CHAPTER I

INTRODUCTION

The thesis deals with the Energy Scenario of India during the twenty-five years (1960-1985), comprising the Pre (1960-73) and Post (1973-1985) Energy Crisis periods taken as a basis to investigate both, theoretically and empirically, the impact of the 'Energy Crisis', emanating due to shortfalls in the supply of energy against demand, and further exacerbated by the international Oil price hike of 1973-74, 1978-79 and 1980-81, on the balance of payments and the economy of India. Moreover, in order to assess the likely 'Energy Crisis', if any, in the years to come, an attempt is also made to estimate statistically the Energy Demand Forecasts (commercial and non-commercial) upto 2020 A.D., based on the past consumption data.

The production and consumption of energy play a vital role in the pace and pattern of economic development and growth and the direction of social and institutional development, with the developed countries moving into a 'post-industrial' or mature phase and developing countries moving from agricultural and pre-industrial stages of development into industrialisation. The importance of energy to growth and development depends upon structural adjustments and policies designed to change the 'linkage' between the growth in energy demand and economic activity. This is a delicate and uncertain area critically depending upon many issues viz., changing patterns of world economic growth and trade; fuel availability; responses to changing energy prices; economic structural change; technological change; factor substitution; balance of payments constraints and availability of international finance; the role of market forces and government policies.

Since 1973 the world economy has been greatly influenced by the need to absorb and accommodate the instability caused by the fifteen to twenty fold increase in world Oil prices. Foreign energy supplies are obviously vulnerable to uncontrollable hazards: price fluctuations (resulting from a monopoly situation or other example of a seller's market), supply embargo or restrictions.

Shock price increases have direct effects on the balance of payments (higher energy import costs and reduced competitiveness on export markets) and indirect effects on economic activity and on the terms of trade (the increased energy import bill means that a greater proportion of Gross National Product has to be earmarked for export).

A physical cut-off supplies, when it cannot be offset by recourse to an available alternative source, means a reduction in the amount of energy on which the country's economic machinery can call, which in turn disrupts production and entails lowered standards of living.

Some of the studies made regarding the international Oil (which is one of the important commercial energy components) price hike of the mid-seventies and the early eighties, and its consequences on the various countries of the world are: Amaya, A.N., and Ikutu, T.(3); Bergman, L.(4); Blair, J.M.(5);

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5 Blair, J.M., "The Control of Oil".
Bruno, M. (6); Castro, A.B.(7); Chenery,H.B.(8);David,P.(9); Desai, A.V. (10); Gately, D.(11); Ghosh,S.N.(12);Guanglin,Z.(13); Guillaumont,P.(14);Gupta, B.D.(15); Haq,M.(16); Henderson, P.D.(17);


9David, P., "The Oil Weapon - A View from the Victims".


12Ghosh, S.N., "Oil and the Third World"; "Guidelines for Oil Policy", "Oil Price and India", Oil Commentary, Edt. and Published by Ghosh, S.N. on behalf of Petroleum Information Service, New Delhi.


Jehangir, A. (18); Khera, S.S. (19); Koshal, R.K. and Bradfield, J. (20); Levy, W.J. (21); Lin, C.Y. (22); Lipton, M. (23); Long, M. (24); Maillet, P. (25); Pachauri, R.K.; Pollar, P.; Krishnamurti, K. (26); Parkin, M. (27); Patwardhan, M.S. (28); Pindyck, R.S. (29);


19 Khera, S.S., "Oil Rich Man, Poor Man".


26 Pachauri, Dr. R.K., Pollar, Dr. Peter, Krishnamurti, K., "Analysis of International Oil Developments", Energy Policy Issues, Tata Energy Research Institute, New Delhi.


Pourgerami, A. (30); Sadli, M. (31); Sarnat, M., and Levey, H. (32); Sassin, W. (33); Sheehey, E. J. (34); Smil, V. and Knowland, W. E. (35); Stanislaw, J. (36); Subramanian, V. K. (37); Szego, G. (38); Tucker, R. W. (39); Wionczek, M. (40).

These studies reveal the impact of commercial energy (mainly oil) consumption on the economies of the various countries of the world in terms of Gross National Product.


32 Sarnat, M. and Levy, H., "World Oil Crisis: A Portfolio Interpretation".


along with the impact of international inflation, deteriorating terms of trade, and balance of payments problems arising due to the increasing oil prices at the international level. The developing nations, in particular, experienced exceptionally high inflation rates, fuelled by excessive monetary expansions, economic stagnation, and inflationary expectations. The inflation therein was mainly of an import-cost push type resulting in deteriorating terms of trade and an outflow of financial resources from these nations to the oil-exporting developing countries. In retrospect, their balance of payments deficits grew and their external debt began to accumulate.

The rising prices of fuel and energy-capital intensive inputs undermined the ability of the oil-deficit developing countries to promote agricultural development. This inability is likely to increase their dependence on imported food in the immediate decades.

Moreover, each time Oil Producing and Exporting Countries (OPEC) announced price increases during the 1970s, Non-OPEC oil exporters have followed with similar price changes.

As a result, the oil importing countries both, developed and developing, were faced with the dilemma: to continue consuming oil as before, thus spending more US dollar earnings on oil imports; or to reduce oil consumption in order to bring the oil import bill down to reasonable levels. By necessity, the second option was adopted globally after each oil crisis, but this also affected global economic growth as shown in Table 1.1.

The Western Industrialised Nations, which accounted for about 85% of oil consumption outside the Centrally Planned Economies in 1973 suffered most after the 1973 crisis. Middle income countries and high income oil exporters also could not sustain their pre-1973 rates of growth. In contrast, the low income developing countries, which are mostly oil importers (the notable exception is China), fared pretty
TABLE 1.1
GROSS DOMESTIC PRODUCT GROWTH RATES
(1960-82)

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<tbody>
<tr>
<td>Low Income LDCs</td>
<td>544</td>
<td>4.5</td>
<td>5.1</td>
<td>6.1</td>
<td>3.7</td>
<td>3.7</td>
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<tr>
<td>Middle Income Oil Importers</td>
<td>920</td>
<td>6.3</td>
<td>5.5</td>
<td>4.2</td>
<td>1.1</td>
<td>1.1</td>
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<tr>
<td>Middle Income Oil Exporters</td>
<td>687</td>
<td>7.0</td>
<td>4.8</td>
<td>-1.3</td>
<td>1.5</td>
<td>1.9</td>
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</tr>
<tr>
<td>High Income Oil Exporters</td>
<td>221</td>
<td>10.7</td>
<td>7.5</td>
<td>7.5</td>
<td>-1.8</td>
<td>-11.7</td>
<td></td>
</tr>
<tr>
<td>Western Industrial Countries</td>
<td>7,395</td>
<td>5.0</td>
<td>2.8</td>
<td>1.3</td>
<td>1.0</td>
<td>-0.2</td>
<td></td>
</tr>
</tbody>
</table>

NOTE: aEstimated; bLess Developed countries; cExcluding Republic of South Africa.

well as a group, as their growth rates accelerated over 5 percent per annum during the 1973-79 period compared to 4.5 percent per annum during 1960-73. This happened because: official development assistance to these nations increased substantially; remittances from migrant workers in the Middle East increased quickly; there was a boom in primary commodity prices after 1975; and interest rates in the developed countries continued to lag behind inflation rates, thus reducing their debt servicing obligations in real terms. However, it need be mentioned that even the low income developing countries could not sustain their pre-1973 growth rates during 1974 when the global economy plunged into a recession 41.

During 1975 to 1978, when the global recovery was being helped by relatively low interest rates and falling oil prices, the 'low-absorber' nations of the Middle East were losing on their surplus petrodollar revenues in terms of deflated dollars. Although these countries embarked on rapid development programmes, there were limits to what could be accomplished in this respect. Most significant among these limitations are the need to modernize or to create infrastructure, and to develop necessary technical and managerial capabilities subject to a minimum strain on the traditional social structure.

With the occurrence of the second oil crisis in 1979—the global economy again plunged into a recession. This time, however, the developed countries made concerted efforts to keep inflation in check, which prolonged the recession. This in turn led to stagnation in world trade and a sharp drop in commodity prices, severely eroding the export revenues of several developing countries 42. The oil price hike thus brought about an economic disequilibrium in the

world economy, widening the income gap between the oil-deficit developing countries and the oil-exporting developing nations since 1973.

In order to evaluate the impact of the rising oil prices, the economic variables analysed in the aforesaid studies are: Gross Domestic Product, energy consumption, money supply, exports, imports, terms of trade, balance of payments, export prices of fertilisers, pesticides, oil, etc., taking time series and cross-sectional data during the period 1960 to 1982.

In most of the empirical studies conducted so far, the impact of the oil price hike on the economies of different countries has been evaluated taking Oil as the major commercial energy source. This study differs in the sense that all the Commercial Energy components (coal, oil, and electricity) along with Non-Commercial Energy being significant in the context of the Indian Energy Scene, have been studied along with other variables for evaluating different economic models, taking time series data. This study attempts to assess and ascertain the extent of the impact of 'Energy Crisis' on the economy of India and its balance of payments, arising from the excess of energy consumption over production, and fuelled by the world Oil price hike, using the bivariate and multiple regression techniques. Also Energy Demand Forecasts - Commercial (coal, oil, electricity) and Non-Commercial up to 2020 A.D., based on the past consumption data (1960-1985), have been statistically estimated to assess the 'Energy Crisis', likely to persist in the years to come.

The scope of this study is presented in the following chapters.

Chapter II examines the Energy Scenario of India detailing resources, production, and consumption of Commercial

Chapter III deals with the computation of Energy Demand Forecasts - Commercial (coal, oil, electricity) and Non-Commercial upto 2020 A.D. applying 'Market Penetration Theory' and 'Trend Extrapolation' models followed by an interpretation of the results.

Chapter IV studies the significance of Energy in the context of the economy in terms of the indicators of economic growth viz., Gross National Product (GNP) or Gross Domestking Product (GDP), and Per Capita National Income (PNY), along with Gross Domestic Capital Formation (GDCF), and the ratio of Gross Domestic Savings (GDS) & Gross Domestic Capital Formation to GNP/GDP, Exports, Imports, Trade Balance, and Balance of Payments - Current Account deficit, both at constant and current prices; substantiated by a theoretical analysis of the impact of 'Energy Crisis' on the Balance of Payments - Current Account deficit, Net Barter and Income Terms of Trade and Domestic Inflation.

Chapter V presents an empirical analysis of the theoretical study. Various regression equations both, at current and constant prices, using Ordinary Least Square (OLS) technique were used to estimate the impact of Energy Crisis on the economy of India and its balance of payments, taking the following explained and explanatory variables. These are regressed in different formulations according to their respective correlations and economic significance.

- GNP or GDP against explanatory variables viz., Total Energy Consumption/or Commercial (coal, oil, electricity) and Non-Commercial Energy Consumption; the ratio of GDCF and GDS to GNP/or GDP; Trade Balance or Balance of Payments-

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44 Spencer, M.H., "Contemporary Macroeconomics" School of Business Administration, Wayne State University, 1976, pp.119-37.
Current Account Deficit; to assess the impact of Energy consumption on the economy of India.

- Net Barter Terms of Trade against explanatory variables viz., export and import prices; Income Terms of trade against quantity of exports and Net Barter Terms of Trade; to determine the impact of rising world oil prices of the mid-seventies and the early eighties on the terms of trade of the country. Some of the variables viz., Net Barter and Income Terms Trade and Import prices have been considered with and without petroleum products to isolate the impact of energy prices on the Indian economy.

- Balance of Payments - Current Account Deficit against independent variables viz., value of exports and imports (with and without petroleum products; Oil and petroleum products import bill; Net Barter and Income Terms of Trade (with and without petroleum products); to evaluate the impact of the Oil price hike on the Current Account of the Balance of Payments.

- Wholesale Price Index against Energy prices, Money supply, and the real Net National Product; Oil and petroleum Product import bill; Export and Import prices (with and without petroleum products); and Balance of Payments - Current Account Deficit; to assess the impact of the rising energy prices alongwith the said variables on the general price level of the domestic economy.

Chapter VI highlights the findings of the study with recommendations which may be considered to render the 'Energy Crisis' to the minimal.