

Oil & Gas

NOVEMBER
2011



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Contents

- ❖ Advantage India
- ❖ Market overview and trends
- ❖ Growth drivers
- ❖ Success stories: ONGC, Reliance Industries
- ❖ Opportunities
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Advantage India

Growing demand

- India is the world's fifth-largest energy consumer; oil accounts for 30 per cent of the total energy consumption
- Buoyant economic growth is the main factor driving the country's energy requirements

Skilled workforce

- About 130,000 people were employed in the petroleum industry during 2009–10
- The University of Petroleum and Energy Studies in Dehradun, Uttarakhand, is Asia's first and only energy university

2015E

Oil demand – 4 million B/D; Gas demand – 105.0 BCM

Advantage India

Supportive FDI guidelines

- 100 per cent Foreign Direct Investment (FDI) is allowed in upstream and private sector refining projects
- The FDI limit for public sector refining projects has been raised to 49 per cent

Accommodating Policies

- Government has enacted various policies [such as the New Exploration Licensing Policy (NELP) and Coal Bed Methane (CBM) policy] to encourage investments across the industry's value chain

2008

Oil demand – 3 million B/D; Gas demand – 41.3 BCM

Source: Business Monitor International (BMI), Aranca research
Notes: B/D – barrels per day, BCM – billion cubic meters

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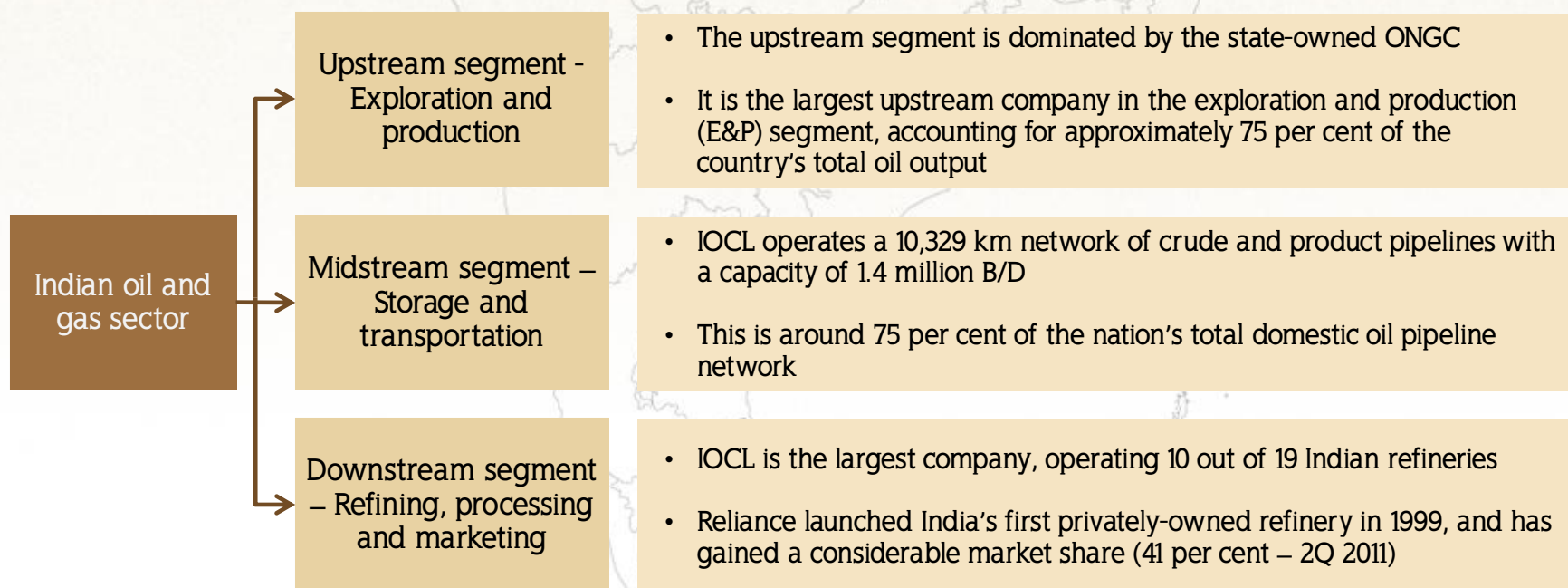
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In India, oil and gas is dominated by state-owned entities

- India is the fifth-largest energy consumer in the world
- The country has 5.8 billion barrels of proven oil reserves with an average oil production of 815,000 B/D
- India has 1,115 BCM of gas reserves, which produce 39.3 BCM annually



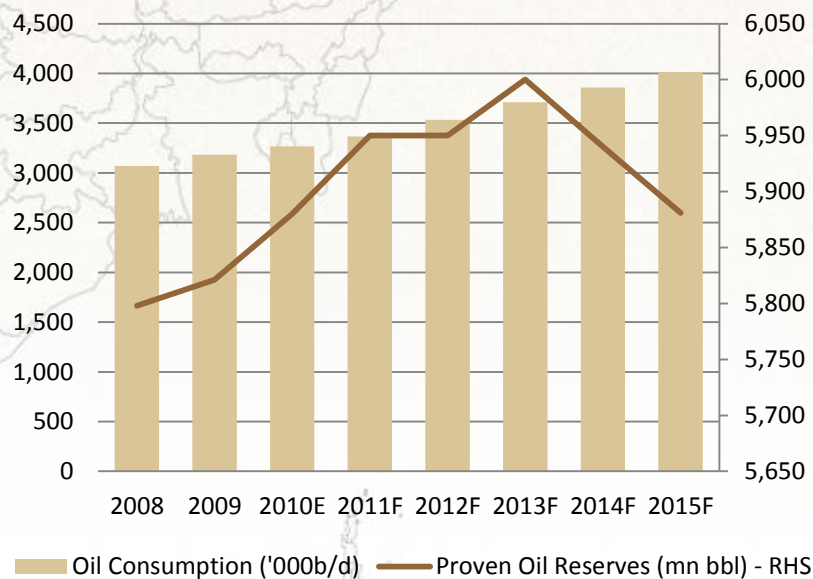
Source: BP Statistical Review, June 2010, BMI Forecasts

Note: BCM – Billion Cubic Meters; Barrel/Day – B/D, ONGC – Oil and Natural Gas Corporation of India, IOCL – Indian Oil Corporation Limited

Oil supply and demand in India ... (1/2)

- Oil consumption is estimated to rise from 3 million b/d in 2009 to 4 million b/d by 2015
- Owing to growth in demand, dependency on imports is expected to increase

Growth in demand has outpaced supply expansion

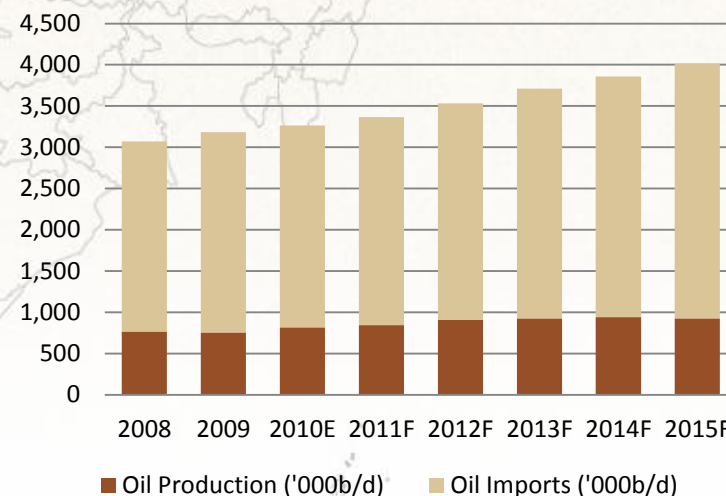


Source: BMI Forecasts - 2Q 2011
Notes: b/d – Barrel/Day, mn bbl – million barrel

Oil supply and demand in India ... (2/2)

- Imports currently account for approximately 75 per cent of the total demand
- Backed by new oil fields, the domestic oil output is anticipated to grow to 925,000 b/d by 2015

Imports form a substantial portion of total oil supply ('000 b/d)

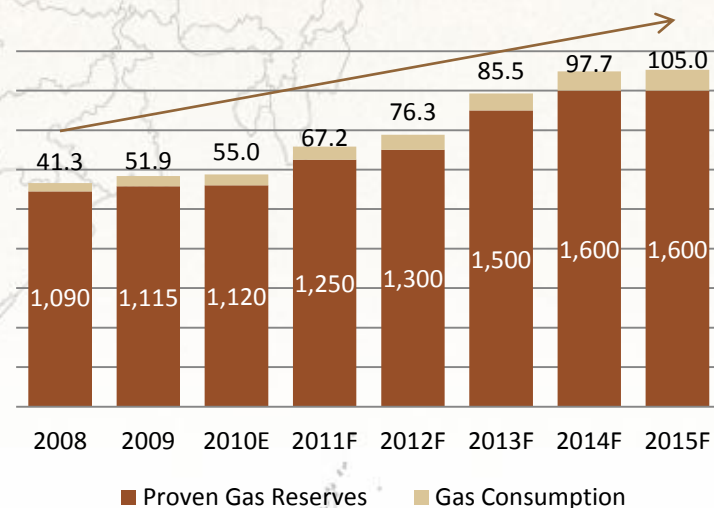


Source: BMI Forecasts - 2Q 2011

Gas supply and demand in India ... (1/2)

→ With India developing gas-fired power stations, consumption is up more than 160 per cent since 1995

Demand expected to rise at a CAGR of 12 per cent (2009–15) (BCM)

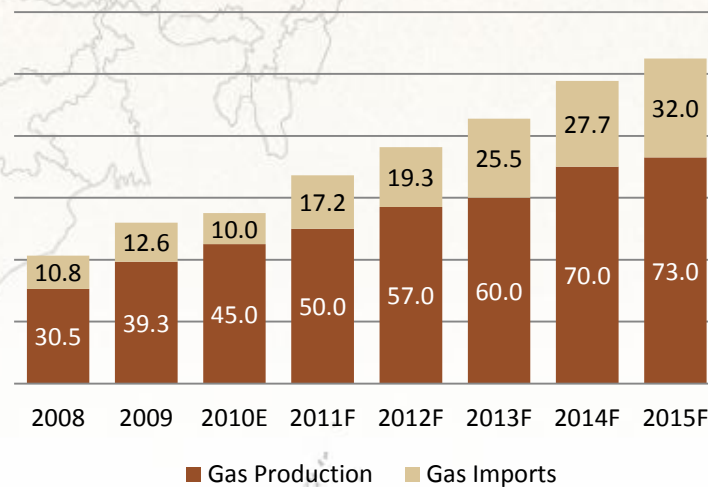


Source: BMI Forecasts - 2Q 2011
Note: BCM – Billion Cubic Meters

Gas supply and demand in India ... (2/2)

→ The gas imports account for approximately 25 per cent of the total demand

Domestic production contributes to most of the supply (BCM)

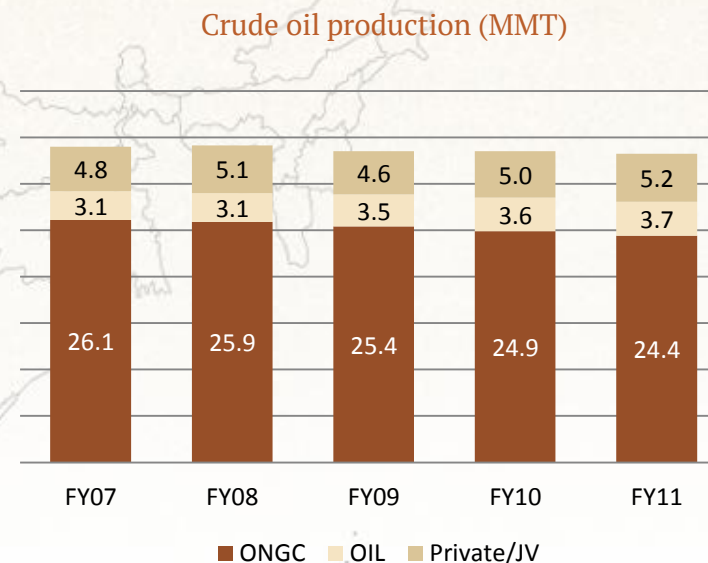


Source: BMI Forecasts - 2Q 2011
Note: BCM – Billion Cubic Meters

Upstream segment – Crude oil and gas production ... (1/2)

- Total crude production stood at 33.3 MMT during FY11
- ONGC accounted for 73 per cent of the total production

Note: MMT – Million Metric Tonne

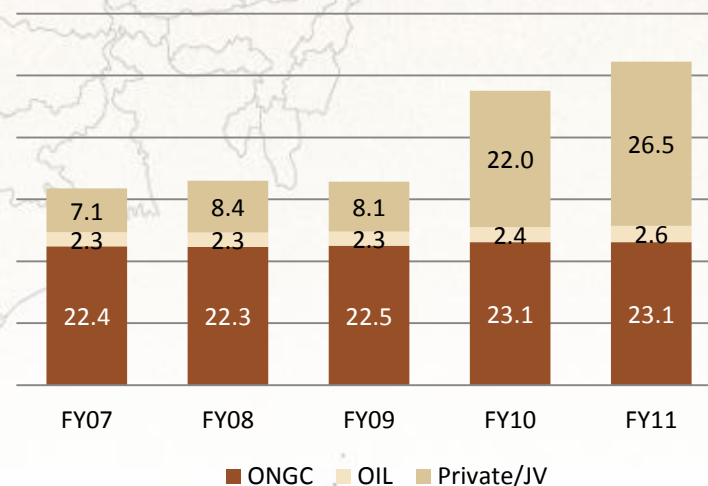


Source: Company reports, www.petroleum.nic.in, Aranca Research

Upstream segment – Crude oil and gas production ... (2/2)

- Total gas production was 52.2 BCM during FY11
- The contribution from Private/JV has drastically increased in the last couple of years as the development of the Reliance - Krishna Godavari (KG) basin commenced

Annual gas production (BCM)

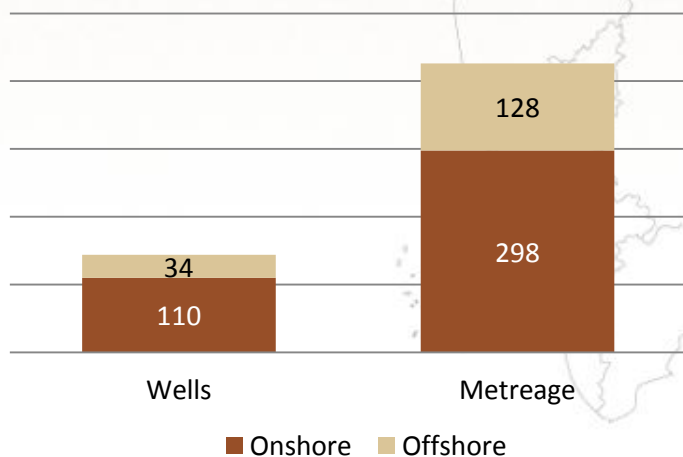


Source: Company reports, www.petroleum.nic.in, Aranca Research

Upstream segment – Exploration and development activities

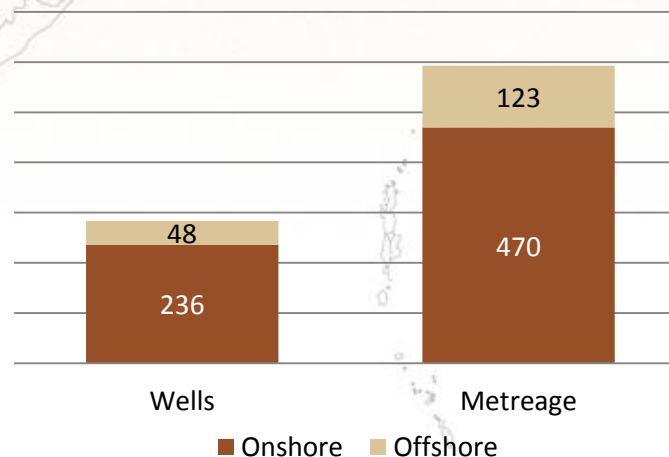
- During FY10, 428,000 meters of wells were being explored and developed in India
- The total number of wells drilled in the country during the same period was 1,019,000 metres
- Most upstream drilling and exploration work is undertaken by state-owned oil companies
- The leader in the upstream segment is ONGC, which accounts for 70 per cent of the total crude oil output in India

Exploration activities (FY10) ('000 meter)



Source: www.dghindia.org

Development drilling activities (FY10) ('000 meter)



Source: www.dghindia.org

Midstream segment – Storage and transportation

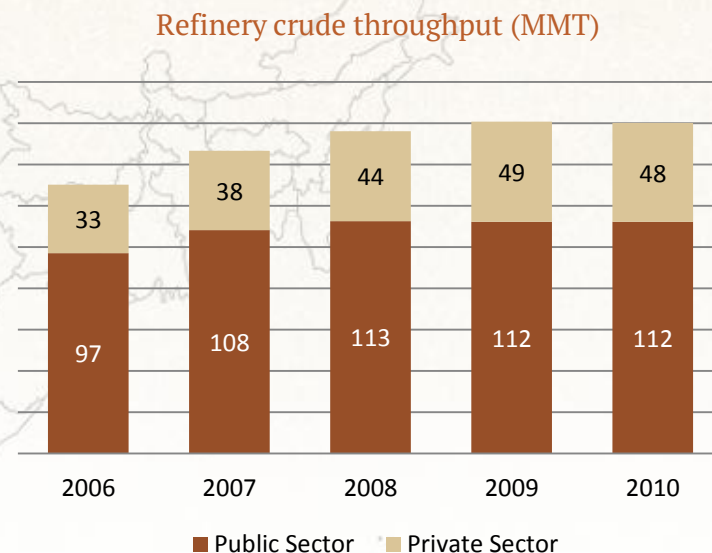
- The total length of crude oil pipelines in India is 6,235 kilometers (km) with a total capacity of 92.6 million metric tonnes per annum (MMTPA)
- ONGC contributes 47.3 per cent to the Indian crude pipeline capacity with a 673 km long pipeline network across the country
- IOCL accounts for 43.6 per cent of the country's crude pipeline capacity with its 4,366 km long network of crude pipelines
- OIL accounts for the remaining share of crude pipeline capacity; it owns the 1,193 km long Duliajan-Digboi-Bongaigaon-Barauni pipeline with a capacity of 8.4 MMTPA

Source: Basic Statistics Report, Indian Petroleum & Natural Gas – www.petroleum.nic.in

Name of the pipeline	Capacity (MMTPA)	Length (km)
OIL - Duliajan-Digboi-Bongaigaon-Barauni	8.4	1,193
IOCL - Salaya-Mathura-Panipat Pipeline	21	1,870
IOCL - Haldia-Barauni/Paradip Barauni	11	1,302
IOCL - Mundra-Panipat	8.4	1,194
ONGC - Mumbai High-Uran	15.6	204
ONGC - Heera-Uran	11.5	81
ONGC - Kalol-Nawagam-Koyali	8.5	129.31
ONGC - MHN-NGM	2.2	77
ONGC - CTF, Ank to Koyali (AKCL)	2	94.8
ONGC - Lakwa-Moran	1.5	18
ONGC - Geleki-Jorhat	1.5	48.47
ONGC - NRM to CPCL	0.7	6
ONGC - KSP-WGGS to TPK refinery	0.08	13.5
ONGC - GMAA EPT to S. Yanam unloading terminal	0.09	4
Total	92.6	6,235

Downstream segment – Refinery crude throughput ... (1/2)

- State-controlled entities dominate the downstream segment as well
- In total, India has 20 refineries, 17 in the public sector and 3 in the private sector
- Public sector refineries accounted for 70 per cent of the total refinery crude throughput

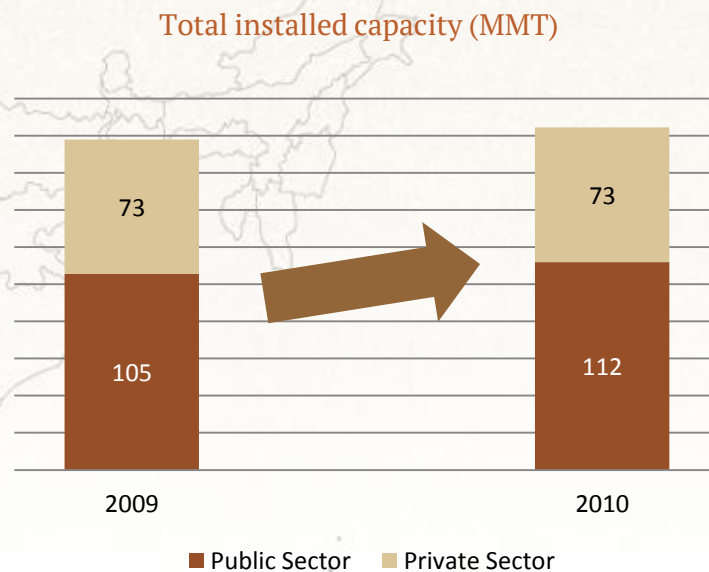


Source: www.petroleum.nic.in

Downstream segment – Refinery crude throughput ... (2/2)

- The total crude throughput rose from 130 MMT during 2006 to 160 MMT by 2010
- In 2010, the sector's total installed capacity also increased to 184 MMT from 178 MMT in 2009
- In 2009, Reliance emerged as the largest domestic refiner with a capacity of 62 MMT (Jamnagar Refinery)

Note: MMT – Million Metric Tonne

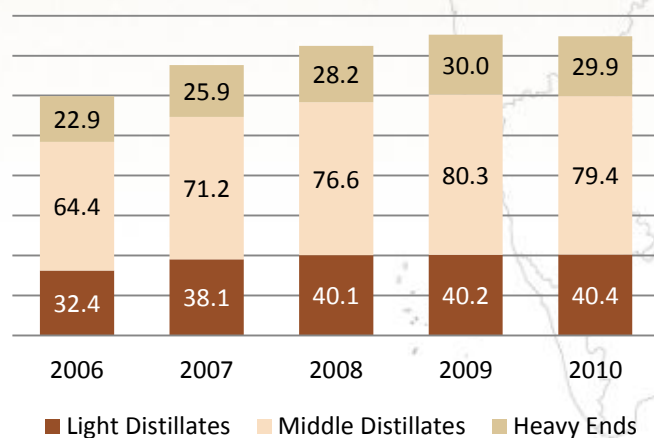


Source: www.petroleum.nic.in

Downstream segment – Petroleum products

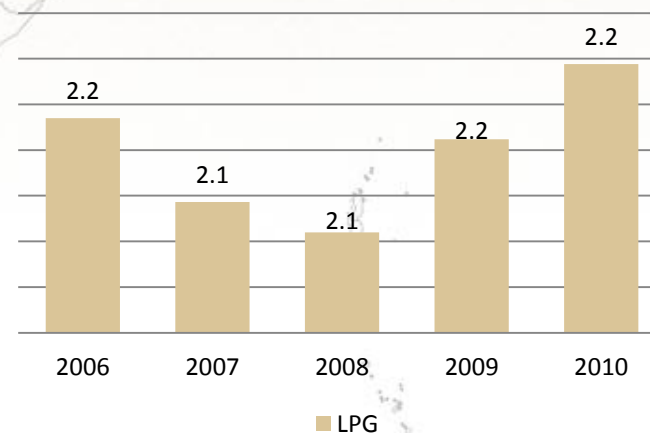
- Petroleum products produced during 2010 amounted to 151.9 MMT (including 2.2 MMT of LPG from natural gas)
- Petroleum products derived from crude oil include light distillates such as LPG, naphtha, natural gas liquids (NGL); middle distillates such as kerosene; and heavy ends such as furnace and lube oils, bitumen, petroleum coke, paraffin wax
- Production of petroleum products is expected to reach 904.8 MMT by the end of the Eleventh Plan Period

Petroleum products from crude oil (MMT)



Source: www.petroleum.nic.in

Petroleum products from natural gas (MMT)

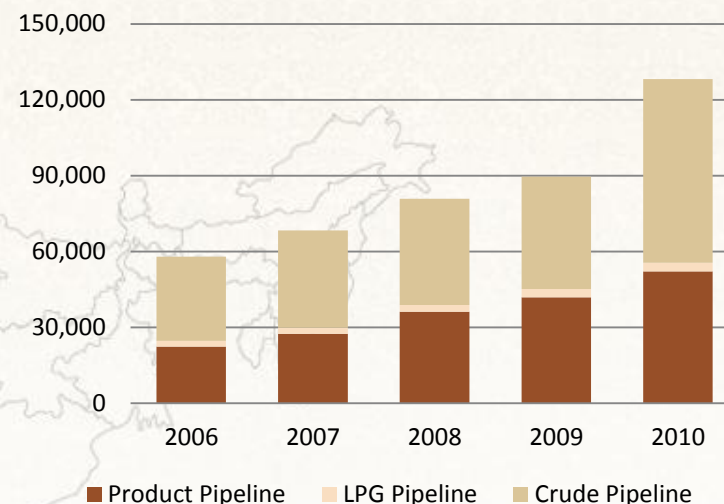


Source: www.petroleum.nic.in

Downstream segment – Distribution and marketing

- Total sales of petroleum products by companies was 138.2 MMT in 2009–10, which was 3.6 per cent higher than the previous year (133.4 MMT)
- IOC had the maximum retail outlets in the country at 51.1 per cent, followed by HPCL at 25 per cent and BPCL at 23.8 per cent; remaining outlets were owned by private firms
- Total number of retail outlets of public sector oil marketing companies (OMCs) increased to 36,462 in April 2010 from 34,948 in 2009
- The number of LPG distributors in India were 9,686 as on 1 April 2010

Petroleum products from crude oil ('000 tonne)



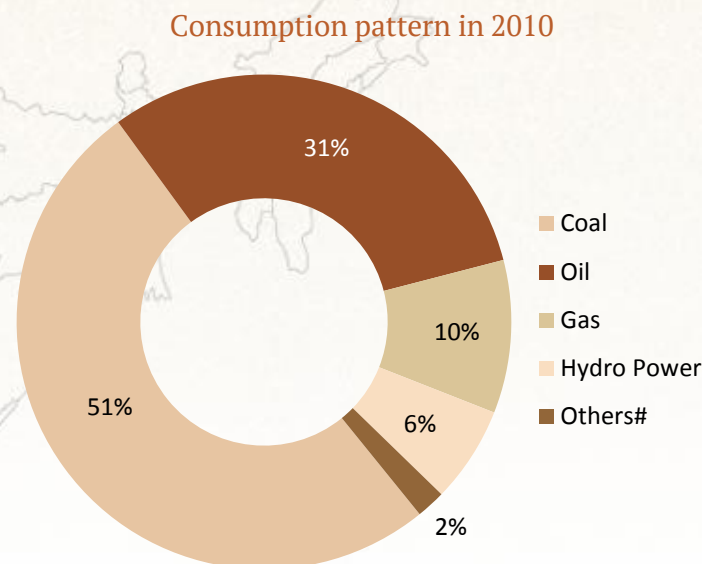
Pipeline	Capacity (MMTPA) As of 2010	Length (km) As of 2010
Product Pipeline	65.9	10,616
LPG Pipeline	3.9	2,252
Crude Pipeline	92.6	6,235
Total	162.5	19,103

Source: Basic Statistics Report, Indian Petroleum & Natural Gas –
www.petroleum.nic.in

India's energy consumption mix ... (1/2)

- In 2010, coal accounted for more than 50 per cent of the total primary energy demand
- Energy demand in Asia Pacific region is expected to reach 5,496 million TOE over the next five years (20.6 per cent growth compared to 2010)
- India's share is forecasted to increase from 11.3 per cent to 11.8 per cent during the same period

Note: TOE – Tonne of oil equivalent



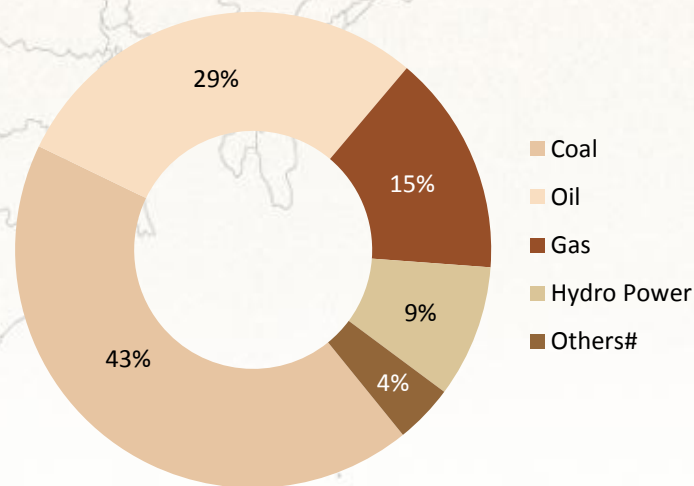
Source: BMI Report, June 2011

Note: # Other sources includes nuclear power as well

India's energy consumption mix ... (2/2)

- The dependence on gas, hydro power and nuclear power is expected to increase, compared to oil and coal
- Gas and hydro power are expected to increase shares in the total primary energy demand
- Nuclear power is expected to contribute approximately 2 per cent

Consumption pattern expected in 2014



Source: BMI Report, June 2011

Note: # Other sources includes nuclear power as well

Key domestic companies – Indian oil and gas sector



Company	Ownership (%)	Turnover 2010–11 (USD million)
Indian Oil Corporation Limited	89% state-owned	68,488
Reliance Industries	Public Listed	53,886
Bharat Petroleum Corporation Limited	66% state-owned	34,591
Hindustan Petroleum Corporation Limited	51% state-owned	27,812
ONGC	74% state-owned	13,782
GAIL India Limited	57% state-owned	6,762
Oil India Limited	98.1% state-owned	1,730

Source: Company Reports

Key international companies – Indian oil and gas sector



Company	Ownership (%)	Turnover FY10 (USD million)
Cairn Energy India Pty Ltd	Private Sector	340
Shell	Private Sector	278,200
BG Group	Private Sector	16,100
BP	Private Sector	239,300

Source: Company Reports

Key trends in the sector – Alternative fuels

Coal bed methane (CBM)

- Government approved the CBM policy in 1997 to boost the development of clean and renewable energy resources
- CBM is an eco-friendly natural gas (methane), which is absorbed in coal and lignite seams
- CBM policy was designed to be liberal and investor friendly; the first commercial production of CBM was initiated in July 2007 at about 72,000 cubic metres per day

Underground coal gasification (UCG)

- The technology was first widely used in the US in the 1800s, and in India (Kolkata and Mumbai) in the early 1900s
- UCG is currently the only feasible technology available to harness energy from deep unmineable coal seams economically in an eco-friendly manner
- Reduces capital outlay, operating costs and output gas expenses by 25–50 per cent, vis-à-vis surface gasification

Gas hydrates and bio-fuels

- The government initiated the National Gas Hydrate Programme (NGHP), a consortium of national E&P companies and research institutions, to map gas hydrates for use as an alternate source of energy
- Bio-fuels (bio-ethanol and bio-diesel) are alternate sources of energy from domestic renewable resources; these have lower emissions compared to petroleum or diesel

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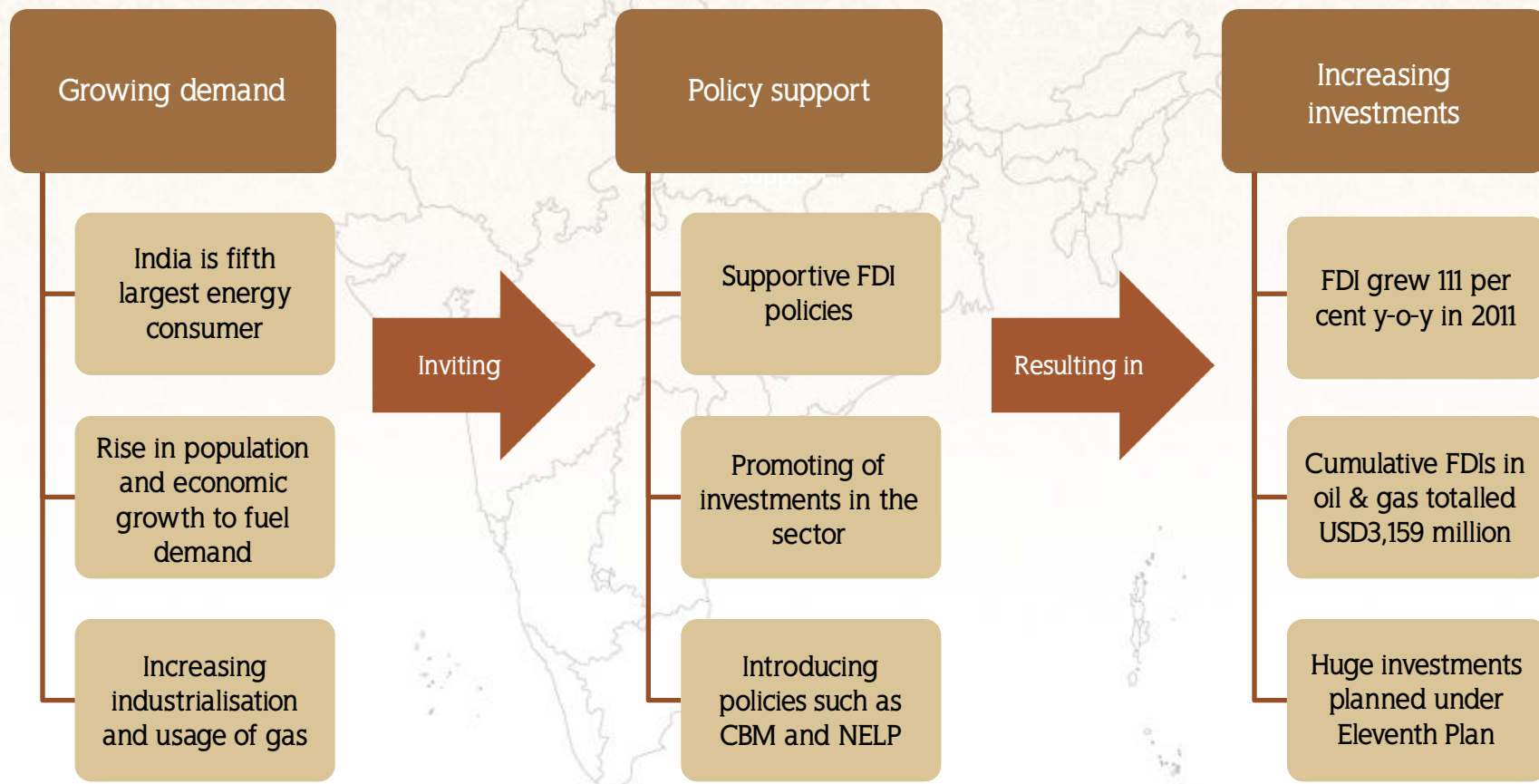
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Persistent domestic demand to drive the market



Growth drivers ... (1/2)

Robust domestic market; expected to expand

- India is the fifth-largest energy consumer in the world
- Oil consumption is expected to rise 42.5 per cent during 2010–20
- The country's gas demand is approximately 11.2 per cent of the total Asia Pacific regional demand

Increasing demand for natural gas

- Several industries are increasing the usage of natural gas in operations; this has boosted natural gas demand in India
- Some of the main industries that use natural gas - pulp and paper, metals, chemicals, glass, plastic and food processing

Abundant raw material

- The nation has large coal, crude oil and natural gas reserves
- Crude oil reserves rose from 775 MMT in 2009 to 1,201 MMT in 2010
- Natural gas reserves increased from 1,074 BCM in 2009 to 1,437 BCM in 2010

Favourable policies

- 100 per cent FDI allowed in E&P projects/companies; 49 per cent allowed in refining
- Policies to promote investments in the industry such as NELP and CBM

Source: BMI, www.petroleum.nic.in, Aranca Research

Growth drivers ... (2/2)

Huge investments

- Investments worth USD563 billion is expected across the oil and gas value chain under the Eleventh Plan (2007–12)
- Since 2005, FDI worth USD2,214 million was invested in the petroleum and natural gas sectors in India

Skilled labour

- The nation offers abundant skilled labour at much competitive wages compared to other countries
- The University of Petroleum and Energy Studies in Dehradun, Uttarakhand, is Asia's first and only energy university

Natural gas discoveries

- Several domestic companies (such as ONGC, Reliance and Gujarat State Petroleum) have reportedly found natural gas in deep waters
- This offers significant expansion opportunity for the next decade

Source: BMI, www.petroleum.nic.in, Aranca Research

Regulatory overview of the industry ... (1/2)

- **FDI Policies** - The E&P segment's FDI limit is 100 per cent, and the refining segment's limit is 49 per cent
- **Oil Field (Regulation and Development) Act, 1948** – An act to regulate oilfields and develop mineral oil resources
- **Petroleum and Natural Gas Rule, 1959** – Regulates the grant of petroleum and natural gas exploration licenses and mining leases, which belong to the government
- **Petroleum and Minerals Pipelines Act, 1962** — Acquisition of user's rights by the government of India on land demarcated for laying pipelines to transport petroleum and other minerals from one area to another
- **Oil Industry (Development) Act, 1974** – An act establishing a board to develop the oil industry and levy excise duty on crude and natural gas
- **CBM Policy, 1997** — To encourage exploration and production of CBM gas as a new eco-friendly source of energy
- **NELP, 1999** — To provide a contract framework for E&P of hydrocarbons; licenses for exploration are awarded through a competitive bidding system; nine rounds of bidding completed till 2011

Source: www.petroleum.nic.in

Regulatory overview of the industry ... (2/2)

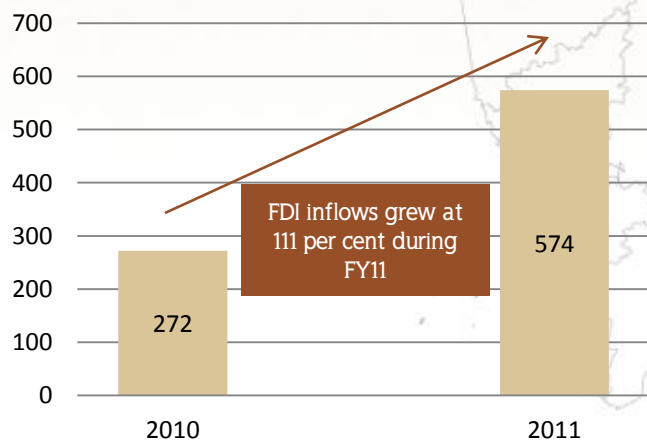
- **Freight Subsidy (for far-flung areas) Scheme, 2002** — To compensate public sector OMCs on the freight incurred to distribute subsidised products in far-flung areas
- **National Biofuel Policy, 2002** — To promote bio-fuel usage, the GoI has provided a 16 per cent concession on the excise duty on bio-ethanol and exempted bio-diesel from excise duty
- **Auto Fuel Policy, 2003** — To provide a roadmap to comply with various vehicular emission norms and corresponding fuel quality upgrading requirements over a period of time
- **Petroleum and Natural Gas Regulatory Board (PNGRB) Act, 2006** — To regulate refining, processing, storage, transportation, distribution, marketing and sale of petroleum, petroleum products and natural gas

Source: www.petroleum.nic.in

FDI investments in petroleum and gas in India

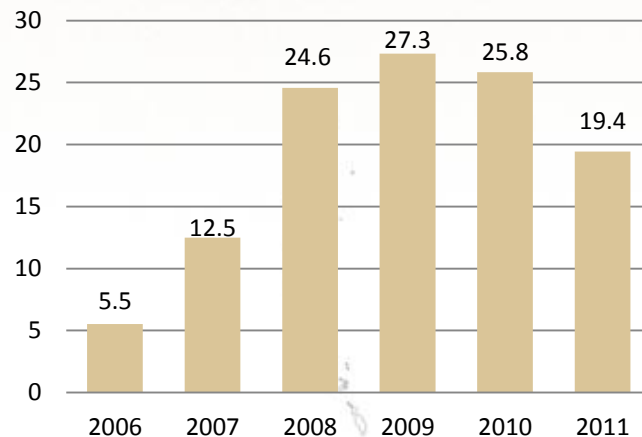
- The FDI totalled USD574 million in the petroleum and natural gas sector during FY11
- Total FDI inflows in Indian petroleum and natural gas stands at USD3,159 million from April 2000 – April 2011
- Across all sectors, total cumulative FDIs totalled USD132 billion during the same period. Services sector has been the leading sector accounting for 21 per cent of the total, followed by Computer Software & Hardware (8.1 per cent), Telecom (8.0 per cent), Real Estate (7.3 per cent), Construction (7.1 per cent), Automobile (4.7 per cent), Power (4.6 per cent), Metallurgical Industry (3.2 per cent) and Petroleum and Natural Gas (2.4 per cent).

FDI inflows in petroleum and natural gas (USD million)



Source: www.dipp.nic.in

FDI Inflows in India 2006-2011 (USD billion)



Source: www.dipp.nic.in

M&A activities in the Indian oil and gas sector

Date Announced	Acquirer Name	Target Name	Value of Deal (USD million)
Feb 2011	BP PLC	Reliance Industries Ltd	9,000.0
Aug 2010	BPRL	EP413	13.4
Aug 2010	Sesa Goa Ltd	Cairn India Ltd	1,180.8
Aug 2010	Vedanta Resources PLC	Cairn India Ltd	6,568.5
Aug 2010	Reliance Industries Ltd	Marcellus Shale Natural Gas	391.6
Jun 2010	Reliance Industries Ltd	Infotel Broadband Svcs Ltd	1,026.7
Apr 2010	Sim Siang Choon Hardware	Interlink Petroleum Ltd	17.8
Apr 2010	Reliance Industries Ltd	Atlas Energy Inc-Marcellus	339.0
Mar 2010	Investor Group	Gulfsands Petroleum PLC	573.3
Mar 2010	Natural Power Venture Pvt Ltd	Great Offshore Ltd	11.8
Feb 2010	Investor Group	Republic of Venezuela-Carabobo	4,848.0
Jan 2010	Avantha Power & Infrastructure	Malanpur Captive Power Pvt Ltd	11.1

Source: Thomson Banker, Aranca Research

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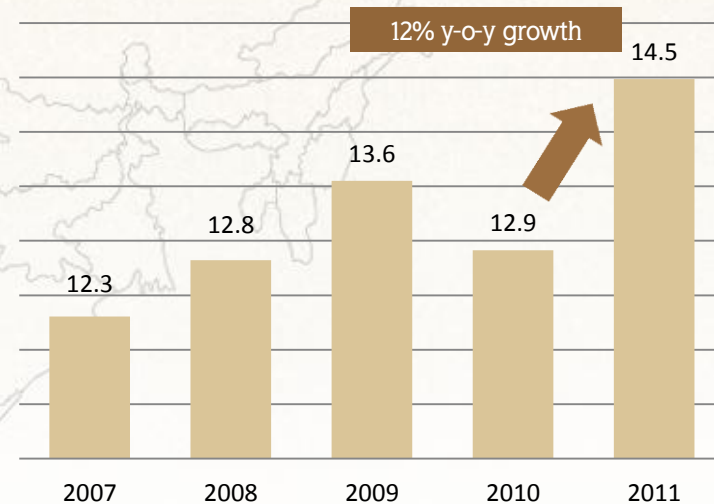
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ONGC: Continuing on its strong growth path

ONGC revenue growth (USD billion)



ONGC's position in the Indian market

- ONGC is the largest upstream oil company
- ONGC accounts for 70 per cent of the total crude oil output in India and 65 per cent of total gas production

- ONGC registered highest-ever oil production

- Highest reserve accretion in the last two decades – 83.5 million toe

- Domestic crude production up 2.1 per cent

- ONGC recorded highest-ever net profit of USD3.9 billion in 2011
- Highest-ever dividend payout of USD1.6 billion

Source: ONGC Annual Report, Aranca Research
Note: TOE – Tonne of oil equivalent

Reliance Industries: Well positioned for growth

- Reliance Industries is a leading company in the petrochemical, refining and oil & gas industry
- Reliance Industries Limited has uniquely positioned itself to pursue organic and inorganic growth opportunities
- In FY11, the company recorded the crude throughput at 66.6 million tonnes and also notified six discoveries (five of oil and one of gas) to the Directorate General of Hydrocarbons (DGH)

- Volume growth in the refining, and oil and gas businesses
- Turnover increased by 29.1 per cent during FY11
- Significant improvement in net profit due to improved refining and petrochemical margins
- Recorded one of the highest profit growths in FY11
- Net profit rose 25 per cent to USD4.2 billion

	FY10	FY11
Turnover	USD41.8 billion	USD53.9 billion
EBITDA	USD6.9 billion	USD8.6 billion
Net Profit	USD3.4 billion	USD4.2 billion

Reliance Industries has entered into JVs with various companies across segments to align growth opportunities; it signed JVs with Atlas, Pioneer, Carrizo SIBUR, and D.E. Shaw as well as entered into a strategic alliance with BP during FY11

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Opportunities

Upstream segment

- Locating new fields for exploration: 78 per cent of the country's sedimentary area is yet to be explored
- Development of unconventional resources: CBM fields in the deep sea
- Opportunities for secondary/tertiary oil producing techniques
- Increased demand for skilled labour and oilfield services and equipment

Midstream segment

- Expansion in the transmission network of gas pipelines
- LNG imports have increased significantly; this provides an opportunity to boost production capacity
- In light of mounting LNG production, huge opportunity lies for LNG terminal operation, engineering, procurement and construction services

Downstream segment

- Development in city gas distribution (CGD) networks, which are similar to Delhi and Mumbai's CGDs
- To construct new refineries considering advantages such as low operation costs, lesser freight charges and favourable policies
- Expansion of the country's petroleum product distribution network

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Industry Associations

Name	Address	Contact person	Telephone	E-mail
Oil Industry Development Board (OIDB)	301, World Trade Centre, Babar Road, New Delhi – 110001	Mr T S Balasubramanian, Financial Adviser and Chief Accounts Officer	91-11- 23413298 91-11- 23414692	oidb@hotmail.com
Petroleum Conservation Research Association (PCRA)	Sanrakshan Bhavan, 10 Bhikaji Cama Place, New Delhi – 110066	Mr Arun Kumar, ED	91-11- 26198799 Ext.301	pcra@pcra.org
Bureau of Energy Efficiency (BEE)	Ministry of Power, 4th floor, SEWA Bhawan, RK Puram, New Delhi – 110066	Dr Ajay Mathur, Director General	91-11- 26178316, 91-11- 26179699	dg-bee@nic.in, amathur@beenet.in
Oil Industry Safety Directorate	Ministry of Petroleum & Natural Gas, 7 th floor, “New Delhi House”, 27 Barakhamba Road, New Delhi – 110001	Mr J B Verma, ED	91-11- 23316798	verma.jb@gov.in
Petroleum Planning and Analysis Cell (PPAC)	Ministry of Petroleum & Natural Gas, 2 nd floor, Core-8, SCOPE Complex, 7 Institutional Area, Lodhi Road, New Delhi – 110003	Dr Basudev Mohanty, Director	91-11- 24362501, 91-11- 24361380	-
Directorate General of Hydrocarbons	Ministry of Petroleum & Natural Gas, C-139, Sector 63, Noida – 201301	Mr S K Srivastava, Director General	0120 - 4029401	dg@dghindia.org

Glossary ... (1/2)

- **B/D**: Barrels per day
- **BCM**: Billion Cubic Metres
- **CBM**: Coal bed methane
- **CGD**: City gas distribution
- **E&P**: Exploration and production
- **FDI**: Foreign direct investment
- **FY**: Indian financial year (April to March)
 - So FY10 implies April 2009 to March 2010
- **GoI**: Government of India
- **INR**: Indian Rupee
- **LNG**: Liquefied natural gas
- **MMT**: Million Metric Tonne

Glossary ... (2/2)

- **NELP:** New Exploration Licensing Policy
- **TOE:** Tonnes of oil equivalent
- **USD:** US Dollar
- Conversion rate used: USD1 = INR48
- Wherever applicable, numbers have been rounded off to the nearest whole number

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