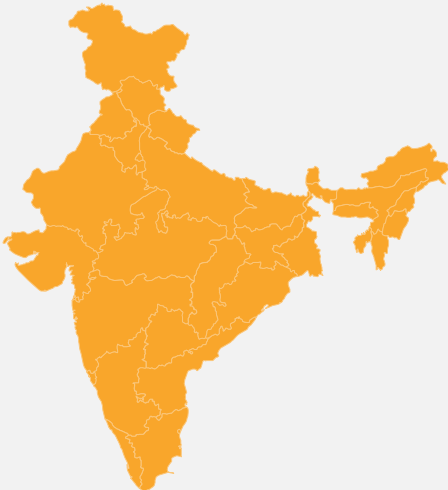




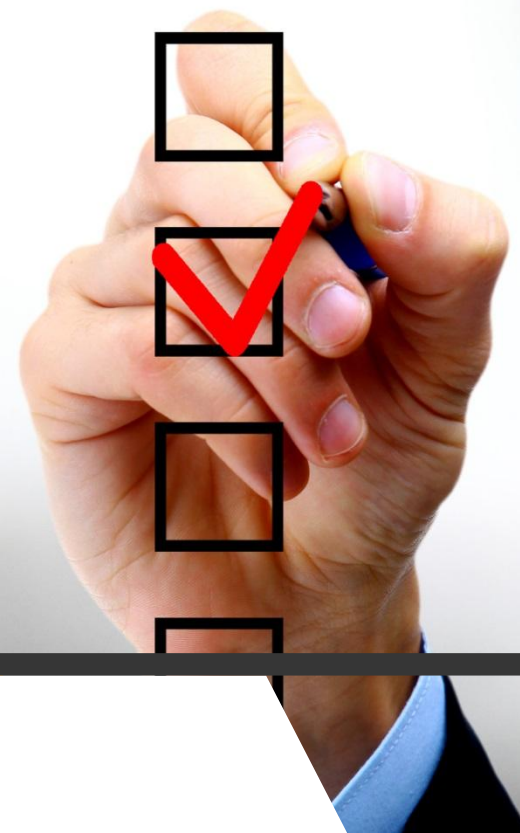
OIL & GAS



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Second largest refiner in Asia

- As of May 1, 2019, the oil refining capacity of India stood at 249.4 million tonnes, making it the second largest refiner in Asia. Private companies own about 35.36 per cent of the total refining capacity.

World's third-largest energy consumer

- India's energy demand is expected to double to 1,516 Mtoe by 2035 from 753.7 Mtoe in 2017. Moreover, the country's share in global primary energy consumption is projected to increase by 2-folds by 2035.
- Petroleum product consumption registered a contraction by 0.2 per cent year-on-year for the quarter and 1.7 per cent in June alone..

Third-largest consumer of oil

- India's consumption of petroleum products grew 2.66 per cent to 211.64 MMT in FY19 from 206.17 MMT in FY18.
- India retained its spot as the third largest consumer of oil in the world in 2017[^].

Fourth-largest LNG importer in 2017

- LNG imports into the country accounted for about one-fourth of total gas demand, which is estimated to further increase by two times, over next five 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 fourth largest LNG importer and accounted for 5.68 per cent of global imports.
- LNG import for the month of June 2019 increased 9.7 percent year-on-year and 13.4 per cent month-on-month to 83 million metric standard cubic metres per day (mmscmd).

Notes: MMT - Million Metric Tonnes, Mtoe – Million Tonnes of Oil Equivalent; mbpd – Million Barrels Per Day, LNG – Liquefied Natural Gas; Figures mentioned in this slide is as per latest data available. [^]Updated data is expected in June 2019 from BP statistical review 2019

Source: US Energy Information Administration (EIA), Ministry of Petroleum and Natural Gas, BP Statistical Review 2018, News sources

ADVANTAGE INDIA

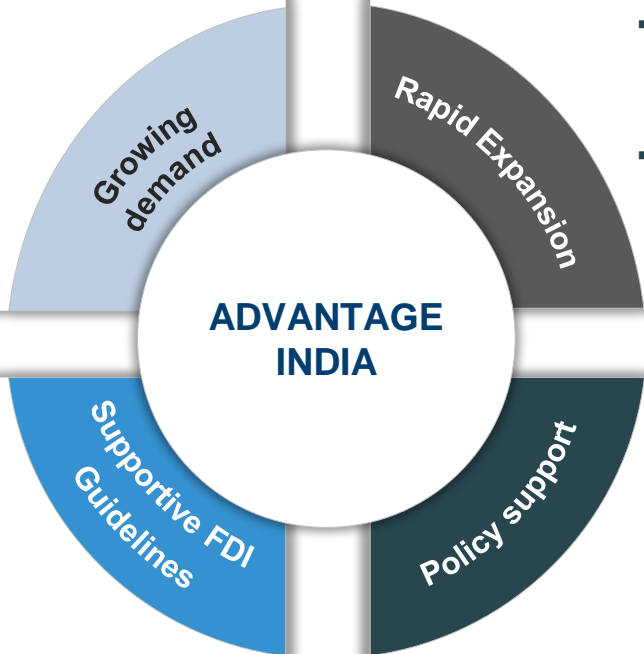


- India is the world's third largest energy consumer globally
- Demand for primary energy in India is expected to increase threefold by 2035 to 1,516 million tonnes of oil
- Diesel demand in India is expected to double to 163 million tonnes (MT) by 2029-30.

- The oil and gas industry is growing robustly, and players are undertaking investments to cater to the burgeoning demand.
- The industry is expected to attract US\$ 25 billion investments in exploration and production by 2022.[^]
- Refining capacity in the country is expected to increase to 667 MTPA by 2040.*

- The government allows 100 per cent Foreign Direct Investment (FDI) in upstream and 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

- Government has enacted various policies such as the OALP and CBM policy to encourage investments
- In September 2018, Government of India approved fiscal incentives to attract investments and technology to improve recovery from oil fields which is expected to lead to hydrocarbon production worth Rs 50 lakh crore (US\$ 745.82 billion) in the next twenty years.



Note: OALP – Open Acreage Licensing Policy, CBM – Coal Bed Methane, MTPA – Million Tonnes Per Annum, [^]As per Directorate General of Hydrocarbons, *As per Working Group on Enhancing Refining Capacity by 2040

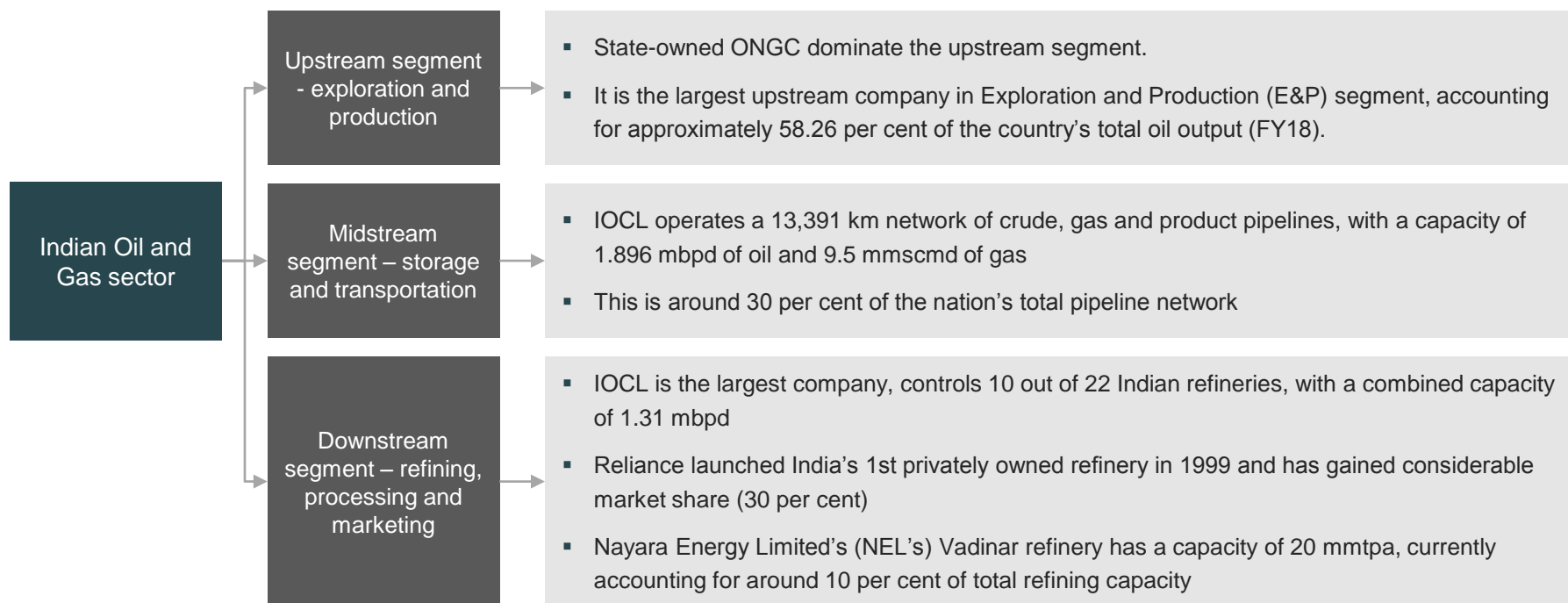
Source: Business Monitor International (BMI), World Oil Outlook 2012, Ministry of Petroleum and Natural Gas, BP Statistical Review 2015, Make in India.

MARKET OVERVIEW AND TRENDS



STATE-OWNED COMPANIES DOMINATE OIL AND GAS IN INDIA

- India remained as the third largest energy consumer in 2017*.
- India's domestic crude oil production in June 2019 is 2,688 thousand tonne (TMT). As of 2017, the country had 600 million metric tonnes (MMT) of proven oil reserves
- India had 4.5 thousand million barrels of proven oil reserves at the end of 2018 and produced 39.5 million tones in 2018.
- Oil production is expected to rise and reach 36 bcm^ by 2021.

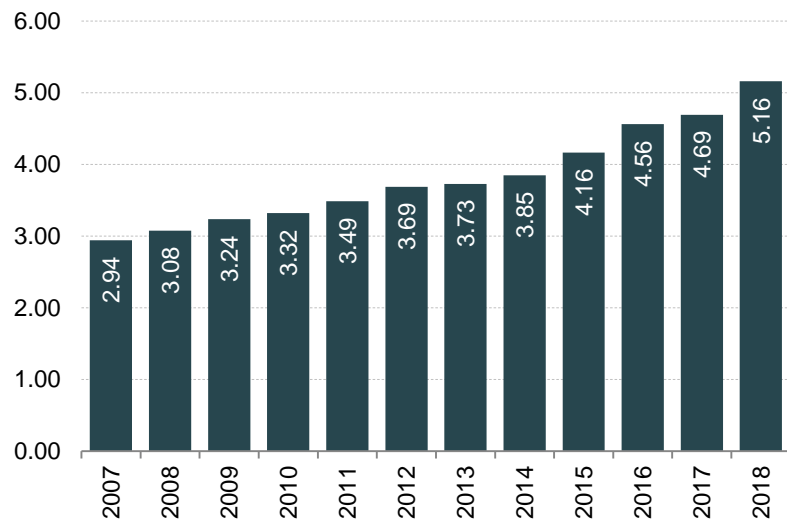


Notes: bcm – Billion Cubic Metres, mbpd – Million Barrels Per Day, mmscmd - Million Metric Standard Cubic Metre Per Day, mmtpa -- million metric tons per annum, ^As per IEA, *Updated data is expected in June 2019 from bp statistical review 2019

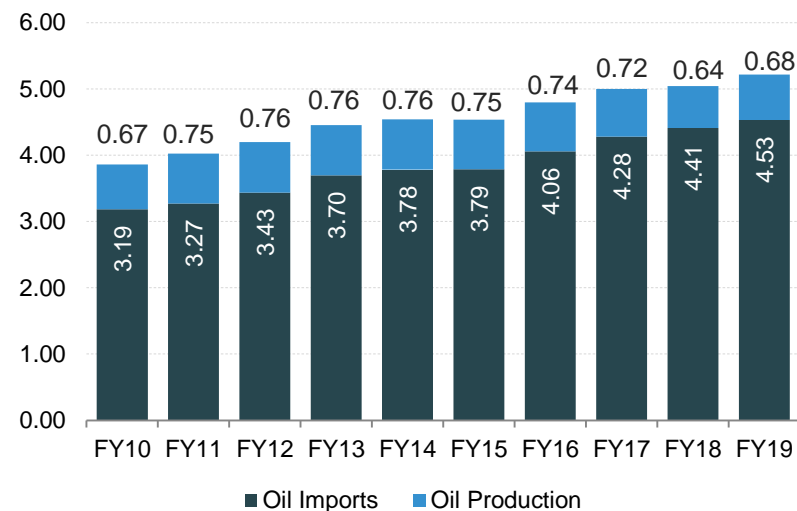
Source: BP Statistical Review 2018, US Energy Information Administration, Petroleum Planning and Analysis Cell, TechSci Research

OIL SUPPLY AND DEMAND IN INDIA

Oil consumption in India (2008-18) (mbpd)



Imports and domestic oil production in India (mbpd)



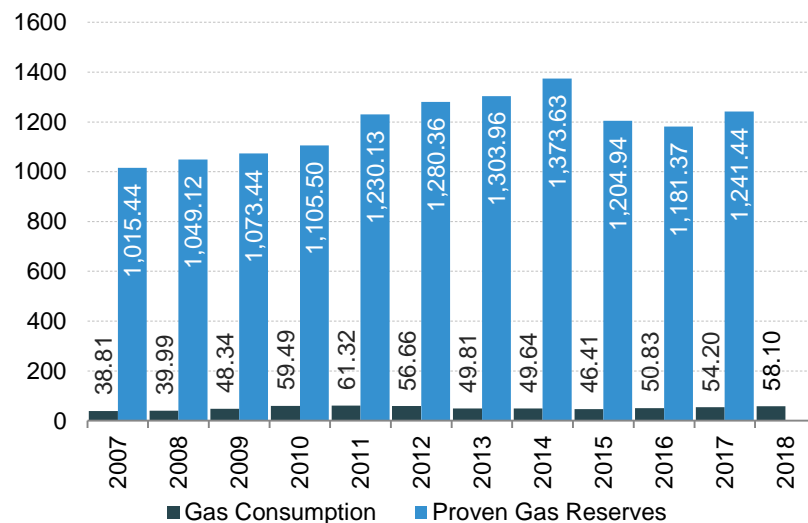
- Oil consumption has expanded at a CAGR of 5.24 per cent during 2007–18 to reach 5.16 mbpd by 2019.
- Due to the expected strong growth in demand, India’s dependency on oil imports is likely to increase further
- Rapid economic growth is leading to greater outputs, which in turn is increasing the demand of oil for production and transportation
- India’s crude oil demand is expected to increase over 150 per cent to 10.1 million tonnes per day by 2040.^
- In FY19, total crude oil imports were valued at US\$ 111.96 billion as compared to US\$ 87.70 billion in FY18. In FY19, crude oil imports increased to 4.53 mbpd from 4.41 mbpd in FY18.

Note: CAGR – Compound Annual Growth Rate, mbpd – Million Barrels Per Day, P - Provisional, ^As per OPEC, Based on 50 MMT = 1 MBPD, *Updated data is expected in June 2019 from BP statistical review 2019

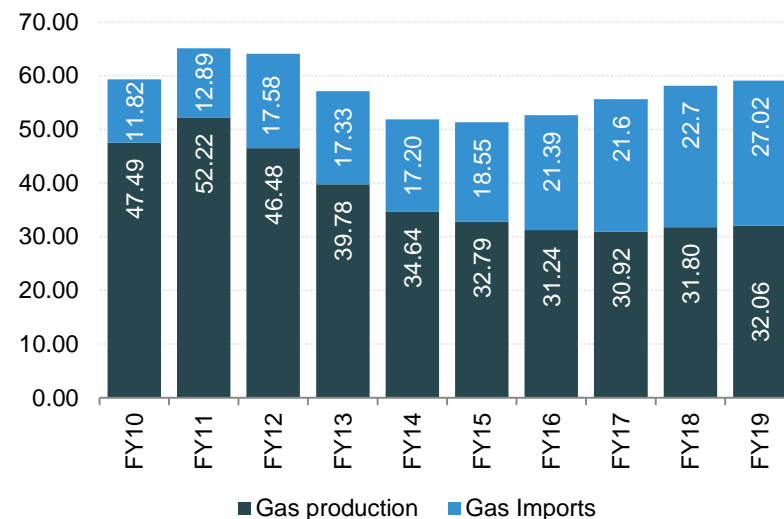
Source: Ministry of Petroleum and Natural Gas, BP Statistical Review 2018, TechSci Research

GAS SUPPLY AND DEMAND IN INDIA

Proven reserves and total gas consumption in the country (bcm)



Domestic gas production and imports (bcm)



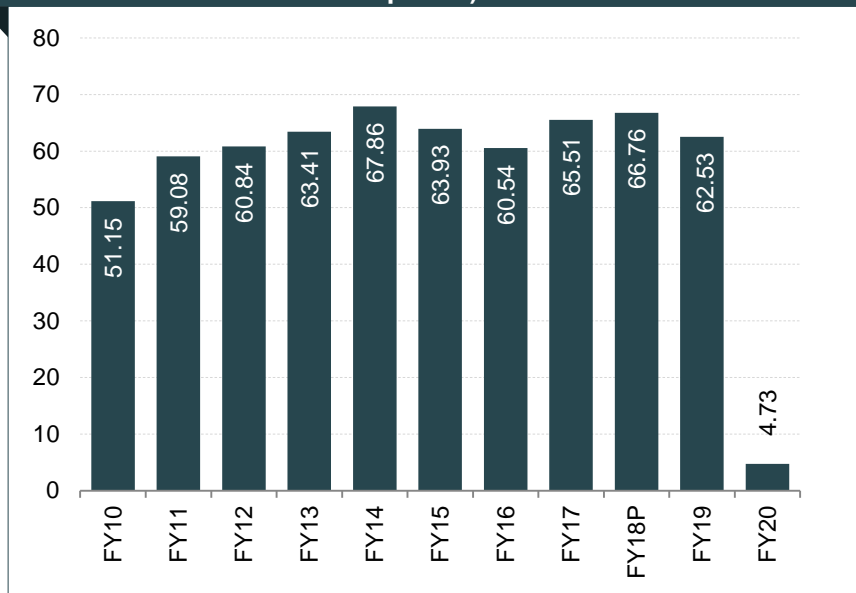
- India's gas consumption has increased at a CAGR of 3.40 per cent between 2007 and 2017[^].
- Demand is not likely to simmer down anytime soon, given strong economic growth and rising urbanisation.
- Gas consumption is projected to reach 143.08 bcm by 2040. The government is planning to invest US\$ 2.86 billion in the upstream oil and gas production to double the natural gas production to 60 bcm and drill more than 120 exploration wells by 2022 .
- India's natural gas imports increased at a CAGR of 10.53 per cent during FY10–FY18.

Note: F – Forecast, bcm – Billion Cubic Metres, CAGR – Compound Annual Growth Rate Figures are as per latest data available, [^]Updated data is expected in June 2019 from BP statistical review 2019

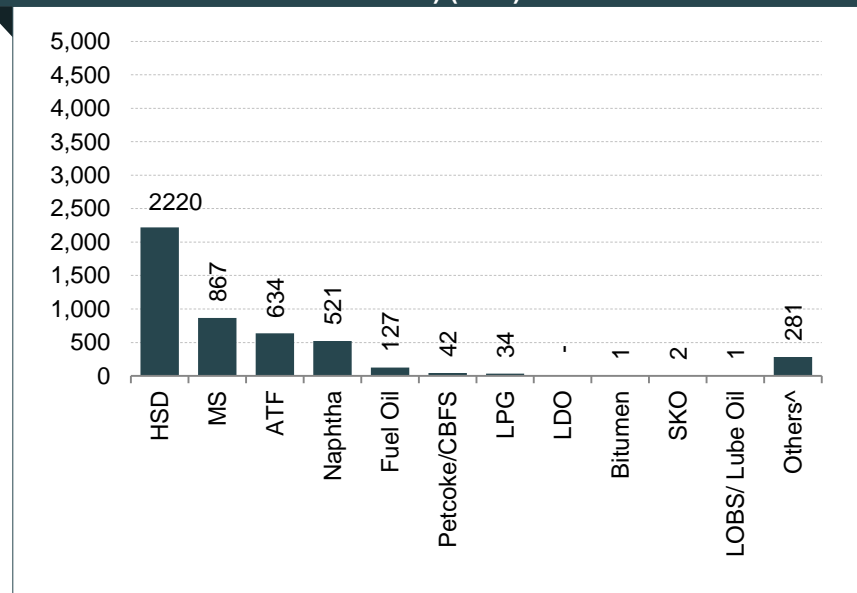
Source: PPAC, BP Statistical Review 2018, TechSci Research

EXPORTS OF PETROLEUM PRODUCTS FROM INDIA

Exports of Petroleum Products from India (MMT) (up to April'19)



Product-wise export of Petroleum Products from India in FY20 (up to June'19) (TMT)



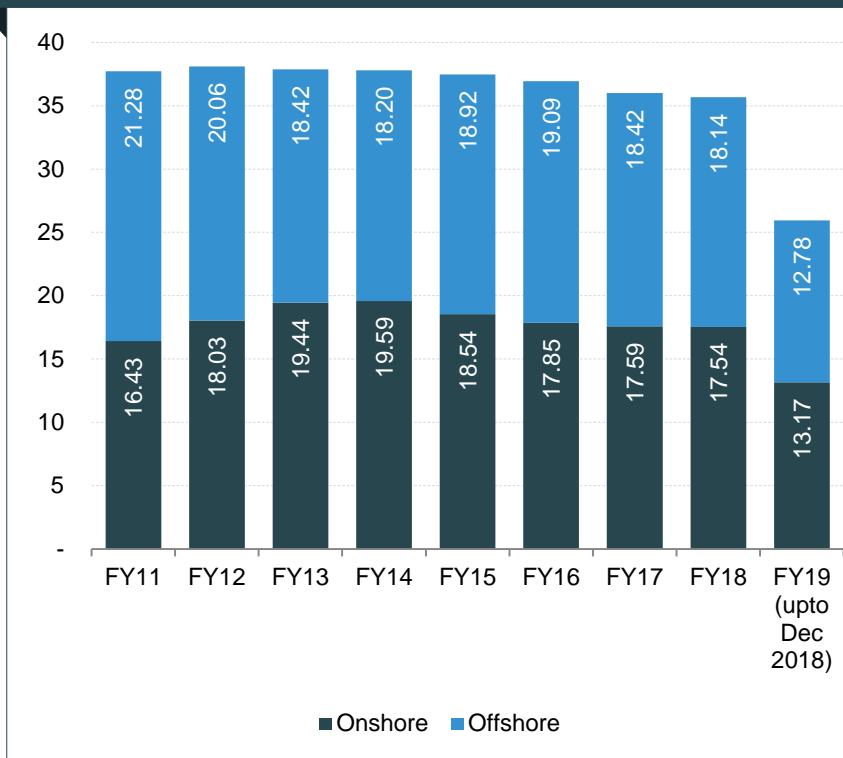
- India is one of the largest exporters of refinery products due to the presence of various refineries. The country had the fourth largest oil refining capacity and fourth largest refinery throughput globally in 2017.
- Exports of petroleum products from India increased from 51.15 MMT in FY10 to 62.53 MMT in FY19.
- The total value of petroleum products exported from the country increased to US\$ 38.24 billion in FY19 from US\$ 34.89 billion in FY18.
- HSD was the major export item among petroleum products, followed by MS, ATF and Naptha.

Note: MMT – Million Metric Tonnes, P – Provisional, HSD – High speed Diesel, MS – Motor Spirit, ATF – Aviation Turbine Fuel, LPG – Liquefied Petroleum Gas, LDO – Light Diesel Oil, SKO – Superior Kerosene Oil, LOBS – Lubricating Oil Base Stocks, ^Others includes Hexane, Benzene, MTO (Mineral Turpentine Oil), Sulphur, etc

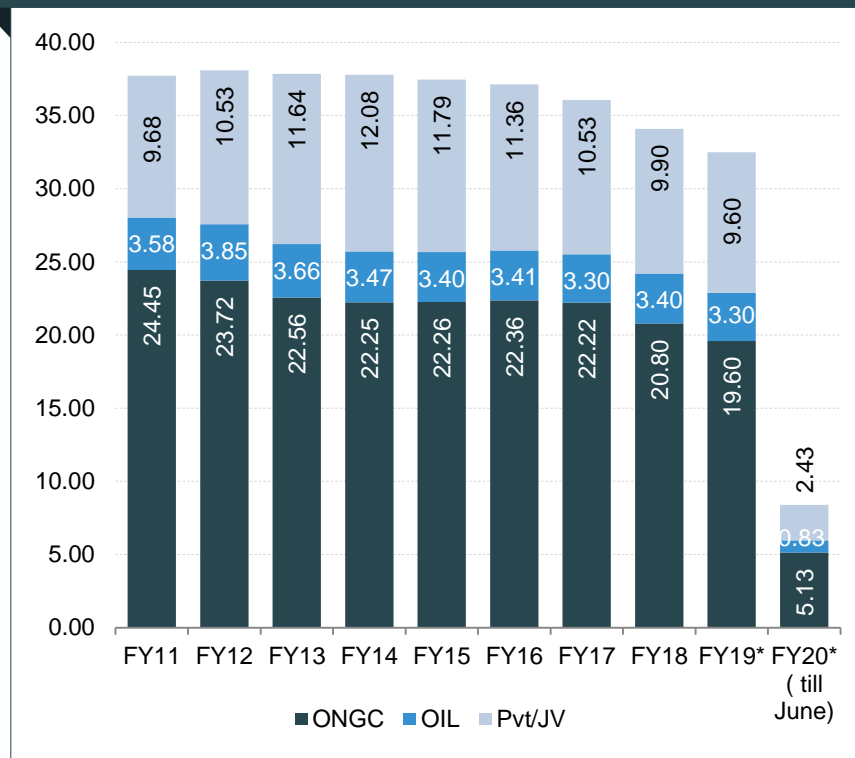
Source: PPAC, BP Statistical Review 2018

UPSTREAM SEGMENT: CRUDE OIL AND GAS PRODUCTION (1/2)

Annual crude oil production (in MMT)



Crude Oil Production (in MMT)



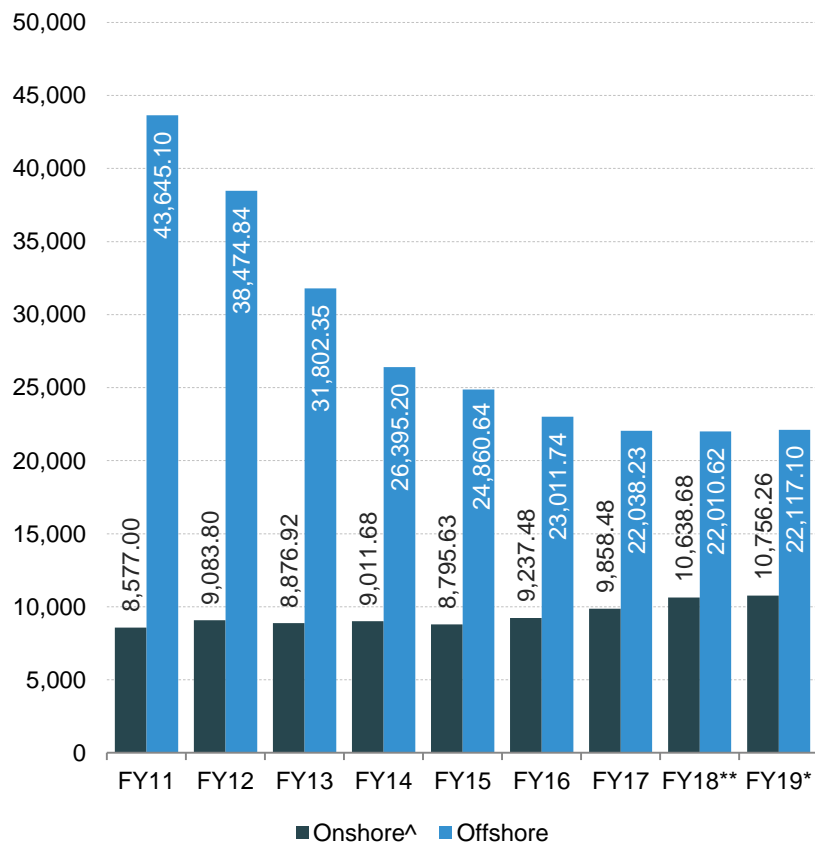
- In 2018-19, crude oil production in India stood at 34.20 million metric tonnes (MMT).
- Onshore production accounted for 50.68 per cent of total production, while offshore contributed the remaining 49.32 per cent.
- ONGC accounted for around 61.25 per cent of total crude oil production in India in FY19*.

Notes: MMT – Million Metric Tonne, JV – Joint Venture, *Provisional

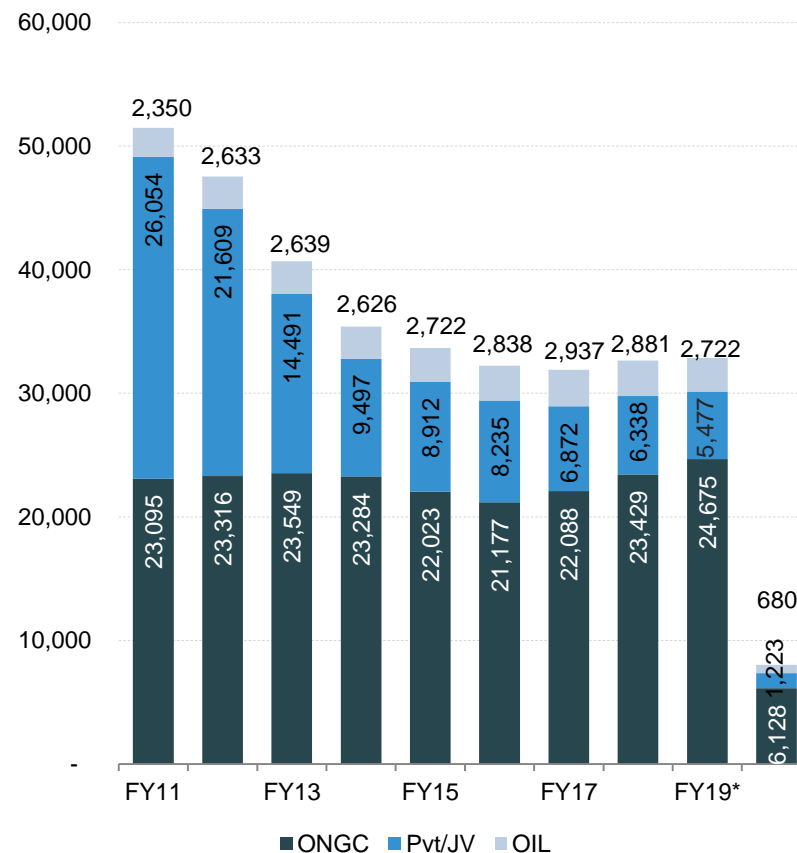
Source: Ministry of Petroleum and Natural Gas, TechSci Research

UPSTREAM SEGMENT: CRUDE OIL AND GAS PRODUCTION (2/2)

Annual gas production (million metric standard cubic meter)



Annual gas production (million metric standard cubic meter)

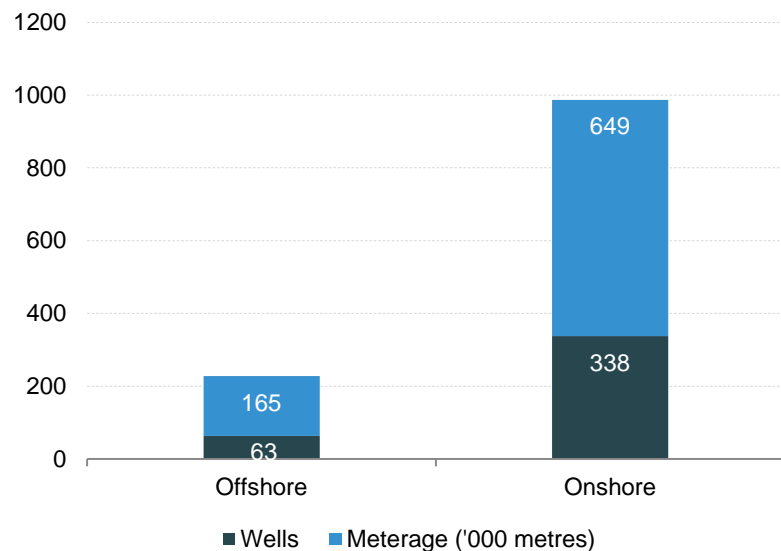


Note: JV – Joint Venture, [^]Including CBM production, **Revised, *Provisional

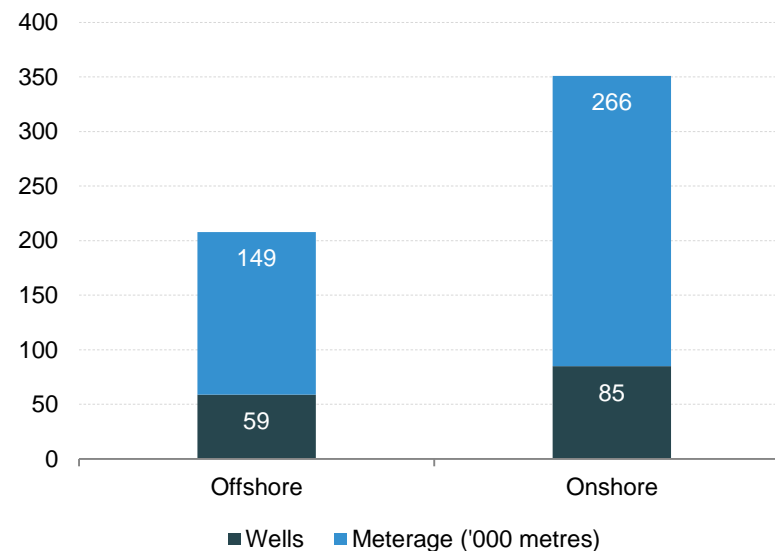
Source: Ministry of Petroleum and Natural Gas; TechSci Research

UPSTREAM SEGMENT: EXPLORATION AND DEVELOPMENT ACTIVITIES

Development drilling activities (FY18P)



Exploration activities (FY18P)



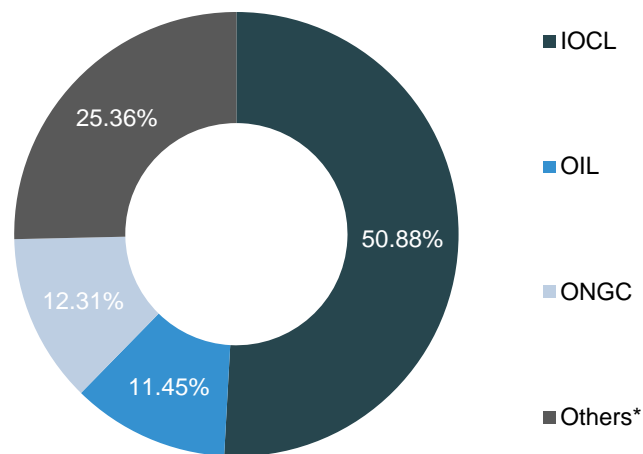
- During FY18 (P), 1,228,000 metres of wells were explored and developed and 545 wells were drilled in the country.
- State-owned oil companies undertake most of the upstream drilling and exploration work.
- In September 2018, investments worth Rs 5,900 crore (US\$ 840.70 million) were committed in 55 oil and gas exploration areas awarded under Open Acreage Licensing Policy – 1. The Government of India will soon undertake auction of 14 more blocks in the second round.
- The government is planning to invest US\$ 2.86 billion in the upstream oil and gas production to double the natural gas production to 60 bcm and drill more than 120 exploration wells by 2022.

Notes: P– Provisional, *OALP – Open Acreage Licensing Policy, Updated data is expected in October - November 2019 from Ministry of Petroleum PNG statistics 2018-19

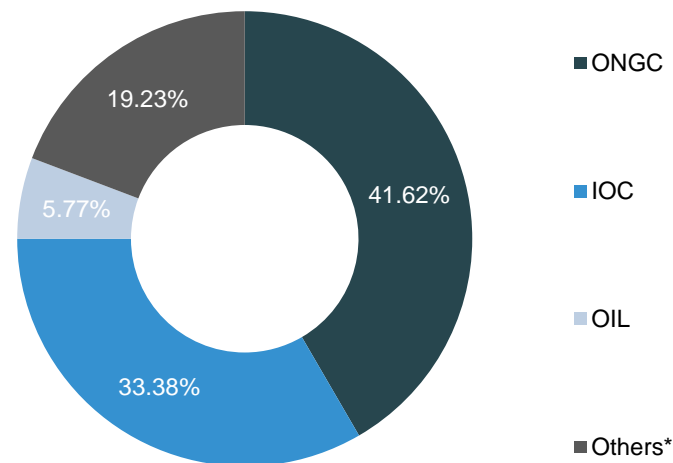
Source: Ministry of Petroleum and Natural Gas, TechSci Research , BMI

PIPELINES: CRUDE PIPELINE NETWORK

Shares in crude pipeline network by length
(out of 10,419 km, Apr 1, 2019)¹



Shares in crude pipeline network by capacity
(out of 145.6 MMTPA, Apr 1, 2019)¹



- As of Apr 01, 2019, India had a network of 10,419 km of crude pipeline having a capacity of 145.6 mmtpa(1).
- In terms of length, IOCL accounts for 50.88 per cent (5,301 km) of India's crude pipeline network.
- In terms of actual capacities, ONGC leads the pack with a share of 41.62 per cent, followed by IOCL at 33.38 per cent.

Note: km – Kilometre, mmtpa – Million Metric Tonnes Per Annum, ⁽¹⁾Approximate, *Others includes HMEL, BPCL and Cairn

Source: Ministry of Petroleum and Natural Gas, TechSci Research

PIPELINES: EXISTING PIPELINES IN INDIA

Company-wise length and capacity of products pipeline and crude oil pipeline (as of Apr 1, 2019)

	IOCL	BPCL ⁽¹⁾	HPCL ⁽²⁾	OIL	ONGC	Cairn	HMEL	Others (GAIL and Petronet India.)	Total industry
Length (Kms)									
Product Pipeline	8,769	2,241	3,371	654	-	-	-	2,395	17,430
Crude oil Pipeline	5,301	937	-	1,193	1,283	688	1,017	-	10,419
Total	14,049	3,178	3,371	1,847	1,283	688	1,017	2,395	27,849
Capacity of Crude Oil Pipelines (MMTPA)									
Product Pipeline	45.6	19.5	38.1	1.7	-	-	-	9.4	114.3
Crude oil Pipeline	48.6	6.0	-	8.4	60.6	10.7	11.3	-	145.6
Total	94.2	25.5	38.1	10.1	60.6	10.7	11.3	9.4	259.9

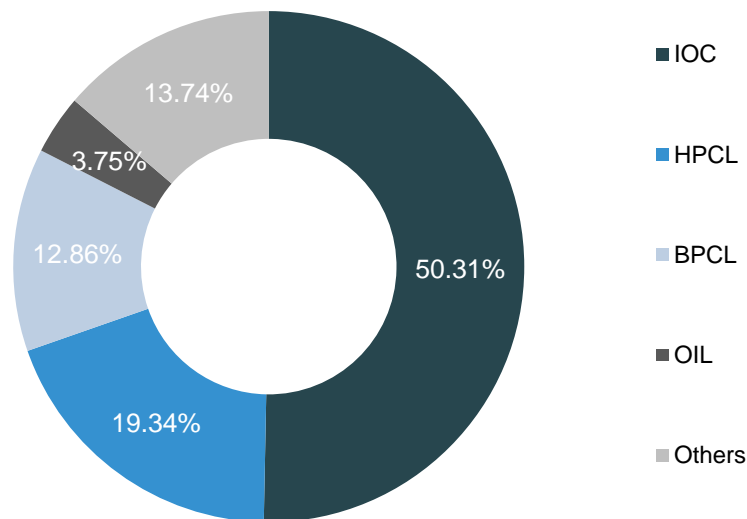
- Government of India is planning to invest Rs 70,000 crore (US\$ 9.97 billion) to expand the gas pipeline network across the country.

Note: kms – Kilometres, mmtpa – Million Metric Tonnes Per Annum, ⁽¹⁾Includes Petronet Cochin-Coimbatore-Karur Product pipeline, ⁽²⁾Includes Petronet Mangalore-Hassan-Bangalore Product Pipeline

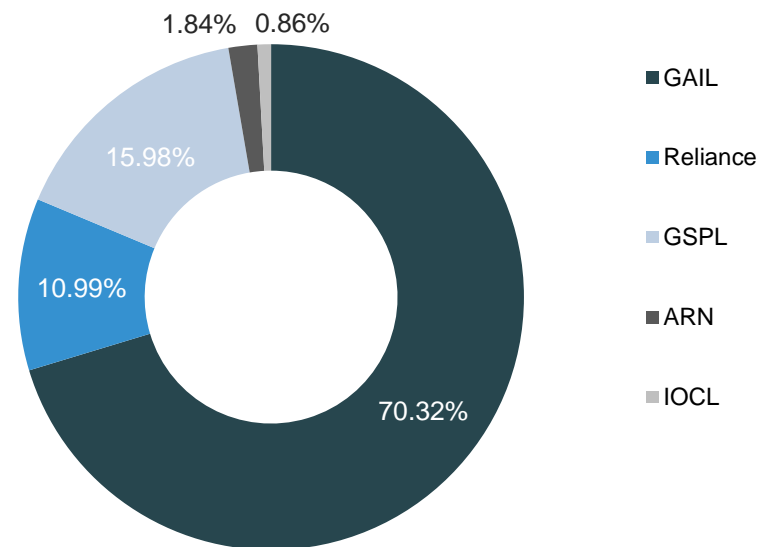
Source: Ministry of Petroleum and Natural Gas, TechSci Research

PIPELINES: REFINED PRODUCTS AND LPG PIPELINE NETWORK

**Shares in products pipeline network under operation by length
(out of 17,430 km, Apr 1, 2019)**



**Shares in Natural Gas pipeline network by length
(out of 16,226 km, Apr 1, 2019)**



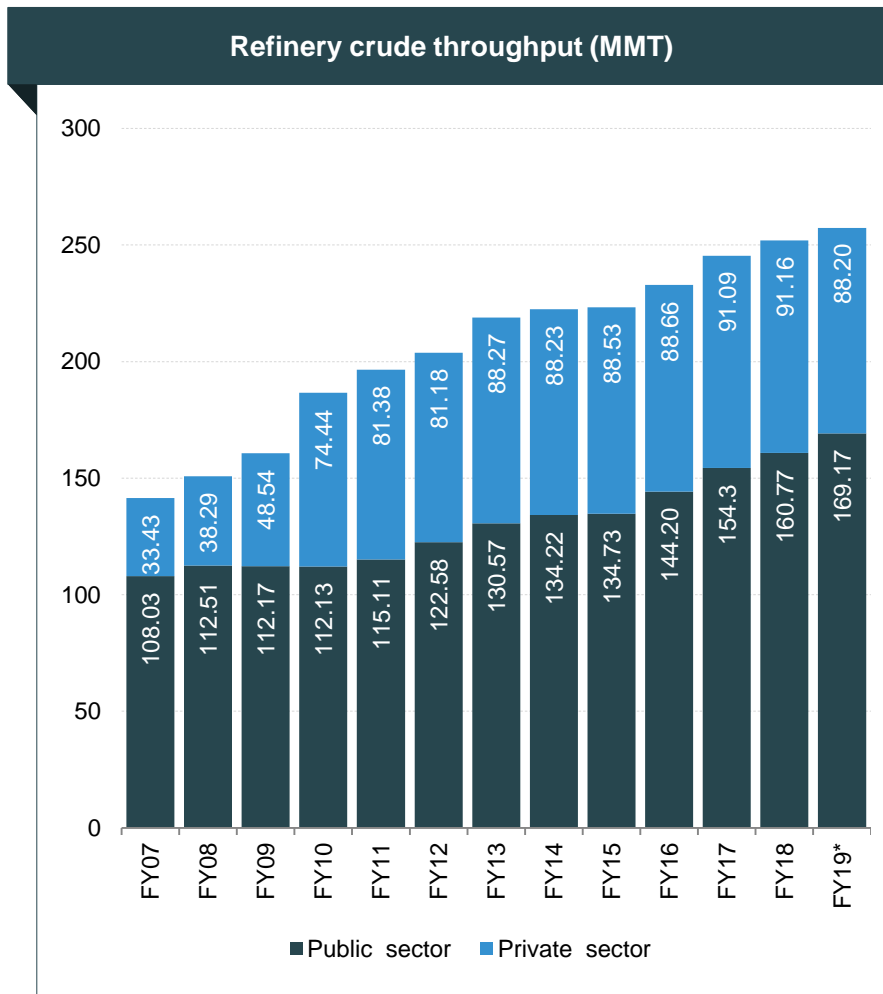
- With 8,748 km of refined products pipeline in India, Indian Oil Corporation (IOC) leads the segment with 50.25 per cent of the total length of product pipeline network, as of Apr 01, 2019.
- Top three companies IOCL, HPCL and BPCL contribute 82.48 per cent of the total length of product pipeline network in the country.
- As of April 01, 2019, Gas Authority of India Ltd. (GAIL) has largest share (70.32 per cent or 11,410 km) of the country's natural gas pipeline network (16,226 km)

Note: 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 and Natural Gas, TechSci Research

DOWNSTREAM SEGMENT: REFINERY CRUDE THROUGHPUT... (1/2)

- India has 23 refineries, out of which 18 are in the public sector, two in the joint sector and three in the private sector.
- Crude oil throughput of public sector refineries has grown at a CAGR of 3.81 per cent from 108.03 MMT in FY07 to 169.16 MMT in FY19*. During the same time, crude oil throughput of private sector refineries has grown at a CAGR of 8.40 per cent from 33.43 MMT to 88.04 MMT.
- The share of private sector refineries' throughput in total crude throughput has grown from 29.99 per cent in FY07 to 34.24 per cent in FY19*.

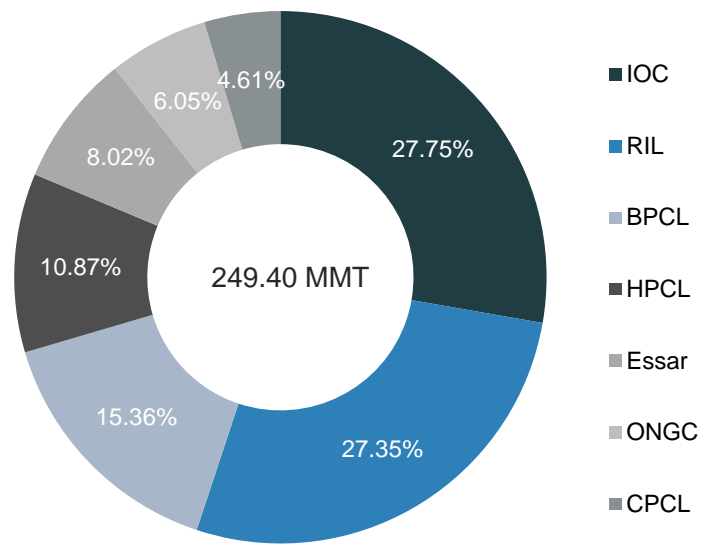


Note: MMT – Million Metric Tonne, Public Sector includes IOCL, BPCL, HPCL, CPCL and ONGC, Private sector includes RIL and NEL, *Provisional

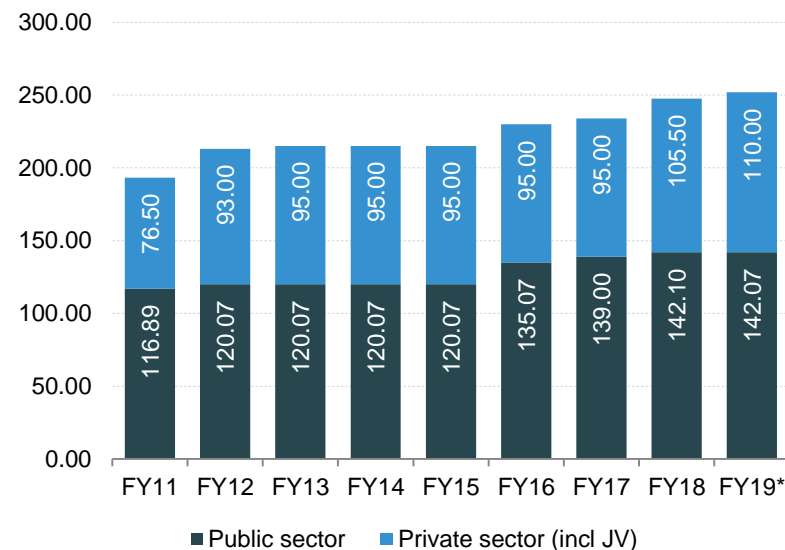
Source: Ministry of Petroleum and Natural Gas, TechSci Research

DOWNSTREAM SEGMENT: REFINERY CRUDE THROUGHPUT ... (2/2)

Shares in India's total refining capacity (As of Apr 1, 2019)



Total installed refinery capacity (MMT)



- As of Apr 01, 2019, the sector's total installed provisional refinery capacity was 249.4 MMT. IOC emerged as the largest domestic refiner with a capacity of 69.2 MMT
- Top three companies - RIL, IOC and BPCL contribute around 70.46 per cent of India's total refining capacity

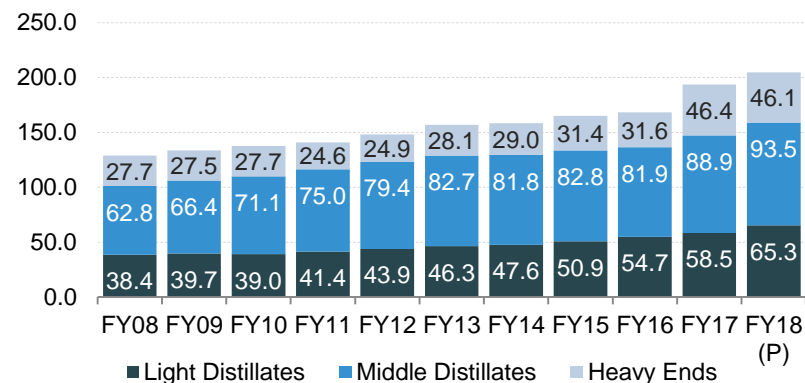
Note: MMT – Million Metric Tonne; HPCL - Hindustan Petroleum Corporation Ltd, BPCL - Bharat Petroleum Corporation Ltd, OIL - Oil India Limited, ONGC - Oil and Natural Gas Corporation, IOCL - Indian Oil Corporation Ltd, CPCL - Chennai Petroleum Corporation Limited, FY 19* - Apr 1, 2019

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

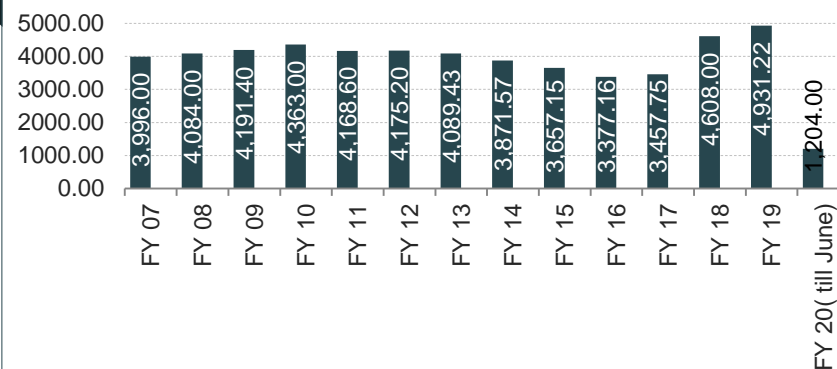
DOWNSTREAM SEGMENT: PETROLEUM PRODUCTS

- Consumption of petroleum products in India increased to 204.92 MMT in FY18(P) from 194.60 MMT in FY17.
- Petroleum products derived from crude oil include light distillates such as LPG, naphtha; middle distillates such as kerosene; and heavy ends such as furnace, lube oils, bitumen, petroleum coke and paraffin wax
- Light distillates with the highest growth rate grew at CAGR of 5.46 per cent, while middle distillates and heavy end segment witnessed a CAGR of 4.06 per cent and 5.21 per cent respectively, during the year FY08-18.
- Production of petroleum products by fractionators grew to 4,931.22 tmt in FY19 from 4,808.00 tmt in FY18.

Consumption of Petroleum Products (MMT)



Production of Petroleum Products by Fractionators (tmt)



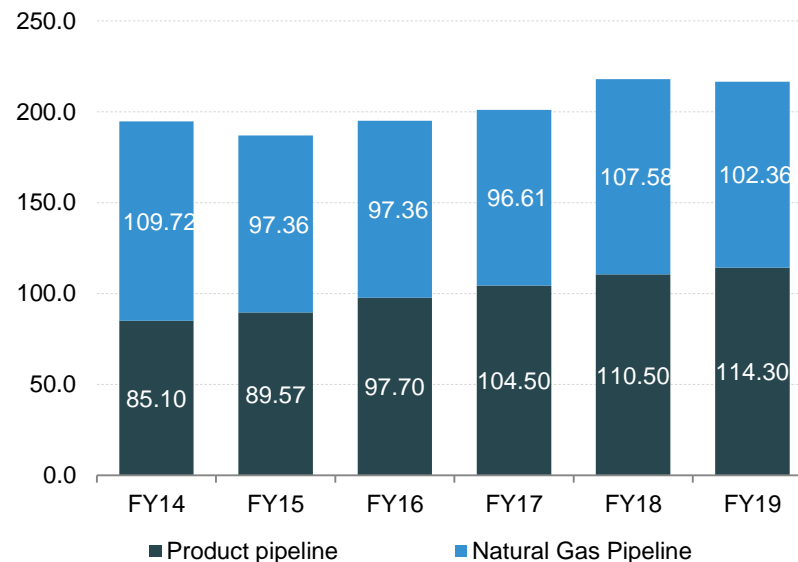
Note: MMT – Million Metric Tonne, tmt – thousand metric tonne, FY19* - As of January 2019, P – Provisional, Updated data is expected in October - November 2019 from Ministry of Petroleum and Natural Gas PNG statistics 2018-19

Source: Ministry of Petroleum and Natural Gas, TechSci Research

DOWNSTREAM SEGMENT: DISTRIBUTION AND MARKETING

- The total number of OMC retail outlets increased to 64,624 at the start of April 2019 (P) from 59,595 at the end of FY17.
- IOCL, as of Mar 1, 2019, owned the maximum number of retail outlets in the country (27,702), followed by HPCL (15,440), BPCL (14,802) and MRPL (7 or 0.01 per cent); the remaining being owned by private firms.
- As of Apr 1, 2019 (P), there were 23,737 LPG distributors (of PSUs) in India.

Downstream distribution statistics (MMT)



Pipeline	Capacity (mmtpa) As of Apr 1, 2019	Length (km) As of Apr 1, 2019
Crude Pipeline	145.6	10,419
Product Pipeline	114.3	17,430
Natural Gas Pipeline	368.5	16,226

Note: MMT – Million Metric Tonne, mmtpa – Million Metric Tonnes Per Annum, OMC – Oil Marketing Companies, (P) – Provisional, PSU – Public Sector Unit

Source: Ministry of Petroleum and Natural Gas, TechSci Research

STATE-WISE CRUDE RESERVE, CAPACITY AND THROUGHPUT

State	Balance recoverable reserves of crude oil, 2018 (MMT)	State	Installed capacity, as of April 2018 (mt)	Crude throughput for FY 2018 (MMT)
Assam	160.34	Gujarat	101.9	104.97
Gujarat	118.20	Maharashtra	19.5	22.70
Rajasthan	17.99	Haryana	15.0	15.65
Tamil Nadu	9.16	Karnataka	15.0	16.13
Andhra Pradesh	7.94	Tamil Nadu	11.5	10.79
Nagaland	2.38	Kerala	15.5	14.10
Arunachal Pradesh	1.74	Andhra Pradesh	8.36	9.64
Tripura	0.07	Uttar Pradesh	8.0	9.24
Total Onshore	317.82	West Bengal	7.5	7.66
Western Offshore	236.25	Assam	7.0	6.90
Eastern Offshore	40.42	Bihar	6.0	5.82
Total Offshore	276.67	Punjab	11.3	8.83
		Madhya Pradesh	6.0	6.71
		Odisha	15.0	12.73
		Total	247.56	251.94

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

Source: Ministry of Petroleum and Natural Gas, TechSci Research

KEY DOMESTIC OIL AND GAS COMPANIES



ऑयल इंडिया लिमिटेड
Oil India Limited

Company	Ownership (per cent) as of FY18	Total Income from Operations in FY19 (US\$ billion)
Indian Oil Corporation Limited	56.98% state-owned	86.68
Reliance Industries	Public Listed	81.70
Bharat Petroleum Corporation Limited	54.31% state-owned	48.73
Hindustan Petroleum Corporation Limited	51.11% state-owned (through ONGC)	42.75
ONGC	68.07% state-owned	12.16
GAIL India Limited	53.59% state-owned	10.74
Oil India Limited	66.13% state-owned	1.52

Note: : FY – Indian Financial Year from April–March

Source: Bloomberg, TechSci Research

NOTABLE TRENDS AND STRATEGIES



NOTABLE TRENDS IN THE OIL AND GAS SECTOR

Coal Bed Methane (CBM)

- Government approved the CBM policy in 1997 to boost the development of clean and renewable energy resources
- The CBM policy was designed to be liberal and investor friendly; the 1st commercial production of CBM was initiated in July 2007 at about 72,000 cubic metres per day. Production in 2018-19* stood at 596.63 million cubic metres.

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 and it 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 and 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

Open Acreage Licensing Policy

- The Open Acreage Licensing Policy (OALP), which allows an explorer to study the data available and bid for blocks of his choice has been initiated to increase foreign participation by global E & P companies like Shell, BP, Conoco Phillips etc
- As of January 2019, the Government of India has put 14 blocks up for auction in the second round of OALP and investments worth Rs 40,000 crore (US\$ 5.54 billion) are expected. As of February 2019, the Government of India put up 23 blocks for bidding in the third round of OALP which would generate work commitment of US\$ 600-700 million.

Note: * - As of January 2019
Source: Ministry of Petroleum

Expansions

- In September 2018, the Government of Gujarat selected Energy Infrastructure Limited (EIL), a subsidiary of the Netherlands-based Energy Infrastructure Butano (Asia) BV, to set up a Liquefied Petroleum Gas (LPG) terminal at Okha with an investment of Rs 700 crore (US\$ 104.42 million).
- H-Energy is planning to invest Rs 3,500 crore (US\$ 540.62 million) to build Liquefied Natural Gas (LNG) terminals and lay down a 60 km pipeline.
- As per Union Budget 2019-20, Indian Scheme 'Kayakave Kailasa', The Ministry of Petroleum & Natural Gas has enabled SC/ST entrepreneurs in providing Bulk LPG Transportation. State run energy firms Bharat Petroleum, Hindustan Petroleum and Indian Oil Corp plan to spend US\$ 20 billion on refinery expansions to add units, by 2022
- Indian Oil Corp plans to make an investment of US\$22.91 billion, including US\$ 7.64 billion for expanding its existing brownfield refineries, in the next 5 to 7 years. Moreover, the company 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 and setting up of CGD network in more cities.
- Reliance Industries Ltd is planning to expand its Jamnagar oil refining capacity by about 50 per cent. After the expansion, the plant will then be able to process about 30 million tonnes crude oil per year.
- As of January 2019, H-Energy is going to invest Rs 3,700 crore (US\$ 512 million) for construction of an LNG project in West Bengal.
- As on January 2019, The Cabinet Committee on Economic Affairs has approved the capacity expansion of Numaligarh Refinery from 3 MMTPA to 9 MMTPA which will be completed within 48 months.
- As of March 2019, Brookfield is going to acquire Reliance Gas Transportation Infrastructure, now known as East West Pipeline (EWPL) for Rs 13,000 crore (US\$ 1.80 billion).

Source: TechSci Research , Bloomberg reports, News Articles

STRATEGIES ADOPTED ... (2/3)

Diversification

- Oil companies are focusing on vertical integration for next stage of growth. For instance, oil producer Oil India Ltd is planning to build and operate refineries, while Indian Oil is planning to enter oil and gas exploration
- As of March 2017, Bharat Petroleum Corp. Ltd. (BPCL), an Indian state-controlled oil and gas company, plans to enter the country's travel business with the launch of its start-up named as "Happy Roads". The application, which is available on Android Play Store, documents itineraries and assists the users in planning a fun-filled trip

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.
- Indian Oil Company (IOC) is planning to invest Rs 1.43 lakh crore (US\$ 22.19 billion) to nearly double its oil refining capacity to 150 million tonnes by 2030.
- Reliance Industries is planning to enter into a Joint Venture with the world's largest oil exporter Saudi Arabia in petrochemicals and refinery projects.
- To boost hydrocarbon production and to improve oil recovery from offshore fields, ONGC plans to invest more than US\$ 500 million in Mumbai High.
- India's rising oil demand is expected to underpin investments in refining capacity expansions and upstream production.^

Move to non-conventional energy resources

- Companies are looking forward to developing JVs and technical partnership with foreign companies to improve capabilities to develop shale reserves
- The Government of India is planning to set up around 5,000 compressed biogas (CBG) plants by 2023.

More focus upon small companies

- Private sector units like Adani, Sun Petrochemicals and few new entrants have bagged 1/3rd of small oil and gas fields.

Notes: ATM - Automated Teller Machine, FIP – Financial Inclusion Plan, RBI – Reserve Bank of India, ^As per Moody's Investor Service

Source: India Banking Association, Reserve Bank of India, TechSci Research , News sources

Pilot project Initiated for Shale Gas Production in India

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

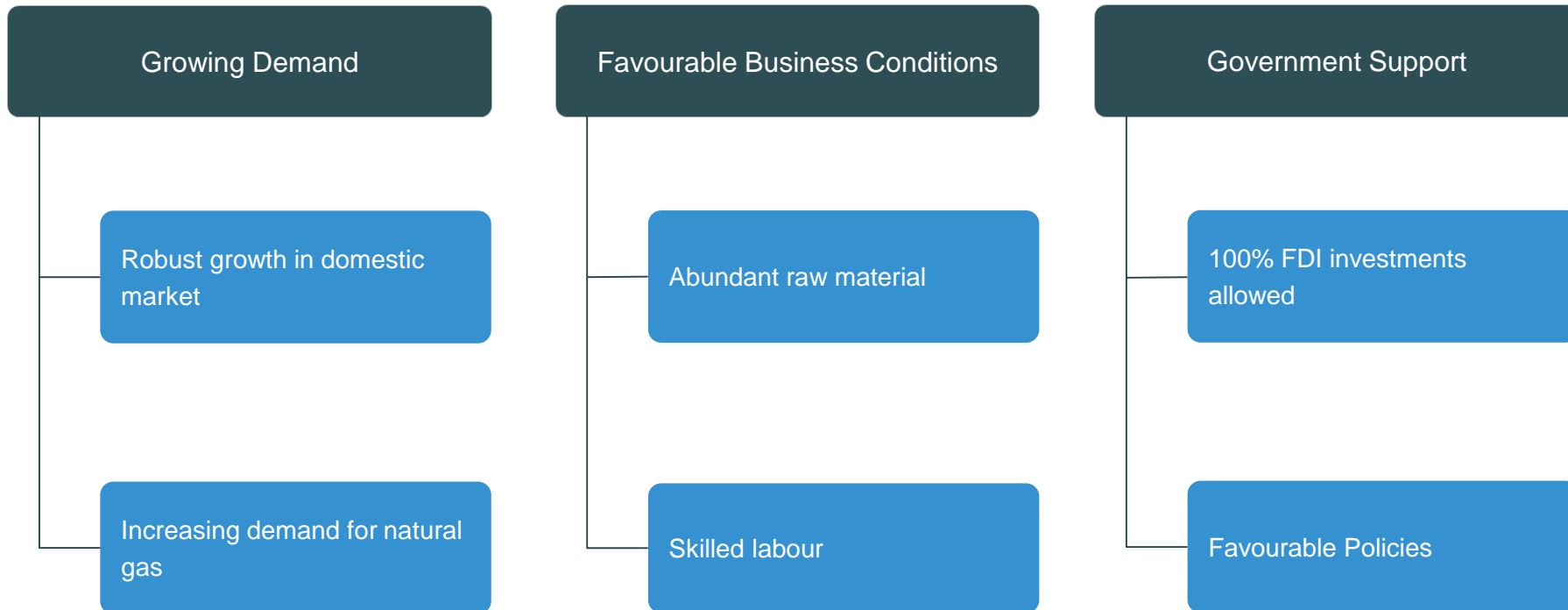
Piped Cooking Gas

- ONGC has started supply of Piped Natural Gas in Bhubaneswar from October 2017 and is currently laying down natural gas pipeline in Varanasi.
- In May 2018, India launched its biggest auction of City Gas Distribution (CGD) networks. The successful companies will be permitted to sell Compressed Natural Gas (CNG) and Piped Natural Gas (PNG) in 86 geographical areas. The auctions are expected to lead to investments worth Rs 70,000 crore (US\$ 10.86 billion).

GROWTH DRIVERS



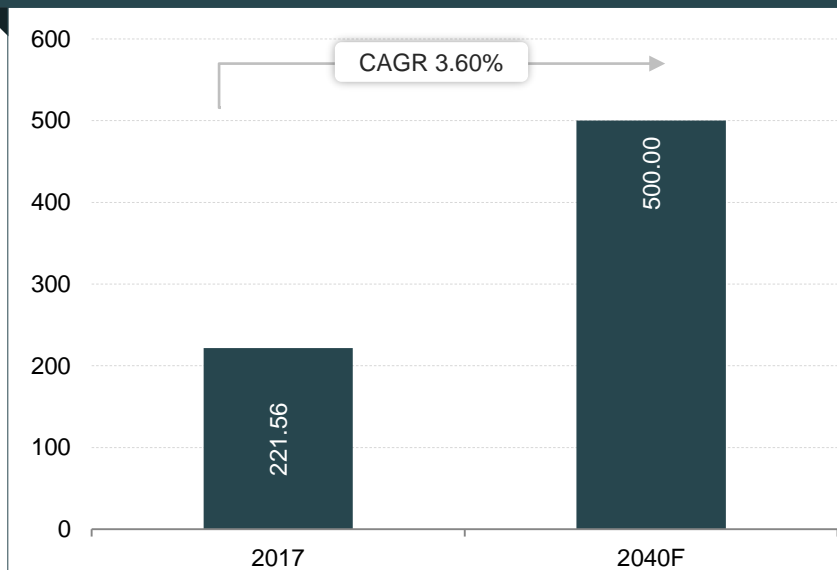
GROWTH DRIVERS



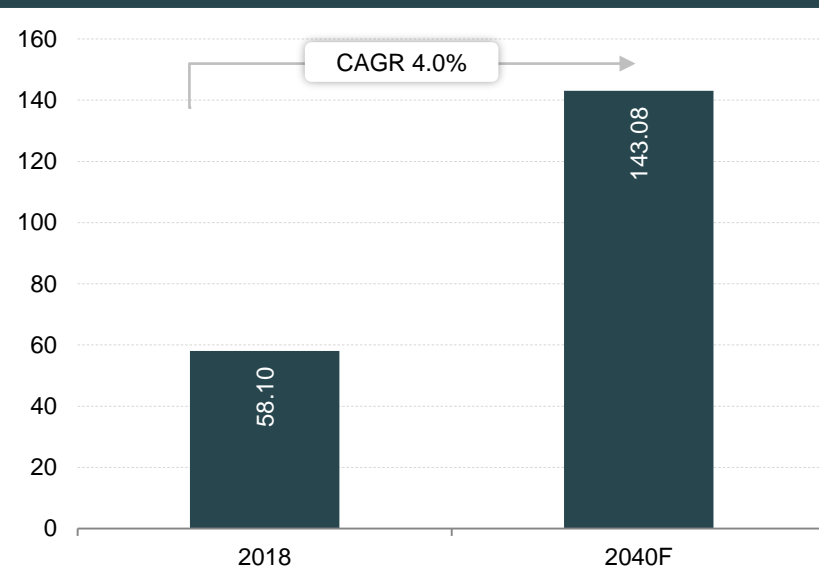
Notes: TCM - Trillion Cubic Metres, EandP - Exploration and Production

Source: Ministry of Petroleum and Natural Gas, US Energy Information Administration, BP Statistical Review of World 2015 Energy, June 2012; BMI, TechSci Research

Crude oil consumption and forecast (MT)



Natural gas consumption and forecast (BCM)



- Energy demand of India is anticipated to grow faster than energy demand of all major economies, on the back of continuous robust economic growth.
- Consequently, India's energy demand as a percentage of global energy demand is expected to rise to 11 per cent in 2040 from 5.58 per cent in 2017.
- Crude oil consumption is expected to grow at a CAGR of 3.60 per cent to 500 million tonnes by 2040 from 221.76 million tonnes in 2017.
- Natural Gas consumption is forecasted to increase at a CAGR of 4 per cent to 143.08 million tonnes by 2040 from 58.10 million tonnes in 2018.
- Diesel demand in India is expected to double to 163 million tonnes (MT) by 2029-30.

Notes: F-Forecast, MT – Million Tonnes, BCM – Billion Cubic Metres, Updated data is expected in June 2019 from BP statistical review 2019

Source: BP Statistical Review of World Energy 2018, BP Energy Outlook 2018

National Policy on Biofuels, 2018

- Proposes an indicative target of 20 per cent blending of ethanol in petrol and 5 per cent blending of biodiesel in diesel by 2030
- Promotes advanced biofuels through a viability gap funding scheme of Rs 5,000 crore (US\$ 745.82 million) in six years for 2G ethanol Bio refineries, along with additional tax incentives.

Pricing of CNG and PNG by CGD Entities (2014)

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

The Policy on Shale Gas and Oil, 2013

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

Open Acreage Licensing

- Launched in June 2017, it allows companies to carve out area for petroleum exploration and production. The policy, launched under Hydrocarbon Exploration and Licensing Policy (HELP), has replaced New Exploration and Licensing Policy under which bidders did not have the freedom of carving out areas for E&P

Integrated Energy Policy (IEP), 2006

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

Source: Ministry of Petroleum and Natural Gas, TechSci Research

Petroleum and Natural Gas Regulatory Board (PNGRB) Act, 2006

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

Auto Fuel Policy, 2003

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

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.

Marginal Field Policy

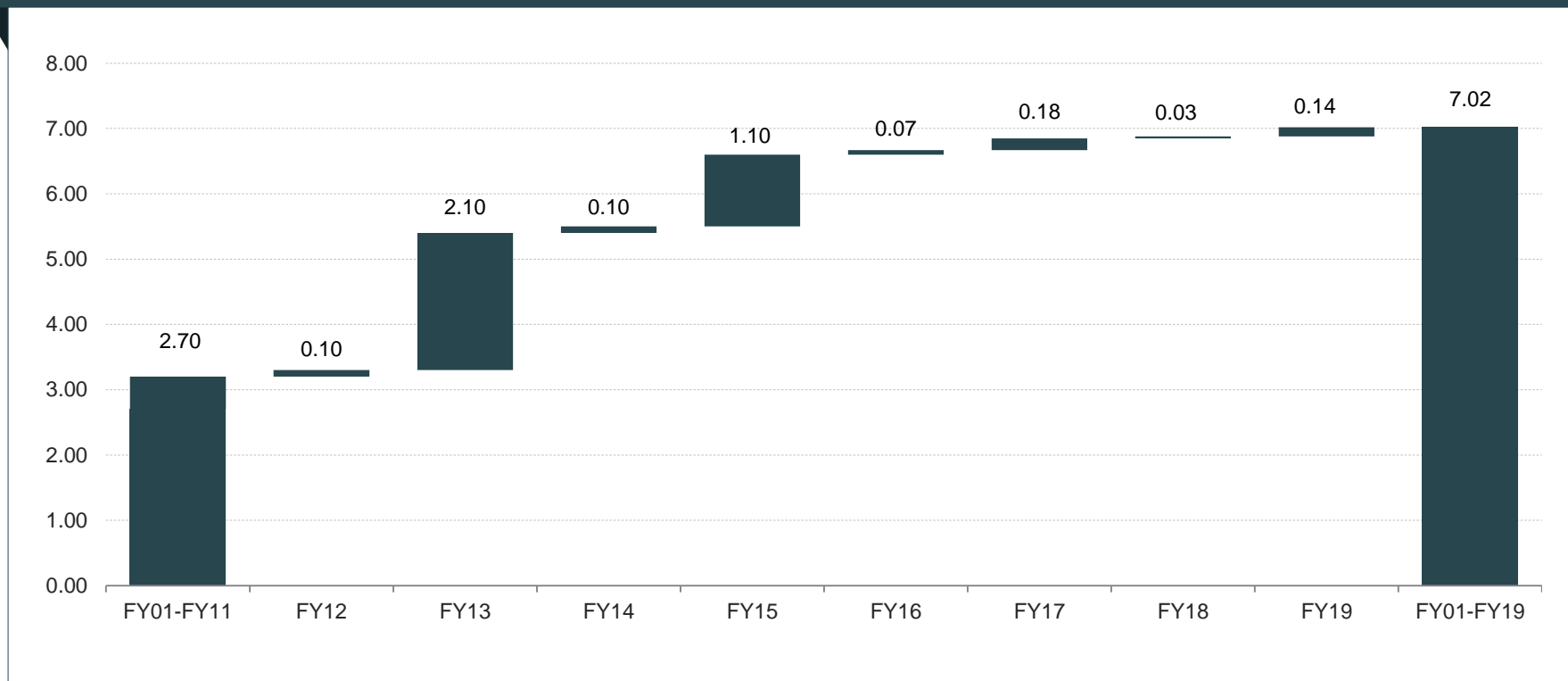
- Monetise discovered small oil and gas fields to augment domestic production
- Improved fiscal terms viz. no oil cess applicable on crude oil production, no upfront signature bonus, pricing and marketing freedom for oil and gas and no carried interest by NOCs

Note: NOCs - National Oil Companies

Source: Ministry of Petroleum and Natural Gas, TechSci Research

FDI INVESTMENTS IN PETROLEUM AND GAS IN INDIA

FDI Inflows in Petroleum and Natural Gas in April 2000-March 2019 (US\$ billion)



- FDI inflows in India's petroleum and natural gas sector stood at US\$ 7 billion during April 2000-March 2019..

Source: Department of Industrial Policy and Promotion, TechSci Research

M&A ACTIVITIES IN THE INDIAN OIL AND GAS SECTOR

Date announced	Acquirer name	Target name	Value of deal (US\$ million)
Mar 2019	Brookfield	East West Pipeline (EWPL) (Previously known as Reliance Gas Transportation Infrastructure)	US\$ 1,800
Apr 2018	Indian Oil Corporation Ltd (IOCL)	Shell Exploration & Production, Oman	329
Feb 2018	ONGC	HPCL (51.11 per cent stake)	57,020.39
Feb 2018	ONGC Videsh	Abu Dhabi National Oil Co (10 per cent stake in offshore oilfield)	600
Aug 2017	Rosneft	Essar Oil (49 per cent stake)	1,290
Dec 2016	Oil and Natural Gas Corp's	Gujarat State Petroleum Co's	1,200
Dec 2015	ONGC Videsh Ltd (OVL)	Vankor oil field	1,260
Jan 2015	Bharat Forge	Mecanique Generale Langroise	12.82
Jun 2014	Gulf Petrochem Ltd	Sah Petroleums Limited	7.13
Mar 2014	IOCL	Progress Energy Canada Ltd	Not disclosed
Mar 2014	IOCL	Progress Energy Canada Ltd	Not disclosed
Mar 2014	IOCL	Progress Energy Canada Ltd	Not disclosed

Source: Thomson Banker, News Articles

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
- In 2017-18, The two Upstream National Oil Companies (NOCs), Oil and Natural Gas Corporation Limited (ONGC) and Oil India Limited (OIL) having a total share of about 71.5% in oil and 81% in gas production in the country.
- Higher 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

- India is already a refining hub with 21 refineries and expansions planned for tapping foreign investment in export-oriented infrastructure, including product pipelines and 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 and 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 and Natural Gas
- India launched its policy on shale gas exploration to tap the non-conventional energy resource in order to boost output.
- Great Eastern Energy Corp (GEECL) will invest US\$ 2 billion over the next ten years in West Bengal to explore shale gas reserves.
- Indian companies are invited to explore partnership opportunities in Vaca Muerta, Argentina which is known to be one of the largest deposits of shale gas in the world.

Notes: tcf – Trillion Cubic Feet

Source: EandY; Ministry of Petroleum and Natural Gas, TechSci Research

USEFUL INFORMATION



CONTACT INFORMATION

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Petroleum Conservation Research Association (PCRA)	Sanrakshan Bhavan, 10 Bhikaji Cama Place, New Delhi – 110066	Mr Alok Tripathi, 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	Mr Abhay Bakre, Director General	91-11- 26178316, 91-11- 26179699	dg-bee@nic.in,
Oil Industry Safety Directorate	Ministry of Petroleum & Natural Gas, 8th Floor, OIDB Bhawan, Plot No 2, Sector-73, Noida, Uttar Pradesh-201301	Mr Varanasi Janardhana Rao, ED	0120-2593800	rao.vj@gov.in
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Directorate General of Hydrocarbons	Ministry of Petroleum and Natural Gas, OIDB Bhawan, Plot No 2, Sector 73, Noida	Mr Atanu Chakraborty, Director General	0120 - 2472001	dg@dghindia.org

- 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
- EandP: Exploration and Production
- FDI: Foreign Direct Investment
- FY: Indian Financial Year (April to March)
- FY17 implies April 2016 to March 2017
- Gol: Government of India
- INR: Indian Rupee
- LNG: Liquefied Natural Gas
- 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
- OALP: Open Acreage Licensing Policy
- TOE (or toe): Tonnes of Oil Equivalent
- US\$: 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)

Year INR	INR Equivalent of one US\$
2004-05	44.95
2005-06	44.28
2006-07	45.29
2007-08	40.24
2008-09	45.91
2009-10	47.42
2010-11	45.58
2011-12	47.95
2012-13	54.45
2013-14	60.50
2014-15	61.15
2015-16	65.46
2016-17	67.09
2017-18	64.45
2018-19	69.89

Exchange Rates (Calendar Year)

Year	INR Equivalent of one US\$
2005	44.11
2006	45.33
2007	41.29
2008	43.42
2009	48.35
2010	45.74
2011	46.67
2012	53.49
2013	58.63
2014	61.03
2015	64.15
2016	67.21
2017	65.12
2018	68.36

Source: Reserve Bank of India, Average for the year

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