

**PUBLIC ENTERPRISES, GOVERNMENT POLICY  
AND  
IMPACT ON COMPETITION**

**INDIAN PETROLEUM INDUSTRY**

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# I Introduction

This paper is about the Indian petroleum refining industry. But this industry is extremely open; trade flows are large compared to production. And there is considerable overlap between oil production and refining internationally, and to some extent in India. So we begin with a brief discussion of the international petroleum industry and its components – refining being one of them.

Petroleum is extracted from underground reserves; then it is cracked or “refined” into end products for various uses. The petroleum industry thus has two parts: an oil exploration and production industry upstream and a refinery industry downstream. Most oil producers also own refineries. But the reverse is not true; a high proportion of oil is sold to refinery companies that do not produce crude oil.

Sedimentary rocks in which hydrocarbons are trapped often hold gas, sometimes in association with crude oil and sometimes alone. It consists mostly of methane, which is lighter than air and toxic. It therefore requires airtight tanks for storage and similarly leak-proof pipes or trucks for transport, which raise its capital costs. Associated gas was flared in early years of the industry; it is still flared at remote or minor wells where the cost of its collection and transport would be high, or often reinjected into the oilfield to maintain pressure which forces oil up to the surface. But where the quantities are large enough, natural gas is mined and traded. It is mainly used as an industrial, domestic and vehicular fuel.

Motor vehicles run almost exclusively on petrol and high-speed diesel oil, both fuels derived from mineral oil – although they can be modified to run on certain biofuels. Vehicles are so widely dispersed that they require an extensive distribution system for these two refinery products. As motor vehicle use has spread across the world, it has brought along with it petrol pumps, logistics, storage and supply of fuels. There is thus a third part of the petroleum industry downstream from refineries which distributes the products. It is owned by refineries in most countries. But this is not inevitable. Some countries have distribution chains that are independent of producers and refiners; and in countries which do not have refineries, distribution is undertaken by either local or foreign oil companies.

Oil has collected in pools and seeps for thousands of years. The Chinese are recorded as having extracted oil from wells 800 feet deep through bamboo pipes in 347; they used it to evaporate brine and make salt. American Indians used to put it to medicinal uses. Persians, Macedonians and Egyptians used tars to waterproof ships. Babylonians used asphalt in the eighth century to construct the city’s walls, towers and roads. But the easily available oil was not put to any mass use because the crude itself was not a good fuel; it gave out much soot and smoke. A distillation process using a retort was invented by Rhazes (Muhammad ibn Zakariya Razi) in Persia in the 9<sup>th</sup> century; liquid heated in it vapourized, passed through a curved spout and condensed in another container. The process could be used to make kerosene; but it was more often used to make alcohol and essence of flowers for perfume. It was a batch process, its fuel consumption was high, and it was not equally efficient at distilling kerosene from all crudes.

A more efficient and reliable distillation process came out of a series of inventions after 1846. The last invention was the invention of oil fractionation in 1854 by Benjamin Silliman, a professor of science in Yale. It used a vertical column which separated components more efficiently, and which could be used continuously.

Oil was first produced in Titusville, Pennsylvania (USA) in 1859 by one Edwin L Drake, who refined it into kerosene, which was then used as an illuminant. Electricity did not emerge as an illuminant till the Edison Electric Light Company was founded in 1878. Well into the 20<sup>th</sup> century, kerosene, gas and electricity continued to compete as illuminants. Whilst the use of gas as an illuminant has virtually disappeared, a large population, especially in India, continues to use kerosene as illuminant.

The invention of the motor car by Karl Friedrich Benz in 1885 created a market for petrol, a new refined product (petrol is called Benzin in Germany, but is not named after Karl Benz). In 1898, Rudolf Diesel invented an engine in which oil was ignited by compression; the diesel engine he invented came to power larger vehicles, principally trucks and buses. Diesel engines used a different fuel, which was named diesel oil. After this, the production and use of motor vehicles spread rapidly in the United States, especially after 1908 when Henry Ford began mass manufacture of his Model T; and petroleum and diesel oil became the most important refined products, first in the US and progressively across the world.

However, only a certain proportion of crude oil can be converted into motor fuels. The demand for kerosene, the original distillate extracted from crude oil, has gone down with the spread of electricity. So other refined products have been developed, and non-vehicular uses developed for them. Some of the products differ little from motor fuels; for instance, naphtha, extensively used to make nitrogenous fertilizers and chemicals, is little different from petrol; and jet fuel is very similar to kerosene. Thus, refineries find markets for their products in many industries other than motor transport (**Appendix-table C4**).

### ***The Industry in India***

India imports three-quarters of the crude it refines (**Appendix-table D1**). It exports refinery products (**Appendix-table E2**); its net exports are roughly ten per cent of production. The government operates an elaborate set of cross-subsidies to insulate domestic from international prices; such cross-subsidies have serious effects on the finances of the Indian companies (**Appendix-table I2**) involved, and influence competition amongst them. The oil companies, both public and private, are so large a part of the economy that the cross-subsidy regime cannot be sustained in all circumstances; sooner or later, the government has to bring domestic prices closer to international prices. Hence the state of competition in the international market and international prices are important for the domestic market.

In Section II, which follows, we give an introduction to refinery technology, products, and the markets they serve. In Section III, we briefly describe the global exploration, production and refining industries. In Section IV, we describe the Indian market structure in terms of the companies operating in it, their products and markets. In Sections V, VI, VII and VIII, we outline the market structure in exploration and production, user industries, refining and gas respectively. In Section IX, we turn to the major barriers to competition and to the steps that need to be taken if greater competition is to be introduced in the domestic market for refined products.

## II Refinery Technology and Products

This section provides a brief overview of the technology and production process. An understanding of these issues is critical as it helps understand industry structure.

Crude oil is a liquid mixture of hydrocarbons – chemical compounds consisting roughly of six parts of carbon and one of hydrogen, both of which are fuels; it generally also carries small quantities of sulphur, salts, metals, oxygen and nitrogen. It was formed from organic remains accumulated undersea and eventually trapped in sedimentary rocks; these rocks are where crude oil exploration is concentrated. Generally the oil is compressed, and gushes out if a pipe is pushed into an oil-bearing trap. But as it is extracted, the pressure diminishes, and it is often artificially reinforced by injection of air or water into the reservoir to push up the oil.

Crude oil contains hydrocarbons that vary in their boiling point; refining is a process in which crude oil is heated in a vacuum until it evaporates and then allowed to rise up a column. Different hydrocarbons liquefy at different temperatures and can be collected at various heights in the distillation column.

In the basic refinery process, crude is heated to 600°C by injection of superheated steam and pumped in at the bottom of a vertical distillation column. As the vapour rises up the column, it cools. The column has trays at various heights with holes. As the vapour cools, fractions with different boiling points liquefy, collect in the trays and are drained off; products with high boiling points rise to the top, while products with low boiling points collect on lower trays. The principal products, with their approximate boiling points, are petroleum gas (20°C), naphtha (40°C), petrol (70°C), kerosene and jet fuel (120°C), diesel (200°C), lubricant (300°C), and furnace oil (370°C); solid petroleum coke collects at the bottom after the liquid fractions are removed.

The proportions in which these products come out vary to an extent with the crude; crudes are classified as light or heavy according to the proportion of light products. But the balance of demand and supply for the products is such that the prices of furnace oil are much lower than those of light products such as petrol, kerosene and diesel oil. In August 2008, international prices of residual fuel oil ranged from \$2.29 to \$2.48 a gallon; the corresponding range was \$2.68-3.05 for petrol, \$3.06-\$3.29 for diesel oil, and \$3.18-\$3.38 for jet fuel. So other technologies are employed to crack, alter or recombine molecules and make lighter hydrocarbons from residual fuel oil.

The principal products obtained from the primary refining and cracking processes are (**see Appendix - table B5 and C1 for product-wise production and consumption**):

**Liquefied petroleum gas (LPG)**, mostly a combination of butane and propane. It is heavier than air, and liquefies under pressure. It is used as a household cooking fuel, refrigerant, and vehicular fuel; 4 million vehicles are estimated to be powered by LPG in the world.

**Petrol** is used to fuel internal combustion engines, mainly vehicular. Its early use as a killer of lice and their eggs has completely disappeared.

**Naphtha** is used to make additives for high-octane petrol, and to make polymeric plastics and urea, a nitrogenous fertilizer.

**Aviation turbine fuel (ATF)** is the fuel used in propeller planes. It is akin to petrol.

**Kerosene**, also known as paraffin, is used as an illuminant and cooking fuel in India and other poor countries, and as a space heating fuel in industrial countries.

**Jet fuel**, used in jet planes, is closely akin to kerosene.

**High-speed diesel oil** is used in engines running at 750 revolutions per minute (rpm) or more. It is mostly used in diesel-powered vehicles

**Light diesel oil** is used in diesel engines running at lower speed – mainly irrigation pumps and generation sets.

**Furnace oil** is made by diluting residual fuel oil from refining with middle distillates such as diesel oil. It is used in boilers, bunkers, heaters, furnaces, or as fertilizer feedstock. Low-sulphur heavy stock (LSHS) is a variant of furnace oil.

**Lubricating oil** consists of greases and viscous oils used to lubricate moving parts in industry, automobiles, railway engines and carriages and marine engines.

**Paraffin wax** is used as an electrical insulator, for heat storage and in thermostats.

**Asphalt** is a black thermoplastic product that is used to make roads and sometimes for waterproofing. It is similar to tar, which is made from coal. Asphalt is also found in natural form; it was used to waterproof Egyptian mummies.

**Petroleum coke** is mostly used as fuel, but is also used to make electrodes and dry cell batteries.

Some petrochemicals are produced in large enough bulk to take a significant proportion of refinery products: the world consumed 345 million tons of hydrocarbons in 2004 to make 310 million tons of petrochemicals. Most of the hydrocarbons are first turned into one of three intermediates - ethylene, propylene and aromatics – before being converted to other products. Of the latter, plastics accounted for 225 million tons, and fibres for 38 million tons; solvents, detergents and synthetic rubber accounted for most of the rest.

### **III Global Oil Industry**

In the early years of the industry, oil or gas seeped out of the earth in many places; elsewhere it was discovered by accident while drilling for water. But such easy discoveries are long gone. Undiscovered oil is all underground, and oil exploration today uses considerable instrumentation – gravimeters, magnetometers, seismic reflectors and refractors – and stratigraphy, which is essentially correlation of available geological data. The data obtained are correlated to guess the location of rock formations and identify those that are most likely to contain hydrocarbons. Then rigs are used to drill into those formations. Drilling costs much more than geological tests; so oil companies invest heavily in geological investigation.

Oil production requires drilling a well into land or seabed. Land usually belongs to someone; if it is not privately owned, it belongs to the government. Similarly, maritime countries claim ownership of the continental shelves along their coastlines. If someone wants to explore for oil, he has to get permission to drill. If he finds oil, he will normally want first right of exploitation. So it is normal for explorers to make an agreement with the owner, called a concession, which lays down the rights of the concessionaire and the payments he would make for them. In the early years, when oil developments were small, it was generally enough to get a concession from a private owner or a number of neighbours. In the US, there were large unoccupied areas where companies could drill without anybody's permission.

But as oil is came to be extracted from deeper formations, investment went up, and exploration passed into the hands of companies which could raise capital. Also, a large area of concession became necessary to avoid disputes with neighbouring concessionaires. Such large areas required the intervention of governments. In the early concessions, governments played the role of landlords, and generally levied a royalty per barrel of oil extracted. For instance, the Shah of Persia gave a concession in 1901 to William D'Arcy, a rich Englishman, to prospect for oil in most of Iran for 60 years, for which he was promised £20,000 in cash, £20,000 in shares of the oil company and 16 per cent of profits. Standard Oil of California negotiated a concession with the King of Saudi Arabia in 1933.

**Table 1: Top twenty countries by oil consumption, 2007**

Country	GDP PPP	Consn	Output	Exports	Imports	Refining capacity	Reserves	Energy intensity
	\$trn2005						Million barrels per day	
USA	13.8	20.7	7.6	1	13.2	17	22	1.5
China	7	6.5	3.6	0.4	3.2	5.8	16	0.9
Japan	4.2	5.6	0.1	0.1	5.4	4.5		1.3
Germany	2.8	2.7	0.2		2.1	2.3		1.0
Russia	2.1	2.5	9.4	7	0.1	5.4	74	1.2
India	3.1	2.3	0.8	0.4	2.1	2.5	6	0.7
Canada	1.2	2.1	3.1	1.6	1	2	179	1.8
South Korea	1.2	2.1		0.6	2.3	2.6		1.8
Brazil	1.8	2	1.6	0.3	0.4	1.9	12	1.1
France	2	2	0.7	0.5	1.9	2		1.0
Mexico	1.3	1.9	3.4	1.8	0.2	1.5	12	1.5
Italy	1.8	1.8	0.1	0.5	2.2	2.3		1.0
Saudi Arabia	0.6	1.8	9.5	7.9		2.1	263	3.0
United Kingdom	2.1	1.8	2.1	1.5	1.1	1.8	5	0.9
Spain	1.4	1.6	0.3	0.1	1.6	1.4		1.1
Iran	0.8	1.5	4	2.5		1.6	133	1.9
Indonesia	0.8	1.2	1.1	0.5	0.4	1.1	5	1.5
Netherlands	0.6	0.9	0.1	1.4	2.3	1.2		1.5
Thailand	0.5	0.9	0.2			0.9		1.8
Australia	0.7	0.9	0.5	0.1	0.5	0.7		1.3
The rest	15.4	19.4	32.1	20.3	7.7	8.3		1.3
<b>World</b>	<b>65.2</b>	<b>82.2</b>	<b>80.5</b>	<b>48.5</b>	<b>47.7</b>	<b>68.9</b>		<b>1.3</b>
<b>Std deviation/Mean</b>	1.32	1.42	1.80	1.89	1.23	1.12	1.33	0.36

Sources: Oil: NationMaster.com. GDP PPP: World Bank

These concession agreements gave a relatively small share of the profits to the governments of oil-producing countries. But over the years, they either took shares in the concessionaire companies or nationalized them. By 2007, 77 per cent of oil production was in governments' hands; their share of reserves would be even higher, since the industries of countries with the largest reserves are all nationalized.

Table 1 gives production, consumption, trade and reserves of the top 20 consumers of oil. The figures are not entirely accurate, but they are good enough for the broad conclusions we seek. The 20 countries account for three-quarters of global consumption; the remaining 186 countries account for only a quarter. The US accounts for a quarter and the next five countries for the next quarter.

These twenty countries also account for three-quarters of the world's GDP (at purchasing power parity; that is, calculated at the same prices for all countries). It would thus seem that income is a major determinant of oil consumption. It is, but oil intensity is equally important. The last column shows oil consumption per unit of GDP. It tends to be high in oil-producing countries, especially if they have extreme climates like Saudi Arabia, Iran and Canada. It is low in developing countries like India and China. Amongst industrial countries, some like Britain, France and Germany have brought down oil intensity considerably. Many countries tried to increase energy efficiency after the first oil crisis of 1973; some did so more effectively than others.

The top 20 countries produce three-fifths of the world's oil. This is because the biggest consumers include most of the biggest producers – Saudi Arabia, Russia, the US, Canada, Mexico, Iran and Indonesia: oil producers tend to consume relatively more oil. Naturally, they are oil exporters as well. That is why the top 20 consumers account for three-fifths of the world's oil exports.

But being the largest consumers, they account for five-sixths of the world's oil imports. And they account for seven-eighths of the world's refining capacity. Oil refineries are more often sited close to consumption centres; so consuming countries have a larger share of refining capacity than of oil production. The ratio of standard deviation to mean confirms these conclusions. Production and exports vary most across the 20 countries. Consumption varies much less, and variability of imports is even less; the variability of both is comparable to the variability of GDP at purchasing power parity. Refining capacity has the least variability, and is most evenly spread across the countries. (Variability of reserves is also low; but this is because nine of the 20 countries have reserves close to zero.)

**Table 2: Top twenty countries by natural gas consumption, 2006**

World Natural Gas Production, Most Recent Annual Estimates, 2006 (Trillion cubic feet)								
Country	Output	Wasted	Reinjected	Marketed	Dry gas	Imports	Exports	Consn
United States	23.5	0.1	3.3	19.4	18.5	4.2	0.7	21.7
Russia	23.2	0.0	0.0	23.2	23.2	1.8	8.4	16.6
Iran	6.0	0.4	1.1	4.4	3.8	0.2	0.2	3.8
Germany	0.7	0.0	0.0	0.7	0.7	3.3	0.4	3.5
Canada	7.8	0.1	0.5	7.2	6.5	0.3	3.6	3.3
Japan	0.2	0.0	0.0	0.2	0.2	3.1	0.0	3.2
United Kingdom	3.0	0.1	0.0	3.0	2.8	0.7	0.4	3.2
Italy	0.4	0.0	0.0	0.4	0.4	2.7	0.0	3.0
Saudi Arabia	3.0	0.0	0.0	3.0	2.6	0.0	0.0	2.6
Ukraine	0.7	0.0	0.0	0.7	0.7	1.9	0.0	2.6
Mexico	1.8	0.1	0.0	1.7	1.7	0.4	0.0	2.2
China	2.1	0.0	0.0	2.1	2.1	0.0	0.1	2.0
Uzbekistan	2.2	0.0	0.0	2.2	2.2	0.0	0.4	1.8
France	0.1	0.0	0.0	0.1	0.0	1.8	0.0	1.8
Netherlands	2.7	0.0	0.0	2.7	2.7	0.9	1.9	1.7
UAE	2.6	0.0	0.6	1.9	1.7	0.0	0.3	1.5
Argentina	1.8	0.0	0.0	1.8	1.6	0.1	0.2	1.5
India	1.1	0.0	0.0	1.1	1.1	0.3	0.0	1.4
Thailand	0.9	0.0	0.0	0.9	0.9	0.3	0.0	1.2
Spain	0.0	0.0	0.0	0.0	0.0	1.2	0.0	1.2
All others	44.0	2.5	8.7	32.8	30.5	9.3	14.9	24.8
<b>World Total</b>	<b>127.8</b>	<b>3.4</b>	<b>14.3</b>	<b>109.3</b>	<b>104.0</b>	<b>32.6</b>	<b>31.6</b>	<b>104.4</b>

Source: US Energy Information Administration

Table 2 summarizes production, consumption and trade in natural gas for 2006. Incidentally, a barrel of oil has the energy equivalent of 6000 cubic feet of gas; so the 2006 global gas consumption of 104.4 trillion cft of gas comes is equivalent to 47.7 million barrels per day of oil – more than half the oil consumption given in Table 1. As will be seen, 2.7 per cent of the gas was flared or vented, and 11.1 per cent was reinjected into oilfields. The remaining 109.3 tcft contained other gases besides methane, liquid hydrocarbons and water; its methane equivalent was 104 tcft. Gas production and consumption show similar concentration to oil. One major difference is that Russia is the foremost producer, consumer and exporter of gas. West European countries are large importers; they import gas from Norway and the Netherlands, which extract North Sea gas offshore, as well as from Russia.

World gas reserves on 1 January 2005 were 180 trillion cubic meters or 6300 trillion cubic feet; 70 trcm or 39 per cent of them were offshore. Two-thirds of them belonged to three countries – Russia (26 per cent), Iran (15 per cent) and Qatar (14 per cent). Apart from natural gas, there are estimated to be 100-260 trcm of coal-bed methane, 402-442 trcm of tight gas (gas trapped in

dense sands), 42-45 trcm of shale gas and 13,000-24,000 trcm of hydrates (methane trapped in frozen water molecules)<sup>1</sup> .

These, in brief, are the production and market structures with which the Indian oil industry is necessarily connected because of its dependence on imports of crude as well as refined products. Oil production is extremely unequally distributed. Oil importing countries have to get oil from producers since the international wholesale market is not large enough to supply large consumers. Oil production is extremely unequally distributed, and oil exports even more so. The only countries with sizeable surpluses of oil are those in the Middle East – Saudi Arabia, Iran, Kuwait, Bahrain, and when its oil production facilities are restored, Iraq – and Russia. North Sea Oil, extracted by Norway, Britain and Netherlands, is mostly consumed within Western Europe; and Canadian and Mexican oil goes to the US.

There is no single market in oil. There are three types of oil distribution arrangements. First, there are oil markets in the US and Western Europe where common crudes of those regions are traded. Here the pricing is competitive, although some of the suppliers' market share is large. Next, considerable quantities of oil are sold through contracts of varying lengths. Prices would normally not vary in the life of these contracts, but they would in the long run take market prices as the benchmark. Many contracts provide for revision of prices depending on a change in international market conditions. Finally, a certain proportion of oil is allocated by governments at prices of their choice; these prices may or may not be aligned to international market prices.

India, like all big oil consumers, has enough refining capacity (**Appendix-table B4**). But since the output pattern of refineries seldom matches domestic consumption patterns, there have to be some exports and imports of refined products. As will be explained later, policy-induced distortions force export of some refined products for which there is a market in India – even some that are imported (**Appendix- tables D2 & E2**). And India has the choice of importing refined products instead of crude. So there are both imports and exports of refined products.

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<sup>1</sup> Armelle Saniere (2006): Gas reserves, discoveries and production. Panorama 2006. Institut Francaise du Petrole, Reuil-Malmaison, France. [www.ifp.com/content/download/56056/1266306/version/3/file/IFP-Panorama06\\_05-ReservesDecouvProd-VA.pdf](http://www.ifp.com/content/download/56056/1266306/version/3/file/IFP-Panorama06_05-ReservesDecouvProd-VA.pdf)

## IV Indian Oil Industry

As in the US, China and Iran, oil seeped out of the soil in India as well; British travelers in Assam reported such pools from 1825 onwards. Once fractionation technology was proved in the US, industrial refining of oil became feasible. Assam Railways & Trading Company Limited was registered in London in 1881 to exploit Assam's natural resources. It struck oil in exploitable volume near Digboi in 1889; at that point it transferred its oil interests to a separate company, Assam Oil Company. AOC built a refinery in Digboi in 1901. AOC was taken over in 1917 by Burmah Oil Company, which later became Burmah Shell and then Shell. Expanded and modernized a number of times, the Digboi refinery continues to function till today.

In 1938, AOC took a prospecting licence for 6,290 square miles in Assam. It ceded the concession after the War started in 1939, and resumed it in 1947. AOC struck oil in Naharkotia in 1953. By that time, however, the government of India had become paranoid about foreign ownership of business; there was a long standoff between it and AOC over the exploitation of the new oilfield. Finally in 1959, AOC and the government set up Oil India Limited, a 67:33 joint venture, to exploit the Naharkotiya oilfield; in 1961 it became a 50:50 joint venture.

Apart from the small refinery in Digboi, India did not produce refinery products when it became independent in 1947; it depended almost entirely on imports, mostly from Anglo-Iranian Oil Company's refinery in Abadan. Three companies sold the products through their distribution networks – Burmah Shell, Standard Vacuum and Caltex (now merged into Shell, Exxon and Chevron respectively). Burmah Shell was the largest, with an almost 50 per cent share of the market.

In December 1953, the Indian government entered a 25:75 joint venture with Standard Vacuum for survey of 10,000 square miles in West Bengal. The company did some gravimetric and seismic surveys, and drilled seven holes. It found some gas in some which it considered non-commercial; it did not find any oil. The general impression was that Standard Vacuum put little effort into prospecting in West Bengal. This could have been due to the incentive structure. Standard Vacuum had access to cheap crude from the Gulf; if it found oil in India, the government would force it to exploit it. Its cost was likely to be higher, and the company would either have earned lower profit margins or the government would have had to protect domestic refining; Standard Vacuum would have had to negotiate the level of protection.

The negotiations between Standard Vacuum and the government on the refinery threw up a large number of issues, many of which are relevant to the policy context today.<sup>2</sup> The following are important.

1. The company wanted a guarantee against nationalization for 30 years, later reduced to 25.
2. It wanted freedom to import crude. The implication was that it did not want to be forced to use domestic oil or oil that the government negotiated access to.
3. It wanted freedom to distribute its refinery products. It wanted to use its own distribution network to sell the products, and did not want to be forced to distribute through other networks, government's or otherwise. Price fixing is anterior to distribution; the company also did not want price control. It would price its refined products at landed cost of imports (including duty). Import parity would be with Mexican oil and products, not Middle Eastern. Import parity was understood to place a ceiling on prices.

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<sup>2</sup> A detailed if rather partisan summary of the negotiations between the government and the oil companies – principally Standard Vacuum – is given in H N Kaul, *K D Malviya and the Evolution of Indian Oil*, Allied Publishers, Delhi.

4. It wanted free access to foreign exchange for all practical purposes – crude, freight, equipment, services, dividend remittance, including crude and services bought from its foreign operations – to be valued at international prices.
5. It wanted no import duty to be charged on crude and on equipment not produced in India. There was an import duty on diesel oil; wharfage rates too were such as to give some protection. The company wanted that these levels of protection would not be reduced. It wanted an import duty on petrol equal to the excise duty plus 12 Paise per imperial gallon. Import duties applicable to the company should be no lower than those applicable to its competitors.
6. The tankers that brought in crude should be allowed to be used for coastal distribution of refinery products.
7. There should be no restrictions on local borrowings for equipment, construction and inventories.
8. Its capital investment would be given 10 per cent straight-line depreciation in the calculation of income tax.
9. The company wanted exemption of the Industrial Development and Regulation Act of 1951, which gave the government the authority to control industrial production, expansion and diversification. The government agreed; but Shell and Caltex did not get this assurance.

The government also wanted a number of things.

1. It wanted Standard Vacuum to set up a local subsidiary to build and run the refiner. Standard Vacuum was against it for three reasons: (1) The subsidiary would be subject to income tax; (2) it would have to pay sales tax on whatever refined products it sold to the distribution company; and (3) if the government placed controls on dividend payments, the subsidiary would be subjected to them. But eventually it did agree to set up a subsidiary. The government wanted the local subsidiary to issue shares to local shareholders; it issued a quarter of its capital of \$6 million to them in preference shares. The other two companies issued non-voting shares to local shareholders.
2. Should India discover oil, the government wanted the Company to promise to use it in preference to imports. The company agreed; price was unspecified.
3. The government reserved the right to impose and vary excise duties, but promised to maintain the existing differentials between excise and import duties. In other words, if it imposed or increased an excise duty, it would increase import duty by at least that much.
4. The government wanted the company to train and employ Indians.
5. The government had agreed at independence to continue pooling dollars with the Commonwealth; at the same time, the British government owed it a large debt, termed sterling reserves, for supplies during the War. So it wanted Standard Vacuum to buy crude and other importables from the Sterling Area as far as possible. The company agreed, since AIOC, the company that produced oil in Iran and Kuwait, was British and would accept Pounds.
6. In the event of the government acquiring tankers, it wanted the company to use them in preference to other tankers. The company agreed, subject to the use of its own tankers and prior contractual commitments.
7. The government wanted the company to give priority to local purchases over imports; the company agreed.

The negotiations continued for three years, but no agreement emerged. The oil companies prevaricated. The government suspected that the oil companies were happy with the import of refined products from Abadan refinery, which they sold in India at certain and high profits. But after Iran nationalized the Abadan refinery in May 1951, India looked a safer country to operate

in. In November, Standard Vacuum signed an agreement with the government to set up a refinery. Burmah Shell and Caltex followed in the next two years. Esso's 25,000 bpd refinery was inaugurated in Bombay in 1954, Burmah Oil Company's 30,000 bpd refinery went onstream in Bombay in 1955, and Caltex's 10,000 bpd refinery went up in Vizagapatam in 1957.

The government was frustrated with the experience of negotiations with the three oil companies. In the 1950s, the government took a number of steps to reduce dependence on foreign oil companies. In 1956, it set up Oil and Natural Gas Commission to explore for oil, and brought in Soviet and Rumanian rigs and crews to prospect for oil. The two areas chosen were the Cambay area in Gujarat and the Jawalपुरi-Janaur area in what is now Himachal Pradesh. The Soviet crew considered Gujarat more promising, and drilled there first. The first well was spudded on 25 July 1958; on 24 September it struck oil under 150 atm pressure at 7000 feet. Further exploratory drilling led to the discovery of Ankleshwar and Kalol oilfields in 1960, and suggested that the oil-bearing strata extended offshore to what came to be known as Bombay High. Oil from this area was the foundation of ONGC's emergence as an oil producer. Gas too was found in and off Gujarat, both associated and non-associated.

In 1984, the government separated ONGC's gas business and gave it to a separate subsidiary, Gas Authority of India Limited (GAIL). GAIL built a pipeline from Hazira on the Gujarat coast to Delhi, and supplied gas to government-owned power stations and fertilizer plants on the way. It also set up joint ventures with government oil companies and state governments to supply gas to Bombay and Delhi for transport and domestic fuel, and to Andhra Pradesh for transport. In 1987 it set up Petronet, a joint venture with three other government oil companies, to import LNG from Qatar. Pricing and distribution of public sector gas are entirely decided by the government; there is no element of market in this area.<sup>3</sup>

The Soviet surveys had shown the oil-bearing structures of Gujarat extending into the sea in 1964-67, but the Soviets did not have the technology for offshore exploration or production. In 1974, a Japanese survey ship leased by ONGC discovered the prolific Bombay High offshore field. It has been the mainstay of ONGC's business since then.

Once oil was discovered in Gujarat, the government had to think about how to exploit it. In 1958, it set up Indian Refineries to set up refineries. In 1959, it set up Indian Oil Company to undertake distribution. The two were later merged into Indian Oil Corporation. IOC was given a monopoly of imports of refinery products; with that, it soon overtook the three foreign companies in distribution. Thus the foundations of the government-owned oil industry were in place by 1961.

A 2mtpa refinery to process Gujarat crude was built with Soviet help in Koyali, Gujarat in 1966. But Gujarat crude could not meet the growing national demand. So in the 1960s, the government took to building coastal refineries in joint ventures with foreign companies. The 2.5 mtpa Cochin refinery came up in 1966 with investment from Phillips Petroleum, the 2.5 mtpa Madras refinery went on-stream in 1969 with participation from AMOCO and National Iranian Oil Company, and the lubricants plant of Lubrizol India came up in Bombay in 1969 with participation of Esso.<sup>4</sup>

In 1960, US President Dwight Eisenhower introduced oil import quotas favouring Mexico and Canada and discriminating against Middle Eastern producers and Venezuela. This upset the latter. In September 1960, Iraq, Iran, Saudi Arabia, Kuwait and Venezuela got together to "coordinate" policies and formed the Organization of Petroleum Exporting Countries. The organization was just a talking club for ten years. But in 1970, OPEC resolved to raise its members' share of oil revenue to 55 per cent, and began negotiations with oil companies to effect the increase. There followed a spate of measures by which Middle Eastern oil producing countries nationalized or imposed revenue shares on oil producing companies, or cancelled concessions. Oil concessions were nationalized by Algeria in 1971, Iraq in 1972 and Kuwait in 1976-77. Libya nationalized a number of oilfields held by foreign companies between 1971 and 1976, and took an 85 per cent share onshore and an 81 per cent share in the oilfields of others.

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<sup>3</sup> Cf Mike Jackson (2005): Natural gas sector reform in India: case study of a hybrid market design. Stanford Program on Energy and Sustainable Development. Working Paper 43, July.

<sup>4</sup> C S Venkataratnam and Anil Verma, *Challenge of Change*, Allied Publishers, Delhi 1997.

(Iran had nationalized the British-owned Anglo-Iranian Oil Company in March 1951.) The Saudi King threatened Arabian American Oil Company (Aramco) with nationalization with 1950 and got a half-share in profits. He acquired a 25 per cent share in Aramco in 1973, increased it to 60 per cent in 1974, and took full ownership of the company in 1980. Kuwait nationalized its oil industry in 1975, Bahrain took a majority share in its concessionaire oil company in 1980.

After the 1967 war between Israel and Palestine, Arab members of OPEC formed Organization of Arab Petroleum Exporting Countries. Israel defeated Egypt and Syria in the Yom Kippur war in 1973. Enraged, OPEC raised the price of its crude from \$3 to \$12 a barrel, and made it effective by cutting supply. After this, oil producing countries realized that they could raise their revenue by raising the price of their crude. So they started increasing prices without coordination.

While the nationalizations of the 1970s did not immediately disrupt the relationships between oil producing countries and their licensee foreign companies, they introduced extreme uncertainty in the companies' business environment. Their attempts to cope with this uncertainty changed the world oil industry in three major ways.

1. The companies began to explore for oil in more difficult environments such as the North Sea, Gulf of Mexico, and the Caspian Sea. Exploration in these fields was more expensive. So smaller companies failed or were bought up; the industry got more concentrated.
2. The governments of the US and Britain did not control oil produced in their jurisdictions in the way the Middle Eastern oil producers did. So oil produced in Texas, Gulf of Mexico and the North Sea began to be traded on commodity markets. For the first time, an open market in crude emerged. Quotations for crude such as Brent
3. Till the 1970s, refineries were tailored to a single crude source, and generally produced a limited set of products. The uncertainty of crude supply led refiners to design or modify refineries to take a broader variety of crudes and make a greater range of products. Not all refineries did; refineries are quite durable, and many refineries remained unchanged. Many closed down. But catalytic cracking technology developed to make refining more flexible.<sup>5</sup>

As oil producing countries increased their share of profits and oil at the expense of foreign oil companies, the oil supplies they controlled went up and those of oil companies went down. In the circumstances, the main reason for having foreign oil companies operate refineries in India – namely, their access to crude – disappeared. In 1976, India nationalized the three refineries owned by Shell, Caltex and Esso. In 1981, the government bought out Burmah Oil's 50 per cent stake in Assam Oil Company. With the nationalizations, the entire Indian oil industry passed into government hands, and came to be run as a part of the government.

In 1977, the government introduced an Administered Price Mechanism, to be operated by an Oil Coordinating Committee. The ministry of petroleum fixed so-called retention prices designed to give oil producers 15 per cent and refiners 12 per cent on their net worth. And it set administered prices at which products were sold to consumers. The difference between the revenue and dues of an oil company went its account with OCC. So overall, the price level was cost-plus; but the government could cross-subsidize individual products at will.

It was the oil companies' practice to construct their own petrol pumps and give them to dealers to run. Under the private companies, dealerships were given to trusted associates, and they became a part of the companies. After nationalization, the government decided to set up a fairer system. In 1983 it set up four Oil Selection Boards; each board had a retired judge and one other member. An SC/ST member was added in 1993. Oil pumps made good profits with little investment on the part of the dealer and at low risk. So many more people wanted pumps than could get them, and recommendations and corruption were rampant in their allocation. In January

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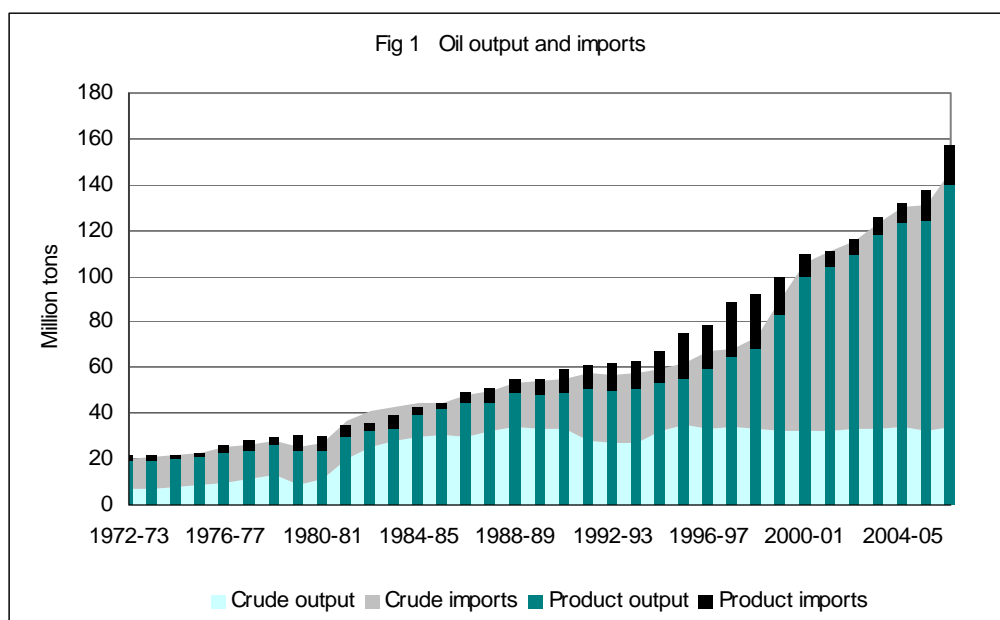
<sup>5</sup> Jerome Davis, *The Changing World of Oil: An Analysis of Corporate Change and Adaptation*. Ashgate, London, pp 1-10.

1996, a PIL led to a court enquiry, which revealed that the personal assistant of Satish Sharma, the petroleum minister, got oil companies to give pumps to relatives and friends of politicians, and charged others money. The same scandal continued under the ensuing BJP government, and blew up in 2002; Prime Minister Vajpayee cancelled all the 3850 allotments made in the previous two years. There has been no public scandal since then, but that does not necessarily mean that the system works any better now.

## V Competition in Exploration

From 1979 onwards, the ministry of Petroleum began to invite international bids for exploration and development from time to time. Nine rounds of bidding were held till 1997; 32 blocks were awarded for exploration and 30 for development. In 1997 they produced 3 mtpa of crude and 7 mcmd of gas. But since refining and distribution were government monopolies (**Appendix-table B1**), the licensees had to sell their oil and gas to the government. Negotiations with the government were protracted and involved each time. So the rounds attracted little international interest. In the meanwhile, the government monopolies could not increase production and refining capacity to keep up with demand (**Appendix-table A2**). Between 1985-86 and 1995-96, the import ratio went up from 31 to 44 per cent for crude and from 7 to 27 per cent for refined products.

The policy of government ownership and control of oil was a part of a socialist approach which applied to all economic policies. These policies became discredited when a serious balance of payments problem arose in 1989-91; a new government elected in 1991 overhauled many of the policies. It appointed two committees in 1994-95: one under the chairmanship of U Sunderarajan was asked to examine replacing administered by market-determined prices, and a strategic planning group on restructuring of the oil industry (R Group) was asked to look at the structure and organization of the industry. The story of which of their recommendations influenced policy and how far is convoluted; but the government made the following major policy changes.



The government announced a New Exploration Licensing Policy in 1997, which differed from the old one in the following respects.<sup>6</sup>

- 1 Bidders were to compete on cost recovery – they could ask for up to 100 per cent – and on their share of profit petroleum.
- 2 They were free to sell their share of the oil to anyone within the country.

<sup>6</sup> R K Narang, Ardhendu Sen and Leela Srivastava, Background paper: Issues in deregulation of oil and gas. In Leela Srivastava and S K Sarkar, *Transition to a Liberalized Environment: Experiences and issues in Liberalization*, Teri Press 1999, pp 411-426.

- 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 licence could be assigned to third parties under conditions.
- 6 A Conciliation and Arbitration Act passed in 1996, based on the model set by United Nations Commission on International Trade Law, would apply to disputes.
- 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.

Under the New Exploration Licensing Policy, six rounds were held and 162 production-sharing licences were given till 1 April 2007, against 28 before the introduction of NELP. Of the licences, 77 per cent were offshore, and 53 per cent were to government companies. The sedimentary area explored went up from 50 per cent in 1995-96 to 85 per cent in 2006-07 of the total 3.14 square kilometers (1.79 million onshore and up to 400 meters offshore, 1.35 million deep-water beyond 400 meters). Well explored area went up from 15 to 20 per cent, poorly explored area from 17 to 21 per cent, and area being explored from 18 to 44 per cent. These figures suggest that many licensees were sitting on concessions because they did not see a satisfactory path to profitable exploitation of discoveries, or were negotiating such a path.

A seventh round of NELP was opened on 1 April 2008. In July, six multinational companies (Chevron and Conoco-Phillips of the US, Britain's BG (British Gas) and BP (British Petroleum), Canada's Niko and Anglo-Dutch Shell) wrote to the government to say that they would not bid if the regulatory framework remained uncertain and the government did not adhere to contractual arrangements. Instances of such were (1) the Enron affair, in which Maharashtra government reneged on a contractual obligation to buy electricity at a fixed price (it was saved from litigation by Enron's liquidation on account of fraud committed by the company in its home country, US), (2) the government's taking away the contractual right of the owners of the Panna-Mukta fields – Reliance, British Gas and ONGC – to sell gas, and forcing them to sell it to GAIL at a price of its choosing to GAIL (the exploration contracts embodied freedom of sale and pricing), and (3) DGH's renegotiation of conditions embodied in the model production sharing contracts issued at the time of announcement of earlier rounds after bidders had invested money and found oil or gas. The companies were also of the view that DGH, which was supposed to be a regulator, acted more like an arm of the government. The government did not respond to the six companies' concerns; consequently, they did not take part in the bids.

In the event, of the 57 blocks on offer, 12 received no bids, and 19 received only one bid. Of the 45 winning bids, one was rejected by Cabinet Committee on Economic Affairs, resulting in 44 production sharing contracts. ONGC and its associates got 20 concessions. Thus, the round confirmed a decline in interest amongst international companies, especially experienced ones.

There is a more general disincentive to bidding in the fact that the bidders have to sell their production in India, which remains a market dominated by government companies; it is thus impossible to be sure that the concessionaire would get an internationally comparable price for his output. This is particularly obvious in the case of Cairn Energy, which bought a block in Rajasthan from Shell in 2002 and soon struck oil. The find in Barmer was far from the sea. It could be sold to Indian Oil Corporation, but negotiations have not borne fruit till now. The crude is waxy, and difficult to transport. Cairn has been drilling more exploration wells and raising its estimate of reserves. Now it is planning to lay a heated pipeline to Salaya and export the crude.

**Table 2: Oil and Gas Reserves on 1<sup>st</sup> April 2007**

	(Mtoe)			
	ONGC	OIL	Others	Total
Oil	4603	815	629	6047
Gas	1820	290	838	2948
<b>Oil in place</b>	<b>6423</b>	<b>1105</b>	<b>1467</b>	<b>8995</b>
Oil	1313	243	172	1727
Gas	982	151	511	1645
<b>Ultimate reserves</b>	<b>2295</b>	<b>394</b>	<b>683</b>	<b>3372</b>

Source: Directorate of Hydrocarbons

It is also probably true of Reliance, which first struck oil in Krishna-Godavari basin offshore, and later gas as well. In 2006, Niko Resources whom Reliance had called in as consultant estimated gas reserves at 1 trillion cbm. Reliance tried to sell the gas to power utilities on the south and east coast, but failed to reach agreement over the price. The power utilities are owned by state governments and make heavy losses. So their ability to pay is in doubt.

Thus, private entry was allowed in oil exploration and production in the 1980s, and private firms have discovered substantial oil and gas resources. But none has used them to enter domestic refining and distribution. This is because deregulation of the downstream industries has not kept pace with that of exploration.

Exploration and production costs vary enormously according to the location and depth of hydrocarbons and the size of reserves. There is a suggestion that the absence of competition makes it possible for the oil concessionaires to take bribes from suppliers of equipment and services in return of overpayments and to overestimate investment costs. The chief safeguard against this possibility is The Directorate of Hydrocarbons, whose block management committee approves all field development plans. When it awards E&P contracts, it looks at both costs and at the technological capacity of the applicant and his ability and willingness to save time, do a thorough exploration and bring reserves into production. Besides its own expertise, its comparison of competing bids would help it make a judgment on individual proposals. The expertise it acquires in evaluating bids should give it capacity to supervise PSUs' activities also. It is authorized to hire outside experts and consultants when necessary.

A suspicion that ONGC's costs had been padded arose in 2006. In April 2007, the allegation that Reliance Industries padded costs was made by the Communist Party of India (Marxist). ONGC pointed out that DeGolyer and McNaughton, an outside consultant, did a third-party audit of all its projects. Reliance got a third-party audit done by Gafney, Cline and Associates when the original discoveries were made, but was asked to get a new audit done.

There are two other authorities that check the proposed costs of public enterprises. They would be approved by the parent ministry. It does not have the expertise to make an informed examination; but that does not prevent it from examining the costs. It is also within its purview to take the help of international experts. The other is the Comptroller and Auditor General. He only makes an ex post examination long after the costs are incurred. He reports to Parliament, which can make the government take action on his report. Parliament committees obtain a reply to CAG's findings from the government, but there is no further action. Thus the safeguards within the government against overstatement of costs are not very effective.

What is crucial here is that there should be multiple competitors for concessions. This requires expertise in formulating invitations for exploration contracts. From the fact that most exploration contracts have gone to a handful of Indian companies – mostly government, some private – it can be inferred that there is little competition for them. The reasons are also clear: that the government restricts the discoverer's right to sell any oil or gas he finds in the world market, and that the dominance of public sector undertakings in the domestic refining industry makes it

impossible for a discoverer to get a fair market price for his oil. Hence if there is padding of costs, it is due to the restraints on competition placed by the government of India.

## VI Competition in user Industries

A major entry barrier into oil refining and gas is lack of competition in major markets for refined products. Government dominance of user industries and the losses it forces them to make limit their capacity to pay internationally comparable prices. Some of the user firms also suffer from endemic liquidity problems on account of their poor profitability, and delay payments for feedstock. Two such industries are important: electricity, which in other countries is an important market for gas and furnace oil, and fertilizer, whose preferred feedstocks are gas and naphtha. Overstatement of costs is not very effective.

The electricity industry is dominated by electricity boards, which are essentially departments of state governments and have no operational freedom. The prices they charge are decided by the governments, and are fixed at unremunerative levels. As a result, they depend for investment funds on state governments, which are themselves in no great financial shape. Owing to their unprofitability, they are often short of liquidity and delay paying suppliers of fuel. Till 2004, they had run up enormous debts to coal and oil companies. Then the central government forced state governments to settle the debts as part of more general financial strengthening. The centre has the power and influence to force state governments to pay. Private companies would not be able to do so. Hence the electricity boards remain unpromising customers for gas or furnace oil produced by private companies.

The centre tried to break this impasse by passing the Regulatory Commissions Act in 1998. It appointed a Central Electricity Regulatory Commission and persuaded a number of states to set up their own ERCs. It also passed a new Electricity Act in 2002 which envisaged introduction of competition from the private sector. Under its persuasion, a number of states corporatized their electricity boards and separated generation and distribution. But despite all this activity, electricity pricing practices did not change. Electricity boards continued to be financially weak and hence poor customers for hydrocarbon products. As long as they remain unable or unwilling to pay, enterprises of the central government, in gas, oil and electricity, will have an advantage in collecting their dues from state electricity boards as against any private competitors that may come up.

The fertilizer industry produces nitrogenous, phosphatic, compound and mixed fertilizers. Of these, only nitrogenous fertilizers require hydrocarbon feedstocks; the normal feedstocks are gas and naphtha, which are first converted to ammonia and then into its compounds. Phosphatic and complex fertilizers were decontrolled in 1992, and nitrogenous fertilizers with low nitrogen content in 1994. But urea, which constitutes 85 per cent of nitrogenous fertilizer consumption, remains under control. It is administered by the Fertilizer Industry Coordination Committee, which is constituted entirely of central government secretaries except for two representatives of private plants.

FICC operates a retention price scheme. It collects output and cost figures from all plants, adds 12 per cent return on capital, and thereby arrives at the total realization required. It divides the realization by the nitrogen output to get nitrogen price, which is then used to derive the prices of various fertilizers. The difference between the prices and the costs is given to plants as subsidy or taken away as tax. A similar exercise is done to calculate total transport costs to the farmer, which are then so distributed between plants that farm gate price of urea is the same across the country.

While input costs rose, the ministry of fertilizers has hesitated to raise prices. The result is that it is paying an enormous fertilizer subsidy. To keep the subsidy down, it has endeavoured to keep input prices as low as possible. This is one reason why the government has tried to commandeer gas supplies from private producers and reneged on the freedom of pricing promised to them.

The domination of the electricity and the fertilizer industries by the central and state governments, the losses they make and the consequent pressure to keep input prices low make the two industries unattractive as customers. This is not so material to public enterprises whose losses are borne by the government, but their ability to bear losses gives them an advantage against

power plants, and discourages private investment in hydrocarbons. Unless electricity and fertilizer markets are decontrolled, this handicap of private hydrocarbon firms cannot be removed.

## VII Competition in Refining Industry

Refinery licences were given to the Birla group (jointly with Hindustan Petroleum Corporation, a subsidiary of IOC) in 1988, the Essar group in 1993, and Reliance Industries in 1996. The Birlas' Mangalore refinery was ready by 1999; it could not be started because HPC, whom the Birla group had taken in as partner for its access to market, refused to lift the products. Finally the Birla group sold off its 37.38 per cent stake to ONGC in 2003. The first phase of the Reliance refinery in Jamnagar was ready in 1999. Although Reliance got a licence for petrol pumps in 2002, it has sold only a small proportion of its petrol and diesel output through pumps; it has exported the bulk. In 2007, it sought and got 100% EOU status. It gave Reliance duty-free access to crude provided it balanced its total imports and exports. The Ruias' Vadinar refinery went onstream in November 2006. The delays were partly due to their legendary lack of finance; but they were also not in a hurry because they could not work out a feasible marketing strategy. Distribution has handicapped growth of private refining, and hence emergence of competition.

On 1 April 2002, the government announced the abolition of the Administered Price Mechanism and of the Oil Coordination Committee which administered the price controls. It introduced direct subsidies on kerosene and LPG (**Appendix-table H1**), and raised taxes on petrol and domestic crude (**Appendix-table G7**). The petroleum ministry issued retail distribution licences to ONGC, GAIL, OIL, Reliance Industries, Mangalore Refineries, Essar Oil and Cairn Energy. Of the licensees, only Reliance and Essar opened a significant number of pumps (**Appendix-table F3**). Reliance set up pumps which were shopping centres at the same time. On the highways, they also offered food, accommodation and baths to truck drivers. They sold 410 kiloliters a month on the average in 2005-06, against public sector outlets which sold 140 kilolitres. So although they had only 1432 outlets out of the total 30,000, their share of retail sales was close to 14 per cent (**Appendix-table F1**).

Then, on 27 March 2007, Reliance applied for the status of a 100% export-oriented unit; it got that status in February 2008. In 2007-08, its exports came to 60 per cent of its sales. On 24 March 2008, Reliance announced that it was closing down all its petrol pumps. The reason was that the government was subsidizing petrol and diesel sold out of its companies' pumps, but did not give the subsidies to private competitors. So retail sales were no longer profitable for Reliance. Essar did not take a public decision to close down pumps; it simply stopped regular supplies to its pumps. As Table 3 shows, its sales in 2007-08 were insignificant relatively to the market. Thus as from May 2008, retail sales of petrol and diesel oil are a government monopoly (**Appendix- table F2**); there is no competition.

One consequence of this lack of competition was the recurring shortage of diesel oil in Tamil Nadu between May and August 2008, when Reliance was exporting it at the same time. Reliance had no petrol pumps any more, so it could not have supplied the market. It could have sold diesel to public sector oil companies, but then it would have breached the conditions of its EOU status. The EOU category, introduced into the trade policy in the 1960s, has outlived its usefulness. While it is reasonable to exempt exports from domestic taxes, there is no reason to make that exemption conditional on minimum exports. It is not certain whether the segregation of exporters and domestic producers was useful when it was tried first; it has outlived its usefulness, and in the Tamil Nadu diesel crisis it proved counterproductive.

## VIII Competition in Gas Industry

Automotive fuels have to be reached to vehicle owners; hence oil refining companies cannot do without access to a marketing network. Gas, however, requires an expensive transport network in the form of pipelines; hence gas producers prefer to sell to as few consumers as possible, and prefer large buyers. Where gas has been available beyond industrial needs, it has been piped to households; but such domestic networks have been confined to cities. Unless pipelines of different suppliers get interconnected, there is no competition between them; each has a monopoly of supply to the customers connected to its pipeline. There is only one common carrier pipeline network in India. It has been built by Gujarat State Petroleum Corporation through two subsidiaries – Gujarat State Petronet, whose pipelines connect the cities of Gujarat, and Gujarat Gas, which lays retail connections within the cities.

It transports supplies from three sources to Bombay and cities of Gujarat: liquefied natural gas from Qatar that Petronet brings into Dahej, gas supplies from Gujarat Gas, a British Gas subsidiary, which in turn buys gas from ONGC and sells it across Gujarat, and GAIL's sales in Gujarat.

GAIL was incorporated in 1984 to evacuate associated gas from ONGC's Gujarat oilfields. Its most important gas pipeline is the Hazira-Vijaypur-Jagdishpur pipeline of GAIL which carries ONGC's gas output from Gujarat to a series of power and fertilizer plants from the Gujarat coast to Punjab. As its gas supply ran short, it also started taking Petronet's gas imports from Qatar.

Assam Gas Company, which is owned by the government of Assam, supplies gas to a fertilizer plant, a petrochemical plant, four power stations, 250 tea gardens, 400 industrial establishments and 20,000 domestic consumers.

Reliance, which found considerable gas offshore in the Krishna-Godavari field starting in 2003, has not laid pipelines to evacuate the gas because it has not yet finalized customers. As shown in Chapter VI above, the two industries that are major potential customers, electricity and fertilizers, are owned by the central and state governments. Most of the enterprises in them make losses which are financed by governments; it would be impossible for new private plants to compete with these plants. Since these markets are closed, the only feasible option for Reliance is to sell its output to GAIL at whatever price it can get, and let the government distribute it to plants of its choice.

## IX Conclusion

In 2007-08, India's five largest companies in terms of sales were oil companies. Four out of five were owned by the government. The sales of the sixth – Essar Oil – were negligible. Reliance's share of sales was 17 per cent of all the oil companies' sales, but 60 per cent of its output was exported. So it does not require much analysis to conclude that the Indian oil industry is an oligopoly, and that it is dominated by government firms (**Appendix-table F1**). The retail market for petrol and diesel is almost entirely a government monopoly. This monopoly also affects exploration and production, for as we have seen, a number of companies that have struck oil or gas cannot find a domestic market because of the government's monopoly of distribution. How can this situation be changed, and competition be introduced?

**Table 3: India's oil companies' revenues, 2007-08**

Company	Rs billion	Per cent
Indian Oil Corporation	2015	34.7
Reliance Industries	1112	19.2
Bharat Petroleum	972	16.8
Hindustan Petroleum	939	16.2
Oil and Natural Gas Corporation	755	13
Essar Oil	6	0.1
Total	<b>5799</b>	<b>100</b>

Source: Company annual accounts.

The domestic market is close to a monopoly. All hydrocarbon products are tradeable, although their transport costs vary greatly – highest for gas, lower for crude, and the more valuable a refined product, the lower proportionally are transport costs. So the most expeditious way of introducing competition is freeing imports. There cannot be competition in exploration and production if refining and distribution are concentrated; and there cannot be competition in refining unless crude is freely importable. Hence the first condition for a more competitive market is absence of restrictions on foreign trade.

The next condition is tax parity of imports and domestic production. This means that whatever domestic taxes are levied should be applicable to imports as well. Import duties may be levied; but unless there is a reason to protect exploration and production beyond the size to which they would grow without protection, crude imports should be duty-free, so that there is maximum incentive to invest in refining. There will inevitably be taxation of refined products, since some of them are considered inputs into luxuries (e.g., aviation fuel and petrol), and are in fact sources of prolific revenue. Duties on domestic production must be matched by equal import duties, so that there is no discrimination in favour of exports.

Under competitive conditions, refining adds little value to crude. The tonnage of refined products comes to 90-95 per cent of the crude input; and the throughput of a refinery is so high in comparison to its capital costs that a low average profit margin gives a high rate of return. In 2007-08, a profit margin before tax of 16.7 per cent translated into a return on assets of 15.5 per cent for Reliance; for IOC, a margin of 3.9 per cent translated into a return on assets of 12.3 per cent. IOC was forced by the government to give huge subsidies on sales of petrol, diesel and kerosene (**Appendix-table H1**); on the other hand, its refineries are older and their historical cost per ton is lower. But even for a highly sophisticated refinery like that of Reliance, the capital-output ratio is close to one; for simpler refineries it would be much lower, and the return on capital would be higher than the margin. Typically, a refinery's margin might be 10 per cent, and crude might account for 80-90 per cent of its costs. Since some refinery products are considered luxuries and others necessities, taxes on them will be different; and the average tax on refined product will be high. In the circumstances, the tax system can be simplified and competition in refining intensified by not taxing crude at all, and concentrating all taxation on refined products.

Finally, we come to entry restrictions. Here, the answer is different for exploration and production, and for refining. We shall deal first with exploration and production, but it should be borne in mind that the attractiveness of exploration is closely dependent on the ease of entry in refining and distribution.

It is difficult to conceive of completely free entry into exploration because it involves access to land which has to be approved and sometimes organized by the government. So some form of exploration licensing is unavoidable. The high proportion of concessions granted to ONGC would suggest otherwise, but there is no overt discrimination against foreign companies or exclusion of any companies other than on such self-evident criteria as minimum experience and minimum investment. The government's insistence that discovered oil and gas must be used in India – its implicit export ban – reduces the potential value of finds and probably leads to fewer bids and lower revenue for the government; now that the balance of payments is no longer a policy problem, this domestic use requirement is outdated. We have argued above for duty-free imports of crude. In those circumstances, an export ban or insistence on domestic use makes even less sense.

So the only important variable in exploration and production would be taxation of production (exploration can obviously not be taxed). The customary form of taxation here is that the government tax a share of the oil produced – what is called profit oil. If profit oil is zero, the producing company takes all the oil that is produced, and the government gets nothing. The government must be very desperate to produce oil domestically before it takes zero profit oil. This is not the situation in India.

At the other extreme, profit oil can be 100 per cent. No oil company would agree to this unless the government paid all costs plus some profit. So this case really comes to the government exploring oil. Exploration does not necessarily imply production; a government may explore simply to get better knowledge of the country's oil resources. The knowledge would reduce the risk in production, and would get the government better terms when it does decide to produce. At present, the government gives companies exploration licences with the condition that the data the concessionaires collect in the course of exploration must be given to the government; they are deposited with Directorate of Hydrocarbons. Given the fact that there is no urgency to produce, it would be a good idea to separate exploration and production; the government should invest simply in exploration and data collection. When it decides on production, it will then have ready data to sell to potential bidders; it will get more bids, and better terms.

So much for exploration. However, it is refining and distribution that require reforms to introduce competition. There is one precondition that is already satisfied and is therefore likely to be ignored: that product standards should be defined and enforced. Oil products are extremely differentiated; different uses require different specifications, some require tight specifications, and non-standardized products can be dangerous in some uses such as aviation. So standards have to be defined and enforced by the government.

Such standards will be correlated with the earlier-mentioned commodity taxes. In India, the extreme variation in tax rates creates powerful incentives to pass off a highly taxed product as a less taxed one, and more often, to adulterate products; for instance, it is common to mix diverted subsidized kerosene and mix it with high-speed diesel oil. The solution adopted has been to put a dye in subsidized kerosene. That is an ineffective remedy, for the dye does not make kerosene less eligible for adulteration. The correct solution would be to have the same tax on close substitutes, and to subsidize the people intended directly.

There is one other condition that would need to be modified. When allowing private entry, the government has insisted that new entrants must set up a minimum proportion of pumps in 'backward' or 'rural' areas. Ideally, there should be no such condition; if the government wants more petrol pumps in certain areas, it must give them subsidies until they reach a certain minimum turnover. The government has a service tax; it can be applied to petrol pumps, and a cut-off point may be set below which there would be no tax.

It is possible to introduce competition in distribution alone, without any changes in refining. The first condition for it would be to abolish licensing of pumps. There is no argument for licensing except that captive pumps of oil companies have existed ever since they started selling petrol; there is a strong argument against licensing in India, that it creates rampant corruption, which reaches right up to the minister.

Second, there should be free imports of products. There should be no canalization of product imports, and no quantitative restrictions. But distribution requires considerable investment in storage, logistics and petrol pumps. If competition is not introduced in refining, the only competition can come from imports; it will not emerge unless new entrants are assured of continued access to imports for a long period. To ensure a level playing field, domestic tax rates and import duties should be identical, so that the tax burden is the same irrespective of the origin of supplies.

This is an argument that applies to all the policy changes suggested here, and not just to taxation. The oil production and distribution chain requires large capital investments whose life runs into decades. If the benefits of competition are to be reaped, the policy regime must be stable for decades, and must in advance be known to be stable. If the government is serious about competition, it must accept and announce self-restraint on its freedom to make and change policies.

Finally, transportation affects competition in an important way. For all hydrocarbons, pipelines are the cheapest medium of transport. Differentiation of refined products makes dedicated pipelines for them expensive, but even amongst them, petrol and diesel are consumed in large enough quantities to make piping economical. Currently, all pipelines in India are owned by gas or oil companies, and thus insulate them from competition. If all the pipelines were common carriers and carried oil, gas or products for all customers without discrimination at preannounced prices, refineries and gas-based plants would spread out more evenly across the country, and there would be greater competition amongst them. The case is similar to that of electricity, in which there cannot be competition for the final market unless a transmitter and distributor provides access from every generator to every consumer. One solution that was tried out was to decree that all companies that had pipelines would allocate a certain proportion of pipeline capacity for common carriage. As far as we know, this regulation was a dead letter from the start; there has been no common carriage in India. The best solution now would be to nationalize all existing pipelines and give them to a new company to run as a public utility on a cost-plus basis. The next best solution would be to give all the pipelines of state-owned companies to a common carrier. In gas in particular, competition cannot emerge in the absence of a common carrier.

The conclusions we have reached have implications for the Competition Commission. The oil industry has a regulator of sorts in Directorate General of Hydrocarbons. It provides expertise that the ministry lacks and buys such expertise as it does not have (or makes oil companies buy it). But it confines itself to technological issues and avoids the economic issues discussed above; and on policy it keeps close to the government and does not choose to take an independent view. This is where a role for the Competition Commission is inescapable. It is for the Competition Commission to decide at what level to frame its interventions. Quite a few of government obstructions to competition that are found in the oil industry are present in other industries as well; the Competition Commission would have to take a view on whether to take an industry-specific approach or to take up more general issues of policy. Either way, there is a role that only the Competition Commission can play.

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# Data Appendix

## Petroleum Statistics

### A. At a Glance

Table A1: Growth of Indian Petroleum Industry at a Glance

Item	Unit	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07*
<b>1. Reserves!</b>								
<b>(Balance Recoverable)</b>								
(i) Crude Oil	Mn. Tonne	703	732	741	733	739	786	756
	Bn. Cub.							
(ii) Natural Gas	Mtr.	760	763	751	854	923	1101	1090
<b>2. Consumption</b>								
(i) Crude Oil (in terms of refinery crude throughput)	Mn. Tonne	103.44	107.27	112.56	121.84	127.12	130.11	146.55
(ii) Petroleum Products (excluding RBF)	Mn. Tonne	100.07	100.43	104.13	107.75	111.63	113.21	119.55
<b>3. Production</b>								
(i) Crude Oil	Mn. Tonne	32.43	32.03	33.04	33.37	33.98	32.19	33.99
(ii) Petroleum Products	Mn. Tonne	95.61	100	104.14	113.4	118.23	119.75	135.26
<b>4. Imports &amp; Exports</b>								
<b>(i) Gross Imports</b>								
(a) Qty : Crude Oil	Mn. Tonne	74.1	78.71	81.99	90.43	95.86	99.41	110.86
POL Products	Mn. Tonne	9.27	7.01	6.74	7.9	8.87	11.68	16.97
Total (a)	Mn. Tonne	83.37	85.72	88.73	98.33	104.69	111.09	127.83
(b) Value :								
Crude Oil	Rs. Billion	659.32	603.97	761.95	835.28	1170.03	1717.02	2199.91
POL Products	Rs. Billion	120.93	72.49	82.06	96.77	148.88	255.75	403.89
Total (b)	Rs. Billion	780.25	676.46	844.01	932.05	1318.91	1972.77	2603.8
<b>Pol. Imports as per DGCI&amp;S</b>								
	<b>Rs. Billion</b>	<b>714.97</b>	<b>667.7</b>	<b>853.67</b>	<b>945.2</b>	<b>1340.94</b>	<b>1946.4</b>	<b>2582.59</b>
<b>(ii) Exports</b>								
(a) Qty								
POL Products	Mn. Tonne	8.37	10.07	10.29	14.62	18.21	21.51	32.4
(b) Value								
POL Products	Rs. Billion	76.72	82.19	108.68	167.81	299.28	467.2	801.72
<b>(iii) Net Imports:</b>								

(a) Qty : Crude Oil	Mn. Tonne	74.1	78.71	81.99	90.43	95.86	99.41	110.86
POL Products	Mn. Tonne	0.9	-3.06	-3.55	-6.72	-9.83	-9.83	-15.43
Total (a)	Mn. Tonne	75	75.65	78.44	83.71	86.48	89.58	95.43
(b) Value :								
Crude Oil	Rs. Billion	659.32	603.97	761.95	835.28	1170.03	1717.02	2199.91
POL Products	Rs. Billion	44.21	-9.7	-26.62	-71.04	-150.4	-211.45	-397.83
Total (b)	Rs. Billion	703.53	594.27	735.33	764.24	1019.63	1505.57	1802.8
<b>(iv) Unit Value of Crude Oil Imports (Gross)</b>	<b>Rs./MT</b>	<b>8898</b>	<b>7673</b>	<b>9293</b>	<b>9237</b>	<b>12206</b>	<b>17272</b>	<b>19844</b>
<b>5. India's Total Exports</b>	<b>Rs. Billion</b>	<b>2035.71</b>	<b>2090.18</b>	<b>2551.37</b>	<b>2933.67</b>	<b>3618.79</b>	<b>4564.18</b>	<b>5716.42</b>
<b>6. Pol. Imports as % of India's Total Exports</b>								
(i) Gross Imports	%	38.3	32.4	33.1	31.8	36.4	43.2	45.5
(ii) Net Imports	%	34.6	28.4	28.8	26.1	28.2	33	31.5
<b>7. Contribution of Oil Sector to Centre/State Resources</b>								
(i) Royalty from Crude Oil	Rs. Billion	22.72	24.86	30.67	31.74	42.71	50.6	N.A.
(ii) Royalty from Gas	Rs. Billion	6.08	6.59	7.78	8.54	8.29	9.81	N.A.
(iii) Oil Development Cess	Rs. Billion	27.28	28.78	50.91	51.43	52.48	50.07	70.34
(iv) Excise & Custom Duties	Rs. Billion	359.12	361.04	451.27	507.33	563.95	631.43	718.93
(v) Sales Tax	Rs. Billion	233.75	200.9	297.41	328.49	390	N.A.	N.A.
(vi) Dividend	Rs. Billion	34.82	32.87	67.94	63.1	94.36	N.A.	N.A.
<b>8. Natural Gas</b>								
:								
(i) Gross Production	Bn. Cub. Mtr.	29.477	29.714	31.389	31.962	31.763	32.202	31.747
(ii) Utilisation	Bn. Cub. Mtr.	27.86	28.037	29.963	30.906	30.775	31.325	30.791

Abbr: NA : Not Available.

Note : \* : Provisional.

! : As on 1st April of Initial year.

Source: Ministry of Petroleum and Natural Gas. Government of India, (downloaded from [www.indiastat.com](http://www.indiastat.com))

**Table A2: Company-wise Production, Consumption, Import and Export of Liquefied Petroleum Gas (LPG) in India**

Particular	Year	Company													Total (TMT)
		PSU										PVT			
		Refinery					Fractionator					Refinery			
	IOCL	CPCL	BPCL	HPCL	NRL	BRPL	MRPL	ONGC	GAIL	OIL	RIL	EOL	PVT		
Production	2007-08 (Apr-Dec 07)	1198	260	673	453	38	34	211	774	789	36	1992	57	---	6515
	2006-07	1488	399	826	592	54	48	282	1020	1032	44	2653	17	---	8454
	2005-06	1354	407	739	466	47	50	275	1094	1042	48	2193	---	---	7717
Consumption	2007-08 (Apr-Dec 07)	3976	---	2192	2105	---	---	---	---	---	---	---	---	477	8750
	2006-07	5098	---	2780	2651	---	---	---	---	---	---	9	---	310	10848
	2005-06	4832	---	2613	2531	---	---	---	---	---	---	47	---	433	10456
Import	2007-08 (Apr-Dec 07)	1226	---	111	171	---	---	---	---	---	---	---	---	477	1985
	2006-07	1558	---	192	217	---	---	---	---	---	---	---	---	310	2278
	2005-06	2233	---	217	---	---	---	---	---	---	---	---	---	433	2883
Export	2007-08 (Apr-Dec 07)	72	---	---	---	---	---	---	---	---	---	---	---	---	72
	2006-07	86	---	---	---	---	---	---	---	---	---	26	---	0.1	112
	2005-06	53	---	---	---	---	---	---	---	---	---	---	---	---	53

Source: Rajya Sabha Unstarred Question No. 575, dated on 04.03.2008. (downloaded from [www.indiastat.com](http://www.indiastat.com))

## B. Production

**Table B1: Refinery Crude Throughput and Production of Petroleum Products in India**  
(<sup>'000 Tonnes</sup>)

Year	Crude Throughput			Production		
	Public Sector/JVC	Private Sector	Total	Public Sector/JVC	Private Sector	Total
1961-62	60	6524	6584	11	6184	6195
1965-66	1966	8267	10233	1733	7828	9561
1970-71	10820	7559	18379	9965	7145	17110
1975-76	17045	5238	22283	15895	4934	20829
1980-81	25333	503	25836	23646	477	24123
1985-86	42910	-	42910	39881	-	39881
1990-91	51772	-	51772	48562	-	48562
1991-92	51423	-	51423	48349	-	48349
1992-93	53482	-	53482	50359	-	50359
1993-94	54296	-	54296	51084	-	51084
1994-95	56534	-	56534	52927	-	52927

1995-96	58741	-	58741	55081	-	55081
1996-97	62870	-	62870	59005	-	59005
1997-98	65166	-	65166	61308	-	61308
1998-99	68538	-	68538	64544	-	64544
1999-00	74052	11912	85964	69144	10267	79411
2000-01	77411	26033	103444	72059	23555	95614
2001-02	77620	29654	107274	72462	27542	100004
2002-03	82015	30544	112559	76236	27904	104140
2003-04	89495	32345	121840	83397	30066	113463
2004-05	92808	34309	127117	86328	31905	118233
2005-06	96946	33163	130109	89793	29957	119750
2006-07*	108173	38378	146551	99714	35546	135260

Note: \* : Provisional.

Source: Ministry of Petroleum and Natural Gas. Government of India, (downloaded from [www.indiastat.com](http://www.indiastat.com))

**Table B2: Refinery-wise Crude Run and Production of Petroleum Products in India - Part I**

(in '000 tonnes)

Year	IOC	BPCL	HPCL	HPCL	IOC	IOC	IOC	IOC	IOC
	AOD	Mumbai	Mumbai	Visakh	Guwahati	Barauni	Gujarat	Haldia	Mathura
<b>1990-91</b>									
Total									
Production	540	6603	5506	3231	712	2206	8791	2608	7414
Crude Run	566	6957	5766	3464	783	2416	9334	2935	7808
<b>1991-92</b>									
Total									
Production	524	6630	4496	3676	793	2060	8877	2791	7925
Crude Run	546	6940	4729	3920	856	2262	9379	3021	8231
<b>1992-93</b>									
Total									
Production	623	6875	5619	4274	749	2097	9258	2810	7430
Crude Run	547	7233	5849	4527	815	2287	9780	3040	7843
<b>1993-94</b>									
Total									
Production	535	6831	5774	4203	840	2051	8830	2878	8121
Crude Run	554	7203	6018	4448	910	2222	9434	3106	8518
<b>1994-95</b>									
Total									
Production	509	7071	4913	4759	833	2039	9148	2998	8018
Crude Run	536	7506	5234	5014	884	2220	9888	3258	8377
<b>1995-96</b>									
Total									
Production	537	7065	5674	4753	781	2129	9476	3168	7934
Crude Run	559	7460	5965	5037	839	2322	10167	3416	8332
<b>1996-97</b>									
Total									
Production	453	7279	6238	4576	778	1720	9722	3189	7744
Crude Run	477	7640	6534	4847	848	1895	10352	3451	8113
<b>1997-98</b>									
Total									
Production	479	7591	6053	2308	779	1989	10043	4445	8302
Crude Run	502	7996	6378	2467	856	2181	10694	4706	8565
<b>1998-99</b>									
Total									
Production	524	8531	4955	3637	772	2017	10346	4432	8665

Crude Run	553	8878	5203	3861	836	2204	10935	4714	8909
<b>1999-00</b>									
Total									
Production	564	8433	5702	4252	858	3177	10429	3797	7875
Crude Run	603	8907	6007	4555	914	3411	11109	4105	8125
<b>2000-01</b>									
Total									
Production	651	8203	5189	5986	653	2889	11269	3502	6863
Crude Run	678	8683	5575	6405	707	3122	12006	3873	7133
<b>2001-02</b>									
Total									
Production	640	8279	5229	6334	578	2625	11028	3601	7780
Crude Run	653	8744	5641	6706	656	2876	11697	4026	8031
<b>2002-03</b>									
Total									
Production	577	8221	5660	6386	390	2637	11734	4031	7880
Crude Run	581	8711	6078	6851	458	2994	12434	4513	8207
<b>2003-04</b>									
Total									
Production	584	8259	5707	7145	739	3815	12029	4112	7932
Crude Run	602	8757	6108	7591	891	4304	12758	4518	8248
<b>2004-05</b>									
Total									
Production	636	8598	5725	7340	868	4563	11037	4971	6145
Crude Run	651	9138	6118	7825	1002	5082	11698	5418	6387
<b>2005-06</b>									
Total									
Production	605	9627	5817	7515	750	5016	10839	4988	7463
Crude Run	615	10298	6248	7980	864	5553	11543	5502	7938
<b>2006-07*</b>									
Total									
Production	567	11234	6981	8782	726	4931	12142	5282	8425
Crude Run	586	12030	7419	9377	839	5469	12953	5836	8883

Source: Ministry of Petroleum and Natural Gas, Government of India, (downloaded from [www.indiastat.com](http://www.indiastat.com))

**Table B3: Refinery-wise Crude Run and Production of Petroleum Products in India - Part II**

(in '000 tonnes)

Year	IOC Paniput	(CRL) KRL Cochin	CPCL(MRL)		BRPL Assam	NRL Numali-garh	MRPL Mangalore	ONGC Tatipaka	RPL Jam-nagar	EOL Vadi-nar	Total
			Manali	Narimanam							
<b>1990-91</b>											
Total											
Production	-	4715	5279	-	957	-	-	-	-	-	48562
Crude Run	-	5006	5698	-	1139	-	-	-	-	-	51772
<b>1991-92</b>											
Total											
Production	-	4554	5147	-	976	-	-	-	-	-	48349
Crude Run	-	4846	5529	-	1164	-	-	-	-	-	51423
<b>1992-93</b>											
Total											
Production	-	4853	4927	-	944	-	-	-	-	-	50359
Crude Run	-	5122	5323	-	1116	-	-	-	-	-	53482

<b>1993-94</b>											
Total											
Production	-	4568	5313	120	1020	-	-	-	-	-	51084
Crude Run	-	4862	5728	126	1167	-	-	-	-	-	54296
<b>1994-95</b>											
Total											
Production	-	4803	6461	370	1005	-	-	-	-	-	52957
Crude Run	-	5135	6921	382	1179	-	-	-	-	-	56534
<b>1995-96</b>											
Total											
Production	-	7010	5162	358	1011	-	23	-	-	-	55081
Crude Run	-	7421	5599	370	1215	-	39	-	-	-	58741
<b>1996-97</b>											
Total											
Production	-	6890	6143	332	1306	-	2635	-	-	-	59005
Crude Run	-	7293	6621	345	1542	-	2912	-	-	-	62870
<b>1997-98</b>											
Total											
Production	-	7312	6437	533	1485	-	3552	-	-	-	61308
Crude Run	-	7729	6965	556	1718	-	3853	-	-	-	65166
<b>1998-99</b>											
Total											
Production	1908	7304	5652	619	1445	-	3737	-	-	-	64544
Crude Run	2208	7770	6101	644	1653	-	4069	-	-	-	68538
<b>1999-00</b>											
Total											
Production	3688	7826	5870	612	1665	186	4713	-	10267	-	79411
Crude Run	4153	7830	6377	636	1905	215	5200	-	11912	-	85964
<b>2000-01</b>											
Total											
Production	5206	7039	5524	559	1353	1293	5879	-	23556	-	95614
Crude Run	5707	7520	6046	579	1488	1451	6438	-	26033	-	103444
<b>2001-02</b>											
Total											
Production	5323	6398	5676	549	1314	2052	5043	13	27542	-	100004
Crude Run	5822	6797	6123	566	1475	2307	5487	13	29654	-	107274
<b>2002-03</b>											
Total											
Production	5561	7063	5658	631	1352	1665	6699	91	27904	-	104140
Crude Run	6101	7580	6176	643	1463	1879	7253	93	30544	-	112559
<b>2003-04</b>											
Total											
Production	5818	7419	5827	645	1963	1961	9352	90	30066	-	113463
Crude Run	6338	7854	6387	653	2126	2200	10069	91	32345	-	121840
<b>2004-05</b>											
Total											
Production	5826	7387	7397	733	2118	1834	11059	92	31904	-	118233
Crude Run	6390	7924	8181	742	2311	2042	11809	93	34309	-	127117
<b>2005-06</b>											
Total											
Production	5780	6456	8742	671	2246	1918	11268	92	29957	-	119750
Crude Run	6507	6939	9680	682	2356	2133	12014	93	33163	-	130109
<b>2006-07*</b>											
Total											
Production	8016	7237	8841	609	1932	2227	11689	93	34174	1372	135260
Crude Run	9435	7742	9784	618	2067	2504	12536	94	36616	1763	146551

Abbr for Part I and II:

IOC : Indian Oil Corporation Limited.

HPCL : Hindustan Petroleum Corporation Limited.

BPCL : Bharat Petroleum Corporation Limited.

AOD : Assam Oil Division.

Note : \* : Provisional.

Source : Ministry of Petroleum and Natural Gas, Govt. of India.

Abbr. : IOC : Indian Oil Corporation Limited.

CPCL : Chennai Petroleum Corporation Limited.

BRPL : Bongaigaon Refinery & Petrochemicals Limited.

NRL : Numaligarh Refineries Limited.

MRPL : Mangalore Refinery & Petrochemicals Limited.

ONGC : Oil & Natural Gas Commission/Corporation Limited.

RPL : Reliance Petroleum Limited.

KRL : Kochi Refineries Limited.

CRL : Cochin Refineries Limited.

Note : \* : Provisional.

Source : Ministry of Petroleum and Natural Gas. Government of India, (downloaded from [www.indiastat.com](http://www.indiastat.com))

**Table B4: Petroleum Refining Capacity in India**

(Million Tonne per Annum)

Refinery	Year of Commissioning	Installed Capacity As on 01.04.2002	Installed Capacity As on 01.04.2003	Installed Capacity As on 01.04.2005	Installed Capacity As on 01.04.2006	Installed Capacity As on 01.04.2007
<b>(A) Public Sector/JVC Refineries</b>		<b>87.668</b>	<b>89.97</b>	<b>94.37</b>	<b>99.47</b>	<b>105.47</b>
<b>I. IOC Refineries</b>		<b>38.15</b>	<b>39.95</b>	<b>41.35</b>	<b>41.35</b>	<b>47.35</b>
1. IOC, Digboi	1901	0.65	0.65	0.65	0.65	0.65
2. IOC, Guwahati	1962	1	1	1	1	1
3. IOC, Barauni	1964	4.2	6	6	6	6
4. IOC, Gujarat	1965	13.7	13.7	-	-	-
5. IOC, Koyali	1965	-	-	13.7	13.7	13.7
6. IOC, Haldia	1974	4.6	4.6	6	6	6
7. IOC, Mathura	1982	8	8	8	8	8
8. IOC, Panipat	1998	6	6	6	6	12.00\$
<b>II. BPCL Refineries</b>		<b>-</b>	<b>-</b>	<b>-</b>	<b>19.5</b>	<b>19.5</b>
1. BPCL, Mumbai	1955	6.9	6.9	6.9	12	12
2. KRL Kochi	1966	7.5	7.5	7.5	7.5	7.5
<b>III. HPCL Refineries</b>		<b>13</b>	<b>13</b>	<b>13</b>	<b>13</b>	<b>13</b>
1. HPCL, Mumbai	1954	5.5	5.5	5.5	5.5	5.5
2. HPCL, Visakh	1657	7.5	7.5	7.5	7.5	7.5
<b>IV. CPCL, Refineries</b>		<b>7</b>	<b>7.5</b>	<b>10.5</b>	<b>10.5</b>	<b>10.5</b>
1. CPCL, Manali	1969	6.5	6.5	9.5	9.5	9.5
2. CPCL, Narimanam	1993	0.5	1	1	1	1
<b>V. BRPL, Bongaigaon</b>	<b>1979</b>	<b>2.35</b>	<b>2.35</b>	<b>2.35</b>	<b>2.35</b>	<b>2.35</b>
<b>VI. NRL, Numaligarh</b>	<b>1999</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>
<b>VII. ONGC, Tatipaka</b>	<b>2002</b>	<b>0.078</b>	<b>0.08</b>	<b>0.08</b>	<b>0.08</b>	<b>0.08</b>
<b>VIII. MRPL, Mangalore</b>	<b>1996</b>	<b>9.69</b>	<b>9.69</b>	<b>9.69</b>	<b>9.69</b>	<b>9.69</b>
<b>(B) Private Refinery</b>		<b>27</b>	<b>27</b>	<b>33</b>	<b>33</b>	<b>43.5</b>
1. RPL, Jamnagar	1999	27	27	33	33	33
2. Essar Oil Ltd. Vadinar	2006	-	-	-	@	10.5
<b>Grand Total (A+B)</b>		<b>114.668</b>	<b>116.97</b>	<b>127.37</b>	<b>132.47</b>	<b>148.97</b>

Note : @ : Commissioned on 24.11.2006.

\$ : Increased installed capacity on 12 January, 2007.

Abbr. : IOC : Indian Oil Corporation Limited.

HPCL : Hindustan Petroleum Corporation Limited.

BPCL : Bharat Petroleum Corporation Limited.

CPCL : Chennai Petroleum Corporation Limited.

KRL : Kochi Refineries Limited.

BRPL : Bongaigaon Refinery & Petrochemicals Limited.

MRPL : Mangalore Refinery & Petrochemicals Limited.

ONGC : Oil & Natural Gas Commission/Corporation Limited.

RPL : Reliance Petroleum Limited.

NRL : Numaligarh Refineries Limited.

JVC : Joint Venture Company.

Source: Ministry of Petroleum and Natural Gas. Government of India, (downloaded from [www.indiastat.com](http://www.indiastat.com))

**Table B5: Production of Petroleum Products in India**

(' 000 Tonne)

Products	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07*	2007-08*
<b>(a) From Crude Oil</b>								
<b>I. Light Distillates of which</b>	<b>25048</b>	<b>26539</b>	<b>28619</b>	<b>31971</b>	<b>32865</b>	<b>32427</b>	<b>38104</b>	<b>40111</b>
LPG	4088	4778	4903	5348	5570	5525	6315	6732
Mogas	8070	9699	10361	10999	11057	10502	12539	14167
Naphtha	9908	9180	9650	11317	14100	14509	16660	16440
SBPS/Hexane	93	84	82	89	81	98	79	-
Others (LD)	2982	2882	3705	4307	2138	1891	2590	2772
<b>II. Middle Distillates of which</b>	<b>52445</b>	<b>54409</b>	<b>55937</b>	<b>60018</b>	<b>62509</b>	<b>64432</b>	<b>71225</b>	<b>76649</b>
Kerosene	8714	9681	10028	10187	9298	9078	8491	7794
ATF/RTF/Jet A-1	2513	2595	3053	4289	5201	6196	7805	9107
HSD	39052	39899	40207	43316	45903	47572	53465	58361
LDO	1481	1703	2079	1659	1546	923	803	671
JBO	57	44	47	43	36	39	32	-
MTO	214	212	243	242	226	212	187	-
Others (MD)	685	531	570	567	561	663	661	716
<b>III. Heavy Ends of which</b>	<b>18121</b>	<b>19056</b>	<b>19584</b>	<b>21474</b>	<b>23205</b>	<b>22891</b>	<b>25931</b>	<b>28170</b>
Furnance Oil	6479	7488	7529	8737	10560	10320	12325	12638
LSHS/HHS/RFO	4913	4739	4638	4635	4410	3985	3372	3167
Total Fuel Oils	11392	12227	12167	13372	14780	14305	15697	-
Lube Oils	684	651	684	666	646	677	825	881
Bitumen	2721	2561	2941	3397	3349	3576	3891	4507
Petroleum Coke	2473	2784	2659	2743	3162	3182	3779	4129
Paraffin Wax	51	45	42	53	64	63	63	64
Others Waxes	61	37	3	0	4	3	-2	-1
Total Waxes	112	82	45	53	68	66	-	-
Others (HE)	739	751	1088	1243	1010	-	-	2784
<b>Total Production Crude Throughput</b>	<b>95614</b>	<b>100004</b>	<b>104140</b>	<b>113463</b>	<b>118579</b>	<b>119750</b>	<b>135260</b>	<b>144930</b>
<b>(b) From Natural Gas</b>								
LPG	2045	2205	2370	2320	2240	2185	2093	2060

Abbr.: LPG : Liquefied Petroleum Gas.

HSD : High Speed Diesel.

LDO : Light Diesel Oil.

ATF : Aviation Turbine Fuel.

Note : LD : Includes Propylene, C-3, Propane, Hexane, Special Boiling Point Spirit, Benzene, Toluene, Petroleum Hydro Carbon Solvent, Natural Heptane, Methyl Tertiary Butyl Ether, Poly Isobutene, PBFS and MEKFS.

MD : Includes Mineral Turpentine Oil, JP-5, Linear Alkyl Benzene Feed Stock, Aromex, Jute Batching Oil, Solvent 1425, Low Sulphur Heavy Fuel HSD, DHCB and Special Kerosene.

HE : Includes Carbon Black Feed Stock, Sulphur, Solar Oil, LARO and Extracts.

\* : Provisional.  
Source : Ministry of Petroleum and Natural Gas. Government of India, (downloaded from [www.indiastat.com](http://www.indiastat.com))

**Table B6: Production (Percentage) of Petroleum Products in India**

Products	1991-92	1995-96	1996-97	1997-98	1998-99	1999-0	2000-1	2001-2	2002-3	2003-4	2004-5	2005-6	2006-7*
Light Distillates	18.8	21.2	20.5	20	20.1	21.3	24.2	24.7	25.4	26.2	25.8	24.9	26
Middle Distillates	51.3	51	51.6	52.1	52.8	52.3	50.7	50.7	49.7	49.3	49.1	49.5	48.6
Total Fuel Oils	18.7	16.3	16.4	17	16.1	13.2	11	11.4	10.8	11	11.6	11	10.7
Lubes	0.8	1.1	1	0.9	0.9	0.9	0.7	0.6	0.6	0.5	0.5	0.5	0.6
Bitumen	3.3	3.4	3.6	3.3	3.5	2.9	2.6	2.4	2.6	2.8	2.6	2.7	2.7
Others	1.1	0.8	0.8	0.8	0.8	1.8	3.2	3.4	3.4	3.3	3.4	3.3	3.8
<b>Total Production</b>	<b>94</b>	<b>93.8</b>	<b>93.9</b>	<b>94.1</b>	<b>94.2</b>	<b>92.4</b>	<b>92.4</b>	<b>93.2</b>	<b>92.5</b>	<b>93.1</b>	<b>93</b>	<b>92</b>	<b>92.3</b>
RBF & Losses/Inventories	6	6.2	6.1	5.9	5.8	7.6	7.6	6.8	7.5	6.9	7	8	7.7
<b>Crude Run</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

Abbr. : RBF : Refinery Boiler Fuel.

Note : \* : Provisional.

Source: Ministry of Petroleum and Natural Gas. Government of India (downloaded from [www.indiastat.com](http://www.indiastat.com))

### C. Consumption

**Table C1: Consumption of Petroleum Products (Public/Private Sector) in India**

(in '000 tonnes)

Products	1997-98	1998-99	1999-0	2000-1	2001-2	2002-3	2003-4	2004-5	2005-6	2006-7
<b>A. Public Sector</b>										
<b>1. Light Distillates</b>	<b>15742</b>	<b>17958</b>	<b>20473</b>	<b>21770</b>	<b>22916</b>	<b>23567</b>	<b>25002</b>	<b>25317</b>	<b>24008</b>	<b>25350</b>
LPG	4581	5041	6029	6613	7310	8143	9089	9967	9976	10530
Mogas	5182	5507	5909	6613	7011	7570	7895	8162	8254	8803
Naphtha	4716	6652	7970	8059	8128	7284	7329	6550	5155	5327
NGL	768	330	91	6	27	32	0	0	0	0
Others	495	428	474	479	440	538	689	638	623	690
<b>2. Middle Distillates</b>	<b>49716</b>	<b>51686</b>	<b>54259</b>	<b>52854</b>	<b>50661</b>	<b>50555</b>	<b>50548</b>	<b>51919</b>	<b>50281</b>	<b>55189</b>
SKO	9878	10599	10731	10714	10114	9707	9426	9395	9373	9412
ATF	2108	2112	2197	2249	2256	2269	2484	2811	3295	3982
HSDO	36071	37217	39287	37938	36515	36534	36875	38087	36308	40617
LDO	1235	1278	1512	1399	1202	1413	1181	1085	834	720
Others	424	480	532	554	574	632	582	541	471	458
<b>3. Heavy Ends</b>	<b>14380</b>	<b>15122</b>	<b>15919</b>	<b>15362</b>	<b>15515</b>	<b>16002</b>	<b>16580</b>	<b>17357</b>	<b>17413</b>	<b>17401</b>
Furnace Oil	6651	6767	6816	6371	7085	6941	7207	8055	8221	8186
LSHS/HHS	4323	4537	4763	4989	4531	4711	4633	4404	3907	3361
Lubes/Greases	835	885	915	797	819	938	816	779	892	878
Bitumen	2178	2412	2879	2618	2428	2847	3367	3318	3485	3818
Petroleum Coke	227	315	328	414	367	335	308	445	496	645

Paraffin Wax	28	36	53	43	45	41	41	60	55	67
Other Waxes	45	76	89	62	51	13	20	20	19	0
Others	93	94	76	68	189	176	188	277	277	446
<b>Total (A) (Excl. RBF)</b>	<b>79838</b>	<b>84766</b>	<b>90651</b>	<b>89986</b>	<b>89092</b>	<b>90124</b>	<b>92130</b>	<b>94593</b>	<b>91702</b>	<b>97940</b>
<b>B. Private Sector</b>										
<b>1. Light Distillates</b>	<b>2124</b>	<b>2573</b>	<b>4058</b>	<b>7544</b>	<b>6702</b>	<b>8188</b>	<b>9333</b>	<b>9887</b>	<b>9654</b>	<b>11726</b>
LPG	222	311	392	403	418	208	216	278	480	319
MS	0	0	0	0	0	0	2	89	393	482
Naphtha/NGL	1874	2239	2831	3614	3600	4645	4539	7443	7039	8559
Benzene	0	23	33	8	0	0	0	0	0	0
Others	28	0	802	3519	2684	3335	4576	2077	1742	2366
<b>2. Middle Distillates</b>	<b>1187</b>	<b>1644</b>	<b>1175</b>	<b>613</b>	<b>778</b>	<b>1510</b>	<b>1475</b>	<b>1987</b>	<b>4141</b>	<b>2406</b>
SKO	1187	1644	1167	593	318	698	804	0	168	93
ATF	0	0	0	0	0	0	0	0	1	1
HSDO	0	0	8	20	31	110	199	1564	3883	2279
LDO	0	0	0	0	390	650	438	391	49	0
Others	0	0	0	0	39	52	34	32	40	33
<b>3. Heavy Ends</b>	<b>1141</b>	<b>1579</b>	<b>1202</b>	<b>1931</b>	<b>3860</b>	<b>4304</b>	<b>4813</b>	<b>5167</b>	<b>7716</b>	<b>8677</b>
Furnace Oil/LSHS	517	1206	874	1293	1366	1086	1105	1081	700	1071
Lubes/Greases	246	212	328	246	318	312	611	568	1189	1022
Bitumen	0	0	0	96	156	139	6	21	23	14
Petroleum Coke	0	78	0	34	1431	2228	2569	2684	4432	4796
CBFS	0	83	0	230	75	74	230	243	157	840
Others	378	0	0	32	514	465	292	570	1215	934
<b>Total (B)</b>	<b>4452</b>	<b>5796</b>	<b>6435</b>	<b>10088</b>	<b>11340</b>	<b>14002</b>	<b>15621</b>	<b>17041</b>	<b>21511</b>	<b>22809</b>
<b>Total (A+B)</b>	<b>84290</b>	<b>90562</b>	<b>97086</b>	<b>100074</b>	<b>100432</b>	<b>104126</b>	<b>107751</b>	<b>111634</b>	<b>113213</b>	<b>120749#</b>
<b>Refinery Fuel</b>	<b>3514</b>	<b>3700</b>	<b>5544</b>	<b>6900</b>	<b>7273</b>	<b>7650</b>	<b>8240</b>	<b>8537</b>	<b>9141</b>	<b>10920</b>
<b>Grand Total</b>	<b>87804</b>	<b>94262</b>	<b>102630</b>	<b>106974</b>	<b>107705</b>	<b>111776</b>	<b>115991</b>	<b>120171</b>	<b>122354</b>	<b>131669</b>

Abbr. : LPG : Liquefied Petroleum Gas.

Mogas : Motor Gasonline.

NGL : Natural Gas Liquid.

SKO : Superior Kerosene Oil.

ATF : Aviation Turbine Fuel.

HSDO : High Speed Diesel Oil.

LDO : Light Diesel Oil.

LSHS : Low Sulphur Heavy Stock.

HHS : Hot Heavy Stock.

CBFS : Carbon Black Feed Stock.

Note : \* : Provisional.

# : Private consumption figures includes imports also.

Source: Ministry of Petroleum and Natural Gas. Government of India, (downloaded from [www.indiastat.com](http://www.indiastat.com))

**Table C2: Average Annual Compound Growth Rates of Consumption of Petroleum Products in India (V<sup>th</sup> to X<sup>th</sup> Plan)**

(in %)

Product	V Plan 1974-79	VI Plan 1980- 85	VII Plan 1985-90	VIII Plan 1992-97	IX Plan 1997-02	X Plan 2002- 07
Liquid Petroleum						
Gas	8.7	18.4	18.9	10	12.6	8.2
MS	-0.1	6.9	10.9	6.8	7.2	7.3
Naphtha	10.4	5.3	1.4	6.4	20.1	-3.5
Others	-1.7	1.2	14.2	7.2	38.7	NA
<b>Light Distillates</b>	<b>5.6</b>	<b>7.2</b>	<b>8.3</b>	<b>7.5</b>	<b>15.3</b>	NA
ATF	8.2	3.2	5.8	6.7	0.9	3.2
SKO	3.7	9	6.7	3.9	0.5	0
HSD	9.8	6.9	8.6	9.1	0.9	5.6
LDO	-1	-1.1	4.4	-3.5	5.4	0
Others	0	0.2	3	8.8	5.2	NA
<b>Middle Distillates</b>	<b>6.7</b>	<b>6.6</b>	<b>7.7</b>	<b>7.4</b>	<b>1</b>	NA
Lubes	-2.3	3.2	6.9	1.7	2.3	4.7
FO/LSHS	2.4	2.3	2.1	4.6	2.4	2.6
Bitumen	-2.4	-2.6	12.6	5.9	2.6	3
Others	1.6	5.5	8.5	4.9	27.6	NA
<b>Heavy Ends</b>	<b>1.5</b>	<b>2</b>	<b>4</b>	<b>4.6</b>	<b>4.4</b>	NA
<b>Total Sale</b>	<b>4.8</b>	<b>5.4</b>	<b>6.9</b>	<b>6.8</b>	<b>4.9</b>	3.7

Note : \* : Provisional.

NA : Not Available.

Growth rates are based on consumption excluding private parties' imports.

Source: Ministry of Petroleum & Natural Gas, Govt. of India , (downloaded from [www.indiastat.com](http://www.indiastat.com))

**Table C3: Per Capita Consumption of Selected Petroleum Products in India**

(in Kgs.)

Year	Naphtha	M.S.	SKO	HSDO	LDO	F.O.(Regular)	LSHS/HHS	India-Total@ Sales/ Consumption
1985-86	4.2	3	8.3	19.7	1.5	5	5.3	57.3
1986-87	4.2	3.2	8.6	20.6	1.5	4.9	5.5	59.3
1987-88	3.6	3.6	9.1	22.3	1.6	5.3	5	62
1988-89	4.3	3.9	9.8	23.8	1.8	5.8	4.9	63.7
1989-90	4.1	4.2	10	25.2	1.8	5.5	5.3	69.1
1990-91	4.1	4.2	10	25	1.8	5.3	5.4	68.4
1991-92	4.1	4.2	9.9	26.9	1.7	5.8	5	70.6
1992-93	4	4.2	10	28.7	1.7	6.2	4.7	72.9
1993-94	3.8	4.5	10.3	30.6	1.6	5.9	4.9	75.2
1994-95	4	4.9	10.6	33.4	1.6	6.9	4.8	81.1
1995-96	4	5.1	10.2	35.2	1.4	7.1	4.6	79.2
1996-97	4.4	5.2	9.6	36	1.3	7.1	4.7	86.2
1997-98	4.9	5.4	10.3	37.8	1.3	7	4.5	90.1
1998-99	6.4	5.7	10.9	38	1.3	6.7	4.7	92.2
1999-00	8.1	6	10.9	40	1.5	6.9	4.9	102
2000-01	7.8	6.4	10.4	36.9	1.4	6.2	4.9	103.7
2001-02	7.9	6.8	9.8	35.6	1.6	8.2	4.4	97.8
2002-03	11.5	7.3	10.1	35.5	2	7.8	4.6	108.1
2003-04	7.1	7.7	9.2	35.9	1.1	7	4.5	112.9
2004-05	13.6	8	9.1	38.5	1.4	8.9	4.3	116.8
2005-06	11.1	7.9	8.7	36.7	0.8	8.1	3.6	111.7
2006-07*	11.3	8.2	8.4	37.9	0.6	8.2	3	115.5

@ : All India actual consumption of all products incl. Ref. Fuel & International Bunkers upto the year 1995-96. Later on total consumption includes imports from Pvt. Parties and Excluding RBF.

\* : Provisional.

Source: Ministry of Petroleum and Natural Gas. Government of India, (downloaded from [www.indiastat.com](http://www.indiastat.com))

**Table C4: Sector-wise (End Use) Consumption of Selected Petroleum Products in India**

(' 000 tonne)

Petroleum Product	Year	Transport	Plantation	Power Generation	Industry	Miscellaneous Services	Private Sales	Total
High Speed Diesel Oil	1991-92	20282	346	110	1416	526	-	22680
	1992-93	21726	388	108	1489	582	-	24293
	1993-94	23059	494	115	1512	698	-	25878
	1994-95	24742	621	229	1783	886	-	28261
	1995-96	28034	789	167	2386	878	7	32261
	1996-97	20276	6783	2284	3608	2068	-	35019
	1997-98	20662	6891	2390	3843	2285	-	36071
	1998-99	21367	6750	2576	4254	2270	-	37217
	1999-00	22386	7593	2622	3890	2796	8	39295
	2000-01	22197	7497	2596	3132	2516	20	37958
	2001-02	21662	7227	2509	2687	2430	31	36546
	2002-03	21832	7278	2497	2548	2379	110	36644
	2003-04	21772	7210	2526	2442	2925	199	37074
	2004-05	22505	7479	2769	2536	2798	1564	39651
	2005-06	21578	7015	2683	2446	2586	3816	40124

	2006-07(P)	21611	7914	2894	5108	3091	2248	42866
Light Diesel Oil	1991-92	80	37	236	644	465	-	1462
	1992-93	85	35	211	647	429	-	1407
	1993-94	82	36	190	625	437	-	1370
	1994-95	83	35	169	641	441	-	1369
	1995-96	68	41	166	700	336	-	1311
	1996-97	66	34	184	633	306	-	1223
	1997-98	64	34	189	626	322	-	1235
	1998-99	63	41	170	646	358	-	1278
	1999-00	59	47	176	769	461	-	1512
	2000-01	58	46	215	681	399	-	1399
	2001-02	53	51	165	621	312	390	1592
	2002-03	40	56	173	754	390	650	2063
	2003-04	57	46	147	727	250	392	1619
	2004-05	49	37	88	628	290	291	1476
	2005-06	49	28	65	422	270	49	883
	2006-07(P)	53	130	67	133	337	0	720
Furnace Oil	1991-92	343	164	527	3692	211	-	4937
	1992-93	339	190	555	3962	227	-	5273
	1993-94	405	186	490	3603	342	-	5026
	1994-95	440	188	580	3944	685	-	5837
	1995-96	321	214	720	4836	405	475	6971
	1996-97	351	250	764	4691	478	660	7194
	1997-98	315	274	549	4865	648	517	7168
	1998-99	349	319	571	4824	704	1206	7973
	1999-00	351	286	515	4901	763	874	7690
	2000-01	318	276	481	4543	753	1293	7664
	2001-02	308	322	551	5057	847	1366	8451
	2002-03	263	376	488	4714	1100	1086	8027
	2003-04	339	251	371	4364	1881	1105	8311
	2004-05	251	**	314	1743	5747	1099	9154
	2006-07(P)	276	**	254	973	5600	1083	8186
Low Sulphur Heavy Stock	1990-91	13	49	1835	2605	22	-	4524
	1991-92	22	29	1798	2335	81	-	4265
	1992-93	10	35	1779	2122	48	-	3994
	1993-94	12	40	1676	2366	72	-	4166
	1994-95	2	27	1624	2258	141	-	4052
	1995-96	3	32	1747	2246	161	@	4189
	1996-97	3	25	1634	2480	171	@	4313
	1997-98	3	21	1614	2482	203	@	4323
	1998-99	5	43	1297	2980	212	@	4537
	1999-00	7	27	1363	3036	330	@	4763
	2000-01	1	22	1657	2948	361	@	4989
	2001-02	-	21	1403	2735	372	@	4531
	2002-03	-	44	1639	2694	334	@	4711
	2003-04	-	5	1569	2263	796	@	4633
	2004-05	-	-	1238	1453	1713	@	4404
	2005-06	0	0	560	1390	1957	@	3907
	2006-	0	0	298	1358	1705	@	3361

07(P)

Abbr. : (P) : Provisional.

Note : @ : LSHS sales through pvt. parties included in Furness Oil sales.

\*\* : Included in Miscellaneous services. Breakup not available.

Source : Ministry of Petroleum and Natural Gas. Government of India, (downloaded from [www.indiastat.com](http://www.indiastat.com))**D. Imports****Table D1: Net Import of Crude Oil and Petroleum Products by India**

(Qty. ' 000 Tonnes, Value: Rs in Crore)

Year	Crude Oil		Petroleum Products		Total	
	Quantity	Value	Quantity	Value	Quantity	Value
1990-91	20699	6118.42	6012	3656.27	26711	9774.69
1991-92	23994	7820.05	6509	4003.62	30503	11823.67
1992-93	29247	10685.86	7564	4753.32	36811	15439.18
1993-94	30822	10688.52	8042	5532.62	38864	16221.14
1994-95	27349	10316.03	10697	5934.33	38046	16250.36
1995-96	27342	11517	16900	10745.87	44242	22262.87
1996-97	33906	18538.19	17103	13548.71	51009	32086.9
1997-98	34494	15872	20589	13043	55083	28915
1998-99	39808	14917	23052	11970	62860	26887
1999-00	57805	40028	15862	13488	73667	53516
2000-01	74097	65932	902	4421	74999	70353
2001-02	78706	60397	-3056	-970	75650	59427
2002-03	81989	76195	-3061	-2021	78928	74174

Note : \* : Provisional.

: # : MMT

Source : Ministry of Petroleum and Natural Gas. Government of India, (downloaded from [www.indiastat.com](http://www.indiastat.com))**Table D2: Gross Import of Crude Oil and Petroleum Products in India**

(Qty. ' 000 Tonnes, Value : Rs in Crore)

Item	2004-05		2005-06		2006-07		2007-08	
	Qty.	Value	Qty.	Value	Qty.	Value	Qty.	Value
<b>A. Crude Oil</b>	<b>95861</b>	<b>117003</b>	<b>99409</b>	<b>171702</b>	<b>110858</b>	<b>219991</b>	<b>121672</b>	<b>27699</b>
<b>B. Petroleum Products</b>								
<b>I. Light Distillates</b>	<b>5391</b>	<b>9973</b>	<b>6074</b>	<b>14514</b>	<b>8651</b>	<b>23097</b>	<b>9462</b>	<b>29010</b>
LPG	2334	4413	2719	6579	2288	5782	2829	8563
MS	233	501	485	1283	421	1326	326	1132
Naphtha	2214	4029	2473	5735	5474	14870	5965	18401
Propane/MTBE	610	1030	397	917	468	1119	342	914
<b>II. Middle Distillates</b>	<b>1027</b>	<b>2047</b>	<b>1615</b>	<b>3948</b>	<b>2344</b>	<b>6814</b>	<b>5424</b>	<b>17507</b>
ATF	3	14	2	11	2	17	3	20
SKO	210	429	881	2214	1424	4250	2489	8324
HSD	814	1604	732	1723	918	2547	2932	9163
Others	0	0	0	0	0	0	-	-
<b>III. Heavy Ends</b>	<b>2410</b>	<b>2868</b>	<b>3988</b>	<b>7113</b>	<b>5971</b>	<b>10478</b>	<b>7830</b>	<b>29926</b>
FO/LSHS	741	692	789	1099	986	1487	1241	2300
Lubes/Others <sup>HEI</sup>	1669	2176	3199	6014	4985	8991	6589	27627
<b>Total</b>	<b>8828</b>	<b>14888</b>	<b>11677</b>	<b>25575</b>	<b>16966</b>	<b>40389</b>	<b>22716</b>	<b>76443</b>
<b>Grand Total</b>	<b>104689</b>	<b>131891</b>	<b>111086</b>	<b>197277</b>	<b>127824</b>	<b>260380</b>	<b>144388</b>	<b>349142</b>

\* : Provisional

Note : <sup>HEI</sup> : Includes Bitumen, Lube Oil Base Stock,, Low Sulphur Waxy Residue,

Carbon Black feed Stock, Rubber Processing Oil and Paraffin Wax.  
Source : Ministry of Petroleum and Natural Gas. Government of India, (downloaded from [www.indiastat.com](http://www.indiastat.com))

**Table D3: Quantum and Value of Crude Oil Imported by Public Sector Oil Refining Companies and Private Oil Refining Companies in India**

(Qty. : in Million Metric Tonne; Value : Rs. in Crore)

Year	Imports by PSUs		Private Companies	
	Quantity	Value	Quantity	Value
2005-06	69	123530	30.4	48172
2006-07	77.5	157689	34	61340
2007-08*	76.4	170824	34.6	72382

Source: Lok Sabha Starred Question No. 372, dated on 17.04.2008.  
(downloaded from [www.indiastat.com](http://www.indiastat.com))

## E. Exports

**Table E1: Export of Crude Oil and Petroleum Products from India**

(Qty. ' 000 Tonnes, Value : Rs in Crore)

Year	Crude Oil		Petroleum Products		Total	
	Quantity	Value	Quantity	Value	Quantity	Value
1990-91	-	-	2648	1003.94	2648	1003.94
1991-92	-	-	2936	1214.65	2936	1214.65
1992-93	-	-	3719	1606.28	3719	1606.28
1993-94	-	-	4034	1508.81	4034	1508.81
1994-95	-	-	3254	1587.36	3254	1587.36
1995-96	-	-	3435	1831.98	3435	1831.98
1996-97	-	-	3162	2084.78	3162	2084.78
1997-98	-	-	2381	1266	2381	1266
1998-99	-	-	720	306	720	306
1999-00	-	-	746	698	746	698
2000-01	-	-	8365	7672	8365	7672
2001-02	-	-	10065	8219	10065	8219
2002-03	-	-	10289	10868	10289	10868
2003-04	-	-	14620	16781	14620	16781
2004-05	-	-	18211	29928	18211	29928
2005-06	-	-	-	-	21.51#	46720
2006-07*	-	-	-	-	32.39#	80172
2007-08* (April-Sept.)	-	-	-	-	19.90#	49981

Note : \* : Provisional.

: #: MMT

Source : Ministry of Petroleum & Natural Gas, Govt. of India. (downloaded from [www.indiastat.com](http://www.indiastat.com))

**Table E2: Gross Export of Crude Oil and Petroleum Products from India**

(Quantity : ' 000 Tonne; Value : Rs. in Crore)

Item	2000-01		2002-03		2003-04		2004-05		2005-06		2006-07*	
	Qty.	Value	Qty.	Value	Qty.	Value	Qty.	Value	Qty.	Value	Qty.	Value
<b>Crude Oil</b>												
<b>Petroleum Products</b>												
<b>I. Light Distillates</b>	<b>4221</b>	<b>4935</b>	<b>4493</b>	<b>5475</b>	<b>5448</b>	<b>7100</b>	<b>6288</b>	<b>11512</b>	<b>7565</b>	<b>17032</b>	<b>12296</b>	<b>32647</b>
LPG			0	0	0	0	145	306	53	164	86	287
MS			2336	3011	2979	4021	2897	5625	2273	5579	3696	10538
Naphtha/ NGL	2882	3273	2067	2325	2176	2653	2926	5030	4996	10674	8308	21205
TAME	137	220	90	139	83	117	0	0	10	25	0	0
Reformate			0	0	210	309	320	551	233	590	206	617
Mogas	1202	1442	0	0	0	0	0	0	0	0	0	0
Others	0	0	0	0	0	0	0	0	0	0	0	0
<b>II. Middle Distillates</b>	<b>1757</b>	<b>2046</b>	<b>3875</b>	<b>4337</b>	<b>7841</b>	<b>8713</b>	<b>9973</b>	<b>16690</b>	<b>11366</b>	<b>26152</b>	<b>15457</b>	<b>40883</b>
SKO			0	0	0	0	207	460	121	371	150	541
HSD/LDO	1597	1872	3178	3547	6181	6763	7286	11782	8464	18798	11645	30045
ATF			697	790	1660	1950	2480	4448	2781	6983	3662	10297
Others	160	174	-	-	-	-	-	-	-	-	-	-
<b>III. Heavy Ends</b>	<b>2387</b>	<b>691</b>	<b>1921</b>	<b>1056</b>	<b>1331</b>	<b>968</b>	<b>1950</b>	<b>1726</b>	<b>2576</b>	<b>3536</b>	<b>4641</b>	<b>6642</b>
FO/LSHS	508	320	1120	902	1310	928	1792	1517	1801	2246	3759	4988
VGO/Lubes	1879	371	101	109	17	36	102	137	701	1205	295	600
Coke/Bitumen	0	0	700	45	4	4	56	72	74	84	587	1054
Others	1879	371	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>8365</b>	<b>7672</b>	<b>10289</b>	<b>10868</b>	<b>14620</b>	<b>16781</b>	<b>18211</b>	<b>29928</b>	<b>21507</b>	<b>46720</b>	<b>32394</b>	<b>80172</b>

Abbr. : TAME : Tertiary Amyl Methyl Ether.

Note : \* : Provisional.

Source : Ministry of Petroleum & Natural Gas, Govt. of India. (downloaded from [www.indiastat.com](http://www.indiastat.com))

**Table E3: Petroleum Products Exported by PSUs and Private Companies from India**

(in '000 Tonnes)

<b>(April 2004 to January 2005)</b>		
<b>Products</b>	<b>PSUs</b>	<b>Private Companies</b>
Petrol	78	2286
Naphtha	2250	125
HSD	1004	4852
Lubes/LOBs	1	0
Fuel Oil	1405	0
Vacuum Gas Oil	54	43
AFT	906	1116
SKO	0	11
Reformate	307	0
Bitumen	33	0
Paraffin Wax	9	0

Source: Lok Sabha Starred Question No. 310, dated on 24.03.2005.  
(downloaded from [www.indiastat.com](http://www.indiastat.com))

**F. Sales and Marketshares**

**Table F1: Sales/Consumption of Petroleum Products and Marketshare of Oil Companies in India**

(Qty. ' 000 tonne)

<b>Year</b>	<b>% S/C</b>	<b>I.O.C</b>	<b>B. Shell/ BPCL</b>	<b>Esso/ HPCL</b>	<b>Caltex/ HPCL@ (VMU)</b>	<b>IBP</b>	<b>Others COs</b>	<b>Imports by Pvt. Parties</b>	<b>Total</b>
1991-92	S/C	32362	10688	11047	-	2498	379	-	56974
	%	56.8	18.8	19.4	-	4.4	0.7	-	100.1
1992-93	S/C	32906	11409	11511	-	2686	390	-	58902
	%	55.9	19.4	19.5	-	4.6	0.7	-	100.1
1993-94	S/C	33501	12099	12011	-	2860	341	-	60812
	%	55.1	19.9	19.8	-	4.7	0.6	-	100.1
1994-95	S/C	36359	13160	12588	-	2990	390	2027	67514
	%	53.9	19.5	18.6	-	4.4	0.6	3	100
1995-96	S/C	39858	14763	14151	-	3273	473	2313	74831
	%	53.3	19.7	18.9	-	4.4	0.6	3.1	100
1996-97	S/C	42054	15732	15460	-	3471	507	1944	79168
	%	53.1	19.9	19.5	-	4.4	0.6	2.5	100
1997-98	S/C	43465	16356	16000	-	3597	420	4452	84290
	%	51.6	19.4	19	-	4.3	0.5	5.3	100
1998-99	S/C	45489	17445	16249	-	3772	1811	5796	90562
	%	50.2	19.3	17.9	-	4.2	2	6.4	100
1999-00	S/C	49391	18894	17497	-	4133	736	6435	97086
	%	50.9	19.5	18	-	4.3	0.8	6.6	100
2000-01	S/C	47812	19368	17887	-	3959	960	10088	100074
	%	47.8	19.4	17.9	-	4	1	10.1	100.2
2001-02	S/C	47151	19047	17499	-	3747	1648	11340	100432
	%	46.9	19	17.4	-	3.7	1.6	11.3	99.9
2002-03	S/C	46336	19843	18228	-	3769	1948	14002	104126
	%	44.5	19.1	17.5	-	3.6	1.9	13.4	100

2003-04	S/C	46778	20297	18577	-	4162	2316	15621	107751
	%	43.4	18.8	17.2	-	3.9	2.1	14.5	100
2004-05	S/C	48018	20697	19091	-	4594	2193	17041	111592
	%	43	18.5	17.1	-	4.2	2	15.3	100
2005-06	S/C	46160	20477	18309	-	4316	2440	21511	113213
	%	40.8	18.1	16.2	-	3.8	2.2	19	100
2006-07#	S/C	53425	22661	19698	-	\$	2156	22809*	120749
	%	44.2	18.8	16.3	-		1.8	18.9	100

S/C : Sales/Consumption.

Note : @ : Included under Esso/HPCL from 1980-81 Onwards.

: Consumption excludes RBF.

# : Provisional

\$ : IBP has been merged with IOC.

\* : Private consumption figures includes imports also.

Source: .Ministry of Petroleum & Natural Gas, Govt. of India. (downloaded from [www.indiastat.com](http://www.indiastat.com))

**Table F2: State/Company-wise Number of Retail Outlets of Petroleum Products in India**

States/UTs	(As on 01.04.2008)				(As on 01.04.2007)				
	IOCL/AOD	HPCL	BPCL	Total	IOCL/AOD	IBP	HPCL	BPCL	Total
Andhra Pradesh	1391	753	706	2850	952	363	715	653	2683
Arunachal Pradesh	46	0	1	47	39	2	0	1	42
Assam	440	61	22	523	377	26	61	15	479
Bihar	854	252	295	1401	551	223	227	282	1283
Chhatisgarh	213	137	148	498	153	41	140	137	471
Delhi	201	96	105	402	152	47	95	105	399
Goa	21	31	39	91	18	3	31	37	89
Gujarat	914	404	433	1751	645	240	393	423	1701
Haryana	868	337	254	1459	585	224	307	238	1354
Himachal Pradesh	158	63	52	273	124	28	62	50	264
Jammu & Kashmir	175	99	90	364	154	10	96	88	348
Jharkhand	338	163	148	649	239	67	158	145	609
Karnataka	1113	524	519	2156	858	181	474	481	1994
Kerala	761	466	381	1608	523	192	445	366	1526
Madhya Pradesh	753	370	472	1595	602	91	350	444	1487
Maharashtra	1194	887	1010	3091	913	211	864	970	2958
Manipur	53	0	2	55	42	5	0	0	47
Meghalaya	94	16	6	116	75	9	15	5	104
Mizoram	19	2	0	21	15	0	2	0	17
Nagaland	41	2	3	46	37	2	2	2	43
Orissa	490	183	238	911	351	74	164	231	820
Punjab	1436	633	544	2613	922	426	577	521	2446
Rajasthan	1086	654	546	2286	886	131	624	506	2147
Sikkim	14	3	11	28	12	2	3	10	27
Tamil Nadu	1385	739	779	2904	1038	236	714	712	2700
Tripura	38	0	0	38	36	1	0	0	37
Uttar Pradesh	2346	916	916	4178	1728	481	870	890	3969

Uttaranchal	188	96	78	362	144	35	95	70	344
West Bengal	903	389	408	1700	601	223	376	389	1589
<b>UTs</b>									
Andaman & Nicobar	6	0	0	6	5	0	0	0	5
Chandigarh	22	11	10	43	18	4	11	10	43
Dadra & Nagar Haveli	7	3	1	11	7	0	3	1	11
Daman & Diu	9	3	3	15	6	2	2	3	13
Lakshadweep	0	0	0	0	0	0	0	0	0
Pondicherry	49	36	18	103	33	10	33	15	91
<b>India</b>	<b>17627</b>	<b>8329</b>	<b>8238</b>	<b>34194</b>	<b>12841</b>	<b>3590</b>	<b>7909</b>	<b>7800</b>	<b>32140</b>

Abbr. : IOCL/AOD : Indian Oil Corporation Limited/Assam Oil Division.

IBP : IBP Co. Limited.

HPCL : Hindustan Petroleum Corporation Limited.

BPCL : Bharat Petroleum Corporation Limited

Source: .Ministry of Petroleum & Natural Gas, Govt. of India. (downloaded from [www.indiastat.com](http://www.indiastat.com))

**Table F3: Selected State-wise Number of Retail Outlets Set up by Private Oil Companies (Reliance, Essar and Numaligarh) in India**

States/UTs	As on 31.12.2004			No of R.Os 31.07.2007
	M/s Reliance Industries Ltd.	M/s Essar Oil Ltd.	M/s Numaligarh Refinery Ltd.	
Assam	-	-	1	21
Gujarat	59	68	-	-
Rajasthan	27	16	-	10
Madhya Pradesh	8	16	-	-
Meghalaya	-	-	4	13
Chhatisgarh	-	-	-	-
Maharashtra	33	66	-	-
Goa	-	-	-	-
Karnataka	19	11	-	-
Andhra Pradesh	35	6	-	2
Kerala	2	1	-	-
Tamil Nadu	20	7	-	-
Pondicherry	-	-	-	-
West Bengal	10	-	-	2
Orissa	2	-	-	1
Bihar	1	-	-	1
Jharkhand	2	-	-	-
Punjab	20	15	-	-
Haryana	6	14	-	8
Delhi	-	-	-	1
Uttar Pradesh	30	10	-	6
Nagaland	-	-	-	2
Manipur	-	-	-	5
Arunachal	-	-	-	1

Pradesh				
Uttaranchal	-	-	-	1
<b>India</b>	<b>274</b>	<b>230</b>	<b>5</b>	<b>74</b>

Source:Source : Lok Sabha Unstarred Question No. 2369, dated 17.03.2005 &  
Rajya Sabha Unstarred Question No. 5066, dated 10.05.2005. &  
Lok Sabha Unstarred Question No. 703, dated 16.08.2007.  
(downloaded from [www.indiastat.com](http://www.indiastat.com))

## G. Prices

**Table G1: Major City-wise Retail Selling Prices of Petrol and Diesel in India**  
(Rs./Litre)

Major City	Petrol	Diesel
<b>(As on 01.04.2007)</b>		
<b>North</b>		
New Delhi	42.85	30.25
Chandigarh	44.09	30.63
Dehradun	44.58	32.7
Jaipur	46.49	33.07
Jammu	44.78	30.99
Lucknow	46.41	33.65
Shimla	45.68	31.38
Srinagar	46.11	31.92
<b>East</b>		
Kolkata	46.9	32.88
Agartala	42.87	30.4
Aizwal	42.69	30.27
Bhubaneshwar	44.55	33.5
Gangtok	45.67	33.24
Guwahati	45.52	31.39
Imphal	42.16	30.17
Itanagar	42.93	30.43
Kohima	43.31	30.48
Patna	46.48	32.97
Port Blair	37.84	29.22
Ranchi	43.96	33.01
Shillong	43.19	30.57
<b>West</b>		
Mumbai	48.41	34.96
Ahmedabad	47.74	35.21
Bhopal	46.99	34.8
Panjim	44.36	33.19
Raipur	44.82	34.13

<b>South</b>		
Chennai	47.48	33.31
Bangalore	50.62	35.25
Hyderabad	48.82	33.81
Pondicherry	41.52	31.47
Trivandum	46.04	33.73
<b>Maximum Price</b>		
<b>Bangalore</b>	<b>50.62</b>	<b>35.25</b>
<b>Maximum Price Port</b>		
<b>Blair</b>	<b>37.84</b>	<b>29.22</b>
<b>Difference</b>	<b>12.78</b>	<b>6.03</b>

Source : Rajya Sabha Unstarred Question No. 4392, dated 15.05.2007.  
(downloaded from [www.indiastat.com](http://www.indiastat.com) )

**Table G2: Consumer and Producer Prices of Natural Gas in India**

(Rs./' 000 Cubic Metre)

Effective Date	Consumer Prices			Producer Prices			Calorific Value (K.Cal/SCM)
	off-shore (Landfall Point) and On-shore	For North Eastern States	Transportation Charges along HVJ Pipeline	ONGC	ONGC (North Eastern State)*	OIL (North Eastern States)*	
01.04.2002	2850	1700	1150	2116	1700	1900	10000
01.07.2002	2850	1700	1150	2074	1700	1900	10000
01.10.2002	2850	1700	1150	2118	1700	1900	10000
01.01.2003	2850	1700	1150	2132	1700	1900	10000
01.04.2003	2850	1700	1150	2206	1700	1900	10000
01.07.2003	2850	1700	1150	2176	1700	1900	10000
01.10.2003	2850	1700	1150	2240	1700	1900	10000
01.01.2004	2850	1700	1150	2224	1700	1900	10000
01.03.2004	2850	1700	1150	2224	1700	1900	10000
01.04.2004	2850	1700	1150	2137	1700	1900	10000
01.07.2004	2850	1700	1150	2176	1700	1900	10000
01.09.2004	2850	1700	1150	2194	1700	1900	10000
01.10.2004	2850	1700	1150	2120	1700	1900	10000
01.01.2005	2850	1700	1150	2143	1700	1900	10000
01.04.2005	2850	1700	1150	2384	1700	1900	10000
01.07.2005	3200	1920	1150	3168	1920	3168	10000
01.10.2005	3200	1920	1150	3137	1920	3137	10000
01.01.2006	3200	1920	1150	3118	1920	3118	10000
01.04.2006	3200	1920	1150	3200	1920	3200	10000
01.04.2007	3200	1920	1150	3200	1920	3200	10000
01.04.2008	3200	1920	1150	3200	1920	3200	10000

Abbr. : ONGC : Oil & Natural Gas Commission.

OIL : Oil India Ltd.

Note : \* : w.e.f. 01.10.1997 gas price along HVJ Pipeline includes Rs. 1150 per 1000 SCM towards transportation charges. The transportation charges along HVJ pipeline are being increased by 1% for every 10% increase in CPI and are linked to the calorific value of Rs. 8500 K.Cal/SCM.

1 : The Consumer prices are exclusive of Royalty, Sales Tax and other Statutory Levies. Producer Prices are exclusive of Royalty.

2 : The discount of Rs. 400 per 1000 SCM was Applicable in case of gas price for North-Eastern States upto 30.09.1997 and at Rs. 300 per 1000 SCM

w.e.f. 01.10.1997 for ONGC had withdrawn this discount from Tripura w.e.f. 01.04.2002 and from Assam w.e.f October 2002.

- 3 : Other Than HVJ pipeline, GAIL/transporters are permitted to negotiate transportation charges with the consumers.
- 4 : W.e.f 1.7.2005, the price of natural gas has been revised for Power, Fertilizer Sector, small consumers having allocation upto 0.05 MMSCMD and consumers drawing gas under supreme court orders vide pricing order dated 20.6.2005.  
The Revised price is Rs. 3200/MCM.
- 5 : W.e.f 01.10.1997 gas price along HVJ pipeline includes Rs. 1150 per 1000 SCM towards transportation charges. The transportation charges along HVJ pipeline are being increased by 1% for every 10% increase in CPI and are linked to the calorific value of 8500 K.Cal/SCM.
- 6 : Actual producer price of Oil & ONGC for sales in north-eastern region is Rs. 1700/MCM at 10000 Kcal/SCM. However, as per gas pricing order dt. 18th September 1997, for concessional price in the north-east, Oil is to be compensated from the gas pool account at a producer price of Rs. 1900/MCM. The producer price of Oil increases by 1% for every 10% increase in CPI.

Source: Ministry of Petroleum & Natural Gas, Govt. of India. (downloaded from [www.indiastat.com](http://www.indiastat.com))

**Table G3: Price Build-up of Selected Petroleum Products in Delhi, Kolkata, Mumbai and Chennai**

Item	(As on 01.04.2007)			
	Delhi	Kolkata	Mumbai	Chennai
<b>High Speed Diesel (Rs./KI)</b>				
Storage Point Price	21675.54	21675.54	21675.54	21675.54
State Surcharge	2	300	137 00	120
BMC Surcharge	0	0 00	299	0 00
Siding Charge	15.86	0	0	0
Rly/Ocean/Freight	102.68	21.93	0	0
RPO Surcharge	21	21	21	21
RPO Charge (Excisable)	0.27	0.27	0.27	0.27
Assessable Value adj.	16.91	0	0 00	0
<b>Assessable Value</b>	<b>21834.26</b>	<b>22018.74</b>	<b>22132.81</b>	<b>21816.81</b>
Basic Excise Duty	1310.06	1321.12	1327.97	1309.01
<b>Sub Total</b>	<b>23144.32</b>	<b>23339.86</b>	<b>23460.78</b>	<b>23125.82</b>
Assessable Value adj.	-16.91	0	0	0
FDZ Charges	44	44	44	44
Additional Excise Duty	2000	2000	2000	2000
Basic Excise Duty Amount	1250	1250	1250	1250
Edn Cess	136.8	137.13	137.34	136.77
<b>Sub Total</b>	<b>26558.21</b>	<b>26771</b>	<b>26892.12</b>	<b>26556.59</b>
Delivery Charges Beyond FDZ	0	13.44	0	0
RPO Price	26558.21	26794.44	26892.12	26556.59
Sales Tax	3162.79	4555.05	7529.79	6222.21
Dealer Commission	529	529	529	529
<b>Selling Price Rs./KI</b>	<b>30249.99</b>	<b>32878.49</b>	<b>34950.91</b>	<b>33307.8</b>
<b>Selling Price Rs./Ltr</b>	<b>1.27</b>	<b>32.88</b>	<b>34.96</b>	<b>33.31</b>
<b>Superior Kerosene Oil(Rs./KI)</b>				
Ex-storage Point Price	7967	7967	7967	7967
State Surcharge	0	62	4	113
BMC Surcharge	0	0	62	0
Siding Charges	6.12	0	0	0
Rly/Ocean/Freight	52.51	19.37	0	0

<b>Assessable Value</b>	<b>8025.63</b>	<b>8048.37</b>	<b>8033</b>	<b>8080</b>
Entry Tax Amount/TN rebate	0	0	0	-576
Sates Tax	321.03	321.93	321.32	300.16
<b>Sub Total - Rs/Kl</b>	<b>8346.65</b>	<b>8370.31</b>	<b>8354.32</b>	<b>7804.16</b>
Wholesales Margin	204	204	204	143
Transport Charges	284.25	203.3	243	52.25
<b>Wholesales Price/Kl</b>	<b>8834.9</b>	<b>8777.61</b>	<b>8801.32</b>	<b>7999.41</b>
Retailers Margin	180	176.45	208	360
Leakage and other Expenses	0	205.18	38.26	30
Retail Transportation	0	130	0	0
Rounding off	75.1	0	2.42	0
<b>Selling Price Rs./Kl</b>	<b>9090</b>	<b>9289.24</b>	<b>9050</b>	<b>8389.41</b>
<b>Selling Price Rs./Ltr</b>	<b>9.09</b>	<b>9.29</b>	<b>9.05</b>	<b>8.39</b>
<b>ATF (Domestic Airlines)</b>				
Basic Price	24870	25410	24970	25240
Inland Differential	570	0	0	0
State Surcharge	2	1520	590	1032
Freight	323.08	590.59	100	148.37
Siding Charges	9.85	0	0	0
Marketing Cost	1850	3100	1750	1650
MSL Cost	206	206	206	206
<b>Assessable Value</b>	<b>27830.93</b>	<b>30826.59</b>	<b>27616</b>	<b>28276.37</b>
Excise Duty	2226.47	2466.13	2209.28	2262.11
Education Cess @3% on ED	66.79	73.98	66.28	67.86
Toll Tax	0	0	0	0
<b>Posted airfield price per KL (Exclusive of Sales Tax and other Levies)</b>	<b>30124.2</b>	<b>33366.7</b>	<b>29891.56</b>	<b>30606.35</b>
<b>Furnace Oil (Rs./Kl)</b>				
Ex-storage Point Price		17050	16600	16900
State Surcharge		105	191.6	375
Notional Railway Freight		286.36	0	0
<b>Assessable Value</b>		<b>17441.36</b>	<b>16791.6</b>	<b>17275</b>
Excise duty + edu cess		2874.34	2767.26	2846.92
<b>Total inclusive of excise duty + edu cess</b>		<b>20315.7</b>	<b>19558.86</b>	<b>20121.92</b>
Sales Tax		812.63	2444.86	2515.24
<b>Total</b>		<b>21128.32</b>	<b>22003.71</b>	<b>22637.16</b>
<b>Light Diesel Oil (Rs./Kl)</b>				
Ex-storage Point Price	21090	21090	21090	21090
State Surcharge	25	370	121.28	455
Notional Railway Freight	254.63	340	0	0
<b>Assessable Value</b>	<b>21369.63</b>	<b>21800</b>	<b>21211.28</b>	<b>21545</b>
Excise duty + edu cess	3521.72	3592.64	3495.62	3550.62
Additional Levy alongwith cess	2575	2575	2575	2575
<b>Total Inclusive of Excise duty + edu cess</b>	<b>27466.35</b>	<b>27967.64</b>	<b>27281.9</b>	<b>27670.62</b>
Sales Tax	3433.29	4754.5	3410.24	6917.65
<b>Total</b>	<b>30899.64</b>	<b>32722.14</b>	<b>30692.14</b>	<b>34588.27</b>

Note : Selling price for Superior Kerosene Oil is for Public Distribution System (PDS).

Source : .Ministry of Petroleum & Natural Gas, Govt. of India. (downloaded from [www.indiastat.com](http://www.indiastat.com))

**Table G4: Wholesale Price Indices of Crude Oil and Petroleum Products in India**

(Base: 1993-94=100)

Products	Weight (%)	(2000-2001 and 2002-2003 to 2007-2008)						
		2000-01	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08*
<b>Light Distillates</b>								
LPG	1.83731	248.2	284	285.5	316	334.8	334.8	334.8
Petrol	0.88815	154.2	163.4	178.7	203.5	231.1	254.8	242.3
Naphtha	0.41885	294.7	256.5	315.6	432.1	530.4	615.9	694.4
<b>Middle Distillates</b>								
Kerosene	0.68928	270.2	359.7	359.2	357.9	357.6	357.6	357.6
Aviation Turbine Fuel	0.16953	144.2	135.7	149.3	174.1	228.7	262.6	272.7
High Speed Diesel Oil	2.02034	228.8	273.5	300.4	360.4	430.4	468.2	451.6
Light Diesel Oil	0.16015	232.2	233	284.6	366.3	445.3	491.1	491.2
<b>Heavy Ends</b>								
Furnace Oil	0.49335	203.5	179.7	227.2	265.5	347.4	393.2	438.4
Lubricating Oil	0.16367	142.6	154.7	163.8	189.3	194.5	248.8	275
Bitumen	0.149	203.5	207.6	251.2	267.4	288	421.7	479
<b>All Commodities</b>	<b>100</b>	<b>156.7</b>	<b>166.8</b>	<b>180.3</b>	<b>189.5</b>	<b>197.2</b>	<b>210.4</b>	<b>215.7</b>

Note : \* : Provisional.

Source: .Ministry of Petroleum & Natural Gas, Govt. of India. (downloaded from [www.indiastat.com](http://www.indiastat.com))**Table G5: Duty Structure of Central Government on Petroleum Products in India**

Items	(As on November, 2007)		
	Basic Customs Duty	Central Excise Duty	Cess/Special Additional Excise Duty
Crude	5%	Nil	Rs. 2500 per tonne
Petrol (MS)	7.50%	6%+Rs. 5/litre	Rs.2 per litre+ Rs. 6 per litre
Diesel (HSD)	7.50%	6%+Rs. 1.25/litre	Rs. 2/litre
LDO	10%	16%+Rs.2.5/litre	-
Naphtha	5%	16%	-
LPG domestic	Nil	Nil	-
LPG	5%	8%	-
SKO PDS	Nil	Nil	-
SKO	10%	16%	-
LNG	5%	Nil	-
Other Products	10%	16%	-

Source : Rajya Sabha Starred Question No. 77, dated on 20.11.2007.

(downloaded from [www.indiastat.com](http://www.indiastat.com))

**Table G6: Realisation of Excise and Custom Duties from Crude Oil and Petroleum Products in India**

(Rs. in Crore)

Product	Actuals									
	1990-91	1999-00	2000-01	200-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
<b>Excise Duties</b>										
Motor Spirit	1202	5018	5426	8501	11563	12575	13792	17554	18303	20102
Kerosene Oil	255	249	725	699	1390	1700	1273	212	236	241
Refined Diesel Oil	693	6769	8147	11028	10570	13470	14455	21773	24672	23848
Diesel Oil (NES)	35	1233	1104	1179	1038	992	1246	505	389	306
Furnace Oil	49	616	981	779	971	822	996	1756	1877	1985
Pol. Products (NOS)	421	2715	3378	2878	3483	2906	3711	4623	4919	6313
Petroleum Gases	66	359	1296	1542	2445	2552	2424	319	454	570
Cess on crude oil	2757	3243	3606	2731	4501	5134	5248	5007	7034	6866
<b>Total</b>	<b>5478</b>	<b>20202</b>	<b>24663</b>	<b>29337</b>	<b>35961</b>	<b>40151</b>	<b>43145</b>	<b>51749</b>	<b>57884</b>	<b>60231</b>
<b>Custom Duties</b>										
Crude Petroleum	3145	6257	7794	4818	6820	7491	9761	7158	7583	9101
Petroleum Products	920	6203	3455	1949	2346	3091	3489	4236	6426	9041
<b>Total</b>	<b>4065</b>	<b>12460</b>	<b>11249</b>	<b>6767</b>	<b>9166</b>	<b>10582</b>	<b>13250</b>	<b>11394</b>	<b>14009</b>	<b>18142</b>
<b>Grand Total</b>	<b>9543</b>	<b>32662</b>	<b>35912</b>	<b>36104</b>	<b>45127</b>	<b>50733</b>	<b>56395</b>	<b>63143</b>	<b>71893</b>	<b>78373</b>

Note : Figures Rounded to Nearest Crore.

\* : Provisional.

Source : Ministry of Petroleum & Natural Gas, Govt. of India. (downloaded from [www.indiastat.com](http://www.indiastat.com))

**Table G7: Change Made in Central Excise and Custom Duty Structure of Crude and Petroleum Products in India**

Item	Crude	Petrol	Diesel	SKO (PDS)	Domestic LPG
<b>Excise Duty</b>					
As on 01.03.2002	*	32%+ Rs. 7 Per Litre	16%+ Rs. 1 per litre	16%	16%
As on 04.06.2002	*	30%+ Rs. 7 per litre	14%+ Rs. 1 per litre	16%	16%
As on 01.03.2003	*	30%+ Rs. 7.50 per litre	14%+ Rs. 1.50 per litre	16%	16%
As on 16.06.2004	*	26%+ Rs. 7.50 per litre	11%+ Rs. 1.50 per litre	16%	8%
As on 19.08.2004	*	23%+ Rs. 7.50 per litre	8%+ Rs. 1.50 per litre	12%	8%
As on 01.03.2005	*	8%+ Rs. 13.00 per litre	16%+ Rs. 3.25 per litre	Nil	Nil
As on 01.03.2006	\$	8%+ Rs. 13.00 per litre	16%+ Rs. 3.25 per litre	Nil	Nil
<b>Customs Duty</b>					

As on					
01.03.2002	10	20	20	Nil	10
As on					
01.03.2003	10	20	20	10	10
As on					
09.07.2004	10	20	20	10	10
As on					
19.08.2004	10	15	15	5	5
As on					
01.03.2005	5	10	10	Nil	Nil
As on					
14.06.2006	5	7.5	7.5	Nil	Nil
As on					
01.03.2007	5	7.5	7.5	Nil	Nil

Note : With effect from 9.7.04, an additional levy of education cess @ 2% has been imposed.

With effect from 1.3.2003 National Calamity Contingent Duty @ Rs. 50/MT levied on imported Crude and indigenous crude (Except PSC/NELP Crude Oil).

\* : Rs. 1800 pmt As Cess.

\$ : Rs. 2500 pmt As Cess.

Source : Rajya Sabha Unstarred Question No. 145, dated on 25th July, 2006. &

Rajya Sabha Starred Question No. 77, dated on 20.11.2007.

(downloaded from [www.indiastat.com](http://www.indiastat.com))

## H. Subsidies

**Table H1: Subsidies on Major Petroleum Products in India**

(Rs. in Crore)

Product	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
Kerosene-Domestic use (PDS)	5310	3018	2018	979	976	969	511\$
(Rs/Litre)	4.05	2.45	1.63	0.82	0.82	0.82	0.82
HSD	0	0	0	0	0	0	0
LPG-Packed-Domestic	5830	3691	2783	1468	1520	1572	830\$
(Rs/Cyl)	115.63	67.75	45.18	22.58	22.58	22.58	22.6
Naphtha/FO/LSHS-Fertiliser use	0	0	0	0	0	0	0
Bitumen-Packed	0	0	0	0	0	0	0
Paraffin Wax	0	0	0	0	0	0	0
<b>Total</b>	<b>11140</b>	<b>6709</b>	<b>4801</b>	<b>2447</b>	<b>2496</b>	<b>2541</b>	<b>2700</b>

Abbr. : N.A. : Not Available.

\$ : Apr-Sep'07 (Estimated).

Source : Ministry of Petroleum & Natural Gas, Govt. of India. (downloaded from [www.indiastat.com](http://www.indiastat.com))

**Table H2: Sector-wise Subsidies by Central Government in India**

(Rs. in Crore)

Sector	1991-92	1994-95	2001-2	2002-3	2003-4	2004-5	2005-6	2006-7	2007-08
<b>I. Total Central Govt. Subsidies</b>	<b>12253</b>	<b>11854</b>	<b>31210</b>	<b>43533</b>	<b>44323</b>	<b>45957</b>	<b>475020</b>	<b>57125</b>	<b>69742</b>
Food	2850	5100	17499	24176	25181	25798	23077	24014	31546
Other subsidies	9403	6754	13711	19357	19142	20159	24443	33111	38196
<b>II. Pol Products@</b>	<b>4175</b>	<b>6560</b>	<b>11140</b>	<b>5225</b>	<b>6351</b>	<b>2957</b>	<b>2683</b>	<b>2699</b>	<b>2882</b>
<b>III. Total Subsidy (I+II)</b>	<b>16428</b>	<b>18414</b>	<b>42350</b>	<b>---</b>	<b>---</b>	<b>---</b>	<b>---</b>	<b>---</b>	<b>---</b>

<b>IV. Pol</b>									
<b>Subsidy as %</b>									
<b>of Total</b>									
<b>Subsidy</b>	<b>25.41</b>	<b>35.63</b>	<b>26.3</b>	<b>12</b>	<b>14.33</b>	<b>6.43</b>	<b>5.65</b>	<b>4.72</b>	<b>4.13</b>

Abbr. : RE : Revised Estimate.

Note : @ : These do not form part of Govt. Budget upto 2001-02.

Source : Ministry of Petroleum & Natural Gas, Govt. of India. (downloaded from [www.indiastat.com](http://www.indiastat.com))

## I. Financials

**Table I 1: Profit After Tax (PAT) of Oil PSUs in India**

(Rs. in Crore)

Company	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
<b>Upstream Oil Cos.</b>						
ONGC	6197.88	10529.3	8664.4	12983.05	14430.78	15642.92
IOCL	-	-	-	4891	4915	7499
BPCL	-	-	-	965.8	291.65	1805.48
HPCL	-	-	-	1277.33	405.63	1571.17
GAIL	1185.83	1639	1869.34	1954	2310	2387
OIL	525.22	916.73	949.7	1061.68	1689.93	1639.99
<b>Sub Total</b>	<b>7908.93</b>	<b>13085.03</b>	<b>11483.44</b>	<b>23132.86</b>	<b>24042.99</b>	<b>30545.56</b>
<b>Integrated Oil Cos.</b>						
IOC	2884.66	6114.89	7004.82	4891.38	889.66*	-
HPC	787.98	1537.36	1903.94	1277.33	-1607.78*	-
BPC	849.83	1250.03	1694.57	965.8	-1658.60*	-
IBP	195.79	87.75	214.66	58.87	-520.83*	-
<b>Sub Total</b>	<b>4718.26</b>	<b>8990.03</b>	<b>10817.99</b>	<b>7193.38</b>	<b>-2897.55*</b>	<b>-</b>
<b>Stand Alone Refineries</b>						
KRL	68.77	456	555.09	842.12	220.60*	-
MRPL	-492.48	-411.81	459.42	879.76	401.10*	-
NRL	122.98	174.63	214.95	409.15	273.65*	-
CPCL	63.71	302.89	400.05	596.97	451.70*	-
BRPL	-198.61	178.45	303.74	478.3	144.11*	-
<b>Sub Total</b>	<b>-435.63</b>	<b>700.16</b>	<b>1933.25</b>	<b>3206.3</b>	<b>1491.16*</b>	<b>-</b>
<b>Total-PSU</b>	<b>12191.56</b>	<b>22775.22</b>	<b>24234.68</b>	<b>26398.34</b>	<b>13193.84*</b>	<b>-</b>

Source : Ministry of Petroleum & Natural Gas, Govt. of India. & Lok Sabha Starred Question No. 333, dated 06.09.2007. (downloaded from [www.indiastat.com](http://www.indiastat.com))

**Table I2: Financial performance of petroleum refining companies in India**

(in Rs Crore)

Company Name	Sales		Compensation to employees		PBDITA		PAT		Networth	
	Mar-06	Mar-07	Mar-06	Mar-07	Mar-06	Mar-07	Mar-06	Mar-07	Mar-06	Mar-07
Bharat Petroleum Corpn. Ltd. Bongaigaon Refinery & Petrochemicals	85149.62	107452.27	881.61	1003.70	1447.80	4142.18	291.61	1805.38	9139.42	10273.53
	6454.17	6565.14	112.63	142.89	314.98	328.96	174.76	184.98	871.64	974.80

Ltd.										
Chennai Petroleum Corpn. Ltd.	25476.71	29425.54	96.82	150.63	1134.35	1306.88	480.96	565.27	2281.53	2637.74
Essar Oil Ltd.	649.27	475.77	18.32	12.32	-83.83	-45.33	-93.68	-67.49	2520.73	2805.74
H P C L-Mittal Energy Ltd.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	300.00	338.94
Hindustan Petroleum Corpn. Ltd.	77526.39	97647.13	695.62	731.23	1394.09	3522.89	405.55	1570.98	8735.62	9598.65
Indian Oil Corpn. Ltd.	199430.91	250380.17	1860.19	2620.86	9886.94	14617.69	4914.36	7498.56	29302.67	34857.29
Kochi Refineries Ltd. [Merged]										
Mangalore Refinery & Petrochemicals Ltd.	28242.86	32208.13	47.96	55.20	1190.91	1629.22	371.62	525.52	2395.34	2756.80
Nagarjuna Oil Corpn. Ltd.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	592.01	684.51
Numaligarh Refinery Ltd.	5809.64	7917.45	38.43	48.50	649.80	761.28	448.93	568.80	1691.33	2044.97
Petro Energy Products Co. India Ltd.										
Reliance Industries Ltd.	89124.46	118353.71	978.45	2094.05	14990.01	20532.13	9069.34	11943.91	49804.26	63967.13
Reliance Petroleum Ltd.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3150.00	13448.82

Source: Prowess CMIE

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