Chapter 3

Recommended Oil Stockpiling for Myanmar

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Chapter 3

Recommended Oil Stockpiling for Myanmar

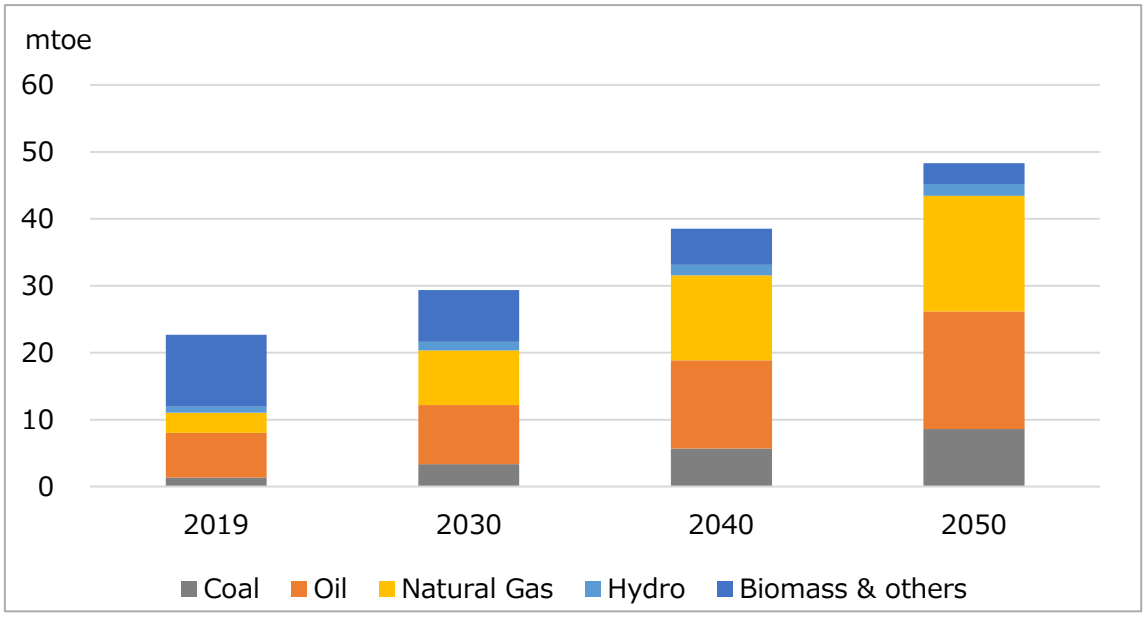
This chapter describes Myanmar's oil fundamentals and outlook. With cost estimates, this chapter also recommends an appropriate oil stockpiling system for the country regarding storage options, quantity, and the role of government and industry.

1. Oil in Myanmar

1.1. Demand Outlook

Apart from non-commercial biomass, oil is the largest energy source in Myanmar. Along with natural gas, oil is expected to remain the primary fuel in the country in the future. Oil demand will grow at 3% per annum to reach 18 million tonnes (Mt) (350 kb/d) in 2050, according to the IEEJ. As a result, the oil share in the energy mix will expand from 29% in 2020 to 36% in 2050.

Figure 3.1. Energy Mix Outlook in Myanmar

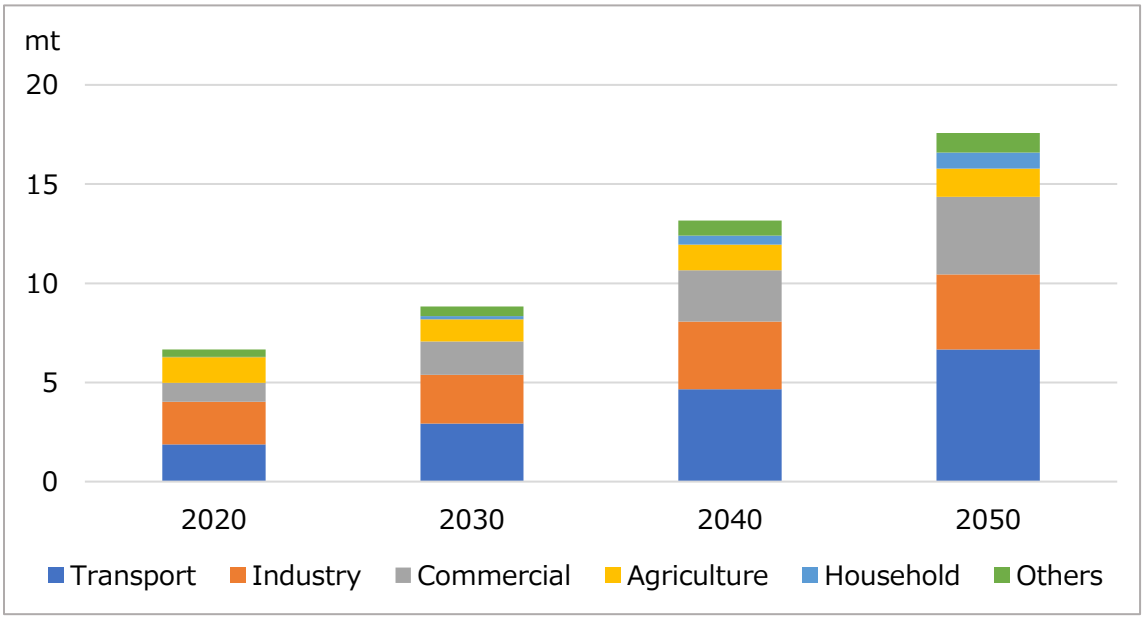


Source: IEEJ (2022).

Industry and transport are the main demand sectors of oil in Myanmar. The industry sector accounted for 32%, and the transport sector for 28% in 2020. The agriculture and commercial sectors follow at 19% and 14% in the same year. While demand growth in agriculture and industry will slow down, transport will accelerate. As a result, the transport sector will share 38%

of the total oil demand in 2050. More than 90% of the demand is currently covered by diesel and gasoline, which are most important for stockpiling in the country.

Figure 3.2. Oil Demand Outlook by Sector in Myanmar

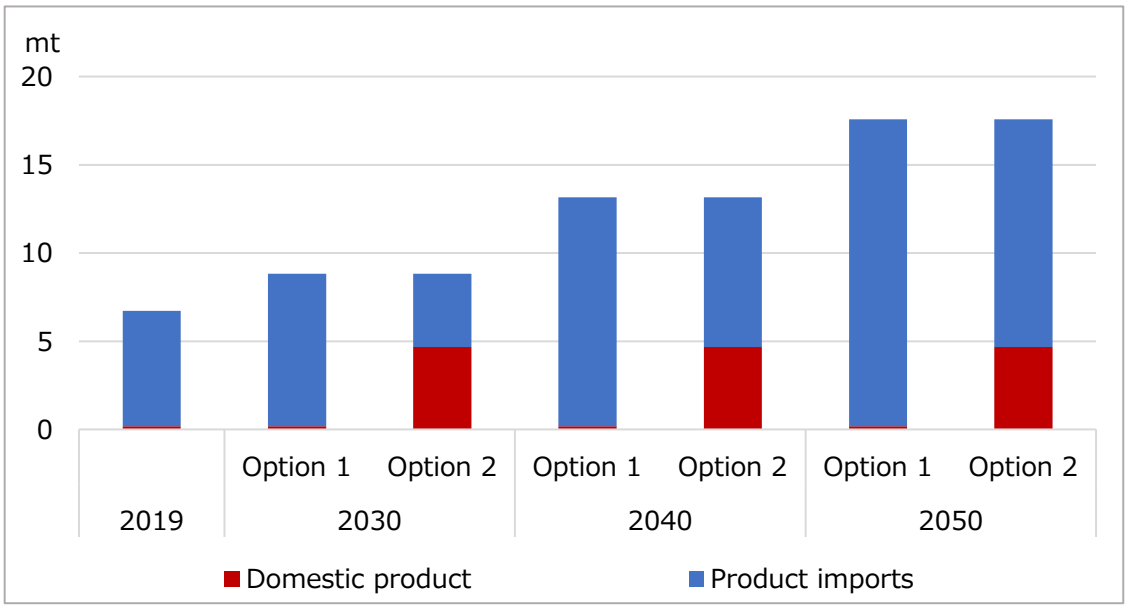


Source: IEEJ (2022).

1.2. Supply Outlook

With negligible crude production and low utilisation of refineries, imported products, mainly diesel and gasoline, meet almost all oil demand. There are two existing refineries, and two are under planning. According to the Ministry of Energy, one of the two new refineries with a crude distillation unit capacity of 5 Mt/y (100 kb/d) could be operational in 2028. Therefore, this study envisages two supply options hereafter. Option 1 considers no new refineries constructed until 2050, and imported products will meet almost all the demand. Option 2 assumes the new refinery will be operational in 2028, and products from this new refinery will meet a considerable part of the demand until 2050.

Figure 3.3. Oil Supply Outlook in Myanmar



Source: IEEJ (2022).

Table 3.1. Refineries in Myanmar

	Name	Design Capacity (kb/d)	Current Capacity (kb/d)	Start Year
Existing	Chauk	5	2	1954
	Thalyin	21	7	1982
Under planning		100		2028
		200		?

Source: Ministry of Energy (2022a).

1.3. Storages

According to the Ministry of Energy (2022a), the total storage capacity in Myanmar is about 200 million gallons (4.7 mb). All storage capacity is based on onshore tanks, mainly at existing refineries. Small capacities at depots are scattered across the country. Storage capacity covers 31 days of gasoline imports and 54 days of diesel imports. However, the IEEJ understands that the total capacity in Table 3.2 does not include capacity at Kyaukpyu Terminal operated by the China National Petroleum Corporation.

In 2019, Myanmar stocked 36 days of gasoline, 35 days of diesel, and 120 days of jet fuel (Ministry of Energy, 2022b). Although the government understands 'all private fuel terminals need to maintain a certain amount of their stocks', no specific stockpiling quantity or days have been legislated (Ministry of Energy, 2022b).

Table 3.2. Oil Storages in Myanmar

Region/State/ Refinery	Gasoline	Diesel	Other Products	Crude	Condensate
Union Territory Nay Pyi Taw	0.3	0.3	N/A		
Yangon Region	0.8	6.7			
Mandalay Region	0.9	12			
Irrawaddy Region	0.4	0.6			
Bago Region	0.6	0.8			
Magway Region	0.5	0.6			
Sagaing Region	0.5	0.7			
Tanintharyi Region	0.1	0.1			
Kachin State	0.4	0.7			
Kayah State	0.1	0.1			
Karen State	0.2	0.1			
Chin State	0.1	0.1			
Mon State	0.4	0.5			
Rakhine State	0.1	0.1			
Shan State	1	1.2			
Refinery	41	76.5	25.2	16	21
Total	47.3	90.2	25.2	16	21

Source: Ministry of Energy (2022a).

2. Appropriate Oil Stockpiling Scheme for Myanmar

2.1. Storage Options

Section 2.1.2 of the previous chapter presented storage options for onshore and offshore tanks and underground facilities. Storage cost seems varied site by site, but the IEA (2013) estimates that underground storage is cheaper than onshore tanks. The IEEJ assumes offshore tanks are the most expensive, although there is a little credible cost estimate for the public.

Important questions when pursuing cheaper options for Myanmar are whether underground facilities of caverns are available and whether storage capacity at the China National Petroleum

Corporation's Kyaukpyu Terminal can be accessed for oil stockpiling for Myanmar. Unfortunately, little open-source information is available for these questions. However, it is certainly worth exploring the possibility of these cheaper and potentially large capacities. However, this study assumes that all additional tanks will be built onshore at the new facility for a more realistic cost estimate.

2.2. Stockpiling Quantity and Quality

As of 2019, there were 36 days of gasoline stock, 35 days of diesel, and 120 days of jet fuel (Ministry of Energy, 2022b). Therefore, considering oil demand by product in 2019, the IEEJ assumes Myanmar held a total oil stock of 34 days of consumption in the same year.

Considering robust demand growth, extremely high import dependency, and substantial supply disruption risks, Myanmar should expand its stockpiling to a significant extent. While the IEA standard of 90 days of net imports could be a benchmark, there might not be a solid rationale for why 90 days are an adequate level of oil stockpiling apart from the fact that 90 days are not proven to be inadequate. Although more stocks will enhance supply security, many developing countries find it too costly to hold a 90-day stock. Thus, determining an appropriate stock quantity (days) requires balancing oil supply security and financial constraints.

This report, considering these issues, sets 60 days' consumption by 2040 as an appropriate target for oil stockpiling quantity in Myanmar. It is also sensible to establish SPR because the security oil supply justifies more government involvement, and the oil industry burden should be minimised. How the 60 days quantity is split between industry and SPR, as well as products and crude, depends on whether new refineries will be built and how each product demand will grow. As described in the previous section, option 1 assumes that no refineries will be built, and option 2 envisages new refineries will be operational in 2028. Here, all the stockpiling for option 1 is assumed to be products – 40 days met by the industry and 20 days by SPR. Option 2 is assumed to include crude and product stockpiling of 26 days owned by SPR. Product stockpiling by industry is assumed to be 34 days in option 2. Table 3.3 summarises possible oil stockpiling options in 2040 for Myanmar.

2.3. International Cooperation

While oil stockpiling is developed mainly by the importing country, Chapter 2 described international schemes, like ticket stockpiling and joint stockpiling, which offer cheaper options. However, Chapter 2 also pointed out that substantial crude demand is a prerequisite for joint crude stockpiling to attract exporters. Although crude joint stockpiling is unrealistic for option 1, it is worth considering option 2, which assumes a new refinery. On the other hand, ticket stockpiling, possibly with neighbouring ASEAN countries, seems sensible for both options. Understanding these international schemes is supplemental to pure national stockpiling development. This study suggests 5 days' ticket product stockpiling for option 1, 5 days' ticket product stockpiling, and 5 days' joint crude stockpiling for option 2.

Table 3.3. Possible Oil Stockpiling Options in 2040 for Myanmar

	Quantity (kilo tonnes)						Days							
	Industry		SPR		Total		Industry		SPR		Total			
	Option 1	Option 2	Option 1	Option 2	Option 1	Option 2	Option 1	Option 2	Option 1	Option 2	Option 1		Option 2	
Gasoline	471	433	236	216	707	649	40	37	20	18	**60**	**60**	**55**	**50**
Diesel	1,015	933	508	466	1,523	1,399	40	37	20	18	**60**		**55**	
Jet	32	30	16	15	48	45	40	37	20	18	**60**		**55**	
Other products	143	0	72	0	215	0	40	0	20	0	**60**		**0**	
Crude	0	0	0	400	0	400	0	0	0	32	**0**	**0**	**32**	**10**
Total	1,661	1,396	832	1,097	2,493	2,493	40	34	20	26	**60**		**60**	

Source: Authors.

2.4. Estimation of Capital and Operation Costs

Estimating stockpiling costs for Myanmar is based on the stockpiling options in Table 3.3 and a set of assumptions from the IEA study (2018) with updated oil prices. Assumptions cover several components of general assumptions: oil prices, CAPEX, and OPEX. With a lack of data on existing oil stocks, these assumptions apply only to the additional stockpiling. Following the presentation of the Ministry of Energy (2022b), the existing stock is assumed to be 34 days. Thus, the cost of an additional 26 days is calculated here. Since ticket stockpiling can eliminate CAPEX and joint stockpiling can eliminate initial oil purchase costs, these schemes are cheaper than national development.

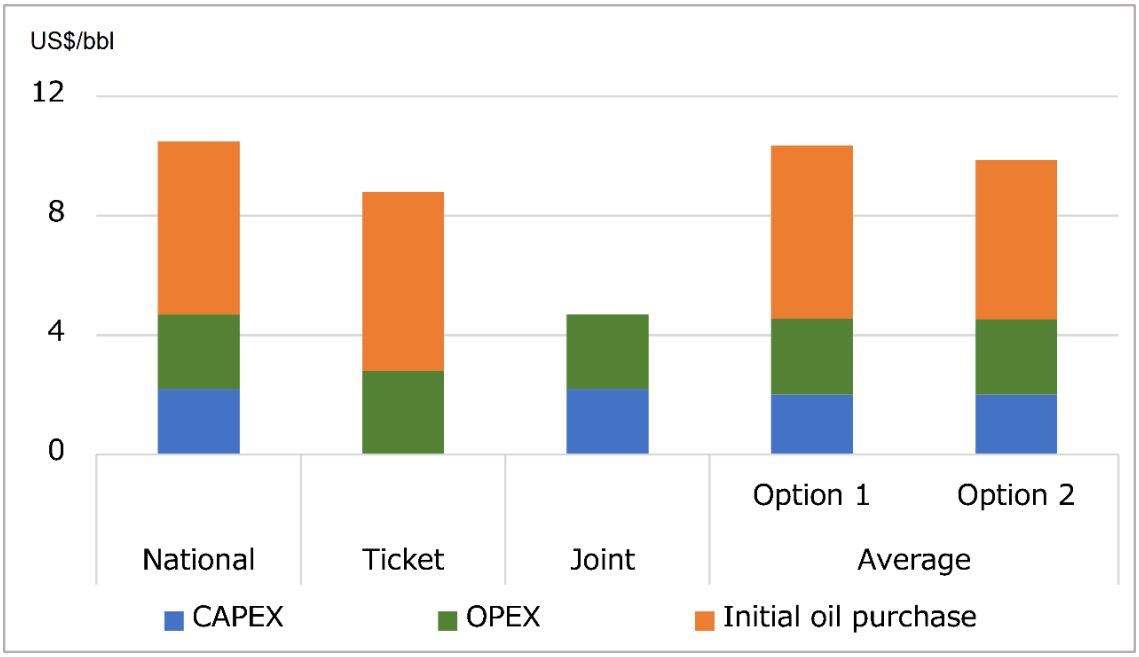
Table 3.4. Main Assumptions for Cost Estimates

Parameter		Value
General assumptions	Project life	30 years
	Interest rate	3%
	Stockpiling amount	60 days of demand (including 5 days of ticket stockpiling)
Oil purchase	Crude oil	Assumed crude price at US$108/bbl and product price at US$122/bbl (2Q 2022 market prices)
	Oil product	
CAPEX	Construction costs of storage facilities (excluding jetty)	US$150/$m^3$ (for crude)
		US$165/$m^3$ (for product)
	Construction costs of jetty	US$35 mn (for VLCC)
		US$12 mn (for product tankers)
OPEX	Land utilisation	3.5m^3/m^2
	Land lease expenses	US$0.3/$m^2$ per month
	Operating expenses	US$12/$m^3$ per year
	Refreshment interval	Every 20 years for crude
		Every 6 years for product
	Cost of alternative storage during refreshment	US$21/$m^3$ per refreshment (for crude)
		US$27/$m^3$ per refreshment (for product)
	Terminal handling cost during refreshment	US$15/mn tonnes (for crude)
		US$4/mn tonnes (for product)

VLCC = very large crude carrier.
Source: Authors.

Based on the above assumptions, the average unit cost of oil stockpiling would be US$10.9/bbl for option 1 and US$9.9/bbl for option 2. The total investment would be US$922 million for option 1 and US$710 million for option 2. While these are substantial amounts, whether Myanmar can see these costs as an insurance policy will determine the future of oil stockpiling and the country's degree of oil security or insecurity.

Figure 3.4. Unit Cost Estimate



Note: Option 1 assumes 5 days of ticket stockpiling. Option 2 assumes 5 days of ticket stockpiling, and 5 days joint stockpiling.
Source: Authors.