CHAPTER-III
THEORETICAL BACKGROUND

This chapter deals with theoretical aspects of oil industry and its policies in upstream and downstream sectors. It also highlights the pricing mechanisms followed in petroleum.

The petroleum industry has three parts namely upstream, mid stream and downstream. The upstream industry includes exploration and production activities and referred as E & P sector. The midstream industry processes, stores, markets and transports commodities including crude oil, natural gas, natural gas liquids like ethane propane and butane and sulphur. The downstream industry includes oil refineries, petrochemical plants, petroleum products distributors, retail outlets and natural gas distribution companies. The downstream industry provides consumers thousands of products such as gasoline, diesel, jet fuel, heating oil, asphalt, lubricants, synthetic rubber, plastics, fertilizers, antifreeze, pesticides, pharmaceuticals, natural gas and propane.¹

In India, the ownership of all mineral resources vests with the central government. It is administered through Ministry of Petroleum & Natural Gas (MoPNG). The Ministry of Petroleum and Natural Gas, is the primary agency for regulating this sector in India. It is entrusted with the responsibility of handling legislation and issues related to E&P of oil and natural gas, such as, refining,

¹ Indian Petroleum Industry (2009), Indicus Analytics, New Delhi, pp. 1-3.
distribution and marketing; and the import, export, and conservation of petroleum products and Liquefied Natural Gas (LNG).

3.1 Upstream Sector: Exploration and Production

Upstream sector, the first part of the oil industry, includes exploration for potential underground / underwater oil and gas fields, drilling of exploratory wells and subsequently operating the wells. There are more than 40,000 oil and gas fields of all sizes in the world (BP statistical Review, 2006) and the largest discovered conventional oil field is the Ghawar Field (75-83 billion) is Saudi Arabia.²

The sedimentary basins of India, onland and offshore up to the 200 m isobath, have an area extent of about 1.79 million sq. km. So far, 26 basins have been recognized and they have been divided into four categories based on their degree of prospectivity as presently known. In the deep waters beyond the 200m isobath, the sedimentary area has been estimated to be about 1.35 million sq. km. The total thus works out to 3.14 million sq. km.³

Oil exploration in India began in 1867, when oil was struck at Makum, near Margherita in Assam. However, exploration and production (E&P) started in a systematic way only in 1899, after the Assam Oil Company (AOC) was formed. At the time of Independence, India’s domestic oil production was just 250,000 tonnes per annum.⁴ In India, Oil exploration and production started in an extensive and systematic way after setting up of the Oil and Natural Gas Commission (ONGC) in

³ www.dghindia.org
⁴ India Brand Equity Foundation, “Oil and Gas Market and Opportunities”, p. 1.
1956, now called Oil and Natural Gas Corporation limited. Till independence, Assam was the only where mineral oil was drilled and refined at the refinery Digboi. Although small in size this is the only field that has lasted for 100 years continuously. After independence, Gujarat plains and Cambay offshore showed evidence of hydrocarbon deposits. But the major reserves were unexpectedly found of the offshore of Mumbai high, 115 km from the shore. The chronology of the Exploration and production events is given Appendix. The entire upstream activity was operated by ONGC & OIL, the two National Oil Companies (NOC's). Exploration bidding rounds started in 1979 and nine rounds were organized by 1995. However, the results of the bidding were not encouraging. These rounds attracted an investment of $ 2 billion. In 1990's some unexplored as well as discovered areas were opened for international competitive bidding, and Production Sharing Contracts regime was experimented with. Subsequently in 1998, Government of India came up with major changes in its policy and introduced NELP. The aim of the NELP was to accelerate exploration to enhance indigenous production by offering globally competitive terms and providing a level playing field to all. So far, nine rounds of bidding under NELP have taken place. New Exploration and Licensing Policy announced was differed from the old one in the following respects:

1. Bidders were to compete on cost recovery. They could ask for up to 100 per cent-and on their share of profit petroleum.

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6 Associate of Oil and Gas Operators of India, www.agog.com
2. They were free to sell their share of the oil to anyone within the country.

3. Conditions regarding minimum expenditure, required partnership with government oil companies, and signature, discovery and production bonuses were scrapped.

4. Tax provisions were defined, and their stability promised. There would be a 7 year income tax holiday, exemption from customs duty on exploration and drilling equipment, royalty was fixed at 10 per cent except for onshore crude which would pay 12.5 per cent, 5 per cent royalty on discoveries in water deeper than 400 meters, and development expenditure could be amortized over 10 years.

5. The license could be assigned to third parties under conditions.


7. Bidders were required to give the Directorate of Hydrocarbons, which was set up in 1993, the results of their surveys; in case they abandoned the concession, the results would become available to subsequent bidders. The following table gives details on various NELP rounds.
Table 3.1
Details of NELP Rounds

<table>
<thead>
<tr>
<th>Parameter</th>
<th>NELP Rounds</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>No. of blocks offered</td>
<td>48</td>
</tr>
<tr>
<td>No. of blocks for which received</td>
<td>28</td>
</tr>
<tr>
<td>No. of bids received</td>
<td>45</td>
</tr>
<tr>
<td>No. of blocks awarded and PSCs signed</td>
<td>24</td>
</tr>
</tbody>
</table>

NA - Not available

Under the various NELP rounds, private and public sector companies have made 68 oil and gas discoveries since June 2001. Exploration activities have increased in India with the introduction of the NELP and improvements in technology. The unexplored area has come down to 15 per cent which was 50 per cent in 1995-96. There have been significant discoveries of oil and gas in the Krishna-Godavari, Mahanadi and Rajasthan basins in recent times. At present, private sector namely Essar Oil, Relince industries and Cairn Energy are in the operation of upstream, contributing healthy of 18 per cent of total.

Though domestic companies were actively bidding in various rounds under NELP, investment from international companies was inadequate. With this regard,

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8 www.dghindia.org/SedimentaryBasins
9 TERI, op. cit., p. 86
Government of India reiterated its interest to introduce the Open Acreage Licensing Policy (OALP) by the end of 2009.

Directorate General of Hydrocarbons (DGH), established under the administrative control of MoPNG is responsible to promote sound management of Indian Hydrocarbon Resources having a balanced regard for environment, safety, technological and economic aspects. It plays a significant role in monitoring the upstream, contract management and regulation. It is also the technical advisor to the Government on all technical matters relating with upstream.  

3.1.1 Open Acreage Licensing Policy

The OALP system offers opportunity to investors to evaluate acreages round the year and carve out their own areas with perceived work programme commitments. It provides continuous window of opportunity to bid for acreages at pre-determined intervals of time, allows in depth study of data including the regional data. The pre- requisite for formulation of open Acreage licensing policy is national data repository, which government is working now.

3.1.2 Exploration overseas

In keeping with the objectives of the Energy Security section of the National Common Minimum Programme, ONGC Videsh Ltd. (OVL), wholly owned subsidiary of ONGC, as well as other national oil companies such as IOC, OIL and GAIL, have been pursuing the acquisition of equity oil abroad, as well as the acquisition abroad of oil and gas exploration acreages and producing properties.

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India Zonal Equity Foundation, *op. cit.*, p. 2.
These companies have participating interests in oil and gas projects located in Vietnam, Sudan, Russia, Iraq, Iran, Myanmar, Libya, Syria, Australia, Ivory Coast, Qatar and Egypt. As of April 2010, OVL has presence in 39 projects in 15 countries, which produced 6.4 mt of crude oil. Apart from public sector, there has been growing interest among private players in acquiring oil gas acreages abroad. For instance, Reliance Exploration and production DMCC a wholly owned subsidiary of Reliance Industries, in consortium with the China national Petroleum Corporation (CNPC) and Argentina’s Pluspetrol, won the rights to explore gas in Block 155 Peru.

3.1.3 The Hubert Theory of Oil Depletion

A number of theories have been implemented to project oil production. One of these theories is the Hubert peak theory. The Hubbert theory of oil depletion was first presented in 1956 by M. King Hubbert, a senior research geologist with Shell Oil. The Hubbert theory states that the rates of fossil fuel production such as oil tend to follow a bell-shaped curve. The theory is based upon the fact there’s a limited amount of oil under the ground in any area, therefore the rate of oil discoveries, which initially increases quickly, must reach a peak and then decline. It is one of the primary theories on peak oil and is based on the observation that the amount of oil under the ground in any region is finite; therefore the rate of discovery which initially increases quickly must reach a maximum and decline.

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11 www. Indiapetrol.com
Hubbert's peak, better known as peak oil, is often used more generally, to refer to the moment in time when the entire planet's oil production peak occurs. After this moment, according to the Hubbert Peak theory, the rate of oil production on the world would enter a terminal decline. Hubbert's peak can be used to observe the peaking of oil production in a particular region and depicted as follows.

Based on his theory, Hubbert made a report for the American Petroleum Institute in 1956, which predicted that the oil production from discovered oil sources would peak in the U.S somewhere between 1965 and 1970. He described two scenario's in his report:

- **Most likely scenario**: a production curve with a growth rate of 6 per cent, a total of 150 Giga-barrels (Gb) of oil and an oil peak in 1965.
- **Second scenario**: a production curve with a production growth rate of 6 per cent, a total of 200 Giga-barrels (Gb) of oil and an oil peak in 1970.
The United States reached Hubbert’s peak in 1970 as predicted. The U.S production of oil reached a peak of 10,200,000 barrels per day. Since then, the U.S oil production has been in decline. United States oil production peaked in the early 1970s, and with this vindication the Hubbert theory became an important tool for those concerned about depletion of natural resources. This success caused Hubbert and others to project future global oil production. Hubert also has predicted that global production would begin to decline by 2006. His theory and guess on global production has been widely discussed and criticized that this theory is simple and that there are contradiction exists between the available evidence and the specific predictions provided by the theory.\footnote{Adam R. Brandt, “Testing Hubbert”, www.iaee.org/en/students/best-papers/adam-brandt.pdf.}

Many experts reject the idea that the world has reached Peak Oil and pointed out that there are probably additional reserves that have not been identified by today’s oil producers. The most optimistic observers hint that for the next 25 to 50 years, the oil available to the market is for all intents and proposes infinite. Cambridge Energy Research Associate given the following criticism on hubbert theory.

“Despite his valuable work, M. King Hubbert’s method does not work flawless because it does not take into account resource growth, improved technology or the impact of politics on oil production. His method is not reliable in all cases including on the United States and cannot predict a reliable global oil production peak. In other words, the case for the imminent peak is flawed. As it is,
oil production in 2005 in the lower 48 in the U.S was 65 per cent higher than Hubbert predicted”.

3.2 Downstream Sector

The first Indian refinery with a capacity of 0.25 mmtpa was set up in 1901 in Digboi. No other refineries were to be commissioned in India until the early 1950s, when three refineries were set up one by each of Burmah-Shell, Esso Standard Refining Co. and Lubes India Limited (Esso) and Caltex Oil Refining (I) Ltd. (‘Caltex’). In the 1960's five more refineries were set up, three by the state-owned IOC and one each by Cochin Refineries Limited (now Kochi Refineries Limited ‘KRL’) and Madras Refineries Limited (now Chennai Petroleum Corporation Limited, ‘CPCL’) both of which were joint ventures between the Government and international oil companies. IOC set up one additional refinery prior to nationalisation in the 1970s. With regard to the marketing sector, IBP began marketing retail petroleum products in 1909. Prior to nationalisation of the downstream sector, Burmah-Shell, Esso, Caltex and IOC had also begun marketing refined petroleum products in India. In the mid-1970s, the downstream sector was nationalised. Following the nationalization, all upstream activity was also controlled through Government companies, only public sector undertakings (‘PSUs’) were allowed to participate in the petroleum industry (other than Castrol which was permitted to continue participating in the lubricants sector). Virtually all aspects of the oil industry were highly regulated, including investment, production, distribution and pricing of petroleum products sold in the market. Beginning in the early 1990s, the Government began instituting a series of reforms aimed at
liberalising the petroleum industry in India. In 1997-98, downstream sector was deregulated and huge expansion has been made in the refining capacity. The commissioning of private sector refinery, Reliance Industries Limited, Jamnagar in July 1999 was a significant achievement in this regard. Now, the country is not only self sufficient in refining capacity for its domestic consumption but also exports petroleum products substantially. Refining capacity depends on the technology used in refineries, capable of processing crude production into clean fuels. Refinery crude throughput, as opposed to designed capacity, is computed by dividing the number of refined barrels of oil processed by the actual number of days the refinery was in operation.

The total refining capacity in the country as on 1.4.2010 stood at 184.4 MTPA of which 60 per cent was in the public sector and the rest in the private sector. Out of the total 20 refineries in the country, 17 refineries are owned by Public Sector companies and 3 by Private Sector. The total crude throughput in 2009-09 and 2009-10 was around 186 mt and 189 mt, respectively. Over all, the capacity utilization of refineries in India has decreased to 101 per cent in 2009-10 as compared to 127 per cent in the previous year. Reliance Petroleum Limited (RPL) and Essar Oil Limited (EOL) are the two private companies involved in the refining of petroleum products and other are in Public sector. IOCL is India largest integrated oil refining and marketing company operating 10 refineries with a combined refining capacity of 60.2 MTPA.

Indian Oil Corporation, Hindustan Petroleum and Bharat Petroleum are involved in both refine and market and known as integrated refineries. Chennai Petroleum Corporation Limited (CPCL), The Bongaigaon Refinery & Petrochemicals Limited (BRPL), Kochi Refineries Limited (KRL) are examples of standalone refineries as they are operate only in the refining.\[^{15}\]

Under the APM, production of public sector refineries was coordinated by the Oil Coordination Committee (OCC) keeping in mind regional product demand patterns. Post deregulation, refineries are free to determine their capacity utilization and yield patterns in accordance with the demand and realization of various petroleum products. The company-wise location and capacity of the refineries as on 1\(^{st}\) April 2010 is given in Appendix-2.

### 3.2.1 Major Petroleum Products and its Uses

<table>
<thead>
<tr>
<th>Products</th>
<th>Major End Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>LPG - known by the names of its principal generic components, propane and butane.</td>
<td>Domestic Fuel. Also for industrial application where technically essential. Now permitted as auto fuel.</td>
</tr>
<tr>
<td>Naphtha - are refined or partly refined light distillates, which are to be further blended or mixed with other materials to make high grade motor gasoline or jet fuel.</td>
<td>Feed stock / fuel for fertilizer units, feedstock for petrochemical sector and fuel for power plants.</td>
</tr>
<tr>
<td>MS (Petrol) - comprises of a mixture of relatively volatile hydrocarbons with or without small quantities of additives.</td>
<td>Fuel for passenger cars, taxies, two- and three-wheelers.</td>
</tr>
<tr>
<td>ATF - is a colorless, combustible, straight-run petroleum distillate liquid.</td>
<td>Fuel for aircrafts</td>
</tr>
</tbody>
</table>

### Theoretical Background

#### SKO (Kerosene) - refined crude petroleum fuel in volatility between motor gasoline and gas oil, free of gasoline’s and heavy hydrocarbons such as gas oil and lubricating oil.

Fuel for cooking and lighting.

#### HSD (Diesel) - middle distillates, dominant type of locomotive.

Fuel for transport sector (Railways / Road), Agriculture (tractors pump sets, threshers, etc.) and captive power generation.

#### LDO - middle distillates, locomotive.

Fuel for agriculture pump sets, small industrial units, start up fuel for power generation.

#### FO/LSHS (Low Sulphur Heavy Stock (LSHS) and Heavy Fuel Oil (HFO) are jointly described as Fuel Oils.

Secondary fuel for Thermal Power Plants, Fuel/Feedstock for fertilizer plants, industrial units.

#### Bitumen - brown to black solid or semi-solid material obtained as a residue in the distillation of crude petroleum.

Surfacing of roads.

#### Lubes - heavy liquid distillates, excludes solid lubricants.

Lubrication for automotive and industrial applications.

#### Other Minor Products - Benzenes, Toluene, MTO, LABFS, CBFS, Paraffin Wax etc.

Feedstock for value added products.

### 3.3 Marketing and Distribution of Petroleum Products

The marketing division of the petroleum ministry looks after the distribution of petroleum products to various customers, namely defense, railways, domestic and international airlines, fertilisers and petrochemical industries, power plants, transporters, general public customers etc., It plans the construction of various ports, installations, tangaers, and terminals to store petroleum at strategic locations to maintain the supply line of petroleum. It also coordinates the movement of
petroleum products by sea, railways, and road to the consumption centres. The marketing division makes monthly allocation of kerosene to all the states and UT in the country through network of public distribution systems and for industrial use. HSD, SKO, LPG etc., are distributed to the consumers through a network of outlets/distributors of oil companies. The selections of dealers/distributors of these products are made through the Dealer Selection Board of the state or region.

In India marketing of petroleum products started in 1882 with the supply of kerosene by Standard Oil Company. At the time of Independence, STANVAC (ESSO), Burmah Shell, Caltex and Indo-Burma Petroleum Co. were marketing petroleum products in the country. In 1959, the Indian Oil Company (IOC), a Government company, was formed for marketing of petroleum products. Indian Oil Company, in competition with the well entrenched transnational oil companies, set itself assiduously to the task of developing marketing infrastructure and distribution network. A major policy decision was also taken then to permit only Indian Oil to handle imports of refined products and their marketing in the country.

Between 1974 and 1976, the Government acquired the assets of ESSO, Burmah Shell and Caltex. This resulted in establishment of Hindustan Petroleum Corporation and Bharat Petroleum Corporation. Finally, with the acquisition of assets of Burmah Oil Company in 1981, the entire oil industry comes under government control.

At present four public sector oil companies are dealing with marketing and distribution of petroleum products, namely, the IOC, Hindustan Petroleum
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Corporation Ltd (HPCL), BPCL and IBP Company Limited.\textsuperscript{16} Major share in total sales of petroleum products forms by IOC, followed by BPCL. Sales by private was 19 per cent in 2005, ahs has been reduced to 15 per cent by 2010. As of 1April 2010, there were 36,462 petrol and diesel outlets, 6615 SKO/LDO dealerships, and 9686 LPG distributors operating throughout country.\textsuperscript{17} The government introduced parallel marketing of kerosene, SKO, LPG, and LSHS in 1993 with a view to bridge the wide gap that existed between supply and demand for petroleum products. The private parties have been allowed to import and market these items at market determined prices under the parallel marketing system.\textsuperscript{18}

3.4 Pricing of Crude Oil

In the international oil market, crude oil is traded based on market related pricing. The absolute price of crude oil is not fixed at the time of finalization of the contract but price prevailing at the time of loading of cargo is taken. For example, crude oil of major exporting countries like Saudi Arabia, Iran, Iraq, Kuwait etc. is sold by National Oil Companies on term basis for one year. However, the price for cargoes loaded in different months is different and dependent on the price prevailing in the month of loading. Thus the pricing of imported crude is based on the actual cost incurred by various refineries and comprises items like FOB cost, freight to India, Insurance, ocean loss, customs duty, wharf age etc.

\textsuperscript{16} http://pib.nic.in -
\textsuperscript{17} Basic statistics on Indian Petroleum & Natural Gas 2010-11, MoPNG, GoI, pp. 20-25.

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The methodology of pricing of crude oil is based on one “Reference” or “Marker” crude oil that is actively traded in a particular region as there are more than 100 grades of crude oils produced in the world and all are not actively traded. Typically there is a premium or discount over the ‘Marker’ due to quality/locational differences etc. In India, Oman and Dubai are the Marker crude oils for high sulphur and Brent is the marker crude oil for most low sulphur crude oils imported by India. Considering the proportion of import of low sulphur and high sulphur crude oil into the country, an indicative Indian Basket price has been devised with weightage of 57 per cent to the average of Oman and Dubai and weightage of 43 per cent to Brent price. Based on this, price is worked out on daily, weekly, monthly and yearly basis. It may be pertinent to note that Indian Basket price is not the price of actual imports but only an indicator for reference purpose. It can be stated as follows.

The Indian basket represents published FOB prices of crude oils in the ratio of 57:43 of Oman/Dubai for sour crude oils and Brent (dated) for sweet crude oils. LPG represents published FOB quotes of butane and propane in the ratio of 60:40. This ratio changes based on the nature of the crude imported.

3.4.2 Duties of Crude - Royalty and Cess

Royalties are received by the State Governments on crude extracted from their respective jurisdictions. According to the provisions of Oilfields (Regulation and Development) Act, 1948 and the Petroleum and Natural Gas Rules, 1959 rate of royalty shall not exceeds 20 per cent of the sale price at the oilfields or the oil well
head. Cess is levied and collected by the Central Government under Section 15 of the Oil Industry (Development) Act 1974. This was enacted to provide financial assistance for the development of Oil Industry through Oil Industry Development Board (OIDB).

3.5 Pricing of Petroleum Products

The pricing of petroleum products in India has witnessed several structural changes in policies since independence, moving through various stages from import parity to cost-plus and back to import parity during the last several decades. The first attempt to regulate the oil prices was based on Valued Stock Account (VSA) procedure agreed between the Government of India and Burmah Shell in 1948. VSA was based on import parity to which were added all elements of cost such as ocean freight up to Indian ports, insurance, ocean loss, remuneration, import duty and other levies and charges. VSA was terminated following the decision of the Government that the basis for pricing of petroleum products should be actual (not assumed) costs with some reasonable profit in 1958. Subsequently, from 1st April 1959, a new ad-hoc arrangement was entered into following the examination of the price structure of the petroleum products by the Chief Cost-Accounts Officer, Government of India. But the first systematic attempt to regulate the prices of petroleum products was based on the recommendations of the Dalme Committee in 1961 which advocated fixing of prices of petroleum products on import parity basis as the bulk of the crude oil and major petroleum products were being imported into the country from West Asia. The other pricing committees appointed by the Government during 1960s are Talukdar Committee (1965) and Shantilal Shah.
Committee (1969). Talukdar Committee essentially extended the concepts laid down by the Damle committee. But the Shantilal Shah Committee felt that the Import Parity basis did not constitute the proper basis for fixation of the prices of petroleum products, as indigenous crude oil production and refining capacity had become a considerable factor by that time. Nevertheless, they recommended the continuance of import parity in view of the Government of India’s commitments to the foreign oil companies in terms of ‘refinery agreements’. After the first oil shock in 1973, the government constituted the oil price committee (OPC) under the stewardship of Dr. K. S. Krishnaswamy, the then Executive Director, and Reserve Bank of India. The OPC recommended discontinuation of the import parity basis and a shift-over to determination of the prices of major petroleum products on “cost plus basis”. Based on these recommendations, the APM came into existence on 16th December 1977.

One of the important drawbacks of the import parity pricing was that the indigenous cost of production was totally overlooked while determining producer prices. This issue under the new mechanism was addressed through ‘retention pricing’, by which refiners were allowed to retain out of the sale proceeds, cost of crude, refining cost and a reasonable return on investment. The same mechanism of retention pricing was also extended to marketing and distribution companies. The Government of India was fixing the prices of finished products and the returns of oil companies were de-linked from the price at which the goods were finally sold. This process of fixation of prices of finished products by the government coupled with the retention mechanism for refiners, marketing and distribution companies was referred to as the Administered Pricing Mechanism or APM. The entire mechanism
was operated through an oil pool account (OPA) maintained by Oil Coordination Committee (OCC), with its secretariat at New Delhi. A flow-chart illustrating the buildup of ex-refinery, ex-storage point and consumer retail price of petroleum products is given in Appendix-3.

3.5.1 Consumer Prices

The retail selling price of a product to the consumer includes in addition to basic ceiling selling price, notional railway freight, retailing cost, various surcharges, and government levies. The administered pricing policy incorporates cross-subsidy to ensure lower consumer prices for products. Socially sensitive domestic consumption products like kerosene, LPG and diesel used for agriculture and mass transportation were heavily subsidized. Furnace oil (FO), or naphtha used for fertilizer manufacturing were also Subsidized. Subsidies were non-transparent and products like petrol, ATF, diesel oil and naphtha used in the other than fertilizer manufacturing were priced to balance the under recoveries on subsidized products.

Thus, under the APM, prices in the hydrocarbon sector were controlled at four stages production, refining, distribution and marketing on the principle of compensating normative cost and allowing a pre-determined return on investments. At the distributor level the dealer commissions and margins were also regulated to maintain uniformity in commission rates. As part of the APM, freight for imported crude was paid to Indian shipping companies at cost plus rates. The market share of public sector oil companies was controlled through sales plan entitlements approved by the Ministry of Petroleum and Natural Gas. Through this mechanism, OCC ensured stability of prices insulating domestic market from the volatility of prices in
international markets. They also took care of regulated returns of the oil companies at reasonable levels. There were four major oil accounts in which the oil companies adjusted their claims arising out of administrative pricing and retention margins, viz. crude oil price equalization account, cost and freight adjustment (C&F) account, freight surcharge pool (FSP) account and product price adjustment (PPA) account.

APM was found to be increasingly unsuitable for the long term growth and efficiency of oil industry. Accordingly, Government, in 1995, set up an industry study group under the Chairmanship of U. Sundararajan, C&MD, and BPCL to prepare the blue print of the deregulation and tariff reforms that was required in the oil sector and provides a framework for the development of Market Determined Pricing Mechanism (MDPM). The report of this group formed the main input for the strategic Planning Group on Restructuring of the Indian Oil Industry otherwise known as the “R” group headed by the then Secretary, P&NG, Vijay Kelkar the then Secretary, Ministry of Petroleum and Natural Gas. The “R” Group submitted its report in September, 1996, recommending dismantling of the APM. Based on the report, the Government decided to abolish APM and replace the cost plus formula with import parity pricing. After considering the phased dismantling recommendations of the Expert Technical Group (ETG), Government announced the complete dismantling of the APM on 21st November 1997. The phased dismantling process and was to be carried out over the period 1998-2001, beginning 1st April 1998. Highlights of the phased dismantling are as follows:

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Crude Prices:

Withdrawn of Cost-plus formula for indigenous crude oil and the oil producers would receive the prices increase to the international price in a phased manner by paying pre-announced increasing percentage of weighted average FOB (Free On Board) price of actual imports of crude oil during the transition period.

Refinery-gate price:

System of retention pricing would be abolished for all refineries and refinery prices would move towards import parity except for the products viz. petrol, diesel, kerosene, LPG and ATF. The prices of these controlled products would be fixed at ‘adjusted import parity’ prices for the existing refineries during the transition period. All other products would be sold by the refineries at market driven prices.

Consumer Prices:

The consumer prices of major petroleum products would be moved to market-driven prices. Price of diesel would be fixed on the principle of import parity upto ex-storage point level with immediate effect, and prices of other major products, viz. LPG, ATF, kerosene and petrol, would be moved towards principle of import parity in a phased manner and prices of paraffin-wax, bitumen, naphtha, FO (fuel oil) and LSHS would be decontrolled.

Servicing the Oil Bonds:

The transition period would be utilized for servicing and amortizing the oil bonds worth around ` 18,200 crores.
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**OCC with enhanced autonomous powers:**

OCC (Oil Coordination Committee) enhanced with enhanced autonomous power to fix the prices of crude and petroleum products during the transition period.

**Decanalisation of Imports and Exports:**

The imports and exports of all petroleum products, except crude, NGL, ATF, petrol and diesel would be decimalized during the transition period. However, sourcing and import of crude would be allowed to joint and private sector refineries under actual user licensing policy.

**Rationalization of Duties on Crude and Petroleum Products**

Customs and excise duties on crude and petroleum products would be rationalized in a phased manner.

**Encouraging Investment:**

The investment in the refinery sector would be encouraged by providing reasonable tariff protection and making marketing rights for transportation fuels viz. petrol, diesel and ATF for refineries owning and operating with an investment of at least 2000 crores or companies in upstream producing at least 3 million tonnes of crude oil annually.\(^1\)

**Cost-plus Formula withdrawn:**

The cost-plus formula for shipping of crude oil would be withdrawn and the rates would move towards market related rates.

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\(^1\) Bandyopadhyay, Kaushik Ranjan, (2009), "Petroleum Pricing in India: Transition from APM to MDPM," MPRA Paper 25905, University Library of Munich, Germany, p. 16-47.
In addition, the government also announced the ‘PDS kerosene and domestic LPG Subsidy Scheme - 2002’ in January 2003. The subsidy was to continue for 3 to 5 years beginning 2002-03. The subsidy on SKO (PDS) and LPG (domestic), which under APM was cross-subsidized through MS and ATF prices, was to be met out of the government’s fiscal budget.

In June 2006, based on the recommendations of the Rangarajan Committee, the Government changed the pricing of Petrol and Diesel to Trade Parity Pricing (TPP) basis. Trade Parity Price (TPP) consists of 80% of IPP and 20% of Export Parity Price (EPP). For this purpose, EPP comprises of FOB price of the product plus Advance license benefit as per Foreign Trade Policy. Export parity component was introduced in the calculation as India became a net exporter for these products. When crude oil is price at the international level, the finished products at the Refinery Gate (RGP) are also required to be determined on the principles of import parity, with linkage to the prices for the respective products in the international oil market.21

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