OIL & GAS

APRIL 2017 (As of 21 April 2017)

For updated information, please visit www.ibef.org
CONTENTS

❖ Executive Summary.................................3
❖ Advantage India.......................................4
❖ Market Overview and Trends......................6
❖ Porter Five Forces Model..........................28
❖ Strategies Adopted...................................30
❖ Growth Drivers.......................................33
❖ Opportunities........................................41
❖ Success Stories......................................44
❖ Useful Information...................................48
OIL & GAS

EXECUTIVE SUMMARY

Second largest refiner in Asia
- In FY16, India had 230.06 MMTPA of refining capacity, making it the 2nd largest refiner in Asia. By 2017, the oil refining capacity of India is expected to rise & reach more than 310 million tonnes. Private companies own about 38.21 per cent of total refining capacity.

World’s fourth-largest energy consumer
- India’s energy demand is expected to double to 1,516 Mtoe by 2035 from 700.50 Mtoe in 2015. Moreover, the country’s share in global primary energy consumption is projected to increase by 2-folds by 2035.

Fourth-largest consumer of oil and petroleum products
- In 2014, India consumed 3.85 mbpd oil, while the consumption is estimated to reach 4.0 mbpd by FY16, expanding at a CAGR of 3.2 per cent during FY08–16F.
- India was 3rd largest consumer of crude oil & petroleum products in the world in 2015.

Fourth-largest LNG importer in 2015
- LNG imports into the country accounted for about one-fourth of total gas demand, which is estimated to further increase by 2 times, over next 5 years. To meet this rising demand the country plans to increase its LNG import capacity to 50 million tonnes in the coming years.
- India increasingly relies on imported LNG; the country is the 4th largest LNG importer in 2015 (As of September 2015) & accounted for 5.68 per cent of global imports.

Source: US Energy Information Administration (EIA), Ministry of Petroleum & Natural Gas, TechSci Research
Notes: MMTPA - Million Metric Tonnes Per Annum, Mtoe – Million Tonnes of Oil Equivalent; mbpd – Million Barrels Per Day;
Figures mentioned in this slide is as per latest data available.
Growing demand

- India is the world’s 4th largest energy consumer (2014); oil & gas account for 37 per cent of total energy consumption
- Demand for primary energy in India is to increase 3-fold by 2035 to 1,516 million tonnes of oil
- Equivalent from 637 million tonnes of oil equivalent in 2014

Policy support

- Government has enacted various policies such as the New Exploration Licensing Policy (NELP) & Coal Bed Methane (CBM) policy to encourage investments
- New domestic natural gas pricing guidelines has been enforced on 10th January 2014

Supportive FDI guidelines

- The government allows 100 per cent Foreign Direct Investment (FDI) in upstream & private sector refining projects
- The FDI limit for public sector refining projects has been raised to 49 per cent without any disinvestment or dilution of domestic equity in the existing PSUs

Advantage India

<table>
<thead>
<tr>
<th>FY16</th>
<th>FY17E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil Production (MMT): 36.942; Gas Production (BCM): 32.249</td>
<td>Oil Production (MMT): 37.085; Gas Production (BCM): 34.119</td>
</tr>
</tbody>
</table>


Notes: mbpd – Million Barrels Per Day, bcm – Billion Cubic Metres, F – Forecast;
Figures mentioned in this slide is as per latest data available

For updated information, please visit www.ibef.org
OIL & GAS

MARKET OVERVIEW AND TRENDS
STATE-OWNED COMPANIES DOMINATE OIL AND GAS IN INDIA

- India has become the 3rd largest energy consumer in 2015
- In FY16, oil production in the country reached 36.942 million metric tonnes as compared to 37.461 million metric tonnes in FY15. In 2016, country had 7087 million metric tonnes of proven oil reserves
- India had 4154 million metric tonnes of gas proved reserves & produced 32.249 bcm of gas in 2016 which is expected to rise & reach 34.119 bcm in 2016


**Notes:** bcm – Billion Cubic Metres, tcf – Trillion Cubic Feet, mbpd – Million Barrels Per Day, mmscmd - Million Metric Standard Cubic Metre Per Day, tcm – trillions of cubic meters, mmtpa – million metric tons per annum

ONGC – Oil & Natural Gas Corporation of India, IOCL – Indian Oil Corporation Ltd

---

**Indian Oil and Gas sector**

- **Upstream segment - exploration & production**
  - State-owned ONGC dominate the upstream segment
  - It is the largest upstream company in the Exploration & Production (E&P) segment, accounting for approximately 59.43 per cent of the country’s total oil output (FY15)

- **Midstream segment – storage & transportation**
  - IOCL operates a 11,214 km network of crude, gas & product pipelines, with a capacity of 1.6 mbpd of oil & 10 mmscmd of gas
  - This is around 30 per cent of the nation’s total pipeline network

- **Downstream segment – refining, processing & marketing**
  - IOCL is the largest company, controls 10 out of 22 Indian refineries, with a combined capacity of 1.31 mbpd
  - Reliance launched India’s 1st privately owned refinery in 1999 & has gained considerable market share (30 per cent)
  - Essar’s Vadinar refinery has a capacity of 20 mmtpa, currently accounting for around 10 per cent of total refining capacity
Oil consumption is estimated to expand at a CAGR of 3.3 per cent during FY2008–16F to reach 4.0 mbpd by 2016

Due to the expected strong growth in demand, India’s dependency on oil imports is likely to increase further

Rapid economic growth is leading to greater outputs, which in turn is increasing the demand of oil for production and transportation

With rising income levels, demand for automobile is estimated to increase, in turn leading to augmented demand for oil & gas.

Source: Ministry of Oil & Natural Gas, BP Statistical Review 2015
BMI forecasts, TechSci Research
Notes: F – Forecast, CAGR – Compound Annual Growth Rate, mbpd – Million Barrels Per Day, mn bbl – Million Barrels, E- Estimated
In FY16, total crude oil imports were valued at USD64.4 billion as compared to USD112.7 billion in FY15. In FY14, imports accounted for more than 80 per cent of the country’s total oil demand.

Despite being a net importer of crude oil, India has become a net exporter of petroleum products by investing in refineries designed for export, particularly in Gujarat.

Backed by new oil fields, domestic oil output is anticipated to grow to 1.0 mbpd by FY16.

In March 2017, the government signed a Definitive Agreement on Oil Storage & Management between Indian Strategic Petroleum Reserve Ltd (ISPRL) & Abu Dhabi National Oil Company (ADNOC) of UAE, to fill up 0.81 MMT or 5,860,000 million barrels of crude oil at ISPRL storage facility at Mangalore, Karnataka.

According to the Organization of the Petroleum Exporting Countries (OPEC), the demand for oil across the world will grow by 1.26 million barrels per day (mb/d) or 1.26 per cent in 2017 from 1.38 mb/d in 2016. Moreover, majority of the oil demand across the globe is expected to originate from India, followed by China. In January, India’s crude imports declined by 132,000 b/d, or 3 per cent, from the previous month to average 4.1 mb/d, showing an annual drop of 161,000 b/d, or 4 per cent.

**Imports and domestic oil production in India**

<table>
<thead>
<tr>
<th></th>
<th>Oil Production (mbpd)</th>
<th>Oil Imports (mbpd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY10</td>
<td>3.20</td>
<td>0.7</td>
</tr>
<tr>
<td>FY11</td>
<td>3.29</td>
<td>0.8</td>
</tr>
<tr>
<td>FY12</td>
<td>3.45</td>
<td>0.8</td>
</tr>
<tr>
<td>FY13</td>
<td>3.71</td>
<td>1.0</td>
</tr>
<tr>
<td>FY14</td>
<td>3.80</td>
<td>1.0</td>
</tr>
<tr>
<td>FY15</td>
<td>3.80</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Source: Ministry of Oil & Natural Gas, BMI forecasts, TechSci Research

Notes: F – Forecast, mbpd – Million Barrels Per Day
With India developing gas-fired power stations, consumption is up more than 160 per cent since 1995.

Demand is not likely to simmer down anytime soon, given strong economic growth & rising urbanisation. Gas consumption is likely to expand at a CAGR of 2.04 per cent during 2007–15.
Domestic production accounts for more than three-quarter of the country’s total gas consumption

Demand is expected to increase due to higher economic growth, ensure less dependency on imported crude and a desire to use cleaner fuel

Reaching 196.48 million tonnes in 2016, fuel sales recorded the highest growth rate of 10.7 per cent since last 16 years.

India’s LNG imports are forecasted to increase at a CAGR of 8.92 per cent during FY08–FY17

Domestic gas production in India stood at around 32.24 million metric tonnes in FY16

Notes: bcm – Billion Cubic Metres,
1Estimated Figures
In 2015-2016, crude oil production stood at 36.95 million tonnes

ONGC accounted for 60 per cent of total crude oil production in India

In 2015-2016, crude oil production stood at 36.95 million tonnes

ONGC accounted for 60 per cent of total crude oil production in India

Annual crude oil production (“000” Tonnes)

Crude oil production (“000” Tonnes)

Source: Ministry of Petroleum & Natural Gas, TechSci Research, petroleum.nic.in,
Notes: mmt – Million Metric Tonne, JV – Joint Venture
P - Provisional

For updated information, please visit www.ibef.org
Total gas production in FY16 was 32.25 bcm
Annual gas production increased between FY09-10 and FY15-16, reaching 32250 mmscmd

Annual gas production (million metric standard cubic meter per day)

Source: Ministry of Petroleum & Natural Gas; TechSci Research
Notes: bcm – Billion Cubic Metres, mmscmd– Million Metric Standard Cubic Meter Per Day, JV – Joint Venture
OIL & GAS

UPSTREAM SEGMENT: EXPLORATION AND DEVELOPMENT ACTIVITIES

* During FY16\(^{(1)}\), 1,118,000 metres of wells were explored & developed in India, during the same period, 506 wells were drilled in the country
* State-owned oil companies undertake most of the upstream drilling & exploration work
* ONGC, the leader in the upstream segment, accounts for 60 per cent of India’s total crude oil output

**Exploration activities (FY16\(^{(1)}\))**
('000 metres)

<table>
<thead>
<tr>
<th></th>
<th>Offshore</th>
<th>Onshore</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wells</td>
<td>105</td>
<td>105</td>
</tr>
<tr>
<td>Meterage</td>
<td>40</td>
<td>320</td>
</tr>
</tbody>
</table>

**Development drilling activities (FY16\(^{(1)}\))**
('000 metres)

<table>
<thead>
<tr>
<th></th>
<th>Offshore</th>
<th>Onshore</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wells</td>
<td>107</td>
<td>320</td>
</tr>
<tr>
<td>Meterage</td>
<td>11</td>
<td>587</td>
</tr>
</tbody>
</table>

Source: Ministry of Petroleum & Natural Gas, TechSci Research
Note: \(^{(1)}\) – Provisional
As on 1st April, 2016, India had a network of 9,864 km of crude pipeline having a capacity of 129.6 mmtpa\(^{(1)}\)

In terms of length, IOCL accounts for 49.34 per cent (4,867 km) of India’s crude pipeline network in April 2016. Moreover, the company has the country’s longest pipelines: Salaya-Mathura-Panipat Pipeline (1,870 km) & Haldia-Barauni/Paradip-Barauni Pipeline (1,302 km)

In terms of actual capacities, ONGC leads the pack with a share of 44.06 per cent, followed by IOCL at 31.2 per cent

\(\text{Source: Ministry of Petroleum & Natural Gas, TechSci Research}\
\)

Notes: km – Kilometre, mmtpa – Million Metric Tonnes Per Annum, \(^{(1)}\) Approximate
## OIL & GAS

### Pipelines: Existing Pipelines in India

<table>
<thead>
<tr>
<th></th>
<th>IOCL</th>
<th>BPCL(1)</th>
<th>HPCL(2)</th>
<th>OIL</th>
<th>ONGC(3)</th>
<th>Cairn</th>
<th>HMEL</th>
<th>Others (GAIL and Petronet India.)</th>
<th>Total industry</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Length (Kms)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product Pipeline</td>
<td>6,739</td>
<td>1,935</td>
<td>2,957</td>
<td>654</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2,687</td>
<td>14,972</td>
</tr>
<tr>
<td>Crude oil Pipeline</td>
<td>4,867</td>
<td>937</td>
<td>-</td>
<td>1,193</td>
<td>1,180</td>
<td>670</td>
<td>1,017</td>
<td>-</td>
<td>9,864</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>11,606</td>
<td>2,872</td>
<td>2,957</td>
<td>1,847</td>
<td>1,180</td>
<td>670</td>
<td>1,017</td>
<td>2,687</td>
<td>24,836</td>
</tr>
</tbody>
</table>

### Capacity of Crude Oil Pipelines (MMTPA)

<table>
<thead>
<tr>
<th></th>
<th>IOCL</th>
<th>BPCL(1)</th>
<th>HPCL(2)</th>
<th>OIL</th>
<th>ONGC(3)</th>
<th>Cairn</th>
<th>HMEL</th>
<th>Others (GAIL and Petronet India.)</th>
<th>Total industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product Pipeline</td>
<td>40.2</td>
<td>14.9</td>
<td>31.6</td>
<td>1.7</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>9.3</td>
<td>97.7</td>
</tr>
<tr>
<td>Crude oil Pipeline</td>
<td>40.4</td>
<td>6.0</td>
<td>-</td>
<td>8.4</td>
<td>57.1</td>
<td>8.7</td>
<td>9.0</td>
<td>-</td>
<td>129.6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>80.6</td>
<td>20.9</td>
<td>31.6</td>
<td>10.1</td>
<td>57.1</td>
<td>8.7</td>
<td>9.0</td>
<td>9.3</td>
<td>227.3</td>
</tr>
</tbody>
</table>

Source: Ministry of Petroleum & Natural Gas; TechSci Research
Notes: Kms – Kilometres, mmtpa – Million Metric Tonnes Per Annum,
(1) Includes Petronet Cochin-Coimbatore-Karur Product pipeline,
(2) Includes Petronet Mangalore-Hassan-Bangalore Product Pipeline,
(3) Source: PPAC,
(4) Approximately, Data is as on 1st April, 2016

For updated information, please visit [www.ibef.org](http://www.ibef.org)
**PIPKINES: REFINED PRODUCTS AND LPG PIPELINE NETWORK**

With 14975 km of refined products pipeline network (capacity of 97.7 mmtpa) in India, Indian Oil Corporation (IOC) leads the segment with more than half of the total length of product pipeline network in 2016.

Top 3 companies IOC, HPCL & BPCL contribute 77.7 per cent of the total length of product pipeline network in the country in 2016.

In 2015, Gas Authority of India Limited (GAIL) has largest share (87.06 per cent or 2,032 km) of the country’s LPG pipeline network (2,334 km).

**Shares in product pipeline network under operation by length (out of 14975 km, FY16)**

- IOC: 17.9%
- HPCL: 4.4%
- BPCL: 12.9%
- OIL: 19.8%
- Others⁽¹⁾: 45.0%

**Shares in LPG pipeline network by length (out of 2,334 km) (FY15)**

- GAIL: 87.06%
- IOC: 11.74%
- BPCL: 1.20%

Notes: km – Kilometre, mmtpa – Million Metric Tonnes Per Annum, LPG - Liquefied Petroleum Gas, IOC - Indian Oil Corporation, HPCL - Hindustan Petroleum Corporation Ltd, BPCL - Bharat Petroleum Corporation Ltd, OIL - Oil India Limited,⁽¹⁾ Others include GAIL and Petronet India.

Source: Ministry of Petroleum & Natural Gas, TechSci Research
State-controlled entities dominate the downstream segment as well.

India has 19 refineries in the public sector & 3 in the private sector.

Private companies such as Reliance Industries Ltd. & Essar Oil have become major refiners.

In FY16, public sector refineries accounted for 54.42 per cent of total refinery crude throughput.

Private sector refineries’ total crude throughput grew at a CAGR of 9.28 per cent, reaching to 88.7 mmt during FY08-16.

Source: Ministry of Petroleum & Natural Gas, TechSci Research
Note: mmt – Million Metric Tonne
In FY16, the sector's total installed provisional refinery capacity was 215.1 mmt

In FY16, IOC emerged as the largest domestic refiner with a capacity of 54.2 mmt

Top 3 companies RIL, IOC & BPCL contributes around 63 per cent of India’s total refining capacity

Shares in India’s total refining capacity (FY16)

Total installed capacity FY16 (mmt)

- RIL: 80.0
- IOC: 135.1
- BPCL: 120.1

Source: Ministry of Petroleum & Natural Gas, PPAC, TechSci Research

Notes: mmt – Million Metric Tonne; HPCL - Hindustan Petroleum Corporation Ltd, BPCL - Bharat Petroleum Corporation Ltd, OIL - Oil India Limited, ONGC - Oil and Natural Gas Corporation, IOCL - Indian Oil Corporation Ltd, CPCL - Chennai Petroleum Corporation Limited, Others include: NRIL - Numaligarh Refinery Limited, MRPL - Mangalore Refinery and Petrochemicals Limited, RPL - Renegade Petroleum Ltd, EOL - Essar Oil Ltd, ONGC, BORL, HMEL

For updated information, please visit www.ibef.org
During FY15, consumption of petroleum products in India stood at 183.5 mmt

Petroleum products derived from crude oil include light distillates such as LPG, naphtha; middle distillates such as kerosene; & heavy ends such as furnace, lube oils, bitumen, petroleum coke & paraffin wax

Light distillates with the highest growth rate grew at CAGR of 4.09 per cent, while middle distillates & heavy end segment witnessed a CAGR of 4.02 per cent & 1.78 per cent respectively, during the year FY08-15

During the 12th Five-year Plan period (2012–17), production of petroleum products in India is expected to reach 1195.8 mmt

Petroleum Products-wise Consumption from crude oil FY15 (mmt)

Production of LPG By Fractionators (mmt)

Source: Ministry of Petroleum & Natural Gas; TechSci Research
Notes: mmt – Million Metric Tonne
In FY16, total consumption of petroleum products by companies stood at around 183.5 MMT, higher by 11.2 per cent in comparison with the previous fiscal year.

The total number of retail outlets increased to 56190 (including private) in April 2016 (Provisional) from 53419 in April 2015.

IOC, as of April 1, 2016, (Provisional), owned the maximum number of retail outlets in the country (45.14 per cent of total), followed by HPCL (24.56 per cent) and BPCL (23.92 per cent); the remaining being owned by private firms.

As of April 1, 2016 (Provisional), there were 17,916 LPG distributors in India.

### Downstream distribution statistics (MMT)

<table>
<thead>
<tr>
<th></th>
<th>FY08</th>
<th>FY09</th>
<th>FY10</th>
<th>FY11</th>
<th>FY12</th>
<th>FY13</th>
<th>FY14</th>
<th>FY15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product Pipeline</td>
<td>2.75</td>
<td>3.34</td>
<td>3.50</td>
<td>3.77</td>
<td>3.83</td>
<td>3.63</td>
<td>3.63</td>
<td>3.97</td>
</tr>
<tr>
<td>LPG Pipeline</td>
<td>36.16</td>
<td>41.85</td>
<td>52.10</td>
<td>55.52</td>
<td>58.98</td>
<td>57.65</td>
<td>59.30</td>
<td>59.83</td>
</tr>
</tbody>
</table>

Source: Ministry of Petroleum & Natural Gas, TechSci Research

Notes: MMT – Million Metric Tonne, mmtpa – Million Metric Tonnes Per Annum, (1) – Data is as of April 1, 2015.
In 2014, coal accounted for 56.47 per cent of total primary energy demand

Energy demand in the Asia-Pacific region is estimated to be around 5,498.5 Mtoe in 2015 and is expected to reach 5,627 Mtoe by 2020 and 6,861 Mtoe by 2035

India’s energy demand is projected to double to 48.7 quadrillion BTU by 2035

The primary energy consumption of India rose by 5.2 per cent in 2015

In 2015, coal maintained its dominancy and accounted for 58 per cent of total primary energy demand

Notes: Mtoe – Million Tonne of Oil Equivalent, BTU – British Thermal Unit; Figures mentioned in this slide is as per latest data available
Over the next few years, dependence on gas, hydro power & nuclear power is expected to increase relative to oil & coal.

The government aims to quadruple India’s nuclear power generation capacity to 20 GW by 2020; currently, 7 nuclear power reactors of 4,930 MWe capacity are under construction.

In coming decades, a major portion of consumption dependability of energy mix is expected to shift from coal & petroleum to other resources like natural gas, solid biomass & waste and nuclear & other renewable sources.

Source: International Energy Agency (IEA), TechSci Research
## State-Wise Crude Reserve, Capacity and Throughput

### Balance Recoverable Reserves of Crude Oil, 2016 (MMT)

<table>
<thead>
<tr>
<th>State</th>
<th>Balance Recoverable Reserves of Crude Oil, 2016 (MMT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assam</td>
<td>160.79</td>
</tr>
<tr>
<td>Gujarat</td>
<td>121.16</td>
</tr>
<tr>
<td>Rajasthan</td>
<td>31.72</td>
</tr>
<tr>
<td>Andhra Pradesh</td>
<td>10.90</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>8.99</td>
</tr>
<tr>
<td>Arunachal Pradesh</td>
<td>1.57</td>
</tr>
<tr>
<td>Nagaland</td>
<td>2.38</td>
</tr>
<tr>
<td>Tripura</td>
<td>0.07</td>
</tr>
<tr>
<td><strong>Total Onshore</strong></td>
<td><strong>337.59</strong></td>
</tr>
<tr>
<td>Western Offshore</td>
<td>247.13</td>
</tr>
<tr>
<td>Eastern Offshore</td>
<td>36.39</td>
</tr>
<tr>
<td><strong>Total Offshore</strong></td>
<td><strong>283.53</strong></td>
</tr>
</tbody>
</table>

### Source: Ministry of Petroleum & Natural Gas, TechSci Research

Notes: Mmt – Million Metric Tonne, mt – Million Tonne

### Installed Capacity, as of April 2015 (mt)

<table>
<thead>
<tr>
<th>State</th>
<th>Installed Capacity, as of April 2015 (mt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gujarat</td>
<td>93.7</td>
</tr>
<tr>
<td>Maharashtra</td>
<td>18.5</td>
</tr>
<tr>
<td>Haryana</td>
<td>15.0</td>
</tr>
<tr>
<td>Karnataka</td>
<td>15.0</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>11.5</td>
</tr>
<tr>
<td>Kerala</td>
<td>9.5</td>
</tr>
<tr>
<td>Andhra Pradesh</td>
<td>8.37</td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td>8.0</td>
</tr>
<tr>
<td>West Bengal</td>
<td>7.5</td>
</tr>
<tr>
<td>Assam</td>
<td>7.0</td>
</tr>
<tr>
<td>Bihar</td>
<td>6.0</td>
</tr>
<tr>
<td>Punjab</td>
<td>9.0</td>
</tr>
<tr>
<td>Madhya Pradesh</td>
<td>6.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>215.07</strong></td>
</tr>
</tbody>
</table>

### Crude Throughput for 2015 (mt)

<table>
<thead>
<tr>
<th>State</th>
<th>Crude Throughput for 2015 (mt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gujarat</td>
<td>100.19</td>
</tr>
<tr>
<td>Maharashtra</td>
<td>20.46</td>
</tr>
<tr>
<td>Haryana</td>
<td>15.5</td>
</tr>
<tr>
<td>Karnataka</td>
<td>14.59</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>10.6</td>
</tr>
<tr>
<td>Kerala</td>
<td>10.29</td>
</tr>
<tr>
<td>Andhra Pradesh</td>
<td>7.83</td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td>8.16</td>
</tr>
<tr>
<td>West Bengal</td>
<td>7.95</td>
</tr>
<tr>
<td>Assam</td>
<td>6.38</td>
</tr>
<tr>
<td>Bihar</td>
<td>6.48</td>
</tr>
<tr>
<td>Punjab</td>
<td>9.27</td>
</tr>
<tr>
<td>Madhya Pradesh</td>
<td>5.45</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>222.50</strong></td>
</tr>
</tbody>
</table>
# Key Domestic Oil & Gas Companies

<table>
<thead>
<tr>
<th>Company</th>
<th>Ownership (per cent) as on FY14-15</th>
<th>FY16 turnover (USD billion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indian Oil Corporation Limited</td>
<td>68.57% state-owned</td>
<td>61.04</td>
</tr>
<tr>
<td>Reliance Industries</td>
<td>Public Listed</td>
<td>45.23</td>
</tr>
<tr>
<td>Bharat Petroleum Corporation Limited</td>
<td>54.93% state-owned</td>
<td>28.79</td>
</tr>
<tr>
<td>Hindustan Petroleum Corporation Limited</td>
<td>51.1% state-owned</td>
<td>32.49</td>
</tr>
<tr>
<td>ONGC</td>
<td>68.94% state-owned</td>
<td>20.10</td>
</tr>
<tr>
<td>GAIL India Limited</td>
<td>56.11% state-owned</td>
<td>7.88</td>
</tr>
<tr>
<td>Oil India Limited (1)</td>
<td>67.64% state-owned</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Source: Bloomberg, TechSci Research  
Note: FY – Indian Financial Year, April–March  
(1) - Data for half year ended September 2015
KEY INTERNATIONAL OIL & GAS COMPANIES OPERATING IN INDIA

<table>
<thead>
<tr>
<th>Company</th>
<th>Ownership (per cent)</th>
<th>Global turnover (FY16) ( USD billion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cairn Energy India Pvt Ltd</td>
<td>Private Sector</td>
<td>1.62</td>
</tr>
<tr>
<td>Shell</td>
<td>Private Sector</td>
<td>211.98</td>
</tr>
<tr>
<td>BG Group</td>
<td>Private Sector</td>
<td>121.19</td>
</tr>
<tr>
<td>BP</td>
<td>Private Sector</td>
<td>55.88</td>
</tr>
</tbody>
</table>

Source: - Indian counterpart, Bloomberg; TechSci Research, Company websites
Coal Bed Methane (CBM)
- Government approved the CBM policy in 1997 to boost the development of clean & renewable energy resources
- CBM is an eco-friendly natural gas (methane), which is absorbed in coal & lignite seams
- The CBM policy was designed to be liberal & investor friendly; the 1st commercial production of CBM was initiated in July 2007 at about 72,000 cubic metres per day

Underground Coal Gasification (UCG)
- The technology was 1st widely used in the US in the 1800s & in India (Kolkata & 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
- The technology reduces capital outlay, operating costs & 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 & research institutions, to map gas hydrates for use as an alternate source of energy
- Bio-fuels (bio-ethanol & bio-diesel) are alternate sources of energy from domestic renewable resources; these have lower emissions compared to petroleum or diesel

Open Acreage Licensing Policy
- The Open Acreage Licensing Policy (OLAP), which allows an explorer to study the data available and bid for blocks of his choice has been initiated in parallel with NELP to increase foreign participation by global E&P companies like Shell, BP, Conoco Phillips etc.
PORTER’S FIVE FORCES ANALYSIS

Competitive Rivalry
- Competitive rivalry is low as just one-two players operate in Upstream, Midstream and Downstream segments
- Although a few private operators have entered the industry in the last couple of years, they do not pose any major threat as of now

Threat of New Entrants
- Threat of new entrants continues to be low, due to the capital intensive nature of the industry and economies of scale

Substitute Products
- Threat is low, as other sources of energy like solar, wind, coal and hydro electric power are less developed. Pressure from alternative sources might rise in future

Bargaining Power of Suppliers
- Bargaining power is medium as despite few players operating, government at times delays subsidy payment to oil companies, thereby increasing losses

Bargaining Power of Customers
- Customers have low/non existent bargaining power
- Customers are price-taker not a price maker

Source: TechSci Research
Indian Oil Corp plans to make an investment of USD22.91 billion, including USD7.64 billion for expanding its existing brownfield refineries, in the next 5 to 7 years.

State run energy firms Bharat Petroleum, Hindustan Petroleum & Indian Oil Corp plan to spend USD20 billion on refinery expansions to add units, by 2022.

Indian Oil Corporation plans to lay the nation’s longest LPG pipeline of 1987 km, from Gujarat coast to Gorakhpur in eastern Uttar Pradesh, to cater to growing demand for cooking gas in the country.

India targets US$100 billion worth investments in gas infrastructure by 2022, including an addition of another 228 cities to city gas distribution (CGD) network. This would include setting up of RLNG terminals, pipeline projects, completion of the gas grid & setting up of CGD network in more cities.

As of March 2017, Indian Oil Corp is planning to spend US$26.77 billion, in a span of 6 years on India’s energy deficit & execute government’s goals to correct disparity in regional development & to create jobs.

In March 2017, a delegation accompanied by the Petroleum & Natural Gas Minister organised an event at CERA Week 2017, in Houston, to promote India’s new Hydrocarbon Exploration & Licensing Policy (HELP). The aim of organising the event was to enhance active international participation in upcoming investment opportunities in the country.

Oil companies are focusing on vertical integration for next stage of growth. For instance, oil producer Oil India Ltd is planning to build & operate refineries, while Indian Oil is planning to enter oil & gas exploration.

Companies are diversifying into alternative energies such as wind power, solar & bio-fuels.

As of March 2017, Bharat Petroleum Corp. Ltd. (BPCL), an Indian state-controlled oil & gas company, plans to enter the country’s travel business with the launch of its startup named as “Happy Roads”. The app, which is expected to be launched in the coming two months, will document itineraries and assist the users in planning a fun-filled trip.
Move to non-conventional energy resources

- Most Indian companies are now targeting shale gas reserves as a source of energy in future
- Companies are looking forward to developing JVs & technical partnership with foreign companies to improve capabilities to develop shale reserves

Investments to enhance production

- Indian companies are enhancing production through redevelopment plans to increase recovery rates of hydrocarbon from oil wells; ONGC in Mumbai High achieved success in implementing this
- With exploration increasing not only in the country but also in outside geographies, companies are pumping up R&D to focus on gasification technology & bio energy
- Bharat Petroleum Corporation (BPCL) has planned to invest USD1.53 billion during FY17 to enhance & expand its refining capacity

More focus upon small companies

- Private sector units like Adani, Sun Petrochemicals & few new entrants have bagged 1/3rd of small oil & gas fields. In February 2017, the government approved 31 contracts to be developed, comprising 44 small fields.
- In February 2017, Genesis, London, bagged a contract from RIL’s (Reliance Industries) to design deep water field front end engineering at KG Basin in West India.

Pilot project Initiated for Shale Gas Production in India

- Oil & Natural Gas Corp (ONGC) has started Shale Gas exploration by spudding the 1st Shale Gas well RNSG-1 in Burdwan District of West Bengal.

Piped Cooking Gas

- By March 2017, state-owned natural gas company, GAIL, plans to start distributing piped cooking gas in Bhubaneswar & Varanasi.
OIL & GAS

PERSISTENT DOMESTIC DEMAND TO DRIVE THE MARKET

Growing demand
- India, fourth-largest energy consumer
- Rise in population and economic growth to fuel demand
- Increasing industrialisation and usage of gas

Policy support
- Supportive FDI policies
- Promoting investments in the sector
- Introducing policies such as CBM and NELP

Innovation
- Expanding production and distribution facilities in India
- Increased R&D activity
- Providing support to global projects from India

Increasing investments
- Petroleum and Natural Gas sector attracted an cumulative FDI of USD6,675.30 million during April 2000-December 2016
- Huge investments planned under the Twelfth Plan

Source: Ministry of Petroleum & Natural Gas, TechSci Research
**OIL & GAS**

<table>
<thead>
<tr>
<th>Robust domestic market; expected to expand</th>
</tr>
</thead>
<tbody>
<tr>
<td>• India is the world's 4th largest energy consumer</td>
</tr>
<tr>
<td>• Oil consumption is expected to rise by 42.5 per cent during 2010–20</td>
</tr>
<tr>
<td>• The country is the 5th largest importer of LNG</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Increasing demand for natural gas</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Several industries are increasing the usage of natural gas in operations; this has boosted natural gas demand in India</td>
</tr>
<tr>
<td>• Some of the main industries that use natural gas are pulp, paper, metals, chemicals, glass, plastic &amp; food processing</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Abundant raw material</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The nation has large coal, crude oil &amp; natural gas reserves</td>
</tr>
<tr>
<td>• Oil reserves amounted to 763.476 MMT in FY15</td>
</tr>
<tr>
<td>• Proved reserves of natural gas stood at 1.48 tcm in FY15</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Favourable policies</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The government has allowed 100 per cent FDI in E&amp;P projects/companies; &amp; 49 per cent in refining under the automatic route from the earlier approval route</td>
</tr>
<tr>
<td>• It has also introduced policies to promote investments in the industry such as New Exploration Licensing Policy (NELP) and Coal Bed Methane (CBM)</td>
</tr>
</tbody>
</table>

**Huge investments**
- Investments worth USD75 billion is expected across the oil & gas value chain under the erstwhile 12th Plan (2012–17)
- ONGC plans to incur capital expenditure of US$ 4.31 billion in FY2017-18, for developing their offshore oil & gas fields in Gamji, Bassein, Daman on the West coast & Vasishta & Nagyalanka on the East coast.

**Skilled labour**
- The nation offers abundant skilled labour at much competitive wages compared to other countries
- The University of Petroleum & Energy Studies in Dehradun, Uttarakhand, is Asia’s 1st & only energy university

**Massive gas pipeline network**
- In 2016, country’s natural gas pipeline network spanned over 16,251 km in length & the proposed expansion of 30,000 kms is envisaged by 2018-19

**Natural gas discoveries**
- Several domestic companies (such as ONGC, Reliance & Gujarat State Petroleum) have reportedly found natural gas in deep waters
- This offers significant expansion opportunity over the next decade
- In March, ONGC started production at 2 oil wells located in Jorhat, Assam. These oil wells were discovered in 2016-17, and are producing 50 tonnes per day, which increased the overall production of Jorhat asset from 350 tonnes per day to 400 tonnes per day.

*Source: Ministry of Petroleum & Natural Gas, BMI, TechSci Research
Note: Kms- Kilometres*
### Pricing of CNG and PNG by CGD Entities (2014)

- In 2014, the pricing for CNG (transport) & PNG (domestic) were examined by the Ministry of Petroleum & Natural Gas while the disclose of prices of the CNG & PNG commodities were made compulsory.

### The Policy on Shale Gas & Oil, 2013

- Allows companies to apply for shale gas & oil rights in their petroleum exploration licenses & petroleum mining leases.

### Shale Gas & Oil Exploration Policy

- Approved in September 2013, it allows companies to explore energy resources trapped within rocks to meet India’s growing energy needs.

### The National Biofuel Policy, 2009

- Promotes bio-fuel usage, the Government of India has provided a 12.36 per cent concession on excise duty on bio-ethanol & exempted bio-diesel from excise duty.

### Integrated Energy Policy (IEP), 2006

- Outlines goals to deal with challenges faced by India’s energy sector.

---

**Source:** Ministry of Petroleum & Natural Gas, TechSci Research

For updated information, please visit [www.ibef.org](http://www.ibef.org)
Petroleum and Natural Gas Regulatory Board (PNGRB) Act, 2006

- Regulate refining, processing, storage, transportation, distribution, marketing & sale of petroleum, petroleum products & natural gas

Auto Fuel Policy, 2003

- Provide a roadmap to comply with various vehicular emission norms & corresponding fuel quality upgrading requirements over a period of time

National Biofuel Policy, 2002

- A 16 per cent concession on the excise duty on bio-ethanol & exemption of bio-diesel from excise duty to promote bio-fuel usage

Freight Subsidy (for far-flung areas) Scheme, 2002

- Compensate public sector Oil Marketing Companies (OMCs) for the freight incurred to distribute subsidised products in far-flung areas

Domestic Natural Gas Pricing Formula, 2014

- New domestic natural gas pricing formula has been formed, which will be revised on an half yearly basis.

Source: Ministry of Petroleum & Natural Gas, TechSci Research
Note: NELP - New Exploration Licensing Policy
FDI INVESTMENTS IN PETROLEUM AND GAS IN INDIA

- Cumulative FDI inflows in India's petroleum & natural gas sector stood at USD6,756.30 billion (2.08 per cent of total FDIs) during April 2000–December 2016.
- In Oil & Gas, FDI inflows into the sector totalled USD6.67 billion and USD6.60 billion in FY16 & FY15, respectively.
- Between FY10 and FY16\(^{(1)}\) (April 2000 – December 2016), FDI inflows into petroleum and natural gas sector grew at CAGR 16.06 per cent.

**FDI inflows into petroleum and natural gas (USD billion)**

```
<table>
<thead>
<tr>
<th>FY10</th>
<th>FY11</th>
<th>FY12</th>
<th>FY13</th>
<th>FY14</th>
<th>FY15</th>
<th>FY16</th>
<th>FY17(^{(1)})</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.70</td>
<td>3.20</td>
<td>3.30</td>
<td>5.40</td>
<td>5.50</td>
<td>6.60</td>
<td>6.67</td>
<td>6.76</td>
</tr>
</tbody>
</table>
```

**CAGR:** 16.36%

**FDI inflows into India (USD billion)**

```
<table>
<thead>
<tr>
<th>FY10</th>
<th>FY11</th>
<th>FY12</th>
<th>FY13</th>
<th>FY14</th>
<th>FY15</th>
<th>FY16</th>
<th>FY17(^{(1)})</th>
</tr>
</thead>
<tbody>
<tr>
<td>115.70</td>
<td>129.80</td>
<td>170.54</td>
<td>193.40</td>
<td>217.70</td>
<td>248.63</td>
<td>265.26</td>
<td>324.47</td>
</tr>
</tbody>
</table>
```

**CAGR:** 15.87%

**Source:** Department of Industrial Policy & Promotion, TechSci Research

**Note:** FY17 – Up to December 2016, FY16\(^{(1)}\) – April 2000 - December 2016
## M&A ACTIVITIES IN THE INDIAN OIL AND GAS SECTOR

<table>
<thead>
<tr>
<th>Date announced</th>
<th>Acquirer name</th>
<th>Target name</th>
<th>Value of deal (USD million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dec 2016</td>
<td>Oil &amp; Natural Gas Corp's</td>
<td>Gujarat State Petroleum Co's</td>
<td>1200</td>
</tr>
<tr>
<td>Dec 2015</td>
<td>ONGC Videsh Ltd (OVL)</td>
<td>Vankor oil field</td>
<td>1260</td>
</tr>
<tr>
<td>Jan 2015</td>
<td>Bharat Forge</td>
<td>Mecanique Generale Langroise</td>
<td>12.82</td>
</tr>
<tr>
<td>Jun 2014</td>
<td>Gulf Petrochem Ltd</td>
<td>Sah Petroleums Limited</td>
<td>7.13</td>
</tr>
<tr>
<td>Mar 2014</td>
<td>IOCL</td>
<td>Progress Energy Canada Ltd</td>
<td>Not disclosed</td>
</tr>
<tr>
<td>Oct 2013</td>
<td>ONGC Videsh Ltd</td>
<td>Parque das Conchas, Brazilian Oilfield</td>
<td>529</td>
</tr>
<tr>
<td>Jun 2013</td>
<td>ONGC Videsh Ltd (in partnership with Oil India Ltd)</td>
<td>Rovuma Area 1 Offshore Block</td>
<td>2640</td>
</tr>
<tr>
<td>Nov 2012</td>
<td>ONGC Videsh</td>
<td>ConocoPhillips (Kashagan Field)</td>
<td>5,000.0</td>
</tr>
<tr>
<td>Nov 2012</td>
<td>Inpex Corp</td>
<td>Oil and Natural Gas Corp’s exploration block KG-DWN-2004/6</td>
<td>Not disclosed</td>
</tr>
<tr>
<td>Sep 2012</td>
<td>ONGC Videsh</td>
<td>Hess Corp (Azrei oilfield)</td>
<td>1,000.0</td>
</tr>
<tr>
<td>Apr 2012</td>
<td>Trafigura Pte Ltd</td>
<td>Nagarjuna Oil Co Ltd</td>
<td>130.0</td>
</tr>
<tr>
<td>Apr 2011</td>
<td>Sesa Goa Ltd</td>
<td>Calm India Ltd</td>
<td>1,492.0</td>
</tr>
<tr>
<td>Feb 2011</td>
<td>BP PLC</td>
<td>Reliance Industries Ltd</td>
<td>9,000.0</td>
</tr>
<tr>
<td>Aug 2010</td>
<td>BPRL</td>
<td>EP413</td>
<td>13.4</td>
</tr>
<tr>
<td>Aug 2010</td>
<td>Sesa Goa Ltd</td>
<td>Cairn India Ltd</td>
<td>1,180.8</td>
</tr>
<tr>
<td>Aug 2010</td>
<td>Vedanta Resources PLC</td>
<td>Cairn India Ltd</td>
<td>6,568.5</td>
</tr>
<tr>
<td>Aug 2010</td>
<td>Reliance Industries Ltd</td>
<td>Marcellus Shale Natural Gas</td>
<td>391.6</td>
</tr>
</tbody>
</table>

Source: Thomson Banker, TechSci Research

For updated information, please visit [www.ibef.org](http://www.ibef.org)
OIL & GAS

OPPORTUNITIES
## 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
- Higher demand for skilled labour & 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 & construction services

### Downstream segment
- India is already a refining hub with 21 refineries & expansions planned for tapping foreign investment in export-oriented infrastructure, including product pipelines & export terminals
- Development of City Gas Distribution (CGD) networks, which are similar to Delhi and Mumbai’s CGDs
- Expansion of the country’s petroleum product distribution network
• India has technically recoverable shale gas resources of nearly 96 tcf

• The Cambay, Krishna Godavari, Cauvery & the Damodar Valley are the most prospective sedimentary basins for carrying out shale gas activities in the country

• Around 20 tcf of gas has been classified as technically recoverable reserves in the Cambay basin in Gujarat (the largest basin in the country) spread across 20,000 gross square miles with a prospective area of 1,940 square miles

• It is estimated that the Krishna Godavari (KG) basin encloses a series of organically rich shales, containing around 27 tcf of technically recoverable gas. KG basin, located in Eastern India, holds the country’s largest shale gas reserves, extending over 7,800 gross square miles with a prospective area of around 4,340 square miles

• In April 2013, the Directorate General of Hydrocarbons (DGH) submitted its policy on exploitation of shale gas to the Ministry of Petroleum & Natural Gas

• India launched its policy on shale gas exploration to tap the non-conventional energy resource in order to boost output

Source: E&Y; Ministry of Petroleum & Natural Gas, TechSci Research
Note: tcf – Trillion Cubic Feet
ONGC: CONTINUING ON STRONG GROWTH PATH

ONGC revenue growth (USD billion)

Source: Company reports, TechSci Research

Notes: TOE – Tonne of Oil Equivalent

- ONGC is the largest upstream oil company
- It accounts for 59.43 per cent of India’s total crude oil output & 65.43 per cent of total gas production (FY15)

APRIL 2017

For updated information, please visit www.ibef.org
Indian Oil Group of Companies owns and operates 10 of India’s 22 refineries with a capacity of 1.30 mbpd

In 2015, its network of crude oil and product pipelines runs to about 11081 Km

Subsidiary CPCL accounts for 49 per cent of market share in petroleum products

In FY16, the gross refining margin (GRM) was estimated to be 5.06 per bbl as compared to USD0.27 per bbl in FY15

- Second-largest player in India’s petrochemical market
- Has interests in 13 domestic and 11 overseas blocks
- Foraying into alternative sources of energy like wind and solar

<table>
<thead>
<tr>
<th></th>
<th>FY15</th>
<th>FY16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turnover</td>
<td>USD73.57 billion</td>
<td>USD61.04 billion</td>
</tr>
<tr>
<td>EBITDA</td>
<td>USD1.7 billion</td>
<td>USD2.7 billion</td>
</tr>
<tr>
<td>Net profit</td>
<td>USD0.8 billion</td>
<td>USD1.6 billion</td>
</tr>
</tbody>
</table>

Source: Company reports, TechSci Research
Note: bbl - barrel
RELIANCE INDUSTRIES: WELL POSITIONED FOR GROWTH

* Reliance Industries has the biggest petrochemical refining complex in the world
* It contributes 14 per cent to India's exports & is going to invest around USD30 billion to improve its businesses in the next 3 years
* For December quarter 2016, Reliance Industries recorded profit of US$ 1.11 billion.

- Exports surged by 4.5 per cent to USD46 billion in 2016
- Record crude throughput at 69.6 million tonnes

<table>
<thead>
<tr>
<th></th>
<th>FY15</th>
<th>FY16</th>
<th>FY17(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turnover</td>
<td>USD61.4 billion</td>
<td>USD45.23 billion</td>
<td>USD10.92 billion</td>
</tr>
<tr>
<td>EBITDA</td>
<td>USD6.1 billion</td>
<td>USD7.9 billion</td>
<td>USD2.1 billion</td>
</tr>
<tr>
<td>Net profit</td>
<td>USD3.8 billion</td>
<td>USD4.2 billion</td>
<td>USD1.1 billion</td>
</tr>
</tbody>
</table>

- 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 recently

Source: Company reports, TechSci Research
Note: (1) Revenue fallen due to negative translation effect, Data from April – June 2016
<table>
<thead>
<tr>
<th>Name</th>
<th>Address</th>
<th>Contact person</th>
<th>Telephone</th>
<th>E-mail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil Industry Development Board (OIDB)</td>
<td>301, World Trade Centre, Babar Road, New Delhi – 110001</td>
<td>Mr T S Balasubramanian, Financial Adviser and Chief Accounts Officer</td>
<td>91-11- 23413298 91-11- 23414692</td>
<td><a href="mailto:oidb@hotmail.com">oidb@hotmail.com</a></td>
</tr>
<tr>
<td>Petroleum Conservation Research Association (PCRA)</td>
<td>Sanrakshan Bhavan, 10 Bhikaji Cama Place, New Delhi – 110066</td>
<td>Mr Arun Kumar, ED</td>
<td>91-11- 26198799 Ext.301</td>
<td><a href="mailto:pcra@pcra.org">pcra@pcra.org</a></td>
</tr>
<tr>
<td>Bureau of Energy Efficiency (BEE)</td>
<td>Ministry of Power, 4th floor, SEWA Bhawan, RK Puram, New Delhi – 110066</td>
<td>Dr Ajay Mathur, Director General</td>
<td>91-11- 26178316, 91-11- 26179699</td>
<td><a href="mailto:dg-bee@nic.in">dg-bee@nic.in</a>, <a href="mailto:amathur@beenet.in">amathur@beenet.in</a></td>
</tr>
<tr>
<td>Oil Industry Safety Directorate</td>
<td>Ministry of Petroleum &amp; Natural Gas, 7th floor, “New Delhi House”, 27 Barakhamba Road, New Delhi – 110001</td>
<td>Mr J B Verma, ED</td>
<td>91-11- 23316798</td>
<td><a href="mailto:verma.jb@gov.in">verma.jb@gov.in</a></td>
</tr>
<tr>
<td>Petroleum Planning and Analysis Cell (PPAC)</td>
<td>Ministry of Petroleum &amp; Natural Gas, 2nd floor, Core-8, SCOPE Complex, 7 Institutional Area, Lodhi Road, New Delhi – 110003</td>
<td>Dr Basudev Mohanty, Director</td>
<td>91-11- 24362501, 91-11- 24361380</td>
<td></td>
</tr>
<tr>
<td>Directorate General of Hydrocarbons</td>
<td>Ministry of Petroleum &amp; Natural Gas, C-139, Sector 63, Noida – 201301</td>
<td>Mr S K Srivastava, Director General</td>
<td>0120 - 4029401</td>
<td><a href="mailto:dg@dghindia.org">dg@dghindia.org</a></td>
</tr>
</tbody>
</table>
B/D (or bpd): Barrels Per Day

MBPD (or mbpd): Million Barrels Per Day

BCM (or 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 FY12 implies April 2011 to March 2012

GoI: Government of India

INR: Indian Rupee

LNG: Liquefied Natural Gas
GLOSSARY… (2/3)

* **MMT (or mmt):** Million Metric Tonne
* **MMTPA (or mmtpa):** Million Metric Tonnes Per Annum
* **EBITDA:** Earning Before Interest Taxes Depreciation Amortisation
* **NRL:** Numaligarh Refinery Limited
* **CPCL:** Chennai Petroleum Corporation Limited
* **HPCL:** Hindustan Petroleum Corporation Limited
* **BPCL:** Bharat Petroleum Corporation Limited
* **IOC:** Indian Oil Corporation Ltd
* **EOL:** Essar Oil Ltd
* **RPL:** Reliance Petroleum Limited
* **MRPL:** Mangalore Refinery and Petrochemicals Limited
* **PCCK:** Petronet Cochin-Coimbatore-Karur
* **PMHB:** Petronet Mangalore-Hassan-Bangalore
OIL & GAS

GLOSSARY… (3/3)

- **NELP**: New Exploration Licensing Policy
- **TOE (or toe)**: Tonnes of Oil Equivalent
- **USD**: US Dollar
- **ONGC**: Oil and Natural Gas Corporation of India
- **IOCL**: Indian Oil Corporation Limited
- **mn bbl**: Million Barrels
- **CAGR**: Compound Annual Growth Rate
- **JV**: Joint Venture
- **UCG**: Underground Coal Gasification
- **NGL**: Natural Gas Liquids
- **OMCs**: Oil Marketing Companies
- **NHGP**: National Gas Hydrate Programme

Wherever applicable, numbers have been rounded off to the nearest whole number
## Exchange Rates

### Exchange rates (Fiscal Year)

<table>
<thead>
<tr>
<th>Year</th>
<th>INR equivalent of one USD</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004–05</td>
<td>44.81</td>
</tr>
<tr>
<td>2005–06</td>
<td>44.14</td>
</tr>
<tr>
<td>2006–07</td>
<td>45.14</td>
</tr>
<tr>
<td>2007–08</td>
<td>40.27</td>
</tr>
<tr>
<td>2008–09</td>
<td>46.14</td>
</tr>
<tr>
<td>2009–10</td>
<td>47.42</td>
</tr>
<tr>
<td>2010–11</td>
<td>45.62</td>
</tr>
<tr>
<td>2011–12</td>
<td>46.88</td>
</tr>
<tr>
<td>2012–13</td>
<td>54.31</td>
</tr>
<tr>
<td>2013–14</td>
<td>60.28</td>
</tr>
<tr>
<td>2014–15</td>
<td>61.06</td>
</tr>
<tr>
<td>2015–16</td>
<td>65.46</td>
</tr>
<tr>
<td>2016-2017E</td>
<td>67.23</td>
</tr>
</tbody>
</table>

### Exchange rates (Calendar Year)

<table>
<thead>
<tr>
<th>Year</th>
<th>INR equivalent of one USD</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>43.98</td>
</tr>
<tr>
<td>2006</td>
<td>45.18</td>
</tr>
<tr>
<td>2007</td>
<td>41.34</td>
</tr>
<tr>
<td>2008</td>
<td>43.62</td>
</tr>
<tr>
<td>2009</td>
<td>48.42</td>
</tr>
<tr>
<td>2010</td>
<td>45.72</td>
</tr>
<tr>
<td>2011</td>
<td>46.85</td>
</tr>
<tr>
<td>2012</td>
<td>53.46</td>
</tr>
<tr>
<td>2013</td>
<td>58.44</td>
</tr>
<tr>
<td>2014</td>
<td>61.03</td>
</tr>
<tr>
<td>2015</td>
<td>64.15</td>
</tr>
<tr>
<td>2016 (Expected)</td>
<td>67.22</td>
</tr>
</tbody>
</table>

Source: Reserve bank of India,
Average for the year

For updated information, please visit [www.ibef.org](http://www.ibef.org)
India Brand Equity Foundation ("IBEF") engaged TechSci to prepare this presentation and the same has been prepared by TechSci in consultation with IBEF.

All rights reserved. All copyright in this presentation and related works is solely and exclusively owned by IBEF. The same may not be reproduced, wholly or in part in any material form (including photocopying or storing it in any medium by electronic means and whether or not transiently or incidentally to some other use of this presentation), modified or in any manner communicated to any third party except with the written approval of IBEF.

This presentation is for information purposes only. While due care has been taken during the compilation of this presentation to ensure that the information is accurate to the best of TechSci and IBEF’s knowledge and belief, the content is not to be construed in any manner whatsoever as a substitute for professional advice.

TechSci and IBEF neither recommend nor endorse any specific products or services that may have been mentioned in this presentation and nor do they assume any liability or responsibility for the outcome of decisions taken as a result of any reliance placed on this presentation.

Neither TechSci nor IBEF shall be liable for any direct or indirect damages that may arise due to any act or omission on the part of the user due to any reliance placed or guidance taken from any portion of this presentation.