



## DISTRIBUTION OF PETROLEUM PRODUCTS BY INDIAN OMCs: CHALLENGES IN SUPPLY-DEMAND AND PRICE

**Singh Mahendra**

Center for Business Administration, School of Management Sciences  
Central University of Jharkhand, Ranchi, (Jharkhand) 835205, India

### ABSTRACT

The distribution of petroleum products widely depends on policy designed by government; prices are controlled by the Government and such bodies. Another complexity to petroleum products is different prevailing government norms. Present study has been done on distribution strategies of oil marketing companies (OMCs) by which they can cope up with high demand of petroleum products with controlled supply of petroleum crude. The study has been done in search for efficient distribution in the adverse situation of government regulated price and distribution policies. The study used exploratory approach of research which included studying objective, vision and mission of concerned OMCs. The secondary data available in the form of analyst report, annual reports, and company manual and governmental policy documents is used for content analysis to identify the critical aspects. Findings come up with demand supply crisis furthering challenges to cope with the situations. The study is limited to distribution strategy for Indian OMCs. This study is an attempt to assess the demand–supply crisis of petroleum products on the basis of analysis of distribution scenario which may help OMCs in coping with high demand of such products.

**KEYWORDS:** Petroleum, Supply-Demand-Price challenge, Distribution Strategy, OMCs

### INTRODUCTION

Petroleum products are in high demand in comparison to their controlled supply in India. Oil Marketing Companies (OMCs) has great pressure of distributing these products in India while keeping in mind the different government policies. In Practical saying it becomes difficult to implement the policies as per government of India (GOI). Other concern for OMCs is of distribution of highly inflammable and serious liquids and gaseous products throughout the targeted market. Indian economy has been maintaining a good enough growth in last two decades. Along with this economic growth, India's oil demand and oil imports from abroad have been increasing constantly and, as a result, Indian OMCs have grown into such important players that they have been exerting an increasing influence on international oil markets also. Key issues in petroleum enterprise-wide optimization span a large spectrum in a supply chain, from the strategic through the tactical to the operational level and over various functions in the supply-chain network, from purchasing of the raw materials through the manufacturing to the distribution and sales. Since the emphasis of enterprise-wide optimization is on manufacturing control, scheduling, and planning, the models required for optimization are usually nonlinear models. Integrated and coordinated decision making across various geographically distributed refinery manufacturing and storage sites offers an additional challenge to refinery operations optimization. (Nikisha K. Shah, Zukui Li, and Marianthi G. Ierapetritou). Seeing the fact that OMCs in this industry carry good image for their products, possess state-of-the-art technology, meet the required standards, and the price structure that is centrally controlled by the Ministry, it is understood that the challenge to cope up

with higher market demand could be balanced by improvements in the supply chain and distribution area. Therefore, the OMCs are convinced that a sound distribution strategy and an effective supply chain structure holds a great promise for the future and would be a key element of their plans to enjoy a superior market performance.

### LITERATURE REVIEW

Petroleum is one of the most critical sources of energy and will continue to remain so in the future. The level of its utilization is directly indicative of the level of economic development. Developing economies are expected drive energy usage to still higher levels. The integrated energy policy of the planning commission defines energy security as (Ministry of Petroleum and Natural Gas, 2011) "We are energy secure when we can supply lifeline energy to all our citizens irrespective of their ability to pay for it as well as meet their effective demand for safe and convenient energy to satisfy their various needs at competitive prices, at all times and with a prescribed confidence level considering shocks and disruptions that can reasonably expected". Majority of the established hydrocarbon resources in the world are confined to and controlled by few countries, whereas the demand is worldwide. The concern related to assured supply is threats to supply disruptions. Nottingham (2004) discussed the distribution segment of the petroleum value chain holds the most promise for domestic initiatives in any market. Further J. Parikh et al. (2010) suggested in their study for the level of preparedness that will be required from the oil and gas sector to enable India achieve the GDP growth target that it aims to.

**Petroleum Market Scenario:** Petroleum supply is controlled by few hydrocarbons rich countries, while demand for oil and gas inmates from the world over. The oil reserves worldwide in year 2009 were approximately 1333 billion barrels. The main concentration of oil is in Middle East Asia followed by south and Central America. Additionally North American region accounts significant portion of reserves.

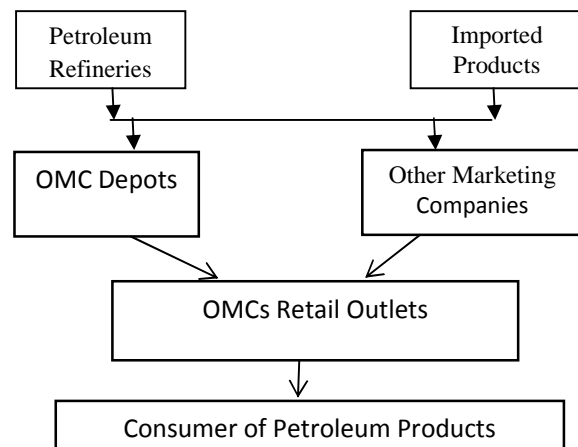
**DEMAND AND PRICING FACTOR IN MARKETING OF PETROLEUM PRODUCTS**

The demand for petroleum products particularly in the second half of nineties had been increasing at a compound annual growth rate of about 6% but investments in the industry failed to keep pace with the demand resulting in large imports of crude and even finished products. Furthermore, crude oil production had been plateauing without discovery of new exploratory wells. The value of imports increased from less than US\$ 4 billion in 1990-91 to about US\$ 13 billion in 2000. Large imports simply exacerbated the crisis in macroeconomic management, especially the exchange rate and inflation and hence it was essential to bring down the imports to manageable levels. The policymakers felt that this would only be possible if the petroleum sector is fully liberalized to attract substantial foreign and domestic investments. There are Difficulties in periodic adjustment of prices. With the responsibility of fixing the prices of petroleum products, the government, driven by political prerogatives, simply kept on postponing the decision of hiking the prices that inevitably led to burgeoning oil pool deficit. The only long-term solution to this problem was that the government should get out of the responsibility of fixing prices leaving them to market forces. Realizing the need of the hour, the Union Cabinet approved the dismantling of the APM (administered pricing mechanism) for the petroleum sector on 20th November 1997. The dismantling was carried out in phases over four years, and was along the lines suggested by the Expert Technical Group<sup>i</sup> (ETG), which had been appointed earlier to recommend on the process of dismantling. ETG recommended complete dismantling of the APM in a phased manner over 4 to 5 years, beginning from 1 October 1997, and ushering in a market determined pricing mechanism. The dismantling primarily involved withdrawal of cost plus formula, abolition of retention prices and movement towards market driven prices, decimalization of imports and exports, rationalization of import duties, reasonable tariff protection to encourage investment of a regulatory framework to oversee the functioning of and enforcing a competitive framework in the hydrocarbon sector.

**Issues in Petroleum Distribution:**

Integrated and coordinated decision making across various geographically distributed refinery manufacturing and storage sites offers an additional challenge to refinery operations optimization. While manufacturing facilities management is an integral part of enterprise-wide optimization, transportation logistics and finished product distribution management remain important parts of the refinery supply chain. Key issues in petroleum enterprise-wide optimization span a large spectrum in a supply chain,

from the strategic through the tactical to the operational level and over various functions in the supply-chain network, from purchasing of the raw materials through the manufacturing to the distribution and sales (Nikisha K. Shah, Zukui Li, and Marianthi G. Ierapetritou). The petroleum industry can be characterized as a typical supply chain. All levels of decisions (strategic, tactical, and operational) arise in such a supply chain. Oladele (1991) said there has been inadequate crude oil allocation to the refineries for domestic consumption In the literature, optimization models deal with planning and scheduling of several subsystems of the petroleum supply chain such as oil field infrastructure, crude oil supply, refinery operations, and product transportation. Raghvendra et al. (1996) pointed out importance of demand forecasting for efficient distribution. In what follows, developments on the petroleum supply-chain design and planning are reviewed on the basis of the following two classifications: oil field infrastructure investments and operations and petroleum supply-chain planning including crude oil worldwide transportation and multisite distribution planning. The pipeline network plays a key role in the petroleum business. These operational systems provide connections between ports and/or oil fields and refineries (upstream), as well as between these and consumer markets (downstream). Transportation is among the basic challenges in a refinery supply chain with the dimensionality of the problem and the specificities of each individual implementation to be the main issues. (Rejowski & Pinto, 2002). The scheduling of a multiproduct pipeline system receiving a number of liquid products from a single refinery source to distribute them among several depots is practiced. The problem of scheduling a transmission pipeline carrying several petroleum products from a single oil refinery to a unique distribution center over a monthly horizon is done (Cafaro & Cerda, 2004).



**Figure: Down-Stream Petroleum Distribution (Adapted from NNPC/PPMC Bulletin, 2010)**

The downstream sector of the petroleum industry which forms the basis of this study is characterized by such activities as

- Gas treatment
- Crude oil and gas conversion into refined and petrol chemical product and

- Transportation and distribution of refined products

In the downstream sector, activities are progressively falling within the control of private entrepreneurs, especially the indigenous independent marketers. It is the policy of the government that petroleum products be distributed by OMCs.

**Petroleum products distribution in India** and the role of oil marketers Product is an important element of the marketing mix. According to Kotler and Armstrong, (2000) a product is anything that can be offered to a market for attention, acquisition, use or consumption which might satisfy a want or need. It includes physical object and intangible objects. From the above conception petroleum and its bye products may include the following:

- Petrol
- Diesel
- Kerosene
- Aviation Fuel
- Industry Fuel
- CNG
- Liquefied petroleum Gas (LPG)
- Lubes
- Others (Paraffin Wax, Benzene, Toluene)

Public sector oil marketing companies IOC, BPCL and HPCL are engaged in marketing of major petroleum products in Indian and overseas market with subsidiaries. For marketing LPG separate sections are there similarly for petrol and diesel Retail outlets based on different distribution patterns with government norms. These OMC are distributing LPG as auto fuel with separate and combined outlets. IOC is having 15 Auto LPG dispensing stations (ALDS). Keeping in mind intense competition ministry of petroleum & natural gas instructed OMCs (letter No.P-19011/5/2005-IOC) for making guidelines on reconstitution need to be made more flexible, objective and transparent. In order to provide commercial freedom to the OMCs, post-Administered Pricing Mechanism (APM) regime in the petroleum sector, it was decided by this Ministry vide its letter of even number dated 9.9.2003 that the OMCs should decide their own policy and procedure for operating those retail outlets, where sites had been procured and facilities created, or which had been withdrawn because of close of dealerships, on Company-Owned-Company-Operated (COCO)/ ad hoc basis till regular dealers were appointed. However, this could not be formulated by the OMCs uniformly on industry basis so far (No.P-19011/9/2001-IOC).

**Table 1: Year wise position of IOC's marketing network**

Description	As on 31.3.2009	As on 31.3.2010	As on 31.3.2011	As on 31.12.2011
Petrol diesel Stations (RO)	18276	18643	19463	20181
Terminal & Depots	167 <sup>ii</sup>	140	140	139
Aviation Fuel Stations	101	98	96	96
LPG distributors	4999	5095	5456	5731
Towns with Indane	2693	2764	2947	2996
Indane Customers(Millions)	53	57	61.8	65.7

Source: Annual Report 2011 of Ministry of Petroleum & Natural Gas

**Table 2: Marketing and Distribution Profile of HPCL**

Distribution Channel	Number	Distribution Channel	Number
Retail Zonal offices	7	LPG Distributorships	2776
Retail Regional offices	50	LPG customers (lacs)	350.8
Retail outlets	10723	CNG Outlets	151
SKO/LDO Dealerships	1638	Aviation Fuel stations	33
LPG Bottling Plant	44	Direct sales Regional Offices	19
LPG Bottling capacity (TMTPA)	3475	Lube distributors	172
Commissioning & forwarding agents	83	Exclusive Lube depots	23

Source: Annual Report 2011 of Ministry of Petroleum & Natural Gas

In any established organization, decision about how to distribute products and services to ultimate consumers are among the most the important decisions confronting management because distribution decisions must be made in terms of various and sometimes divergent objectives and strategies. Under such situations, Kotler and Armstrong (2000) suggested that distribution decisions should be guided by three overall criteria as follow:

- Market coverage i.e. the size of the potential market that needs to be served
- Control i.e. control over the product and;
- Costs i.e. fixed and variable

Petroleum products distribution is therefore concerned with the movement of refined petroleum from the refinery

to the final consumers across various locations of delivery in the country. In the Indian situation, the pipelines and products Oil Marketing Company responsible for the wholesale supply, distribution and marketing of petroleum products in India. Until recently, the petroleum products available for distribution were through an elaborate, network of pipelines inter connected to widely dispersed depots across the country. The products may be obtained from the four local refineries or in the event of a supply short-fall from off-shore refineries by way of imports. In addition to pipelines, some twenty marine tankers are us.

#### **Pricing and Subsidies in Petroleum products:**

Three petroleum products, namely PDS kerosene, domestic LPG and diesel are sold for less than

international market prices, with the government providing a fiscal subsidy on LPG and kerosene. The subsidy, however, covers only a part of the difference between the cost price (including marketing costs) and the selling price of these three petroleum products, thereby resulting in “under-recoveries” for the OMCs. Under-recoveries are calculated as the difference between the cost price and the regulated price at which petroleum products are finally sold by the OMCs to the retailers after accounting for the

subsidy paid by the government which can be explained as below<sup>iii</sup>:

**Domestic LPG and PDS Kerosene**

$$\text{Cost Price} - \text{Depot Price} - \text{Fiscal Subsidy} = \text{Under-recovery}$$

**Diesel**

$$\text{Cost Price} - \text{Depot Price} = \text{under-recovery}$$

**Table 3: Subsidies and under recoveries (2010-11)**

Fiscal Subsidy	INR Crore (US\$)	Under recoveries	INR Crore (US\$)
<b>PDS Kerosene</b>	931 (204)	Domestic LPG	21772 (4777)
<b>Domestic LPG</b>	1,974 (433)	PDS Kerosene	19484 (4275)
<b>Total</b>	2904 (637)	Petrol	2227 (489)
		Diesel	34706 (7614)
		<b>Total</b>	<b>78 190 (17154)</b>
<i>Government cash assistance</i>	41000 (8995)	<i>Borne by OMCs</i>	6893 (1512)

Source: Report published by Ministry of Petroleum & Natural Gas (2011)

**Demand forecasting of Petroleum Products.**

Forecasting demand is crucial to all OMCs in petroleum distribution industry. The whole order cycle for an important distribution terminal is possible to forecast. Knowing the total demand is not sufficient for a distribution system. It is essential to know where and

when customer demand to be satisfied. The planning and effective operation of petroleum products requires the use accurate, dis-aggregated demand forecast. Demand forecast by demand methods, such as time series analysis, judgment Approach and experimental approach can be done.

**Table 4: Estimates of domestic Natural Gas Production-12<sup>th</sup> Plan**

Company	2012-13	2013-14	2014-15	2015-16	2016-17	Total
<b>ONGC</b>	24.9	25.5	26.7	28.2	38.7	<b>143.9</b>
<b>OIL</b>	3.1	3.8	4.0	4.1	4.2	<b>19.2</b>
<b>Pvt./JVs</b>	15.0	14.5	16.5	18.5	21.0	<b>85.5</b>
<b>Total</b>	<b>43.0</b>	<b>43.8</b>	<b>47.2</b>	<b>50.8</b>	<b>63.9</b>	<b>248.6</b>

Source: Report of Ministry of Petroleum & Natural Gas (Economic Division)

**DISCUSSIONS AND FINDINGS**

The limits of its production and its ever increasing demand and also the issues related to energy security of nations are at the centre stage of global forums, amongst the most important challenges faced by the planet today (Radhika, 2004). Marketing has always been considered as a tool for markets with imperfect competition, where many sellers fight for consumers, they have differentiated products and lots of advertising and sales promotion various prices might also prevail in these markets (Plamer, 2004). Selling of petrol in India was anything but not about marketing. Since, none of the characteristics of Indian Petroleum Market of that time coincides with the characteristics of markets with imperfect competition. For example – during that time, the petrol selling companies need not fight for consumers and they (petrol selling companies) offered exactly the same product to the consumers (characteristic of a commodity) and that too at the same price. In other words, the history of marketing of petrol in India was defined and characterized by extreme government control and protectionism. Not only the marketing function, but all aspects of petroleum business, (exploration, refining, distribution or selling) were strictly regulated and

protected. But, recently a big paradigm shift is taking place in the way petrol is being marketed (Anurag, 2007) . The study also aims to trace the trends in the petroleum distribution in Indian context, i.e., to understand the changing dynamics of marketing and distribution in the Indian petroleum industry, taking a case of price and demand nexus. The above study is just a snapshot of the sizzle that the petrol distributing industry is going through, it is this significant change in the scenario of petrol distribution in India, which has attracted a lot of attention of the policy makers in India. It’s uncertain that what the future beholds but one thing is for sure that marketing and distribution of petrol is quiet a challenging task for policy makers, OMCs and government.

**REFERENCES**

Anurag, D. (2007). Marketing of petrol in India – transformation of an undifferentiated low involvement commodity into high involvement brands. *Innovative Marketing, Volume 3, Issue 4, 52-59.*

- Cafaro, D. C., & Cerda, J. (2004). Optimal scheduling of multiproduct pipeline systems using a non-discrete MILP formulation. *Comput. Chem. Eng.*, 2053-2068.
- Jyoti Parikh, Pallav Purohit, Pallavi Maitra, (2007) Demand projections of petroleum products and natural gas in India. *Energy*, Volume 32, Issue 10, 1825–1837
- Kotler P, (2000). *Principles of Marketing*. New Jersey: Prentice Hall Inc.
- Nikisha K. Shah, Zukui Li, and Marianthi G. Ierapetritou.. *Petroleum Refining Operations: Key Issues, Advances, and Opportunities*. American chemical society.
- Nottingham, R., (2004). *Energy Market Strategic Practice*. New York Isherwood Products Inc.
- Plamer. (2004). *Introduction to Marketing: Theory and Practices*. New Delhi: Oxford University Press.
- Radhika. (2004). The Evolution, Growth and structure of the global oil industry. *The Effective Executive*.
- Rejowski, R., & Pinto, J. M. (2002). An MILP formulation for the scheduling of multiproduct pipeline systems. *Braz. J. Chem. Eng.*, 467-474.
- Raghavendra D Rao, Jyoti K Parikh, (1996). Forecast and analysis of demand for petroleum products in India. *Energy Policy*, Volume 24, Issue 6, 583–592
- Ministry of Petroleum & Natural Gas, 'Review of marketing guidelines' November 2005
- Ministry of Petroleum & Natural Gas, 'Reconstitution of Retail Outlet dealerships/LPG Distributorships /SKO-LDO dealerships' October 2008
- Ministry of petroleum & natural gas, Annual Report, 2011-12.
- Ministry of Petroleum & Natural Gas, 'Operation of retail outlets of OMCs on COCO basis' September 2006
- The Hindu Business Line, May 4, 2009, 'The strategic East-West gas pipeline' article
- Ministry of petroleum & natural gas citizens/clients charter 2011-12 available at [www.petroleum.nic.in](http://www.petroleum.nic.in)
- Ministry of Petroleum and Natural Gas. (2011). *Report of the working group on Petroleum and Natural Gas sector for the 12th five year plan (2012-17)*. New Delhi: GOI.

---

<sup>i</sup> The Expert Technical Group was appointed by Government of India vide its order No. P-20029/21/95-PP dated June 25 1996 with the following primary objectives: a) re-examination of the notion of retention mechanism in the oil sector; b) examination of the feasibility of introduction of notional import-parity concepts for pricing of crude oil and petroleum products in the country in order to promote competitiveness and cost-effectiveness in the petroleum sector ; c) examination of the impact on various sectors at different levels of duty structure in case of dismantling of APM; and d) any other allied matters

<sup>ii</sup> After merger of IBP with IOC, the terminals & Depots of the two entities were rationalized to remove duplication and improve efficiencies.

<sup>iii</sup> Adapted from the price build-up published by Petroleum Planning and Analysis Cell (PPAC)