

## Oil Transportation in Thailand\*

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### THE OIL DISTRIBUTION SYSTEM

Oil product consumption in Thailand was about 13,040 million liters (excluding LPG), 74 percent of which (9,640 million liters) was produced by domestic refineries. Most of the oil trade in Thailand has been controlled by the country's four largest oil companies: namely, PTT, Shell, Esso and Caltex. Altogether, these four companies control about 94 percent of the total market share. The rest of the market is held by small, independent oil companies, most of which are 100 percent Thai-owned.

About 43 percent of this oil is consumed in Bangkok (5,761 million liters), followed by 11 percent in the East and South, and about 7-8 percent in the remaining regions (see [Table 1](#)).

Approximately 78 percent of the oil—either produced domestically or imported from Singapore—is shipped to primary oil installations in Bangkok. This includes most of the oil produced by the two refineries in Sriracha (which is shipped to Bangkok by barge), and by the Bangchak refinery. From these main installations, the oil products are further distributed to consumers in Bangkok and in the Central, North, Northeast, and Western regions. There are two modes of oil transportation from the installations in Bangkok. First, the oil is sent directly by tanker trucks of varying sizes to end users in Bangkok (including Don Muang Airport), and in most other parts of the country. Of the 9,225 million liters of oil sent from the Bangkok installations, 7,745 million liters (84 percent) were transported by truck (see [Table 2](#)).

Second, a relatively small amount of oil—16 percent of the total—is transported by rail tankers to consumers in the North and Northeast. Furthermore, rail oil transportation service is available from Bangkok installations only. Despite continuously rising oil consumption in all parts of the country, the volume of rail oil product transportation has been declining. The volume fell from 1,618 million liters in 1982 to 1,462 million liters in 1988.

As for the other regions, oil products are being shipped to consumers in the South by barge from Sriracha refineries, and also by barge from Singapore. Consumers in the West receive oil products partly by barge from Sriracha but mostly by truck from Bangkok. Consumers in the East are serviced directly by trucks from Sriracha refineries.

Because of the relatively heavy reliance on tanker trucks, the amount of oil truck traffic in the Bangkok metropolitan area is very high. It is estimated that about 1,100 trucks transport oil from Bangkok oil installations each day. These trucks play a significant role in the city's traffic problems, particularly in the Bangkok Port areas and in some key outbound highways.

### COMPARATIVE COSTS OF OIL TRANSPORTATION

One of the reasons why trucking has become the primary oil transportation mode in Thailand is because it affords the lowest economic and financial costs for inland oil transportation. Compared to railways, oil transports by truck—especially those having a 30,000-liter capacity—is significantly less costly both in the short run (in which investment costs are excluded) and in the long run. For example, this study has found that the short-run financial cost of oil transportation from Bangkok to Khon Kaen by 30,000-liter truck is 18 satang per liter, compared to 28 satang per liter by rail. Since the government's allowed transportation markup to Khon Kaen is 32 satang per liter, proprietors transporting oil by truck make a 14-satang-per-liter

transportation "gain," giving them a competitive edge in upcountry sales. Thus, proprietors have had a strong incentive to transport oil by truck in recent years.

In the long run—when investment costs are considered—truck transportation to Khon Kaen will cost 23 satang per liter, while long-run rail transportation costs will be 47 satang per liter. Furthermore, economic cost calculations also consistently indicate lower oil transportation costs for trucks compared to railways. Thus, a 30,000-liter truck is more efficient than are railways for oil transportation in Thailand.

It has been found that rail transportation has a high double handling cost in addition to its high operating cost. Oil transported by rail needs to be stored at upcountry oil depots first before final deliveries to end users are made by truck. A large number of these depots have been underutilized because of the increasing popularity of the tanker truck, which has compounded the problems of high rail system unit costs.

On the other hand, because barge transportation has lower costs than transport by tanker truck, barges have become the main transportation mode for the Southern provinces. Barges have very low operating costs and are able to compete with trucks despite the double handling costs involved.

In summary, the current oil transportation system in Thailand consists mainly of truck transport for inland destinations and barge transport for the Southern provinces.

## **THE IMPACT OF FUTURE OIL CONSUMPTION ON OIL TRANSPORTATION**

The National Energy Policy Office has projected that oil consumption in Thailand will grow from 14,834 million liters in 1988 to 36,550 million liters by the year 2000. The demand will grow between 10-14 percent annually during the Sixth Plan period, and will gradually decelerate afterward. Regionally, high demand will come from Bangkok and its nearby provinces, and from provinces in the East.

Given its high future demand, a large quantity of oil will pass through Bangkok oil installations. Under the scenario of the existing oil transportation system, Bangkok installations will be handling 28,640 million liters of oil by the year 2000, compared to 9,225 million liters handled in 1987. If the shares of transportation held by the various modes remain unchanged from today's, the number of oil truck trips from Bangkok installations will increase from 1,100 in 1987 to over 3,000 by the year 2000. Such a large number of truck trips will certainly compound the ever-worsening Bangkok traffic problems in the future.

## **MEASURES FOR IMPROVING THE FUTURE OIL TRANSPORTATION SYSTEM**

This study has proposed a number of measures that would improve the efficiency of the country's oil transportation system. They include the construction of a major oil product pipeline, the sharing of oil depots by oil companies, and others. These measures are summarized as follows:

- **Sriracha Oil Product Pipeline Construction** The PTT's proposed Sriracha-Saraburi oil product pipeline should be built. The study has found that the 185 km, 18-inch pipeline has lower financial and economic costs compared to all other inland transport modes, including the 30,000-liter truck. For example, the long-term financial costs for carrying oil from Sriracha to Don Muang Airport are 6, 11 and 28 satang per liter for pipeline, 30,000-liter truck and rail transport, respectively. The pipeline should be developed as a public/private joint venture project having PTT as the coordinator and major shareholder. The pipeline's primary purpose is to carry oil products to a new common terminal in Saraburi, which will supply consumers in the Central, North and Northeast regions. Small terminals along the pipeline route will supply parts of Bangkok, and a branch line to Don Muang Airport should also be built.
- **BAFS Pipeline** Should the Bangkok Aviation Fuel Services (BAFS) decide to build the Bangchak-Don Muang jet fuel pipeline, the pipeline should be a multi-product line in order to increase the project's economic viability. The study has found that the Sriracha-Saraburi pipeline could transport oil to Don

Muang at a lower cost than could the proposed BAFS line. Thus, consideration should be given to constructing the BAFS line as a supplementary pipeline connected to the Sriracha line in order to increase the supply security for Don Muang Airport.

- **Bangkok Oil Installations** The role of Bangkok oil installations should be reduced from that of a nationwide supplier to that of serving Bangkok area consumers only. In addition, the Bangchak refinery should become a common supplier, providing oil to all licensed oil traders for distribution in the Bangkok metropolitan area. In this way, the oil distribution system in Bangkok will become more efficient, and oil truck traffic in the city will be minimized.
- **Western Oil Depots** To further reduce oil truck traffic in Bangkok, oil companies should be encouraged to build oil depots on the upper west coast of the Gulf of Thailand to receive supplies directly by barge from Sriracha. The depots will serve consumers in the Western Region.
- **Rail Transportation** The rail transportation system should be streamlined in order to improve efficiency and to reduce operating costs. The rail transportation tariff must be substantially reduced in order for railways to become competitive with other transportation modes.
- **Joint Depot Utilization** One way to cut rail transportation costs is by increasing the utilization of upcountry oil depots, particularly those in the North and Northeast. Joint usage of some depots—for example, in Ubon and Udon provinces—will help reduce the high unit operating costs of these depots.
- **Inland Waterways Transportation** The study has found that transporting oil by river barge to Nakhon Sawan is relatively costly compared to truck transport. It also incurs high risk because of uncertainty about the water level, especially during the dry season. A fully loaded barge requires a 2.8-meter draft, whereas the water level in some parts of the river will be as low as 1.7 meters during the dry season period.
- **Upcountry Transportation Allowance** Bangkok has been the point of origin for Thailand's oil supply for decades, and the government has established its upcountry oil transportation allowance based on the distance from Bangkok. Thus, oil dealers in the provinces come to Bangkok to pick up their oil because in this way, they make the largest transportation "gain." However, since most of the country's refining capacity is in Sriracha, it will be appropriate to establish Sriracha as oil supply point of origin as far as the transportation cost markup is concerned. Provincial oil traders will thus have an incentive to pick up their oil from Sriracha. They could also take advantage of the new highways linking Sriracha with the North and Northeast, bypassing Bangkok. In this way, oil truck traffic in the capital city will be further reduced.

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