

Executive Summary

According to the Cambodia National Energy Statistics (2019), oil demand in Cambodia is significant, and its share per total primary energy supply (TPES) was 42% in 2018, followed by biomass (33%). The demand for gasoline and diesel oil, mainly used as road transport fuels, accounted for 81% of total oil demand in 2018. Oil in Cambodia is all imported from Singapore, Thailand, and Viet Nam. There are two main oil import places in Cambodia serving as primary terminals due to their storage capacity: Sihanoukville along the coastline and Phnom Penh along the Mekong River. The share of oil unloaded at Sihanoukville is approximately 70%; that unloaded at Phnom Penh is the remaining 30%. Currently, tank trucks transport gasoline and diesel oil to each province directly from the primary terminals in Sihanoukville and Phnom Penh. In addition, a small amount of oil is transported by rail from Sihanoukville to Phnom Penh and Battambang due to poor railway condition.

According to the Cambodia Energy Outlook 2019, part of the East Asia Summit (EAS) Energy Outlook (2020) that includes 17 EAS countries except for Russia, oil demand, especially gasoline and diesel oil, will increase 1.8 times from 2018 to 2030 and 3.2 times to 2040 due to continuous stable economic growth. Thus, the General Department of Petroleum (GDP), Ministry of Mines and Energy (MME) should seek optimal oil logistics from the primary terminals to each province in 2030 and 2040 to show oil companies – which make economical and rational investments to accomplish resilient petroleum supply chains in Cambodia – a better oil supply chain in the future.

Firstly, gasoline and diesel oil demand of the whole country in 2030 and 2040, based on the Cambodia Energy Outlook 2019, is allocated to all provinces based on existing petroleum supply chains getting from interviews of the oil companies and the estimated provincial population in 2030 and 2040. Secondly, the following transport options are assumed for moving gasoline and diesel oil in 2030 and 2040: (i) pipeline but only between Sihanoukville and Phnom Penh, (ii) rehabilitation of railway system between Sihanoukville and Phnom Penh and Sihanoukville and Battambang in 2040, (iii) enhancement of terminal capacity in the Mekong River, and (iv) appropriate improvement on national roads.

The cost minimum approach (linear programming method) – representing the economic and rational decisions of oil companies regarding investment in resilient petroleum supply chain between their primary terminals to each province – is applied to extract several policy recommendations to guarantee an optimal solution to the petroleum supply chain in 2030 and 2040. In 2030, a pipeline system between Sihanoukville and Phnom Penh will accelerate the country's economic and rational oil supply chain due to high oil demand (more than 50% of total Cambodia demand) in Phnom Penh. However, the Mekong River terminal and railway transport will remain to reflect oil supply business practices. In 2040, the pipeline system will not be sufficient due to the significant increase in oil demand. Therefore, the Mekong River terminal needs enhancement. In addition, the railway system to Battambang should also be rehabilitated to expand oil transport capacity.

The optimisation approach to the oil supply chain is based on economically rational human behaviour. However, the actual oil supply chain depends on both the economic rationale and historical business practice. Thus, this model is a useful reference when the General Department of Petroleum/Ministry of Mines and Energy (GDP/MME) prepares an oil supply chain plan for Cambodia, including all

transport modes: pipeline, railway, and tank truck. In addition, the GDP/MME should prepare safety guidelines or regulations on all transport modes regarding oil transport.