CHAPTER - III

LOCATION OF INDIAN REFINERIES

Introduction

While oil wells can be located only where geological conditions permit, refineries can be located in widely differing centres and still function effectively and efficiently. On one side the location may be at the material source, on the other it may be at the market.

As usual a host of other requirements like labour requirements, patterns of ownership and control on the location of the refinery influences the final location decision which again is affected by changing technology.

Locational Characteristics

Before the Second World War the practice prevalent in the World Oil Industry was to locate refineries near centres of crude oil production. This is because of low installation and operation cost and flexibility in the distribution of oil products. Refining being a weight losing industry, the cost of transport can be economised if the industry is situated near the crude source.

The high proportion of waste after the refining in the earlier years, proved to be uneconomic for the transport
of crude oil very far before refining and it was natural that source refineries were preferred.

Near the turn of century came the first big demand for petrol owing to the development of the motor vehicles and the former 'light fraction' waste became an important market product. By the invention of the cracking process more waste could be utilised. Now-a-days 95% of the crude oil can be made to yield marketable products while of the 5% residue, about half can be used by the refinery itself. As a result of this a marked shift to market location is found in recent years. The technical developments in the refinery industry have brought flexibility in refinery operations. The out-turn of products from a given crude can be varied and hence the output of the market oriented refinery can be adjusted as necessary to match the demand of the market. Refineries nearer the consumption centres reduces the distribution cost and the cost of transporting crude oil is cheaper than the cost of transporting oil products. Whereas crude is a single, commodity, different oil products would involve separate costs for packaging and handling and occupy more space. Secondly with the growth of oil consumption in the world it is now becoming increasingly possible to install large refineries even in the consumption centres far away from the crude source.
Throughout the world the oil companies are now trying to spread the risk of investment geographically rather than concentrating in the crude oil centres. Transport improvement has broadened the market for oil products also.

**Location of the Indian Oil Refineries**

The refineries of India can be classified into three groups according to their location. The inland refineries situated near the sources of domestic crude, the inland refineries based on domestic crude but situated near the consumption area, the refineries situated near the coast. The inland refineries situated near the domestic crude are Digboi, Nunmati and Bongaigaon of Assam, and Koyali of Gujarat. The inland refineries based on domestic crude but situated near consumption areas is the Baruani Refinery of Bihar in India. The coastal refineries based on imported crude are the Refineries of Bombay, Vishakhapatnam, Madras, Cochin, Haldia. The Refinery at Mathura, Uttar Pradesh is based on imported oil but with production of crude of the Bombay High region, it is also utilising more and more indigenous crude. Most of the coastal refineries can be treated as market oriented refineries (Fig. 13).

Foreign crude coastal refineries ensure flexibility of distribution and avoid duplication of transport costs.
LOCATION OF
INDIAN REFINERIES

Fig: 13
A refinery in an inland area would involve first the transport of crude to that refinery and second the transport of surplus products from that area to other areas. When crude oil would arrive in large amounts from the foreign countries at the sea ports, it would be possible to build larger refineries at the coast. On the other hand, the same amount of crude, when transported into the interior for a number of refineries would be absorbed by units of smaller size. Many of the sea ports are also important areas of consumption, and the location of refineries in those areas would also minimise the costs of distribution of oil products. In this case, coastal refineries would provide the advantages of both resource-oriented and market-oriented refineries up to the limit of consumption of that area. Since a large component of the cost of refinery construction is the import of machinery, a coastal refinery is cheaper to construct.

The growth of inland consumption justify the setting up of a refinery away from the cost, if the economy achieved in the cost of distribution of oil products, compensates for the additional construction costs, as well as the cost of the disposal of surplus oil products to other areas.

An important factor in the choice between coastal and inland refineries would be the development of various forms of transport. The growth of crude oil pipelines
favours the installation of inland refineries, whereas a network of product pipelines would work in favour of large coastal refineries. But all the products are not suitable for transportation by pipeline. In the absence of extensive pipeline networks, capacity and freight structure of railways would be an important determinant in choosing the location for a refinery. So long as the higher freight for oil products exists, there remains the incentive for building refineries near consumption centres. Again, the carrying capacity of the railways in various regions would also be an important variables. The strain imposed on the railway system around Bombay was one of the factors which shaped the Government policy against the expansion of refineries in that area for a period of time. The two refineries of east and west India in Baruani and Mathura respectively, are situated at consumption centres with the facilities of crude pipelines constructed from Salaya to Mathura by IOC and from Nahar-katiya to Baruani by OIL. These two refineries are also well connected by product pipelines, as for example Baruani to Kanpur, Baruani - Rajbandhu - Mourigram pipeline. The Mathura - Jalandhar product pipeline has achieved the highest ever throughput. Industrialisation in this area of north-western India is maximum at present so the design capacity of this product pipeline is also
maximum to 3,700 tonnes and in 1986-87 its throughput was 2,760 tonnes.

There are certain disadvantages for an internal resource based refinery. The total investment requirements for a resource-based refinery is considerably high, where housing, water, electricity and other needs would probably have had to be provided, in addition to the refinery itself. An important argument against the resource based refineries is the prospect of the oil-fields, on which they are dependent for crude, drying out in the future, thus involving imports of crude from distant areas and the disposal of products to distant areas - both at high costs. These are also vulnerable to local disturbances. As was the case of Assam refineries during the Assam agitation of early 80's. Another important factor in the refinery location now-a-days involves the environmental impact of the plant, because processing of oil can give rise to air, water and soil pollution and the refinery may be an unwelcome intruder in a densely populated (i.e. market) area. Thus the plant in Mathura had to face tough opposition from the local authorities on environmental grounds and the implementation was delayed.

The size of a refinery is very much related to the problem of location. The size of refineries based on domestic crude is largely a function of the capacity of
the oil fields when the consumption of the hinterland is not very high. The size of the refineries based on foreign crude will depend upon the transport cost of the crude as well as the products. In view of the existence of a large number of small markets throughout this large sub-continent, the construction of a number of refineries, each geared to supply a particular region seems to be a more practical policy. The location of the Koyali Refinery as the biggest (initial 6 million tonnes capacity) in the country, is mainly in view with the important market there. The dispersion of the effective demand for oil over widely spaced areas of the country means refineries have to be built in order to provide an effective supply of refined products.

Government policy also plays an important role in the location of the oil refining industry. In such a case economic factors become unimportant in decisions concerning location. To overcome the most important problem of the present day oil refining industry in India, that is the yawning gap between the consumption and the production of refined products, we must think of setting up of number of refineries. This will help to set up more petrochemical industries in the country.

Plans have been drawn up for new grassroot refineries, specially in the area with heavy consumption rate. The Karnal Refinery in Haryana and the Mangalore Refinery in Karnataka are a case in point. These two will be joint
ventures with Birlas and Hindusthan Petroleum going for the first one and the Tatas and Indian Oil Corporation, for the second one. The first one has a petrochemical project whereas the second one does not have such a project.

Another refinery in Assam will be set up in future as programmed by the country's former Prime Minister late Rajiv Gandhi in Assam Accord.

These proposed refineries will have mixed locational characteristics. The first one will be near the consumption area, as the region has registered maximum increase in the consumption of oil products. The second one will be near the port for easy access to the imported crude, as India will have to depend on foreign crude. The third refinery will be near the resource base of Assam, as Assam is still the largest producer of crude oil in India.

The Government has asked Bharat Petroleum Corporation and Indian Oil Corporation to begin preliminary work on two new six million tonnes per annum refinery one each in central and eastern India - which will be also set up in the joint sector. BPC is looking up sites like Khandwa, Bina and Hosangabad in Madhya Pradesh and Jhansi in Uttar Pradesh. Indian Oil Corporation is keen on locating its second refinery at Paradip in Orissa.
Conclusion

Different development in the oil consumption has a great influence on the economy of the different oil refinery location. In our country though the production of crude has increased the gap between the demand and production is also increasing very fast. As a result we shall have to depend much on the foreign crude, which will again favour port side location of the refineries. Again many refineries of the country, have the processing units suitable to use only imported crude. So here locational factors are, to some extent, restricted. With more construction of product and crude pipelines, more refineries can be located, with the help of expansion of the market.
References


