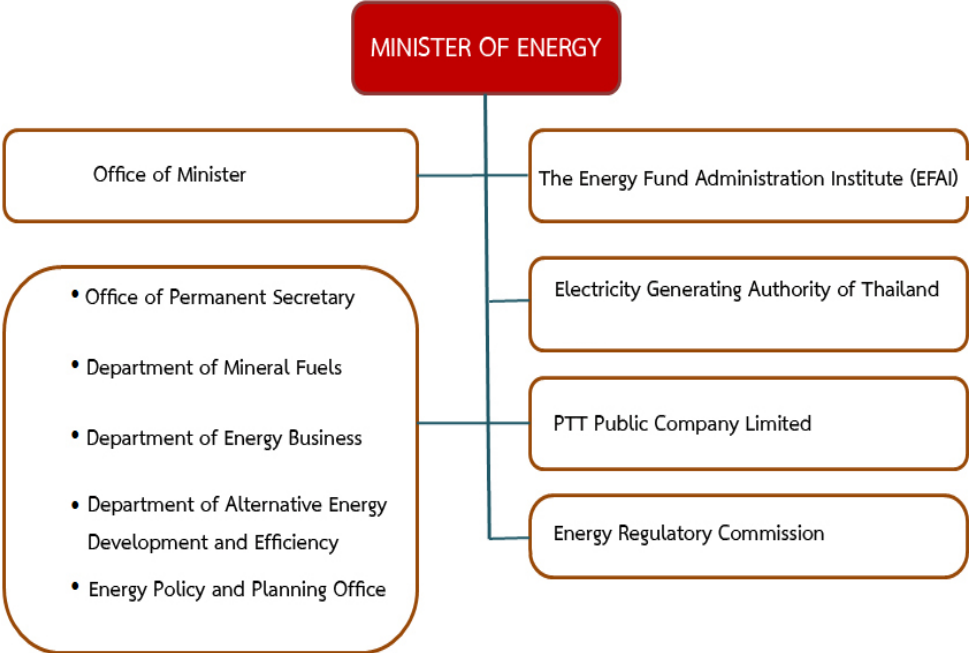
Sources: ERIA (2016) and IEEJ (2017).

1.5.2 Governance and Industry

The Ministry of Energy formulates and executes energy policy in Thailand. It has four main sections: the Energy Policy and Planning Office, the Department of Mineral Fuels, the Department of Energy Business, and the Department of Alternative Energy Development and Efficiency. The Energy Policy and Planning Office has a wide range of functions, such as monitoring energy demand and supply, formulating and

evaluating energy policy, aligning with other ministries and industries, and managing the Oil Fund.² (Figure 1-12) The Department of Mineral Fuels has jurisdiction over upstream sectors, including signing contracts for exploration and production projects in Thailand. The Department of Energy Business regulates downstream activities – wholesale, retail, product quality, safety, and environmental management. The Department of Alternative Energy Development and Efficiency oversees renewable energy and energy efficiency.

Figure 0-12: Organisation Chart of the Ministry of Energy



PTT = Petroleum Authority of Thailand.
 Source: Ministry of Energy (2018).

The Ministry of Energy has jurisdiction over two major energy companies: the Petroleum Authority of Thailand (PTT) and the Electricity Generating Authority of Thailand. PTT was partially privatised in 2001, but the government retains 51% of the company shares. Both the upstream and downstream sectors are open to foreign investment. Thailand has six refineries in operation, of which PTT controls five through its subsidiaries for an accumulated capacity of 1.2 mb/d.

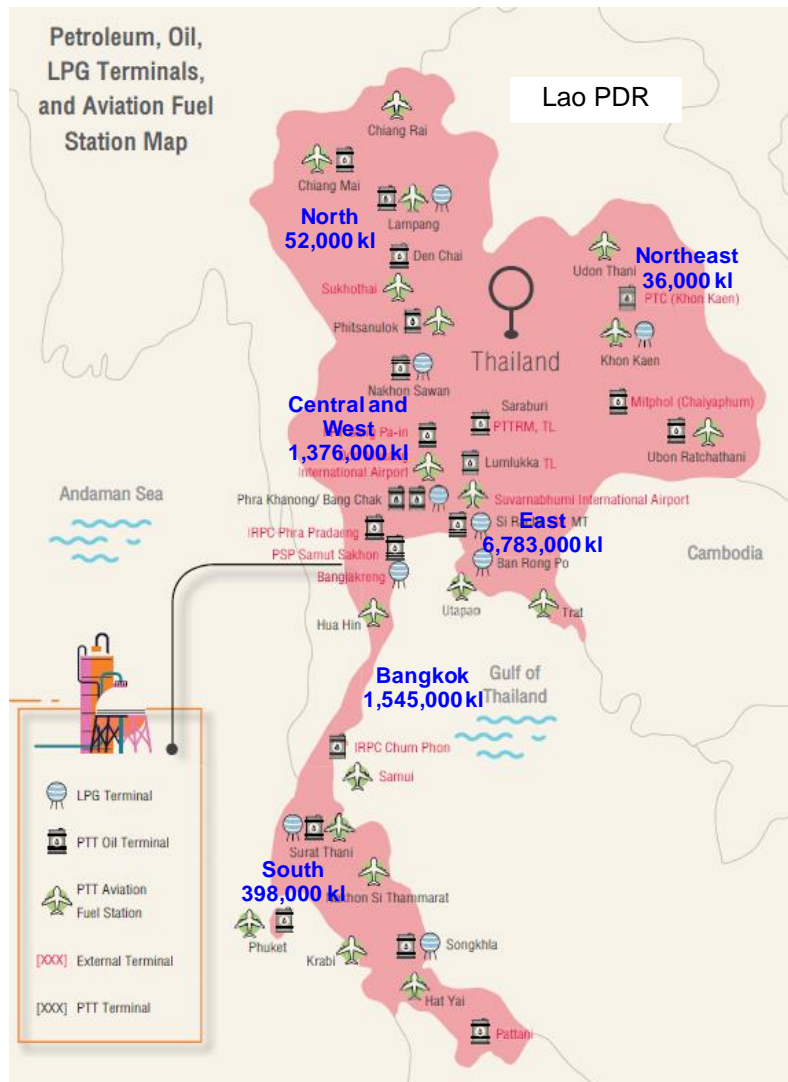
² The Oil Fund is aimed at stable domestic energy prices.

1.5.3 Oil Stockpiling

Thailand has ample oil storage capacity. According to the Ministry of Energy, the total capacity in the country is 10.2 million kl (64 mb), which is 13% or 46 days of the annual demand in 2015. (Figure 1-13) This study assumes that PTT owns most of the capacity, although no official information is available to confirm this. Other details – such as the share of storage capacity of oil terminals, refineries, or deposits – are not disclosed.

The government obliges refinery and oil traders to hold stocks. In the case of crude oil, refineries are required to hold 6% or the equivalent of 21.5 days of crude demand. Traders are mandated to hold 1% or 3.5 days of demand. The government is undertaking a study on oil stockpiling to decide whether to introduce government stockpiling. The study is expected to be completed by the first quarter of 2019.

Figure 1-13: Oil Storage Capacity in Thailand



kl = kilolitre.

Source: PTT (2018); storage capacity figures added by IEEJ.