



COMMODITY PROFILE- CRUDE OIL

Though crude oil is found in ancient time, people knew about it more as a medicine, not as a fuel. It was only in 1859 that modern day oil industry was born. People started using oil initially in the form of kerosene, lubricants etc. In 1889, Germany's Daimler and Wilhelm Maybach first built one gasoline engine, and it was the beginning of the modern day automobile industry.

Crude oil is a mixture of hydrocarbons that exists in a liquid phase in natural underground reservoirs. The liquid substance derived its material from 'the fossilization of plants and animals'. It takes million of years for that fossilized plant an animal to be converted into crude oil substance. Crude oil is the most important energy carrier at a global scale and since all kinds of transport rely heavily on oil, the future availability of crude oil is of paramount interest. Crude oil is classified by the location of its origin and often by its relative weight or viscosity (light, intermediate or heavy). Refiners may also refer to it as 'sweet', which means it contains relatively little sulphur, or as 'sour', which means it contains substantial amounts of sulphur and requires more refining in order to meet current product specifications. The number of carbon atoms determines the oil's relative 'weight' or density. Gases generally have one to four carbon atoms, while heavy oils and waxes may have 50, and asphalts, hundreds.

Types of Crude Oil

Light sweet crude oil - WTI (West Texas Intermediate) crude oil is of very high quality, excellent for refining a larger portion of gasoline. Its API gravity is 39.6 degrees (making it a "light" crude oil), and it contains only about 0.24% of sulfur (making a "sweet" crude oil).

Refiners prefer Light Sweet Crude because of its low sulfur content and considered best for high value products such as gasoline, diesel, heating oil and jet fuel.

This combination of characteristics, combined with its location, makes it an ideal crude oil to be refined in the United States, the largest gasoline consuming country in the world. Most WTI crude oil gets refined in the Midwest region of the country, with some more refined within the Gulf Coast region.

Brent crude oil - Brent blend is actually a combination of crude oil from 15 different oil fields in the Brent and Ninian systems located in the North Sea. Its API gravity is 38.3 degrees, while it contains about 0.37% of sulfur.

Brent blend is ideal for making gasoline and middle distillates, both of which are consumed in large quantities in Northwest Europe, where Brent blend crude oil is typically refined. However, if the arbitrage between Brent and other crude oils, including WTI, is favorable for export, Brent has been known to be refined in the United States (typically the East Coast or the Gulf Coast) or the Mediterranean region.

Usage

Common usage of crude oil or petroleum can be classified as follows: ethane, diesel fuel (petrol-diesel), fuel oils, gasoline (petrol), jet fuel, kerosene and liquefied petroleum gas (LPG). About 35 percent of the world's primary energy consumption is supplied by oil, followed by coal with 25 percent and natural gas with 21 percent. Transport relies to well over 90 percent on oil, be it transport on roads, by ships or by aircrafts. Therefore, the economy and the lifestyle of industrialized societies rely heavily on the sufficient supply of oil.

Crude Oil Refinery

An oil refinery is an industrial process plant where crude oil is processed and refined into more useful petroleum products, such as gasoline, diesel fuel, asphalt base, heating oil,

kerosene and liquefied petroleum gas. Most of all refineries perform three basic steps such as separation, conversion and treatment.

Crude Oil Composition

Table 1: Chemical Composition of Crude Oil

Element	Share in percentage
Carbon	83 to 87
Hydrogen	10 to 14
Nitrogen	0.1 to 2
Oxygen	0.1 to 1.5
Sulfur	0.5 to 6
Metals	Less than 1000 ppm

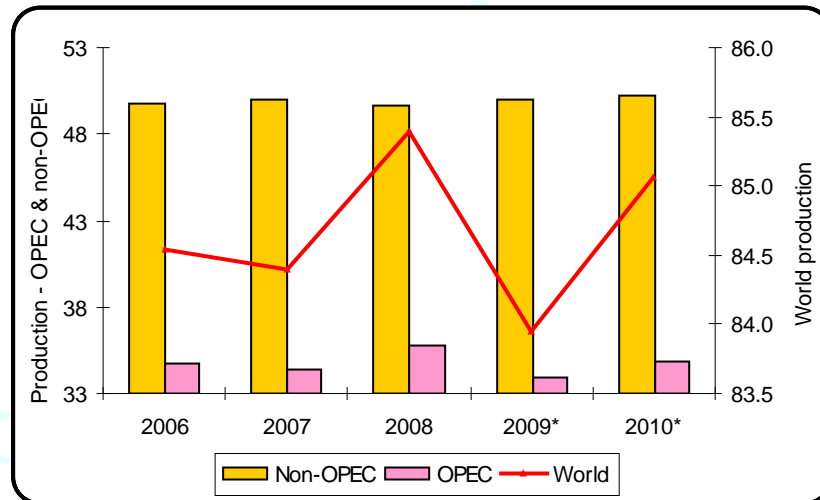
Crude oil composed of various chemical molecules. Carbon by weight has the highest composition to the tune of 83 to 87%. Nitrogen, oxygen, sulfur and metals are the other composition of crude oil.

Global Scenario

Saudi Arabia, Russia and United States are the top three crude oil producing countries in the world. OPEC comprises 11 countries, which preserve more than three quarters of oil reserves in the world. The major contributors of this reserve are Middle East countries including Saudi Arabia, Iran and Iraq. Together they contribute more than 50% of the total OPEC reserves. The economy of these countries largely depends on their oil export revenues. OPEC produces 40% of the world crude oil and 15% of natural gas. It represents 55% of total oil exports traded internationally. Hence, OPEC has great influence on the world crude oil market. Its purpose is to supply crude oil to consumer at reasonable prices and stabilize the price at the same time. Often they increase or decrease the oil supplies based on demand and supply scenario to stabilize the price.

Crude Oil Production

Fig. 1: World Crude Oil Production (Mln barrels/ day)



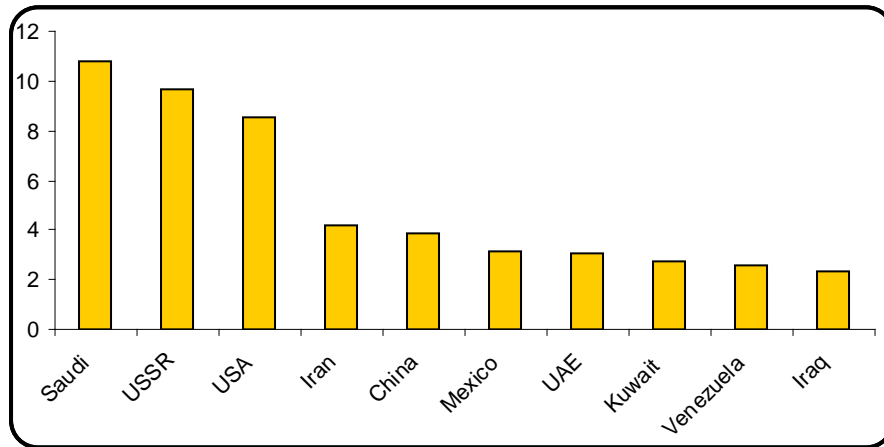
Source: EIA

* Indicates estimated value for 2009 and 2010

World oil production increased by 3,80,000 barrels per day in 2008 despite production cuts instituted by OPEC countries late in the year. World crude oil production is ranging from 84 to 85 million barrels per day during 2006 to 2010. During this period, it has recorded a

marginal growth of about 0.1%. In the same period, OPEC production share was about 41% with the output of 34 million barrels per day.

Fig. 2: Top Crude Oil Producing Countries in 2008 (Mln barrels / day)



Source: EIA

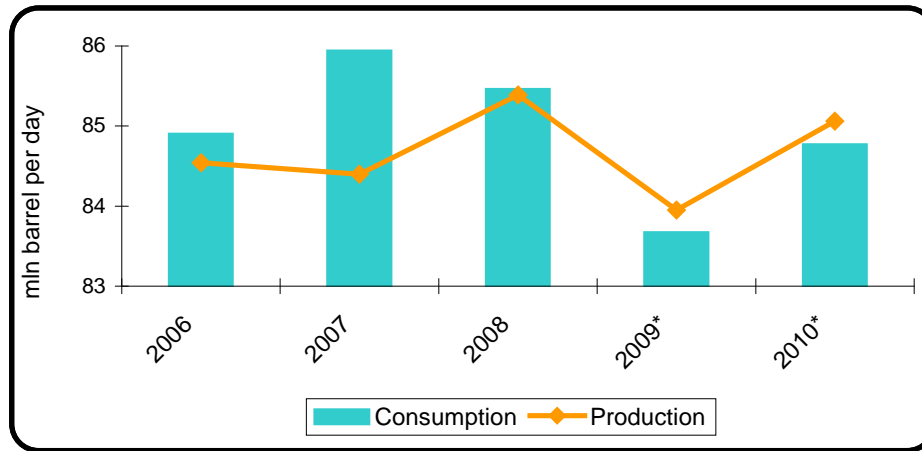
Saudi Arabia, Russia, USA, Iran and China were major producing countries of crude oil in the world in the year 2008 with the output of 10.78 mln barrel/ day, 9.7 mln barrel/ day, 8.5 mln barrel/ day, 4.17 mln barrel/ day and 3.9 mln barrel/ day respectively.

Crude Oil Consumption

The key driver of crude oil demand is robust global economic growth; particularly in emerging market economies. Since 2003, world oil consumption growth has averaged 1.8 percent per year, representing an estimated 1 million barrels per day in 2008. Non-member countries of the OECD, especially China, India, and the Middle East, represent the largest part of this growth. These economies are among the fastest growing in the world; together they have accounted for nearly two-thirds of the rise in world oil consumption since 2004.

World oil consumption fell by 420,000 b/d in 2008, the largest decline since 1982. However, China again recorded the world's largest incremental growth, rising consumption by 260,000 barrel/day.

Fig. 3: World Crude Oil Consumption vs Production (2006 - 2010)



Source: EIA

* Indicates estimated value

World crude oil consumption is averaged at 85 million barrels per day and production is around 84-85 million barrels per day during 2006 to 2010 and consumption has recorded a negative growth of about 0.3% where as production have shown a positive growth of about 0.1% during 2006 to 2010.

Table 2: Top Crude Oil Consuming Countries (Avg. from 2006-2008)

Countries	Consumption (mln barrel/ day)	Share (%)
US	19.7	24.9
China	7.2	9.0
Japan	4.9	6.2
Russia	3.9	4.9
India	2.7	3.4
Germany	2.5	3.2
Canada	2.3	2.9
Brazil	2.3	2.9
South Korea	2.2	2.8
Mexico	2.0	2.6

Source: OPEC

Among major consumers of crude oil, the US tops the list with the share of 25% followed by China, Japan, USSR and India with a share of 9%, 6.2%, 4.9% and 3.4% respectively.

Chinese Demand

After 2002, China became largest consumer of oil after United States surpassing Japan. In 2003, China accounted for 7.2% of the total oil used. Chinese GDP growth has increased up to 10% per year in last 3 years, which has generated huge amount of energy demand in the country. In 2008, China is estimated to consume about 7.5 million barrels per day. Chinese imports of oil rose to 3.9 million barrels per day. Energy Information Administration – USA (EIA) maintains that Chinese demand will continue to grow in 2009 and 2010 despite global slowdown and the oil demand will reach 8.2 million barrel per day in 2010.

Crude Oil EXIM Trade

Although global crude oil consumption is close to 80 million barrels per day during 2006-2008, global EXIM trade will be ranging between 40 and 43 million barrels per day. This could be mainly attributed to home production at various consuming countries. Some countries like USA would also carry out re-exports of petroleum products.

Table 3: Top Crude Oil Exporting Countries (Avg. from 2006-2008)

Countries	Exports (mln barrels /day)	Share (%)
Saudi Arabia	7.1	17.5
Russia	5.7	14.0
Iran	2.4	6.0
United Arab Emirates	2.4	5.8
Nigeria	2.2	5.3
Norway	2.0	4.9
Venezuela	1.9	4.8
Mexico	1.7	4.3
Kuwait	1.7	4.2
Iraq	1.7	4.1
Total world exports	40.5	100.0

Source: OPEC

Among major exporters of crude oil, the Saudi Arabia and Russia top the list with the share of 17.5% and 14% respectively. Iran, UAE and Nigeria are the other major exporters of crude oil.

Table 4: Top Crude Oil Importing Countries (Avg. from 2006-2008)

Countries	Imports (mln barrels /day)	Share (%)
United States	10.0	23.2
Japan	4.0	9.3
India	2.4	5.6
South Korea	2.4	5.5
Germany	2.2	5.1
Italy	1.7	4.0
France	1.7	3.9
Spain	1.2	2.7
United Kingdom	1.0	2.4
Netherlands	1.0	2.3
World total imports	43.0	0.1

Source: OPEC

Among major importers of crude oil, the US tops the list with the share of 23% followed by Japan, India, South Korea and Germany with a share of 9.3%, 5.6%, 5.5% and 5.1% respectively. Although the countries such as China and Russia are among major consumers of crude oil, they feed their domestic requirements with own production.

Domestic Scenario

Crude Oil Production in India

India produced 650 thousand bbl / day in 2008 and it is estimated the production would rise in next three years. India reserves second highest crude oil deposits in Asia-Pacific after China. As of Jan 2009, Indian reserves stands at 5.6 billion barrels.

Indian Oil Refining Companies

Currently, state-owned Oil and Natural Gas Corporation Ltd is the biggest producer of oil (largely from the Mumbai High offshore fields) with a share of around 75 per cent in India's total crude production.

The major units pertaining to the oil sector in India are

- Indian Oil Corporation (Public sector)
- Oil and Natural Gas Corporation (Public sector)
- Reliance India Ltd (Private sector)
- Essar Oil Refinery (Private sector)
- Bharat Petroleum Corporation Ltd (Public sector)
- Hindustan Petroleum Corporation Ltd (Public sector)
- Mangalore Refineries and Petrochemicals Ltd (Public sector)

ONGC is the major player in the Indian energy & petroleum sector.

Crude Oil Consumption in India

India is the sixth largest consumer of crude oil in the world with about 70% of its local requirement met through imports. Due to relatively low inland production, India depends mainly on oil imports to meet its demand. Indian consumption stood robust in recent years. The country consumed average of about 2.7 million barrels per day during 2006 and 2008.

Import of Crude Oil in India

India currently stands at third largest importer of crude oil in the world. About 70% of oil consumption in India is depended on imports. In 2007-08, India imported 121.672 million tonnes of crude oil that was 9 per cent higher than the 111.502 million tonnes imported in 2006-07. India's crude oil import bill was \$68 billion in FY08, an astounding 40 per cent higher than \$48.4 billion over the previous year because of the unprecedented rise in international crude oil prices.

Factors influencing Prices

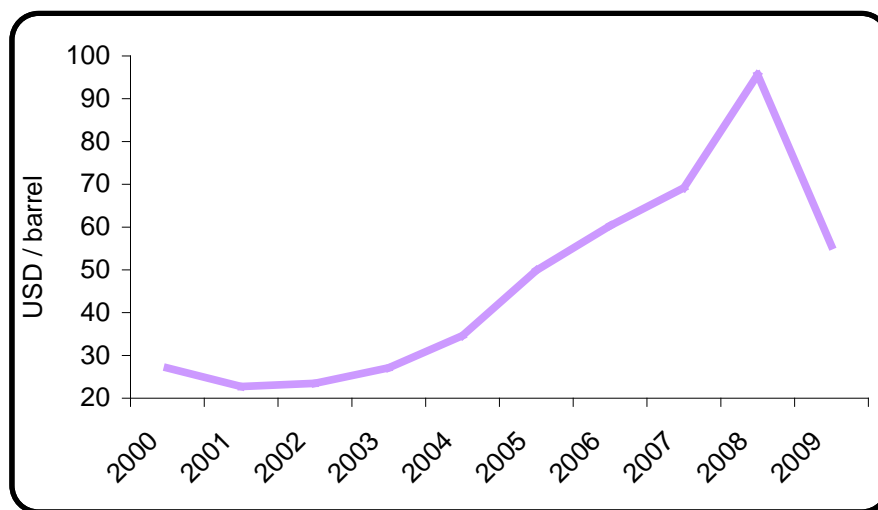
- Decision by OPEC to increase or decrease crude oil production
- Demand from global emerging economies such as China, India and Brazil etc.
- Seasonal factors such Hurricane season, winter demand in the US etc
- Increase or decrease in the inventory level of crude oil
- Any new source of crude oil
- Investment demand like US oil fund ETF

Crude Oil Prices

WTI is generally priced at about a USD 5 to 6 per-barrel premium to the OPEC Basket price and about USD 1 to 2 per-barrel premium to Brent crude oil, although on a daily basis the pricing relationships between these can vary greatly.

Crude oil prices (annual average) have galloped in 2008. After recording historic high levels in mid 2008, prices have witnessed sharp decline due to subdued demand on global economic slowdown. Although prices are ruling lower levels during the current year, they are witnessing recovery in recent months.

Fig. 4: Crude Oil Spot Prices (FOB) weighted by estimated export volume



Source: EIA

Note: Jan to Sept daily avg. prices for 2009

As it is evident from the table below, there is little price variation among OPEC and non-OPEC countries. This trend has been witnessed during current decade as a whole.

Table 5: Crude Oil Prices (USD/barrel)

Year	All country	OPEC	Non-OPEC
2000	27.1	27.0	27.19
2001	22.7	23.0	22.45
2002	23.5	23.5	23.49
2003	27.1	27.0	27.25
2004	34.6	34.7	34.58
2005	49.9	50.4	49.47
2006	60.3	61.4	59.58
2007	69.2	69.6	68.70
2008	95.6	95.7	95.52
2009*	55.7	55.9	55.40

Source: EIA

Note: * Indicates Jan to Sept daily avg. prices for 2009

Major Global Exchange

New York Mercantile Exchange (NYMEX) is the biggest platform where energy futures are traded. Its Light Sweet Crude is the most liquid and largest future contract traded on physical commodity. The contract is considered as the international benchmark for the crude oil pricing. Contract consists of 1000 barrel as trading unit and delivered in Cushing, Oklahoma.

References

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INDIAN
COMMODITY EXCHANGE
Seize the right opportunity