CHAPTER VIII

PROBLEMS AND FUTURE LINES OF DEVELOPMENT

It has long been recognised that a major turning point in the history of the human race occurred when man changed from a nomadic hunter-gatherer to a cultivator. A second stage in human development, the energy revolution occurred with the onset of the Industrial Revolution.

The nature and speed of economic development of a country is intimately related to the use of energy. A low level of energy consumption in an economy is a certain indication of under development because economic growth consists essentially of increasing the average productivity of a labour force which in turn is directly influenced by the quantity of energy which can be utilised in the production process. Furthermore, a small variation in energy supply will result in a disproportionately large variation in economic output.

How much energy does India need in the future? The most highly developed countries presently use 170 KW hours of energy of all kinds per day per capita, mostly in the form of fossil fuel, that is coal, oil and gas. Assuming that we can get by with one third of this amount and that our population will stabilise at 100 crores by another decade we would need to produce energy of all kinds at a
rate of about 25 million MW as against 0.1 million MW today, the availability must be increased by 250 times. Without an adequate supply of energy, we may be facing an era of great social and political unrest.

Under this condition, it is important to boost domestic production of all forms of commercial energy particularly hydrocarbons, as India would continue to be a net importer of these products. There is a need to improve the productivity of existing assets in the energy sector, to optimize the choice of technology.

**OIL CRISIS**

The share of oil has been increasing in the total commercial energy consumption of India. India exerted greater pressure on the demand for fossil energy for agriculture, industry, transport and household sectors in the 50's and 60's, though corresponding indigenous supply did not keep pace with the demand leading to imbalance on energy front. Due to increasing demand for oil and petroleum product, import bill increased substantially forcing the Government to spend 70% to 75% of the total export earnings.

**Problem of crude oil**: The crude oil productivity in India rose considerably during the plan period but the growth rate was not according to the expectation. The onshore and offshore
production scenario is not also bright. The production of ONGC alone decreased significantly in the period 1988 to 1991, due to over exploitation, political problems in Assam and last of all, shortage of funds. Oil India Limited holds out no better hope, as it is also bogged down by political problems of north-eastern sector, and ageing wells. On the question of self-sufficiency in crude oil, it should be noted that even the U.S.A. with an availability of 16.0 tonnes per capita is a major importer, India with a current availability of 0.78 tonnes per capita would need miracles to become self-sufficient.

**Inadequate Refining Capacity**: Oil refining industry also cannot satisfy the country's need for oil products. Adequate refining capacity has not been created and the slow progress in the Seventh Plan period has necessitated increasing imports of high speed diesel oil and kerosene which are in short supply. The refining industry which started to develop during the fifties with an expectation of self-sufficiency in every front could not fulfil the need. The oil scenario within the country as well as international, changed to such an extent, which could not be foreseen before. Unlike other industries, this industry has to depend much on import, so that a little change in the international oil market, changes the productivity
rate as well as the locational characteristics of the industry. This has an adverse effect on the economy of planned management.

The above problem in the oil refining industry can be partly dealt by setting up of more refineries. India has also planned to set up three grass-root refineries by the end of the Eighth Plan. But for the supply of crude oil these refineries will have to depend on foreign crude and in the process will lose hard earned foreign exchange. The Assam Refinery was planned in the Assam Accord, to fulfill the country’s need, with the indigenous crude oil of Assam. But recent political turmoil in the region has decreased the productivity of oil of the region to a great extent, causing much concern to the planners. Can the region supply crude oil to a newly erected refinery when it is unable to supply the needs of the existing refineries? It is a very important question, the planners must think of.

From the study of the growth and development of the Vishakhapatnam Oil Refinery, it has been found that the production has reached more or less saturation point with very little scope for further rise. So rise in the production capacity with more secondary processing techniques is an urgent necessity in the oil refining industry.
Inefficient Consumption: The most significant problem faced by the oil sector at present is the problem of product imbalance. The demand for crude and petroleum products is placed at about 54 million tonnes. The country's oil production has stagnated around 30 to 34 million tonnes over the last few years, which means imports would jump from the anticipated 20 million tonnes to 26 million tonnes of crude oil. Though the consumption is rising the per capita consumption of petroleum products in India is only 70 kgs. A person in a developed country, however, consumes petroleum 40 times than that of an Indian. Our per capita income is only $380 against $20,000 of a person in a developed country. There seems to be a correlation between income and energy consumption. If we want to have more industries, better living standards, more employment, more cars, more scooters, gas in more homes etc. the per capita consumption of petroleum will only increase, widening the gap between demand and indigenous supply and resulting in still higher imports of petroleum products. It has been found that we consume energy available to us inefficiently. In comparison to developed countries we consume 50 to 100% extra energy per unit of material manufactured by us. India is not as efficient a user of energy as some of the other developing countries of Asia. The energy intensity has declined in many developing countries after the first oil crisis in 1970.
Rising Import Bill: India is a net oil importer and during the last two decades, the bill has increased substantially. The oil import bill increased to over 30% following the first oil crisis in 1973-74 and after the second oil crisis in 1980-81 to over 75%. This occurred despite an increase in relative self sufficiency in oil supplies from a mere 6% in 1960 to over 30% during the 1970s and 60% by 1983-84. The rise in import bill is mainly due to weak oil prices in the international market. At least 10% saving in imports can be brought about by avoiding wastage, and fuel saving technologies. The economy can hardly bear the burden of rising import bill.

Faulty Transportation Network: India's pipeline network is also not sufficient, compared to the huge areas of the country. Pipeline constructed is expensive but maintenance and transportation through pipelines is much cheaper, compared to other means of transportation. Pipeline transportation of more crude oil to the new market side refineries, will be more cost efficient and increase the productivity.

The new Gujarat Fertilizer and Petrochemical complexes, if can be connected by a gas pipeline, with the offshore gas wells, will be able to reduce the consumption of oil for movement by road or by sea.
Lack of Imaginative Policy: It is needless to point out that the consumer's hardship and the economic stresses of oil crisis, would not have been so keenly felt if the Union Ministry of Petroleum and Natural Gas had adopted an imaginative policy. The policy of utilisation of more substitutes, harnessing the vast reserves of natural gas and conservation should have been given much importance in the earlier plan periods.

FUTURE LINES OF DEVELOPMENT:

The problem in oil sector can be met by 1) Producing more, (2) developing substitutes and initiating more research work on substitution, (3) efficient utilization of conservation of energy.

New thrust to exploration: The Government has once again sought foreign and Indian parties for supplementing the efforts of ONGC and Oil India in the search of oil. Seismic operations of ONGC and OIL have thrown up additional oil and gas reserves. The western offshore area is expected to contribute about 34 million tonnes and the onshore production from the western region is projected at 9.27 million tonnes a year. Almost the entire increase in production is expected from structures in Bombay Offshore such as Neelam, Panna, Heera, Ratna and Mukta. The ONGC has also plans to develop the mid and south Tapti fields.
The recent trend in the oil and gas find in the country indicate that future discoveries are likely to be more in the form of natural gas. Its availability presently is 17 million tonnes of oil equivalent and long term projections based on geological estimates indicate that gas availability will increase to 30 million tonnes of oil equivalent by the year 2000. Natural gas is relatively a new comer on the energy scene and will be a significant factor in future energy mix in meeting our energy demand.

**Capacity Increase in Refining:** For avoiding a larger outgo of foreign exchange on imports of refined products additional refining facilities should be created with the execution of expansion schemes of the coast based refineries particularly. There is very little prospect of the Karnal, Mangalore or Assam refineries to take into shape until the early years of the Ninth Plan. So additional refining capability can be created only with the execution of expansion schemes of the refineries in Trombay, Cochin, Madras, Vishakhapatnam and Haldia. The managements of these refineries assert that expansion of new capacity for 2 to 3 million tonnes in each case, with debottlenecking and expansion schemes can be easily implemented.

Despite the gloomy situation on the oil front, the refineries have tried to raise their capacity. The
Gujarat Refinery (IOC) which is the biggest in the country, will have a hydrocracker process for the first time in the country. The product patterns of the refinery before and after the addition of the hydrocracker is given below.

The product pattern of Gajarat Refinery.

<table>
<thead>
<tr>
<th>Product</th>
<th>Pre GHP</th>
<th>Post GHP</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(In million tonnes)</td>
</tr>
<tr>
<td>LPG</td>
<td>201</td>
<td>230</td>
</tr>
<tr>
<td>Naptha</td>
<td>843</td>
<td>819</td>
</tr>
<tr>
<td>Motor Spirit</td>
<td>518</td>
<td>518</td>
</tr>
<tr>
<td>Aviation Turbine Fuel</td>
<td>363</td>
<td>363</td>
</tr>
<tr>
<td>Superior Kerosene</td>
<td>977</td>
<td>1578</td>
</tr>
<tr>
<td>HSD</td>
<td>2356</td>
<td>3047</td>
</tr>
<tr>
<td>LSHS</td>
<td>3179</td>
<td>1604</td>
</tr>
</tbody>
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The projected refining capacity in the year 2005 by the HPC refineries are expected to rise through expansions to the amount of 2.5 million tonnes. Additional grass-root capacity of the company will be 15 million tonnes.
Proper Management by Substitution: It is clear that in the absence of any strategic intervention towards oil conservation, the oil demand in India would far exceed the most optimistic supply projections. The First Energy Survey Committee in its report in 1965 warned against the pro-oil drift in the energy consumption of our country. The country must adopt measures, to cut down oil consumption. But the cut should be in such a way that the country's 'essential' industrial and agricultural input will not be affected. But the restraint on consumption has to be stringent and replacement by other forms of energy must be more substantial and rapid.

The factors to be taken into consideration are the feasibility of substitution, the time required for effecting the substitution and investment costs. Preliminary exercise indicate that a substantial portion of our oil consumption can be replaced by coal, electricity based on coal and hydel potential. In other words the Fuel Policy Committee's plan is that the so-called oil crisis only accentuates the need for the substitution. If the nation can meet the challenge in the short run with determination, the long run benefits arising out of the accelerated programme of energy substitution may prove the 'oil crisis' to be a blessing in disguise.
Policy on fertilizer feed stocks, in particular, illustrates most sharply the adverse consequences of the earlier preference for oil. The drive initiated in the mid sixties to tie up the entire fertilizer programme on petroleum feed stock first on naptha and more recently on fuel oil has suddenly reached a dead end. The demand for naptha for fertilizer units operating and under erection and the petrochemical units has gone so high that it cannot be wholly met even at the optimal level of refinery capacity and importation is absolutely necessary. Indian scientists and technologists gave a clear alternative, several years ago, on their own initiative. They suggested process know-how and other requirements for developing coal based fertilizers.

Coal can easily replace fuel oil in furnaces and for power generation. In a few cases some marginal additional investments may have to be made for suitable technical adjustments and for coal handling facilities, but this should not present any serious difficulties.

For substitution, the pattern of fuel production and utilisation and transport costs of different fuel will have to be taken into consideration.

The major area where coal can replace an oil product with the least amount of dislocation to the cost of
production is in places where fuel oil is used in the industrial furnaces or for heating boilers. The use of fuel oil is costlier to the consumer than the use of coal in all locations in India.

Natural gas can be another very important substitute for oil. Natural gas application in fertilizer plant results in saving of about 15 per cent capital cost and 5 per cent lower energy consumption as compared to naptha-based plants. In case of petrochemicals also it give higher yield than naptha. As fuel, natural gas have significant advantage in terms of case of operation. The natural gas is a premier source for domestic and commercial sector, where the user is benefitted from assured uninterrupted supply and the environmental compitability and is more economical option as compared to the use of LPG. It can not only replace liquid petroleum in various sectors, it offers energy efficiency also.

R & D activities have supported research in the area of renewable sources such as biogas, solar and wind power to replace oil, particularly in the rural areas in the field of agriculture and domestic sector. Environmental pollution can also be checked by the use of these energy sources.
Conservation of Oil: Conservation should be achieved through a sectorwise approach. Consumers of petroleum products are transport, industry, domestic/household and agriculture. Awareness programme, for each category need to be developed followed by extensive publicity.

We have to clearly differentiate between conservation and curbs. The conservation measures should not lead to a situation where the economy and the developmental programmes are adversely affected. At times, the curbs by the Government could cause hardship to the consumers.

In the household sector, it should be our endeavour to promote a shift away from traditional non-commercial fuel. A development strategy aimed at increasing per capita income and in the rural India would facilitate this process. On the other hand, by increasing the pace of rural electrification, the use of kerosene can be reduced.

The transport sector not only accounts for maximum oil consumption, but it also offers maximum scope for oil conservation. Three key determinants of oil conservation in the transport sector are (a) share of roadways for meeting the demands of freight traffic, (b) Pace of electrification in railways, (c) Share of public transport for meeting the demands of passenger traffic. Improvements
in vehicle designs and road conditions would also offer considerable scope for oil conservation. We can increase more freight traffic by railways, and it will save about 30,000 tonnes of diesel in every billion IKM of traffic because of efficiency of rail transport. More railway tracts can be electrified to conserve diesel in the process. There has been a phenomenal growth in the number of personal vehicles, largely in response to a poor public transport system. This trend needs to be reversed. The solution lies in providing a reliable and efficient public transport system. The success of the suburban rail network in Bombay and the Calcutta Metro, are encouraging precedence in this direction.

In industrial sector, standardized equipments should be used to minimize the fuel loss by wastage. The industrial management must be aware of the energy efficiency.

**Need for a New Policy :** It is important to stress that for managing our energy crisis, we need an integrated developmental programmes, covering all aspects of the demand as well as the supply side. Substitutions to conserve oil would lead to an increase in the demand for electricity and coal. Expansion strategy for these sectors must be based on such a scenario. We must not overlook the fact that around 35 per cent of energy is lost in India before the final end-use. Minimisation of energy losses should be accorded a priority. We must have a favourable energy pricing that would provide incentives to both customers and oil conservation.