CHAPTER III

OIL IN THE ENERGY SECTOR AND FACTORS GOVERNING THE DEMAND FOR OIL IN INDIA

Composition of Commercial Energy

As we have seen in the last chapter, the total consumption of energy in India doubled between 1953-54 and 1970-71. Along with the increase in total energy consumption in India there is also a change in composition of energy. The share of non-commercial energy in the total energy, declined from 68 per cent in 1953-54 to 48 per cent in 1970-71. Apart from this change in the share of the commercial and non-commercial energy, there is also a change in the composition of commercial energy. The components of commercial energy in India are coal, petroleum and electricity. The shares of these three sources of commercial energy in the total commercial energy in India are shown in the following table 3.1.
Table 3.1

Share of Different Fuels in the Commercial Energy Consumption in India
(in coal replacement terms)

Per cent

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Coal</td>
<td>47.8</td>
<td>39.9</td>
<td>35.2</td>
<td>26.0</td>
</tr>
<tr>
<td>Oil</td>
<td>39.6</td>
<td>43.4</td>
<td>44.0</td>
<td>49.3</td>
</tr>
<tr>
<td>Electricity</td>
<td>12.6</td>
<td>16.7</td>
<td>20.8</td>
<td>24.7</td>
</tr>
</tbody>
</table>

Source: Fuel Policy Committee Report, 1974, p.6

The above table shows that the share of coal gradually decreased while the share of oil and electricity have increased between 1953-54 and 1970-71. During this period the consumption of coal increased at an annual average rate of 3.5 per cent while the oil consumption increased at the rate of 8.6 per cent. The consumption of electricity has increased at the rate of 11.5 per cent during the same period. Because of these differences in the rates of growth of consumption of different fuels, we find a change in the share of these fuels in the total commercial energy consumption. The share of coal which was
roughly 48 per cent in 1953-54 declined to 26 per cent in 1970-71. The share of electricity doubled from 12.6 per cent to 24.7 per cent. The share of oil moved from 40 per cent to 50 per cent.

In absolute amounts the consumption of oil products in India has gone up from 3.3 million tonnes in 1950 to 23.7 million tonnes in 1973. The consumption of oil products has increased almost six-fold during this period. Oil has a number of advantages compared to coal. It is easy and safe to handle. It is easy to transport from one place to another. Added to this oil prices in the international market declined during the 1960's because it was a buyers market then. These advantages of oil led to large scale use of oil at the cost of coal both in the developed and developing countries. India was no exception to this.

Even though the consumption of oil products has increased at an annual rate of 8.6 per cent between 1953-54 and 1970-71, it varied among different products. The consumption of 'middle distillates' increased at a faster rate followed by 'heavy ends'. 'Light distillates' increased at a lower rate. Table 3.2 shows the rates of growth of consumption of different petroleum products between 1950 and 1972.
Table 3.2

Rates of Growth of Consumption of Selected Oil Products (1950 to 1972)

<table>
<thead>
<tr>
<th>Products</th>
<th>1950-55</th>
<th>1955-60</th>
<th>1960-65</th>
<th>1965-72</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor gas</td>
<td>6.38</td>
<td>2.08</td>
<td>2.96</td>
<td>5.50</td>
</tr>
<tr>
<td>Kerosene</td>
<td>9.33</td>
<td>6.77</td>
<td>5.32</td>
<td>4.80</td>
</tr>
<tr>
<td>HSDO</td>
<td>18.43</td>
<td>22.83</td>
<td>14.00</td>
<td>10.34</td>
</tr>
<tr>
<td>Kerosene and HSDO</td>
<td>11.10</td>
<td>11.43</td>
<td>8.97</td>
<td>7.67</td>
</tr>
<tr>
<td>LDO</td>
<td>5.30</td>
<td>7.59</td>
<td>2.81</td>
<td>9.57</td>
</tr>
<tr>
<td>Fuel oil (including LSHS and HHS)</td>
<td>3.57</td>
<td>13.05</td>
<td>15.23</td>
<td>10.52</td>
</tr>
</tbody>
</table>


The table above shows that the demand for middle distillates (kerosene, HSDO and LDO) is increasing faster, than the demand for light distillates like motor gas. As a result of this India has been importing middle distillates from other countries.
Factors Affecting the Consumption of Oil in India

The consumption of oil in India depends upon the rate of growth of commercial energy, on the price and availability of substitutes, and the transport policy of the government. We shall consider these factors one by one.

1) Substitutes for Oil

Coal

There are a number of substitutes for oil in India like coal and electricity. With regard to coal, India possesses substantial quantities of coal reserves estimated at 81 million tonnes. The coal production in 1973-74 was 78 million tonnes and it is expected to reach 141 million tonnes by 1978-79. However, the exploration for coal is a continuing process and large quantities of coal reserves might be discovered in future. There is scope for increasing the production of coal and lignite in India. Coal can be substituted for oil in the manufacturing sector where more than 1/3rd of the commercial energy is consumed in India. The mining and manufacturing sectors in India account for 38.7 per cent of the total commercial energy consumption. But there are two difficulties in the way of increased use of coal for
energy purposes. The coal production is concentrated in the Eastern region which is far removed from Western and Southern consuming regions of India. Therefore substantial quantities of coal will have to be transported from producing areas to consuming areas. This will put heavy burden on the railways. Moreover Indian coal has high ash content which needs to be washed before use. This increases the cost of coal to the consumer. On the other hand increased use of coal does not involve foreign exchange expenditure and it can substitute oil in a variety of end-uses. Coal can substitute oil in manufacturing sector, in the railways and in the production of fertilizers. In fact coal can be used to produce crude oil itself. Germany produced crude oil from coal during Second World War and at present China and South Africa produce oil from coal.1

Electricity

India has also great potential for electricity generation - thermal, hydel and nuclear. In the last two decades good progress has been made in the electricity

generation. Electricity can substitute oil in almost all sectors like manufacturing, transport, domestic and agriculture. As an industrial fuel it replaces diesel and furnace oil. Its use in the railways replaces diesel. However, this requires initial investments. In the domestic sector electricity can replace kerosene both for lighting and cooking purposes. But the Indian experience shows that the consumption of kerosene does not fall with the increasing use of electricity. In India the total amount of kerosene consumed has increased despite the fact that relative share of kerosene as an illuminant has decreased. One of the explanations offered for this phenomenon is that the electricity generates more demand for light. And the persons who cannot afford electricity tend to consume more kerosene. Similarly because of the income effect people switch to kerosene for cooking purposes from less efficient energy sources. In urban areas the use of kerosene as an illuminant declines but at the same time its total consumption does not fall because of its diversion to cooking and heating. Therefore kerosene can be said to have high income elasticity in India.

In the agricultural sector electricity can replace LDO which is used for running irrigation pump sets.
ii) Transport Policy

Since transport is an important oil consuming sector, the transport policy of the government will affect oil consumption in the country. The demand for motor spirit depends upon the size and number of motor vehicles. In a poor country like India, the use of private cars on a large scale as in the West is ruled out. But the large inequality in the distribution of income generates some demand for private cars. Even here, the total number of cars depends upon the price of petrol and the taxes imposed on petrol and motor vehicles. The development of efficient public transport in big cities also reduces the demand for motor spirit. In the last few years, the demand for motor spirit has come down in India because of high prices of motor spirit. Heavy taxes imposed on vehicles in India is also responsible for the decline in the consumption of motor spirit. If this policy is continued, the number of private cars in India will decrease, and the consumption of petrol will come down.

Diesel Traction in Railways

The total consumption of oil also depends upon the dieselisation of railways. Diesel locomotives are
considered to be more efficient than steam locomotives on routes where the density of traffic is very high. Operational costs of diesel locomotives is lower compared to steam locomotives. Electric locomotives have the lowest operational costs but investment costs are higher in the case of electric traction. Therefore, steam locomotives are to be preferred on lines where the density of traffic is low and diesel traction on lines where the density is higher but not adequate enough to justify the investment required for introducing electric traction.3

iii) Choice of Feed Stock for Fertilizer Production

The choice of feed stock for fertilizer production affects the consumption of oil in India. This is especially so when the fertilizer production in India is expected to go up, to increase agricultural production. Nitrogenous fertilizer can be produced by using either natural gas, naphtha, fuel oil or coal as feed stock. The Fuel Policy Committee has shown that at crude price of $7 per barrel, coal is cheaper as a feed stock for

3 Ibid, p.71.
fertilizer production. The fuel oil so saved can be used to produce more of 'middle distillates' through hydro-cracking. The Fuel Policy Committee has also recommended the use of coal in place of fuel oil for the production of fertilizer.

Oil Consumption in Future

The oil consumption in future in India depends upon the total energy consumption and the substitution of other fuels for oil. The total energy consumption depends largely on the choice of the route to economic growth. A development strategy leaning heavily on the agricultural sector and small scale industries would entail much less energy consumption than a strategy centred around large scale industrial promotion. Given a level of energy consumption the demand for oil depends upon the relative advantages and costs of different energy resources.

Estimates of the projected levels of consumption of oil upto 1990–91 are available from the Report of the Fuel Policy Committee. The basic approach adopted by the Fuel Policy Committee for projecting the demand for oil has been the end-use method. The Committee arrived at three alternative sets of estimates under differing assumptions. The estimates are set out below in table 3.3.
Table 3.3

Estimates of demand for Oil Products
1978-79, 1983-84 and 1990-91
(In million tonnes)

<table>
<thead>
<tr>
<th></th>
<th>Case I</th>
<th>Case II</th>
<th>Case III</th>
</tr>
</thead>
<tbody>
<tr>
<td>1978-79</td>
<td>34.41</td>
<td>32.20</td>
<td>30.39</td>
</tr>
<tr>
<td>1983-84</td>
<td>47.75</td>
<td>42.58</td>
<td>38.89</td>
</tr>
<tr>
<td>1990-91</td>
<td>77.48</td>
<td>66.74</td>
<td>56.84</td>
</tr>
</tbody>
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The assumptions are as follows:

Case I: The first estimate which was made before the price hike of oil was based on the following assumptions:

(i) that the factors which determined the past trend in the level and pattern of fuel usage will continue to operate in future in the same manner,

(ii) that the relative prices of fuel will continue to be the same in future as in the past, and

(iii) that the technology shifts would follow the same trends in the past.
Case II: This estimate is an intermediate level between Case I and Case III.

Case III: This estimate is based on the following assumptions:

(i) the level of economic growth upto 1990-91 will be the same as in Case I.

(ii) the relative prices of oil products and other fuels will continue to be the same as in the first quarter of 1974, and

(iii) the measures indicated in the Report for increasing fuel efficiency and for substituting oil products by other fuels in areas which are identified as viable and desirable in techno-economic considerations are implemented fully by the government.

We can take the third estimates as realistic in view of the assumption on which they are based. Accordingly the total demand for petroleum products is likely to increase to 30 million tonnes in 1978-79, to 39 million tonnes in 1983-84 and to 57 million tonnes in 1990-91. These estimates indicate that unless domestic production of crude oil is stepped up very rapidly, India's dependence on imported oil is likely to increase.