



सत्यमेव जयते

पेट्रोलियम और प्राकृतिक गैस मंत्रालय
भारत सरकार

Ministry of Petroleum and Natural Gas
Government of India

Energizing and Empowering India



ANNUAL REPORT
2018-19





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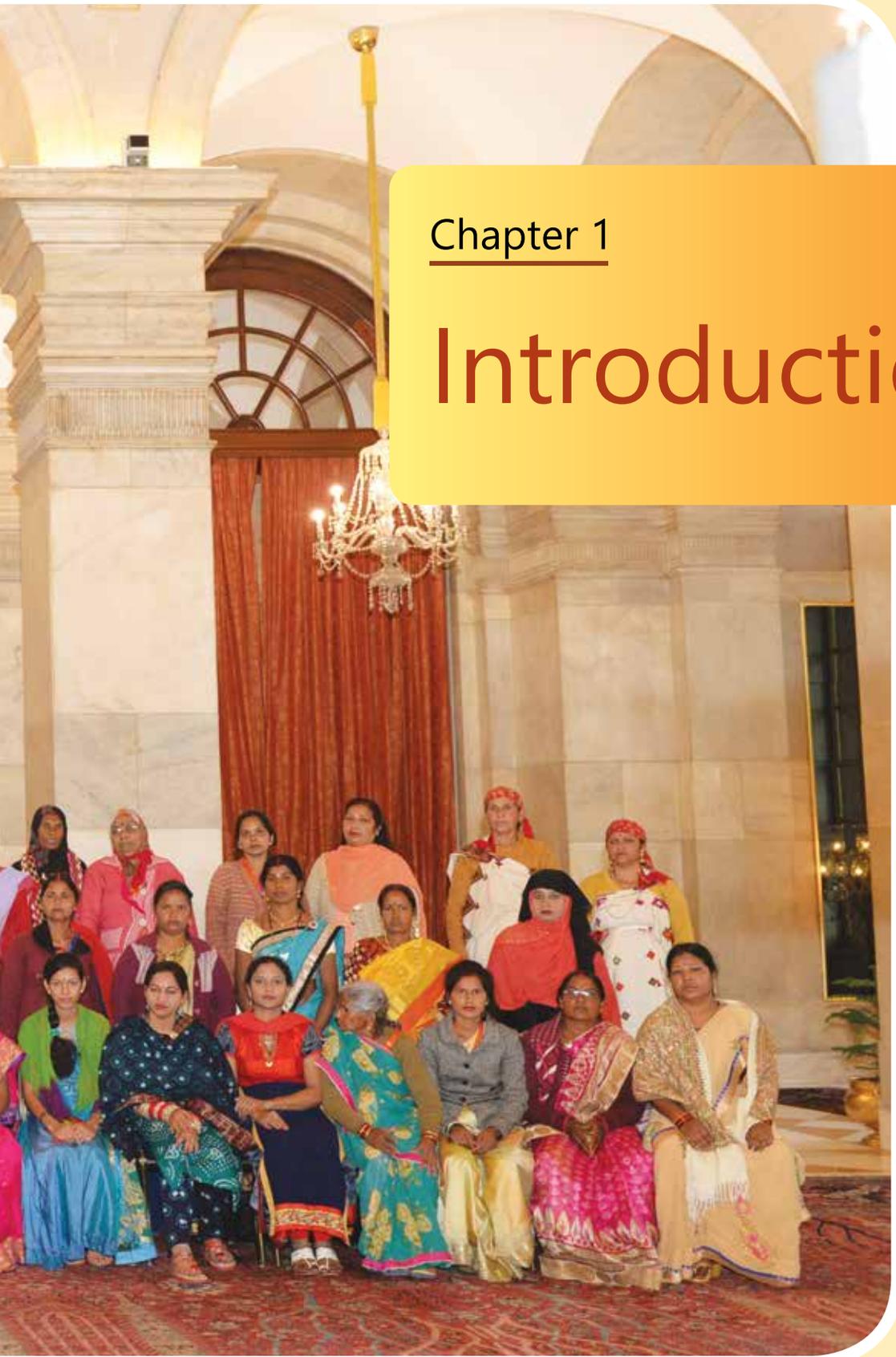
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Chapter 1

Introduction



Introduction



Minister of Petroleum & Natural Gas and Skill Development & Entrepreneurship, Shri Dharmendra Pradhan handing over the Guinness World Record certificate for the world's largest cash-benefit transfer scheme 'PAHAL' to Hon'ble Prime Minister, Shri Narendra Modi

- 1.1** The Ministry of Petroleum & Natural Gas is concerned with exploration and production of Oil & Natural Gas, refining, distribution and marketing, import, export and conservation of petroleum products. The work allocated to the Ministry is given in **Appendix-I**. The names of the Central Public Sector Enterprises and other organisations under the Ministry are listed in **Appendix-II**.
- 1.2** Shri Dharmendra Pradhan earlier Minister of State (Independent Charge) for Petroleum & Natural Gas continues to hold the charge of Minister for Petroleum & Natural Gas w.e.f. 3rd September, 2017.
- 1.3** Dr. M.M. Kutty, IAS (AGMUT 1985) assumed the charge of OSD (P&NG) w.e.f. 1st May, 2018 and subsequently assumed the charge of Secretary (P&NG) in the Ministry of Petroleum & Natural Gas w.e.f. 1st July, 2018.
- 1.4** Shri Rajiv Bansal, IAS (NL 1988) continues to hold the charge of the post of Additional Secretary & Financial Advisor in the Ministry of Petroleum & Natural Gas w.e.f. 24th July, 2017.
- 1.5** Smt. Sushmita Dasgupta, IES (1985) assumed the charge of Senior Advisor in the Ministry of Petroleum & Natural Gas w.e.f. 31st December, 2018.
- 1.6** Shri Sandeep Poundrik, IAS (BH 1993) continues to hold the post of Joint Secretary in the Ministry of Petroleum & Natural Gas w.e.f. 8th October, 2014.
- 1.7** Shri BV Reddy, IAS (1993) hold the post of OSD (SS level) in IC division in the Ministry of Petroleum & Natural Gas w.e.f. 27th February, 2019.
- 1.8** Shri Amar Nath, IAS (AGMUT 1994) continues to hold the post of Joint Secretary in the Ministry of Petroleum & Natural Gas w.e.f. 1st June, 2016.
- 1.9** Shri Ashutosh Jindal, IAS (MT 1995) continues to hold the post of Joint Secretary in the Ministry of Petroleum & Natural Gas w.e.f. 17th February, 2015.
- 1.10** Shri Ashish Chatterjee, IAS (TN 1999) continues to hold the post of Joint Secretary in the Ministry of Petroleum & Natural Gas w.e.f. 2nd November, 2016.
- 1.11** Ms. Indrani Kaushal, IES (1995) continues to hold the post of Economic Adviser in the Ministry of Petroleum & Natural Gas w.e.f. 1st June, 2016.
- 1.12** Shri Sukh Ram Meena, ISS (1993) continues to hold the charge of the post of Deputy Director General in the Ministry of Petroleum & Natural Gas w.e.f. 6th March, 2017.

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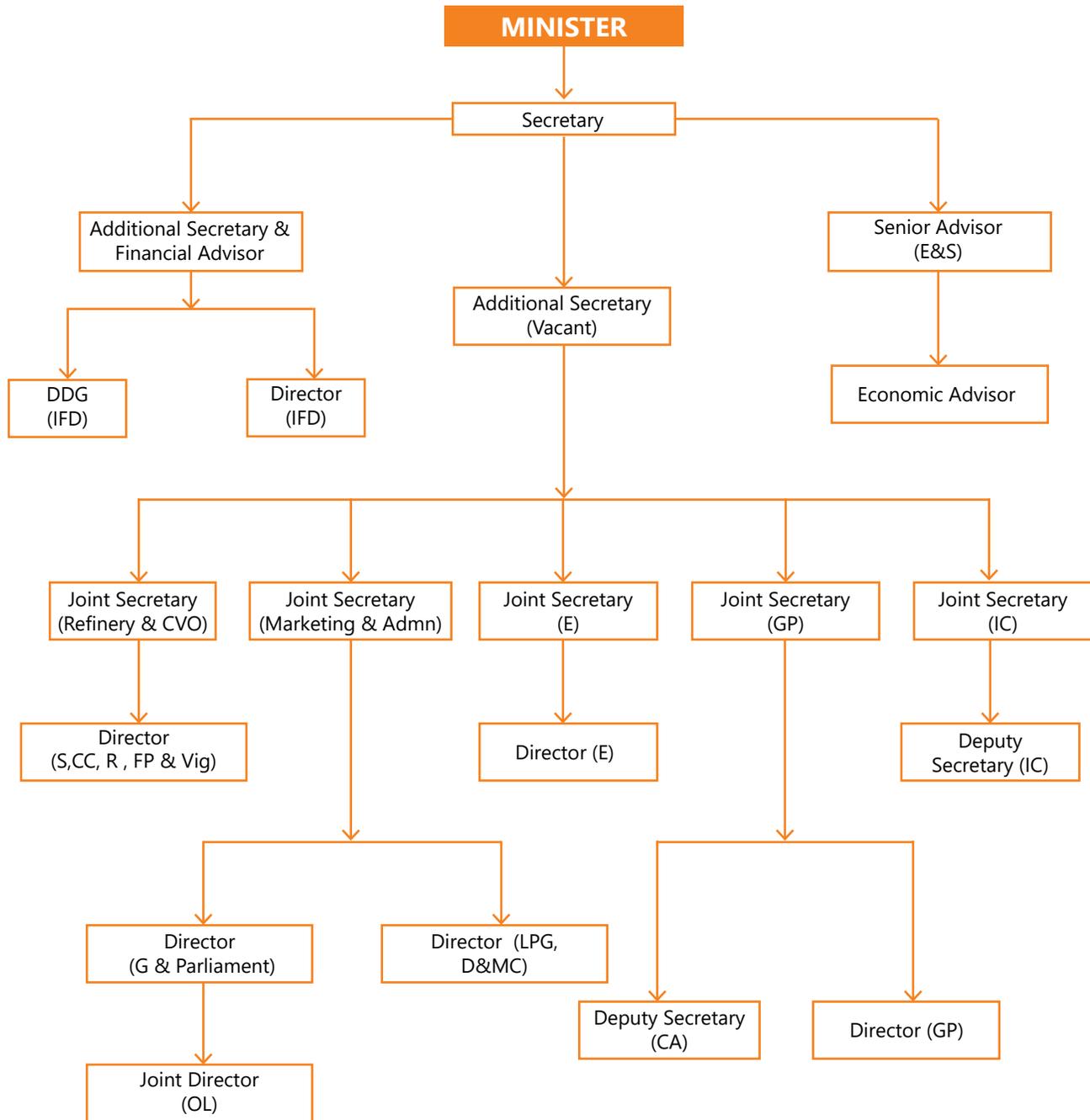
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Organizational Chart of the Ministry of Petroleum & Natural Gas as on 31st December, 2018



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Hon'ble Prime Minister, Shri Narendra Modi, along with Union Ministers, launching the 10th CGD Bidding Round

1.13 PERFORMANCE OF PETROLEUM & NATURAL GAS SECTOR-SOME KEY MACRO-ECONOMIC TRENDS

According to CSO's advanced estimates dated 7th January, 2019, Indian economy is estimated to grow 7.2% in FY 2018-19 as compared to 6.7% in FY 2017-18. The growth in the economy has triggered energy demand. On domestic front this strong growth is due to robust private consumption, expectation of greater stability in GST and public investment as well as ongoing structural reforms. It may also be mentioned here that global tension on trade front and volatile global oil market has hardened the crude oil prices.

Oil and Gas being the important import for our economy, many initiatives have been taken by the Ministry for increasing production and exploitation of all domestic petroleum resources to address the priorities like Energy Access, Energy Efficiency, Energy Sustainability and Energy Security.

1.14 MAJOR INITIATIVES

Following initiatives have been taken up by the Ministry

1.14.1 Hydrocarbon Exploration Licensing Policy

The new Hydrocarbon Exploration Licensing Policy

(HELP) for award of Hydrocarbon Acreages in the Upstream Sector of India was notified on 30th March, 2016 and formally launched w.e.f 1st July, 2017. Open Acreage Licensing Policy (OALP) is one of the key features of HELP which has been notified on 30th June, 2017. Under OALP Bid Round I, 55 Blocks having area of 59,282 square kilometres (sq. km) have been awarded on 1st October, 2018. OALP Bid Round II with 14 blocks with approx. 30,000 sq. km was recently launched for bidding to the investor community on 07th January, 2019.

1.14.2 National Data Repository

National Data Repository (NDR) set up at DGH and launched on 28th June, 2017 to make the entire Exploration and Production (E&P) data available for commercial exploration, research and development and academic purposes.

1.14.3 Discovered Small Field Policy

Discovered Small Field Policy (DSF) is aimed at monetizing hydrocarbon resources locked-in for years in a time bound manner to boost domestic production of Oil and Gas. The first bidding round under the DSF Policy was launched on 25th May, 2016 thereby offering 67 discovered small fields in 46 contract areas of ONGC and OIL for international bidding. Total 30 contracts for 43 discovered small fields were signed with 20 companies in March, 2017. It is expected that in-place locked hydrocarbons

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volume of 40 MMT oil and 22.0 BCM of gas will be monetised over a period of 15 years. In February, 2018, Cabinet has approved the DSF Policy Bid Round-II, an extension of the DSF Policy notified on 14th October, 2015. Under DSF-II, 59 discovered small fields/ unmonetized discoveries estimated to have 194.65 MMT Oil and Oil equivalent gas in place are offered for bidding. The second bidding round under DSF Policy offering 59 discoveries clubbed into 25 new Contract Areas was launched on 9th August, 2018.

1.14.4 2D Seismic Survey

The Government has taken up programme of undertaking 2D seismic survey of entire unappraised areas. National Seismic Programme was launched on 12th October, 2016. Under the programme, Government has approved the proposal for conducting 2D seismic survey for data Acquisition, Processing and Interpretation (API) of 48,243 Line Kilo Metres (LKM). The estimated cost of the project is ₹2932.99 crore and the project is proposed to be completed by FY 2019-20. As on 31st November, 2018, surface coverage of 29,707 LKM, out of 48,243 LKM has been achieved under 2D Seismic data acquisition under National Seismic Programme.

1.14.5 Natural Gas Grid and City Gas Distribution

In order to promote the usage of natural gas as a fuel/feedstock across the country and move towards a gas based economy, the development of additional



70% of India's population will be covered under CGD with the conclusion of 10th CGD round

13500 km long gas pipeline is under way to complete the Natural Gas Grid (NGG). At present, the NGG in the country predominantly connects the western, northern and south-eastern gas markets with major gas sources. As a commitment to provide clean energy in the eastern part of the country, the Government has approved a capital grant of ₹ 5,176 crore (40 per cent of the estimated capital cost of ₹12,940 crore) under Pradhan Mantri Urja Ganga.

To make available natural gas to public at large, Government has put strong emphasis on expansion of City Gas Distribution (CGD) network coverage across the country. CGD networks ensures the supply of cleaner fuel (i.e. PNG) to households, Industrial & commercial units as well as transportation fuel (i.e. CNG) to vehicles. Till 2017, only 19% of the country's population spreading over 11% of the country's area was covered for development of CGDs in 96 geographical areas. To boost the CGD sector, 9th CGD Bidding Round was launched in April, 2018 for 86 Geographical Areas (GAs) covering 174 districts in 22



Hon'ble Prime Minister Shri Narendra Modi lays the Foundation Stone of North East Gas Grid at Guwahati

Bio-Fuels	Conservation	Pricing	Welfare of SC, ST, OBC and Divyangjan	Welfare, Development and Empowerment of Women	Undertakings / Organisations	General	Appendices
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Hon'ble Vice President, Shri M. Venkaiah Naidu handing over the PMUY connections to PMUY beneficiaries on the milestone of release of 6 crore PMUY connections, in the presence of Minister of Petroleum and Natural Gas & Skill Development and Entrepreneurship, Shri Dharmendra Pradhan

States/ Union Territories of the country. 38 entities (Public and Private) participated in this round and submitted total 406 bids for all 86 GAs. As of now, 84 GAs has been authorized to the successful bidders for the development of CGD networks. Prime Minister, on 22nd November, 2018 has laid the foundation stone for the development of CGD projects in 61 newly authorized GAs covering 129 districts spreading over 17 States/UTs as well as launched the 10th round of CGD bidding for 50 GAs. With the conclusion of 10th round, it will expand the coverage of CGD networks to about 70% country's population spreading over 50% of India's area.

1.14.6 Refineries and Auto Fuel Vision and Policy

India's total refining capacity increased from 233.97 Million Metric Tonnes (MMTPA) (as on 1.4.2017) to 247.57 MMTPA at present with the capacity additions in BPCL Kochi, HMEL Bhatinda & RIL (SEZ) Jamnagar refineries.

Taking advantage of investor friendly policies, Saudi Aramco (Saudi Arabia) and Abu Dhabi National Oil Company (ADNOC) of UAE signed an MoU in June 2018, with Indian promoters, IOCL, BPCL and HPCL, to jointly develop and built an integrated refinery and petrochemicals complex, i.e. Ratnagiri Refinery & Petrochemicals Ltd (RRPCL) in Maharashtra.



**Achieved target of
5 crore free LPG
connections 8 months
ahead of schedule**

1.14.7 Implementation of BS-IV & BS-VI

The Government has implemented supply of BS-IV auto fuels in the entire country in phases by 1st April, 2017. Further, Government has also decided to leapfrog from BS-IV to BS-VI directly and a notification has been issued for implementation of BS-VI w.e.f. 1st April, 2020 in the entire country. However, considering the recent rise in environmental pollution in Delhi and NCR, Government has preponed the implementation of supply of BS-VI w.e.f. 1st April, 2018 in NCT-Delhi.

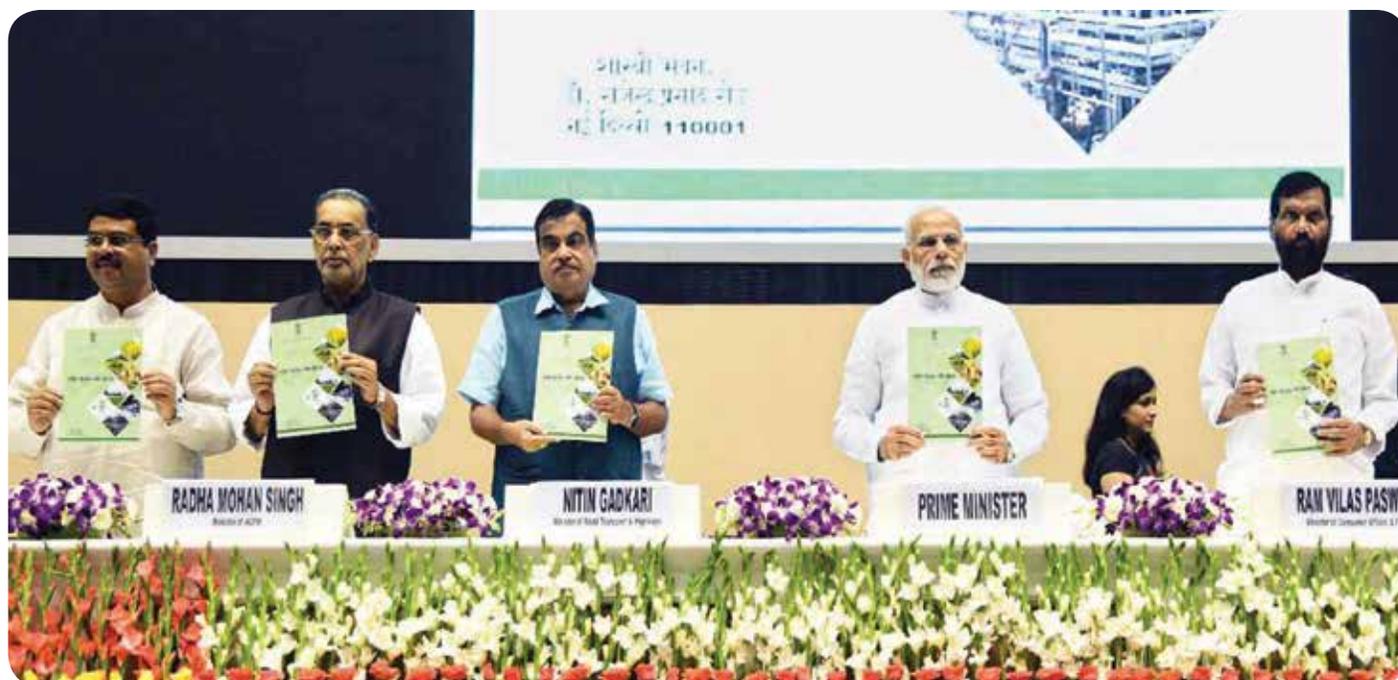
1.14.8 Pradhan Mantri Ujjwala Yojana and PAHAL

"Pradhan Mantri Ujjwala Yojana' has been launched with an objective to provide LPG connections to 5 crore women belonging to the Below Poverty Line (BPL) families over a period of 3 years starting from

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Hon'ble Prime Minister, Shri Narendra Modi along with Union Ministers releases a booklet on 'National Policy on Biofuels 2018' during the World Bio-Fuel Day 2018 function in New Delhi.

Financial Year (FY) 2016-17. Prime Minister of India formally launched the scheme on 1st May, 2016. The Government had decided to increase the target from 5 crore to 8 crore to be achieved by FY 2019-20. The main objective of the scheme is to provide clean fuel solution to poor households especially in rural areas. Use of fossil fuels and conventional fuel like cow-dung, firewood, etc., has serious implications on the health of rural womenfolk and children. More than 5.9 crore LPG connections have been released under this scheme as on 31st December, 2018. The original target of issuing 5 crore LPG connections was achieved by 3rd August, 2018, 8 months in advance of the target of 31st March, 2019.

As on 31st December, 2018, 23.28 crore LPG consumers have joined the PAHAL - Direct Benefits Transfer for LPG (DBTL) scheme. So far, more than ₹99842 crore has been transferred into the bank accounts of consumers. PAHAL has helped in identifying 'ghost' connections, multiple connections and inactive connections which in turn has resulted in curbing diversion of subsidised LPG to commercial purposes.

More than 3.07 crore new LPG connections have been released as on 31st December, 2018 in the FY 2018-19 which is more than the number of LPG connections released in the FY 2017-18 (2.81 crore). LPG coverage as per active customer count based on 2011 Census

has increased in the country from 80.9% (as on 1st April, 2018) to 89.95% (as on 31st December, 2018).

'SAHAJ' was a digital initiative launched by OMCs for release of LPG connection with online payment and issuance of 'e-SV' under the Digital India Initiative and the facility is now available on PAN India basis. Total 80,766 LPG connections have been issued through Sahaj in FY 2017-18. 46,727 LPG connections have been issued through Sahaj as on 31st December, 2018 in FY 2018-19 which is nearly 57.85% of the achievement in FY 2017-18.

1.14.9 Gram Swaraj Abhiyan and Extended Gram Swaraj Abhiyaan

As part of the Gram Swaraj Abhiyan (GSA), Ministry of Petroleum & Natural Gas in association with Oil Marketing Companies organised Ujjwala Diwas on 20th April, 2018. During the Ujjwala Diwas, LPG Panchayats were organized aimed at educating LPG consumers especially beneficiaries of PMUY on benefits and safe usage of LPG, and new connections (10.93 lakh) were also distributed under Pradhan Mantri Ujjwala Yojana (PMUY).

The Extended Gram Swaraj Abhiyaan (eGSA) was organized from 1st June, 2018 to 15th August, 2018 in 159 districts which comprised of 117 aspiration districts and all the districts of West Bengal and

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Hon'ble Prime Minister, Shri Narendra Modi and H.H. Sheikh Mohamed Bin Zayed witness signing of historic ADNOC Offshore Concession Agreement

Karnataka. During eGSA, release of 39.94 lakh LPG connections was targeted under PMUY in 48,929 villages across the country. 40.17 lakh LPG connections were released under PMUY during eGSA, more than the target fixed.

1.14.10 Direct Benefit Transfer Kerosene

To bring reforms in Allocation and Distribution of Public Distribution System (PDS) Superior Kerosene Oil (SKO) distribution system, for better subsidy management and also for reducing subsidy outgo by means of curbing diversion of subsidized kerosene, this scheme was launched. Direct Benefit Transfer Kerosene (DBTK) Scheme was implemented in 4 districts of Jharkhand on 1st October, 2016 and w.e.f. 1st July 2017, the State Government of Jharkhand implemented the DBTK in all the 24 districts. Recently, State Government of Madhya Pradesh has also proposed to start DBTK in one urban area each in Raisen and Hoshangabad districts. So far, States of Haryana, Punjab, Andhra Pradesh and UTs of Delhi, Chandigarh, Daman & Diu, Dadar & Nagar Haveli, and Puducherry have become 'Kerosene Free'. State Governments of Karnataka, Telangana, Haryana, Nagaland, Bihar, Gujarat, Rajasthan and Goa have undertaken voluntary cut. Accordingly, kerosene allocation of these States has been rationalized/reduced.

1.14.11 National Policy on Biofuels 2018

The Government has notified National Policy on Biofuels 2018 on 8th June, 2018 which envisages a target of 20% blending of ethanol in petrol by 2030. The policy has widened the scope of raw material for ethanol procurement and thereby is expected to give boost to the Biofuel programme of the country. The major features of the Policy are as below:

- i) Categorization of biofuels as "Basic Biofuels" viz. First Generation (1G) bio ethanol & biodiesel and "Advanced Biofuels" – Second Generation (2G) ethanol, bio-CNG etc. to enable extension of appropriate financial and fiscal incentives under each category.
- ii) Expanding the scope of raw material for ethanol production by allowing use of sugarcane Juice, sugar containing materials like sugar beet, sweet sorghum, starch containing materials like corn, cassava, damaged food grains like wheat, broken rice, rotten potatoes, unfit for human consumption for ethanol production.
- iii) The Policy allows use of surplus food grains for production of ethanol for blending with petrol with the approval of National Biofuel Coordination Committee.

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Hon'ble Prime Minister Shri Narendra Modi and Hon'ble Prime Minister of Bangladesh, Sheikh Hasina (on the screen) jointly unveil e-plaques for India-Bangladesh Friendship Pipeline via video conference

- iv) With a thrust on Advanced Biofuels, the Policy indicates a viability gap funding scheme for 2G ethanol Bio refineries of ₹5000/- crore in 6 years in addition to additional tax incentives, higher purchase price as compared to 1G biofuels.

The World Biofuel Day 2018 was organised by Ministry of Petroleum and Natural Gas on 10th August, 2018 with Prime Minister addressing diverse gathering of participation including farmers, students, scientists, technology providers, etc.

1.14.12 Compressed Bio Gas Plants

There is an untapped potential of 62 MMT of compressed bio gas production that can be generated from the vast amounts of annual Municipal Solid Waste, biomass residue that get accumulated at a nation-wide scale. In this backdrop, a new initiative named Sustainable Alternative Towards Affordable Transportation (SATAT) was launched on 1st October, 2018. SATAT involves making available a new transportation fuel i.e. Compressed Bio-Gas (CBG) through management of various biomass/waste sources and thereby help bring down dependency on crude oil imports. The Expression of Interests (EOIs) have been invited from potential entrepreneurs to roll out 5000 CBG production plants across India

in a phased manner, to make available CBG in the market for use in automotive fuels. Road Shows were also organized at Bhubaneswar, Chandigarh and Lucknow to promote Compressed Bio Gas (CBG) production and use. First Road Show was organised at Chandigarh on 17th November, 2018 by Public Sector Oil Marketing Companies IOCL, BPCL and HPCL. The event was attended by prospective entrepreneurs, technology providers, representatives of Punjab Energy Development Agency (PEDA), Haryana Renewable Energy Development Agency (HAREDA), financial institutions, FICCI, CII, ASSOCHAM along with interested dealers / distributors and officers of OMCs. In the Road Show, the participants were informed about the SATAT initiative and entrepreneurs were encouraged to setup CBG plants and supply CBG to OMCs.

1.14.13 Neighborhood First Policy

In line with the 'Neighborhood First' policy, Government is building pipelines from India to Nepal, i.e. between Raxaul in Bihar to Amlekhgunj in Nepal. On 7th April, 2018, Prime Ministers of India and Nepal jointly witnessed the ground-breaking ceremony of the pipeline project. These pipelines are being built as grant projects. India is also building a product pipeline to Bangladesh i.e. from Siliguri to Parbatipur

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and it is called as Indo-Bangla Friendship Product Pipeline. The ground breaking was carried out by both Prime Ministers on 18th September, 2018.

1.15 CRUDE OIL AND NATURAL GAS PRODUCTION

The crude oil production during FY 2017-18 is at 35.68 MMT as against production of 36.01 MMT in FY 2016-17, showing a decline of 0.9%. 71.8% of crude oil production is by ONGC and OIL from nomination regime and remaining 28.2% of crude production is by Private/JVs companies from PSC regime. The projected crude oil production in FY 2018-19 is 37.01 MMT. Crude oil production during April-December, 2018 was at 25.94 MMT which was lower by 3.70% against 26.94 MMT during April-December, 2017. Shortfall in production by ONGC during FY 2017-18 was mainly due to delay in deployment of MOPU-Sagar Samrat, non-realisation of production from Integrated Development of B 127 Cluster due to delay in implementation, ESP related issues in NBP field of western offshore and increase in water cut in wells of Heera, Neelam & B-173 fields. Production by OIL is mainly from matured fields where decline rate encountered more than expected, less than planned contribution from work-over wells due to bandhs, blockades, miscreant activities which contributed



35.68 MMT
Crude Oil produced during FY 2017-18 (provisional)

to direct loss of production. Shortfall in production under PSC Regime was mainly due to shutdown at RJ-ON-90/1 to 85 oil wells are closed due to high water cut, require WOJ etc., poor reservoir performance of Bhagyam field and wells of Panna-Mukta closed for riser line pigging & closure of certain wells owing to well integrity issues.

Natural Gas production during the FY 2017-18 is at 32.65 Billion Cubic Metres (BCM) which is 2.36% higher than production of 31.90 BCM in FY 2016-17. 80.59% of natural gas production is by ONGC and OIL from nomination regime and remaining 19.41% of natural gas production is by Private/JVs companies from PSC regime. The projected natural gas production in FY 2018-19 is 35.60 BCM. The actual production of natural gas during April-December, 2018 was at 24.65



Minister of Petroleum & Natural Gas and Skill Development & Entrepreneurship, Shri Dharmendra Pradhan at the Ankleshwar well

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BCM which was lower by 0.15% against 24.69 BCM during April-December, 2017. Shortfall in production by OIL was mainly attributed to less than planned production due to decline in associated gas production in Makum, Hapjan and Barekuri area and non-associated gas in few wells in Naharkatiya and Kusijan area. Gas production was also affected due to number of unscheduled shutdowns of plants of major gas customers like BCPL, BVFCL, NTPF & LTPS and various intermittent problems like bandhs, blockades in operational areas in Assam. Shortfall in production under PSC Regime was mainly due to underperformance of KG-DWN-98/3 due to closure of wells, lower reservoir pressure and no offtake by major customers.

The trend in the production of crude oil and natural gas is depicted below (details in Appendix III):

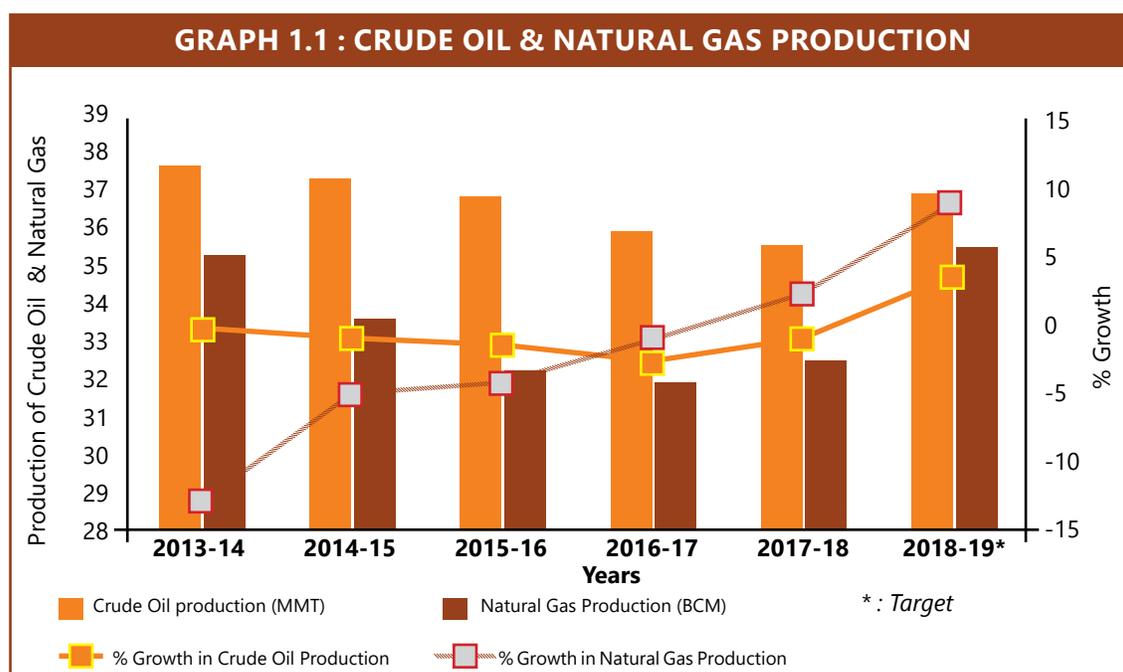


2.36%
(32.65 BCM)
increased in Natural Gas production during FY 2017-18 (provisional)

TABLE 1.1 : CRUDE OIL AND NATURAL GAS PRODUCTION

Fin. Year	Crude Oil Production (MMT)	% Growth in Crude Oil Production	Natural Gas Production (BCM)	% Growth in Natural Gas Production
2013-14	37.79	-0.19	35.41	-12.96
2014-15	37.46	-0.87	33.66	-4.94
2015-16	36.94	-1.39	32.25	-4.18
2016-17	36.01	-2.53	31.90	-1.09
2017-18 (P)	35.68	-0.90	32.65	2.36
2018-19*	37.01*	3.72	35.60*	9.03
2017-18 (Apr-Dec) (P)	26.94	-	24.69	-
2018-19 (Apr-Dec) (P)	25.94	-3.70	24.65	-0.15

P : Provisional * : Target



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1.16 REFINING CAPACITY & REFINERY CRUDE THROUGHPUT

India has emerged as a refinery hub. India is second largest refiner in Asia after China. Refining capacity exceeds the demand. The country's refinery capacity has increased to 247.57 MMTPA at present. Capacity of BPCL-Kochi increased from 9.5 MMTPA to 15.5 MMTPA. Further, there was an addition of 2.3 MMTPA and 8.2 MMTPA capacities in HREL-Bhatinda. and RIL (SEZ) Jamnagar refineries respectively during the year. Refinery Crude Throughput (Crude Oil Processed) for the FY 2017-18 is 251.93 MMT as against 245.36 MMT in FY 2016-17, showing an increase of about 2.68%. Refinery capacity utilisation is 107.68 for the FY 2017-18. Crude throughput during April-December, 2018 was at 192.68 MMT, higher by 2.51% against 187.96 MMT during April-December, 2017. The trend in Refining Capacity and Crude throughput is depicted below (details in Appendix IV & V):

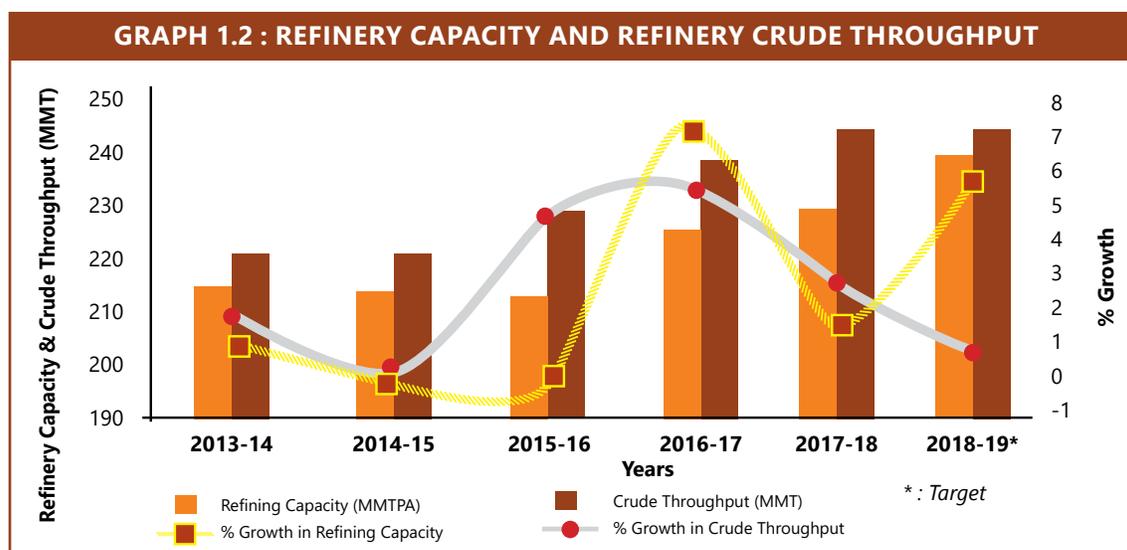


India is world's 4th
Largest refiner with total
refining capacity of
247.57
MMTPA

TABLE 1.2 : REFINERY CAPACITY & REFINERY CRUDE THROUGHPUT (IN TERMS OF CRUDE OIL PROCESSED)

Fin. Year	Refining Capacity (MMTPA)	% Growth in Refining Capacity	Crude Throughput (MMT)	% Growth in Crude Throughput
2013-14	215.07	0.94	222.50	1.50
2014-15	215.07	0.00	223.24	0.33
2015-16	215.07	0.00	232.86	4.31
2016-17	230.07	6.97	245.36	5.37
2017-18(P)	233.97	1.70	251.93	2.68
2018-19*	247.57	5.81	253.90*	0.78
2017-18 (Apr-Dec)(P)	-	-	187.96	-
2018-19 (Apr-Dec)(P)	247.57	-	192.68	2.51

P : Provisional * : Target



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1.17 PRODUCTION AND CONSUMPTION OF PETROLEUM PRODUCTS

The production of petroleum products recorded at 254.40 MMT in FY 2017-18 as against 243.55 MMT achieved in FY 2016-17, showing an increase of about 4.46%. The production of petroleum products is targeted at 254.40 MMT in FY 2018-19. During April-December, 2018, production of petroleum products was at 196.69 MMT i.e. an increase of 4.10% over 188.94 MMT of production achieved during the corresponding period last year.

During the FY 2017-18, the consumption of petroleum products in India was 206.17 MMT with a growth of 5.95% as compared to consumption of 194.60 MMT during FY 2016-17. The consumption of petroleum products during April-December, 2018 was at 157.40 MMT i.e. an increase of 2.52% over 153.53 MMT in April-December, 2017. Year-wise production and consumption of petroleum products are depicted below (details in Appendix VI & VII).



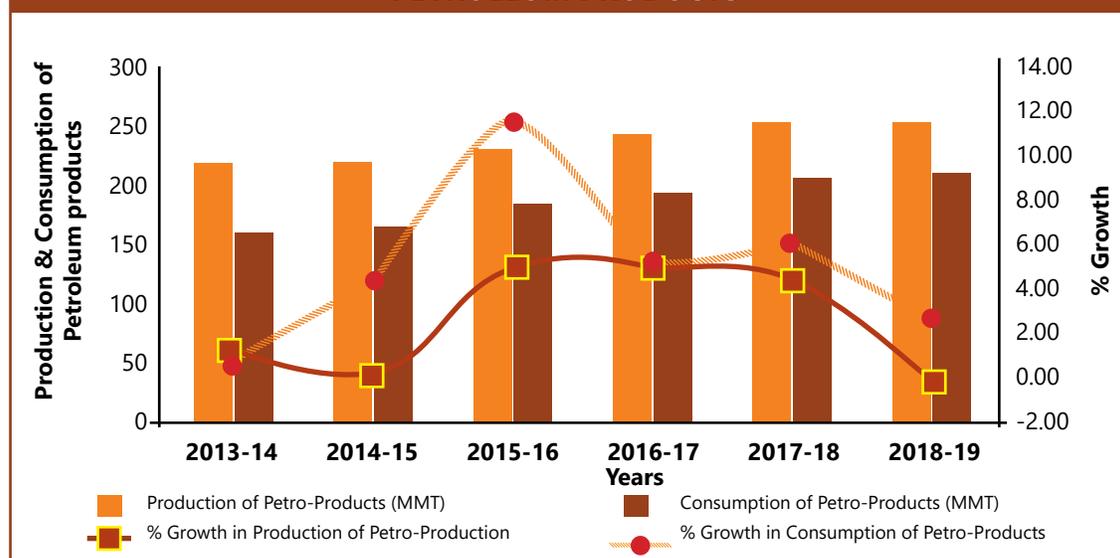
4.46%
growth in
production
of petroleum
products during
the FY 2017-18
(provisional)

TABLE 1.3 : PRODUCTION AND CONSUMPTION OF PETROLEUM PRODUCTS

Fin. Year	Production of Petro-Products (MMT)	% Growth in Production of Petro-Products	Consumption of Petro-Products (MMT)	% Growth in Consumption of Petro-Products
2013-14	220.76	1.39	158.41	0.86
2014-15	221.14	0.17	165.52	4.49
2015-16	231.92	4.88	184.67	11.57
2016-17	243.55	5.01	194.60	5.37
2017-18(P)	254.40	4.46	206.17	5.95
2018-19*	254.40*	0.00	211.03**	2.36
2017-18 (Apr-Dec) (P)	188.94	-	153.53	-
2018-19 (Apr-Dec) (P)	196.69	4.10	157.40	2.52

P : Provisional * : Target ** : Estimated

GRAPH 1.3 : PRODUCTION AND CONSUMPTION (INDIGENOUS SALES) OF PETROLEUM PRODUCTS



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1.18 IMPORT OF CRUDE OIL

Import of crude oil during FY 2017-18 was 220.43 MMT valued at ₹ 566450 crore as against import of 213.93 MMT valued at ₹ 470159 crore in FY 2016-17 which marked an increase of 3.04% in quantity terms and 20.48% in value terms as compared to the import of crude oil during FY 2016-17. Import of Crude Oil during April-November, 2018 was 150.98 MMT valued at ₹548021 crore which marked an increase of 4.13% in quantity terms and 59.62% in value terms as against the imports of 144.99 MMT valued at ₹343321 crore for the same period of last year.

The prices of crude oil and petroleum products have shown a declining trend after July, 2014. As a result, the average price of Indian crude oil basket during FY

2015-16, FY 2016-17 and FY 2017-18 was recorded at \$46.17/bbl, \$47.56/bbl and \$56.43/bbl respectively. The price has increased to \$72.16/ bbl during the current FY 2018-19 (up to 27th December, 2018). Since the price of crude oil and petroleum products in the international markets are quoted in US Dollars, the Indian ₹–US\$ exchange rate plays a vital role in the Indian context. The rupee dollar exchange rate was moving in a narrow band till FY 2011-12, but subsequently there was a depreciation of the Indian rupee thus making the prices of crude oil and petroleum products expensive in domestic currency.

The trend in growth of crude oil imports and crude oil international (Indian Basket) prices is shown in Table-1.4 & Graph- 1.4A. The trend in prices of Indian basket crude oil during April, 2017 to December, 2018 is at Graph-1.4B.

TABLE 1.4 : IMPORTS OF CRUDE OIL AND AVERAGE CRUDE OIL PRICES (INDIAN BASKET)

Fin. Year	Imports of Crude Oil (MMT)	% Growth in Imports of Crude Oil	Imports of Crude Oil (₹ crore)	% Growth in Value of Imports of Crude Oil	Average Crude oil Prices (US\$/bbl.)	% Growth in Average Crude oil Prices
2013-14	189.24	2.40	864875	10.22	105.52	-2.27
2014-15	189.43	0.10	687416	-20.52	84.16	-20.24
2015-16	202.85	7.08	416579	-39.40	46.17	-45.15
2016-17	213.93	5.46	470159	12.86	47.56	3.02
2017-18	220.43	3.04	566450	20.48	56.43	18.65
2018-19	229.54	4.13	822032*	45.12	72.16	27.88
2017-18 (Apr-Nov)	144.99	-	343321	-	52.50	-
2018-19 (Apr-Nov)(P)	150.98	4.13	548021	59.62	73.46	39.92

P: Provisional * : Estimated ^ : Average April-November #: Average 2018-19 (upto 27.12.2018)

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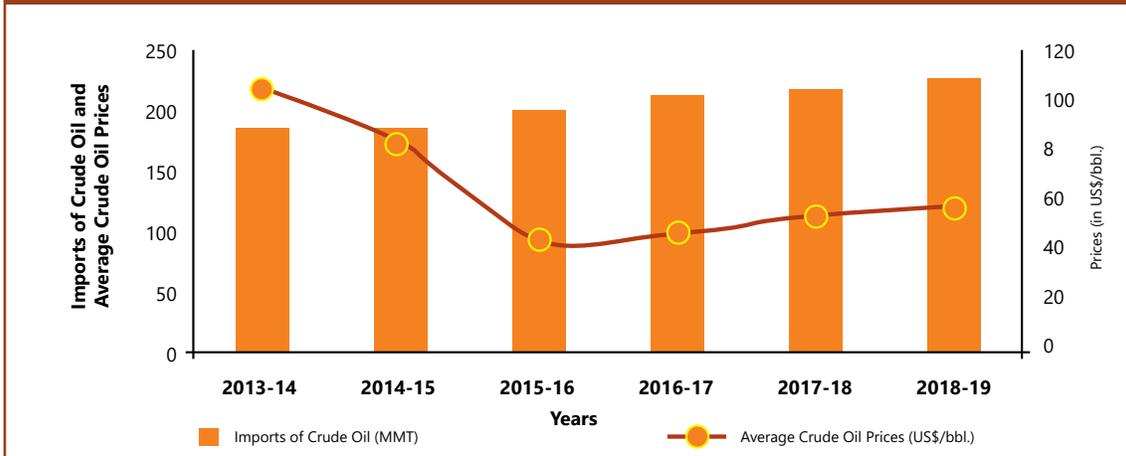
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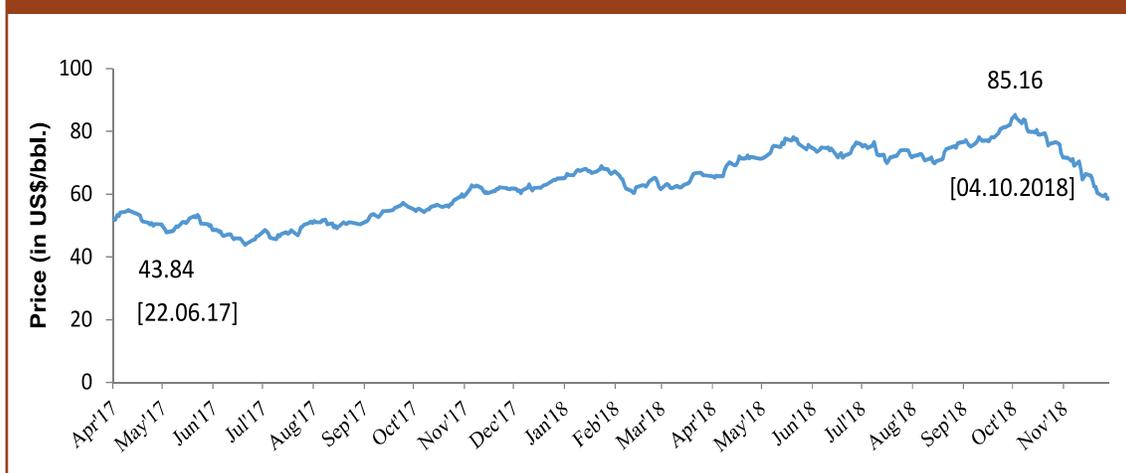
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GRAPH 1.4A : QUANTITY OF CRUDE OIL IMPORTS AND AVERAGE INTERNATIONAL CRUDE OIL PRICES (INDIAN BASKET)



GRAPH 1.4B : DAILY PRICE OF INDIAN BASKET CRUDE OIL SINCE APRIL, 2017



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1.19 IMPORTS & EXPORTS OF PETROLEUM PRODUCTS

During April to November, 2018, imports of petroleum products were 21.25 MMT valued at ₹75160 crore, which shows a decrease of 11.24% in quantity terms but increase of 37.33% in value terms, against the imports of 23.94 MMT valued at ₹54731 crore for the corresponding period of previous year. The quantity of petroleum products imported during FY 2017-18 was 35.46 MMT valued at ₹88374 crore.

During April-November, 2018, exports of petroleum products were 41.69 MMT valued at ₹192154 crore, which shows decline of 6.04% in quantity terms and increase of 36.39% in value terms, as against the exports of 44.37 MMT valued at ₹140882 crore for the same period of last year. During FY 2017-18, 66.83 MMT of petroleum products, valued at ₹225388 crore were exported.

During April-November, 2018, import of LNG was 14.03 MMT valued at ₹46565 crore which marked an increase of 8.1% in quantity terms and 57.37% in value terms, against imports of 12.98 MMT valued at ₹25590 crore for the same period of previous year. During FY 2017-18, 19.87 MMT of LNG, valued at ₹49941 crore was imported. The trend in quantity of petroleum products and LNG imports & exports is depicted in Table-1.5(A) & Table-1.5(B) (**details in Appendix VIII**).



41.69 MMT of petroleum products exported during April-November, 2018 (provisional)

TABLE 1.5(A): IMPORTS & EXPORTS OF PETROLEUM PRODUCTS & LNG

Fin. Year	Imports of Petroleum Products (MMT)	% Growth in Imports of Petroleum Products	Exports of Petroleum Products (MMT)	% Growth in Export of Petroleum Products	Imports of LNG (MMT)	% Growth in Imports of LNG
2013-14	16.70	2.10	67.86	7.03	12.99	-1.07
2014-15	21.30	27.57	63.93	-5.79	14.09	8.45
2015-16	29.46	38.28	60.54	-5.31	16.14	14.55
2016-17	36.29	23.19	65.51	8.22	18.63	15.42
2017-18(P)	35.46	-2.28	66.83	2.01	19.87	6.65
2018-19*	31.87	-10.13	62.53	-6.44	21.05	5.91
2017-18 (Apr-Nov)(P)	23.94	-	44.37	-	12.98	-
2018-19 (Apr-Nov)(P)	21.25	-11.24	41.69	-6.04	14.03	8.10

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TABLE 1.5(B) : IMPORTS & EXPORTS OF PETROLEUM PRODUCTS & LNG

Fin. Year	Imports of Petroleum Products (₹ crore)	% Growth in Imports of Petroleum Products	Exports of Petroleum Products (₹ crore)	% Growth in Export of Petroleum Products	Imports of LNG (₹ crore)	% Growth in Imports of LNG
2013-14	75896	10.23	368279	15.05	53123	26.78
2014-15	74644	-1.65	288580	-21.64	57384	8.02
2015-16	65361	-12.44	176780	-38.74	45038	-21.51
2016-17	71566	9.49	194893	10.25	40804	-9.40
2017-18(P)	88374	23.49	225388	15.65	49941	22.39
2018-19*	112740	27.57	288231	27.88	69848	39.86
2017-18 (Apr-Nov)(P)	54731	-	140882	-	29590	-
2018-19 (Apr-Nov)(P)	75160	37.33	192154	36.39	46565	57.37

*: Estimated P: Provisional

1.20 EQUITY OIL AND GAS FROM ABROAD

Government is committed to ensure energy security of the country and is focusing on acquiring quality overseas oil and gas assets and importing oil & gas from diverse sources at competitive prices through oil diplomacy and enhanced coordination between various Ministries and Departments of the Government and Indian Missions abroad.

Oil & Gas PSUs are also being encouraged to diversify crude oil & LNG import sources. Presently, PSU companies have 59 overseas assets in total 28 countries. These assets range from exploratory blocks to producing assets and pipeline projects. The producing assets yield approximately 22 MMTOE of oil and gas annually. The focus of PSU oil and gas companies has shifted from acquiring exploratory blocks to acquiring stake in producing blocks. The latest acquisitions being: (i) Indian Consortium of IOCL, OIL, OVL and BPRL acquired 10% stake in Lower Zakhum offshore field in UAE and (ii) IOCL acquired 17% participating interest in Mukhaizna oilfield in Oman. Indian PSU companies have diversified their

oil and gas import sources. Russia was added as a new source for our long term LNG imports. India has also added USA and Australia as its LNG import source apart from earlier and largest source Qatar.

1.21 FOREIGN DIRECT INVESTMENT INFLOWS

The Government is encouraging Foreign Direct Investment (FDI) in order to supplement domestic investment and technological capabilities in the petroleum sector. The present FDI policy for petroleum & natural gas sector allows 100% FDI through automatic route for exploration and production, refining by the private companies (for public sector companies 49% on automatic route without any divestment or dilution of domestic equity in the existing PSUs), marketing of petroleum products, pipelines, storage and LNG regasification infrastructure and all related services, subject to the existing sectoral policy and regulatory framework in the oil and gas sector. During April- June FY 2018-19, FDI inflow received was ₹825 crore contributing 0.97% of total FDI inflow (₹85180 crore) in the economy.

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TABLE 1.6 : YEAR WISE FDI INFLOWS UNDER PETROLEUM & GAS SECTOR

Fin. Year	FDI inflows				Annual Growth (%)			
	All Sectors		P&NG Sector		All Sectors		P&NG Sector	
	₹ Million	US\$ Million	₹ Million	US\$ Million	₹ Million	US\$ Million	₹ Million	US\$ Million
2013-14	1475177.76	24299.33	6783.90	112.23	21.01	8.37	-43.12	-47.75
2014-15	1891071.26	30930.50	64956.73	1079.02	28.19	27.29	857.51	861.44
2015-16	2623215.61	40000.98	6770.37	103.02	38.72	29.33	-89.58	-90.45
2016-17	2916963.33	43478.27	11970.57	180.40	11.20	8.69	76.81	75.11
2017-18	2888885.01	44856.75	1560.93	24.18	-0.96	3.17	-86.96	-86.60
2018-19 (Apr-June'18)*	851795.48	12751.67	8250.44	121.92	-	-	-	-

* : Provisional

1.22 OUTLAY FOR MINISTRY OF PETROLEUM & NATURAL GAS

The actual expenditure of Internal & Extra Budgetary Resources (IEBR) of Oil and Gas CPSEs in FY 2017-18 was ₹132002.98 crore against Budget Estimate (BE) of ₹86027.28 crore. Budget Estimates (BE) of IEBR of Oil and Gas CPSEs under Ministry of Petroleum & Natural Gas in FY 2018-19 is ₹89335.09 crore. Detailed Budget Estimates of the Ministry of Petroleum & Natural Gas are given in **Appendix IXA & IXB**.

1.23 STRATEGIC CRUDE OIL STORAGE

The Indian Strategic Petroleum Reserves Ltd (ISPRL) signed an MoU with ADNOC of UAE to explore the possibility of storing ADNOC crude oil at ISPRL's Strategic Petroleum Reserve (SPR) facility at Padur in Karnataka. ADNOC has already stored, at its own cost, crude oil at one of the two caverns at Mangaluru SPR facility under an Amended and Restated Agreement on Oil Storage and Management. ISPRL has been authorized by Government to explore filling crude oil in Padur SPR facility based on the key principles of the 'ADNOC Model' as used for filling Cavern-A at Mangaluru SPR facility by overseas National Oil Companies (NOCs).



First quarter of FY 2018-19
registered FDI Inflow
of ₹825 crore
in P&NG Sector

In order to further augment India's preparedness during emergency oil shortage situation, Government has given 'in principle' approval for establishment of two additional SPR facilities at (i) Chandikhol in Odisha and (ii) Padur in Karnataka with a total capacity of 6.5 MMT. The Ministry is closely working with the two State Governments to take the project forward.

The pipelines will put in place a mechanism for assured, long-term, uninterrupted and eco-friendly supply of petroleum products to Bangladesh and Nepal. India is also working with Sri Lanka and Japan to set up an LNG Terminal near Colombo. Taking advantage of proximity, Indian PSU refineries i.e. IOCL and Numaligrah Refineries Ltd. are also working with Myanmar companies to supply petroleum products to the country.

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The Ministry also worked with various Ministries and Departments of the Government and engaged with interlocutors from the USA to obtain waiver from US sanctions for continued import of Iranian crude oil for Indian refineries. This is important achievement from the perspective of India's energy security as ensures continues import of required crude oil for our refineries. Ministry also worked with stakeholder Ministries and Departments of the Government and engaged with interlocutors from Iran for 100% rupee mechanism settlement of bilateral trade payments.

1.24 NON-CONVENTIONAL ENERGY

1.24.1 EBP Programme:

The Government through Oil Marketing Companies (OMCs), is implementing Ethanol Blended Petrol (EBP) Programme under which, OMCs sell ethanol blended petrol with percentage of ethanol up to 10%. In order to augment the supply of ethanol, the Government on 10th December, 2014, decided to procure ethanol produced from other non-food feedstocks besides molasses, like cellulosic and ligno cellulosic materials including petrochemical route. It was also decided to administer the price of ethanol under EBP Programme.

For ethanol supply FY 2018-19, the Government has fixed the price of ethanol as follows:

- i) From C-heavy molasses at ₹43.46 per litre.
- ii) From B-heavy molasses / partial sugarcane juice at ₹52.43 per litre.
- iii) Price of ethanol for the mills, who will divert 100% sugarcane juice for production of ethanol thereby not producing sugar, has been fixed at ₹59.19 per litre. This price will be paid by OMCs to those sugar mills that will divert 100% sugarcane juice for production of ethanol thereby not producing any sugar. If a sugar mill produces ethanol with a combination of B heavy molasses and sugarcane juice, the ethanol price derived from B heavy molasses route shall be payable by OMCs.

Further, the Government has also allowed production of ethanol from damaged food grains. OMCs are offering differential pricing of ₹47.13/- per litre to incentivize this route.

For the previous ethanol supply FY 2017-18 (from 1st December, 2017 to 30th November, 2018), the

blending quantity of ethanol with petrol was 149.54 crore litres and the average blend percentage was 4.19 % which is the highest in the history of EBP Programme.

Subsequent to amendment in Industries (Development & Regulation) Act, 1951, giving control on production, movement and storage of ethanol to the Central Government, Central Government has been regularly interacting with the State Governments and other stakeholders to resolve the bottlenecks in smooth implementation of EBP Programme. Till now, nine States have already implemented the amended provisions.

On taking up the matter for reduction of GST on denatured ethanol meant for EBP Programme with Ministry of Finance, Government has reduced the GST rate on ethanol meant for EBP Programme from 18% to 5%.



**Recorded highest ever
ethanol blend percentage of
4.19%
in the history of EBP
Programme**

Under the Department of Food & Public Distribution Scheme for extending financial assistance to sugar mills for enhancement and augmentation of ethanol production capacity, 114 proposals worth ₹6139.08 crore have been approved which are estimated to add 200 crore litres per annum of ethanol distillation capacity. In furtherance, in line with the decision held in PMO dated 21st September, 2018 on "Ease of doing business and reduction in time taken for setting up of sugar related Distilleries", MoP&NG has developed a format to monitor the progress, identify red flags and share it with distilleries. In this regard, Joint meetings with Project Proponents were held on 10th October, 2018 and 13th November, 2018. Further, MoP&NG has written letter to State Govt. of Karnataka, UP, Maharashtra, Madhya Pradesh and Uttarakhand for facilitating implementation of financial assistance scheme on 16th October, 2018.

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1.24.2 2G Ethanol Programme

Subsequent to opening up of alternate route i.e. Second Generation (2G) route for ethanol production, Oil Marketing Companies are in the process of setting up 12 2G bio-refineries with an investment of ₹10,000 crore. Detailed Feasibility Report (DFR) for some 2G Bio-ethanol plants has been prepared by Oil PSUs. One of the Oil PSU viz. Numaligarh Refinery Ltd. has formed a JV named Assam Bio-refinery Private Limited with M/s Chempolis Oy of Finland and M/s Fortum 3 BV of Netherlands in June, 2018. The ground breaking ceremony of 2G ethanol project in Bargarh, Odisha, proposed to be set up by BPCL, was held on 10th October, 2018. Oil PSUs have obtained Environment clearance in respect of their projects at Assam, Odisha and Punjab.

1.24.3 Biodiesel Programme

Purchase Orders have been issued by Oil Marketing Companies for supply of 8.14 crore litres of biodiesel during the period May to October, 2018, with provision for extension for three months. As on 30th November, 2018, OMCs have procured 8.2 crore litres of Biodiesel.

1.25 NEW AND RENEWABLE ENERGY INITIATIVES

As a part of initiative under New and Renewable energy, Oil Marketing Companies (OMCs) have provided solar lighting in Retail Outlets (ROs). As of November, 2018, OMCs have undertaken solarisation of approximately 15889 retail outlets with solar power plants. The expenditure incurred on solarisation of one retail outlet ranges from ₹2 lakh to ₹25 lakh. As part of renewable energy initiatives, Bharat Petroleum Corporation Limited (BPCL) has started Biogas Plant at BP, Bazargaon, Near Nagpur from food waste from Dhaba. The gas is being used for cooking purpose at the same Dhaba and commissioned one Hybrid Model (Wing + Solar) at BP Kagnoli, Karnataka and one EV Station at Nagpur. During FY 2017-18, Hindustan Petroleum Cooperation Limited (HPCL) commissioned its largest solar plant of 750 kW at Bahadurgarh Terminal, Haryana. The plant is expected to generate around 12 lakh kWh/year.) HPCL is operating Wind Farms of 100.9 MW capacity in the states of Rajasthan and Maharashtra. During FY 2017-18, total electricity generation through these wind farms was 16.9 crore kWh and total of about 1.05 lakh non-solar renewable energy certificates. During FY 2018-19 (till November, 2018) energy generation



Oil Marketing Companies are setting up 12 2G bio-refineries

of 1500 lakh kWh and approximately 0.95 lakh non-solar REC have been achieved.

1.26 FUEL CONSERVATION INITIATIVE SAKSHAM

In order to provide sustained impetus on fuel conservation efforts PCRA undertakes nationwide people centric mass awareness campaign, called 'Saksham' (Sanrakshan Kshamta Mahotsav) starting 16th January, 2019 in association with PSU Oil & Gas Companies. During this one-month drive, various sections of society viz. students, youths, farmers, housewives, drivers, industrial workers, etc. are being engaged to profess and propagate the need to conserve by judicious utilization of petroleum products. Sectoral emphasis is being given towards inclusion of one & all in underlining and appreciating the individual's effort in reducing consumption of energy and lessening greenhouse gas emissions through multiple activities.

1.27 GOODS & SERVICES TAX (GST)

With the implementation of the Goods and Services Tax (GST) w.e.f 1st July, 2017, five petroleum sector items viz., Crude Oil, Natural Gas, Petrol, Diesel and Aviation Turbine Fuel (ATF), although included under the GST Constitutional Amendment Act, are presently, outside the scope of levy of GST, till such time they are notified, based on the recommendation of the GST Council. Thus while, petroleum products are included under GST, the date on which GST shall be levied on such goods shall be as per the decision of the GST Council, which has representation of Ministers-in-charge of Finance or Taxation of all States and Union Territories with Legislature. The fallout is that the oil and gas sector is faced with a hybrid tax regime on account of it being subject to a levy of existing taxes i.e. excise duty and State sales tax for non-GST items and GST for the remaining petroleum products. In the ideal state, the entire oil and gas sector including 'excluded goods' should be brought under the fold of GST and be liable to an appropriate rate of GST. The

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concerns of oil and gas industry have been flagged by Ministry of Petroleum & Natural Gas to Ministry of Finance.

1.28 SWACHH BHARAT MISSION

Ministry of Petroleum & Natural Gas received Swachh Bharat National Award for Swachhata Action Plan (SAP) FY 2017-18 in Swachh Bharat National Award ceremony held on Gandhi Jayanti, 2nd October, 2018. MoP&NG allocated a budget of ₹335.68 crore for SAP FY 2017- 18 and as a result of continuous monitoring through various apex level review meetings, MoPNG including Oil & Gas CPSEs, has achieved an expenditure figure of around ₹402 crore, showing an achievement of around 120%.

As a precursor to the launch of the 150th birth year celebrations of Mahatma Gandhi, MoPNG observed Swachhata Hi Seva 2018 (SHS) from 15th September to 2nd October, 2018. MoPNG led the SHS campaign from the front. Ministry has undertaken various initiatives which inter-alia include organizing Shramdaan at various locations, conducting rallies/walkathon / cyclothons to generate awareness about sanitation; distribution of jute bags to general public to make plastic free zone; organizing cleaning drives at tourist places; constructing toilets in schools, public places, etc., distributing sanitary and hygiene products and organizing health talks and health camps.

1.29 START UP INDIA & SKILL INDIA

The CPSEs have set up their Start Up fund aggregating to ₹320 crore for 3 years. The Oil and Gas PSUs under this Ministry have selected a total of 61 Startup Projects for funding, incubation and mentoring support and signed MOU with various IITs/IIMs/other academic institutions for mentoring support for the first round of Startups.

As part of Skill India initiative, 12 Qualification Packs (QPs) of Priority Trades related to Oil and Gas Sector have been approved for imparting training at six Skill Development Institutes (SDIs) i.e. Bhubaneswar (Odisha), Ahmedabad (Gujarat), Kochi (Kerala), Guwahati (Assam), Vishakhapatnam (A.P.) and Rae Bareli (U.P.). Under the Pradhan Mantri Kaushal Vikas Yojana (PMKVY) Recognition of Prior Learning (RPL) Type-4 project, Hydrocarbon SSC is in process for certifying the large uncertified workforce engaged with the dealers, distributors and contractors of IOCL, HPCL and BPCL in Retail Outlet Attendant



98%
of retail outlets across the country are enabled with digital payment facility (as of November 2018)

(Oil & Gas), LPG Delivery Personnel and Tank Lorry Driver (Petroleum Products) trades. CPSEs under MoPNG have engaged 10.21% of total workforce as apprentices.

1.30 AUTOMATION AT OMC ROs

To enhance customer confidence through Q&Q (Quality & Quantity) of fuel and minimizes chance of fraudulent transactions, this Ministry has given target to OMCs to automate all ROs across the country wherever feasible. As on 31st December, 2018, 97084 ROs (86.63%) have been automated across the country.

1.31 DIGITAL INDIA

There has been a significant expansion of digital payment infrastructure at retail outlets. As on 31st December, 2018, 102909 POS terminals and 92663 e- wallet facility have been provided at 53901 (98%) retail outlets across the country, 52959 retail outlets have been enabled with BHIM UPI. All the LPG Distributors and City Gas distribution companies are enabled with BHIM UPI.

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Chapter 2

Exploration & Production



Exploration & Production



Minister of Petroleum & Natural Gas and Skill Development & Entrepreneurship, Shri Dharmendra Pradhan flags off ONGC's KG-DWN-98/2 East Coast Project

2.1 CONTEXT/BACKGROUND

2.1.1 The energy demand will rise with social and economic development in the country. The country is dependent on imports for about 83% of its crude oil requirement and to the extent of about 47% in case of natural gas. In order to bridge the gap between energy supply and demand, it is imperative to accelerate the exploration and production activities in the country.

2.1.2 The reforms in Exploration and Production (E&P) sector were initiated through participation of private and foreign companies in oil and gas sector in 1991 when 28 discovered fields (Pre-NELP Discovered Field) were auctioned during 1991-93. Further, 28 Exploration Blocks were awarded between 1990 -1997 known as Pre-NELP Exploration Blocks. Subsequently, after implementation of New Exploration Licensing Policy (NELP) and Coal Bed Methane (CBM) Policy in 1997-99, the level playing field was provided to the private investors by giving the same fiscal and contract terms as applicable to National Oil Companies (NOCs) for the offered exploration acreage.

2.1.3 In a major policy drive to give a boost to petroleum and hydrocarbon sector, the Government has unveiled a series of initiatives. The reforms in hydrocarbon sector are based on the guiding principles of enhancing domestic oil and gas production, increasing investment, generating sizable employment, enhancing transparency and reducing administrative discretion. Government has

formulated path breaking policies to revolutionize the E&P sector which inter-alia includes –

- » Gas Pricing Reforms
- » Policy Framework for Early Monetization of CBM
- » Discovered Small Field (DSF) Policy
- » Reform Initiatives to enhance Domestic Production
- » Hydrocarbon Exploration and Licensing Policy (HELP) coupled with operationalization of Open Acreage Licensing Policy (OALP)
- » Monetization of the Ratna offshore field
- » Permission of Extraction of CBM to Coal India Limited (CIL) & its subsidiaries in Coal Mining area.
- » Policy for the Grant of extensions to Pre-NELP Discovered fields and Exploration Blocks
- » Hydrocarbon Vision 2030 for North East
- » National Seismic Programme of Un-appraised areas
- » National Data Repository (NDR)
- » Policy framework to permit exploration and exploitation of unconventional hydrocarbons in

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existing acreage of Production Sharing Contracts (PSCs), CBM contracts and Nomination fields

- » Policy framework for streamlining the working of PSCs
- » Policy framework to incentivise enhanced recovery methods for oil and gas.

2.1.4 In the upstream sector, the two Upstream National Oil Companies (NOCs) viz., Oil and Natural Gas Corporation Limited (ONGC) and Oil India Limited (OIL) play a dominant role with a total share of about 71.5% in oil and 81% in gas production in the country in the year 2017-18. ONGC produces nearly 61% of indigenous crude oil and 71.5% of country's gas production, while OIL's share is 10% of indigenous crude oil and 9% of gas production. The share of Private/JV companies in oil and gas production is 29% and 19.5% respectively.

2.1.5 The Directorate General of Hydrocarbons (DGH) was established under the administrative control of Ministry of Petroleum and Natural Gas by Government of India Resolution in 1993. The objective of setting up of DGH was to promote sound management of the Indian oil and natural gas resources having a balanced regard for environment, safety, technological and economic aspects of petroleum activity. In addition, DGH has been strengthened with certain responsibilities concerning the Production Sharing



3.36 Million Sq. Km.
area in India covered by sedimentary basins

Contracts for Discovered fields/Exploration blocks, promotion of investment through implementation of policies including Discovered Small Field Policy, Hydrocarbon Exploration & Production Policy (HELP) and monitoring of E&P activities.

2.2 SEDIMENTARY BASINS IN INDIA

2.2.1 India has 26 sedimentary basins covering an area of 3.36 million square kilometres. The sedimentary basins of India, onland and offshore up to the 400m isobath, have an aerial extent of about 2.04 million sq. km. In the deepwater beyond the 400m isobath, the sedimentary area has been estimated to be about 1.32 million square kilometres.

2.2.2 The Indian sedimentary basins have been broadly divided into three categories based on their degree of prospectivity as presently known which is as under:



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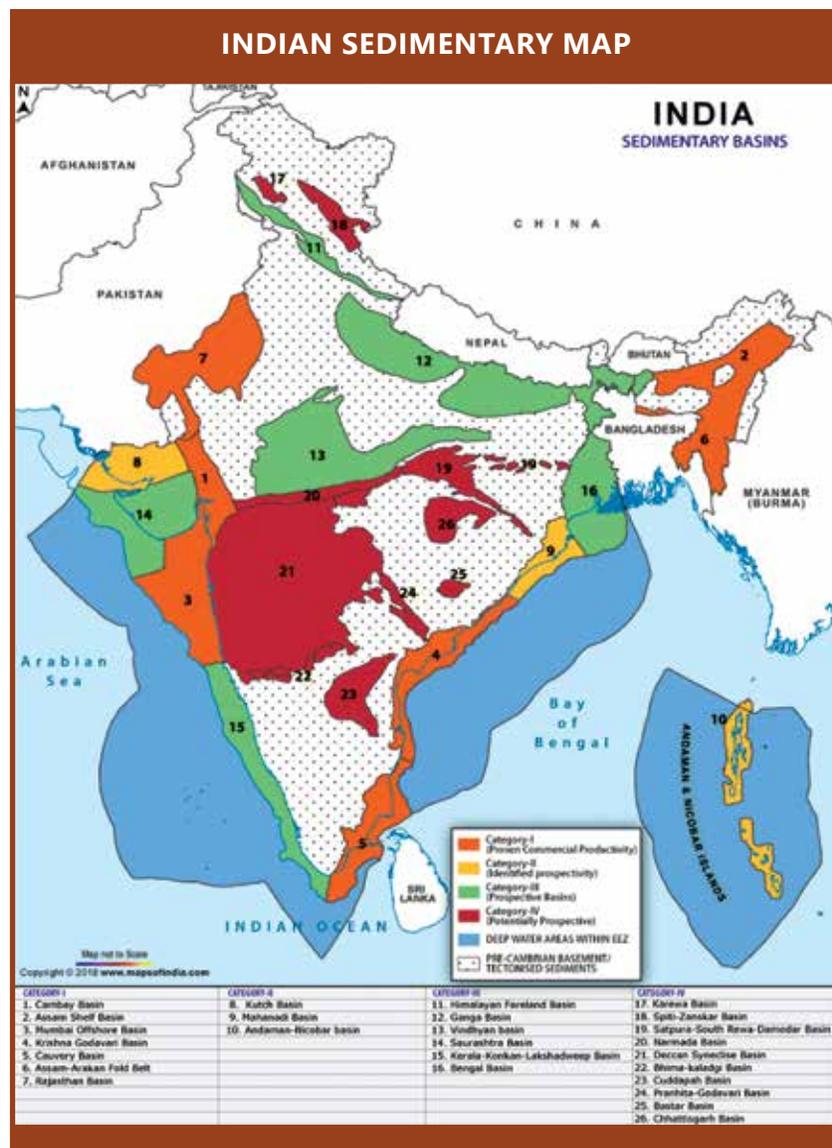
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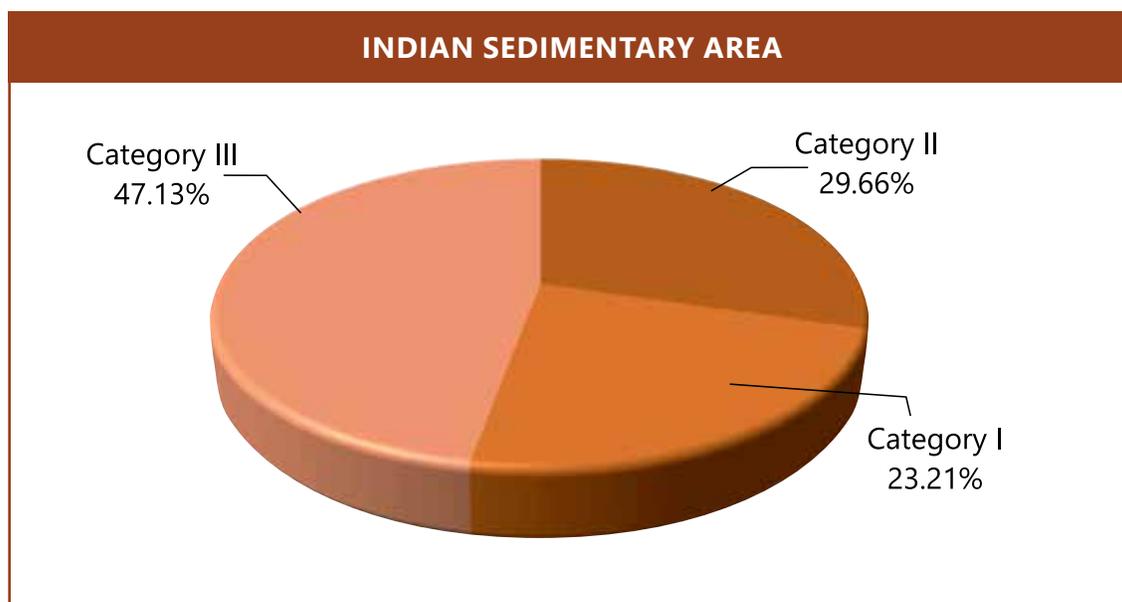


TABLE 2.1: CATEGORIES OF INDIAN SEDIMENTARY BASINS

Type of Basins	Area (Sq. Km.)	Hydrocarbons Prospectivity	Basins/ Region
Category I (7 Basins)	9,98,325	Established commercial production	Cambay, Assam Shelf, Mumbai offshore, Krishna Godavari, Cauvery, Assam Arakan Fold Belt and Rajasthan
Category II (5 Basins)	7,80,974	Known accumulation of hydrocarbons but no commercial production as yet	Kutch, Mahanadi-NEC & Andaman-Nicobar, Vindhyan, Saurashtra,
Category III (14 Basins)	15,86,150	Indicated hydrocarbon shows that are considered geologically prospectivity.	Himalayan Foreland, Ganga, Kerala-Konkan-Lakshadweep, Bengal, Karewa, Spiti-Zanskar, Satpura-South Rewa-Damodar, Narmada, DecanSyncline, Bhima-Kaladgi, Cuddapah, Pranhita-Godavari, Bastar, Chhattisgarh
Total	33,65,449		



2.2.3 Crude oil and natural gas production in the country is from 7 sedimentary basins, under Category I, there are 5 basins in Category II that have established petroleum resources but are yet to produce commercially. The distribution of total Indian sedimentary area of 3.36 million square kilometre under different categories is presented as under:



2.3 ESTIMATED RESOURCES OF CRUDE OIL & NATURAL GAS CONVENTIONAL HYDROCARBON RESOURCES

2.3.1 The prognosticated conventional hydrocarbon resources in 26 sedimentary basins of the country are of the order of 41.87 billion tonnes (oil and oil equivalent of gas), which is about 49% increase as compared to earlier estimates of 28.08 billion tonnes. The basin-wise details are as under:

TABLE 2.2: ESTIMATED HYDROCARBON RESOURCES IN INDIA

Basin Category	Sl. No.	Basin Name	Total Hydrocarbon In-place (MMTOE)	
			Estimate (1995-96)	Estimate (2017)
Category I (Basins with reserves being produced and exploited)	1	Krishna-Godavari (KG)	1,130	9,555
	2	Mumbai Offshore	9,190	9,646
	3	Assam Shelf	3,180	6,001
	4	Rajasthan	380	4,126
	5	Cauvery	700	1,964
	6	Assam-Arakan Fold Belt (AAFB)	1,860	1,633
	7	Cambay	2,050	2,586
SUB-TOTAL (Category I)			18,490	35,511

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TABLE 2.2: ESTIMATED HYDROCARBON RESOURCES IN INDIA

Basin Category	Sl. No.	Basin Name	Total Hydrocarbon In-place (MMTOE)	
			Estimate (1995-96)	Estimate (2017)
Category II (Basins with contingent resources to be developed and monetized)	8	Saurashtra	280	1,325
	9	Kutch	760	898
	10	Vindhyan	Not assessed	632
	11	Mahanadi	145	651
	12	Andaman	180	371
SUB-TOTAL (Category II)			1,365	3,877
Category III (Basins with only prospective resources to be explored and discovered)	13	Kerala-Konkan (KK)	660	1,245
	14	Bengal-Purnea	190	828
	15	Ganga-Punjab	230	128
	16	Pranhita-Godavari (PG)	Not assessed	95
	17	Satpura-South Rewa-Damodar	Not assessed	63
	18	Himalayan Foreland	150	44
	19	Chhattisgarh	Not assessed	25
	20	Narmada	Not assessed	18
	21	Spiti-Zaskar	Not assessed	11
	22	Deccan Syneclise	Not assessed	11
	23	Cuddapah	Not assessed	5
	24	Karewa	Not assessed	4
	25	Bhima-Kaladgi	Not assessed	3
	26	Bastar	Not assessed	1
SUB-TOTAL (Category III)			1,230	2,481
Deepwater				7,000
BASIN TOTAL			28,085	41,872

* MMTOE : Million Metric Tonne of oil and oil equivalent of gas

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2.3.2 As on 1st April, 2018 in-place hydrocarbon volume of 10680 million tonnes of oil and oil equivalent gas has been established through exploration by ONGC, OIL and Private/JV companies. About 74% of resources are under 'yet to discover' category. Out of 10,680 MMT of oil and oil equivalent gas of in-place volumes, the ultimate reserves which can be produced are about 4,095 MMT of oil and oil equivalent gas. The balance recoverable reserves are of the order of 1,812 MMT of oil and oil equivalent gas. The break-up of hydrocarbon reserves explored by ONGC, OIL and private/JV companies in the country as on 1st April, 2018 are as under:

TABLE 2.3: CRUDE OIL AND NATURAL GAS RESERVE POSITION AS ON 1.4.2018

	Initial In-Place			Ultimate Reserves			Balance Recoverable Reserves		
	Oil (MMT)	Gas (BCM)	O+OEG (MMT)	Oil (MMT)	Gas (BCM)	O+OEG (MMT)	Oil (MMT)	Gas (BCM)	O+OEG (MMT)
ONGC	5,009	2,204	7,213	1,433	1,249	2,683	431	560	992
OIL	806	384	1,140	252	217	440	79	125	187
Pvt/JV	1,081	1,246	2,327	234	738	972	84	548	633
Total	6,896	3,834	10,680	1,919	2,204	4,095	594	1,233	1,812

O+OEG: Oil and Oil Equivalent of Gas

2.3.3 Unconventional Hydrocarbon Resources Coal Bed Methane (CBM) Resources

The estimated CBM resources are of the order of 2,600 Billion Cubic Metres (BCM) or 91.8 Trillion Cubic Feet (TCF) spread over in 11 States in the country. The State-wise details of CBM resources are as under:

TABLE 2.4: COAL BED METHANE RESOURCES IN INDIA

Sl. No.	STATE	Estimated CBM Resources (BCM)
1	JHARKHAND	722.08
2	RAJASTHAN	359.62
3	GUJARAT	351.13
4	ORISSA	243.52
5	CHATTISGARH	240.69
6	MADHYA PRADESH	218.04
7	WEST BENGAL	218.04
8	TAMIL NADU	104.77
9	ANDHRA PRADESH	99.11
10	MAHARASHTRA	33.98
11	NORTH EAST	8.50
Total CBM Resources		2,599.48



Drilling rig at Arunachal Pradesh installed by OIL

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2.3.4 Recoverable CBM Reserves

In order to harness CBM potential in the country, CBM blocks were offered through international competitive bidding for exploration and production of CBM in the country for the first time in May, 2001. So far, Government has awarded 30 CBM blocks under four rounds of bidding to National, Private & Joint Venture Companies. In addition, 2 CBM blocks were awarded on nomination basis and one block through Foreign Investment Promotion Board (FIPB) route. These CBM blocks are in the States of Andhra Pradesh, Assam, Chhattisgarh, Gujarat, Jharkhand, Madhya Pradesh, Maharashtra, Odisha, Rajasthan, Tamil Nadu and West Bengal. CBM in-place reserves of about 280.3 BCM (9.9 TCF) have been established by different operators as on 1st April, 2018. State-wise and block-wise CBM reserves position is given below:

TABLE 2.5: RECOVERABLE COAL BED METHANE RESERVES AS ON 01.04.2018

State	Block name	Operator	GIIP (BCM)	Recoverable Reserves (BCM)
Jharkhand	BK-CBM-2001/1	ONGC	30.182	3.68
	NK-CBM-2001/1	ONGC	9.529	1.46
	Jharia	ONGC	14.61	3.04
Madhya Pradesh	SP(E)-CBM-2001/1	RIL	47.855	16.7
	SP(W)-CBM-2001/1	RIL	55.501	15.44
West Bengal	RG(E)-CBM-2001/1	EOL	60.881	28.12
	Raniganj North	ONGC	7.43	1.86
	Raniganj South	GEECL	54.368	37.94
Total			280.357	108.24

2.3.5 Shale Gas / Oil Resource

It is estimated that a number of sedimentary basins (Gangetic plain, Gujarat, Rajasthan, Andhra Pradesh and other coastal areas) in India, including the hydrocarbon bearing ones – Cambay, Assam-Arakan and Damodar estimates of shale gas and oil are prospective from shale oil and gas point of view in the Indian sedimentary basins carried out by some agencies are as under:

- ONGC in August, 2013 has estimated Shale Gas resources of 187.5 TCF for 5 basins namely Cambay, Krishna Godavari, Cauvery, Ganga and Assam
- Central Mine Planning and Design Institute (CMPDI): in July, 2013 has estimated Shale Gas resources of 45.8 TCF for one basin, namely Gondwana.
- United States Geological Survey (USGS) in January, 2011 estimated Technical Recoverable Shale Gas of 6.1 TCF in three basins namely Cambay, KG & Cauvery.

2.3.6 Re-assessment of Hydrocarbon Resources

The last hydrocarbon resources assessment exercise was carried out approximately two decades ago



Prognosticated conventional hydrocarbon resources registered 49% increase

(1995-96). During the course of implementation of pre-NELP and NELP rounds and other exploration and production activities, substantial geoscientific data have been generated. New oil and gas fields have also been discovered by utilizing improved geological understanding and new technology. With the increase in exploration spread and quantum jump in availability of geo-scientific data generated under NELP, there was a need to revisit the hydrocarbon resource assessment of all sedimentary basins of India. A Multi Organization Team (MOT) comprising of representatives of ONGC, OIL and DGH has carried out estimation of hydrocarbon resource potential in the country. The exercise of re-assessment of hydrocarbon resources for all the sedimentary basins in the country was completed in 2017. The prognosticated conventional hydrocarbon resources in 26 sedimentary basins of the country are of the



order of 41.87 billion tonnes (oil and oil equivalent of gas), which is about 49% increase as compared to earlier estimates of 28.08 billion tonnes.

2.4 CRUDE OIL & NATURAL GAS PRODUCTION

2.4.1 Crude oil production in FY 2018-19 (April to December, 2018) is about 25.94 Million Metric Tonne (MMT). About 71% of crude oil is by ONGC and OIL from nomination regime and remaining 29% of crude oil production is by Private/JV companies from PSC regime.

2.4.2 In FY 2018-19 (up to December, 2018), the share of offshore crude oil production is about 49.3%. The remaining crude oil production was from 6 States viz., Andhra Pradesh (0.9%), Arunachal Pradesh (0.1%), Assam (12.7%), Gujarat (13.4%), Rajasthan (22.5%) and Tamil Nadu (1.1%). The details of crude oil production in FY 2018-19 (up to December, 2018) and last 5 years are as under:



25.94MMT
crude oil production
in FY 2018-19 (up to
December, 2018)

TABLE 2.6: STATE-WISE CRUDE OIL PRODUCTION TRENDS (THOUSAND METRIC TONNES)

State/Source	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19 (upto Dec)
ONSHORE						
Andhra Pradesh	297	254	295	276	322	226
Arunachal Pradesh	111	68.88	57	55	50	32
Assam	4,709	4,473	4,185	4,203	4,345	3,293
Gujarat	5,061	4,653	4,461	4,605	4,591	3,477
Rajasthan	9,180	8,848	8,602	8,164	7,887	5,848
Tamil Nadu	226	241	261	284	345	290
Total Onshore	19,584	18,538	17,861	17,587	17,540	13,166
Share of PSUs	10,171	9,482	9,051	9,307	9,386	7,090
Share of Private/JV	9,413	9,056	8,810	8,280	8,154	6,076
OFFSHORE						
Share of PSUs	15,541	16,194	16,543	16,284	16,240	11,340
Share of Private/JV	2,663	2,729	2,546	2,137	1,905	1,437
Total Offshore	18,204	18,923	19,089	18,421	18,145	12,777
Grand Total	37,788	37,461	36,950	36,008	35,684	25,943

2.4.3 Natural Gas production in 2018-19 (up to December, 2018) is about 32.74 Billion Cubic Metre (BCM) or 89.7 Million Metric Standard Cubic Meter per Day (MMSCMD). About 81% of natural gas production is by ONGC and OIL from nomination regime and remaining 19% of natural gas production was by Private/JV companies from PSC regime.

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2.4.4 The share of offshore natural gas production in FY 2018-19 (up to December, 2018) is about 67.22%. The remaining natural gas production including CBM was from 10 States viz., Andhra Pradesh (3.3%), Arunachal Pradesh (0.1%), Assam (10.14%), Gujarat (4.23%), Rajasthan (4.45%), Tamil Nadu (3.67%), Tripura (4.68%), Jharkhand, Madhya Pradesh and West Bengal (2.11%). The details of Natural gas production in 2018-19 (up to December, 2018) and last 5 years are as under:



89.7 MMSCMD
natural gas production
in FY 2018-19 (up to
December, 2018)

TABLE 2.7: STATE-WISE NATURAL GAS PRODUCTION TRENDS (MMSCMD)

State/Source	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19 (upto Dec 2018)
ONSHORE						
Andhra Pradesh	3.2	1.5	1.7	2.4	2.6	3.0
Arunachal Pradesh	0.1	0.1	0.1	0.1	0.1	0.1
Assam	7.9	8.1	8.3	8.6	8.8	9.1
Gujarat	4.5	4.2	4.1	4.3	4.4	3.8
Rajasthan	2.7	3.2	3.7	3.5	4	4.0
Tamil Nadu	3.6	3.3	2.6	2.7	3.3	3.3
Tripura	2.3	3.1	3.6	3.9	3.9	4.2
CBM-WB, MP, Jharkhand	0.4	0.6	1.1	1.5	2.0	1.9
Total Onshore	24.7	24.1	25.2	27.0	29.1	29.4
Share of PSU	21.8	20.5	20.7	22.3	23.3	22.9
Share of Private/JV	2.9	3.6	4.5	4.7	5.8	6.5
OFFSHORE						
Share of PSU	49.2	47.3	44.8	46.3	48.7	51.6
Share of Private/JV	23.1	20.8	18.1	14.1	11.6	8.7
Total Offshore	72.3	68.1	62.9	60.4	60.3	60.3
Total	97	92.2	88.1	87.4	89.5	89.7

2.4.5 Commercial production of Coal Bed Methane (CBM) in India has commenced w.e.f. July, 2007 in Raniganj (South) block in West Bengal. CBM production in the Raniganj (South) block is about 0.41 MMSCMD in December, 2018. Another two blocks, Raniganj (East) block operated by Nayara Oil Limited is producing at the rate of 0.54 MMSCMD and Jharia operated by ONGC is producing at the rate of 0.01 MMSCMD. CBM production from Sohagpur (West) and Sohagpur (East) operated by RIL is about 0.98 MMSCMD. Thus, CBM production from 5 blocks in the country is about

1.94 MMSCMD in December, 2018 which includes test gas production from 2 CBM Blocks and commercial production from 3 CBM Blocks.

2.5 INDIAN SEDIMENTARY AREA

As per India Hydrocarbon Vision 2025, 100% Indian sedimentary area is to be appraised. Onland area covers 1.63 Million Square Kilometres (48.5%) and Offshore area covers 1.73 Million Square Kilometres. As of now, only 48% of the basinal areas have been

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appraised. About 4% sedimentary basinal area has been declared as "NO GO area" by Ministry of Defence / Ministry of Environment & Forest which remains unappraised. This means, about half of the Indian sedimentary basins have the undiscovered potential of hydrocarbons.

2.6 BLOCKS AWARDED FOR EXPLORATION & PRODUCTION

2.6.1 Government of India signed 310 production sharing contracts involving 29 discovered fields (One PSC signed for Panna & Mukta Fields), 28 exploration blocks under pre-NELP Exploration Blocks and 254 blocks under NELP regime with National Oil Companies and Private (both Indian and Foreign)/ Joint Venture companies as licensee /lessee for blocks. Also 30 Revenue Sharing Contracts (RSCs) have been signed under DSF (Discovered Small Field)-2016 involving 30 Contract Areas. Under HELP (Hydrocarbon Exploration and Licencing Policy), in Open Accreage Licencing Policy (OLAP), Bid Round I, 55 RSCs have been signed on 1st October, 2018. At present out of 310 PSCs & 85 RSCs signed so far under various bidding rounds (Discovered Field, Pre-NELP, NELP,HELP and DSF), 106 PSCs and 85 RSCs are operational.

2.6.2 Petroleum Exploration Licenses (PEL) for domestic exploration & production of crude oil and natural gas have been granted under the different regimes over a period of time:

a). Nomination Basis: Petroleum Exploration License (PEL) is granted to National Oil

Companies viz. Oil and Natural Gas Corporation Ltd (ONGC) and Oil India Ltd. (OIL) on nomination basis prior to implementation of NELP.

b). Pre-NELP Discovered Field: Petroleum Mining Lease (PML) is granted under small / medium size discovered field Production Sharing Contract (PSCs) during 1991 to 1993 where operators of blocks are private companies and ONGC/OIL has the participating interest.

c). Pre-NELP Exploration Blocks: 28 Exploration Blocks are awarded to private companies between 1990 and prior to implementation of NELP where ONGC and OIL have the rights for participation in the block after hydrocarbon discoveries.

d). New Exploration Licensing Policy (NELP) -1999 onwards: Under NELP, exploration blocks were awarded to Indian Private and foreign companies through international competitive bidding process where National Oil Companies viz, ONGC and OIL also competed on equal footing.

e). Discovered Small Field (DSF) Policy: Under Discovered Small field Policy, Government has awarded 30 Contract area based on Revenue Sharing Model in March, 2017.

f). Hydrocarbon Exploration & Production Policy: Under Hydrocarbon Exploration & Production Policy (HELP), Government has awarded 55 Exploratory Blocks on Revenue Sharing basis in October, 2018.



ONGC Offshore Production Platform

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2.6.3 Under PSC Regime as on 1st April, 2018, an investment of about US\$ 41 billion on exploration and production was made. Out of this, investment of US\$6.3 billion on discovered fields, US\$ 8.2 billion on Pre-NELP exploration Blocks and US\$ 26.5 billion on NELP Blocks were made for exploration and production activities.

2.7 PETROLEUM EXPLORATION LICENCE (PEL) AND PETROLEUM MINING LEASE (PML)

2.7.1 Under Nomination regime, ONGC is operating 9 PEL and 334 PML blocks covering an area of about 94,358 sq. Km. In addition, OIL is operating 3 PEL and 22 PML under nomination regime covering an area of 5,158 square Kilometres. The basin-wise details of PEL/PML operated by ONGC and OIL are as under:

TABLE 2.8: BASIN-WISE PEL & PML UNDER NOMINATION REGIME AS ON 1.12.2018

Company / Operator	Basin		PEL		PML		Total	
			No.	Area (Km ²)	No.	Area (Km ²)	No.	Area (Km ²)
ONGC-Nomination	Assam-Arakan		4	1,677	60	5,980	64	7,657
	Cambay		-	-	167	5,815	167	5,815
	Cauvery	Onland	-	-	28	3,516	28	3,516
		Offshore			1	86	1	86
	Himalayan Foreland	1	1,828	-	-	1	1,828	
	Krishna	Onland	-	-	36	4,928	36	4,928
	Godavari	Offshore	1	1,190	11	1,286	12	2,476
	Kutch	Offshore	1	16,557	2	1,673	3	18,230
	Mumbai	Offshore	2	16,487	24	31,300	26	47,787
	Jaisalmer-Rajasthan				4	885	4	885
	Vindhyan				1	1,150	1	1,150
	Total- ONGC		9	37739	334	56,618	343	94,358
OIL-Nomination	Rajasthan		-	-	2	460	2	460
	Assam - Arakan		3	332	20	4,366	23	4,698
	Total - OIL		3	332	22	4,826	25	5,158

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2.7.2 Private/JV companies are operating 64 PEL and 62 PML blocks covering an area of 62,251 Sq. Km. The basin-wise details of PEL/PML operated by private/JV companies are as under:

TABLE 2.9 : BASIN-WISE PEL & PML WITH PRIVATE/JOINT VENTURE COMPANIES AS ON 01.12.2018

Basin	PEL		PML	
	PEL (No.)	Area (Sq. Km.)	PEL (No.)	Area (Sq. Km.)
Assam-Arakan Fold Belt	1	3,213.0		
Assam-Arakan Shelf	7	6,758	3	139
Bengal	3	11,733.0		
Cambay	26	6,736	43	1,569
Cauvery	2	267	2	156
Krishna Godavari	9	8,705	7	1,571
Kutch	4	3,519.0		
Mahanadi	1	832		
Mumbai	3	4,126.0	3	2,678
Rajasthan	4	4,559.2	4	3,287
Satpura-South Rewa-Damodar	1	789.0		
Saurashtra	2	1,152.0		
Vindhyan	1	462.0		
Total	64	52,851	62	9,400

2.8 EXPLORATORY EFFORTS BY ONGC AND OIL UNDER NOMINATION REGIME

ONGC and OIL have carried out 9,16,377 line kilometre (LKM) of 2D seismic survey 1,37,349 Sq. Km. of 3D seismic survey and drilled 6,451 exploratory wells since inception as on 31st December, 2018. The details of exploratory efforts in terms of 2D, 3D seismic and exploratory wells made by ONGC and OIL are as under:

TABLE 2.10 : EXPLORATORY INPUTS BY ONGC AND OIL AS ON 31.12.18

Sr. No.	Company	Cumulative exploratory efforts as on 1.1.2018		
		2D (LKM)	3D (Sq. KM)	Exploratory Wells (Nos.)
1.	ONGC-Nomination	8,82,130	1,26,088	6,071
2.	Oil India Ltd. - Nomination	34,247	11,261	380
	Total	9,16,377	1,37,349	6,451

2.9 EXPLORATORY EFFORTS BY PRIVATE/JV COMPANIES UNDER PSC REGIME

2.9.1 The basin-wise exploratory efforts made by Private/Joint venture companies in terms of 2D seismic, 3D seismic and exploratory wells as on 31st March, 2018 are as under:

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TABLE 2.11: EXPLORATORY INPUTS IN PSC REGIME AS ON 31.03.2018

Basin	2D seismic (LKM)	3D seismic (Sq. KM)	Exploratory Well (No)
Andaman-Nicobar	27,070	16,562	6
Assam-Arakan Fold Belt	1,352	613	2
Assam-Arakan Shelf	5,435	2,125	36
Bengal	5,247	4,573	9
Cambay	35,239	9,612	304
Cauvery	67,851	45,872	51
Deccan Syncline	476	0	0
Ganga	6,417	1,683	8
Himalayan- Foreland	810	0	1
Kerala Konkan	52,290	14,035	7
Krishna Godavari	76,629	70,847	187
Kutch	2,985	6,984	17
Mahanadi	59,542	64,659	53
Mumbai	21,349	24,604	46
Pranhita Godavari	195	0	1
Rajasthan	14,267	17,547	304
Satpura-South Rewa-Damodar	2,050	304	2
Saurashtra	16,037	14,690	15
Vindhyan	3,702	369	5
Grand Total	3,98,944	2,95,080	1,054

2.9.2 Exploratory efforts carried out by PSUs, Indian Private and foreign companies under PSC regime as on 31st March, 2018 are given below:

TABLE 2.12 : OPERATOR-WISE EXPLORATORY WORK UNDER PSC REGIME

Operator	2D seismic (LKM)	3D seismic (Sq. KM)	Exploratory Well (No)
Foreign companies	65,106	24,683	289
Indian Private companies	1,26,089	1,08,933	326
PSUs	2,07,749	1,61,464	439
Total	3,98,944	2,95,080	1054

2.10 HYDROCARBON DISCOVERIES IN 2018-19

ONGC and OIL have made 12 hydrocarbon discoveries. ONGC has made 9 hydrocarbon discoveries comprising of 6 discoveries in onshore acreages and 3 discoveries in offshore acreages. Out of these, four onland discoveries have been monetized by ONGC. OIL has made 3 hydrocarbon discoveries in the State of Assam. The details of hydrocarbon discoveries made in 2018-19 up to December, 2018 are as under:

TABLE 2.13 : HYDROCARBON DISCOVERIES IN 2018-19 UPTO DECEMBER, 2018

Sr. No.	Company	Oil Discovery	Gas Discovery	Total Discoveries
1.	ONGC	4	5	9
2.	OIL	1	2	3
3.	PSC	1	4	5
	Total	6	11	17

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OIL Drilling rig at a remote location in Assam

2.11 NATIONAL DATA REPOSITORY (NDR)

2.11.1 The Government of India notified the Open Acreage Licensing Policy (OALP) as a part of the Hydrocarbon Exploration and Licensing Policy (HELP) on 30th June, 2017. National Data Repository (NDR) is a pre-requisite and key component for making OALP operational to view the surface and sub-surface geological, geophysical and other technical data by the investors. NDR was launched on 28th June, 2017.

2.11.2 NDR is managed by DGH. Entire country's E&P data is uploaded in NDR so that any interested party from around the globe can have access to these data and show interest to invest in India. As on 30th November, 2018, 19.92 Lakh Line Kilometre(LKM) of 2D Seismic data, 7.03 Lakh Sq. KM of 3D Seismic data and 15,712 well log data have been uploaded in NDR system.

2.12 SHALE GAS EXPLORATION

2.12.1 In order to promote Shale Gas and Oil exploration in India, the Government of India on 14th December, 2013 notified the policy guidelines for exploration and exploitation of Shale gas and oil by National Oil Companies (NOCs) in their onland Petroleum Exploration Lease (PEL) / Petroleum Mining Lease (PML) blocks awarded under the nomination regimes.

2.12.2 As per policy guidelines, ONGC Ltd. and Oil India

Ltd have to carry out Shale Gas and Oil exploration in 50 and 5 blocks respectively for assessment under Phase-I. ONGC is carrying out Shale Gas and Oil exploration activities in Cambay, Cauvery, Krishna-Godavari and Assam and Arakan Basins. Oil India Ltd is carrying out Shale Gas and Oil exploration activities in Assam and Rajasthan basins. In phase II and III ONGC is to carry out exploration in 75 and 50 blocks respectively. Oil India is to carry out exploration in 5 blocks each in Phase II and III. So far ONGC has drilled 23 wells in 19 blocks. Presently, shale exploration activities are in progress in Cambay and KG Basins where two wells [exclusive shale assessment well NDSGA(NADA#37) in Cambay Basin and dual objective well NGSAA (Nandigam South#1) in KG Basin] are under drilling.

2.13 GAS HYDRATE

National Gas Hydrate Project-2 (NGHP-2) was conducted successfully in Eastern offshore from 9th March, 2015 to 31st July, 2015. NGHP-Expedition-02 carried out in 2015 drilled 42 wells at 25 sites in Krishna Godavari and Mahanadi area in sand reservoirs for gas hydrates. Based on the results of NGHP-02, two world class gas hydrate reservoirs have been discovered (Block KG-DWN- 98/5 and Block KG-DWN-98/3).

Based on the post-expedition studies and review by international experts, the site located in KG-DWN-98/5

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has been found suitable for pilot production test during NGHP-03 expedition for which various studies like sand control measures, well design, reservoir and production simulation modelling as prerequisite for the pilot production have been completed. .

2.14 POLICY INITIATIVES TAKEN BY THE GOVERNMENT FOR ENHANCING CRUDE OIL AND GAS PRODUCTION

Government has formulated path breaking policies to revolutionize the E&P sector. The Policy-wise details have been enumerated as under:

In a major policy drive to give a boost to upstream hydrocarbon sector, the Government has unveiled a series of policy reforms in last one year. Some of the notable Policy reforms are listed as under:

2.14.1 Hydrocarbon Exploration and Licensing Policy/ Open Acreage Licensing Policy

- » Government notified Hydrocarbon Exploration and Licensing Policy (HELP) on 30th March, 2016 and formally put in operation w.e.f. 1st July, 2017 with notification of Open Acreage Licensing Policy (OALP) and operationalisation of National Data Repository (NDR). HELP is a paradigm shift from Production Sharing Contract (PSC) regime to Revenue Sharing Contract (RSC) regime which completely overhauls the regulatory regime for the future Exploration and Production (E&P) activities by reducing the regulatory burden based on the principle of 'Ease of doing business'. It provides for single License for exploration and production of conventional as well as non-conventional Hydrocarbon resources, pricing and marketing freedom, reduced rate of royalty for offshore blocks etc. Open Acreage Licensing Policy (OALP) means potential investors/companies can carve out exploration acreages of their choice and submit Expressions of Interest round the year. Bidding is carried out every 6 months.
- » Under OALP, 55 Blocks having an acreage area of 59,282 Sq. Km. have been awarded in Bid Round-I in October, 2018. Under OALP Bid Round-II, bid for 14 blocks having an acreage area of 29,233 Sq. Km. is launched on 7th January, 2019. Under OALP Bid Round-III, 23 Blocks having an acreage area of 31,722 Sq. Km. are proposed for bidding through International Competitive Bidding (ICB) process.
- » Under National Data Repository (NDR), launched by Government in June, 2017 to assimilate, preserve and upkeep the vast data, till November,

2018 19,92,776 Line Kilo Metres (LKM) of 2D seismic processed data, 7,03,733 sq.km of 3D seismic processed data, 15,712 numbers of Well data log, 32,142 numbers of Well reports etc. have been uploaded on NDR. The data in NDR is used by Exploration and Production (E&P) Companies for bidding in OALP.

2.14.2 Discovered Small Field Policy (DSF) Policy

- » For early monetization of un-monetized discoveries of National Oil Companies (NoCs), Government in September, 2015 approved 69 marginal fields for offer under Discovered Small Fields Policy. The Policy envisages awarding of Contract Areas under the new regime of Revenue Sharing Model with an objective to provide faster development of fields and facilitate early production of oil and gas.
- » First bidding round under the Discovered Small Field Policy was launched on 25th May 2016, offering 67 discovered small fields/discoveries clubbed into 46 Contract Area for international bidding. Total 30 contracts for 43 discovered small fields/discoveries were signed in March, 2017. It is expected that in-place locked hydrocarbons reserves of 44.7 Million Metric Tonnes (MMT) of oil and oil equivalent gas (O+OEG) will be monetised over a period of 15 years.
- » On 7th February, 2018, Government approved the Discovered Small Field (DSF) Policy Bid Round-II, an extension of the Discovered Small Field Policy notified on 14.10.2015. Under DSF Bidding Round-II, 59 discovered small fields/unmonetized discoveries estimated to have 189.61 Million Metric Tonnes (MMT) Oil and Oil equivalent gas in-place are offered for bidding. Bidding under DSF Bidding Round –II was launched on 9th August, 2018 and bid closing date is 18th January, 2019.

2.14.3 Policy Framework to Promote and Incentivize Enhanced Recovery Methods for Oil and Gas (October, 2018)

- » The Government approved the Policy framework to promote and incentivize Enhanced Recovery (ER)/Improved Recovery (IR)/Unconventional Hydrocarbon (UHC) production methods/techniques through fiscal incentives in the form of partial waiver of royalty and cess and an enabling ecosystem to improve productivity of existing fields and enhance overall production of domestic hydrocarbons. The Policy provides

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for systemic assessment of every field for its ER potential, appraisal of appropriate ER techniques and fiscal incentives to de-risk the cost involved in ER Projects and to make it economically viable.

2.14.4 National Seismic Programme (NSP)

- » Government formulated National Seismic Programme (NSP) in October, 2016 to appraise the unappraised areas in all sedimentary basins of India where no/scanty data was available. Under the programme, Government approved the proposal for conducting 2D seismic survey for data Acquisition, Processing and Interpretation (API) of 48,243 Line Kilo Metres (LKM). The estimated cost of the project is ₹ 2,932.99 crore and expected to be completed by 2019-20.
- » As on 30th December, 2018, out of 48,243 LKM, surface coverage of 31,323 LKM has been achieved under NSP.

2.14.5 Policy Framework for streamlining the working of the Production Sharing Contracts (August, 2018)

Government notified the policy for expeditious development of hydrocarbon resources by streamlining the working of PSCs in August, 2018. Policy includes extending exploration period by 2 years and appraisal period by 1 year for operational blocks in North Eastern Region (NER) besides allowing marketing including pricing freedom for natural gas to be produced in future in NER; sharing of the statutory levies including royalty & cess in Pre-

NELP Exploration Blocks and to be cost recoverable with prospective effect; extending tax benefits under Section 42 of Income Tax, 1961 to operational blocks under Pre-NELP discovered fields with prospective effect for the extended period of Contract.

2.14.6 Re-assessment of Hydrocarbon Resources

A Multi Organisation Team comprising of representatives of National Oil Companies (ONGC and OIL) and DGH has carried out estimation of hydrocarbon resource potential in the country. The prognosticated conventional hydrocarbon resources in 26 sedimentary basins of the country are re-assessed to the order of 41.87 billion tonnes of oil and oil equivalent of gas (O+OEG), which is about 49% increase as compared to earlier estimates of 28.08 billion tonnes.

2.14.7 Policy Framework for Exploration & Exploitation of Unconventional Hydrocarbons under Existing Production Sharing Contracts, Coal Bed Methane Contracts and Nomination Fields (August 2018)

Government approved the policy to encourage the existing Contractors to unlock the potential of unconventional hydrocarbons including shale oil and gas and CBM in the existing acreages under PSCs and CBM contracts subject to conditions stipulated in policy document. An area of 72,027 sq. km. held under PSCs and 5,269 sq. km. area under CBM contracts has been opened up for simultaneous exploration and exploitation of conventional or unconventional hydrocarbons.

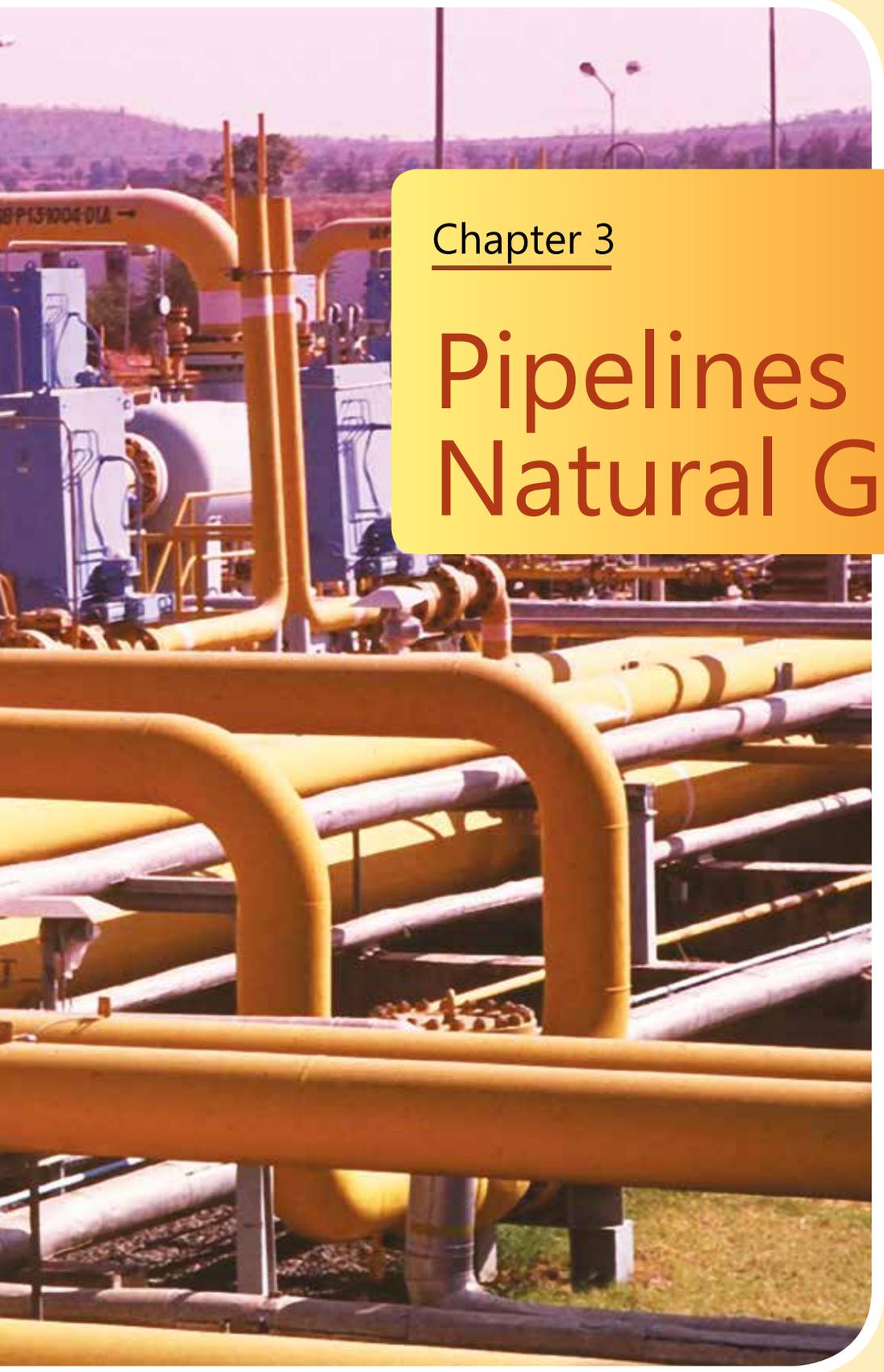


Minister of Petroleum & Natural Gas and Skill Development & Entrepreneurship, Shri Dharmendra Pradhan along with Joint Secretary, Shri Amar Nath, MOP&NG at the ONGC drillship, Platinum Explorer

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Chapter 3

Pipelines & Natural Gas



Pipelines & Natural Gas



Hon'ble Prime Minister, Shri Narendra Modi lays the foundation stone of the Ranchi City Gas Distribution (CGD) project being developed by GAIL (India) Limited, in the presence of Chief Minister of Jharkhand Shri Raghubar Das and a host of other dignitaries

India is not only the 3rd largest energy consumer in the world after China and USA but also one of the fastest growing energy consumers. In the year 2017, the primary energy consumption in the country was about 754 Million Tonnes of Oil Equivalent (MTOE) and Natural Gas has a share of 6.2 % of the country's primary energy mix. It has been envisaged to increase the share of Natural Gas in primary energy mix of the country from current level to 15% in coming years.

In order to move forward, thrust has been put to enhance domestic gas production, encourage the import of Liquefied Natural Gas (LNG) and augment LNG import capacity, completion of national gas grid and speedier roll out of City Gas Distribution (CGD) network across the country.

3.1 GAS GRID

At present, about 16,800 km long gas pipeline network is under operation in the country and around 14,200 km pipeline is approved/under construction.

In order to develop the national gas grid, the Government has taken a decision to provide a capital grant of ₹ 5,176 crore (i.e. 40% of the estimated capital cost of ₹ 12,940 crore) to GAIL for development of a 2,655 km long Jagdishpur-Haldia/Bokaro-Dhamra Gas Pipeline (JHBDPL) project, popularly known as the "Pradhan Mantri Urja Ganga" of Eastern India. It will pass through 50 districts in the State of Uttar Pradesh, Bihar, Jharkhand, Odisha & West Bengal. The construction work on the pipeline is under progress and it is scheduled to be completed by 2020. GAIL has also been entrusted to develop Barauni (Bihar)-Guwahati (Assam) pipeline as an integral part of JHBDPL project which will connect North East region with the National Gas Grid.



India has a strong gas pipeline network of 16,800 km

To further extend the gas grid to North-Eastern Region, five CPSEs viz. ONGC, OIL, GAIL, IOCL and NRL signed a MoU on 3rd February, 2018 for formation of a Joint Venture Company to develop Gas pipeline connectivity to all North-Eastern States viz. Assam, Sikkim, Mizoram, Manipur, Arunachal Pradesh, Tripura, Nagaland and Meghalaya. These promoters have formed a Joint Venture (JV) company, named as Indradhanush Gas Grid Ltd, on 10.08.2018. The JVC has also been authorized to develop NER Gas Grid of about 1656 Km long in a phased manner at the total cost of about ₹ 9265 Crore. On completion, NER grid will ensure uninterrupted availability of natural gas across the region and boost industrial growth in the region.

The construction work to develop Kochi-Kottanad-Managlore-Bangalore Pipeline (KKBMPL) and Ennore-Thiruvallur-Bengaluru-Puducherry-Nagapatinam-Madurai-Tuticorin (ETBPNMT) in the southern part of the country is in progress. Efforts are underway for time bound development of this pipeline project and provide accessibility of natural gas sources (domestic and imported both) to southern cities by connecting KKMBPL and ETBPNMT projects with the existing gas grid.

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Construction work is also going on in Mallavaram - Bhopal - Bhilwara via Vijaipur pipeline to connect Ramagundum Fertiliser plant.

3.2 REGASIFICATION INFRASTRUCTURE IN THE COUNTRY

Country commenced the first import of Liquefied Natural Gas (LNG) in year 2004 with the establishment of its first regasification LNG (RLNG) terminal located at Dahej (Gujarat). The import of LNG is being carried out as Open General License (OGL) item. The imported RLNG is being supplied at market determined prices as per contractual agreement between suppliers and

buyers across the country. Establishment of LNG terminals is also permitted as an infrastructure project and eligible for 100% Foreign Direct Investment (FDI).

At present, import of LNG is being carried out at terminals located on western and south western coast viz. Dahej (GJ), Hazira (GJ), Dabhol (MH) and Kochi (KL). There is a continuous increase in volume of Re-gasified LNG (RLNG) in overall gas consumption due to limited availability of domestic gas. LNG is being procured on spot, short-term, medium-term and long-term basis. In FY 2017-18, imported LNG contributed about 50% of the total gas consumption in the country. The terminal wise details are given as under:

Location	Owner	Capacity (MMTPA)
Dahej	PLL	15
Hazira	SHELL	5
Kochi	PLL	5
Dabhol*	GAIL	1.3
Total Capacity (MMTPA)		26.3
Sub-total (MMSCMD)		~95

* In absence of break water, terminal is operational in non-monsoon months and is operating at ~1.3 MMTPA.

Details of upcoming LNG terminals is given as under:

Terminal location	Company	Capacity	Scheduled completion by
Mundra, Gujarat	GSPC LNG Limited (main promoter)	5 MMTPA	FY 2018-19
Ennore, Tamil Nadu	Indian Oil Corporation Limited (IOCL)	5 MMTPA	FY 2018-19
Dhamra, Odisha	Dhamra LNG Terminal Private Limited (DLTPL)	5 MMTPA	At conceptualization/ Feasibility study stage
Jaigarh, Maharashtra	H-Energy	5 MMTPA	

3.3 CITY GAS DISTRIBUTION (CGD)

A City Gas Distribution (CGD) network is the interconnected network of pipelines to make supply of natural gas to domestic, industrial or commercial premises and CNG stations situated in a specified Geographical Area (GA). CGD networks are being developed based on the availability of trunk gas pipeline connectivity or gas sources and techno-commercial feasibility in a GA.

CGD network ensures the supply of environment friendly cooking fuel at the door step of domestic households in the form of Piped Natural Gas (PNG) as well as clean fuel to transport sector in the form of



Compressed Natural Gas (CNG). The usage of CNG in transport sector helps in curbing the vehicle emissions in urban area and it improves the air quality.

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Coverage of CGD networks has been expanded to 96 GAs till August 2018. As on 1st January, 2019, 47 lakh (approx.) households and 35,000 Industries and

Commercial Units are connected with gas supply. Further, 31.91 lakh vehicles are running on CNG and Country has 1,491 CNG Stations.

List of Cities covered with CGD network			
Sr. No.	State	Geographical Area	No. of CNG Stations
1	Andhra Pradesh	Vijayawada, Kakinada, East Godavari, West Godavari and Krishna	27
2	Assam	Upper Assam	-
3	Bihar	Patna	-
4	Delhi/NCR (including Noida & Ghaziabad)	Delhi	450
5	Goa	North Goa and South Goa	-
6	Gujarat	Surat-Bharuch-Anklashwer, Bhavnagar, Hazira, Jamnagar, Nadiad, Navsari, Rajkot, Surendernagar, Valsad, Anand (excluding CGMSL area-including Khambhat), Panchmahal (including Halol), Kutch (West), Amerali, Dahej Vagra Taluka, Dahod District, Ahmedabad city, Anand area including Kanjari & Vadtal Village in Kheda District, Gandhinagar-Mehsana-Sabarkantha, Patan, Vadodara, Kutch East and Banaskantha.	469
7	Haryana	Rewari, Sonapat, Faridabad*, Gurgaon*, Panipat, Yamunanagar, Karnal, Rohtak, Ambala & Kurukshetra	55
8	Jharkhand	Ranchi and East Singhbhoom	-
9	Karnataka	Bengaluru, Dharwad, Tumkur and Belgaum	9
10	Kerala	Ernakulam	4
11	Madhya Pradesh	Dewas, Indore (including Ujjain), Gwalior and Dhar	32
12	Maharashtra	Mumbai, Greater Mumbai, Thane and adjoining municipalities, Raigarh, Palghar District & Thane Rural, Pune City including Pimpri Chichwad& adjoining contiguous areas, Pune District excluding MNGL area, Ratnagiri, Solapur and Kolhapur	282
13	Odisha	Cuttack and Khorda	4
14	Punjab	Jalandhar, Amritsar, Bhatinda, Rupnagar, Fatehgarh Sahib and Ludhiana.	1
15	Rajasthan	Bhiwadi (Alwar District) and Kota	5
16	Telangana	Hyderabad	34
17	Tripura	AGARTALA	8
18	UT	Dadra & Nagar Haveli	3
19	UT	Chandigarh	4
20	UT	Daman and Diu	2
21	Uttar Pradesh	Saharanpur, Gautam Budh Nagar**, Ghaziabad**, Firozabad (TTZ), Meerut, Khurja, Lucknow, Agra, Kanpur, Bareilly, Jhansi, Moradabad, Mathura, Allahabad, Baghpat, Bulandshahr, Varanasi	94
22	Uttarakhand	Udham Singh Nagar and Haridwar	1
23	West Bengal	Kolkata & adjoining area	7
Total			1491

Note: * Matter Sub judice, ** Under Consideration of PNGRB





Hon'ble Prime Minister, Shri Narendra Modi dedicating to the Nation, the Varanasi City Gas Distribution (CGD) network, which is connected to the 'Pradhan Mantri Urja Ganga' in the presence of Hon'ble Governor of Uttar Pradesh Shri Ram Naik, Chief Minister of Uttar Pradesh Shri Yogi Adityanath and a host of other dignitaries

In order to expand the coverage of CGD network, PNGRB had granted authorization for 84 GAs in 9th CGD Bidding Round. With the completion of 9th CGD Bidding Round, CGD would be accessible in 180 GAs covering approximately 280 districts (263 complete and 17 part) spread over 26 States and UTs. As per the commitment made by the various entities in 9th CGD Bidding Round, 2,21,00,000 domestic PNG connections and over 4,600 CNG stations would be installed largely during a period of eight years. In addition to above, 1,14,000 inch-km of steel pipeline will be laid in the GAs. Further, the entities would be authorised to supply natural gas to industrial and commercial units in their respective GAs as per the limits provided in the CGD Authorisation Regulations.

After successful completion of 9th CGD bidding round, more than 50 percent of India's population and 35 percent of its geographical area has been covered with CGD networks.

PNGRB has also completed 10th CGD Bidding Round for development of CGD Network covering 50 Geographical Areas spread over 14 states and 124 districts (112 full and 12 part). It would increase coverage of city gas distribution to 74% of the country's population and 53% of its area.

The total investment for setting up CGD networks in areas under 9th and 10th Bidding Rounds will be to the tune of ₹ 1,20,000 crore in next 8 years. These CGD bidding rounds will create employment generation potential for around 3 lakh persons in skilled, semi-skilled and non-skilled category.

Government has envisaged to connect one crore households with PNG supplies for cooking purpose by 2020.

In order to boost the growth of CGD sector, the major steps taken by the Government are as under:

- i) This Ministry has accorded priority to PNG (Domestic) and CNG (Transport) segments

of CGD sector in domestic gas allocation. At present, domestic gas is being supplied to meet entire requirement of CNG (transport) and domestic PNG segments based on last six monthly consumption data by the respective CGD networks.

- ii) State Governments have been advised-
 - a. To standardize the Road Restoration/permission charges along with time bound permission for development of CGD networks.
 - b. to earmark land plot for development of CNG Stations in their Master Plan.
 - c. Relevant modification in building by-laws for providing gas pipeline infrastructure in residential & commercial buildings at architectural design stage.
- iii) CGD networks have been provided the status of 'Public Utility' under the Industrial Dispute Act, 1947.
- iv) Guidelines have been issued for allowing the development of PNG network into defence establishments across the country.
- v) Further, Public Sector Undertakings have been advised to have the provisions of PNG in their residential complexes.
- vi) Efforts are underway to develop an online portal in consultation with State Government to streamline the process of permissions to develop CGD network.

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Minister for Petroleum & Natural Gas and Skill Development & Entrepreneurship, Shri Dharmendra Pradhan inaugurates 2 CNG stations in Cuttack.

3.4 CREATION OF COMPETITIVE GAS MARKET IN THE COUNTRY

Natural Gas is recognized as a cleaner and environment friendly energy source. Government is focused to promote the usage of natural gas as a fuel/feedstock across the country to move towards a gas based economy in the long run. Government is taking necessary policy and regulatory steps to attract investment in enhancing domestic gas

production, gas infrastructure including pipelines, City Gas Distribution (CGD) networks and Liquefied Natural Gas (LNG) import terminals. The Government is exploring means for establishing a gas market where natural gas can be traded freely and supplied. It is expected that free gas market will attract new investment in Exploration & Production (E&P) activities so as to increase gas availability and accessibility to all at market price.



Minister for Petroleum & Natural Gas and Skill Development & Entrepreneurship, Shri Dharmendra Pradhan launched the supply of CNG and CNG-run scooters in Bhubaneswar

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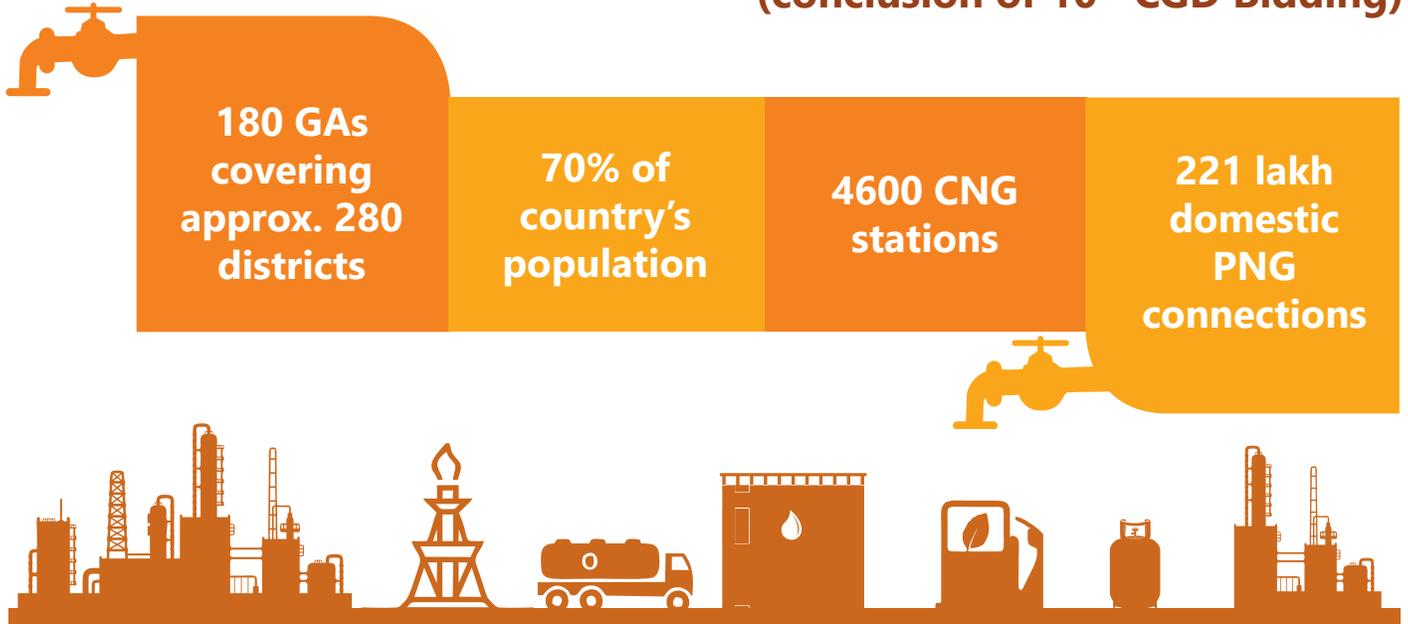
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Transforming India into a Gas Based Economy (conclusion of 10th CGD Bidding)

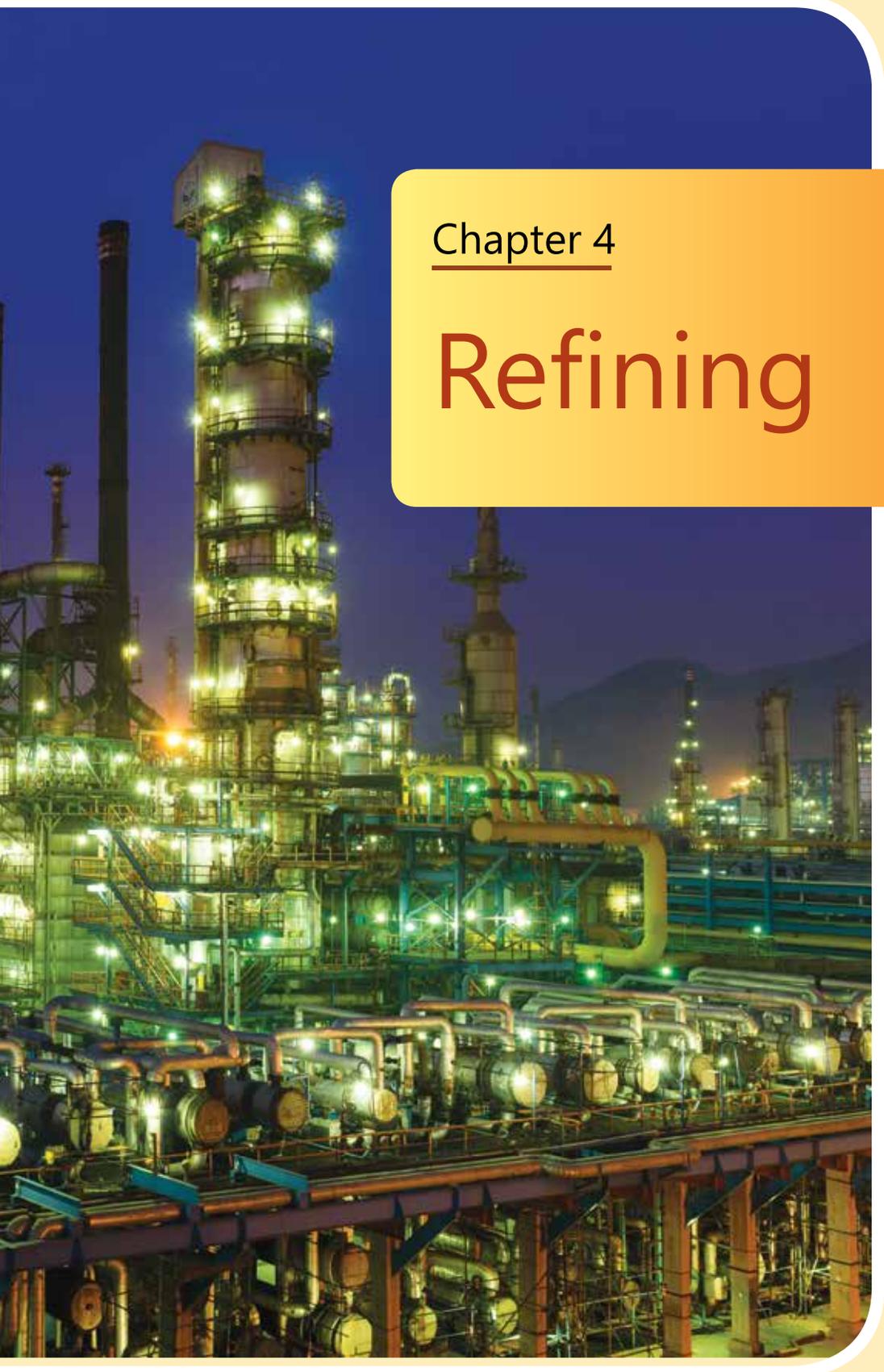


Minister for Petroleum & Natural Gas and Skill Development & Entrepreneurship, Shri Dharmendra Pradhan launched the commencement of PNG supply to residents of Bhubaneswar

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Chapter 4

Refining



Refining



Work Commencement of HRRL's Refinery & Petrochemical Complex done at the hands of Hon'ble Prime Minister, Shri Narendra Modi at Pachpadra in Barmer, Rajasthan

4.1 REFINING CAPACITY

4.1.1 The Indian refining industry has established itself as a major player globally. India is emerging as a refinery hub and refining capacity exceeds the demand. The country's refining capacity has increased from a modest 62 Million Metric Tonnes Per Annum (MMTPA) in 1998 to 247.566 MMTPA at present, comprising of 23 refineries – 18 under Public Sector, 3 under private sector and 2 in Joint Venture (JV).



41.7 MMT
of Petroleum Product
exported during April
to November, 2018

The capacity wise details of the refineries are given below:

TABLE 4.1 : CAPACITY WISE DETAILS OF REFINERIES

Sl. No.	Refineries	Name of the company	Name Plate Capacity (MMTPA)
PSU REFINERIES			
1	Digboi-1901#	Indian Oil Corporation Limited	0.650
2	Guwahati-1962		1.000
3	Barauni-1964		6.000
4	Koyali-1965		13.700
5	Bongaigaon-1974		2.350
6	Haldia-1975		7.500
7	Mathura-1982		8.000
8	Panipat-1998		15.000
9	Paradip-2016		15.000
10	Mumbai-1954	Hindustan Petroleum Corporation Limited	7.500
11	Visakhapatnam-1957	Bharat Petroleum Corporation Limited	8.300
12	Mumbai-1955		12.000
13	Kochi-1963		15.500

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Sl. No.	Refineries	Name of the company	Name Plate Capacity (MMTPA)
14	Manali-1965	Chennai Petroleum Corporation Limited	10.500
15	Nagapattinam-1993		1.000
16	Numaligarh-2000	Numaligarh Refinery Limited	3.000
17	Mangalore-1996	Mangalore Refinery and Petrochemicals Limited	15.000
18	Tatipaka, AP-2001	Oil and Natural Gas Commission	0.066
Total			142.066
JV REFINERIES			
19	Bina-2011	Bharat Oman Refinery Ltd.	6.000
20	Bathinda-2012	HPCL Mittal Energy Ltd.	11.300
Total			17.300
PRIVATE SECTOR REFINERIES			
21	DTA-Jamnagar-1999	Reliance Industries Limited	33.000
22	SEZ, Jamnagar-2008		35.200
23	Vadinar-2006	Nayara Oil Limited	20.000
Total			88.200
Grand Total			247.566

(# Refinery was set up at Digboi in 1901 by Assam Oil Company Ltd and later on IOCL took over the refinery on 14.10.1981)

*MMTPA-Million Metric Tonne Per Annum



Hon'ble Prime Minister, Shri Narendra Modi dedicates to the nation the Integrated Refinery Expansion Project Complex (IREP) at Kochi Refinery

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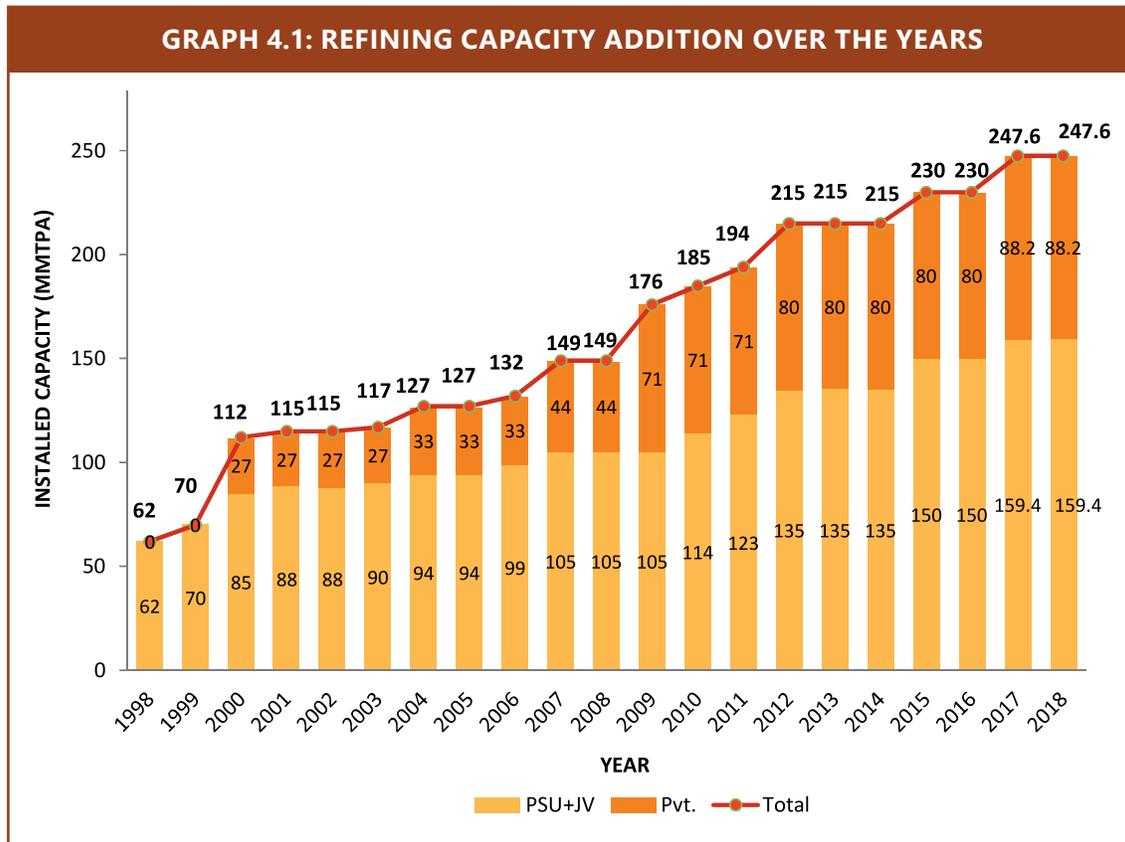
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4.1.2 The refining capacity is not only sufficient for domestic consumption but leaving a substantial surplus also for export of petroleum products. Since FY 2001-02, India is a net exporter of petroleum products. During FY 2018-19 (From April, 2018 to November, 2018), the country has exported 41.7 Million Metric Tonnes (MMT) of Petroleum products worth US Dollars 27.5 Billion (provisional). India is the largest exporter of petroleum products in Asia since August 2009.

4.2 REFINING CAPACITY ADDITION OVER THE YEARS

4.2.1 The graphical representation of the refining capacity addition over the years shown in Graph 4.1.



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4.3 EXPANSION OF EXISTING REFINERIES

The Capacity expansion planned by 2022 is as under:-

TABLE 4.2 : PLANNED REFINERY CAPACITY EXPANSION

S.No.	Name of the Company	Location of the Refinery	Increase in Capacity, MMTPA
1	Indian Oil Corporation Limited (IOCL)	Barauni	3.000
2	Indian Oil Corporation Limited (IOCL)	Guwahati	0.200
3	Indian Oil Corporation Limited (IOCL)	Bongaigaon	0.350
4	Indian Oil Corporation Limited (IOCL)	Mathura	1.200
5	Indian Oil Corporation Limited (IOCL)	Haldia	0.500
6	Hindustan Petroleum Corporation Limited (HPCL)	Visakhapatnam, Andhra Pradesh	6.700
7	Hindustan Petroleum Corporation Limited (HPCL)	Mumbai, Maharashtra	2.000
8	Numaligarh Refinery Limited (NRL)	Numaligarh, Assam	6.000
9	Chennai Petroleum Corporation Limited (CPCL)	Nagapattinam	8.000
10	Bharat Oman Refinery Limited (Bharat Petroleum Corporation Limited & Oman Oil Company, Joint Venture), Bina	Bina, Madhya Pradesh	1.800

Green Field Refinery

S.No.	Name of the Company	Location of the Refinery	Capacity, MMTPA
1	HPCL Rajasthan Refinery Limited (HRRL)	Barmer, Rajasthan	9



Hon'ble Prime Minister, Shri Narendra Modi unveiling e-plaque of foundation stone laying of Barauni Refinery expansion, ATF unit and augmentation of PHDPL

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4.4 REFINERY PERFORMANCE IMPROVEMENT

Indian public sector refineries are equipped with modern technologies and have continuously upgraded the technologies in line with the International trend and as per the requirement. Indian refineries have accorded top priority to reduce the energy consumption through various energy conservation measures.

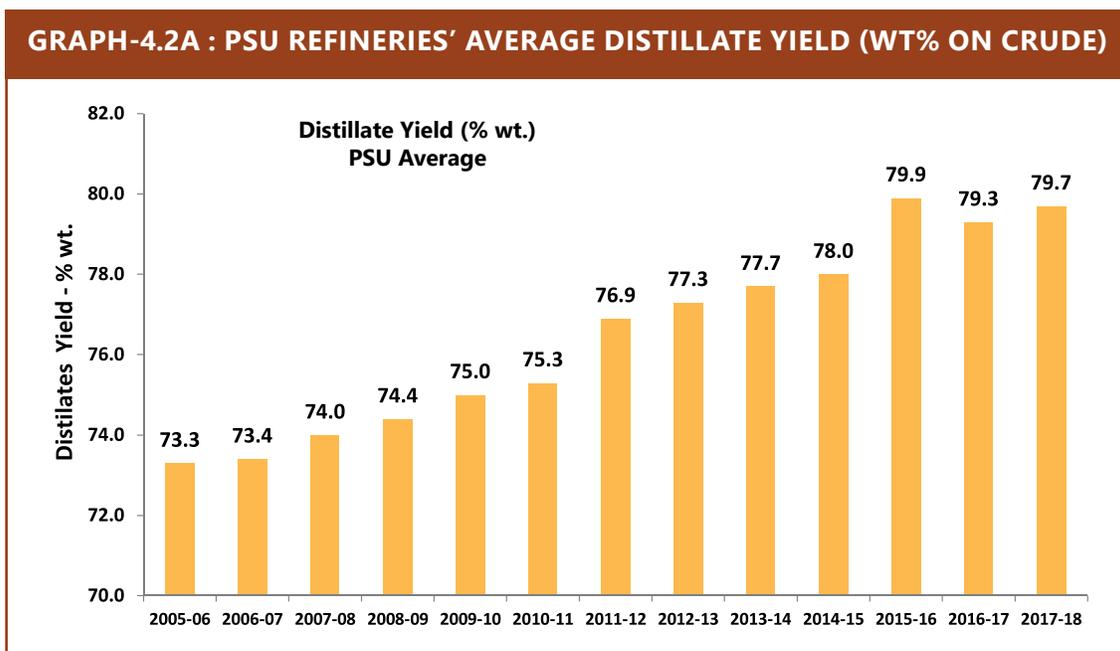
The Centre for High technology (CHT) carried out a Performance Benchmarking Study of public sector Refineries through M/s Solomon Associates for consecutive cycles 2010, 2012, 2014, 2016 and the study for 2018 has been initiated.

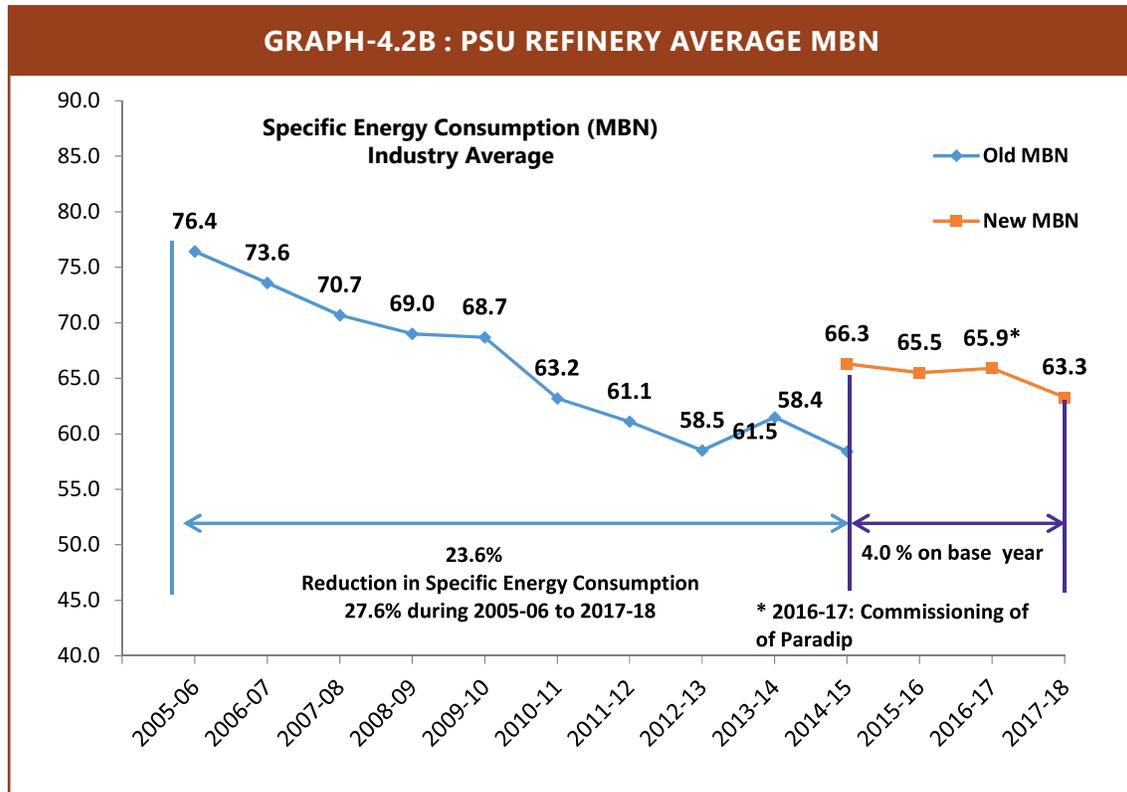
Adoption of modern technologies by Indian refineries and energy conservation measures has helped in increasing the distillate yield, quality upgradation of petrol/diesel and reduction in Specific energy



79.7%
average distillate yield
of PSU Refineries in
FY 2017-18

consumption (MBTU/bbl/NRGF-MBN). The PSU refineries' average distillate yield (wt% on crude) has improved from 73.3% in FY 2005-06 to 79.7% in FY 2017-18 as depicted in Graph 4.2A. Similarly, the industry average MBN has come down from 76.4 (Old) in FY 2005-06 to 63.3 (New) in FY 2017-18 as depicted in Graph 4.2B. The MBN methodology and reporting has been changed to New MBN from 2015-16.





4.5 AUTO FUEL QUALITY UP-GRADATION

The supply of BS-IV has been completed across the entire country w.e.f. 1st April, 2017.

It has also been decided to leap frog directly from BS-IV to BS-VI emission norms in the country w.e.f. 1st April, 2020. Ministry of Road transport & Highways vide Notification No. GSR 889(E) dated 16th September, 2016 has notified emission standards for BS VI fuels. Further, considering recent rise in pollution level in Delhi, Government has carried out the implementation of BS-VI in NCT Delhi w.e.f. 1st April, 2018.

4.6 BRIEF DESCRIPTION OF THE REFINERIES

4.6.1 Public Sector Refineries

a) Indian Oil Corporation Limited (IOCL) Refineries

i) Digboi Refinery (Assam)

Digboi Refinery was commissioned in 1901 by Burmah Oil Company Ltd. (later Assam Oil Company Ltd.). Indian Oil Corporation Ltd. took over the Refinery and marketing management of Assam Oil Company Ltd. with effect from 14th October, 1981 and created a separate division. This division had both Refinery and Marketing operations.

The present capacity of the refinery is 0.650 MMTPA. The crude refining capacity utilisation of the refinery was 107.7% in 2017-18.

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Digboi Refinery is the oldest operating refinery in the world and produces premium grade paraffin wax and micro-crystalline wax.

ii) Guwahati Refinery(Assam)

Guwahati Refinery was commissioned in January, 1962 with design capacity of 0.75 MMTPA. The refinery was set up in collaboration with Romania.

The present capacity of the refinery is 1.00 MMTPA. The crude refining capacity utilisation of the refinery was 100.0% in 2017-18.

Guwahati Refinery was the first refinery in the Public Sector. It was the first refinery to install "Indmax Unit", a novel technology developed by IOCL R&D Centre for upgrading heavy ends to LPG, motor spirit and diesel oil in 2003.

iii) Barauni Refinery (Bihar)

Barauni Refinery was commissioned in July, 1964. The refinery was set up in collaboration with the then Soviet Union.

The present capacity of the refinery is 6.00 MMTPA. The crude refining capacity utilisation of the refinery was 96.7% in 2017-18.

Barauni Refinery, which was originally designed for processing indigenous Assam crudes, was subsequently revamped and expanded and is now capable of processing imported crudes.

iv) Koyali Refinery (Gujarat)

Koyali Refinery was commissioned in October, 1965. The refinery was set up in collaboration with former Soviet Union.

The present capacity of the refinery is 13.700 MMTPA. The crude refining capacity utilisation of the refinery was 100.7% in 2017-18.

Koyali Refinery commissioned the country's first Hydrocracker Unit for conversion of heavier ends of crude oil to high value superior quality kerosene/ATF and Diesel. It also has the world's largest single train Linear Alkyl Benzene (LAB) plant which marked Indian Oil's entry into Petrochemicals.

v) Bongaigaon Refinery (Assam)

Bongaigaon Refinery & Petrochemicals Ltd. (BRPL) was incorporated on 20th February, 1974 as a fully owned Central Government company. BRPL became a subsidiary of Indian Oil Corporation Ltd. in March, 2001. BRPL was amalgamated with the holding company, Indian Oil Corporation Limited effective from 25th March, 2009.



IOCL's Panipat Refinery

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Engineer at work at IOCL's Refinery

The present capacity of the Refinery is 2.350 MMTPA. The crude refining capacity utilisation of the refinery was 100.0% in 2017-18.

BRPL which was originally processing Assam crudes is now capable of processing imported crudes.

vi) Haldia Refinery (West Bengal)

Haldia Refinery was commissioned in January, 1975. The fuel sector of the refinery was built with French Collaboration and the Lube Sector with Romanian Collaboration.

The present capacity of the refinery is 7.500 MMTPA. The crude refining capacity utilisation of the refinery was 102.7% in 2017-18.

Haldia Refinery is the only refinery of Indian Oil producing Lube Oil Base Stocks. Catalytic Dewaxing Unit commissioned in March, 2003 to produce API Group-II lube base stock was first of its kind in the country.

vii) Mathura Refinery (Uttar Pradesh)

Mathura Refinery was commissioned in January, 1982. The primary units of the refinery were designed by USSR.

The present capacity of the refinery is 8.000 MMTPA. The crude refining capacity utilisation of the refinery was 115.0% in 2017-18.

It is first Green Refinery of Indian equipped with elaborate environment monitoring system and ecological park. It also uses natural gas to control SO₂ emissions from the refinery.

viii) Panipat Refinery (Haryana)

Panipat Refinery was commissioned in 1998. The present capacity of the Refinery is 15.000 MMTPA. The crude refining capacity utilisation of the refinery was 104.7% in 2017-18.

Panipat Refinery of Indian Oil Corporation Ltd. is the first modern integrated Refinery-cum-Petrochemical complex in public sector. The Purified Terephthalic Acid (PTA) plant is the largest in the country. The commissioning of Panipat Naphtha Cracker Unit, Mono ethylene Glycol (MEG) unit, Poly propylene (PP) unit, Linear Low density Poly Ethylene (LLDPE) and High density Poly ethylene (HDPE) units etc. heralded Indian Oil's entry into Plastics Industry.

ix) Paradip Refinery (Odisha)

Paradip Refinery was dedicated to the nation by the Prime Minister on 7th February, 2016. Paradip Refinery is Indian Oil's most prestigious and capital intensive project till date and this is the 11th refinery of group of IOCL, located at Paradip, Odisha. This refinery will serve as an economic stimulus for industrial development in the region by way of immediate potential growth of ancillary and auxillary industries.

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This refinery is the most modern refinery with state-of-the-art technologies from various technology licensors across the world. The refinery is designed to process 15.0 MMTPA crude with an overall Nelson complexity factor of 12.2, which makes it capable of processing broad basket of crude including high sulphur heavy crudes.

The Refinery is configured to produce LPG (700 TMTPA), Propylene (200 TMTPA), Motor Spirit (3.8 MMTPA), ATF (380 TMTPA) and HSD (6.9 MMTPA). The refinery is capable to produce Euro-IV/Euro-V quality transportation fuel. The distillate yield from the refinery is expected to be best in class with 81.1% with no black oil production.

The present capacity of the refinery is 15.000 MMTPA. The crude refining capacity utilisation of the refinery was 84.7% in 2017-18.

b) Hindustan Petroleum Corporation Limited (HPCL) Refineries

i) Mumbai Refinery (Maharashtra)

Mumbai Refinery was first incorporated in 1952 as Standard Vacuum Refining Company of India (StanVac) which was commissioned in 1954. In 1962 StanVac was named ESSO India Limited. In 1969, Lube India Ltd. came into existence for manufacturing Lube Oil Base Stock (LOBS). On

15th July, 1974 the undertakings of ESSO and Lube India Ltd were nationalized and merged to form Hindustan Petroleum Corporation Limited (HPCL).

The present capacity of the Refinery is 7.500 MMTPA. The crude refining capacity utilisation of the refinery was 114.7 % in 2017-18.

HPCL's Mumbai Refinery is the only refinery of HPCL to produce Lube Oil Base Stocks. The refinery also produces special products like Food Grade Hexane, Rubber Processing (RPO), Diana Processing oil etc.

ii) Visakh Refinery (Andhra Pradesh)

HPCL's Visakh Refinery was commissioned in 1957 by Caltex Oil Refining (India) Ltd. The Refinery was taken over by the Government of India in 1976 and was consequently amalgamated with HPCL in 1978.

The present capacity of the refinery is 8.300 MMTPA. The crude refining capacity utilisation of the refinery was 115.7% in 2017-18.

HPCL's Visakh Refinery first oil Refinery on the East Coast and was one of the first major industries of Visakhapatnam. With the commissioning of the Single Point Mooring (SPM) facility at Visakh in the year 2010, Very Large Crude Carriers (VLCC), which carry up to 2 million barrels of oil, can now be received at Visakh Refinery. The Indian Strategic Petroleum Reserves Ltd. (ISPRL) nearby to this refinery.



Officers at work at HPCL's Mumbai Refinery

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c) Bharat Petroleum Corporation Limited (BPCL) Refineries

i) Mumbai Refinery (Maharashtra)

The refinery in Mumbai was commissioned in January 1955 under the ownership of Burmah Shell Refineries Ltd. Following the Government acquisition of the Burmah Shell, Bharat Petroleum Corporation Ltd came into existence on 24th January, 1976.

The present capacity of the refinery is 12.000 MMTPA. The crude refining capacity utilisation of the refinery was 117.5 % in 2017-18.

BPCL's Mumbai Refinery has pioneered the processing of indigenous crude oil and currently can handle processing of 72 types of crude oil. The refinery has also Lube Base Oil Unit for production of environment friendly Group II base oil.

ii) Kochi Refinery (Kerala)

The Kochi Refinery Ltd. (KRL), a public sector undertaking was set up in pursuance of formation agreement dated 27th April, 1963 between Government of India, Philips Petroleum Co. of USA and Duncan Brothers of Calcutta. The refinery has been amalgamated with Bharat Petroleum Corporation Ltd in 2006.

The present capacity of the refinery is 15.500 MMTPA. The crude refining capacity utilisation of the refinery was 91.0% in 2017-18.

The refinery is equipped to receive crude oil in Very Large Crude Carriers (VLCC). Kochi Refinery has undertaken an ambitious plan to diversify into petrochemical manufacturing for value addition.

d) Chennai Petroleum Corporation Limited (CPCL) Refineries

i) Manali Refinery (Tamil Nadu)

Chennai Petroleum Corporation Limited (CPCL), formerly known as Madras Refineries Limited (MRL) was formed as a joint venture in 1965 between the Government of India (GOI), AMOCO and National Iranian Oil Company (NIOC). CPCL became a subsidiary of IOCL in 2001.

The present capacity of the refinery is 10.500 MMTPA. The crude refining capacity utilisation of the refinery was 98.1% in 2017-18.

CPCL's Manali Refinery is one of the most complex refineries in India with Fuel, Lube, Wax and Petrochemical feedstocks production facilities. The 5.8 MGD Sea Water Desalination Project to augment the water requirements of its refinery was first of its kind in the industry.



HMEL's Refinery at Bathinda, Punjab

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ii) Cauvery Basin Refinery (Nagapattinam-Tamil Nadu)

CPCL's second refinery, located at Cauvery Basin at Nagapattinam was commissioned in 1993.

The present capacity of the refinery is 1.000 MMTPA. The crude refining capacity utilisation of the refinery was 50.0 % in 2017-18.

The Cauvery Basin Refinery is a small well-head refinery processing crudes from nearby ONGC fields, Rawa crude and KG-D6 crude. An Oil Jetty was commissioned in 2003 in Nagapattinam area for handling crude and products for Cauvery Basin Refinery.

e) Numaligarh Refinery Limited (NRL) Refinery

i) Numaligarh Refinery (ASSAM)

Numaligarh Refinery, popularly known as "Assam Accord Refinery" was commissioned in October, 2000. Current shareholding pattern of NRL is: Bharat Petroleum Corporation Limited (61.65%), Oil India Limited (26%) and Government of Assam (12.35%).

The present capacity of the refinery is 3.000 MMTPA. The crude refining capacity utilisation of the refinery was 93.3% in 2017-18.

NRL is the largest refinery in the North-East equipped with modern units Hydrocracker and Delayed Coker for maximising distillate yield.

f) Mangalore Refinery & Petrochemicals Limited (MRPL) Refinery

i) Mangalore Refinery (KARNATAKA)

Mangalore Refinery and Petrochemicals Limited (MRPL) was commissioned in March, 1996. MRPL was originally set up as a Joint Venture refinery, promoted by Hindustan Petroleum Corporation Ltd. (HPCL) and the Aditya Birla Group of Companies. In March, 2003 MRPL became a subsidiary of ONGC.

The present capacity of the refinery is 15.000 MMTPA. The crude refining capacity utilisation of the refinery was 107.3% in 2017.18.

MRPL has got a versatile design with high flexibility to process Crudes with 24 to 46 API gravity and has high degree of Automation. MRPL is the only Refinery in India to have 2 Hydrocrackers producing Premium



MRPL's refinery at Mangalore

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Diesel (High Cetane). It is also the only Refinery in India to have 2 CCRs producing Unleaded Petrol of High Octane.

g) Oil & Natural Gas Corporation Limited (ONGC) Refinery

i) Tatipaka Refinery (Andhra Pradesh)

The refinery, set up as mini refinery (Phase-I) of ONGC, was commissioned in September, 2001 at Tatipaka in East Godavari District of Andhra Pradesh.

The present capacity of the refinery is 0.066 MMTPA. The crude refining capacity utilisation of the refinery was 114.3% in 2017-18.

4.6.2 Joint Venture Refineries

a) Bina Refinery - Bharat Oman Refineries Limited (BORL) (Madhya Pradesh)

Bina Refinery was set up by Bharat Oman Refineries Limited (BORL), a joint venture of Bharat Petroleum Corporation Limited (BPCL) and Oman Oil Corporation Limited (OOCL), was commissioned in May 2011.

The present capacity of the refinery is 6.000 MMTPA. The crude refining capacity utilisation of the refinery was 111.7% in 2017-18.

Bina Refinery is the first refinery central part of India and augments the availability of petroleum products in Central and Northern India. Other facilities include Single Point Mooring facility (SPM), Crude Oil Storage Terminal (COT) at Vadinar in Gujarat and 935 kilometre long cross country crude pipeline from Vadinar to Bina (VBPL).

b) Guru Gobind Singh Refinery – HPCL-Mittal Energy Limited (HMEL), Bathinda (Punjab)

Guru Gobind Singh Refinery (GGSR), owned by Hindustan Mittal Energy Limited (HMEL), a joint venture between HPCL and Mittal Energy Limited, was commissioned in April, 2012.

The present capacity of the refinery is 11.300 MMTPA. The crude refining capacity utilisation of the refinery was 77.9% in 2017-18.

The refinery is a testimony to a successful Public Private Partnership in the oil and gas sector. Given the strategic location of Bathinda, the refinery will serve fuel requirements of the northern States of India. HMEL has also incorporated a wholly owned

subsidiary HPCL-Mittal Pipelines Limited (HMPL) to set up and operate an SPM for crude oil receipt, storage and cross country transportation of crude oil.

4.6.3 Private Sector Refineries

a) Reliance Industries Limited (Domestic Tariff Area)(RIL-DTA) (Private Sector), JAMNAGAR (GUJARAT)

The refinery was commissioned in July, 1999. The present capacity of the Refinery is 33.000 MMTPA. The crude refining capacity utilisation of the refinery was 100.6% in 2017-18.

RIL-DTA was the first private sector refinery in the country. RIL-DTA is the World's biggest grassroots Refinery having a petrochemical plant for the production Paraxylene, a polymer plant for the production of Polypropylene.

b) Reliance Industries Limited-SEZ (RIL-SEZ) (Private Sector), JAMNAGAR (GUJARAT)

The refinery was commissioned in December, 2008. The present capacity of the Refinery is 35.200 MMTPA. The crude refining capacity utilisation of the refinery was 106.0% in 2017-18.

The SEZ refinery has a unique design and path breaking configuration with 'Clean Fuels' process plant. It is designed with high level of flexibility to change grades based on economy and to capture margins based on market dynamics. The new SEZ refinery is the first refinery in India to produce Euro-IV grades of gasoline and diesel.

c) Nayara Energy Limited, Vadinar Refinery (Private Sector), VADINAR (GUJARAT)

The refinery was commissioned in November, 2006. The present capacity of the Refinery is 20.000 MMTPA. The crude refining capacity utilisation of the refinery was 103.5% in 2017-18.

Vadinar Refinery is the single-location second largest refinery in the country.

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Chapter 5

Marketing & Distribution



Marketing & Distribution



Ujjwala Utsav observed to celebrate stellar role of various stakeholders in making PMUY a success

5.1 RETAIL MARKETING INFRASTRUCTURE OF LPG

The retail marketing of petroleum products in India is done by the Public Sector Oil Marketing Companies (OMCs) i.e. Indian Oil Corporation Ltd. (IOCL), Hindustan Petroleum Corporation Ltd. (HPCL), Bharat Petroleum Corporation Ltd. (BPCL) and Private Companies such as Reliance, Nayara, Shell, etc. As on 31st December, 2018, the National LPG coverage is 89.9%. (There are 191 LPG Bottling Plants operated by Public Sector Oil Marketing Companies and 22,654 LPG Distributorships in the country as on 31st December, 2018.) Total 2,530 new LPG distributorships have been commissioned from 1st April, 2018 to 31st December, 2018 and 2,592 Letter of Intents (LOI) have been issued by OMCs to set up new distributorships.

5.2 CITIZEN CENTRIC INITIATIVES

5.2.1 PAHAL (DBTL Scheme)

Government of India launched Direct Benefit Transfer for LPG consumer (DBTL) scheme, namely 'PAHAL', in 54 districts of the country on 15th November, 2014. Later, the scheme extended all over the country and till 31st December, 2018, 23.28 crore LPG consumers have joined the scheme. The scheme aims to rationalise subsidies based on approach to cut subsidy leakages, but not subsidies themselves. LPG consumers who join the PAHAL scheme, will get the LPG cylinders at non-subsidised price and receive LPG subsidy (as per their entitlement) directly into their bank accounts. With the implementation of PAHAL, a new regime of



As on 31st December, 2018, the National LPG coverage was 89.9%

transparency in subsidy management has been put in place empowering LPG consumers in the country. PAHAL has further helped in identifying 'ghost' connections, multiple and inactive connections. This has resulted in curbing diversion of subsidised LPG for commercial purposes.

5.2.2 Pradhan Mantri Ujjwala Yojana

'Pradhan Mantri Ujjwala Yojana' (PMUY) was launched with an objective to provide LPG connections to 5 crore women belonging to the Below Poverty Line (BPL) families over a period of 3 years starting from FY 2016-17. Prime Minister formally launched the scheme on 1st May, 2016. Objective of the scheme is to provide clean fuel solution to poor households especially in rural areas. Use of fossil fuels and conventional fuel like cow-dung, firewood etc. has serious implications on the health of rural womenfolk and children.

Under the scheme, the Government provides deposit free LPG connection to the adult woman member of BPL family, which includes, security deposit towards cylinder and Pressure Regulator, cost of DGCC Card, Suraksha Hose and administrative/installation charges and the Government is bearing an expenditure upto ₹ 1600/- for each new connection. The customer will have to bear the cost of Hot Plate and purchase of first refill.

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Later, the Government had decided to increase the target from 5 crore to 8 crore to be achieved by FY 2019-20. More than 5.90 crore LPG connections have been released under PMUY as on 31st December, 2018. It is noteworthy to mention here that the original target of issuing 5 crore LPG connections was achieved by 3rd August, 2018, 8 months in advance of the target of 31st March, 2019.

Now, the Government has extended the benefit of PMUY to cover all such poor families of the country who were left out on account of their names not appearing in either the SECC list or 7 identified categories. As on 31st March, 2019 more than 7.18 crore LPG connections have been released under PMUY.

5.2.3 New LPG connections

New domestic LPG connections are released to the prospective customers once he/she approaches the concerned distributorship and fulfils the formalities. More than 3.05 crore new LPG connections have been released as on 31st December, 2018 in the FY 2018-19 which is more than the number of LPG connections released in the FY 2017-18 (2.81 crore). LPG coverage as per active customer count based on 2011 Census has increased in the country from 80.9% (as on 01.04.2018) to 89.9% (as on 31.12.2018).

5.2.4 Give It Up Campaign

As a part of subsidy management, Prime Minister of India gave call to well-off LPG consumers to voluntarily surrender their subsidy by launching 'GiveltUp' campaign. GiveltUp campaign has evoked huge response from socially committed individuals and has resulted in more than 1.04 crore consumers giving up their LPG subsidy voluntarily. GiveltUp campaign has



**Under PMUY scheme,
5.90 crore LPG
connections have been released
as on 31st December, 2018
bringing cleaner energy and
better health across the nation**

heralded new chapter in 'social volunteerism' by the citizens of this country and has set a new benchmark of public good delivery mechanism.

5.2.5 Rationalisation of LPG Subsidy (Higher Income Group)

Government has taken steps to rationalise the subsidy outgo by excluding such LPG consumers or his/her having spouse taxable income of above ₹10 lakh from availing LPG subsidy with effect from 1st October, 2016. Necessary operational guidelines have been issued to OMCs to give effect to the direction of the Ministry. As on 31st December, 2018, more than 8 lakh consumers have either submitted self-declaration or identified for exclusion using information provided by Department of Revenue.

5.2.6 Commissioning of New Distributorships

Currently, selection process for all types of distributorships is undertaken under Unified Guidelines for Selection of LPG distributorships. In FY 2017-18, 1,390 new LPG distributorships were commissioned and 2,463 LOIs were issued. In FY 2018-19, 2,592 LOIs have been issued during the period from 1st April, 2018 to 31st December, 2018 and 2,530



Lok Sabha Speaker, Smt Sumitra Mahajan giving away 5 crore LPG connection under PMUY to the beneficiaries, in the presence of Minister of Petroleum and Natural Gas & Skill Development and Entrepreneurship, Shri Dharmendra Pradhan and Minister of State for Health & Family Welfare, Smt Anupriya Patel

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new LPG distributorships have been commissioned across the country for the above period.

5.2.7 Gram Swaraj Abhiyan

Prime Minister in his 'Mann Ki Baat' addressed on 25.03.2018 announced 'Gram Swaraj Abhiyan' (GSA) to be organized on the occasion of Ambedkar Jayanti, starting from 14th April, 2018 to 5th May, 2018. As part of GSA, Ministry of Petroleum & Natural Gas in association with Oil Marketing Companies organised 'Ujjwala Diwas' on 20th April, 2018. During Ujjwala Diwas, LPG Panchayats were organized aimed at educating LPG consumers especially beneficiaries of PMUY on benefits and safe usage of LPG, and new connections were also distributed under PMUY.

1. No of LPG Panchayats – 15,909
2. No of Participants - 48.73 lakh
3. No of LPG connections released -10.93 lakh

5.2.8 Extended Gram Swaraj Abhiyan

The Extended Gram Swaraj Abhiyan (eGSA) was organized from 1st June, 2018 to 15th August, 2018 in 159 districts which comprised of 117 aspirational districts and all the districts of West Bengal and Karnataka. During eGSA, 40.17 lakh LPG connections were released under PMUY in 48,929 villages across the country.

5.3 CONSUMER CENTRIC INITIATIVES

Several digital Initiatives for empowering of consumers of LPG were undertaken:

5.3.1 SAHAJ

'SAHAJ' was a digital initiative launched by OMCs for release of LPG connection with online payment and



To educate the masses about safe and efficient use of LPG,
15,909 LPG Panchayats
held as on 20th April, 2018

issuance of 'e-SV' under the Digital India Initiative and the facility is now available on PAN India basis. 'e-SV' is the electronic subscription voucher which has the details of number of cylinders and pressure regulator loaned to the consumer against the security deposit. This document is emailed to the customer upon release of LPG connection online.

Total 80,766 LPG connections have been issued through SAHAJ in FY 2017-18. 45,777 LPG connections have been issued through SAHAJ as on 31st December, 2018 in FY 2018-19 which is nearly 56.67% of the achievement in FY 2017-18.

5.3.2 Digilocker

'Digital locker' facility has been implemented with a view to move towards paperless office. Under this facility, Subscription Vouchers (SVs) and Transfer Vouchers (TVs) are made available to consumers from Digilocker. Ministry of Petroleum & Natural Gas is the largest issuer of e-SV document linked to Aadhar in the country. This enables the consumers to get the connections without hassles and also ensures safety and security of the documents without the fear of loss or damage. All the LPG consumers can avail the facility of Digilocker for SVs and TVs. More than 23.34 crore SV documents are available on Digilocker website for the consumers to view the same by logging into their Digilocker account.



LPG Panchayats to spread awareness and educate beneficiaries on the safe use of LPG

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5.3.3 Emergency Helpline No. '1906'

This multilingual LPG Emergency Helpline was dedicated to the nation on 1st January, 2016 by the Minister of Petroleum & Natural Gas. This facility is available 24X7, operating in 2 shifts of 12 hours each for attending emergency LPG leakage complaints. The call centre is having a web based application for logging, viewing and monitoring the call logs & updation of the contact details of the mechanics & field officers. From 1st April, 2018 to 31st December, 2018, 2,04,680 complaints were received & 2,03,521 complaints were resolved using this emergency helpline number.

5.3.4 Smart Delivery Management System

The new age consumer looks for a hassle free experience in all types of transactions. Keeping this in mind and in line with the continuing effort of Oil Marketing Companies (OMCs) to bring transparency in the supply and distribution of LPG, this initiative was undertaken. Smart Delivery Management System is an initiative to promote friendly mobile application for delivery boys with features like smartcard based delivery options, real time delivery confirmation for deliveries made, better control on delivery boys and supply chain and capturing of geographical coordinates of delivery location. In FY 2018-19, more than 1.33 crore LPG consumers have booked their refill online and more than 28.80 lakh LPG consumers have made online payment for their refills as on 31st December, 2018. OMCs have developed different software for Smart Delivery Management System in which delivery men are provided with mobile applications for carrying out activities namely, displaying cash memos, option for accepting digital payments at customer's doorsteps, real time delivery confirmation at the customer's premises and authentication of customer via OTP/card before refill delivery.

5.3.5 Facility for On-line payment for refill booking

In order to promote cashless transaction, consumers have been given facility to make on-line payment for their refill booking. This helps a consumer get the delivery of refill at his/her residence without his/her presence and effectively address the issue related to overcharging, if any. OMCs have announced cash discount of ₹ 5 per refill to such consumers who have booked their refill online. OMCs have the facility for online payment for refill booking in their respective websites by which customers can make online payment via UPI through their BHIM/any other banks apps. In FY 2018-19, more than 28.80 lakh LPG consumers have made online payment for their LPG refill as on 31st December, 2018.



Ushering in an era of convenience through digital technology, over **1.33 crore** LPG Consumers booked their LPG refills online during FY 2018-19 (as on 31st December, 2018)

5.3.6 Promotion of Digital Payments Undertaken by MOP&NG

There has been a significant expansion of digital payment infrastructure at retail outlets. As on 20th November, 2018, 100876 POS terminals and 92408 e-wallet facility have been provided at 53717 (98%) retail outlets across the country, 52959 retail outlets have been enabled with BHIM UPI. All the LPG Distributors and City Gas distribution companies are enabled with BHIM UPI.

5.3.7 Automation at OMC Retail Outlets

To enhance customer confidence through Q&Q (Quality & Quantity) of fuel and minimizes chances of fraudulent transactions, OMCs have undertaken action for automation of all retail outlets across the country wherever feasible. As on 31st December, 2018, 47084 retail outlet (86.63%) have been automated across the country.

There has been a significant expansion of digital payment infrastructure at retail outlets. As on 31st December, 2018, 102909 POS terminals and 92663 e-wallet facility have been enabled with BHIM UPI. All the LPG Distributors and City Gas distribution companies are enable with BHIM UPI.



e-fuel station of HPCL

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Chapter 6

International Cooperation & Engagement



International Cooperation & Engagement



In pursuit of new avenues and to fortify existing bilateral cooperation in the hydrocarbon sector, India witnessed heightened level of engagements with the neighboring countries under the umbrella of 'Neighborhood First' and our policy shift from 'Look East' to 'Act East'. There has been a conscious effort to take the neighboring countries along and share our developmental experiences, particularly in the field of energy. It has become a significant vehicle to promote cooperation in our neighborhood, one that aims at strengthening regional self-reliance. Ensuring greater energy security has been another objective that has been made possible by forging bonds of friendship in our extended neighborhood and beyond.

The Neighborhood First Policy of the Government is designed to underline the greater importance attached to relationships in South Asia. South Asia struggled with development of connectivity and shared developmental endeavors for decades. That has started to change and the more positive sentiment is being harnessed to accelerate greater economic cooperation. Addressing growing energy demands is of great significance as it directly impacts both growth prospects and quality of life. India can make the difference for the entire region not just due to its geographical centrality but also as it can bring to bear scale and capacities in a manner that would benefit its neighbors.

6.1 KEY HIGHLIGHTS OF ACTIVITIES PURSUED TO STRENGTHEN INTERNATIONAL COOPERATION DURING FY 2018-19

6.1.1 Engagement with Nepal

- India has been supplying all of Nepal's petroleum product requirements since 1970s. The contract between Indian Oil and Nepal Oil Corporation was renewed for another five years in March, 2017.

- To make the supplies more weather-proof, efficient and cost effective, Prime Ministers of India and Nepal witnessed the groundbreaking of a 69 km petroleum product pipeline from Motihari in India to Amlekhgunj in Nepal in April this year. Since then over 70% of the pipeline work has already been completed.
- Indian companies are in the process of setting up a petroleum skill development centre in Nepal.
- A delegation led by Minister of Petroleum & Natural Gas, Shri Dharmendra Pradhan, visited Nepal from 28th to 29th September, 2018 to discuss issues related to Oil and Gas.

6.1.2 Engagement with Bangladesh

- The ground breaking of Indo-Bangla Friendship Pipeline (IBFPL) was witnessed by Prime Minister Narendra Modi and Prime Minister Sheikh Hasina in September, 2018. India is constructing a 130 km long pipeline from Siliguri in India to Parbatipur in Bangladesh which will supply 1 Million Metric Tonne (MMT) of diesel to Bangladesh Petroleum Corporation for 20 years.
- Till the pipeline becomes operational, Numaligarh Refinery is supplying diesel by rail rakes through the Radhikapur-Birol Rail route.
- Indian companies are also working on building a land based Liquefied Natural Gas (LNG) Terminal to augment supply of natural gas to Bangladesh as well as a pipeline to the Jessore-Khulna power plant across the Panitar - Satkhira border points

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A 130km long inter-country pipeline is under construction which will connect Siliguri in India to Parbatipur in Bangladesh

on the Indian and Bangladeshi side respectively. The pipeline will supply R-LNG from upcoming Dhamra LNG terminal in Odisha.

- d. As a goodwill gesture, India supplied 20,000 cooking stoves and kerosene oil to displaced persons in the Cox bazaar area.
- e. India is trying to work out modalities with Bangladesh for supplying LPG from its storage facilities in Chittagong to demand centers in Tripura.

6.1.3 Engagement with Myanmar

- a. The 1st India-Myanmar JWG on oil and gas sector was held in Nay Pyi Taw, Myanmar during 7th to 8th March, 2018.

- b. Minister of Petroleum & Natural Gas, Shri Dharmendra Pradhan held a meeting on 4th October, 2018 with H. E. U. Win Khaing, the Union Minister for Construction, Electricity and Energy of Myanmar. The Myanmar Minister was on an official visit to India to attend the first General Assembly of International Solar Alliance (ISA). Both Ministers expressed their keenness to work towards strengthening the bilateral engagements in the hydrocarbon sector and make it one of the important areas of bilateral cooperation between both the countries.
- c. Numaligarh Refinery is working with interested parties in Myanmar for supplying diesel to Myanmar by land route across the Moreh-Tamu border to reduce logistical costs in ferrying petroleum products from Yangon to the North-Eastern parts of Myanmar.
- d. IOCL is working on possibilities of implementing petroleum sector infrastructure projects

6.1.4 Engagement with Sri Lanka

- a. IOCL Lanka, which is a subsidiary of IOCL, has 43.5% of the total market share and is, therefore, a major stakeholder in the oil industry of Sri Lanka.



Hon'ble Prime Minister, Shri Narendra Modi at the inauguration of Petrotech-2019, the 13th International Oil & Gas Conference & Exhibition, organized under the aegis of the Ministry of Petroleum & Natural Gas

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- b. India is creating an LNG Terminal in partnership with a Japanese Company in Sri Lanka. There is also a proposal to develop City Gas Distribution (CGD) and Compressed Natural Gas (CNG) market & infrastructure in Sri Lanka.

6.1.5 Engagement with Bhutan

- a. India continues to strengthen the engagements with Bhutan and supplies full requirement of petroleum products of Bhutan.
- b. The Government of Bhutan is planning to extend 100% LPG coverage by end 2018 from its current penetration of nearly 38%. This additional product demand is envisaged to be supplied from the refineries in Assam.
- c. India is also working with Government of Bhutan to share the experience of successfully implemented Pradhan Mantri Ujjwala Yojna (PMUY) for implementation in Bhutan.

6.1.6 Engagement with Mauritius

- a. India continues to be a reliable supplier of 100% of petroleum product requirements of Mauritius through Mangalore Refinery and Petrochemical Ltd (MRPL) since 2006.
- b. IOCL has been present in the energy sector of Mauritius since 2004 covering retail, bunkering, lubricants and consumer sales. It is the leading supplier of Jet Fuel in Mauritius.
- c. In order to harness the strategic locations of Mauritius as a base for bunkering the exports to countries of East and South East Africa, IOCL and EIL along with STC of Mauritius are in the process of setting up petroleum storage and bunkering facilities in Albion.

Keeping pace with the expanding comprehensive strategic partnership with countries of India's extended neighborhood such as Saudi Arabia, UAE and Iran some major landmarks have been achieved in the oil and gas sector.

6.1.7 Engagement with Saudi Arabia

- a. Saudi Arabia is an important country for India. It is today the second largest exporter of crude oil to India. India buys nearly 18 % of annual requirement of crude oil from Saudi.

Minister of Petroleum & Natural Gas, Shri Dharmendra Pradhan held a bilateral meeting with Saudi Oil Minister, Khalid Al Falih during February, 2018. During the meeting, Shri Pradhan discussed details of various investment opportunities in India in downstream and upstream sectors.

- b. Engaged with Saudi Aramco for setting up world's largest single location refinery. Saudi Aramco, along with ADNOC of UAE, have signed an MoU with the Indian promoters of Ratnagiri Refinery and Petrochemical plant. The estimated investment for this 60 MMTPA plant is around US \$ 44 billion.
- c. The Government of India has been strongly taking up the issue of high crude oil price and the issues of Asian Premium and balanced price, bilaterally with crude oil producing countries such as Saudi Arabia and with OPEC.
- d. Prime Minister, on 30th November, 2018, during his meeting with Prince Mohammed Bin Salman (MBS) of Saudi Arabia in Buenos Aires, Argentina had strongly taken up the issue of high crude oil prices and also the issue of Asian Premium. Prince of Saudi Arabia assured PM that Saudi Arabia will seriously consider India's consider and work with India in this regard.
- e. Following Prime Minister's meeting with Prince of Saudi Arabia, there has been a reduction in the premium charged to Asian market on grades of crude oil sold by Saudi Arabia. On comparison with the current months the premium has been reduced by approximately US\$ 1 to 1.5 per barrel for different crude varieties.
- f. Approximate saving for January, 2019 was US \$ 72 million and presuming that Asian Premium remains at January, 2019 level – savings for First Quarter of 2019 will be US\$ 218 million which would be a saving of ₹1544 crore and this saving is passed on to the consumers with reduction in prices of products.
- g. During a recent OPEC meeting, Mr Khalid al-Falih, the Saudi Energy Minister, stressed that the organization will "seriously consider" Indian Prime Minister's views on oil pricing before a decision is taken on production cuts during the meeting.

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6.1.8 Engagement with UAE

The year 2018 was a landmark year for India and UAE which has transformed the energy relationship from buyer-seller to the level of strategic partners in the energy sector. 3 concrete milestones have been achieved in the year which include:

- A Restated Agreement on Oil Storage and Management was signed between ISPRL and ADNOC in February, 2018 for storing crude oil by ADNOC in Cavern A of Mangluru SPR. The agreement was implemented with ADNOC storing 5.86 Million Barrels of crude oil. The first consignment was received in May, 2018, second consignment received in October, 2018 and the final consignment received in November 2018. Thus, ADNOC has completed filling of crude oil in Mangaluru SPR facility thereby successfully implementing the first PPP model in the SPR programme.
- On 8th November, 2018, Cabinet approved filling of crude oil in Padur SPR facility by overseas National Oil Companies (NOCs) on the key principles of the 'ADNOC Model' as used for filling Cavern-A at Mangaluru SPR facility. Subsequently, ISPRL signed MoU in Abu Dhabi with ADNOC on 12th November, 2018, to explore possibility of storing crude oil at Padur SPR facility.
- Acquisition of 10% PI in Lower Zakhum offshore field by Indian Consortium comprising of ONGC Videsh Ltd., Indian Oil Corporation Ltd. and Bharat PetroResources Ltd. in February, 2018. The average share for India will be 1.75 MMTPA for next 40 years. Total cumulative share will be 70 MMT.
- Partnering of ADNOC in the Ratnagiri Refineries and Petrochemical project (RRPCL) along with Saudi Aramco. The MoU between ADNOC and Saudi Aramco was signed during June, 2018.
- A delegation led by Shri Dharmendra Pradhan, Minister for Petroleum and Natural Gas and Skill Development & Entrepreneurship, visited UAE from 11th to 12th November, 2018 to Attend Abu Dhabi International Exhibition and Conference (ADIPEC).



ISPRL and ADNOC have signed an Agreement on Oil Storage and Management

6.1.9 Engagement with Iran

- Iran is an important neighbor in the region and has been an important source of crude oil for India. It is the 3rd largest exporter of crude oil to India.
- Most of Indian refineries are reliant for technical and commercial reasons on the Iranian crude oil.
- The USA, on 8th May, 2018, unilaterally announced that it was walking out of the JCPOA and imposing sanctions on Iran from 5th November, 2018, on countries engaging in trade with Iran, including in the energy sector.
- The Government is strongly committed to provide affordable energy to our citizens and therefore, India had strongly taken up with USA for continued sourcing of Iranian crude oil.
- After several rounds of negotiations, on 5th November, 2018, USA announced exemption from sanction to eight countries, including India, for sourcing of crude oil from Iran.
- India has also worked out a mechanism of 100% Rupee payment for trade with Iran, including for import of crude oil from Iran.

Government's approach towards energy diplomacy has been simple - diversify sourcing; bargain for better terms; find new markets; collaborate with countries that are similarly placed; and seek investments. Government-to-Government dialogues have been stepped up and with the synergy of external affairs ministry and Indian missions, there have been unprecedented milestones which have been achieved towards ensuring energy security.

6.1.10 Engagement with USA

- In an effort to reduce over reliance on few geographies for crude supplies, India has further

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diversified crude sourcing by importing crude from non-traditional sources such as the USA since October, 2017.

- b. More than 30 million barrels of US crude have been imported by Indian public sector refiners till January, 2019 which is equivalent to a trade value of approximately \$ 2 billion.
- c. Import of crude from the US is likely to go up much further in 2019 once port and pipeline infrastructure in the US gets completed.
- d. India also has investments in the oil and gas sector in the USA to the tune of over US\$ 4 billion, in the conventional and unconventional hydrocarbons.
- e. GAIL has a long-term contract for LNG import from US which is equal to US \$ 2 billion per year.
- f. In order to further strengthen the energy relations, India launched Strategic Energy Partnership with USA in April, 2018. 1st Meeting of the India-US Strategic Energy Partnership was held on 17th April, 2018 in New Delhi. Indian delegation was led by Shri Dharmendra Pradhan, Minister (PNG) and US delegation was led by Mr. Rick Perry, Secretary Energy.
- g. It has opened a new chapter in our bilateral energy engagements. This was a follow up of the bilateral meeting between Prime Minister Narendra Modi and President Donald Trump in July, 2017 in which both discussed trade in the energy sector.

6.1.11 Engagement with Russia

- a. Russia has been India's time tested partner in the oil and gas sector. Our historic hydrocarbon relationship with Russia goes back to 1970s when a team of Soviet oil and gas experts helped ONGC to explore and strike oil in Indian waters and the joint efforts led to the discovery of Bombay High, which even today remains India's biggest oil and gas field.
- b. We have strengthened our hydrocarbon engagement and there is an 'Energy Bridge' between our two countries.
- c. Russia is our largest oil and gas investment destination with over US \$ 15 billion investments so far.



International Energy Forum was chaired by India during 2016-18

- d. In 2016 our PSU companies invested over US \$ 5.4 billion in acquiring quality producing oil and gas assets in Russia.
- e. Rosneft's investment of nearly US \$ 13 billion in Vadinar refinery is the largest FDI investment in India in the Indian oil and gas sector.
- f) GAIL has contracted 2.5 MMTPA of LNG from Gazprom on a long term basis which works out to be nearly US \$ 2 billion per annum. The first cargo of Russian LNG was received on 4th June, 2018 at Dahej.

6.1.12 Engagements with International Organizations

The last few years have also witnessed increasing engagement of India with International oil and gas organizations.

a) Engagement with IEF

India chaired the International Energy Forum (IEF) over 2016-18 which comprises countries contributing 90% to global energy consumption and production. The leadership of this organization culminated in India's hosting the 16th edition of the International Energy Forum Ministerial meetings in New Delhi. Prime Minister Shri Narendra Modi inaugurated the event on 11th April, 2018 which saw participation of about 40 Ministers, 10 Heads of International organizations about 30 CEOs. External Affairs Minister, Smt. Sushma Swaraj delivered the valedictory remarks on 12th April, 2018. The theme of IEF 16 was "The Future of Global Energy Security: Transition, Technology Trade and Investment" focused on how global shifts, transition policies and new technologies influence market stability and future investment in the energy sector.

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b) Engagement with IEA

- i) India also became an association country in Paris based International Energy Agency in March, 2017.
- ii) The hotline was re-established and the First test conversation on hotline took place on 22nd June, 2017. Dr. Fatih Birol, Executive Director, IEA made a call to JS(IC) to reactivate hotline. The hotline will be used in case of any supply side disruption or threats of any such disruption. The hotline will also be used to convey urgent messages from time to time.
- iii) IEA organized meetings of Standing Group on Emergency Question and Standing Group on the Oil Market and special Workshop on the Oil Stockholding Workshop for India during 20th – 22nd March, 2018 in Paris.
- iv) India became member of the Advanced Motor Fuels Programme on 9th May, 2018.
- v) India-IEA Joint Workshop on Oil Stockholding Strategy for India was conducted on 29th August, 2018 at Delhi. The workshop focused on the Importance of Oil Stocks in Energy Security and IEA's role and coordination.
- vi) Executive Director of IEA, Dr Fatih Birol, made positive references to Indian oil and gas sector in IHS CERA Week in Houston in March, 2017 and highlighted India's role in the increasing global gas demand and trends towards a transparent, flexible and competitive gas market in the LNG Producer – Consumer dialogue in Tokyo during October, 2017.

c) Engagement with OPEC

- i) Shri Dharmendra Pradhan, the Minister of Petroleum & Natural Gas and Skill Development & Entrepreneurship on 14th June, 2018 met with the Ambassadors from OPEC countries to India. During the meeting Minister expressed his concern about rising crude oil prices and its negative impact on consumers across the world, particularly in India.

- ii) A delegation led by Minister of Petroleum and Natural Gas and Skill Development & Entrepreneurship, Shri Dharmendra Pradhan, visited Vienna, Austria to Attend 7th OPEC International Seminar and Germany to visit German SPR Management entity from 20th – 22nd June, 2018. During the visit in Vienna Shri Pradhan delivered a key note speech on "Sustainable Global Energy Future".
- iii) The 3rd India-OPEC Institutional Dialogue held in New Delhi on 17th October, 2018 to discuss important issues relating to oil and gas sector. The Indian delegation led by Minister PNG and the OPEC delegation led by Secretary General.

d) TAPI Steering Committee Meeting

TAPI Steering Committee Meeting was held on 22nd February, 2018 at Mary, Turkmenistan. Indian delegation was led by Shri M.J. Akbar, MoS (MEA). The Indian delegation included representatives from MoP&NG, MEA, GAIL and IOCL. Ground breaking Ceremony for Afghan leg of TAPI pipeline was held on 23rd February, 2018 at Serhetabad, Turkmenistan. The event was attended by Shri M.J. Akbar, MoS, MEA along with delegation

6.1.13 International Meetings and Conferences**a) CERA WEEK-India Energy Forum**

Minister of Petroleum & Natural Gas inaugurated the 2nd Edition of CERA Week India Energy Forum event held in New Delhi from 14th -15th October, 2018. The event focused on India as a growing energy market.

b) International Think Tank of MoP&NG

The Ministry, in order to gain from the experience of NRI oil and gas experts, have instituted the Think Tank of MoPNG and the 1st Think Tank meeting was held in New Delhi on 9th to 10th October, 2017. The 2nd meeting of the International Think Tank held in New Delhi from 12th to 13th October, 2018 to assess the progress made on the identified topics and developments that have taken place during the last one year.

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TALBEL 6.1 : OVERSEAS PROJECTS / ASSESTS

Sl. No.	Country	Name of the Project	Participating Companies and their Share
1	Vietnam	Block 06.1, Offshore	ONGC Videsh-45% TNK-35% (Operator) Petrovietnam-20%
		Block 128, Offshore	ONGC Videsh- 100%
2	Russia	Sakhalin-1, Offshore	ONGC Videsh – 20% Exxon Mobil –30% (Operator) Sodeco – 30% SMNG – 11.5% RN Astra – 8.5%
		Imperial Energy, Russia	ONGC Videsh-100%
		Vankorneft	ONGC Videsh 26% OIL, IOCL, BPRL – 23.9%
		Taas-Yuryakh	OIL, IOCL, BPRL – 29.9%
3	Sudan	GNPOC, Block 1, 2 & 4, Sudan	ONGC Videsh – 25% CNPC – 40% Petronas – 30% Sudapet – 5% (Jointly Operated)
		Khartoum-Port Sudan Pipeline (741 Km), Sudan	ONGC Videsh-90% (Operator) OIL-10%
4	South Sudan	GNPOC, Block 1, 2 & 4, South Sudan	ONGC Videsh – 25% CNPC – 40% Petronas – 30% Nilepet – 5% (Jointly Operated)
		SPOC/Block 5A, South Sudan	ONGC Videsh– 24.125% Petronas–67.875% Nilepet – 8% (Jointly Operated)
5	Myanmar	Block A-1, Myanmar	ONGC Videsh – 17% Daewoo–51% (Operator) KOGAS – 8.5% GAIL – 8.5% MOGE – 15%
		Block A-3, Myanmar	ONGC Videsh – 17% Daewoo–51% (Operator) KOGAS – 8.5% GAIL – 8.5% MOGE – 15%
		Shwe Offshore Mid-Stream Project, Myanmar	ONGC Videsh – 17% Daewoo–51% (Operator) KOGAS – 8.5% GAIL – 8.5% MOGE – 15%
		Onshore Gas Transportation Pipeline, Myanmar	ONGC Videsh – 8.347% CNPC-SEAP – 50.9% (Operator) Daewoo - 25.041% GAIL - 4.1735%

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			KOGAS - 4.1735% MOGE - 7.365%
		Block B-2,	ONGC Videsh - 97% (Operator) M&S - 3%
		Block EP-3, Myanmar	ONGC Videsh - 97% (Operator) M&S - 3%
		Block: M4, Myanmar	OIL:60% (Op) Oilmax: 10% Mercator: 25% Oil Star:5%
		Block :YEB, Myanmar	OIL:60% (Op) Oilmax: 10% Mercator: 25% Oil Star:5%
6	Mozambique	Rovuma Area-1	ONGC Videsh - 16% Anadarko - 26.5% (Operator) OIL - 4% ENH - 15% Mitsui - 20% BPRL - 10% PTTEP - 8.5%
7	Iraq	Block 8, Iraq	ONGC Videsh - 100%
8	Iran	Farsi Offshore Block, Iran	ONGC Videsh – 40% (Operator) IOC – 40% OIL – 20%
9	Libya	Block 43, Libya Area 95-96	ONGC Videsh- 100% Sonatrach – 50% Indian Oil – 25% OIL – 25%
10	Syria	Block 24, Syria	ONGC Videsh – 60% IPR International – 25% (Operator) Tri Ocean Mediterranean – 15%
		Al Furat Petroleum Co., Syria	Himalaya Energy (Syria) B.V. – 33.33% to 37.5% Shell – 66.67% to 62.5% (Operator –Al Furat Petroleum Company)
11	Brazil	Block BM-SEAL-4, Brazil	ONGC Videsh-25% Petrobras -75% (Operator)
		BC-10, Brazil, Offshore	ONGC Videsh - 27% Shell - 50% (Operator) Qatar Petroleum International - 23%
		BM-SEAL-11 (3 blocks), Sergipe Basin	Petrobras (Operator)- 60%, IBV 40%
		BM-C-30 (1 block), Campos Basin	Anadarko Petroleum (Operator) - 30%, British Petroleum - 25%, Maersk - 20%, IBV 25%
		BM-POT-16 (2 blocks), Potiguar Basin	Petrobras 30% (Operator), BP - 30%, GalpEnergia - 20%, IBV 20%
12	Colombia	Mansarovar Energy Colombia Limited (MECL), Colombia	ONGC Videsh–25-50%, Sinopec-25-50% Ecopetrol-50% (Jointly Operated)
		Block RC-8, Colombia	ONGC Videsh – 40% (Operator) Ecopetrol - 40% Petrobras – 20%
		Block RC-9, Colombia	ONGC Videsh – 50% Ecopetrol - 50% (Operator)

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		Block RC-10, Colombia	ONGC Videsh – 50% (Operator) Ecopetrol - 50%
		Block LLA-69, Colombia	ONGC Videsh - 50% SIPC - 50% (Jointly Operated)
		Block GUA OFF 2	ONGC Videsh - 100%
		CPO-5, Colombia	ONGC Videsh – 70% (Operator) Petrodorado – 30%
		SSJN7, Colombia	ONGC Videsh – 50% Pacific Rubieales Energy (PRE) – 50% (Operator)
13	Venezuela	San Cristobal Project,	ONGC Videsh-40% PDVSA-60% (Jointly Operated)
		Carabobo-1 Project, Venezuela	ONGC Videsh – 11% IOC – 3.5% OIL – 3.5% Petronas – 11% PDVSA – 71% (Jointly Operated)
14	Azerbaijan	ACG, Azerbaijan	ONGC Videsh-2.7213% BP-36% (Operator) SOCAR-12% Chevron-11% INPEX-11% Exxon-8% StatOil-8% TPAO-7% ITOCHU-4%
		BTC Pipeline (1760 Km), Azerbaijan	ONGC Videsh-2.36% BP-30.1% (Operator) SOCAR-25% StatOil-8.71% TPAO-6.53% ITOCHU-3.4% Chevron-8.9% INPEX-2.5% ENI-5% TOTAL-5% Conoco Philips-2.5%
15	Bangladesh	Block SS4, Bangladesh	ONGC Videsh - 45% (Operator), OIL - 45% BAPEX - 10%
		Block SS9, Bangladesh	ONGC Videsh - 45% (Operator), OIL - 45% BAPEX - 10%
16	New Zealand	Block- 14TAR-R1,	ONGC Videsh - 100%
17	Indonesia	Nunukan Block	BPRL- 12.5% PT Pertamina Hulu Energy-35% (operator) PT Medico – 40% Videocon Indonesia -12.5%
18	Australia	Block EP – 413 (onland)	BPRL- 27.803%
		T/L 1 & T/18P	-
19	East Timor	Block JPDA 06-103	BPRL- 20%

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Sl. No.	Country	Name of the Project	Participating Companies and their Share
20	USA	Niobrara Shale Oil/Condensate JV asset	Carrizo (Niobrara) LLC – 60% OIL - 20% Indian Oil – 10% Haimo Oil & Gas -10%
		Eagle Ford Shale acreage in Texas State	GAIL 20% PI
21	Canada	Pacific Northwest LNG Project	Progress Energy Canada Ltd. – 62% Sinopec – 15% Indian Oil – 10% Japex – 10% Petroleum Brunei – 3%
22	Nigeria	OPL- 205	Summit Oil 30%
		OML – 142	Suntera Nigeria 205 Ltd – 70% Suntera 50%, Indian Oil 25%
23	Gabon	Shakthi	Old PSC: OIL – 45% Indian Oil – 45% MarvisPte Ltd -10% New PSC: OIL – 50% Indian Oil – 50%
24	Yemen	82	Medco – 45% Kuwait Energy – 25% IOC- 15% OIL- 15%
25	Namibia	PEL 0037	Tullow Namibia– 35% (Operator) Pancontinental Namibia–30% OVL - 30% Paragon Oil and Gas - 5%
		PEL 30	Eco Oil and Gas Namibia– 32.5% (Operator) Azimuth Namibia Ltd – 32.5% ONGC Videsh – 15% Tullow Namibia – 10% National Petroleum Corp of Namibia (Pty) Ltd – 10%
26	UAE	Lower Zakum	ADNOC - 60% Falcon Oil & Gas BV*** - 10% Inpex - 10% CNPC - 10% Total - 5% ENI - 5%
27	Israel	Block 32	ONGC Videsh - 25% BPRL - 25% Oil India - 25% IOCL - 25%
28	Oman	Mukhaizna	Occidental :45% (Operator) Indian Oil:17%; Oman Oil Co.:20%; Liwa 15%; Total:2%; Partex :1%;

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Chapter 7

Development of North-Eastern Region



Development of North-Eastern Region



Hon'ble Prime Minister, Shri Narendra Modi laying the foundation stone for North East Gas Grid at Guwahati

7.1 CONTEXT/BACKGROUND

7.1.1 The history of oil and gas exploration in India dates back to the 19th century in the state of Assam located in the North-Eastern region of India. The first well that struck oil was in Makum area near Margherita during 1867 drilled by McKillop, Stewart & Co., barely 9 years after Drake's well in 1859 in Titusville, Pennsylvania. Subsequently, a number of wells were drilled in Makum and Namdang areas of Margherita and produced crude oil in minor quantities for more than two decades. The Assam Railway & Trading Co. Ltd, which was involved in the business of timber, coal, tea & construction of railway lines, drilled the first commercial well Digboi-1 (September, 1889 – November, 1890- total depth of 662ft) with an initial production of 200 gallons per day, opened up a new chapter in exploration and production of oil in this part of the world and the oil industry of India was officially born. During the subsequent years before independence of India, Digboi oil field was extensively developed and searched for new oil fields continued.

7.1.2 Other significant milestones in oil and gas exploration in North-East took place mainly during post-independence. These include the discoveries of the Nahorkatiya and Moran fields by Assam Oil Company (AOC) and Rudrasagar oil fields by Oil & Natural Gas Corporation Limited (ONGC) in 1953, 1956 and 1960 respectively. Subsequently, more than 100 oil and gas fields, that include fields such as Jorajan, Kumchai, Hapajan, Shalmari, Dikom, Kathaloni, Tengakhat, Bhogpara, Chabua, Baghjan, Berekuri, Mechaki, Lakwa, Lakhmani, Geleki, Amguri, Kharsang, Charali, Borholla-Champang, Khoraghat, Baramura,

Tichna, Gojalia, Rokhia, Khobal, Hortokihave been discovered by Oil India Limited (OIL) and ONGC in the North-Eastern states of Assam, Arunachal Pradesh, Nagaland, Tripura and Mizoram.

7.1.3 Since then, both the national oil companies viz., OIL and ONGC have proven substantial amount of producible hydrocarbons and have technical know-how of producing and managing complex reservoirs and contributing to about 8.6 Million Metric Tonnes per Annum (MMTPA) of oil plus oil equivalent of gas (O+OEG) from their producing assets in North-East.

7.1.4 The prognosticated hydrocarbon resources of the country has been reassessed based on the newly acquired data. The prognosticated hydrocarbon resources (O+OEG) of Upper Assam Shelf basin has been upgraded to the order of 6001.2 MMT from the level of 3180 MMT and for Assam-Arakan Fold Belt basin, the total prognosticated hydrocarbon resources are of the order of 1633 MMT. Thus, there is about 34% increase in the prognosticated hydrocarbon resources as compared to previous assessment. The North-East region is having around 18% (7634 MMT) of country's total prognosticated hydrocarbon resources. About 2246.6 MMT of in-place hydrocarbon reserves have been established so far by E&P companies, which means about 73% of hydrocarbon resources are under "yet to discover" category.

7.1.5 The two national oil companies, namely, Oil and Natural Gas Corporation Limited (ONGC) and Oil India Limited (OIL) have been engaged in the North-East Region for exploration and exploitation

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of oil and gas for more than 60 years and generated a vast geo-scientific database and geological understanding of the basin.

7.2 EXPLORATION ACTIVITIES IN NORTH-EAST UNDER THE NOMINATION REGIME

7.2.1 Oil India Limited (OIL) since its inception in February, 1959 has been actively pursuing exploration & development activities in the state of Assam. During 1962-65, various new technologies were adopted such as deviation drilling, dual completion, pressure maintenance etc. In 1968, exploration programme in Kharsang, Arunachal Pradesh began and in Kusijan areas, west of Digboi hydrocarbon was discovered.

7.2.2 During 1969-79, extensive geophysical survey and development effort in Assam and Arunachal Pradesh was carried out which led to the discovery of the Jorajan field in 1972 and establishment of gas resources in Eocene of Tengakhat (west of Naharkatiya) in 1973. Till date OIL has acquired more than 27,000 GLKM of 2D seismic data and nearly 9000 square kilometers (sq. km.) of 3D seismic data in the North- East.

7.2.3 During the nineties, intensive exploration/exploratory well drilling & development activities resulted in discovery of fields such as Bogapani, Kumchai, Hapjan, Shalmari and Rajgarh. Deeper Exploration:

After discovery of hydrocarbon in the deeper Eocene-Paleocene horizons, more thrust was given to explore into these horizons in different fields of Upper Assam. As a result, production from deeper reservoirs during late 1990's surpassed the production from shallower reservoirs (Barail and Tipam). This led to significant discoveries involving deeper prospects subsequently with depths ranging between 3550-3800 metres in the central basement high areas of Dikom-Kathaloni-Chabua-Matimekhana to more than 5500 metres in Mechaki areas towards the eastern flank of Upper Assam Basin.

7.2.4 As on 1st January, 2019, OIL holds 3 exploration blocks in North-East under nomination regime. OIL also holds 3 NELP (New Exploration Licensing Policy) exploration blocks in the North-Eastern region. In recently concluded Open Acreage License Policy (OALP) Round-I, OIL was awarded 7 Blocks as operator in North-East across Assam and Arunachal Pradesh.

7.2.5 ONGC started its exploration work in Assam in 1956. Seismic surveys and geological mapping of the outcrop areas were initiated while gravity-magnetic surveys began in 1961. The analysis of seismic data along with the outcrop mapping data generated by ONGC and earlier workers helped refining the basin architecture and its evolution.



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- 7.2.6** The first wild cat well of ONGC was drilled on Disangmukh structure in 1960, however, the first commercial oil discovery was on Rudrasagar structure in the same year. As a result of initial successes encountered in pursuing structural prospects the focus remained on identification of such prospects through seismic data. Since then ONGC has drilled more than 740 exploratory wells in the state of Assam.
- 7.2.7** The reservoirs of Barail Group belonging to Upper Eocene to Lower Oligocene age and those of Tipam Group of Upper Miocene age proved to be most prolific and drew significant attention of explorationists. A significant number of oil and gas fields, including Panidihing, Disangmukh, Lakwa, Lakhmani, Sonari, Geleki, Demulgaon, Amguri and Charali, were discovered with this exploration philosophy.
- 7.2.8** During the past nearly five decades, it has been ONGC's endeavour to prove the extension of the established hydrocarbon bearing areas of Sivasagar and Dhansiri Valley of North Assam Shelf and at the same time step out and explore new areas. In the process it has established hydrocarbon fields in the logistically difficult areas of Cachar and neighbouring states of Tripura and Nagaland.
- 7.2.9** Currently, ONGC holds 4 exploration blocks in the States of Assam (1) and Nagaland (3) under nomination regime. In addition, ONGC holds 3 exploration blocks under Production Sharing Contracts (PSC) regime

in North-East It also holds 58 Petroleum Mining Lease (PML) blocks (41 in Assam, 16 in Tripura, 1 in Nagaland) in North-East. During 2018-19, it acquired 51.72 Line Kilometre (LKM) of 2D and 89.6 sq. km. of 3D seismic data and drilled 13 exploratory wells. Further exploratory efforts are in progress.

7.3 EXPLORATION ACTIVITIES IN NORTH-EAST UNDER THE PSC REGIME

Under the PSC regime, exploration blocks were first awarded in the State of Assam in the year 1998 under Pre-NELP rounds of bidding. Subsequently, blocks were awarded under various rounds of NELP. 31 awarded blocks (Assam-21, Manipur- 2, Mizoram- 3, Nagaland-2 and Tripura-3) covering an area of 43,722 sq. km. Out of these, 8 blocks are operational, 5 blocks have been proposed for relinquishment by operators and 18 blocks have been relinquished. In addition, there are 2 discovered fields under PSC regime, namely, Kharsang in Arunachal Pradesh and Amguri in Assam. At present Kharsang field is in operation.

7.4 CRUDE OIL AND NATURAL GAS PRODUCTION IN NORTH-EAST

- 7.4.1** The contribution in crude oil production by North-Eastern States is about 12.3% of the total production. In FY 2017-18, crude oil production in North-East is about 4.395 Million Metric Tonnes (MMT). The state-wise and company-wise trend of crude oil production in last 5 years is given below:

TABLE-7.1: CRUDE OIL PRODUCTION IN LAST FIVE YEARS IN NORTH-EAST (MMT)

State/ Region		2013-14	2014-15	2015-16	2016-17	2017-18	2018-19 (April to Dec.18)
Assam	OIL	3.445	3.405	3.219	3.250	3.367	2.515
	ONGC	1.263	1.061	0.965	0.950	0.975	0.753
	Pvt/JV	-	-	-	-	0.003	0.024
	Total	4.708	4.466	4.184	3.278	4.345	3.293
Arunachal Pradesh	OIL	0.021	0.007	0.006	0.008	0.007	0.006
	Pvt/JV	0.09	0.069	0.051	0.048	0.043	0.0026
	Total	0.111	0.076	0.057	0.056	0.050	0.032
North-East	Grand Total	4.819	4.542	4.241	4.256	4.395	3.324

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7.4.2 From the table 7.1, it may be observed that in FY 2017-18 OIL has the share of 76.8% in crude oil production in North-East, followed by ONGC with a share of 22.2%. The share of Private/Joint Venture companies in crude oil production is about 1.0%, which is from the Kharsang field in the State of Arunachal Pradesh.

7.4.3 The contribution in natural gas production by North-Eastern States in FY 2017-18 is about 14.4% of the total production. In 2017-18 natural gas production in North-East is about 4689 Million Metric Standard Cubic Metre (MMSCM). The state-wise and company-wise trend of natural gas production in last 5 years is given below



**During FY 2017-18
North-East produced
4689 MMSCM
natural gas**

TABLE 7.2: NATURAL GAS PRODUCTION IN LAST FIVE YEARS IN NORTH-EAST (MMSCM)

State/ Region		2013-14	2014-15	2015-16	2016-17	2017-18	2018-19 (April to Dec.18)
Assam	OIL	2409	2509	2618	2693	2659	1895
	ONGC	459	449	405	434	508	366
	Pvt/JV	-	-	-	-	53	230
	Total	2868	2958	3023	3127	3219	2491
Arunachal Pradesh	OIL	19	12	12	12	12	11
	Pvt/JV	22	22	18	16	18	12
	Total	41	34	30	28	30	23
Tripura	ONGC	822	1140	1332	1430	1440	1144
North-East	Grand Total	3731	4131	4385	4585	4689	3658

7.4.4 From the table 7.2, it may be observed that in FY 2017-18 OIL has the share of 57% in natural gas production in North-East, followed by ONGC with a share of 41.54%. The share of Pvt/JV companies in natural gas production is about 1.5%.

7.5 DISCOVERED SMALL FIELD POLICY

In order to accelerate exploration and production activities in North-East, Government of India has awarded 9 discovered fields under first round of discovered Small Field Policy. One block is in the State of Arunachal Pradesh and other 8 blocks are located in the State of Assam. In second round of

Discovered Small Fields Policy, out of 25 Contract Areas offered for bidding, 6 Contracts Areas (5 Blocks in Assam and 1 Block in Tripura) fall in North-Eastern region.

7.6 ALTERNATE HYDROCARBON SOURCES IN NORTH-EAST

Shale Gas: Based on the data available from conventional oil/gas exploration it appears that few sedimentary basins, including Assam Arakan Basin may be prospective from Shale gas point of view. In October, 2013, Government has issued guidelines for exploration and exploitation of Shale Oil & Gas by

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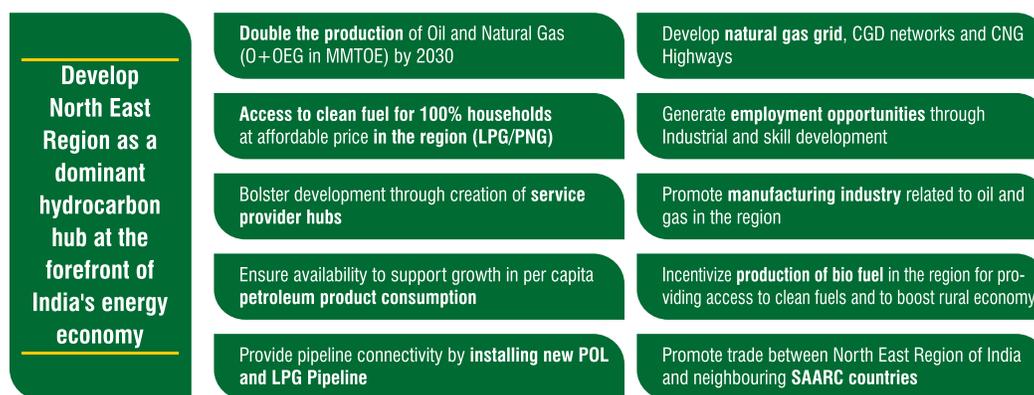


HYDROCARBON

VISION 2030

FOR NORTHEAST INDIA

Initiatives in the North East



national oil companies in the nomination acreages under which ONGC and OIL have identified 50 blocks and 6 blocks respectively. Out of 55 blocks, 3 blocks operated by ONGC and 4 blocks operated by OIL are in the state of Assam. So far ONGC has drilled 2 wells (1 each in Namti and Lakwa). OIL has acquired conventional cores from Dibrugarh, Dumduma and Chabua PML of Assam. Interpretation of Dibrugarh PML block has been completed. In Arunachal Pradesh, OIL has identified two locations for acquiring the conventional cores.

7.7 NORTH-EAST VISION 2030

7.7.1 The North-East Vision Document has been a focused and consultative exercise to develop a common and shared aspiration for benefiting people of the North-Eastern region. With involvement and inputs of various stakeholders, industry players and state governments, the Vision document not only includes the ambition for the region but also an actionable roadmap.

7.7.2 The objectives of the plan are to leverage the region's hydrocarbon potential, enhance access to clean fuels, improve availability of petroleum products, facilitate economic development and to link common people to the economic activities in this sector. The states covered include Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura. The Ministry also undertook series of consultations with the state Governments while drafting the vision document.

7.7.3 The Vision rests on five pillars People, Policy, Partnership, Projects and Production. For People, it foresees clean fuel access to households alongside fostering skill development and involvement of the local community. The Policy focus areas include moderation in light of specific terrain and weather conditions of the region coupled with ensuring fund planning for new projects. As for Partnership, the stress is on greater involvement of state governments in planning and implementation, and on boosting trade with neighbouring nations. In Projects, the focus is on

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pipeline connectivity for carrying liquefied petroleum gas (LPG), natural gas, and petroleum products, oil and lubricants (POL); building refineries and import links; and development of compressed natural gas (CNG) highways and city gas distribution network. The Production side emphases include production enhancement contracts, technology deployment and fast-track clearance, and development of service provider hubs.

- 7.7.4** Beyond production, the focus areas include exploring hydrocarbon linkages and trade opportunities with Bangladesh, Myanmar, Nepal & Bhutan; implementation of 'Make In India' in the region; development of health & medical facilities; industrial policy & infrastructure related action points; focus on skill development; and employment generation requirement in the region. The vision statement lays out a detailed roadmap for the entire hydrocarbons value chain, covering upstream, midstream and downstream segments. This report includes an action plan – of immediate, medium-term and long-term initiatives – to help achieve the objectives.
- 7.7.5** The Vision aims at doubling Oil & Gas production by 2030, making clean fuels accessible, fast tracking projects, generating employment opportunities and promoting cooperation with neighbouring countries.
- 7.7.6** To fulfill one of the major goal envisaged under Vision 2030, Government has allowed special

dispensation of 2 year extension in exploration period and 1 year in Appraisal period for operational blocks in North–Eastern region. Government has also provided marketing and pricing freedom for natural gas produced in future in North-Eastern region. This is likely to result in increased investment in development of oil & gas resources.

7.8 NEW EXPLORATION BLOCKS IN NORTH-EASTERN REGION UNDER HYDROCARBON EXPLORATION & LICENSING POLICY (HELP)

Under OALP Bid Round- I of Hydrocarbon Exploration & Licensing Policy (HELP), out of 55 blocks awarded by Government, 19 exploration blocks fall in the North-Eastern region. Oil E&P Companies are showing keen interest in the North-Eastern region.

7.9 NATIONAL SEISMIC PROGRAMME

In order to give impetus to hydrocarbon activities Government formulated a plan to conduct 2D seismic Data Acquisition, Processing and Interpretation (API) of 48,243 LKM in un-appraised areas of all sedimentary basins of India under National Seismic Programme, OIL has been assigned to carry out 2D seismic API of 7408 LKM, which later on revised to 6032 LKM. as Govt. of Nagaland denied permission for undertaking seismic survey in the State. Till December, 2018, 3360 LKM (56%) of 2D seismic data has been acquired.



Minister of Petroleum & Natural Gas and Skill Development & Entrepreneurship, Shri Dharmendra Pradhan dedicates ONGC multi-specialty hospital 'Chaolung Sukaphaa' to the people of Assam, in the presence of Chief Minister of Assam, Shri Sarbananda Sonowal

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Chapter 8

R & D and New Technology



R & D and New Technology



Oil Companies have undertaken number of R&D Projects which have resulted in improved technology in upstream and downstream sector.

8.1 R&D BY INDIAN OIL CORPORATION LIMITED (IOCL)

The year was marked by deployment of major technologies developed by R&D Centre at Indian Oil refineries. An Octamax unit was commissioned at Mathura Refinery to produce high-octane fuel for BS-VI gasoline pool. The unit is a true amplification of the 'Make in India' drive as the technology was conceptualised, engineered and executed by R&D team and Mathura Refinery. The DHDT Unit at Gujarat Refinery based on indDiesel technology developed by R&D centre was implemented during the year 2017-18. The unit produces Diesel meeting BS-VI norms for Sulphur. The flagship innovation of R&D centre, INDMAX was adjudged winner in 22nd World Petroleum Congress in Turkey.

Indian Oil R&D Centre filed for 82 patents and was granted 54 patents (14 Indian and 40 overseas) during the year 2017-18. Indian Oil now has 611 active patents in its kitty.

8.2 R&D BY OIL & NATURAL GAS CORPORATION LIMITED (ONGC)

ONGC has established separate R&D institutions to undertake specific activities in key areas of Exploration, Drilling, Reservoir Management Production Technology, Ocean Engineering and

Health, Safety and Environment (HSE) Management. Regional laboratories have also been established at various Assets and Basins of ONGC to support these institutes. ONGC through its R&D Institutes is pursuing adaptation/customization and applied research.

ONGC has also established Gas Hydrate Research & Technology Centre (GHRTC) at ONGC, Panvel and is functional since 14th September, 2016 and studies pertaining to fundamentals of gas hydrates, research for exploration and potential exploitation of gas hydrates, techno-economics and commercialization of gas hydrates in a safe and environment friendly manner are being carried out.

In the year 2018-19, ONGC carried out R&D work for conventional and Nonconventional Hydrocarbons includes studies undertaken at different Institutes of ONGC.

As per DPE guidelines, one project on "Production enhancement through innovative stimulation in low pressure wells" has been selected and included in the MOU with MoP&NG for 2018-19 which is likely to be completed by 31st March, 2019.

Industry-Academia Participation: To create a strong Industry-academia interface, ONGC has initiated the "PAN IIT Collaborative Research Program" with seven IITs viz. IIT Kharagpur, Delhi, Kanpur, Mumbai, Madras, Roorkee and Guwahati. ONGC's R&D Institutes and the IITs shall jointly undertake advanced research and development projects for the E&P sector of the country.

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R&D Initiatives by ONGC in the field of IOR/EOR activities: ONGC puts efforts on continuous basis for performance analysis of fields and suitable corrective measures are taken for improvement in the field performance and recovery. The salient measures including the use of the state of art technology to enhance global recovery factor are as under:

- a) Simulation studies for development of Basal Clastics of Mumbai High.
- b) Integrated GCM for Cluster-7 and WO-24 area of Mumbai High including recent discoveries.
- c) Low Salinity water flood (LSWF) as EOR pilot for L-III reservoir of Mumbai High South.
- d) Feasibility studies for CO₂ EOR.
- e) Borholla Gas Injection Scheme & immiscible gas injection in Lakwa field of Assam.
- f) Studies for Northern part of Balol and Southern part of Lanwa of Mehasana.

8.2.1 R&D Patents Registered by ONGC

R&D is one of the key driver of productivity and economic growth of any country. To accomplish this, ONGC has undertaken an important initiative to patent its R&D technological innovation/ invention to protect output of an R&D Project. During the current year 2018-19 upto December, 2019, ONGC has registered 13 patents and obtained 2 patents, for which details are given as under:

a) Patents Registered by ONGC

- i) Acid and oxidative resistant cation exchange membrane for electro dialysis electrolysis and other electrochemical processes.
- ii) A debris filtration Assembly.
- iii) Recovery of mercury from core plugs used in petrophysical studies.
- iv) Process for estimation of free fluid cut off value from nuclear magnetic resonance logs.
- v) Process of estimation of realistic hydrocarbon saturation by computation cementation exponent of sub-surface formations.
- vi) A process for increasing recovery of a Hydrocarbon Gas in a Subterranean formation.
- vii) A method for characterizing low resistivity pay zones.
- viii) Process for estimating irreducible water saturation/BFV in clastic reservoirs from conventional log data.
- ix) A Process for preparing an improved sealing agent.
- x) Thermogel system and a method for preparing the same.
- xi) Process for enhancing biomass productivity by high density cultivation of microalgae.



IOCL's R&D Centre

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- xii) Well Completion fluid and process for Inhibiting Corrosion in Oil and Gas Wells.
- xiii) Method for producing gas hydrates using cyclopentyl methyl ether.

b) Patents Obtained by ONGC

- i) Slim hole Gas lift completion with Macaroni Tubing Carried Gas lifts Valves.
- ii) Micro-bubble cement composition and uses thereof.

8.2.2 New Technologies Inducted in ONGC

Concerted efforts to upgrade and induct technology are being made in ONGC as per the industry requirement. During 2018-19, several technologies were evaluated/ inducted in ONGC. The brief about the technology is given below.

- a) Development of methodologies for oil to oil correlation using compound specific isotopic analysis of biomarkers (CSIB) and Total Scanning Fluorescence Spectrophotometry (TSF).
- b) Development of methodology for estimation of thermal maturity of organic matter through Fourier Transform Infra-Red spectroscopy
- c) Geo Cellular Modelling (GCM) through Landmark.
- d) Broadband Processing has been established in OMEGA System by inducting Adaptive De-ghosting (AD) Technology on marine data to broaden the spectrum and improve the resolution by removing the source and receiver end ghosts.
- e) Profile modifications and water shut-off jobs using in house chemical formulations in different fields of ONGC.
- f) Chemical Tracer test used to Estimate Remaining Oil Saturation to see the effect of Low salinity water flooding.
- g) Gas Tracer used for better understanding of migration of flue gases in reservoir.
- h) Immiscible gas injection in Borholla field with the objective to enhance oil production and increase recovery from a depleted dipping reservoir.
- i) Miscible CO₂ in Gandhar field.
- j) Feasibility of Miscible gas injection in major pays of NBP field of Bassein Asset for improvement in oil recovery from the field.

- k) Laboratory study of Low Salinity in South Heera field of Neelam & Heera Asset.
- l) Gas Assisted Gravity Drainage (GAGD): The process is envisaged to give dual benefit of maintaining reservoir health and reducing the gas flaring.
- m) Polymer flood pilot in Bechraji, a heavy oil field of Mehsana Asset to improve recovery.

8.3 R&D BY GAIL (INDIA) LIMITED

Natural Gas business has undergone a number of far-reaching developments in the last decade and these changes brought lot of business opportunities. R&D plays a vital role in leveraging these business opportunities for providing a wider, more sustainable mix of energy resources for the country's economic growth. In this direction, GAIL continuously strives to emphasis on R&D for making affordable clean energy available across the length and breadth of the nation through integrating and mainstreaming emerging technologies. The Major Research themes pursued in this year include works on Bio-based fuels, clean energy development, CO₂ utilizations and Pipeline Integrity Management.

8.3.1 Bio- Based Fuels

Under this initiative, an Eco-friendly and Energy efficient process for Bio-ethanol production from agricultural residues is carried out. Further Microwave assisted co-pyrolysis of Bio-residue to value added products is also pursued.

8.3.2 Clean Energy Development

Under clean energy development, a low emission Natural gas combustor as a hybrid heating source for supercritical CO₂ Brayton cycle is being developed. Moreover, lab scale studies on Methane production from marine hydrate are also explored to augment the natural gas availability. GAIL has also participated gas hydrate scientific drilling investigation under the National Gas Hydrate Program (NGHP). In addition, a 1TPD waste plastic to Diesel pilot plant is being setup at IIP, Dehradun campus to validate the technology.

8.3.3 CO₂ utilizations

CO₂ is a potential Green House Gas and GAIL is continuously focusing on process improvements to minimize its emissions at its facilities. In this regards, a Pilot study is being pursued on development of new efficient solvent for our Gas sweetening operations. R & D initiatives on valorizations of CO are also being carried out. In this direction, our main research focus

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is on Microbial fixation of CO₂ to biomass production and conversion of the same in to valuable, fertilizers and biofuels. GAIL is in the process of setting up of pilot photo bioreactors at its PATA facility. Moreover, novel catalysts are also being developed for dry and tri reforming of CO₂ and Methane in to syngas for production of valuable chemicals. Promising catalysts are being subject to Scale-Up Studies for performance evaluation and validations. Further Electro catalysts are also being developed for Solid State Electrochemical reduction of CO₂ to value added products.

8.3.4 Pipeline Integrity Management

In pipeline integrity management, remote monitoring of Pipeline RoU through high resolution satellite images was continued in GAIL Bhuvan portal which was successfully launched during last year. In addition, the pilot testing of Wireless Sensor Network based Data transfer is being continued at selected terminal.

8.4 R&D BY OIL INDIA LIMITED (OIL)

R&D activities are undertaken primarily with the focus of solving field related problems with regards to increasing oil & gas production. R&D Department carries out applied research to develop in-house remedial solutions in the areas of petroleum geochemical exploration, enhanced oil / improved oil recovery, oil field chemicals, flow assurance, water shut off, well stimulation, petroleum microbiological intervention to mitigate microbial corrosion and for

microbial enhanced oil recovery etc. Majority of the projects during the current year are continuation of the earlier projects and studies. The continued ongoing projects and new projects/studies undertaken during the year 2018-19 are as under:

- Reservoir fluid identification through Geochemical Analysis of Sidewall cores
- Rock-Eval pyrolysis study of core samples for study of source potential
- Determination of Source Rock potential and geochemical characterization of the wells from KG Basin Area
- Characterization of crude oils for understanding the flow and organic deposition behavior in OIL's operational areas of Assam
- AAQM & Stack Emission Monitoring
- Geochemical characterization of pipeline deposits in OIL's crude oil transportation pipelines
- Routine Clay mineralogical study by XRD of Sidewall core, Conventional core and Drill cutting samples from different locations
- Synthesis and extraction of surfactants from natural resources and their characterization for application in enhanced oil recovery
- Carbonate water injection (CWI)



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- j) Laboratory data generation in connection with simulation study for ASP flooding in HJN 2D Block
- k) Comparative study of Alkali and polymer flooding with the ASP formulation developed
- l) Pilot Polymer flooding project in NHK 11D+18 block
- m) Mitigation of corrosion problems
- n) Corrosion Monitoring in Crude Oil and Gas Pipelines
- o) Optimization of Corrosion Inhibitor Dosage for Acidization jobs
- p) Development of new solvent formulation to treat near well bore damage
- q) Designing of suitable solvent formulation for removal of excessive wax deposition in Duliajan-Digboi branch pipeline
- r) Designing of Suitable formulation for Well Stimulation Jobs
- s) Development of testing protocol for analysis of pipeline pigging residue
- t) Development and Field Trial of Essential Oil as Bactericide
- u) Field Trials of In-house Bioremediation technology
- v) Bacteriophages as biocontrol agent for Sulphate Reducing Bacteria in Oil and Gas Industry
- w) Scale-up of in-house developed MEOR technology for field implementation
- x) Periodic monitoring of corrosive bacterial population in Kathaloni OCS and ITF Tengakhat and Evaluation of Bactericide efficacy, generation of dosage plan for their control
- y) Development of Low Temperature Demulsifier (LT – OSD)



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BPCL's R&D Centre

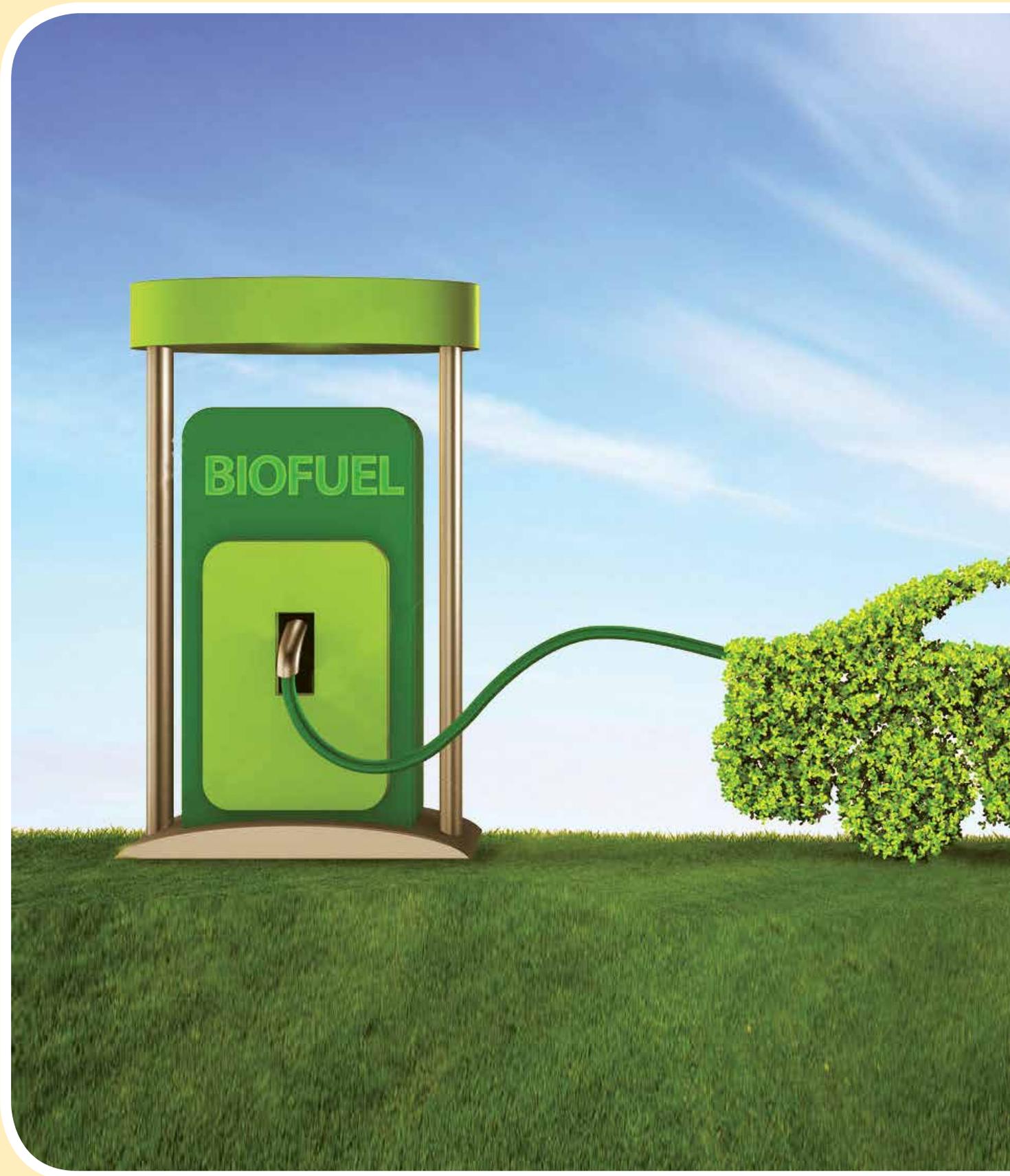
- z) Development of a "Wax Dispersant" additive for Branch line and Main line crude oil
- aa) Alternate product / vendor development for "Liquid Flow Improver (LFI)"
- bb) Flow Assurance study of ITF – Tengakhat composite crude and Mainline crude
- cc) Flow Assurance study of oil wells / flow-lines and COD pipelines
- dd) Control of Scale formation at various field installations

8.4.1 Benefits Achieved for Enhancing Oil & Gas Production through R&D

R&D Department of Oil India Limited at Duliagan, Assam is striving for developing techno-economically feasible solutions to the problems encountered by OIL in its daily operations in the field of exploration, drilling, production, transportation of crude oil, gas, and pollution control and above all to introduce new technologies for improving operational efficiency. All the R&D studies and the projects initiated have been utilized in E&P activities by OIL.

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Chapter 9

Bio-Fuels



Bio-Fuels



9.1 NON-CONVENTIONAL ENERGY

9.1.1 Ethanol Blended Petrol (EBP) Programme

The Government through Oil Marketing Companies (OMCs), is implementing Ethanol Blended Petrol (EBP) Programme under which, OMCs sell ethanol blended petrol with percentage of ethanol up to 10%. In order to augment the supply of ethanol, the Government on 10th December, 2014, decided to procure ethanol produced from other non-food feed stocks besides molasses, like cellulosic and lignocellulosic materials including petrochemical route. It was also decided to administer the price of ethanol under EBP Programme.

For ethanol supply for the year 2018-19, the Government has fixed the price of ethanol as follows:

- From C-Heavy molasses at ₹43.46 per litre.
- From B-Heavy molasses / partial sugarcane juice at ₹52.43 per litre.
- Price of ethanol for the mills, who will divert 100% sugarcane juice for production of ethanol thereby not producing sugar, has been fixed at ₹59.19 per litre. This price will be paid by Oil Marketing Companies (OMCs) to those sugar mills who will divert 100% sugarcane juice for production of ethanol thereby not producing any sugar. If a sugar mill produces ethanol



Recorded highest ever ethanol blend percentage of 4.19% since the inception of EBP Programme

with a combination of B-Heavy molasses and sugarcane juice, the ethanol price derived from B-Heavy molasses route shall be payable by OMCs.

Further, the Government has also allowed production of ethanol from damaged food grains. OMCs are offering differential pricing of ₹47.13/- per litre to incentivize this route.

For the previous ethanol supply year 2017-18 (from 1st December, 2017 to 30th November, 2018), the blending quantity of ethanol with petrol was 149.54 crore litres and the average blend percentage was 4.19% which is the highest in the history of EBP Programme.

Subsequent to amendment in Industries (Development & Regulation) Act, 1951, giving control

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on production, movement and storage of ethanol to the Central Government, Central Government has been regularly interacting with the State Governments and other stakeholders to resolve the bottlenecks in smooth implementation of EBP Programme. Till now, Nine States have already implemented the amended provisions.

The proposal to reduce GST on denatured ethanol meant for EBP Programme was initiated by the Ministry of Petroleum & Natural Gas (MOP&NG) with Department of Revenue, Ministry of Finance. Based on the said proposal, Government has reduced the GST rate on ethanol meant for EBP Programme from 18% to 5%.

Department of Food & Public Distribution has introduced a Scheme for extending financial assistance to sugar mills for enhancement and augmentation of ethanol production capacity. This Scheme aims to infuse ₹1,332 crore via Interest Subvention route. Under this Scheme, 114 proposals worth ₹6,139.08 crore have been approved which are estimated to add 200 crore litres per annum of ethanol distillation capacity. In furtherance, in line with the decision taken in the meeting of PS to PM dated 21st September, 2018 on "Ease of doing business and reduction in time taken for setting up of sugar related Distilleries", MoP&NG has developed a format to monitor the progress, identify red flags and share it with distilleries. In this regard, Joint meetings with Project Proponents were held on 10th October, 2018 and 13th November, 2018. Further, MoP&NG has written letter to State Government of Karnataka, Uttar Pradesh, Maharashtra, Madhya Pradesh and Uttarakhand for facilitating implementation of financial assistance scheme on 16th October, 2018.

9.1.2 Bio-Diesel Programme

- Purchase Orders have been issued by Oil Marketing Companies for supply of 8.14 crore litres of biodiesel during the period May to October, 2018, with provision for extension for three months.
- As on 30th November, 2018 OMCs have procured 8.2 crore litres of Biodiesel.

9.1.3 Second Generation Ethanol

- Subsequent to opening up of alternate route i.e. Second Generation (2G) route for ethanol production, OMCs are in the process of setting up 12 2G bio-refineries with an investment of ₹10,000 crore.

- Detailed Feasibility Report (DFR) for some 2G Bio-Ethanol plants has been prepared by Oil PSUs. One of the Oil PSU viz. Numaligarh Refinery Limited (NRL), has formed a Joint Venture named Assam Bio-refinery Private Limited with M/s Chempolis Oy of Finland and M/s Fortum 3 BV of Netherlands in June, 2018. The ground breaking ceremony of 2G Ethanol project in Bargarh, Odisha, proposed to be set up by Bharat Petroleum Corporation Limited (BPCL), was held on 10th October, 2018. Oil PSUs have obtained environment clearance in respect of their projects at Assam, Odisha and Punjab

9.1.4 Three Days Bilateral Conference "EU-India Conference On Advance Biofuels"

MoP&NG jointly organised with the European Union a three days' bilateral conference "EU-India Conference on Advanced Biofuels" during March 6-8, 2018 in New Delhi. This conference was organized for recognizing the pioneering work done by the EU members in the field of Biofuels and their widespread usage, combined with commitment of Government of India towards moving to green fuels. This helped in improving the contacts and discussions among technology providers, Researchers and investors of both sides with reference to deployment of advanced biofuels in Indian Transport Sector.

9.1.5 National Policy on Biofuels 2018

The Government has notified National Policy on Biofuels 2018 on 8th June, 2018 which is expected to give boost to the biofuel programme of the country. The major features of the Policy are as below:

- Categorization of biofuels as "Basic Biofuels" viz. First Generation (1G) bioethanol & biodiesel and "Advanced Biofuels" – Second Generation (2G) ethanol, bio-CNG etc. to enable extension of appropriate financial and fiscal incentives under each category.
- Expanding the scope of raw material for ethanol production by allowing use of sugarcane Juice, sugar containing materials like sugar beet, sweet sorghum, starch containing materials like corn, cassava, damaged food grains like wheat, broken rice, rotten potatoes, unfit for human consumption for ethanol production.
- The Policy allows use of surplus food grains for production of ethanol for blending with petrol with the approval of National Biofuel Coordination Committee.

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OMCs are setting up 12 2G bio refineries

- d) With a thrust on Advanced Biofuels, the Policy indicates a viability gap funding scheme for 2G ethanol Bio-refineries of ₹5,000/- crore in 6 years in addition to additional tax incentives, higher purchase price as compared to 1G biofuels.

9.1.6 Joining of Advanced Motor Fuels

MoP&NG joined Advanced Motor Fuels (AMF), a Technology collaboration programme (TCP) under International Energy Agency (IEA) as Member on 9th May, 2018. It is an international platform to promote collaboration in R&D for developing advanced motor fuels / alternate fuels with greater focus on improving fuel efficiency and reduced GHG emissions.

9.1.7 Celebration of World Biofuel Day

The World Biofuel Day, 2018 was organised by MoP&NG on 10th August, 2018 in which, Prime Minister was the Chief Guest. There was participation of nearly 2,500 people from all over the country, including farmers, students, scientists, technology providers, etc. On this occasion, a booklet on "National Policy on Biofuels-2018" was also released by the Prime Minister.

The event was also simultaneously celebrated at many major cities/state capitals in which various activities and contests like quiz, painting, essays, rallies, walks, plantation, etc., were organized to spread the awareness about the importance of usage of biofuels.

9.1.8 Hosting of 56th AMF TCP

The 56th Executive Committee meeting of AMF TCP was hosted by India at New Delhi during 15th to 18th October, 2018.



Minister of Petroleum & Natural Gas and Skill Development & Entrepreneurship, Shri Dharmendra Pradhan launch the Sustainable Alternative Towards Affordable Transportation (SATAT), in New Delhi.

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Promoting renewable energy, 15,889 retail outlets have been equipped with solar power technology

9.1.9 Sustainable Affordable Initiative Alternative Transportation Towards (SATAT)

The Ministry has decided to give wide publicity to the initiative of Sustainable Alternative Towards Affordable Transportation (SATAT) by organising Road Shows at Bhubaneswar, Chandigarh and Lucknow to promote Compressed Bio Gas (CBG) production and use.

Accordingly, First Road Show was organised at Chandigarh on 17th November, 2018 by Public Sector Oil Marketing Companies IOCL, BPCL and HPCL. The event was attended by prospective entrepreneurs, technology providers, representatives of Punjab Energy Development Agency (PEDA), Haryana Renewable Energy Development Agency (HAREDA), financial institutions, FICCI, CII, ASSOCHAM along with interested dealers / distributors and officers of OMCs. In the Road Show, the participants were informed about the SATAT initiative and entrepreneurs were encouraged to setup CBG plants and supply CBG to OMCs.

9.2 NEW AND RENEWABLE ENERGY

As a part of initiative under New and Renewable Energy, OMCs have provided solar lighting in Retail Outlets (ROs). As of November, 2018, OMCs have undertaken solarisation of approximately 15,889 retail outlets with solar power plants. The expenditure incurred on solarisation of one retail outlet ranges from ₹2 lakh to ₹25 lakh.

Besides, Indian Oil Corporation Limited (IOCL) is exploring feasibility of battery charging for EVs as well as swapping infrastructure in Retail Outlets.

Bharat Petroleum Corporation Limited (BPCL) also has undertaken following activities:

- It has started Biogas Plant at BP, Bazargaon, Near Nagpur from food waste from Dhaba. The gas is being used for cooking purpose at the same Dhaba.
- Commissioned one Hybrid Model (Wind + Solar) at BP Kagnoli, Karnataka.
- Commissioned one EV Station at Nagpur and plan to start three in next year.
- Working on Battery swapping stations. Has received PESO approval for the same.

Hindustan Petroleum Corporation Limited (HPCL) has undertaken the following activities:

- Operating Wind Farms of 100.9 MW capacity in the states of Rajasthan and Maharashtra. During FY 2017-18, total electricity Generation through these wind farms was 16.9 crore kWh and total of about 1.05 lakh non-solar renewable energy certificates. During FY 2018-19 (till November, 2018) energy generation of 1,500 lacs kWh and approx. 0.95 lakhs non-solar REC have been achieved.
- During FY 2017-18, HPCL commissioned its largest solar plant of 750 kW at Bahadurgarh Terminal, Haryana. The plant is expected to generate around 12 lakh kWh / year.

9.3 FUEL CONSERVATION INITIATIVE : SAKSHAM 2018

In order to provide sustained impetus on fuel conservation efforts, PCRA undertakes nationwide people centric mass awareness campaign, called "SAKSHAM" (Sanrakshan Kshamta Mahotsav) starting 16th January in association with PSU Oil & Gas Companies. During this one-month drive, various sections of society viz. students, youths, farmers, housewives, drivers, industrial workers, etc. are being engaged to profess and propagate the need to conserve by judicious utilization of petroleum products. Sectoral emphasis is being given towards inclusion of one & all in underlining and appreciating the individual's effort in reducing consumption of energy and lessening GHG emissions through multiple activities.

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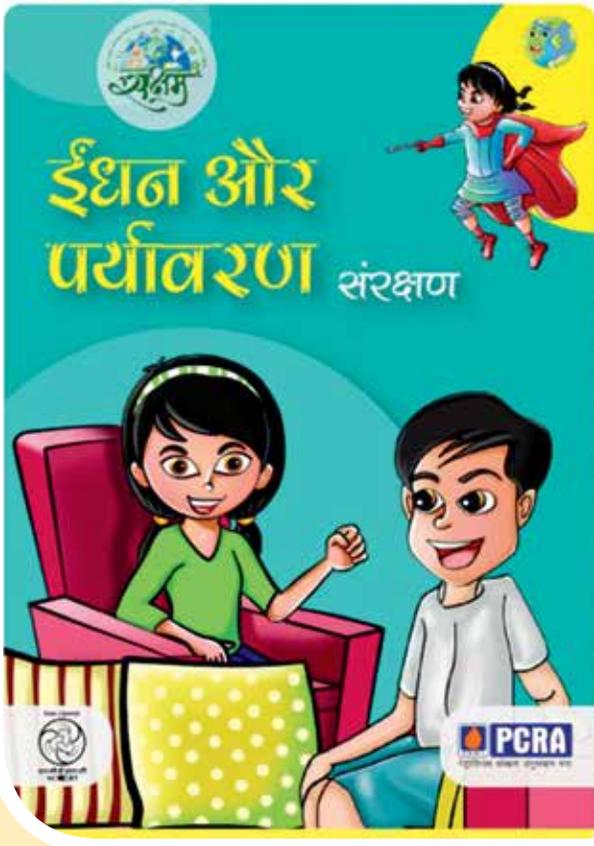
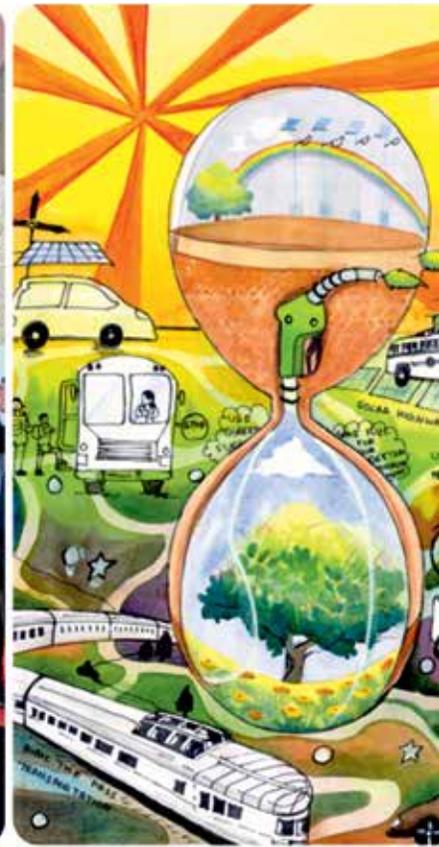
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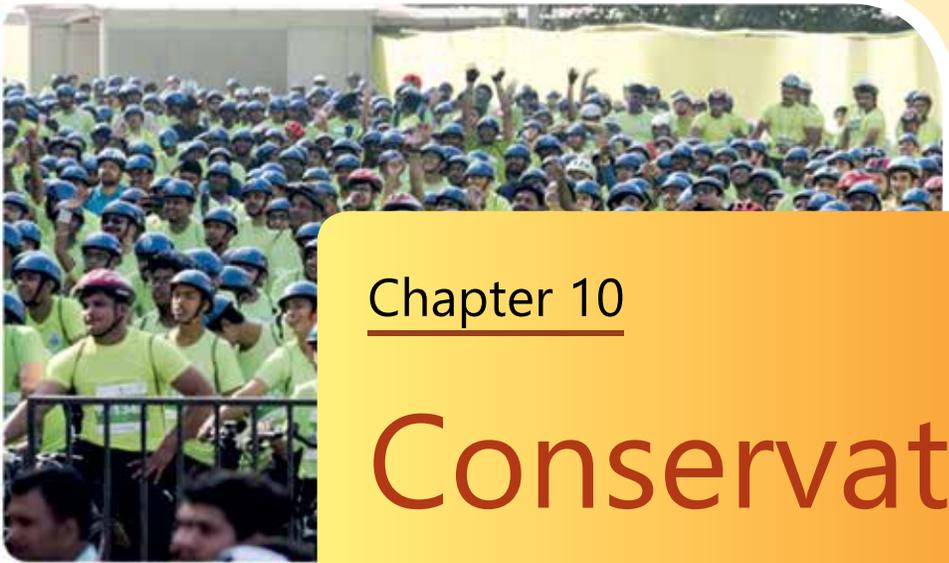
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Chapter 10

Conservation



Conservation



10.1 Petroleum Conservation Research Association (PCRA) is a registered society set up under the aegis of Ministry of Petroleum & Natural Gas, Government of India. As a non-profit organization, PCRA is a national government agency engaged in promoting energy efficiency in various sectors of economy. It helps the government in proposing policies and strategies for petroleum conservation, aimed at reducing excessive dependence of the country on oil requirement. It sponsors R&D activities for the development of fuel-efficient equipment/devices and organizes multi-pronged field activities for creating mass awareness for the conservation of petroleum products. PCRA utilizes technology to promote awareness thru social media sites like Facebook, Twitter, Google+, YouTube and My Gov. Fuel saving tips, inviting suggestions and update on PCRA's conservation activities are posted regularly on these social media platforms of PCRA. Forum is also provided and various contests are organized time to time to generate interest of the masses. PCRA has developed a number of films, TV spots and radio jingles in various languages for promoting oil conservation, which is being utilized from time to time. PCRA also publishes quarterly newsletter with the name Active Conservation Techniques (ACT) highlighting the major activities carried out by PCRA in the core sectors along with successful case studies leading to conservation of petroleum fuel.

10.2 CHARTERED ACTIVITIES

PCRA carries out various chartered activities, which is one of the core areas of its operations. Through

sectoral field activities, PCRA engineers and its empaneled experts reach the targeted groups under various sectors of economy by conducting activities like Energy Audit, Fuel Oil Diagnostic Studies and walk-through Audits, Technical Seminars, Institutional Training Programme, Driver Training Programme, Transport Workshop, Model Depot Project, Van Publicity, Kisan Melas and Educational programs for students of agricultural colleges, Workshop of LPG Savings, Youth Programs, Children engaging activities like quiz, essay, debate and painting competitions, exhibitions etc. These activities are designed to cover a large spectrum of socio-economic profile of our country in different sectors viz. Industry, Transport, Domestic, Agricultural and Commercial. For FY 2018-19, targets were fixed in a manner so as to increase the outreach of these programmes on fuel conservation and could achieve a total of 15645 numbers. of chartered activities during April-January. Total drivers trained through various training programmes during the period is 132873 numbers.

Over the years, PCRA has been able to identify and quantify direct savings in terms of oil equivalent through its various programmes. Through various chartered activities, Energy savings identified is 210363 MTOE (Apr-Jan) against target of 232867 MTOE for the FY 2018-19. Of late, refinery sector benefitted lot through audit programmes conducted by PCRA under Perform, Achieve and Trade (PAT) scheme of Government of India. PCRA also assists industries in obtaining ISO 50001:2011 Energy Management System (EnMS), which is essentially an ISO procedure for energy management.

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10.3 PCRA NATIONAL LEVEL COMPETITION-2018 FOR SCHOOL CHILDREN

Children, being the future of India, were also motivated through National Level Painting, Essay and quiz competitions during the year 2018-19. The essay competition was conducted in 23 Indian languages (Hindi, English, Urdu, Assamese, Bengali, Bodo, Gujarati, Kannada, Maithili, Malayalam, Oriya, Punjabi, Tamil, Telugu, Marathi, Sanskrit, Kashmiri, Konkani, Nepali, Santhali, Manipuri, Sindhi and Dogri) for school students across the country. The painting competition was conducted in 2 categories- Junior (Class 5-7) & Senior (Class 8-10). The quiz competition was conducted online up to State Level. Ground activation was done for Zonal & Final round at New Delhi. Episodes were recorded and will be telecast on Doordarshan. This year participation of about 82.50 Lakh students across the country has been recorded, which is unprecedented. Total prizes to be distributed to students is 2061 numbers. (Laptop, Tablet, Cash & Singapore trip) worth ₹ 2.52 crore.

This year, the first prize winners of the national level competition-2017 were taken on 5-days (16th-20th June 2018) study tour to Singapore. The winners were taken around places of interest for their learning including Singapore Science Centre, Newater Plant, Nexus International School along with amusement places.

10.4 SAKSHAM-2019

In order to provide sustained impetus on fuel conservation efforts, PCRA undertakes nationwide people centric mass awareness campaign, called

“SAKSHAM” (Sanrakshan Kshamta Mahotsav) starting 16th January in association with PSU Oil & Gas Companies. During this one-month drive, various sections of society viz. students, youths, farmers, housewives, drivers, industrial workers, etc. are being engaged to profess and propagate the need to conserve by judicious utilization of petroleum products. Sectorial emphasis is being given towards inclusion of one & all in underlining and appreciating the individual's effort in reducing consumption of energy and lessening GHG emissions through multiple activities. The inaugural function of Saksham-2019 was held at Constitution Club of India, New Delhi on 16th January, 2019, where large number of Senior Officials from MoP&NG, Students, Teachers, Chairman/CMDs of Oil PSUs, Media etc. were present. The first prize winners of National Level Competitions along with State Level Coordinators and State Governments were felicitated. Impressive Inaugural functions of Saksham-2019 were also organized by State Level Coordinators at the State Capitals. During the one-month campaign of Saksham-2019, number of mass awareness activities were planned/carried out in Industrial, Transport, Domestic and Agriculture sector. Some of them are -

- Cycle Day in 200 cities throughout the country on 20th January, 2019.
- Debate Competition / Group Talk / Concerts / Talent Show / Graffiti / Wall Painting Competition on Fuel Conservation in Schools / Colleges.
- Workshop in Engineering Colleges / Technical Meet in Industrial Sectors on Fuel Conservation through Technical Meets / Workshops.



Launch of comic book on fuel conservation

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- d) Group Talk at RWAs.
- e) Mass Rally/Human Chain by Club members/ Online pledge/Quiz/Essay competition/ Fuel Efficient Cooking Competitions for ladies in residential societies for Clubs/Societies/NGOs/ Groups etc.
- f) Fuel Efficient Driving Contest for Cars/LCVs/ MCVs/HCVs.
- g) Publication of message of Minister, P&NG/Chief Minister/Governor in Newspapers & Magazines, Address by Governor/Chief Minister/Ministers on TV & Radio, Talk Show in TV /Radio, Article Writing Competition for Newspaper agencies, Extensive Social Media Campaigns, Jingles/ Spots on TV, Radio & Cinema Halls.
- h) LPG Panchayats at all LPG Distributorships.
- i) Group Talk at all Retail Outlets & CNG Stations.
- j) Agriculture workshops for farmers.
- k) Workshops/Group Talks for STUs/ Fleet Operators (Organized/Unorganized Sector).
- l) Walkathon at District Head Quarters.
- m) Publication/Display of Conservation Message of Chairman/CMDs/Directors, Publication of Fuel Conservation Articles in Newspapers/Magazines, Talk Show in Radio/TV by Chairman/CMD of PSU Corporate Offices.
- n) Publication/Display of Conservation Message of Unit Head, Cycle Rally/Mass Rally/Human Chain by Employees in public place, Online pledge, Quiz competition on Fuel Conservation, Fuel Efficient Cooking Competitions for ladies in residential societies, Messages on Hoardings/ Digital Displays, Emission Check of all petroleum consuming Equipment, Emission Check of all Vehicles, Valedictory Function on 15th February, 2019 at PSU offices/locations/units etc.

10.5 SAKSHAM PEDAL DELHI-2018

To promote cycling in order to create awareness among masses about conservation of petroleum products and to encourage people to use bi-cycles for their short distance travelling needs instead of using motorized vehicles that consume fossil fuels, "Saksham Pedal Delhi-2018" was organized on 7th October 2018 at JLN Stadium, New Delhi. The event was carried out along with Public Sector Oil Companies and the Cycling Federation of India

(CFI). The event had 4 categories namely Elite ride, Amateur ride, Open ride and Green ride. Renowned sports personalities, Top Management executives of Oil PSU's and film celebrities were present on the dais to enthral the gathering. It saw more than 6000 participants, which was very encouraging for the organizing team.

10.6 MEGA MEDIA CAMPAIGN DURING SAKSHAM-2019

Media campaigns has been run nationwide on Doordarshan, All India Radio, Lok Sabha TV, various FM Channels, various TV channels, and Digital Cinemas educating people about the need for fuel conservation during Saksham-2019. The Appeal of Minister of P&NG is also aired on Radio channels across the country.

10.7 RADIO PROGRAM FOR SAKSHAM-2019

A radio program "Urja Ek Aas" of 9 episodes of 30 minutes each was developed and is being broadcast on All India Radio, three episodes per week viz. Monday, Wednesday and Friday.

10.8 PARTICIPATION IN AGRO WORLD FAIR, NEW DELHI

PCRA participated in Agro World Fair held in ICAR, Pusa Road from 25th to 27th October, 2018, which was used to disseminate information through extensive distribution of printed literature, state of the art transslides, online quiz, games, Nukkad Natak and Videos. Technology was also demonstrated through Augmented Reality screen. The stall was visited by several dignitaries including Governor of Mizoram, Sh. Kummanam Rajasekharan and DDG, ICAR, Dr. A. K. Singh who also inaugurated the stall. The stall received the 'Best Informative Stall' award.



Saksham Pedal Delhi

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10.9 EXTENSIVE USE OF SOCIAL MEDIA PLATFORMS

Live coverage of events like Saksham Cyclothon, Agro World, Saksham Inaugural Function 2019 etc. were made on PCRA Social Media Platforms. 19 Trending Activities were done gathering large number of impressions.

10.10 SHORT FILM MAKING CONTEST FOR PROMOTING CYCLING

A short film making contest for promoting cycling has been launched through NFDC at MyGov. The audio jingle and video creative on the theme was also developed for this contest.

10.11 COMIC BOOK FOR CHILDREN

PCRA, with support of NCERT, developed a comic book for school children, which is available in the E-Pathshala of NCERT for the benefit of school children.

10.12 ANIMATION FILM "POLLUTION KA SOLUTION"

PCRA has developed a short animation film "Pollution ka Solution" targeting mainly children and youth depicting various aspects of fuel conservation in Transport and Domestic sectors in an attractive manner. The film is used for dissemination during various youth programs conducted by PCRA.

10.13 PARTICIPATION IN PETROTECH-2019

PCRA participated in Petrotech-2019 showcasing its various activities. Augmented reality game having a mix of conservation related material evoked enthusiastic response of the visitors.

10.14 PARTICIPATION IN VIBRANT GUJARAT, AHMEDABAD

From 18th to 22nd January, 2019, PCRA participated in "Vibrant Gujarat" fair held in Gandhinagar, Gujarat. The digital setting included e-books, translites, displays, games, quiz etc., which attracted large crowds.

10.15 PARTICIPATION IN JNNSMEE-2018

PCRA participated in 45th Jawaharlal Nehru National Science, Mathematics and Environment Exhibition 2018, organized by NCERT. The event was held in Ahmedabad, Gujarat from 23rd to 27th November, 2018.

10.16 CAMPAIGN AT RED LIGHTS IN DELHI THROUGH CRR I

PCRA, with support of Delhi Traffic Police, conducted a campaign through CRR I at 100 busiest intersections of Delhi and estimated its impact "before", "during"

and "after" the campaign in terms of idling fuel consumption and corresponding emissions and Signal designing. The campaign also included study of existing status of visibility, hindrance, signal timings and accordingly give recommendation for repositioning of red lights and reconfiguration of signal timings. The campaign concluded on 09.11.18. With such campaigns, it is expected that there shall be significant improvement in switching off behaviour leading to fuel saving and reduction in emissions.

10.17 WORLD BANK SPONSORED PROGRAM

PCRA has been awarded World Bank sponsored works of Ministry of Housing and Urban Affairs on lowest quote basis (of a global tender floated for driver and maintenance staff training focused on improving fuel efficiency) for 2 zones consisting of 18 nos. of NURM (National Urban Renewal Mission) cities depot worth ₹1.25 crore + taxes.

10.18 MORTH SPONSORED TRAINING PROGRAMS

MoRTH sponsored training programs were conducted for officers of Municipal Corpn, Traffic Police, STUs and RTO at 8 locations (Lucknow, Jaipur, Pune, Ahmedabad, Guwahati, Patna, Hyderabad and Trivandrum).

10.19 FUEL ECONOMY NORMS FOR LCVS/MCVS/TRACTORS/CNG VEHICLES

The report submitted by the Steering Committee, along with the notifications/administrative order, has been accepted by MoP&NG, who in turn has submitted draft notification and administrative order to be issued by Ministry of Power and MoRTH.

10.20 BEST DEPOTS/BEST STU AWARD SCHEME PROMOTING FUEL SAVINGS

A group incentive scheme for 'STU wise Best Depot at State Level' and 'Best STU at National Level' has been initiated by PCRA. The program is initially taken up for one year i.e. 2019-20, which may be extended in future based on the review after its successful conduct for one year.

These and many more activities are planned and undertaken at the behest of Ministry of Petroleum and Natural Gas, which are very significant for fuel efficiency and conservation. Through these activities, PCRA has been making positive contributions towards the Government's ambitious programme on reduction of 10% of import of crude oil by the year 2021-22.

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Chapter 11

Pricing



Pricing



IOCL's LPG Bottling Plant at Karnal

11.1 BACKGROUND

The pricing of petroleum products was brought under Administered Price Mechanism (APM) effective July, 1975 when the pricing of petroleum products was shifted from import parity principles to cost plus principles. Under APM (1975 to 2002) various oil pool accounts were maintained with the objective to i) ensure stability in selling price; ii) insulate consumers against international price fluctuations; and iii) subsidization of consumer price of certain products like kerosene for public distribution and domestic LPG by cross subsidization from other products like petrol, Aviation Turbine Fuel (ATF) etc.

Effective 1st April, 2002, the APM was dismantled and the Government decided to provide subsidy on sale of PDS kerosene and domestic LPG at specified flat rates. To administer these budgetary subsidies, the Government formulated a 'PDS Kerosene and Domestic LPG Subsidy Scheme, 2002'. Under this scheme it was decided that these subsidies will be phased out in 3-5 years.

The sharp rise and volatility of prices of oil and petroleum products in the international markets since 2004 became a matter of global concern. The Indian basket of crude oil, which averaged about \$23 per barrel (bbl) at the time of dismantling of APM in March, 2002 and \$36/bbl in May, 2004 went up to an average of \$85.09/bbl during 2010-11. The average price of Indian basket of crude oil further increased to \$111.89/bbl. during 2011-12. The prices of crude oil, after continuously being at the level of more than \$100/bbl for over three years, started falling sharply during the second half of 2014. As a result, the



Average price of Indian crude oil basket during 2018-19 (up to 15th January, 2019) was \$71.28/bbl

average price of Indian crude oil basket during 2015-16, 2016-17 and 2017-18 was recorded at \$46.17/bbl, \$47.56/bbl and \$56.43/bbl respectively whereas the same is at \$71.28/bbl during the current financial year 2018-19 (up to 15th January, 2019). The trend of Indian basket of crude oil during 2002-03 to 2018-19 is given at **Graph-11.1**.

Even though APM was dismantled effective 1st April, 2002, since 2004, the consumers of sensitive petroleum products viz. petrol (decontrolled w.e.f. 26th June, 2010), diesel (decontrolled w.e.f. 19th October, 2014), PDS Kerosene and Domestic LPG are being insulated from the impact of high international oil prices by the Government / Oil Companies. The retail selling price of the sensitive petroleum products are kept lower than what is warranted by the international oil prices. This results in under recoveries of Oil Marketing Companies (OMCs) with corresponding subsidization of prices for the consumers. The trend of under recovery in the two sensitive petroleum products i.e. PDS Kerosene and subsidized Domestic LPG is given in **Graph-11.2**.

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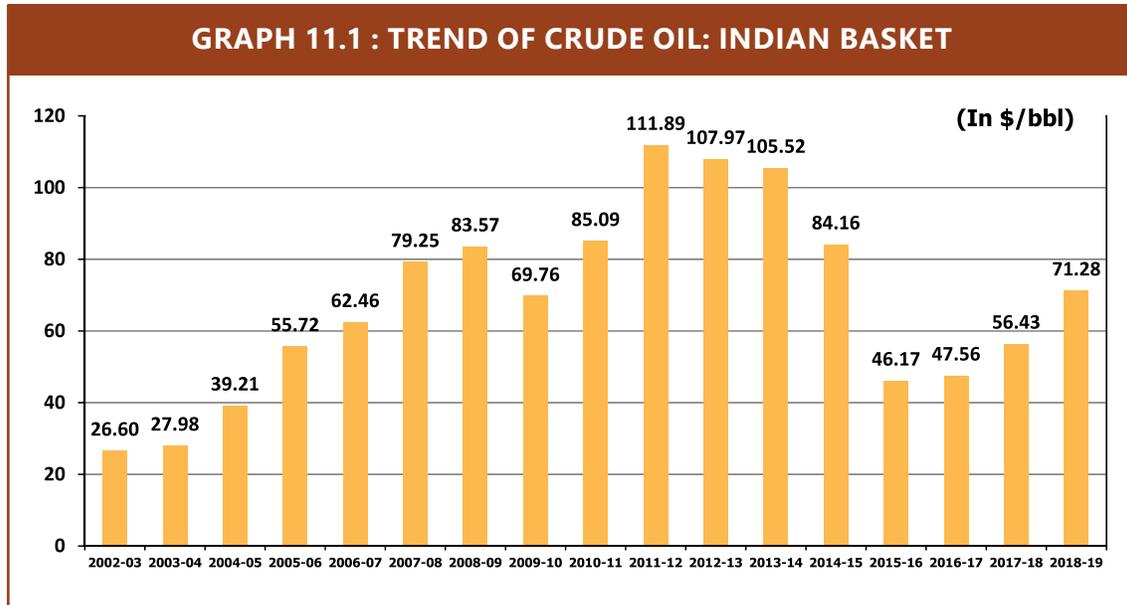
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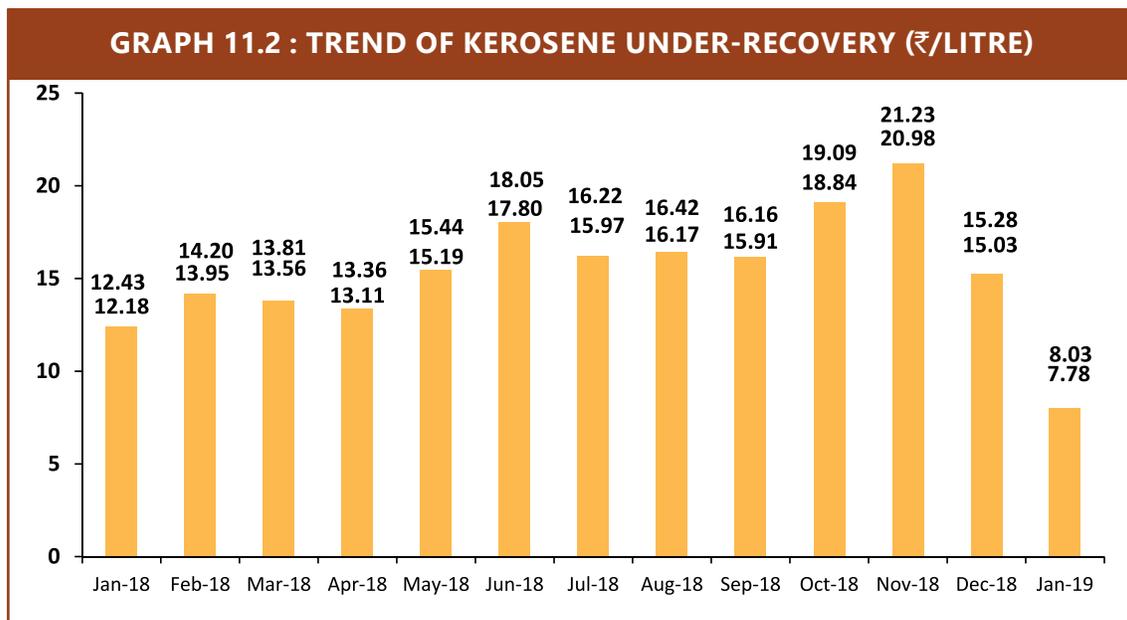
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Note: 2018-19 prices are up to 15/01/2019



Note:- The upper figure represents the under-recovery for the first fortnight and the lower figure for second fortnight.



11.2 PETROL AND DIESEL

The Government has made the prices of petrol and diesel market determined effective 26th June, 2010 and 19th October, 2014 respectively. Since then, the OMCs take decision on prices of petrol and diesel in line with changes in international market and domestic conditions. The OMCs have not only increased but also decreased the prices of petrol and diesel in line with changes in international prices and rupee dollar exchange rate.

Effective 16th June, 2017, daily pricing of petrol and diesel has been implemented in the entire country resulting in closer alignment with the international prices.

11.3 DOMESTIC LPG (SUBSIDISED)

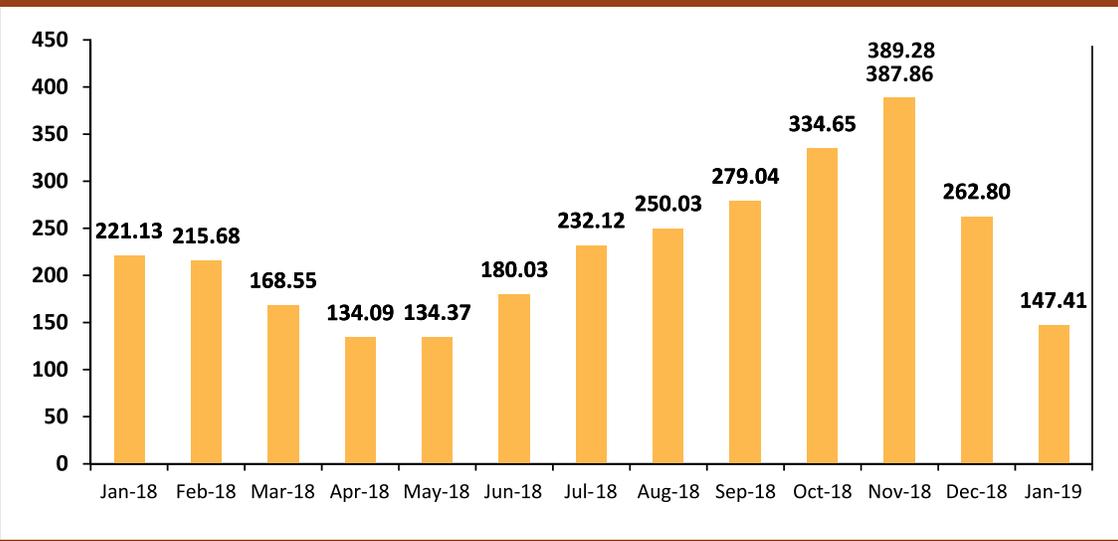
In order to insulate the common man from the impact of rise in international oil prices, the Government

continues to modulate the effective price to consumer of Domestic LPG (up to cap of 12 cylinders per annum to each household). The prices of non-subsidized Domestic LPG are however determined by the OMCs in line with changes in the international markets.

Effective 1st January, 2015, the 'PAHAL (DBTL) Scheme 2014' has been implemented in the entire country wherein the subsidy on Domestic LPG is being transferred to the eligible consumers directly to their bank accounts.

Based on the refinery gate price as on 1st January, 2019, the consumers are getting a total DBTL subsidy of ₹194.01/Cylinder (including cash compensation towards uncompensated costs charged in the RSP) under the DBTL scheme at Delhi. Details of cash compensation from January 2018-19 are given in **graph 11.3**.

GRAPH 11.3 : CASH COMPENSATION BY GOVT. ON LPG UNDER DBTL (₹/ 14.2 KG CYLINDER)



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11.4 PDS KEROSENE

In order to insulate the common man from the impact of rise in international oil prices, the Government continues to modulate the retail selling prices of PDS Kerosene. The consumers continue to get the product at subsidized rates and the OMCs are incurring under-recovery on its sale.

Effective 1st October, 2016 Direct Benefit Transfer in PDS Kerosene Scheme 2016 (DBTK) was implemented in 4 districts in Jharkhand State. This scheme was extended to another 6 districts effective 1st April, 2017 and the entire state of Jharkhand was covered under DBTK effective 1st July, 2017.

In the year 2016-17 there was an overall reduction of 20% in the PDS Kerosene allocation given to the States in comparison to the allocation of 2015-16. In the year 2017-18 there was an overall reduction of 28% in the PDS Kerosene allocation given to the States in comparison to the allocation of 2016-17.

The allocation for the year 2018-19 has been further reduced by 12% in comparison to the allocation of 2017-18. Over and above the above reduction in the PDS Kerosene allocations, till date, 12 State Governments/UTs (Karnataka, Haryana, Telangana, Nagaland, Chandigarh, Gujarat, Andhra Pradesh, Bihar, Goa, Puducherry, Rajasthan and Maharashtra) have voluntarily surrendered their PDS kerosene allocations under DBTK Scheme. As on date, 8 State Governments/UTs have already cut down their PDS Kerosene allocation to nil.

Based on the refinery gate price effective 1st January, 2019, the OMCs are currently (as on 16th January, 2019) incurring under-recovery of ₹7.78 per Litre on PDS Kerosene at Mumbai.

11.5 SUBSIDY/ UNDER-RECOVERY

The total subsidy / under-recovery on petroleum products and natural gas during the last 4 years and the current year is as under:

(₹ in crore)					
Particulars	2014-15	2015-16	2016-17	2017-18	H1, 2018-19
Diesel	10,935	-	-	-	-
PDS Kerosene	24,799	11,496	7,595	4,672	3,309
Domestic LPG	36,580	18	-	-	-
Total Under-recoveries (A)	72,314	11,515	7,595	4,672	3,309
Total DBTL related subsidies (B)	3,971	22,011	12,905	20,905	14,013
DBTK Subsidy (claims) (C)	-	-	11	113	-
Other Subsidies (D)	23	-	3,293	-	-
Total Subsidy/ Under-recovery on Petroleum Products (A+B+C+D)	76,308	33,526	23,804	25,690	17,322

on payment basis.

DBTK subsidy excludes cash incentive/assistance for establishment of institutional mechanism for direct transfer of subsidy paid to States/UTs.

11.6 PRICING OF CRUDE OIL

Indian basket of crude oil represents the average of crude oil processed by Indian refineries in the ratio of actual processing of sweet crude and sour crude in the immediate preceding year. For sweet crude oil price, the daily Platts assessments for benchmark crude oil 'Brent' is considered. For sour crude oil, the

average of Platts assessment for benchmark crude oil 'Dubai' and 'Oman' is considered. During 2017-18, Indian refineries processed 74.77% sour crude and 25.23% sweet crude. Therefore, for 2018-19, Indian basket of crude oil represented the daily price assessment by Platts for benchmark under average of 'Dubai' and 'Oman' (sour crude) and 'Brent' (sweet crude) in the ratio of 74.77:25.23.

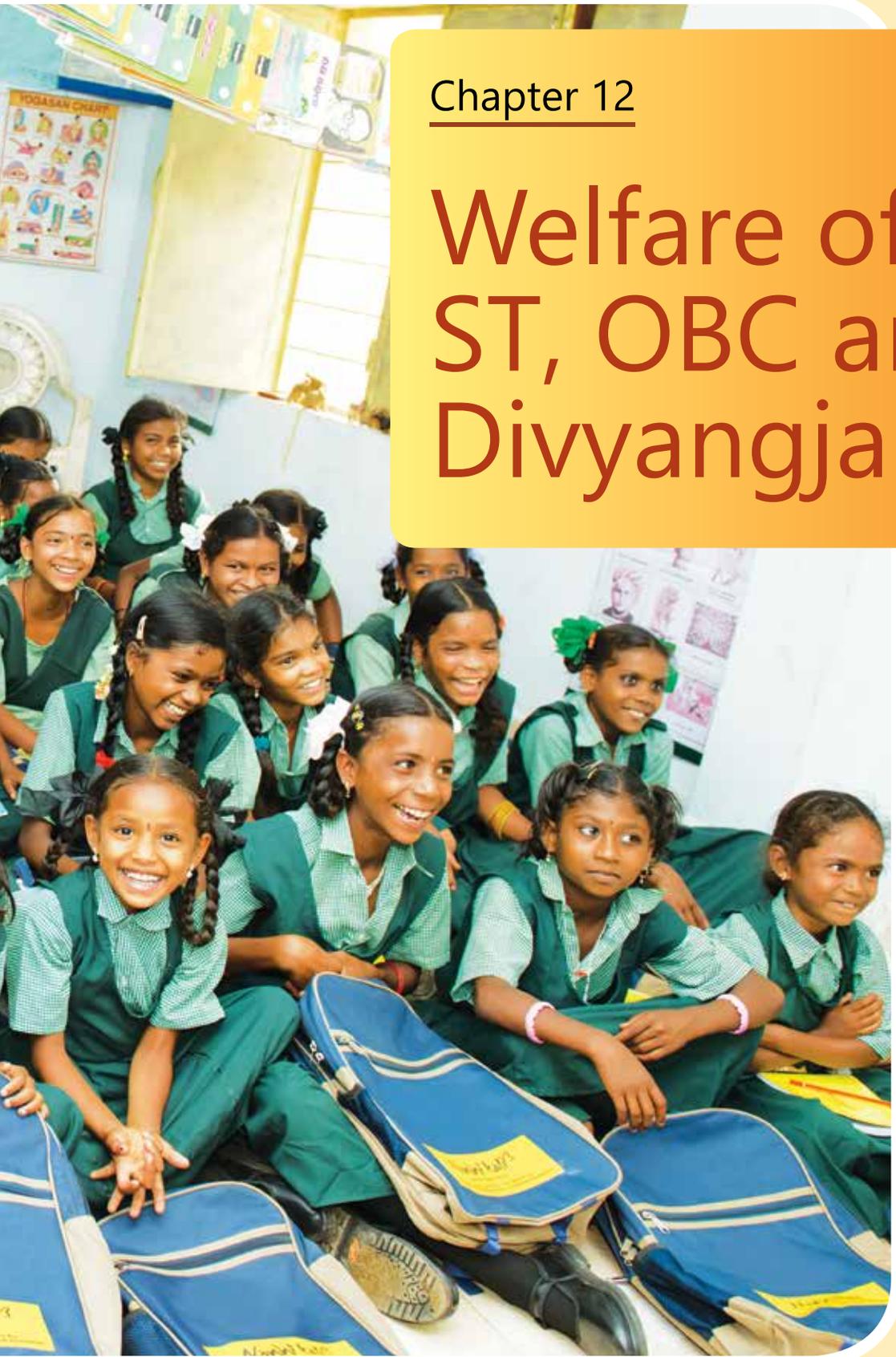
Domestic crude oil producing companies are also offered international crude oil prices benchmarked to international crude that corresponds to their crude assay. Import of crude oil takes place at international prices.





Chapter 12

Welfare of SC, ST, OBC and Divyangjan



Welfare of Scheduled Castes, Scheduled Tribes, Other Backward Classes and Divyangjan



Minister of Petroleum & Natural Gas and Skill Development & Entrepreneurship, Shri Dharmendra Pradhan inaugurates Community Service Centre at Visakhapatnam

12.1 CONTEXT/BACKGROUND

The guidelines in respect of the reservation for the Scheduled Castes (SC), Scheduled Tribes (ST), Other Backward Classes (OBC) and Divyangjan issued from time to time by Department of Personnel & Training, Department of Public Enterprises, Ministry of Social Justice & Empowerment and Ministry of Tribal Affairs are being implemented in the Ministry of Petroleum & Natural Gas (MOP&NG) and the Public Sector Undertakings (PSUs) under the administrative control of this Ministry. The SCT Cell of this Ministry monitors the implementation of reservation policies in PSUs as well as in the Ministry. The PSUs have also constituted Implementation Cells under the supervision of their Chief Liaison Officers / Liaison Officers to safeguard the interests of SCs, STs, OBCs and Persons with the Disability (PWD) employees and to redress their grievances. The Liaison Officers of the PSUs are responsible for ensuring implementation of the Presidential Directives as well as the various orders of the Government of India issued time to time on the subject. Remedial action on the grievances of the SCs, STs, OBCs and PWD employees of PSUs received through Members of Parliament, National Commission for SC and ST, National Commission for OBCs are taken. The status of appointment of SCs, STs, OBCs, PWDs are monitored by the Ministry through report furnished by PSUs.

In pursuance of the observations of Parliamentary Committee on the Welfare of SCs/STs/OBCs and the Presidential Directives on Reservations for SCs/STs in service, a team lead by the Liaison Officer of this Ministry inspects the Reservation Rosters maintained by the Units of PSUs, annually. In 2018 the team has inspected rosters of 70 units of PSUs where Reservation Rosters are maintained.



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12.2 DETAILS OF BACKLOG VACANCIES IN RESPECT OF SC, ST, OBC, PWD IN PSUS / ORGANIZATIONS UNDER THIS MINISTRY AS ON 31ST DECEMBER, 2018

TABLE 12.1 : NUMBER OF BACKLOG VACANCIES IN RESPECT OF SC, ST, OBC AND PWD (DIRECT RECRUITMENT)

PSU	Group A				Group B				Group C				Group D			
	SC	ST	OBC	PWD	SC	ST	OBC	PWD	SC	ST	OBC	PWD	SC	ST	OBC	PWD
Balmer Lawrie	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OIL	0	2	0	9	0	0	0	0	13	8	10	25	2	1	5	1
EIL	3	1	1	0	0	0	0	1	0	0	1	1	0	0	0	0
BPCL	0	0	0	15	0	0	0	1	0	0	0	2	0	0	0	2
NRL	4	1	5	1	0	0	0	0	-4	-4	-11	0	-1	-6	0	0
IOCL	6	15	11	22	No recruitment undertaken in Group B				1	7	10	38	0	1	1	18
GAIL	8	13	15	14	2	3	14	5	24	9	17	9	4	5	1	0
HPCL	0	0	0	20	0	0	0	0	0	0	14	16	0	0	0	0
ONGC	1 (-)	29 (+)	4 (+)	162 (-)*	Only promotional post				23 (+)	3 (+)	2 (+)	114 (-)	20 (-)	1 (-)	17 (+)	2 (+)*
CPCL	0	0	0	0	0	0	0	0	2	0	3&	7*	0	0	0	0
MRPL	3	2	8	3	0	0	0	0	5	5	1	7	0	0	0	0
OIDB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RGIPT	6	2	7	0	0	0	5	0	4	0	3	0	0	0	0	0

CPCL: & out of this a post is also reserved for PWD, * out of this a post is also reserved for OBC

ONGC: ** the short fall in PWD indicate total short fall (including VH, HH, OH)

12.3 SPECIAL RECRUITMENT DRIVE FOR PERSONS WITH DISABILITIES (PWDS)

Supreme Court on 28th April, 2015 in the Contempt Petition No. 499/2014 in CA No.9096 /2013 filed by National Federation of Blind ordered for filling up of posts with Persons with Disabilities. This matter is being monitored by DoPT. 359 posts were identified in MoP&NG and PSUs under the administrative control of this Ministry. As on 31st December, 2018

the position for the filling up of vacancies for Persons with Disabilities are as under:

S. No.	Step –Wise Details	Posts
1.	No. of posts in the Ministry and Oil PSUs reported to Hon'ble Supreme Court	359
2.	No. of Posts already filled in	285
3.	Remaining posts to be filled up by 31.12.2018	74



Governor of Odisha, Prof. Ganeshi Lal hands over Assistive Aids & Appliances provided under EIL's CSR initiative to beneficiaries in presence of Minister of Petroleum & Natural Gas and Skill Development & Entrepreneurship, Shri Dharmendra Pradhan

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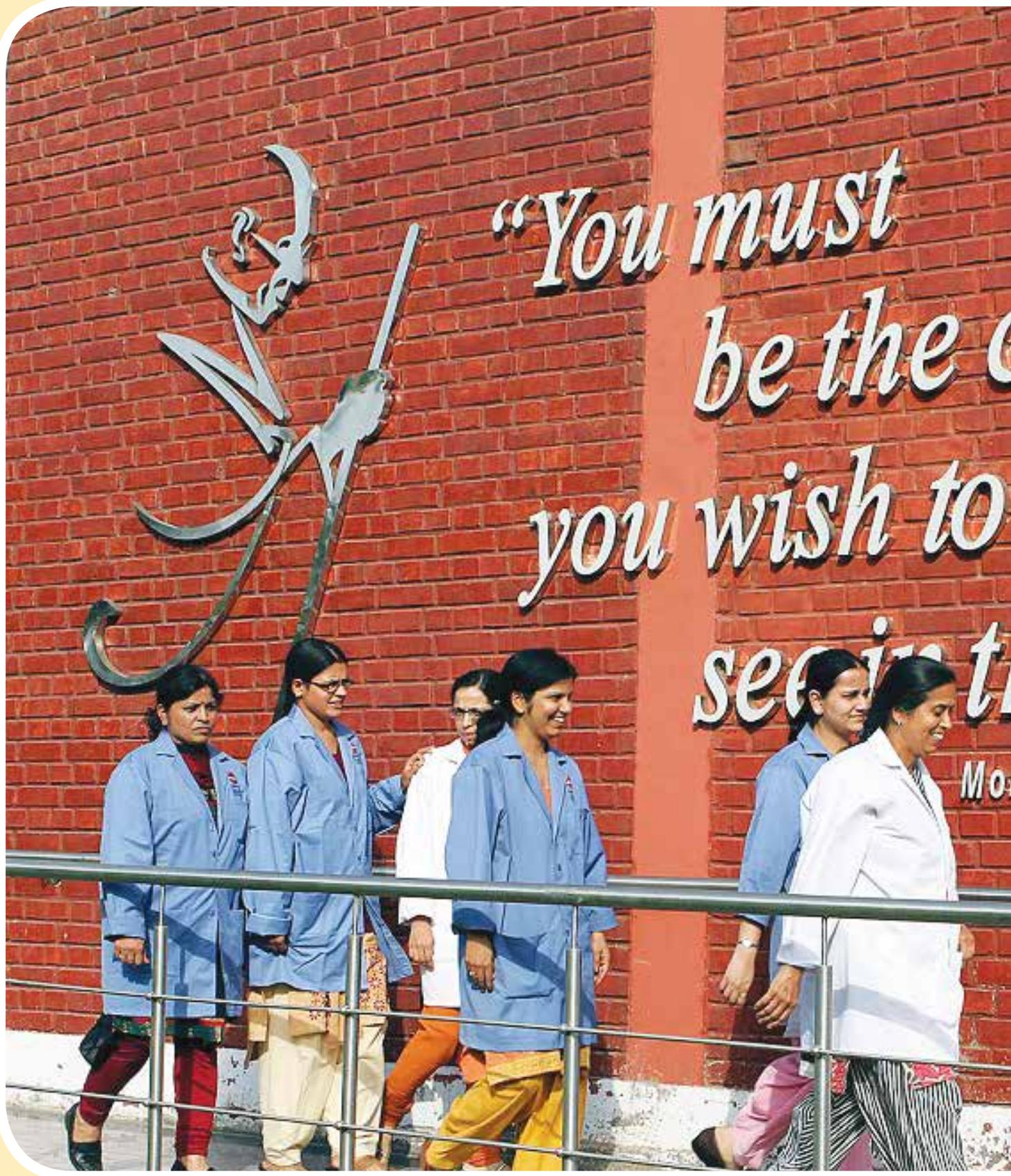
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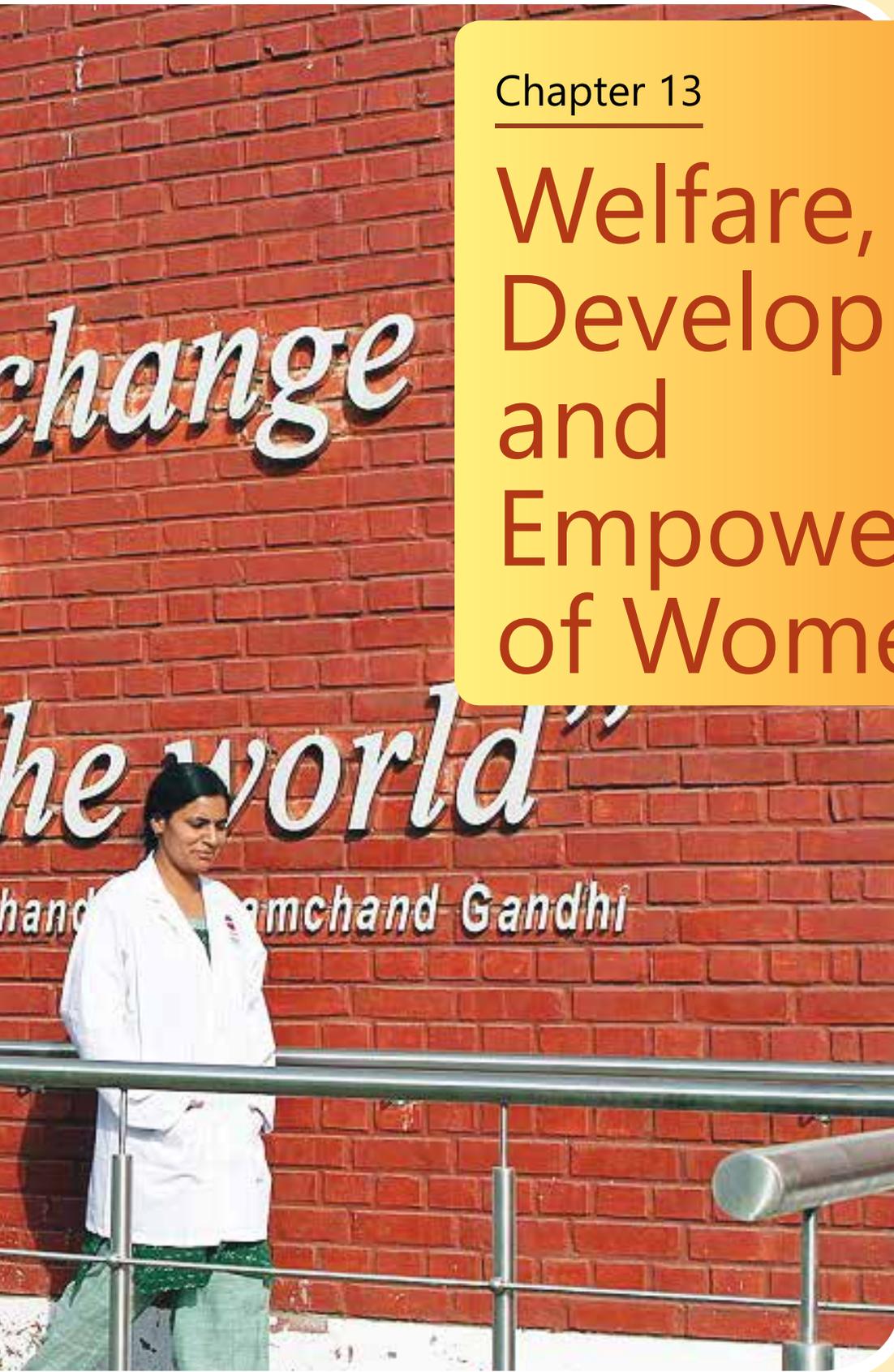
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Chapter 13

Welfare, Development and Empowerment of Women



Welfare, Development and Empowerment of Women



Lady officers at work in a control room

13.1 Ministry of Petroleum & Natural Gas (MOP&NG) and Public Sector Undertakings (PSUs) / Organizations under the administrative control of this Ministry have been taking numerous initiatives towards welfare and empowerment of women employees. With a view to deal with gender sensitization and to promote the cause of women empowerment, special programmes are organized focusing on their professional development and welfare activities. These include external and in-house training, programmes on women health, sponsoring them to attend the National Meet of the Forum of Women in Public Sector, etc.

Women Forum has been formed in the PSUs to look after the interest of the women employees. List of Do's and Don'ts prepared by the National Commission for Women circulated for attention of all employees. Committees have been set up to attend to redressal of complaints on 'Sexual harassment at work place.'

The number of women employees vis-à-vis total number of employees as on 31st December, 2018 in the oil PSUs is tabulated as below:

Sl. No.	Name of PSU	Total No. of Employees	Total No. of Women Employees
1.	ONGC	31673	2201
2.	IOCL	33596	2873
3.	HPCL	10391	979
4.	BPCL	11935	1134
5.	GAIL	4551	287
6.	EIL	2750	334
7.	OIL	7028	403
8.	CPCL	1675	85
9.	NRL	878	41
10.	MRPL	1947	128
11.	BALMER LAWRIE	1082	88
12.	OIDB	21	04
13.	RGIPT	70	07

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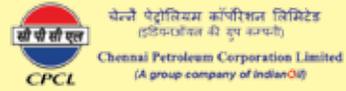
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Chapter 14

Undertakings / Organisations



बामर लॉरी इन्वेस्टमेंट्स लिमिटेड
(भारत सरकार का एक प्रतिष्ठान)

Balmer Lawries Investments Ltd.
(A Government of India Enterprises)



Undertakings / Organisations



5 kg. FTL Indane Cylinders Marketing at Dal Lake Floating Bazar, Srinagar

14.1 MAHARATNA PSUS

14.1.1

Indian Oil Corporation Limited (Indian Oil)



Indian Oil Corporation Limited's (Indian Oil) core business has been refining, transportation and marketing of petroleum products. In line with India's growing energy demand, the Indian Oil has over the years expanded its operations across the hydrocarbon value chain - upstream into oil & gas exploration & production and downstream into petrochemicals, besides diversifying into natural gas and alternative energy resources.

Indian Oil is ranked 137th among the world's largest corporation (and first among Indian enterprises) in the prestigious Fortune 'Global 500' listing for the year 2018.

Indian Oil continues to expand its business operations abroad through its overseas establishments in Sri Lanka, Mauritius, the UAE, Singapore and USA. During the year 2017-18, Indian Oil has set up offices in Myanmar and Bangladesh.

Indian Oil has also been pursuing diverse business interests through joint ventures with reputed business partners from India and abroad. During the year, a new joint venture company, viz., Ratnagiri Refinery and Petrochemicals Ltd. (RRPCL), was incorporated with BPCL and HPCL as partners for setting up a mega 60 Million Metric Tonnes Per Annum (MMTPA) refinery & petrochemicals complex in Ratnagiri district of Maharashtra.

a) Financial Performance

Indian Oil is India's largest commercial enterprise, with a turnover of ₹ 5,06,428 crore for the financial year (FY) 2017-18 against ₹ 4,45,442 crore during 2016-17. During the FY 2017-18, Indian Oil registered a profit (after tax) of ₹ 21,346 crore against ₹ 19,106 crore during FY 2016-17. GRM stood at US\$ 8.49/bbl in 2017-18 as against US\$ 7.77/bbl in 2016-17.

b) Physical Performance

Indian Oil refineries achieved the highest ever crude throughput of 69.0 Million Metric Tonnes (MMT) during the FY 2017-18 with capacity utilization 99.7%, as against a throughput of 65.19 million tonnes with a capacity utilization of 94.2% during FY 2016-17. Indian Oil refineries also achieved the best performance in energy parameters of Fuel & Loss, Specific Energy Consumption (MBN) and distillate yield at 8.75% and 72.61 respectively, as against 9.4% and 74.9 registered during FY 2016-17. The distillate yield of refineries of Indian Oil improved to 80.4% from 78.8% achieved during the previous year.

The refineries of Indian Oil at Mathura and Panipat commenced BS-VI grade auto fuel supplies well in time to meet the 1st April, 2018 timeline for National Capital Territory (NCT).

To boost flexibility in crude oil sourcing, Indian Oil crude oil basket was expanded with inclusion of 16 new grades, of which 11 were of US origin. Processing of cheaper, heavy & high-TAN grades was stepped up to over 21.4% during the FY 2017-18, compared to 18.4% in the previous year. Processing of high-

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sulphur crude oil was also higher at 55.6% compared to 51.6% in the previous year.

Indian Oil Pipelines achieved throughput of 85.68 MMT during the FY 2017-18 as against a throughput of 82.49 MMT in FY 2016-17. Crude Oil Pipelines achieved throughput of 51.08 MMT during the FY 2017-18, previous year's throughput of 51.34 MMT. Petroleum product pipelines recorded the highest ever throughput of 34.60 MMT during the FY 2017-18 which is 11.06% higher than the previous year's throughput of 31.15 MMT. The gas pipelines achieved the highest ever throughput of 1,683 MMSCM during the FY 2017-18 as against a throughput of 1,587 MMSCM in 2016-17.

With the commissioning of 543 kilometres (km) of new pipeline sections during the year and augmentation of existing pipeline, the total length of the pipeline network of crude oil, product and gas pipelines as on 31st March, 2018 expanded to 13,391 km.

Indian Oil continued to energise and empower all sections of the economy during the year and achieved highest ever sales of 77.13 MMT of petroleum products during the FY 2017-18, as against 74.11 MMT during the previous year. In addition, 7.18 MMT of petroleum products were exported during the FY 2017-18 as against 4.72 MMT exported during the previous year.

Indian Oil maintained its position as the second largest petrochemicals player in the country during the FY 2017-18. During the FY 2017-18, Indian Oil recorded petrochemicals sales (domestic and exports) of 2.37 MMT as against 2.58 MMT in 2016-17. The sales volumes were lower mainly due to shutdown of plants that restricted the production and resultantly the sales.

The global reach of PROPEL brand increased further, with its exports now reaching 75 countries.

Indian Oil is investing across the Natural Gas value chain in the country and is committed to enhancing availability through expansion of infrastructure of Natural Gas in the country. During the FY 2017-18, the overall Regasified Liquefied Natural Gas (R-LNG) sales of Indian Oil was 1.89 MMT. Indian Oil now has 58 R-LNG customers. In addition, 1.98 MMT of R-LNG was internally consumed in three of Indian Oil refineries, viz. Panipat, Mathura and Gujarat while its Digboi Refinery consumed 0.06 MMT of domestic gas.

Indian Oil imported 17 cargoes (1.13 MMT) of LNG during the FY 2017-18, against 11 cargoes (0.71 MMT) in the previous year. Indian Oil has so far signed 22 Master Sales & Purchase Agreements (MSPAs) with

various international suppliers for purchase of LNG on Spot/Short term basis of which 9 MSPAs were signed during the FY 2017-18.

c) Marketing & Associated Infrastructure

During the FY 2017-18, Indian Oil commissioned 953 retail outlets (fuel stations, including 502 Kisan Seva Kendra outlets in rural areas) taking their total number to 27,089 (19,560 regular retail outlets & 7,529 Kisan Seva Kendra outlets). The total network comprising 48,172 touch points as on 31st March, 2018 was strengthened from 46,532 touch points last year. Apart from the largest network of retail outlets, 125 Terminals/Depots, 6650 consumer pumps, 3897 SKO/LDO dealers and 107 AFS are some of the vital components of the logistic network. Indian Oil continued with its focus on the use of alternate energy, and 2,533 retail outlets were converted to operate on solar energy during the FY 2017-18, taking their number to 9,140 outlets i.e. 34% of the total number of retail outlets. The Kisan Seva Kendra (KSK) outlets of Indian Oil increased their contribution to the total sales of Indian Oil with Petrol (Retail) touching a new high of 15.7% and Diesel (Retail) touching 15.1%. In addition, CNG facilities were commissioned at 100 retail outlets during the year 2017-18, which increased the CNG market share by 3.29%.

During the FY 2017-18, Indian Oil released new domestic LPG connections to 131.7 lakh customers, out of which, 73.8 lakh connections were released under Pradhan Mantri Ujjwala Yojana (PMUY), the flagship scheme of the Government of India, to the women of poor households with an objective to improve the health of poor families by providing clean cooking fuel.

Indian Oil achieved an all-time high LPG sale of more than 10.8 MMT and bottling capacity was augmented by 540 TMTPA to meet the increased demand of LPG.

Indian Oil's flagship lubricant brand SERVO maintained its market leadership position during the year 2017-18 and registered positive growth across all segments of finished lubricants. 37 new lube grades were introduced during FY 2017-18 and 34 product approvals were obtained from Original Equipment Manufacturers (OEMs). In the overseas markets also, SERVO registered excellent performance with a growth of 18%. SERVO now has a global presence in 30 international markets.

The Aviation Service of Indian Oil continued to maintain its leadership position during the year and improved its market share to 61% as compare to 59.3% during last year. During the FY 2017-18, Indian Oil commissioned its aviation fuel stations at Puducherry, Kadappa and Shillong.

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d) Research & Development

The year was marked by deployment of major technologies developed by R&D Centre at Indian Oil refineries. An Octamax unit was commissioned at Mathura Refinery to produce high-octane fuel for BS-VI gasoline pool. The unit is a true amplification of the 'Make in India' drive as the technology was conceptualised, engineered and executed by R&D team and Mathura Refinery. The DHDT Unit at Gujarat Refinery based on indDiesel technology developed by R&D centre was implemented during the FY 2017-18. The unit produces Diesel meeting BS-VI norms for Sulphur. The flagship innovation of R&D centre, INDMAX was adjudged winner in 22nd World Petroleum Congress in Turkey.

Indian Oil R&D Centre filed for 82 patents and was granted 54 patents (14 Indian and 40 overseas) during the FY 2017-18. Indian Oil now has 611 active patents in its kitty.

e) Alternative Energy

Indian Oil has a portfolio of 168 MW wind power and 34 MW solar PV, which includes 17.5 MW grid connected solar PV and 16.5 MW off-grid solar projects (as on 31.03.2018). The renewable power generated from the wind and solar projects was 337 GWh, which corresponds to an emission reduction of 277 TMTCO_{2e} (thousand metric tonnes carbon dioxide equivalent). During the FY 2017-18, 14 MW of solar PV capacity was installed and, work is in progress for installation of another 13 MW at various units of Indian Oil.

Indian Oil has also been selling solar lanterns as an energy access solution. During the FY 2017-18, around 14,000 solar lanterns were sold through its LPG network. Cumulatively, over 4.1 lakh solar lanterns have been sold by Indian Oil.

Indian Oil is setting-up three 2nd Generation Ethanol production plants at Panipat (Haryana), Gorakhpur (UP) and Dahej (Gujarat) of 100 KL per day capacity each.

Under the aegis of Swachh Bharat Mission of the Government of India, two waste-to-energy plants of 5 tonnes per day capacity each were commissioned in Varanasi by Indian Oil. The plants process organic Municipal Solid Waste and produce Biogas and Compost. The electricity produced from the generated Biogas is being used to energise street lights in the vicinity of each plant.

f) Exploration & Production

Indian Oil is engaged in upstream (Exploration & Production) activities through its joint operations, joint ventures and wholly owned subsidiaries (WoS). The upstream portfolio of Indian Oil consists of 19 assets (9 domestic and 10 overseas) with active Participating Interests (PI) ranging from 3 to 100 per cent. Out of 19 assets, Indian Oil has 8 Producing (7 overseas & 1 domestic), 3 Domestic Discovered Small Fields, 2 Coal Bed Methane, 1 Overseas Under Development, 2 Domestic Exploration with discoveries under appraisal and 3 Under Exploration (2 overseas & 1 domestic) assets.

During the FY 2017-18, Hydrocarbon production increased by 66% over last year from 1.61 MMT to 2.67 MMT from 6 overseas producing assets viz. Lower Zakum (UAE), Taas (Russia), Vankor (Russia), Niobrara Shale Oil (USA), Pacific Northwest (Canada), Carabobo (Venezuela) and one domestic producing asset i.e. Dirok (Assam, India).

A major highlight during the year 2017-18 was acquisition of new blocks overseas. Indian Oil acquired 3% PI in Lower Zakum, Offshore Abu Dhabi (UAE) through a consortium with ONGC Videsh Ltd. and Bharat Petro Resources Ltd. In addition to this, the Indian Oil acquired 17% PI in Mukhaizna Oil Field, a producing field in Oman in April, 2018 resulting in an increase of its production profile by 20,400 barrels of oil equivalent per day (boe/day).

A major milestone for Indian Oil was the beginning of production of gas and condensate from its Pre-NELP asset AAPON- 94/1 (Dirok Field) in August, 2017. This marked the advent of its first domestic exploration asset maturing from exploration stage to a producing asset. Indian Oil has 29.03% PI in this asset.

g) Details of Projects Completed during FY 2017-18

- Phase-I of BS-IV fuel quality upgradation projects at Barauni and Gujarat Refineries
- 1.3 MMTPA Petcoke evacuation facility at Paradip Refinery
- Feed Preparation Unit at Haldia Refinery
- Jharsuguda-Khunti section of Paradip-Raipur-Ranchi product pipeline
- 157 km of Paradip-Balasore section of Paradip-Haldia-Durgapur LPG Pipeline

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TABLE 14.1 : MAJOR ONGOING PROJECTS OF INDIA OIL

Sl. No.	Project Name	Latest Approved Cost (in ₹ crore)
1	Ethylene Glycol Project at Paradip Refinery	4807
2	BS-VI Projects at Panipat Refinery	3529
3	BS-VI Projects at Gujarat Refinery	3380
4	Polypropylene Plant at Paradip Refinery	3150
5	BS-VI Projects at Haldia Refinery	2934.4
6	INDMAX Project at Bongaigaon Refinery	2582
7	Fuel Quality Upgradation Project at Barauni Refinery	1774.3
8	Fuel Quality Upgradation Project at Gujarat Refinery	1315
9	BS-VI Projects at Bongaigaon Refinery	1222
10	Creating infrastructure facilities at Gujarat Refinery & Dumad for Koyali-Ahmednagar-Solapur (KAHSPL) Pipeline	906
11	BS-VI Projects at Mathura Refinery	666.64
12	BS-VI Projects at Guwahati Refinery	557
13	Ennore-Thiruvallur-Bengaluru-Puducherry -Nagapattinam-Madurai-Tuticorin Natural Gas Pipeline	4497
14	30' OD Crude Oil Pipeline in H-B section of PHBPL and Conversion of existing 18" twin Pipelines in H-B section from Crude to Product and Gas service	3712
15	Paradip Hyderabad Pipeline Project	3338
16	Koyali-Ahmednagar-Solapur Pipeline Project	1945
17	Augmentation of Paradip-Haldia- Durgapur LPG Pipeline and its extension up to Patna and Muzaffarpur	1823
18	Dhamra-Haldia Refinery Captive Natural Gas Pipeline with Spur line To Paradip Refinery	1342
19	Paradip-Haldia-Durgapur LPG Pipeline	1330
20	Paradip-Somnathpur-Haldia Pipeline	1297
21	Jaipur-Panipat Naphtha Pipeline along with Koyali- Sanganer Pipeline augmentation	887.5
22	Ennore -Trichy - Madurai LPG Pipeline	711
23	Augmentation of Mathura Tundla pipeline and its extension for hook-up with Barauni-Kanpur Pipeline at Gawria T Point	676
24	Branch Pipeline from Patna to Motihari and Baitalpur on Barauni- Kanpur Pipeline	664
25	LPG Import Terminal and Jetty at Cochin, Kerala	714.25
26	LPG Import Facility at Paradip, Odisha	690
27	Augmentation of LPG Import Terminal from 0.6 MMTPA to 2.5 MMTPA at Kandla, Gujarat	588.2
28	Construction of Grass Root POL Terminal at Motihari, Bihar	522

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h) Corporate Social Responsibility

Indian Oil has utilized 100% of the Corporate Social Responsibility (CSR) Budget allocated for the FY 2017-18, amounting to ₹ 331.05 crore. This gratifying achievement exemplifies Indian Oil unstinted commitment to serve the society, which has been an integral philosophy of conducting its business operations since inception. In addition to serving the Nation through thousands of marketing and operation touch-points across the country, Indian Oil, through its CSR outreach, has touched hearts and souls of millions of under-privileged citizens with care and passion, the key values, which Indian Oil actively nurtures and espouses.

During FY 2017-18, Indian Oil reached out to a large number of beneficiaries through a variety of CSR initiatives. Under its flagship healthcare initiatives viz. Swarna Jayanti Samudayik Hospital, Mathura (Uttar Pradesh); AOD Hospital, Digboi (Assam); Sarve Santu Niramaya, Digboi (Assam); Indian Oil treated more than 76,100 patients. Assistive devices were provided to 900 Divyangjans across 4 States and about 23,400 animals were given various healthcare treatments for their well-being. Under various Skilling initiatives across India viz. Skill Development Institute, Bhubaneswar (Odisha); Multi-Skill Development Institute, Digboi (Assam); Skill Development Centre, Barauni (Bihar) etc., 1,200 beneficiaries were skilled in various trades.

Through projects like Indian Oil Gyanodaya, scholarships were provided to more than 6,100 students across India. For meeting basic livelihood needs viz. drinking water and electricity, Indian Oil Jal-Jeevan projects were rolled out in 30 villages and Indian Oil Surya- Prakash (solar) projects were implemented in 25 villages.

i) Contribution to Exchequer

Indian Oil has consistently been the largest contributor to the Government exchequer in the form of duties and taxes. During the FY 2017-18, ₹ 1,90,670 crore was paid to the exchequer as against ₹ 1,79,014 crore paid in the previous year. An amount of ₹ 1,03,362 crore was paid to the Central Exchequer and ₹ 87,308 crore to the State Exchequer as against ₹ 1,02,817 crore and ₹ 76,197 crore paid in the previous year to the Central and State Exchequer respectively.

j) Major Awards & Recognitions

i) Indian Oil retained its position as the top-ranked Indian company among the world's largest corporates in the prestigious Fortune 'Global 500' listing for 2018. The Company has also retained its top position in the annual rankings

of Business Today (BT-500), Businessworld (The BW Real 500), Business Standard (BS-1000), The Economic Times (ET-500) and Financial Express (FE-1000) by net revenue.

- ii) Indian Oil is among the top 10 companies in The Great Place to Work Institute's prestigious listing of India's Best Workplaces in Manufacturing-2018.
- iii) For the third consecutive year, Indian Oil's Refineries Division bagged the prestigious Dun & Bradstreet Infra Award for Excellence in Project Implementation. This year, the award was bagged for the Coker-A project at Barauni Refinery based on indigenous technology developed by Indian Oil R&D and EIL.
- iv) Indian Oil's Barauni Refinery won the Oil Industry Safety Award for the year 2015-16 and 2016-17
- v) Indian Oil's INDMAX Technology adjudged winner at the 22nd World Petroleum Congress in Istanbul, Turkey
- vi) Indian Oil bagged the Jawaharlal Nehru Centenary Award at the 21st Refinery Technology Meet held by the Centre for high Technology in the category Best innovation in Refining Team for performance improvement of the FCC unit if Gujarat Refinery through innovative hardware designs. Indian Oil refineries in Panipat, Guwahati, Bongaigaon and Haldia too bagged awards under various categories at the Refinery Technology Meet.
- vii) Indian Oil bagged the Dun & Bradstreet Award in the category of Refining and Marketing of Oil at the fourth edition of D&B PSU Awards-2017.
- viii) Indian Oil's INDMAX Technology won the Best Innovator of the Year award and Bongaigaon Refinery won the most improved refinery of the Year award, instituted by the Federation of Indian Petroleum Industry (FIPI) for the year 2016.
- ix) Indian Oil was adjudged the Best PSU in Oil & Gas category at India Pride Awards presented by Dainik Bhaskar group.
- x) The Polypropylene (PP) Unit of Panipat Naphtha Cracker (PNC) was ranked No.1 globally in the category of 'Internal Stream Factor' for the year 2016-17, as part of a benchmark study conducted by the Licensor, M/s Lyondell Basell. The HDPE unit too bagged the first rank in prime percentage and unplanned shutdowns for external reasons.

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- xi) Indian Oil bagged two prizes at the 11th Express Logistics & Supply Chain Leadership Awards in the categories of Industry Excellence in Supply Chain-Oil & Gas (for the 10th time in a row) and Best-In-Class Supply Chain Innovation. The second award was for innovative practices adopted in logistics of POL products, especially in the Northeast where products were moved through tank-trucks loaded on open rail-wagons, airlifted as well as by road through Bangladesh to Tripura.
- xii) Indane Nanocut was declared First Runners-Up under Breakthrough Innovation in R&D & Artificial Intelligence category by AIMA.

14.1.2 Oil and Natural Gas Corporation Limited (ONGC)



Oil and Natural Gas Corporation Ltd. (ONGC) was incorporated on June 23, 1993 under Companies Act 1956 to transform the statutory Commission into a Public Limited Company. As on 31st December, 2018, authorized capital of ONGC is ₹15,000 crore and paid up capital is ₹6,416.63 crore. Government of India shareholding is 65.64% as on 31st December, 2018.

ONGC Videsh Limited (OVL) is a wholly owned subsidiary of ONGC. ONGC acquired 51.11% equity stake in Hindustan Petroleum Corporation Limited (HPCL) on January, 2018. Mangalore Refineries and Petrochemicals Limited (MRPL) is another partially owned subsidiary where ONGC has 71.63% equity stake with management control.

Major Highlights for the Year 2018-19 upto December 2018

a) Exploration

- i) During 2018-19 (upto December 2018), ONGC has made 9 hydrocarbon discoveries comprising of 6 in onland acreages and 3 in offshore acreages. Out of these, 4 onland hydrocarbon discoveries have been monetized by ONGC
- ii) First hydrocarbon discovery, Asokenagar-1, has been made in Bengal Onland basin in NELP block, WB-ONN-2005/4. This is a new prospect discovery and the success in this well has opened up further exploration in the entire Eocene hinge zone corridor towards South east part of Bengal Basin
- iii) A major success has been achieved in Vindhyan Basin in well Hatta-2 which flowed gas
- iv) A total of 17 discoveries have been monetized during 2018-19

b) Production and Development

- i) ONGC's standalone gas production has increased by about 8% during the first 9 months in 2018-19 from 65.94 Million Metric Standard Cubic Metre per Day (MMSCMD) in April 2018 to 71.10 MMSCMD in December 2018. Offshore gas production has increased by about 10% from about 50 MMSCMD in April 2018 to about 55.2 MMSCMD in December 2018. The increased in gas production is mainly from Daman



Hon'ble Prime Minister, Shri Narendra Modi unveiling the plaque to dedicate ONGC Corporate Office - Deendayal Urja Bhawan - to the Nation

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Development Project in Western Offshore and ramping up of gas production from Vashistha and S1 field in Eastern Offshore

- ii) As on 31st December, 2018, a total of 23 projects (Development – 13, Infrastructure-7) are under various stages of implementation to enhance crude oil and natural gas production. In addition, ONGC has also taken up development of new marginal discoveries through innovative cluster development approach.
- iii) 9 projects Development and Infrastructure projects have been completed in 2018-19 (upto December 2018) which are as under:

Sr. No.	Project Name
1.	Construction of 3 ETPs, Mehasana
2.	MH North Redevelopment Phase-III
3.	Development of C026 Cluster Fields
4.	Six Pipeline Replacement Project, Assam
5.	Pipeline Replacement Project, Ahmedabad
6.	Construction of 1 ETP at GGS-Nada, Ankleshwar
7.	Ahmedabad Gas Compressor Project
8.	Nawagam-Koyali Pipeline Project
9.	Pipeline Replacement Project – IV in Mumbai Offshore

- iv) Vashistha-S1 project in eastern offshore, ONGC's first deepwater development project, completed in March 2018, has started making contribution to the overall gas production from offshore
- v) Jorhat asset successfully completed pilot project of immiscible gas injection in Borholla Field which has helped in increase of reservoir pressure and enhancement of oil production. Based on the encouraging results of the pilot project, the process will be implemented at the field level
- vi) Tripura Asset has achieved their highest ever gas production of 4.76 MMSCMD in November 2018
- vii) During the period April 2018 to December 2018, a total of 375 wells have been drilled, which included 71 exploratory, 1 shale gas, 273 development and 30 sidetrack wells
- viii) Rig Deep Driller DD_8 deployed at Deen Dayal West (DD) platform (acquired by ONGC in 2017 from GSPC) on the East Coast to harness the hydrocarbon potential at DDW platform

c) Policy Initiatives Undertaken by ONGC

Strategic goals set for 2030 as per ONGC Perspective Plan 2030

- i) Sustained production growth 4-5%
- ii) More than 130 MMT0E production in 2030 (50% international)
- iii) 1,300 MMT0E proved reserves
- iv) 6.5 GW alternate energy, 9 MMTPA LNG
- v) Full downstream value capture in petrochemicals

d) Strategic Initiatives

- i) Major development projects including IOR/EOR schemes are under various stages of implementation to enhance Crude Oil and Natural Gas Production.
- ii) In order to increase the oil and gas production, ONGC has even taken up development of new marginal discoveries through innovative cluster development approach.
- iii) A new and dedicated business unit viz. Eastern Offshore Asset has been constituted with an aim to put East Coast Discoveries on a fast track development through an integrated East Coast Hub.
- iv) With a view to explore and produce from hitherto elusive unconventional plays; ONGC has established & operationalized the following four centers of delivery (COD).
 - » COD for Shale gas at Vadodara
 - » COD for Coal Bed Methane at New Delhi
 - » COD for HP-HT wells at Chennai
 - » COD for Basement exploration at Mumbai
- v) Substantive decentralization of administrative authorities together with delegation of financial authorities carried out to empower the field executives.
- vi) Best- in-class technology inducted in core areas of E&P activities like
 - » Acquisition, Processing and Interpretation of seismic data
 - » Drilling and Production technology
 - » IT and communication.

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e) Other Initiatives during the year 2018-19 (upto December, 2018)

- i) ONGC has undertaken an important initiative to patent its R&D technological innovation/invention to protect output of an R&D Project. During the current year 2018-19 upto December, 2018, ONGC has obtained 2 patents.
- ii) ONGC has introduced a new facility 'Ask the Experts' in October 2018 in its intranet portal ongreports.net. This portal provides a platform to all ONGCians to raise work-related queries, which are suitably addressed by identified in-house domain experts.
- iii) ONGC has rolled out a new HR Succession Planning model "DEEKSHA" (Developing Experienced, Esteemed and Kaleidoscopic Successors for Higher Achievement). It involves and empowers Key Executives as talent managers. It empowers the Key Executives to identify and recommend potential successors for critical positions. It also enables executives as per the eligibility criteria aspiring for the key positions to submit their "Value Propositions" for such roles.
- iv) CBM Asset has adopted new technology in the form of True Vertical Tool system for drilling of vertical wells. Induction of this technology has helped in continuous monitoring of downhole drilling parameters / well path resulting in improved drilling performance.

f) Information Consolidation for Efficiency (ICE) initiatives:

ONGC has taken up implementation of enterprise-wide paperless office solution named DISHA (Digitisation, Integration and Standardisation by Harnessing Automation). This will not only improve efficiency, speed, and transparency in dealings and quick decision making, but will also play an important role in Environmental Conservation.

- i) 10 MW solar unit was installed and commissioned at Hazira plant in February 2018.
- ii) 3.9 MW installed at 43 different locations in Gujarat and have already started generating power.
- iii) 1.5 MW and 0.25 MW under execution at Assam and Tripura respectively, are planned to be completed by March 2019.
- iv) 1.08 MW plants are installed at 7 locations in Dehradun.

- v) 1 MW ground-mounted solar power plant has been commissioned at Goa in 2018.
- vi) 494 KW has been commissioned in December 2018 at Dahej Plant.
- vii) Around 1,85,000 LED lights have been installed so far at various work centres of ONGC under LED lighting program and resulting in less consumption of electricity.
- viii) To optimize internal gas consumption, Mehsana Asset has installed Burner Management System and Combustion Management System (BMS/CMS) on pilot basis. This has realized in a saving of about 33% in gas consumption.
- ix) Updated E-Waste Policy and Environment Policy, in line with contemporary rules and regulations, were duly approved in April, 2018.

14.1.3

GAIL (India) Limited (GAIL)



GAIL (India) Limited, a Government of India undertaking and the youngest Maharatna of India came into existence on 16th August, 1984 pursuant to the Cabinet decision with the mission "To accelerate and optimise the effective and economic use of Natural Gas and its fractions to the benefit of the national economy". GAIL, after having started as a gas transmission company during the late eighties, has grown organically to become an integrated energy major, having presence in entire gas value chain. Today, GAIL is India's flagship Natural Gas transmission and marketing company which manages over two third of gas transmission and half of the natural gas marketed in India.

GAIL owns and operates of India's largest Gas Transmission Network (11,000 Km gas pipelines), 2048 Km long LPG pipeline network including world's longest exclusive LPG Pipeline (1415 Km), six gas processing units with an aggregate capacity of 1.3 MMTPA of LPG, Propane, Pentane and Naphtha, India's largest gas based Petrochemical Complex with an installed capacity of 810KTPA of Polyethylene. GAIL is also the co-promoter of two other petrochemical projects including 280 KTPA Brahmaputra Cracker and Polymer Limited (BCPL) Complex in Assam and 1.4 MMTPA ONGC Petro-additions Limited (OPaL) project in Gujarat. On upstream segment, GAIL has stakes in 9 Oil and Gas Exploration blocks including 2 overseas blocks (Myanmar). In addition, GAIL has acquired 20% stake in shale asset in USA. To reduce carbon emission and to become a sustainable organization, GAIL has also taken steps towards

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implementing renewable energy projects. Currently, GAIL has a 5 MW solar plant in Rajasthan and also 118 MW wind power plants across India. In addition, GAIL completed setting up India's 2nd largest solar roof top of 5.76 MW grid connected captive solar power plant at Pata Petrochemical complex, Uttar Pradesh offsetting around 9000 tonnes per year of greenhouse gases.

Considering the increasing hydrocarbon import bill

and to free up LPG for the rural market, India has put renewed emphasis on City Gas distribution (CGD) in recent years. GAIL is a pioneer in City Gas Distribution business in India with 9 JVs, notably IGL in Delhi and MGL in Mumbai and 1 fully owned subsidiary GAIL Gas Ltd. Today GAIL operates more than 2/3rd of India's total CNG stations through its alliances. Further, it also holds equity stakes in Fayum Gas Company & National Gas Company in Egypt and in China Gas Holdings Limited in China.

a) Physical and Financial performance

TABLE 14.2 : PHYSICAL PERFORMANCE OF GAIL

Parameters	Units	Performance in 2017-18	Performance in 2018-19 (Up to Sept 2018)	Projected Performance in 2018-19 (As per RE)
Gas Transportation	MMSCMD	105	106.44	107.8
Gas Marketing	MMSCMD	85	96.66	95.8
Liquid Hydrocarbon Production	TMT	1276	650	1260
Petrochemical Production	TMT	671	368	730
LPG Transportation	TMT	3721	1916	3507

TABLE 14.3 : FINANCIAL PERFORMANCE OF GAIL

Description	Units	Performance in 2017-18	Performance in 2018-19 (Up to Sept 2018)	Projected Performance in 2018-19 (As per RE)
Turnover	₹ crore	53,690	36,358	71,904
Gross Margin (EBDITA)	₹ crore	8,648	5,656	9,129
Profit Before Tax	₹ crore	6,958	4,837	7,372
Profit After Tax	₹ crore	4,618	3,222	4845

b) Major Projects

GAIL is currently implementing the following major Natural Gas pipelines which will help to complete the Natural Gas grid of India and will bring many new states in the ambit of natural gas:

i) Jagdishpur-Haldia & Bokaro-Dhamra Pipeline (JHBDPL)

GAIL is constructing prestigious 'Pradhan Mantri Urja Ganga' natural gas pipeline project spanning 2655 Km from Jagdishpur to Haldia-Bokaro-Dhamra covering five States with a thrust to connect Eastern India with the gas grid network at an investment of approx. ₹12,940 crore. Government of India accorded 40% capital grant for financially supporting the project, a first of its kind move in the natural gas infrastructure development in the country. This 16 MMSCMD

capacity pipeline shall pass through the eastern part of Uttar Pradesh, Bihar, Jharkhand, Odisha and West Bengal and will supply gas primarily to three fertilizer plants at Gorakhpur, Barauni and Sindri and also the urea manufacturing unit at Durgapur. The pipeline shall have two gas sources, one at Phulpur (Allahabad, Uttar Pradesh) and the other at Dhamra R-LNG Terminal (Odisha). The pipeline would help development of gas based industries in Eastern India and also provide clean fuel to various cities along the pipeline. City Gas Distribution projects enroute at pipeline at Varanasi, Patna, Ranchi, Jamshedpur, Cuttack and Bhubaneswar is also being developed. Kolkata CGD is being developed through a JV of GAIL and Greater Calcutta Gas Supply Corporation Ltd (Government of West Bengal Enterprise).

Execution of Phase-I of JHBDPL project i.e. Phulpur-

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Dobhi section with branch line to Varanasi, Gorakhpur, Barauni and Patna has already commenced in the state of Uttar Pradesh and Bihar, and the entire project is scheduled to be completed by December 2020.

ii) Kochi-Koottanad-Bengaluru/Mangalore Pipeline (Phase-II)

Construction of Kochi – Koottanad- Bengaluru/ Mangalore Pipeline (Phase-II) is underway in Kerala (438 Km) and Tamil Nadu (435 Km). Kerala section of the pipeline is expected to be completed by 2019 whereas Tamil Nadu section will be completed within 30 months from availability of hindrance free RoU/ land.

iii) Vijaipur-Auraiya-Phulpur Pipeline

In order to de-bottleneck the upstream network of JHBDPL Project for enhanced capacity, a Parallel pipeline from Vijaipur to Auraiya (357 Km) and further to Phulpur (315 Km) is under execution.

iv) Coal Gasification

GAIL is entering into coal gasification by setting up surface coal gasification based urea project

at Talcher. The project, with an estimated cost of ₹ 12,000 crore is envisaged for the production of 2200 MTPD ammonia and 3300 MTPD urea. A joint venture company Talcher Fertilizers Limited was formed with consortium partners namely GAIL, Coal India Limited (CIL), Rashtriya Chemicals and Fertilizers (RCF) and Fertilizer Corporation of India Limited (FCIL). Pre-project activities are on full swing with M/s Shell being selected the Licensor.

c) Achievements

During the last couple of years, GAIL has endeavoured to develop the Indian natural gas sector. Significant achievements of GAIL at various levels are worth mentioning be it renegotiation of contracts, cross country pipeline, developing city gas across the nation.

- i) GAIL has successfully renegotiated LNG Supply and Purchase Agreement (SPA) contract with RasGas, Qatar to ensure affordable gas availability to the end consumer.
- ii) Construction commenced for 1st phase of 2,540 Km Jagdishpur-Haldia-Bokaro-Dhamra pipeline project. This project is referred to as "Energy



GAIL's Petrochemical Complex

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Highway of Eastern India' and it is a step towards extending the "National Gas grid" to eastern regions with the aim of creating new gas markets and also revival of the closed fertilizer plants.

- iii) Commissioned 280,000 TPA Brahmaputra Cracker & Polymer Limited (BCPL) first integrated Petrochemical complex project and started marketing of polymer products. GAIL has doubled its Petrochemical Capacity to 810,000 TPA with successful commissioning of Pata-II petrochemical expansion project including C2/C3 recovery plant at Vijaipur for bridging demand – supply gap.
- iv) Actively pursuing Turkmenistan–Afghanistan–Pakistan–India (TAPI) Pipeline project for sourcing 38 MMSCMD gas from Turkmenistan. Shareholders Agreement of TAPI Pipeline Company Limited (TPCL) has been signed and GAIL is an equity partner. Construction in Turkmenistan leg started.
- v) Actively executed the role of "e-bid RLNG Operator" for sourcing and supplying of LNG for stranded gas based power plants. GAIL also successfully executed the role of "Pool Operator" for Gas Pooling Scheme for Fertilizer Sector. Under this pooling arrangement, demand and supply gap under existing contracts are being bridged by GAIL through LNG.
- vi) Talcher Fertilizers Limited, a consortium of GAIL, RCF and Coal India was floated to implement surface coal gasification based urea project which envisages production of 2200 MTPD Ammonia and 3850 MTPD Urea.
- vii) GAIL signed MoU with Dhamra LNG Terminal Pvt. Limited (DLTPL) for taking equity in the 5 MMTPA LNG receiving, storage and regasification terminal being put up at Dhamra Port, Odisha. LNG terminal at Dhamra will provide clean fuel for the Industrial Development of Eastern states of Uttar Pradesh, Jharkhand, Bihar, West Bengal and Odisha.
- viii) City Gas Distribution (CGD) for Six Eastern India cities Varanasi, Jamshedpur, Patna, Ranchi, Bhubaneswar, and Cuttack was also approved under Urja Ganga Project. CGD authorization received for Bengaluru, Haridwar and North Goa geographical areas. In line with Gol mission to accelerate usage of natural gas, GAIL through City Gas Distribution JVs serves over 19 lakh households & 19 lakh vehicles.
- ix) For efficient upkeep of its pipelines, GAIL has developed software for geo-mapping of pipeline

routes. Satellite images of the route are taken at intervals and sequenced for monitoring. Change detection software is also developed to identify encroachments through analysis of sequential images known as "Bhuvan-GAIL Portal".

- x) GAIL also initiated the famous 'Hawa Badlo Campaign'. This campaign is one of the most effective initiatives against air pollution which has managed to engage as many as 6.8 million people.

d) Major Accolades/Awards received during 2017-18

- i) Dun & Bradstreet's Awards 2018: Renewable Energy: Roof Top Solar and Gas Processing and Transmission Company
- ii) Economic Times 2Good CSR Rating- the only PSU to be feted in 'All Round Excellence' category- by Economic Times.
- iii) GAIL was conferred with Best Overall Performance Award for Upstream Sector Company by PCRA/ MoP&NG for Saksham activities.

14.1.4

Bharat Petroleum Corporation Limited (BPCL)



a) Activities and Performance 2018-19

Bharat Petroleum Corporation Limited (BPCL), a Maharatna CPSE, is an integrated oil company in the downstream sector engaged in exploration & production, refining and marketing of petroleum products. The Authorized Share Capital and Paid up Capital of the company as on 31st December, 2018 is ₹2,635 crore and ₹2,169.25 crore respectively.

BPCL has Refineries at Mumbai and Kochi with a combined refining capacity of 27.50 MMTPA as on 31st December, 2018. The Mumbai and Kochi Refinery are certified for ISO 9001, ISO 14001 and OHSAS 18001, had throughput of 10.98 MMT and 11.77 MMT respectively during 2018-19 (up to December 2018).

BPCL, with 11,935 employees, has an all-India presence through its extensive marketing network as on 31st December, 2018. The Market Sales of BPCL is 31.50MMT with market share of 23.58% with PSU (April to December, 2018).

b) Marketing Profile

BPCL has a robust distribution network comprising of 41 depots, 13 major installations, 24 TOPs, 51 LPG

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bottling plants, 56 Aviation Service Stations, 14651 Retail Outlets, 5641 LPG Distributorships, 1001 SKO Agencies, 3 lubricant blending / filling plants & 1 Lube filling Plant and 2241 KM BPCL group product pipelines as on 31st December, 2018.

c) Financial Performance

The financial performance (RE) of the Corporation during April – September, 2018: Gross Sales Turnover ₹1,64,789 crore and Profit After Tax (PAT) ₹ 3,511.97 crore

d) Exploration and Production

Bharat Petro Resources Limited (BPRL), a 100% subsidiary of BPCL, has Participating Interest (PI) in 25 blocks in 8 countries along with Equity stakes in 2 companies in Russia that hold the license to 4 Producing assets.

7 Indian blocks were acquired under various NELP bid rounds, 5 blocks were awarded under the Discovered Small Fields Bid Round 2016 and 1 block was awarded in the Open Acreage Licensing Policy Bid Round 1 in 2018. The foreign blocks were acquired through the bidding/farm-in process. As part of various consortia, BPRL has made world class discoveries in multiple geographies, specifically in Mozambique and Brazil; in addition to discoveries in Indonesia and India

which are in various stages of appraisal/development. BPRL has also been awarded one block, viz. CB-ONHP-2017/9 in the Open Acreage Licensing Policy Bid Round 1 in October 2018.

In 2018, BPRL along with ONGC Videsh and Indian Oil Corporation Limited acting jointly as the Indian Consortium have been awarded 10% Stake in Lower Zakum Concession, Offshore Abu Dhabi.

The consortium of ONGC Videsh (as Operator), BPRL, IOCL and OIL was also awarded the Offshore Block 32 in Israel in March 2018 with a Participating Interest of 25% each.

BPRL has invested approx. ₹21000 crore for its projects (till November, 2018).

e) Completed / Ongoing Projects

Refinery Projects

- i) Laying a Heat Traced Pipeline at Kochi Refinery: The project envisages laying of a Heat traced pipeline and associated facilities at Kochi Refinery for transporting High Pour Products. The approved cost of the project is ₹ 337.06 crore. The project is completed during the current year.



BPCL's LPG Bottling Plant at Bareilly

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- ii) Laying a Heat Traced Pipeline at Mumbai Refinery: The project envisages laying of a Heat traced pipeline and associated facilities at Mumbai Refinery for transporting High Pour Products. The approved cost of the project is ₹ 193.49 crore. The project is completed during the current year.
- iii) Installation of Gasoline Hydro Treatment Unit (GTU) to produce 100% BS-VI MS at Mumbai Refinery: The project envisages installation of Gasoline Hydro Treatment Unit (GTU) to produce 100% BS VI MS at Mumbai Refinery. The approved cost of the project is ₹ 554 crore and is currently on going.
- iv) Propylene Derivatives Petrochemical Project (PDPP) at Kochi Refinery: The project envisages production of niche Petrochemicals Acrylic Acid, Oxo Alcohols and Acrylates utilizing Polymer Grade Propylene produced from the Petro FCCU set up as a part of IREP. The approved cost of the project is ₹ 5245.96 crore and is currently on going.
- v) BS VI Motor Spirit Block Project (MSBP) at Kochi Refinery for 100% BS VI MS production: The Motor Spirit Block Project (MSBP) consists of NHT, NSU, CCR, Light Naphtha Isomerization Units and associated facilities for the production of 100% BS VI grade MS from Kochi Refinery. The approved cost of the project is ₹ 3288.96 crore. The Project is currently on going.
- vi) Setting up of facilities for production of Polyol, Propylene Glycol, and Mono Ethylene Glycol at Kochi Refinery: The Project envisages production of propylene based niche petrochemicals with high growth rate and demand such as Polyol, Propylene Glycol and Mono Ethylene Glycol utilizing propylene and ethylene feed stock from KR. The approved cost of the project is ₹ 11130 crore and is currently on going.
- vii) 2G Ethanol Bio Refinery at Bargarh, Odisha: The project envisages setting up 2nd Generation Bio Ethanol Refinery to produce 100 KLPD Ethanol using 400 MTPD lignocellulosic Biomass as feedstock (Rice Straw / Maize stalk) using indigenous technology. 2G Ethanol produced will be used for blending in Motor Spirit (MS). The project is currently on going.
- ii) LPG Import Facility at Haldia: The project envisages construction of 2 X 15000 MT refrigerated storage tanks for Propane & Butane, facilities for Ocean tanker unloading, Propane and Butane heating, Ethyl Mercaptan Dosing, LPG Bottling and dispatch in cylinders or in bulk through road tankers. This also entails laying of twin pipeline (one for Propane & other for Butane) from Jetty to Terminal. The approved cost of the project is ₹ 1097.54 crore and is currently on going.
- iii) POL Terminal with Railway siding at Haveli, Pune: The project envisages construction of a new rail fed POL terminal at Pune with approx. 45 TKL storage tanks, 12 bay tank lorry gantry, full rake single spur railway siding and associated firefighting facilities. The approved cost of the project is ₹ 282.64 crore and is currently on going.
- iv) Resitement of Raichur Depot to Gulbarga, Karnataka: The project envisages resitement of old depot of Raichur to Gulbarga on safety consideration and meet the present and future market demand from a new location on KIABD land of 56.2 acres near Nandur railway head in Karnataka. The approved cost of the project is ₹ 206.26 crore and is currently on going.
- v) Rerouting of Mumbai-Manmad pipeline: The project envisages laying of approx 50 km long 18' Dia API 5L X 65 Pipeline of Mumbai Mangliya section, construction of 3 SV stations and associated facilities. The approved cost of the project is ₹ 449.58 crore and is currently on going.

g) Corporate Social Responsibility

In alignment with the vision of the organisation, the CSR initiatives strive to 'energise lives' of the marginalised / underprivileged communities. There are 5 thrust areas for CSR projects/activities which are Education, Water Conservation, Skill Development, Health & Hygiene and Community Development. The highlight of the current year's CSR work has been the project "Swachh Bharat Mission' as a part of Government of India in which we have continued our work at Swachha Iconic Places i.e. Madurai Meenakshi Temple and Sri Adi Shankaracharya Janmabhoomi Tirth in Kalady. We have also constructed/refurbished

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more than 850 toilets in individual households/schools/communities.

CSR expenditure by BPCL stands at ₹ 61.22 crore during the current year till December, 2018 and during FY 2017-18 was ₹ 166.02 crore.

h) Contribution to Exchequer

BPCL's contribution to the Exchequer (RE) during April to September, 2018 is ₹ 44,768.03 crore.

i) Major Accolades / Awards received

- i) Kochi Refinery was conferred with the highest award in the State for Energy Conservation - the Kerala State Energy Conservation Award 2018 in the category of Large Scale Energy Consumers in Kerala on 27th December, 2018.
- ii) Mumbai Refinery was recognized with the Gold award on 6th December, 2018 in the India Manufacturing Excellence Awards 2018 (IMEA) instituted by Frost & Sullivan under the Process Sector, Mega Large Business category.
- iii) BPCL's CSR flagship project i.e. Project Boond was awarded the Silver Award by SKOCH in the Oil and Gas Category on 6th December, 2018.
- iv) Mumbai Refinery received the prestigious Dun & Bradstreet - Infra Award 2018 in the Industrial Plants category for its DHT project, signaling international recognition in the field of Project Management & Execution.
- v) BPCL was awarded 'SKOCH Award for Corporate Excellence 2018' under the category 'Market Leadership' on 19th September, 2018
- vi) BPCL received the 'Golden Peacock Award 2018' for 'Excellent Corporate Governance' from the Institute of Directors at London on 25th October, 2018.
- vii) The BPCL Brand Quiz Baadshah – 2018, a knowledge enhancement initiative, was adjudged as the largest Corporate Brand Engagement Program in Asia for employees and channel partners (RO dealers, LPG Distributors, Lube Distributors) and justifiably entered the Asia Book of Records and India Book of Records in 2018 with 12,646 participants.
- viii) Mumbai Refinery was awarded the prestigious FIPI (Federation of Indian Petroleum Industry) trophy on 31st August, 2018 for completing the Diesel Hydro Treatment (DHT) Project ahead of the time schedule with cost savings.
- ix) Mumbai Refinery has been adjudged as the winner of the 'MQH – Best Practices Competition'

under the Manufacturing category, conducted by IMC Ramkrishna Bajaj National Quality Award (RBNQA) Trust, Mumbai.

- x) In the prestigious Fortune Global 500 list for 2018, BPCL's rank is 314, a jump from last year's 360. BPCL's rank is 672 in the Forbes Global 2000 list for 2018.
- xi) BPCL Happy Roads has won the India Content Leadership Award 2018 for the Best Content in the Travel/ Tourism App category at the India Content Leadership Conference and Awards (ICLC) on 27th April, 2018

14.2 NAVRATNA PSUS

14.2.1

Hindustan Petroleum Corporation Limited (HPCL)



Hindustan Petroleum Corporation Limited (HPCL) is a Navratna CPSE and a S&P Global Platts top 250 Global energy company ranked at 58 with Annual Sales of ₹ 2,43,227 crore during FY 2017-18. HPCL has a strong presence in Refining & Marketing in India with about 21% market share in the PSU category.

The 2017-18 performance of the Corporation has qualified for 'Excellent' rating in terms of the MOU signed with the Government of India (basis self-evaluation).

a) Physical Performance

The total sale of products for HPCL during Apr-Sep'18 was 18.86 Million Metric Tonnes (MMT) with a growth of 4.8% over historical. During April to September, 2018, HPCL processed 9.28 MMT of crude at refineries and recorded Pipeline throughput of 10.7 MMT.

b) Financial Performance

During April to September, 2018, HPCL has achieved profit after tax (PAT) of ₹ 2,811 crore as compared to ₹ 2,659 crore of the same period in 2017-18.

c) Marketing and Associated Infrastructure

HPCL owns and operates Refineries at Mumbai & Visakhapatnam with designed capacities of 7.5. MMTPA & 8.3 MMTPA respectively. HPCL also owns the largest Lube Refinery in the country at Mumbai for producing Lube Oil Base Stock with a capacity of 428 TMTA (Installed capacity).

In addition, HPCL holds 48.99% equity stake in joint venture company, HPCL-Mittal Energy Limited

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(HMEL) which operates 11.25 MMTPA capacity refinery at Bathinda in the state of Punjab and also has 16.96% equity stake in Mangalore Refinery and Petrochemicals Limited (MRPL) which operates 15 MMTPA capacity refinery at Mangalore in the state of Karnataka.

HPCL has the second largest network of petroleum product pipelines in India with network length of about 3,370 km and a vast marketing network consisting of 14 Zonal Offices in major cities and 133 Regional Offices facilitated by a Supply & Distribution infrastructure comprising 42 Terminals, 42 Aviation Service Facilities, 48 LPG Bottling Plants, 6 Lube Blending Plants, 41 Inland Relay Depots and 27 Exclusive Lube Depots. The customer touch points constitute of 15,255 Retail Outlets, 1638 SKO/LDO dealers, 270 Lube distributors, 116 Clearing & Forwarding Agents and 5,305 LPG Distributorships with a customer base of over 7.5 crore domestic LPG consumers as of September 2018.

d) Exploration & Production

HPCL undertakes Exploration & Production (E&P) of hydrocarbons through its wholly owned subsidiary company Prize Petroleum Company Limited (PPCL). During 2017- 18, PPCL achieved total production of 33,752 barrels of crude oil from domestic oil field at Hirapur, Gujarat.

PPCL has a wholly owned subsidiary namely Prize Petroleum International Pte Ltd. (PPIPL), incorporated

in Singapore. PPIPL has 11.25% and 9.75% participating interests in two E&P Blocks, T/L1 and T/18P respectively in Australia. PPIPL has achieved its share of production of 459,269 BOE (Barrels of Oil Equivalent) from Yolla producing field (T/L1) in Australia.

e) Projects Completed

To strengthen the supply infrastructure, HPCL has commissioned Ramanmandi Bathinda Pipeline capacity expansion project and completed Resitement of tank wagon decantation facilities at Visakh black oil terminal along with augmentation of facilities at various locations in 2018.

In addition, HPCL expanded LPG infrastructure with commissioning of one of India's largest LPG plant at Panagarh in West Bengal with bottling capacity of 250 TMTPA and augmentation of facilities at a number of LPG bottling plants.

f) New Projects

i) Refinery Projects

HPCL has undertaken capacity expansion projects at both the refineries to increase the installed capacity of Mumbai Refinery from 7.5 MMTPA to 9.5 MMTPA and of Visakh Refinery from 8.33 MMTPA to 15 MMTPA along with the enablement for BS-VI grade fuel production at refineries.

In addition, HPCL is setting up a new 9 MMTPA capacity greenfield refinery-cum-petrochemical



HPCL's LPG plant at Panagarh in West Bengal

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complex at Barmer District of Rajasthan through a joint venture company, HPCL Rajasthan Refinery Ltd. (HRRL). Project activities have commenced for HRRL refinery project.

HPCL is also participating in setting up of 60 MMTA Integrated greenfield refinery-cum-petrochemical complex at Ratnagiri district of Maharashtra through a Joint venture company, Ratnagiri Refinery and Petrochemicals Ltd. (RRPCL).

ii) Marketing Projects

To cater to the growing demand of petroleum products in country in a cost effective and environment friendly manner, HPCL has undertaken a number of pipeline capacity expansion projects, viz. (i) Mundra Delhi Pipeline (MDPL) capacity expansion, and Extension line from Palanpur to Vadodara including new greenfield terminal at Vadodara, (ii) Visakh Vijayawada Secunderabad Pipeline (VVSP) Capacity Expansion including offshore tanker terminal (OSTT) / Sunken Ship (SS) Jetty Sub-Sea Pipeline at Visakh (iii) Extension of Visakh-Vijayawada-Secunderabad pipeline (VVSP) from Vijayawada to Dharmapuri & construction of marketing terminal at Dharmapuri. All these projects are progressing as per schedule.

In addition, Uran Chakan LPG pipeline project (with BPCL at 50:50 sharing basis) and Ramanmandi Bahadurgargh pipeline capacity expansion project are in advanced stage of completion.

To expand presence in Natural Gas business, HPCL is constructing a 5 MMTA LNG regasification terminal at Chhara Port in GirSomnath District of Gujarat through a Joint venture company HPCL Shapoorji Energy Pvt. Ltd. (HSEPL). HPCL is also participating in two separate Joint Venture companies viz. GSPL India Gas Net Limited (GIGL) and GSPL India Transco Limited (GITL) for laying, building and operating three (3) natural gas pipelines. During 2018, HPCL has formed a Joint Venture company HPOIL Gas Pvt. Ltd. to set up CGD networks in geographical areas of Kolhapur (Maharashtra) and Ambala-Kurukshetra (Haryana).

To expand footprints in overseas business, HPCL has formed a wholly owned subsidiary company – 'HPCL Middle East FZCO' in Dubai (UAE) for marketing of lubricants / petroleum products in the growing markets of Middle East and Africa.

administrative set-up of Ministry of Petroleum and Natural Gas, is engaged in the business of exploration, production and transportation of crude oil & natural gas both in-country and overseas. The authorized capital of OIL is ₹2,000 crore and the paid up capital is ₹ 1,134.90 crore. As on 31.12.2018, Government of India's shareholding is 63.2% of the paid-up equity share capital of OIL.

a) Domestic Portfolio

The domestic operations of OIL are spread over areas under onshore Petroleum Exploration License (PEL) and Petroleum Mining Lease (PML) in the states of Assam, Arunachal Pradesh, Mizoram, Andhra Pradesh, Puducherry and Rajasthan. Besides, OIL has also ventured into shallow and deep water in Krishna Godavari, Cauvery, Andaman and Mumbai offshore Basins either jointly or in partnership with other consortium partners.

OIL has 3 PELs covering area of about 332 sq.km granted on nomination basis in the country and 22 PMLs spread across an area of about 4826 square kilometres (sq.km.). These acreages are in the state of Assam, Arunachal Pradesh and Rajasthan. OIL has 5 Blocks under NELP as Operator with an area of 4144 sq. km. in the state of Assam, Mizoram, Andhra Pradesh / Puducherry and Rajasthan. OIL has 2 blocks under NELP as non-operator with 5301 sq. km. in Gujarat-Kutch (Shallow Offshore), West Bengal (Onshore). OIL also has 2 blocks with 121 sq. km in Assam and Arunachal Pradesh under Pre-NELP regime as non-operator.

OIL also holds 40% non-operating participating interest in one Contract Area awarded under DSF-I Bid round. In 2018, OIL has been awarded 9 (nine) blocks covering an area of 7,907 sq.km under OALP Bid Round-I as an Operator. These acreages are in the state of Assam, Arunachal Pradesh and Rajasthan.

b) Overseas Portfolios

OIL is currently holding overseas exploration blocks and participating interest in other business ventures in nine countries, viz. Libya, Gabon, Nigeria, Bangladesh, Venezuela, Mozambique, Russia, USA and Israel. In addition, OIL also holds stake in 741 Km long pipeline in Sudan. The details of oil and gas producing blocks are given below:

i) Russia – Vankorneft

OIL along with Indian Consortium partners - Indian Oil Corporation Limited (IOC) and Bharat Petro Resources Limited (BPRL) has acquired 23.9% stake

14.2.2

Oil India Limited (OIL)



Oil India Limited (OIL), a Government of India enterprise, 'A Navaratna Company' under the

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in Vankorneft, Russia w.e.f. 5th October, 2016. The asset is held through an SPV Vankor India Pte. Ltd. incorporated jointly by wholly owned subsidiaries of OIL, IOCL and BPRL in Singapore. As on 31st March, 2018, the 2P reserve position corresponding to OIL's participating interest in this asset has been estimated at 17.79 MMT of oil and 5.88 Million Metric Tonne of Oil Equivalent of Gas (MMTOE). During 2017-18, OIL's share of production in asset stood at 1.938 MMTOE. During April- December, 2018, OIL's share of production in asset stood at 01.411 MMTOE.

ii) Russia - Taas-Yuryakh

OIL along with Indian Consortium partners IOCL and BPRL has acquired 29.9% stake in LLC Taas- Yuryakh th Neftgazodobycha (TYNGD), Russia w.e.f. 5th October 2016. TYNGD is a producing asset with current production level of 2.502 MMTPA and expected peak production of 5 MMTPA by 2021. As on 31st March, 2018, the 2P reserve position corresponding to OIL's Participating Interest in this asset has been estimated at 12.34 MMT of oil. During 2017-18, OIL's share of production in asset stood at 0.18 MMTOE. During April- December, 2018, OIL's share of production in asset stood at 0.312 MMTOE.

iii) Russia: License 61

OIL acquired 50% shares in License 61, Russia (Area: 4991 sq. km) on 3rd July, 2014 from PetroNeft Resources Plc (PR). During 2017-18, OIL's share of production in asset stood at 0.0503 MMT. OIL's share of 2P hydrocarbon reserve position in the asset is 6.350 MMT as on 31st March, 2018. During April-

December 2018, OIL's share of production in asset stood at 0.032 MMTOE.

iv) USA: Liquid rich Shale Asset

OIL and IOCL have jointly acquired 20% and 10% respectively in Carrizo Oil & Gas Inc's ("Carrizo") liquid rich shale assets in the Denver - Julesburg (D-J) basin in Colorado, USA on 1st October, 2012. As on 31st March, 2018, the 2P reserve position corresponding to OIL's Participating Interest in this asset has been estimated at 0.689 MMT of oil and 0.105 MMTOE of gas. During 2017-18, OIL's share of production in asset stood at 0.025 MMTOE. During April- December 2018, OIL's share of production in asset stood at 0.016 MMTOE.

v) Venezuela: Project Carabobo

The Consortium comprising of OVL (11%), IOC (3.5%) and OIL (3.5%) was incorporated as M/s Petrocarabobo SA on 29th July 2010 for execution of Caraboro Project. As on 31st March, 2018, the 2P reserve position corresponding to OIL's Participating Interest in Project Carabobo has been estimated at 0.889 MMT. During 2017-18, OIL's share of production in asset stood at 0.050 MMT. During April- December 2018, OIL's share of production in asset stood at 0.029 MMTOE.

Other Overseas Exploration and Development Activities: Rovuma Area1 in Mozambique and Block OML 142 (Formerly OPL 205) in Nigeria are in developmental stage. 2 blocks in Bangladesh, 4 blocks in Libya and one block in Gabon are at exploration stage.



OIL_Monitoring of operations at OIL's Facility, Assam

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b) Physical Performance

Table No. 14.2 : The exploration and production activities undertaken by OIL in 2018-19 (upto December, 2018)

Parameter	Unit	2017-18 (Actual)	2018-19 Actual (Upto Dec'18)
Seismic Survey			
2D	LKM	139.000	14.440
3D	SKM	413.250	367.550
Drilling			
Exploratory	'000 Metre	65.405	33.903
	Wells	14.000	14.000
Development	'000 Metre	82.212	55.648
	Wells	28.000	11.000
Total (Exp+Dev)	'000 Metre	147.417	89.551
	Wells	42.000	25.000
Crude Oil Production			
	MMT		
Assam		3.3673	2.515
Arunachal Pradesh		0.0074	0.005
Rajasthan (Heavy Oil)		0.0016	0.0017
Total		3.3763	2.522
Natural Gas Production			
	MMSCM		
Assam		2658.525	189.297
Arunachal Pradesh		11.566	10.595
Rajasthan		211.406	164.904
Total		2,881.500	2070.796
LPG Production			
	'000 Tonne	34.110	24.543

Note: LKM – Line Kilometre; SKM – Square Kilometre; MMT – Million Metric Tonne; MMSCM- Million Metric Standard Cubic Metre

c) Hydrocarbon Discoveries and Reserve Position

OIL has made 3 oil and gas discoveries during the 2018-19 upto December, 2018 in the nominated areas of Assam. As a result of exploration and development activities, OIL has established 2P in-place volume of 817.05 MMT (oil) & 389.45 BCM (Gas) in the domestic sector. Similarly, the 2P remaining producible oil & gas volume of the company stands at 78.67 MMT and 127.58 BCM respectively.

d) Crude Oil Transportation

OIL operates a total network of 1220 km of crude oil pipelines. This pipeline transports crude oil produced from oilfields in Upper Assam to the public sector refineries at Numaligarh, Guwahati and Bongaigaon.

The pipeline runs through the states of Assam, West Bengal and Bihar traversing hostile terrain, dense forests and cuts across 78 rivers including the mighty Brahmaputra. In addition, crude oil is transported from Duliajan to Digboi Refinery through 30 kms pipeline. During the year, 2018-19 upto December 2018, OIL transported about 4.94 MMT of crude oil.

The natural gas produced in Assam is sold to different customers such as Brahmaputra Valley Fertilizer Chemical Limited (BVFCL), Brahmaputra Cracker and Polymer Limited (BCPL), Assam Gas Company Limited (AGCL), Tea gardens, etc. Since March 2011, OIL is also supplying gas to Numaligarh Refinery. The non-associated gas produced by OIL in Rajasthan is sold to Rajasthan Raja Vidyut Utpadan Nigam Limited (RRVUNL). OIL also produces Liquefied Petroleum Gas (LPG) in its plant at Duliajan, Assam.

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e) Renewable Energy Portfolio

OIL, as part of its strategic intent, has over the last few years diversified into the Renewable (Alternate) Energy Domain specifically into the Wind and Solar segments and as of 31st December 2018 has established Commercial nature Renewable Energy (RE) projects of 188.10 MW comprising of 174.10 MW of Wind Energy Projects and 14 MW of Solar Energy Projects. While the operational Wind Energy Power Projects are spread over the states of Rajasthan, Madhya Pradesh & Gujarat, the operational Solar Energy Power Projects are installed in Rajasthan and Assam.

f) Diversification

OIL holds 26% stake in Numaligarh Refinery Limited, 10% stake in Brahmaputra Cracker and Polymer limited, 23% stake in Duliajan – Numaligarh Pipeline Limited, 49% stake in Assam Petrochemicals Limited, 25% equity stake in Suntera Nigeria 205 Ltd., 50% shares in IndOil Netherlands B.V (through Oil India Sweden AB), 40% share in BREML (Beas Rovuma Energy Mozambique Ltd.), 50% share in World Ace Investments Ltd (through Oil India International B.V).

g) Corporate Social Responsibility

OIL has given due importance to its social and community responsibilities, and implemented several socio-economic schemes for the welfare development of people and communities in and around its operational areas in various states. As specified under Schedule VII of the Companies Act, 2013, OIL has embarked upon various CSR projects under key thrust areas such as healthcare and sanitation, project Swachh Bharat Abhiyaan, education, livelihood generation, skill / capacity building, women empowerment, environment and sustainability, development of sports, augmentation of rural infrastructure, etc.

14.2.3

Engineers India Limited (EIL)



A Navratna Company

Engineers India Limited (EIL) was established in 1965 with its head office in New Delhi to provide engineering and related technical services for petroleum refineries and related projects. Over the years, it has augmented its span of services and excelled in various fields to emerge as a leading Project, Design, Engineering and Turnkey (LSTK) contracting company in the fields of:

- » Petroleum Refining

- » Petrochemicals, Chemicals & fertilizers
- » Crude, Petroleum products & Gas Pipelines
- » Offshore/ Onshore Oil & Gas
- » Terminals & Storage
- » Sub Surface Strategic Storage
- » Mining & Metallurgy
- » Infrastructure & Urban Development

Since its foray in infrastructure sector, EIL has secured several noteworthy and significant assignments related to modernization/ development of international airports, intelligent buildings and water management.

An ISO 9001:2015 certified company, EIL has regional offices in Chennai, Vadodara and Kolkata; branch office in Mumbai, overseas engineering/ marketing office in Abu Dhabi, which is a hub of the company's activities in Middle East. There are Inspection/ Procurement offices at various locations all over India and also in London, Milan and Shanghai with construction offices at different project sites both in India and abroad. Besides, EIL has a wholly owned subsidiary, Certification Engineers International Ltd for providing certification and inspection services. EIL has a joint venture company, Ramagundam Fertilisers and Chemicals Limited, with National Fertilizer Limited (NFL) and Fertilizer Corporation of India (FCIL) for setting up a new Urea and Ammonia plant at Ramagundam, Telangana.

EIL provides a comprehensive range of project related technology and engineering services spanning from project conceptualizing to project commissioning which includes revamp, capacity expansion and modernization of plants.

a) Services Offered by EIL

i) Pre-Project Services

- » Feasibility Studies
- » Environment Impact Assessment Technology & Process Licensor election
- » Cost Estimation

ii) Project Implementation Services

- » Project Management
- » Process Design and Front End Engineering
- » Basic and Detailed Engineering

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Signing of MOU for 2018-19 by EIL with Ministry of Petroleum & Natural Gas

- » Procurement
- » Inspection and Third Party Certification
- » Construction Management
- » Commissioning and plant start-up Assistance

iii) Specialist Services

- » Heat and Mass Transfer Equipment Design
- » Environment Engineering
- » Information Technology
- » Specialist Materials and Maintenance
- » Plant Operations & Safety including HAZOPS & Risk Analysis
- » Corrosion Protection, Plant Integrity and Residual Life Assessment
- » Refinery Optimization Studies
- » Yield & Energy Optimization Studies

iv) Turnkey Contracting

- » EPC (Engineering, Procurement & Construction)
- » OBE (Open Book Estimate)

EIL has a multi-disciplinary engineering workforce and the company's employee strength at headquarters and in field offices including foreign offices was 2759 as on 30.11.2018.

In addition to pursuing excellence in engineering, EIL is a responsible Corporate Citizen and is committed

to good Corporate Governance practices. The Right to Information Act 2005 has been implemented in the company with a Public Information Officer and an Appellate Authority nominated to address issues under the Act. Information as per provision of the Act is posted in the company's website www.engineersindia.com. Besides, a web-based complaint management system has been implemented for handling complaints/ grievances from public, contractors, vendors, suppliers etc. Further, the Women's Forum of the company has a designated committee for dealing with complaints relating to sexual harassment.

b) Performance Highlights 2018-19 (Up To November, 2018)

i) Business Secured

During the current financial year (up to November, 2018), EIL secured new business worth ₹5756 crore.

Details of major jobs secured by the company are given below:

ii) Domestic Jobs

- » Execution of Residual Utilities and Offsites for Rajasthan Refinery Project on Open Book Estimate Basis for HPCL Rajasthan Refinery Limited (HRRL)
- » Project Management Consultancy Services for Execution of Rajasthan Refinery Project
- » Engineering, Procurement, Construction Management (EPCM) Services for Bio-Refinery

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- Project at Numaligarh, Assam EPCM Services for INDJET Unit at Barauni Refinery for IOCL
- » Project Management Consultancy Services for New Campus Design & Development of Indian Institute of Management, Nagpur at Mihan
 - » Engineering Review, Procurement & Construction Management Services for Phase-II of HP Green R&D Centre at Bengaluru for HPCL
 - » Pre-Project Activities for Rajasthan Refinery Project for HRRL
 - » Project Management Consultancy Services on Depository Basis for Redevelopment of Tripura Sundari Temple Complex for TTDCL at Udaipur, Tripura
 - » Consultancy for Third Party Assessment for Establishment of Bhamashah State Data Centre at Jaipur (Change Order) for Department of Information Technology and Communication, Government of Rajasthan
 - » LEPCM for 500TPD Methanol 200TPD Acetic Acid Plant at Namrup, Assam (Change Order) Project Monitoring and Consultancy for Construction of various IT related facilities in Rajasthan for Department of Information Technology and Communication, Government of Rajasthan
 - » PMC Services for Construction of LNG Truck Loading Facility at Dhabol for Konkan LNG
 - » Detail Design Consultancy Services for MS Block Revamp (Change Order) for Numaligarh Refinery Limited
 - » Detailed Feasibility Report on GGSPAP Expansion from 1200 KTPA TO 1500 KTPA for HMEL Bhatinda Refinery
 - » Engagement of consultant for preparation of DPR for proposed Brownfield Expansion of Smelter by addition of 5th Pot Line & Up-gradation of Existing Pot Lines 1, 2, 3 & 4 from 180 KA Technology to 220 KA Technology of NALCO at Angul, Odisha
 - » Health Assessment, Engineering, Procurement assistance for revival of Hydrocracker Unit at BPCL Mumbai Refinery
 - » Licensor Selection of Hydrogen Based Residue Upgradation Unit, HGU and SRU under MREP Phase II at HPCL Mumbai Refinery
 - » EPCM Services for Development of Khajekhalan Ghat at Patna Sahib, Patna for IOF.

iii) Overseas Jobs

- » Project Management Consultancy & EPCM Services for Dangote Refinery Project, Nigeria (Variation order no. 7)
- » Project Management Consultancy Services for Hail-Full Field Development - FFD for ADOC(Japan) in UAE
- » Consultancy Services Contract for supply of services (Quantitative Risk Analysis for Suhar Refinery New Crude Oil Tank and Single Buoy Mooring) for ORPIC, Oman

c) Financial Performance

The turnover and profit before tax of the company for FY 2018-19 (up to September 2018) was ₹1255 crore and ₹280 crore, respectively. The details of the financial performance of the company for 2018-19 (up to September, 2018) are attached in Annexure-I and Annexure - II.

d) Policy Initiatives Undertaken (up to December, 2018)

The significant policy initiatives taken during the current financial year include the following:

i) HR Development:

- Besides, the various ongoing HR interventions, measures, the following initiatives were pursued:
- » Organised Trainings are conducted for domestic and international clients in specialised Domain areas which generates revenue for the Company
 - » Assessment of level of People Capability Maturity Model (P-CMM) to establish a culture of excellence & become employer of choice
 - » Leveraging IT in HR: Continuous upgradation of HR Software for seamless integration with special focus on F&A system
 - » Conducted Assessment & Development Centres (ADCs) for senior executives to assess potential covered under this exercise against predefined competencies & identify developmental areas for them
 - » Apprenticeship & Vocational trainings are provided in Technical and Professional streams
 - » Creating a Learning Culture through regular Knowledge Sharing Sessions
 - » Revisit & Review of HR policies to bring in better employee engagement

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- » HR Audit has been undertaken during the year

ii) Technology & Sustainable Development

Technology Development Projects Initiated

- » Development of Novel Chimney type air distributor for fluidized bed gasifier handling high ash coal
- » Computational Fluid Dynamics (CFD) studies of new Air injection system for monitoring and controlling stack temperature in Sulphur recovery unit
- » Gasification studies of high ash coal in pilot coal gasifier
- » Kinetic model development for slurry phase hydrocracking reactions
- » Development of slurry phase reactor model
- » Development of high level Oxygen Enrichment (O₂ > 35%). Technology for capacity enhancement of Sulphur Recovery Units (SRU)
- » Development of Incinerator waste heat boiler bypass system for trouble free operation of SRUs
- » Development of Process Scheme and reactor design for production of Dimethyl ether (DME) from Methanol
- » Development of process for utilization of CO₂ for neutralization of alkaline stream in Effluent Treatment Plant (ETP)
- » Recovery of ammonia from refinery sour gases for production of anhydrous ammonia
- » Technology Development and Demonstration for production of Methanol from Syngas by coal gasification
- » Recovery of low level heat from process streams
- » Development of Organic Rankine cycle (ORC) technology

iii) Technology Commercialization Efforts made

- » Commissioning of SRUs (3 x 180TPD) of BORL successfully completed
- » Commissioning of both Tail Gas Treating Units (TGTUs) of BPCL Mumbai Refinery licensed by EIL completed successfully

- » c) Design of Oxygen enrichment facilities for capacity enhancement of two SRUs upto 25% (2x 421 TPD) at BPCL- Kochi
- » Basic Engineering Design Package (BEDP) preparation for Straight Run LPG treating and CR LPG treating for HRRL Refinery project
- » BEDP preparation for EngHOG unit at HRRL Refinery project
- » Commissioning of EngHOG unit at BORL licensed by EIL completed
- » Implementation of indjet unit at IOCL Barauni
- » Implementation of Process Integration and Solar Integration at GGS, ONGC Mehasana
- » Awarded Job of CFD Study of Feed Distributors of Fluid Bed Reactor System by M/s Jubilant Life Sciences Ltd
- » Awarded job of CFD study by M/s ADNOC Fertilizers, Abu Dhabi as part of Integrity Assessment Study for their Circulation Water Tank
- » Energy Efficiency Improvement Studies for 15 PSU Refineries completed successfully.
- » Energy Efficiency Improvement Study for Ruwais Refinery of ADNOC, Abu Dhabi
- » Order received from IOCL-Mathura for supply of PARLPAK (as part of EIL-Kevin MOU) in Amine Absorption Column, 307-C-01(M) of FCC Gasolene Desulphurization unit

iv) R&D Activities likely to be initiated in the remaining three months of 2018-19

- » Kinetic studies of coal from different sources using HPTGA
- » Demonstration of amine purification process at one of the Indian refineries.
- » Development of 3D CFD model for Fluidised Bed Coal Gasifier
- » Development of Population Balance Model for Particle Size Distribution changes due to attrition during pneumatic transport of coal – A tool for scale up and design of gasifier feeding system
- » Setting up of experimental facilities for water treatment by electrocoagulation
- » Setting up of experimental facilities for study of attrition of solids in solid processing systems

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v) Initiatives taken for strengthening technology tie ups

- » Renewal of membership for FY 2018-19 for:
 - Process Science Technology Center (PSTC), an industry-academia collaborative research program initiated by University of Texas, USA
 - Fractionation Research Incorporated (FRI), a non-profit cooperative research organization based at Oklahoma, USA
 - Process Integration Research Consortium (PIRC), University of Manchester UK
- » MOU signed with BHEL for joint development of coal to Methanol production technology by gasification of Indian Coal.
- » MOU signed with BEE for Energy Audit of Petrochemical Plants.
- » MOU under process with CSIR NCL-Pune for joint development of Methanol to Dimethyl Ether through dehydration route.

vi) Patents filed / granted

- » The following Patents filed earlier were granted this year(up to December, 2018):
 - Patent No. 296138: An apparatus and method for treatment of a sour stream
 - Patent No. 302055: Novel process for selective removal of Sulphur compounds from LPG with caustic
- » Four new patents are under process of filing

14.3 MINIRATNA CATEGORY – 1 CPSE

14.3.1

Balmer Lawrie & Co. Ltd. (BL)



Balmer Lawrie & Co. Limited (BL) is a multi-technology, multi-locational Company headquartered at Kolkata with operations spread through India. The company has significant transnational business interest with a joint venture in Dubai, Indonesia and subsidiary in UK. The Company also has several joint ventures in India.

The Company's business interest spans both Manufacturing and Services. The authorized and paid up capital of the Company were ₹ 120 crore and ₹ 114 crore respectively as on 31st March, 2018. Balmer Lawrie Investments Ltd., a Government Company hold 70,452,900 equity shares of ₹ 10 each (totalling

to about 61.8% of paid-up equity capital) of the Company. The Company achieved Net Turnover of ₹1797.10 crore during FY 2017-18 as against ₹1779.45 crore in FY 2016-17, representing a marginal increase of around 1% over the previous year. The Profit before Tax was ₹ 261.12 crore in FY 2017-18 as against ₹254.11 crore in FY 2016-17.

The major activities of the Company have been classified into Strategic Business units with fair autonomy in running of each business unit. The business units are shown as under classifying them under manufacturing and services :-

a) Manufacturing

- i) Industrial Packaging
- ii) Greases & Lubes
- iii) Performance Chemicals

b) Service

- i) Logistics Infrastructure
- ii) Tours & Travel
- iii) Logistics Services

c) Research & Development

- i) Technology Product Development, Kolkata
- ii) Applications research Laboratory, Kolkata
- iii) Product Development Centre, Chennai

The company also operates a wholly owned subsidiary in UK and vide joint ventures, two of which are outside the Country (one in UAE and the other one in Indonesia) and the rest are in India.

CSR activities undertaken by BL are:

- » Education.
- » Health.
- » Drinking Water & Sanitation.
- » Skill Development.

14.3.2

Chennai Petroleum Corporation Limited (CPCL)



Chennai Petroleum Corporation Limited (CPCL), formerly known as Madras Refineries Limited (MRL) was formed as a joint venture in 1965 between the Government of India (GOI), AMOCO and National Iranian Oil Company (NIOC) having a shareholding in the ratio 74% :13% :13% respectively. From time to time, the shareholding of CPCL has changed. In 2001, the GOI transferred its entire shareholding in CPCL to

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Indian Oil. Subsequently CPCL became a subsidiary of Indian Oil. In July 2003, NIOC transferred their entire shareholding to Naftiran Intertrade Company Limited (NICO), its 100% subsidiary. Currently Indian Oil holds 51.89%, while NICO holds 15.40%; the Financial Institutions, Public etc. hold the balance.

Shareholding pattern as on 31.12.2018 is as under:

DESCRIPTION	% TO SHARES
Indian Oil Corporation Limited	51.89
Naftiran Inter-trade Co. Ltd.	15.40
Public (including Employees)	8.97
Bodies Corporate	1.35
Banks, FIs and Insurance Companies	5.22
Mutual Funds and UTI	7.65
Non-Resident Indians/OCBs/FN/Foreign Portfolio Investors/Non-Resident Indians (Non Repatriable)/Alternative Investment Fund	9.52
Total	100.00

CPCL has two refineries with a combined refining capacity of 11.5 MMTPA. The Manali Refinery has a capacity of 10.5 MMTPA and is one of the complex refineries in the country with Fuel, Lube, Wax and Petrochemical feedstocks production facilities. CPCL's second refinery is located in Nagapattinam at Cauvery Basin (CBR). This unit was set up with a capacity of 0.5 MMTPA in 1993 which was later enhanced to 1.0 MMTPA.

CPCL has a Wax Plant of 30,000 metric tonnes (MT) capacity per annum, to produce paraffin wax for manufacture of candle wax, waterproof formulations and match wax. A Propylene Plant was commissioned in 1988 with an initial capacity of 17000 MT per annum to supply petrochemical feedstock to neighbouring downstream industries. The unit was revamped to enhance the propylene production capacity to 30,000 MT per annum in 2004.

The main products of the Company are LPG, Motor Spirit, Superior Kerosene, Aviation Turbine Fuel, High Speed Diesel, Naphtha, Bitumen, Lube Base Stocks, Paraffin Wax, Fuel Oil, Hexane, Petrochemical feed stocks and Petroleum Coke. CPCL also supplies Linear Alkyl Benzene Feedstock (LABFS) to a downstream unit for manufacture of Linear Alkyl Benzene.

a) Performance

i) Physical Performance

The company processed 10789 Thousand Metric Tonnes (TMT) of crude oil in the year 2017-18 and processed 7818 TMT of crude oil for the period April to December, 2018.

Parameter	2017-18 Actuals	2018-19 (upto Dec'18)
Crude Throughput in MMT	10.79	7.82
Total Distillate %	73.2	74.1

CPCL achieved the highest ever Total Distillates of 74.1% in 2018-19 (Up to December, 2018). The MBN during the period is 84.2 against the earlier best of 88.6 in 2017-18.

ii) Financial Performance

During the FY 2017-18, CPCL achieved a turnover of ₹44135 crore. For the current FY 2018-19, the turnover upto September 2018 is ₹27417 crore.

The details of financial performance are given below:

₹ in crore

Parameter	2017-18 Actuals	2018-19 (upto Sept'18)
Turnover	44135	27417
Profit Before Tax	1458	304
Profit After Tax	913	183

b) Projects

i) Major Projects Completed

- » **New Crude Oil Pipeline (42' size):** The new Crude Oil Pipeline Project which was implemented at an estimated cost ₹257.87 crore with enhanced safety features to ensure reliable and faster crude transfer from Chennai Port to Manali Refinery was commissioned on 24th December, 2018.

ii) Major Projects under Implementation

- » **Auto Fuel BS - VI Quality Improvement Project:** As part of BS - VI Quality Upgradation project, the following are being implemented at a cost of ₹1858 crore:
 - New FCC Gasoline Desulphurization unit of 0.6 MMTPA capacity
 - Revamp of existing DHDT unit from 1.8 to 2.4 MMTPA and
 - Other associated facilities

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These units are expected to be mechanically completed by September, 2019.

- » Re-Gasified Liquefied Natural Gas (RLNG): Usage of RLNG as Feed & Fuel in Hydrogen Reformers in place of Naphtha, as Fuel in place of Naphtha in Gas Turbines and as fuel in place of Fuel Oil in Process Heaters and Utilities Boilers, is under implementation at an estimated cost ₹421 crore. The project is scheduled to be completed in a phased manner starting from January, 2019. RLNG would be supplied by IOCL from their upcoming RLNG Terminal at Ennore to Manali Refinery.

iii) Future Projects

Refinery Expansion Project at CBR: Pre-feasibility for a new 9 MMTPA Refinery Expansion Project at CBR was carried out through M/s Engineers India Limited. The project has been approved in-principle and DFR is under preparation. The estimated cost of the project is ₹27460 crore ± 30% and is anticipated to be completed by 2023.

c) Corporate Social Responsibility & Sustainable Development:

The Company has an approved Corporate Social Responsibility Policy and CPCL plays the role of a responsible corporate citizen while discharging its social obligations. The CSR & SD activities focuses on health, education, women empowerment, Swachh Bharat activities, infrastructure development, etc., for ensuring sustainable development of the society to which it belongs. CPCL has spent a sum of ₹9.2 crore during 2017-18 for various CSR initiatives. During 2018-19, CPCL has so far spent an amount of ₹12.2 crore towards various CSR activities upto December, 2018.

Major area of CSR activities carried out during the year 2018-19 are Health, Education, Woman Development, Swachh Bharat, Divyangjans rehabilitation, etc.

14.3.3

Mangalore Refinery and Petrochemicals Limited (MRPL)



Mangalore Refinery and Petrochemicals Limited (MRPL) is a "Schedule -A" CPSE and a subsidiary of ONGC. The Refinery has a versatile design with high flexibility to process Crude with 24 to 46 API gravity and has high degree of Automation. MRPL is the only Refinery in India to have 2 Hydrocrackers producing Premium Diesel (High Cetane) and to have 2 CCRs producing Unleaded Petrol of High Octane.

The present capacity of the Refinery is 15 MMTPA. MRPL achieved the highest ever crude throughput of 16.31 MMT during the FY 2017-18 against 16.27 MMT during the previous year 2016-17 registering an increase of 0.25%. MRPL earned a Profit After Tax (PAT) of ₹2224 crore during the FY 2017-18 against profit of ₹3644 crore earned during the FY 2016-17. Company has declared dividend of ₹3/- per equity share of ₹10/- each for 2017-18.

MRPL continues to maintain major share of the direct sales segment of petroleum products market in Karnataka and adjoining states. MRPL maintained leadership position in its marketing zone for direct sales products such as Bitumen, Fuel Oil, Diesel, Sulphur, Petcoke, Xylol (Xylenes) etc. MRPL has commenced Diesel supplies directly to new Railway Consumer Depots during the period and has also expanded its retail network. The total domestic sales volume of all products during the FY 2017-18 has been 1786 TMT with a sales value of ₹5940 crore which is about 15.7% higher than previous year sales value of ₹5132 crore.

MRPL continues to enhance its market share for Polypropylene with introduction of new and niche grades. The company has made in-roads in new geographical areas and has enhanced its sales value in FY 2017-18 to ₹2639 crore compared to the previous year sales value of ₹2273 crore. The company has maintained its leadership position in the Polypropylene market of South India for its MANGPOL brand.

MRPL has also successfully marketed its entire production of Petcoke on consistent basis with a sales volumes of 809 TMT. Company also sold about 103 TMT Sulphur in its marketing zone and the surplus Sulphur is being exported in larger parcel sizes.

MRPL has also maintained timely supplies to State Trading Corporation, Mauritius which has a long term supply contract with MRPL. The company supplied 1065 TMT of petroleum products to STC Mauritius with a sales value of ₹3347 crore in FY 2017-18.

MRPL has commenced its retail expansion plan by releasing the advertisement for appointment of dealers for retail outlets in the state of Karnataka & Kerala and process to set up new retail outlets is going on. Letter of Intents have been issued to several shortlisted applicants for time bound commissioning of new retail outlets. Two new outlets were commissioned in the FY 2017-18.

MRPL holds 51% of the equity share of the ONGC Mangalore Petrochemicals Limited (OMPL). OMPL has setup an Aromatic Complex with an annual

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capacity of 914 KPTA of Para Xylene and 283 KPTA of Benzene in Mangalore Special Economic Zone.

Shell MRPL Aviation Fuel & Services Limited has steadily acquired business for sale of Aviation Turbine Fuel (ATF) at Indian airports. The company achieved a turnover of ₹543.29 crore during FY 2017-18 against turnover of ₹554.29 crore in the previous FY 2016-17.

a) Projects

Existing Projects - BS VI Upgradation: As per Auto Fuel Policy and directives for MoP&NG, the entire country is moving towards BS VI quality specifications for MS and HSD by 1st April, 2020. Products from the Refineries have to meet BS VI quality specifications from 1st January, 2020. MRPL has drawn a detailed roadmap to complete construction activities and attain mechanical completion by July, 2019 and roll out the products to Oil marketing companies from 1st January, 2020. MRPL requires additional units for MS and Revamp/Catalyst changes for HSD. As part of this project, new FCC Gasoline Treatment Facility, Sulphur Recovery Unit, Nitrogen and Utilities and Revamps of CHTU and DHDT is being carried out.

Axens, EIL, UOP are the licensors for the various units and EIL has been appointed as EPCM Consultant for the job. Environment Clearance for the project has been obtained. All long lead items ordering completed. Balance items ordering and Site grading job under progress. The project has a scheduled completion of Q3 of FY 2019-20.

b) Human Resources

- i) MRPL continues to enjoy cordial and harmonious relations with the collectives as evident from the fact that not a single day was lost on account of any industrial disturbance since inception.
- ii) Total employee strength as on 31st October, 2018 was 19196 including 129 women employees, 256 SC/ST employees and 28 Physically Challenged employees. 823 employees belong

to Management cadre whereas 1093 employees belong to Non-Management cadre.

- iii) During the FY 2017-18, MRPL devoted 3552.68 Man days for Training, Development and Learning which amounted to an average of 2.80 Man days per employee.

c) Energy Conservation

The company continued its emphasis on energy conservation through Process Optimization, Continuous monitoring and Implementation of several Energy Conservation modifications.

Major Energy Conservation measures taken during the year:

- i) Flare Gas Recovery System for Phase-3 Hydrocarbon flare header
- ii) Largest solar project within a Refinery site in India with an installed capacity of 6.063 MW Peak
- iii) Routing of Crude Distillation Unit-1 Full Range Naphtha to Crude Distillation Unit-2 Naphtha Splitter Unit, thereby stopping Crude Distillation Unit-1 Naphtha Splitter Unit.
- iv) Recovery of Heat from Crude Distillation Unit-1 short residue by generating Low Pressure Steam.
- v) Utilization of Condensate Transfer Pump for Heat Recovery Steam Generator-1/2 Make up water heater service, thereby stopping of Makeup water heater pumps
- vi) Improving the Heat transfer efficiency of Heat Recovery Steam Generator-2 by dry ice cleaning.

These measures resulted in estimated fuel savings (Standard Refinery Fuel equivalent) of 19635 SRFT/Year, equivalent to a net savings of nearly ₹ 46.12 crore/year, with an investment of nearly ₹ 49.85 crore.

d) Financial Performance Highlights

TABLE NO. 14.4 : FINANCIAL PERFORMANCE HIGHLIGHTS

Period		FY 2015-16	FY 2016-17	FY 2017-18
Throughput	MMT	15.53	15.77	16.31
Turnover (Gross)	₹ crore	50,864	57,037	63067
EBITDA	₹ crore	2,464	4,825	4462
PBT	₹ crore	1,174	3,234	2871.40
PAT	₹ crore	1,148	2,115	2224
GRM	\$ / Bbl	5.21	8.08	7.75

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14.3.4 Numaligarh Refinery Limited(NRL)



Numaligarh Refinery Limited (NRL) was incorporated on 22nd April, 1993. NRL's establishment is rooted in the "Assam Accord" signed by the Government of India on 15th August, 1985. NRL is a subsidiary of BPCL and operates a 3.0 MMTPA petroleum refinery at Numaligarh in Golaghat district of Assam. NRL is a Category-I Miniratna PSU. The Company's net worth as on 31st March, 2018 was ₹ 5,181 crore.

NRL's refinery has a high complexity factor owing to advanced secondary processing technologies that has enabled achievement of high distillate yield. Product slate of NRL comprises LPG, Naphtha, Motor Spirit (MS), Aviation Turbine Fuel (ATF), Superior Kerosene Oil(SKO), Mineral Turpentine Oil (MTO), High Speed Diesel(HSD), Raw/Calcined Petroleum Coke (RPC/CPC), Sulphur and Paraffin Wax.

NRL has an LPG Bottling Plant of 42 TMTPA capacity at Numaligarh. The company has two marketing terminals – one at Numaligarh, Assam and the other at Siliguri, Bengal from where products are dispatched by road and rail. Additional White Oil products, viz. MS, SKO and HSD are also transported from Numaligarh to Siliguri through the Numaligarh-Siliguri product pipeline (NSPL) owned and operated by Oil India Limited.

a) Performance

NRL has been operating with sustained profitability every year. NRL has succeeded in achieving highest Distillate Yield among all PSU oil refineries in the Country. NRL's Specific Energy Consumption (SEC) and Gross Refining Margin (GRM) are among the best in the Industry.

Physical and financial performance indicators of NRL during last three years and April – November, 2018 of the current financial year are as follows:

TABLE NO. 14.5 : PHYSICAL PERFORMANCE OF NRL

Parameter	15-16	16-17	17-18	18-19 (Apr-Nov)
Crude Receipt (TMT)	2,478	2,751	2,849	1,879
Crude Throughput (TMT)	2,520	2,683	2,809	1,937
Capacity Utilisation (%)	84.0	89.4	93.6	86.1
Distillate Yield (%)	90.42	86.5	86.68	86.5
Specific Energy Consumption (MBN)*	70.4	72.3	64.8	68.9
Energy Intensity Index (EII)	96.5	95.2	88.3	90.39

TABLE NO. 14.6 : FINANCIAL PERFORMANCE OF NRL

Parameter	15-16	16-17	17-18	18-19 Apr-Nov (Provisional)
Sales Turnover (₹/Cr)	11,923	13,945	15,922	12,234
PBT (₹/Cr)	1,883	3,148	3,142	2,106
PAT (₹/Cr)	1,222	2,101	2,045	1,368
GRM (\$/bbl)	8.06	8.50	11.43	12.95
Net Worth	4279	5,181	5,044	

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b) Projects

i) Projects under Implementation

- » **Indo-Bangla Pipeline:** NRL has initiated a proposal to construct a product pipeline from NRL's terminal at Siliguri to Parbatipur in Bangladesh. NRL and Bangladesh Petroleum Corporation (BPC) has entered into a Sale/Purchase Agreement for operation of 1 MMTPA capacity Indo-Bangladesh Friendship pipeline (IBFPL) from NRL's Siliguri Marketing Terminal in India to Parbatipur in Bangladesh. Product for export to Bangladesh on a sustained basis will be available after expansion of Numaligarh Refinery from 3 to 9 MMTPA. The estimated cost involved in laying the pipeline is ₹ 346 crore. Prime Minister of India and Prime Minister of Bangladesh jointly unveiled e-plaques for the ground-breaking ceremony of the India-Bangladesh Friendship Pipeline (IBFPL) on 18th September, 2018.
- » **Bio-Refinery Project:** The joint venture Assam Bio Refinery Private Limited' (ABRPL) was incorporated on 04th June, 2018. NRL has formed the joint venture company to set up a bio-refinery at Numaligarh with equity partnership of 50:50 between NRL and M/s Chempolis Oy (22%) of Finland and M/s Fortum 3 B.V. (28%) of Netherlands. The bio-refinery will produce fuel grade ethanol from bamboo, which is a ligno-cellulosic bio-mass for the first time in the country in a commercial scale using third generation technology developed by M/s Chempolis Oy. Besides ethanol, the bio-refinery will also produce furfural, acetic acid and bio-coal. The plant shall have capacity to process 300 TMT of Bamboo (Bone Dry) and shall produce 49 TMT of Ethanol together with associated platform chemicals. The feedstock will be sourced primarily from Assam, Nagaland, Arunachal Pradesh and Meghalaya. It is envisaged that setting up of the bio-refinery in North East, where bamboo is available in abundance, will open up avenues for agricultural income to marginal farmers and will also generate employment opportunities in bamboo handling such as cutting and transportation. Hence, setting up of the bio-refinery, which will involve foreign investors, is not expected to result in any exploitation of natural resources or to cause any adverse impact on growth of petroleum industry.
- » **North East Gas Grid:** The joint venture Indradhanush Gas Grid Limited (IGGL) was incorporated on 10th August, 2018 to set up the North East Gas Grid which will supply natural gas

to all the State capitals in the region. NRL's share in the joint venture is 20% which has four other promoters, namely IOCI, GAIL, ONGC and OIL with equal equity participation.

ii) Projects in Pipeline

- » **Refinery Expansion:** Demand of auto fuel has increased rapidly during the past 14 years. While HSD consumption is growing at a steady CAGR of 4.6%, MS growth has increased rapidly at a CAGR of 7.6% during this period. To meet the growing demand, particularly in the North East and Eastern part of the country where NRL supplies its products, NRL has planned for expansion of its refinery from 3 MMTPA to 9 MMTPA. Through this expansion, the refinery will also achieve economic scale of operation. In addition to increasing refining capacity, the expansion project includes construction of two cross-country pipelines: a) crude pipeline of 8 MMTPA capacity and 1,398 km in length from Paradip (Odisha) to Numaligarh (Assam) for transporting imported crude oil to the refinery, and b) product pipeline of 6 MMTPA capacity and 650 km in length from Numaligarh to Siliguri for evacuation of product. It is envisaged that construction of the crude pipeline will ensure crude oil security to all four North East refineries at a time when these refineries are operating below their installed capacities due to declining domestic crude oil production in the region. The estimated cost for implementing the expansion project and associated pipelines is in the range of ₹ 22,594 crore. The expansion proposal has been approved by both the Boards of NRL and its holding company BPCL. The project is under active consideration of Government of India.

c) Policy Initiatives Undertaken by NRL

NRL has undertaken several policy initiatives for growth and sustenance of the Company. Such initiatives comprise expansion of the refinery upto 9.0 MMTPA, sustained product export to neighbouring countries, particularly Bangladesh and Nepal, establishment of a Bio Refinery.

d) Conservation of Petroleum Products

NRL's Specific Energy Consumption is among the best in the Industry. NRL has implemented specific schemes such as Advance Process Control system for remaining process units to optimise process parameters and improving operating efficiency and reducing loss of petroleum products. Various measures are being persistently adopted for

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conservation of petroleum products. Some such measures comprise-

- » Storage of Turbine driven fuel oil pump and switched to motor. Saving of 3.5 TPH MP steam in lieu of 45KW motor. Net saving is 1200 MTOE.
- » Reduction of re-boiler steam in MSP-DIH with operational change. Net steam saving leading to saving of 300 MTOE.
- » 10 KW rooftop solar PV panel installed at NRMT Admin building and Control room.
- » Achieved zero steam leak by attending leaky steam traps and i/l valve.
- » Stoppage of steam tracing in SDU feed line and the tank heating steam coils of Solvent de-oiling unit stoppage.
- » Air compressor 3rd stopped (400 KW) with close monitoring, isolating the plant air at battery limit.
- » Reuse of storm water as CT make up at 300 m³/h.
- » PATII mandatory energy audit by PCRA and Energy efficiency improvement study by EIL done during the year. Recommendations taken up for implementation at various phases.
- » Overhauling of STG turbine and improvement in condenser vacuum done during the year lead to saving of 1500 MTOE.

- » GTG Exhaust to HRSG SH inlet heat loss plugging done. This lead to saving of 3000 MTOE.
- » Solomon study CY 2016 performance results received in September 2017.

e) NRL's Contribution to Development of the North East Region

NRL was established by the Government under provisions of the "Assam Accord" with the objective of providing the required thrust for socio-economic development of the North East region. Over the years, the company has been able to sustain stakeholders' expectations and is today the biggest operating industrial unit in the Region. Contribution of NRL for development of the North East regions is broadly summarised below.

i) Investment in Value Added Projects

NRL's refinery project was implemented within the approved project cost of ₹ 2,724 crore. Since commissioning of the refinery, NRL has been implementing several value added projects for ensuring sustenance and growth. All such projects are within the North East region, barring establishment of a marketing terminal at Siliguri at the North East border. NRL's total investment on such projects is in the range of ₹ 3,100 crore as per details below:



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TABLE NO. 14.8

Sl. No.	Project	Investment (₹ in crore)	Remark
1	LPG Bottling Plant of 10 TMTPA capacity	6	Commissioned in 2002-03
2	Coke Calcination Unit	90	Commissioned in 2004-05
3	Motor Spirit Plant of 225 TMTPA capacity	297	Commissioned in 2006-07
4	Siliguri Marketing Terminal	186	Commissioned in 2008-09 as linked project to the Numaligarh-Siliguri Product Pipeline of Oil India Limited
5	Diesel Quality Upgradation Project	435	Commissioned in 2010-11 for production of BS-III HSD at 100% capacity utilization
6	Naphtha Splitter Unit	87	Commissioned in 2013-14 for production upto 160 TMTPA Petrochemical Grade Naphtha
7	Wax Project	676	Commissioned in March 2015. NRL has emerged as the largest Wax producing unit in the Country with production upto 50 TMTPA Wax
8	Investment in joint venture: Assam Gas Cracker project	142	10% equity participation at Brahmaputra Cracker and Polymer Limited
9	Investment in joint venture: Natural gas pipeline from Duliajan to Numaligarh	43	26% equity participation at DNP Limited.
10	Diesel Hydrotreater Unit (DHT)	1,031	
11	Mounded Bullet Project	122	Mechanical Completion declared on 29.10.18
12	Investment in joint venture: Assam Bio Refinery Private Limited	13	Under implementation (50% equity participation)
13	Investment in joint venture: Indradhanush Gas Grid Limited	5	Under Implementation (20% equity participation)
14	Capacity augmentation of LPG Bottling plant from 10 to 42 TMTPA	10	Commissioned in 2017-18
	Total	3,143	

ii) Contribution to Exchequer

Since start of commercial operations and upto 2017-18, NRL has contributed over ₹ 26,849 crore to the Central and State Exchequers. NRL's contributions to the Exchequers during the last three years and current year upto November, 2018 are as follows:

(in ₹ crore)

	2015-16	2016-17	2017-18	2018-19 (Apr-Nov)
Central Exchequer	2,758	3,747	4,212	2,027
State Exchequer	327	606	459	170
Total	3,085	4,353	4,672	2,197

iii) Showcase of Industrial Success

Over the years, NRL has emerged as the showcase of industrial success, in the North East, thereby acting as an enabler for drawing in further investments into the region.

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14.3.5 ONGC Videsh Limited (OVL)



ONGC Videsh Limited (OVL), a wholly owned subsidiary and overseas arm of Oil and Natural Gas Corporation Limited (ONGC), the flagship national oil company of India. The primary business of the company is to prospect for oil and gas acreages abroad, which includes acquisition of oil and gas fields in foreign countries as well as exploration, production, transportation and sale of oil and gas. OVL holds 711.36 MMTOE of 2P Reserves and 738 MMTOE of 3P reserves spread across the globe. The total 2P reserve that OVL holds internationally is equal to 68% of 2P reserves held by ONGC in India. OVL production equals around 26.2% of the entire domestic oil production in India and around 20.7% of domestic oil & gas production of India. It is the 2nd largest Indian private or public company in terms of reserves and production, next only to its parent company ONGC.

Presently, OVL has stake in 40 oil and gas projects in 19 Countries, viz. Azerbaijan (2 projects), Bangladesh (2 projects), Brazil (2 projects), Colombia (7 projects), Iran (1 project), Iraq (1 project), Israel (1 project), Libya (1 project), Mozambique (1 Project), Myanmar (6 projects), Namibia (1 project), New Zealand (1 project), Russia (3 projects), South Sudan (2 projects), Sudan (2 projects), Syria (2 projects), UAE (1 project), Venezuela (2 projects), and Vietnam (2 projects). OVL has cumulatively invested US\$ 28.45 billion in overseas acquisitions and on capital expenditure. The company has produced 128 MMToE of crude oil and gas since inception.

OVL adopts a balanced portfolio approach and maintains a combination of producing, discovered, exploration and pipeline assets. OVL has oil and gas production from 15 Assets, 4 Assets where hydrocarbons have been discovered and are at various stages of development, 17 Assets are under various stages of Exploration and 4 projects are pipeline projects. OVL has total 41 oil and gas assets in 20 countries of which OVL has operatorship status in 14 blocks, joint operatorship in 7 blocks and non-operator in remaining 20 assets. Through geographical spread of overseas investment, OVL has enhanced its annual equity production to the level of 14.16 MMToE during 2017-18.

OVL has been partnering with global majors such as BP, Chevron, ExxonMobil, Rosneft, Shell, Petronas,

Petrobras etc in various projects. From all its projects, OVL retains the right to bring equity oil to India in most projects.

14.3.6 Bharat Petro Resources Limited (BPRL)



Bharat Petro Resources Limited (BPRL) is a wholly owned subsidiary and Exploration and Production (E&P) arm of Bharat Petroleum Corporation Limited (BPCL). Over the years, BPRL has built up a portfolio of assets that are presently in various stages of exploration/appraisal/pre-development/production.

Presently, BPRL has presence in the upstream segment in 8 countries with participating interest in 12 E&P blocks along with equity stake in 2 Russian entities holding the license to 4 producing assets. Of these, 12 blocks, 6 are in Brazil, and 1 each in Mozambique, UAE, Indonesia Australia, Israel and East Timor along with Equity stake in 2 Russian entities which hold the license to 4 producing assets.

BPRL has projects in various stages including 3 projects in production stage, 1 project in development stage and 7 projects in exploratory stage. BPRL's overseas projects are spread in Russia, Brazil, Mozambique, Australia, Indonesia, East Timor, UAE and Israel. Consortia, of which BPRL is a part, has made world class discoveries in multiple geographies, specifically in Mozambique and Brazil; in addition to discoveries in Indonesia and India which are in various stages of appraisal/development.

75 trillion cubic feet of recoverable natural gas resources has been discovered in Mozambique (BPRL holds 10% participating interest in the Block) and plans are under way to monetize the same by setting up of a 2 train LNG plant (of 6.44 MMTPA each) for initial Development. In Brazil, significant oil and gas discoveries have been made in the Sergipe Alagoas basin for which appraisal plans are under way. In Indonesia, a new prospect has been drilled with encouraging shows that will help in augmenting the already discovered reserves for progressing towards development.

In addition to equity stake in 2 Russian entities holding License to 4 producing assets, BPRL acquired equity stakes in the Lower Zakum concession in UAE in FY 17-18, in consortium with other Indian PSUs, entitling BPRL to its share of equity crude from the concessions.

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14.4 OTHER CPSES

14.4.1 Biecco Lawrie Limited (BLL)



Biecco Lawrie Limited (BLL), under the administrative control of the Ministry of Petroleum & Natural Gas (MoP&NG), was established in 1919 and became a Government Company in 1972. This is a medium sized Engineering Unit with diversified activities having two factories located at Kolkata.

BLL is a loss making Public Sector Unit under the administrative control of Ministry of Petroleum and Natural Gas, Government of India. The President of India directly holds 32.23% of the Company's shares while Oil Industry Development Board (OIDB) owns 67.33%.

BLL is making losses for the last several years. The accumulated losses have become more than the equity and the net worth has become negative. Hence, the company is registered in Board for Industrial and Financial Reconstruction (BIFR) under Sick Industrial Companies Act.

The major operations of the Company are as under:-

- » Switchgear & Spare Parts
- » Electrical Repairs
- » Projects
- » Lube Oil Blending & Filling

a) Closure of BLL

BLL is making losses for the last several years. The accumulated losses have become more than the equity and the net worth has become negative. Hence, the Government, after several initiatives to revive the company failed, had decided to close down the Biecco Lawrie Limited (BLL) including giving Voluntary Retirement Scheme (VRS)/ Voluntary Separation Scheme (VSS) to the employees of the Company on 10th October, 2018. The closure process is currently in progress and all the employees of the Company have been relieved on 15th December, 2018. The relieved employees have been paid their VRS/VSS, Ex-Gratia and Gratuity to the tune of ₹31 crore as on 21.12.2018. Further, the process of release of other payments to the employees is also underway and will be released after due authentication by the CA/Consultant. The Ministry is making utmost efforts

to ensure that the closure process is implemented in a smooth and time bound manner.

14.4.2 Balmer Lawrie Investments Limited (BLIL)



Government of India, in view of its planned deregulation of oil and globalization of the economy, decided to disinvest 33.58%, of its total equity holding of 59.58%, in IBP Company Limited (IBP) to a strategic partner with management control. Consequently, the shareholding of IBP, in its erstwhile subsidiary Balmer Lawrie & Company Limited (BL), was de-merged in favour of Balmer Lawrie Investments Limited (BLIL), which was incorporated on 20th September 2001 under the Companies Act, 1956. The President of India holds 59.67%, of its total paid up equity capital. BLIL is under the administrative control of Ministry of Petroleum & Natural Gas having its registered office at Kolkata.

BLIL is a non-banking financial Company as defined under section 45-I(f) of the Reserve Bank of India Act, 1934. BLIL does not carry on any business except to hold 1,00,64,700, equity shares of ₹10/- each of BL.

a) Joint Ventures/Subsidiaries

Joint Venture Companies - BLIL does not have any joint venture with any corporate entity.

b) Subsidiary Companies

BLIL has at present two subsidiary companies, namely Balmer Lawrie & Co. Ltd. (as per Section 4(1)(b) (ii) of the Companies Act, 1956 [which is referred to herein as 'BL']; and (ii) balmer Lawrie (UK) Ltd. (as per Section 4(1) (c) of the Companies Act, 1956).

14.5 OTHER ORGANISATIONS

14.5.1 Oil Industry Development Board (OIDB)



The Oil Industry Development Board was established on 13th January, 1975 under the Oil Industry (Development) Act, 1974 to provide financial and other assistance for development of Oil Industry. The functions of the Board, as defined in Section 6 of the Act, involve rendering financial assistance including loans and grants to the promotion of all such activities as are, in its opinion, conducive to the development of the Oil Industry.

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a) Organisational Setup

Oil Industry Development Board comprises of Secretary, MoP&NG as Chairman and other members namely Secretary, Department of Chemical and Petrochemical, Additional Secretary and Financial Adviser, MOP&NG, Additional Secretary, Department of Expenditure, Joint Secretary (Exploration), MOP&NG, Chairman IOCL, ONGC, GAIL, BPCL and HPCL, Director General of Hydrocarbons, Director(R&D) IOCL and Secretary, OIDB as Member Secretary.

b) Resources of the Board

The funds required for various activities as envisaged under the Act, are made available by the Central Government after due appropriation by Parliament from the proceeds of cess levied and collected on indigenous crude oil. So far, OIDB has received an amount of ₹902.40 crore from the Central Government. This amount together with internal receipts generated as interest income on loans given to various oil sector companies and short term investment of surplus funds has accumulated to ₹11,623 crore (provisional) as on 31st December, 2018.

c) Deployment of Funds

During 2017-18 (upto 31st December, 2018), OIDB has released grants to institutions viz. DGH, PCRA, CHT, OISD, PPAC and for R&D activities amounting to ₹276.54 crore. Indian Strategic Petroleum Reserves Ltd. (ISRPL), a wholly owned subsidiary of OIDB has been entrusted with the construction of strategic

storage for crude oil at three locations. During 2018-19 (upto 31st December, 2018), an amount of ₹38 crore was released to ISPRL as advance against equity. Besides, an amount of ₹2 crore has also been released to Hydrocarbon Sector Skill Council (HSSC) for its corpus.

14.5.2

Oil Industry Safety Directorate (OISD)



Oil Industry Safety Directorate (OISD) is a technical directorate under the Ministry of Petroleum and Natural Gas and has been entrusted with the responsibility of formulating standards, overseeing its implementation through safety audits in petroleum industry to enhance safety levels and reduce risk inherent with this industry. OISD standards cover the entire activities pertaining to hydrocarbon sector i.e. exploration & production, refining, gas processing, storage, distribution, environment etc. which are implemented on self-regulatory basis by the Oil & Gas companies.

Our goal is to enhance safety in Oil & Gas Installations in co-ordination with industry members both public and private sector.

a) Safety Audits by OISD: FY 18-19

OISD carries out periodic safety audits of all types of Oil & Gas installations to monitor their compliance with the OISD standards. OISD Safety Audit Performance for the year 2018-19 is as indicated below:

TABLE 14.9

Actions	Unit	Plan	Actual As on 31.12.18	Projection (Dec'18 to Mar'19)	Total
Core Audits					
Refineries & Gas Processing plants	Nos	17	15	2	17
Mktg. Installations	Nos	70	68	18	86
E&P Onshore Installations	Nos	50	51	0	51
E&P Offshore Installations	Nos	16	11	5	16
Cross Country Pipelines	Kms	8000	5068	2981	8049
Additional audits Pipelines Installations					
Single point Mooring Installations	Nos	02	03	0	03
Jetty Pipelines for Hydrocarbon Transportation	Nos	01	0	01	01
Pipelines Crude Tank farms	Nos	01	01	0	01

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b) Pre-Commissioning Safety Audits (PCSA)

To ensure safe & productive capitalization thereby enabling uninterrupted distribution of petroleum products for the public at large, OISD carries out pre-commissioning safety audits of projects across the Oil & Gas Industry. These audits are conducted where;

green-field developments and also major additional facilities at existing locations are being done, to ensure ab initio compliance of these facilities to the OISD standards at the construction stage itself.

During 2018-19, 32 numbers of such audits had been conducted on the request of the user Industry members. 874.38 Km of Pipeline was also audited in this context.

TABLE 14.10

Actions	Unit	Actuals
Pre Commissioning Safety Audits (PCSA 2018-19) upto December 2018		
Refineries & Gas Processing plants	Nos	12
Mktg. Installations	Nos	20
Cross Country Pipelines	Kms	874

c) 'Consent to Operate' for Offshore Installations

OISD, as the competent authority to oversee implementation of the Petroleum & Natural Gas (Safety in Offshore Operations) Rules, 2008 accords 'consent to operate' to offshore installations including Drilling Rigs. 6 mobile Rigs, 5 new fixed unmanned platforms and 1 Process Platform have been accorded 'consent to operate' during the year 2018-19.

d) Technical Seminar / Conference / Workshops

Technical Seminars / Conferences / Workshops for the Oil industry are conducted by OISD to discuss the latest technological developments, sharing of incident experiences etc.

During the year 2018-19 OISD has organized the following seminars/workshops:

- i) Workshop for Auditors on 'Audit of LPG Bottling Plant' was organized by Marketing Operations (LPG) group of OISD at HPCL LPG Bottling Plant, Ajmer on 26th April, 2018.
- ii) "Workshop for Auditors for Mounded Storage Vessels and its CP System' was organized by Marketing Operations (LPG) group of OISD at HPCL LPG Bottling Plant, Ajmer on 27th April, 2018.

iii) Workshop on inspection of LPG plants was organized at Bengaluru on 15th & 16th June, 2018 by Marketing Operations (LPG) group of OISD & IOCL jointly.

iv) Workshop on inspection of LPG plants was organized by Marketing Operations (LPG) group of OISD at IOCL LPG Bottling Plant, Varanasi on 28th August, 2018.

v) Workshop on 'Decommissioning and Abandonment of Oil and gas facilities' was organised by FIPI (Federation of Indian Petroleum Industry) in association with OISD E&P section on 5th September, 2018.

vi) Workshop on "Enhancing Auditor's Skill' was organized by OISD Marketing Operations (POL) group at HPCL Kanpur Terminal during 8th to 9th October, 2018 along with External Safety Audit of the location.

vii) "Workshop for Auditors for Mounded Storage Vessels and its CP System' was organized by Marketing Operations (LPG) group of OISD at IOCL LPG Bottling Plant, Varanasi on 15th October, 2018.

e) The Safety Council

To ensure proper implementation of the various aspects of safety in the Oil & Gas Industry in India, Government of India had set up a Safety Council at

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the apex under the administrative control of Ministry of Petroleum & Natural Gas. The Oil Industry Safety Directorate (OISD) assists the Safety Council, which is headed by Secretary, P&NG as Chairman and members represent the entire spectrum of stakeholders – PSU, Pvt. Sector & JVs – as well as relevant expert bodies. To review the safety performance of the Industry, the Safety Council meets at least once a year and 35th meeting of the Council was held on 17th October'2018.

Key issues discussed & reviewed during the 35th meeting are as under:

- i) Major activities undertaken in 2017-18 & Activity plan for 2018-19
- ii) Analysis of OISD Safety Audits Compliance status (ESA/SSA)
- iii) Approval for constitution of Executive Committee for smooth functioning of OISD
- iv) Approval for revision in Delegation of Powers for Executive Director (ED), OISD

f) Development of Safety Standards

OISD develops Standards/Guidelines/Recommended Practices for the oil and gas sector thru a participative process involving all the stakeholders (including the public at large), drawing inputs from international standards and adapting them to Indian conditions by leveraging the experience of the constituents. These standards cover inbuilt design safety, asset integrity and best operating practices in the field of production, processing, storage and transport of petroleum. OISD standards are reviewed periodically to ascertain needs of developing new standards, updating / amending existing standards to incorporate the latest technological developments as well as current experiences on the ground. As on date, OISD has developed 121 technical safety standards for the oil industry. 21 of these standards are mandatory for the entire Oil & Gas sector by dint of their being included in the Petroleum Rules 2002, the Gas Cylinder Rules 2016, the Static & Mobile Pressure Vessels (Unfired) Rules, 2016 and the Oil Mines Regulations 2017.

During the year 2018-19 OISD has formulated two numbers of standards for the safety of new target areas and revised/ amended 07 Numbers of the existing standards. These standards, after their approval in the 35th Safety Council Meeting held on 17th October, 2018 have been released for implementation by the Industry

OISD Standards for New Target Areas: To address the safety issues in the new target areas, OISD has developed following new standards:

- i) **OISD STD 245 on 'Safety for LNG Bunkering Facilities at Ports, for Large Ships, Coastal Shipping and Inland Water Transport (IWT) Terminals'** : In view of the revised marine fuel specifications that will come in effect from year 2020, more and more ships are switching over to cleaner fuels and use of LNG as ship fuel. Therefore, Indian ports would have to be ready for LNG bunkering in near future. Similarly, with expected increase in Cargo movement through coastal shipping and using inland water transport, use of LNG as fuel in smaller ships, ferries, barges, OSV's, etc. is likely to grow on account of economic and environmental considerations in line with international trends.

With the above in view; and with an objective of ensuring the safety of the upcoming LNG Bunkering Terminals in the country, Ministry of Shipping, Government of India, in its right earnest, advised Oil Industry Safety Directorate(OISD) to develop standard on Safety for LNG Bunkering Facilities at Ports, for Large Ships, Coastal Shipping and Inland Water Transport (IWT) Terminals.

The standard, after its approval in the 35th Safety Council Meeting held on 17th October, 2018, has been released for implementation by the Industry.

- ii) **OISD RP 243 "Recommended Practices on Coal Bed Methane (CBM) Operations'**: In recent years, the exploration and development of CBM has been under intense scrutiny in many parts of the world. The heightened concern of operational safety and environmental issues related to present-day production practices (including water production, fracturing, pipeline construction, storage facilities, water impoundment and disposal facilities, etc.) increases the importance of using practices and risk mitigation strategies that facilitate resource development in an effective, timely, and environmentally sound manner.

These issues have placed increased pressure on regulatory agencies and operators to develop and define best recommended practices and mitigation strategies to aid in minimizing and alleviating safety and operational risks.

To address the safety issues of the Coal Bed Methane Industry, OISD has developed a Recommendatory Practice OISD RP 243 "Recommended Practices on Coal Bed Methane (CBM) Operations'.

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The standard, after its approval in the 35th Safety Council Meeting held on 17.10.2018 has been released for implementation by the Industry.

- iii) **Encouragement of Safety Performance across the Industry through 'Oil Industry Safety Awards':** Annual evaluation of Safety Performance of the Industry members is done by a specially developed methodology, which takes cognizance of hazards associated, incident recorded during the year and safety management system of the installation. Organizations, achieving 'exceptional safety performance' during the year, are awarded with the Oil Industry Safety Awards. In addition, individuals either company employees or contract labors making exceptional contributions towards the cause of safety in their respective installations are also encouraged and presented with such awards.

Oil Industry Safety Awards, for the year 2017-18 have been finalized by an expert committee constituted for the purpose by MoP&NG. The awards are scheduled to be presented to the respective winners by the Minister of Petroleum & Natural Gas in the presence of Secretary, Petroleum & Natural Gas during the inaugural ceremony of 23rd Refining & Petrochemical Technology Meet (RPTM) to be held at Bombay Exhibition Centre, Mumbai on 12th January, 2019.

- iv) **Incident Investigation & Analysis:** OISD investigates as well as participates in investigation of major incidents (depending upon the severity/damage) to analyze root cause of the incident. A databank of incidents of the oil industry is maintained and analyzed to assess trends, areas of concern and required corrective action. These are then disseminated to the industry through safety alerts, advisory notes, workshops, training programs, website links etc. During 2018-19, 3 major incidents were investigated by OISD.

g) Other Major Activities

- i) **53rd Steering Committee Meeting:** 53rd Steering Committee meeting held on 13th April, 2018 with representatives from Oil & Gas industry (Principal Panelists) at OISD, Noida. Some of the major points discussed during the meeting are as under:

- » Adoption of New/ Revised/ Amended OISD Standards
- » OISD's ESA Plan Vis-à-vis Actual for the year 2017-18 of all sectors – E&P, Ref & GPP, Pipeline and Marketing groups
- » Review of implementation status of long pending critical ESA/SSA recommendations
- » Incident analysis for the last three years and review of implementation status of recommendations.
- » Safety issues related to Common Railway Siding.

- ii) **Safety Audits of Central Tank Farms (CTFs) associated with Upstream Operations:** During Safety Audits of Group Gathering Stations (GGS) of Upstream Sector, it was observed that Central Tank Farms (CTFs) associated with such GGS need more focused attention. As a measure to further enhance the Safety of such CTFs, OISD has included Safety Audits of such CTFs as separate entity. Henceforth, for the purpose of Safety Audits these Installations shall be treated as standalone facilities and all such locations shall be audited at a frequency of 3 years in line with Refineries and GPP Installations. During FY 18-19, External Safety Audits of 8 numbers of such CTFs have been carried out till date.

- iii) **Evaluation of Functionality checks of the critical firefighting equipment like HVLRLMs, ROSOVs, RSFPS, MEFG etc., at Marketing (POL) Installations – Another Safety enhancement initiative by OISD:** OISD, during safety audits of Installations, has been laying more focus on the functionality checks of the critical firefighting equipment like HVLRLMs, ROSOVs, RSFPS, MEFG etc. It may be mentioned that such state of the art firefighting equipment were installed in the Industry as part of M B Lal Committee recommendations.

In this regard, a comprehensive check list for checking the performance of such equipment for any given installation has been developed; and during audit of the installation detailed functionality checks of such fire critical equipment is ensured by OISD team.

As on 31st December, 2018, out of a total of 276 POL Installations of all the three OMCs put

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together, (locations except Class C/excluded petroleum & locations under resitement), functionality checks of 122 of such Installations have already been completed and for balance 154 locations, such checks shall be completed in the next two years.

- iv) **Streamlining Safety Audits Frequency of POL Installations based on Hazard Potential:** Since the current fiscal year, OISD has started the process of fixing the Safety Audits frequency of POL Installations based on the hazard potential of such Installations. Installations having aggregate storage capacity of more than 1 Lac KL Petroleum shall be audited every five years in place of the existing seven years' frequency. Safety audit of all the POL installations having aggregate storage capacity of more than 1 Lac KL Petroleum, which were due for audit as per revised frequency of five years during the current year i.e. 2018-19, has been completed.

14.5.3

Directorate General of Hydrocarbons (DGH)

Directorate General of Hydrocarbons (DGH) was set up on 8th April, 1993 with an objective to promote sound management of the Indian petroleum and natural gas resources having a balanced regard for the environment, technological and economic aspects of the petroleum activity.

a) Role and Functions of DGH

- i) To review the exploration programmes of companies operating under Petroleum Exploration Licences granted under the Oilfields (Regulation and Development) Act, 1948 and the Petroleum and Natural Gas Rules, 1959 with a view to advising Government on the adequacy of these programmes.
- ii) To evaluate the hydrocarbon reserves discovered and estimated by the operating companies.
- iii) To advise the Government on the offering of acreages for exploration to companies as well as matters relating to relinquishment of acreage by companies.
- iv) To review the development plans for commercial discoveries of hydrocarbon reserves proposed by the operating companies and advise Government on the adequacy of such plans and the exploitation rates proposed and matters relating thereto.

- v) To review and audit concurrently the management of petroleum reservoirs by operating companies and advise on any mid-course correction required to ensure sound reservoir management practices in line with the optimal exploitation of reserves and the conservation of petroleum resources.
- vi) To regulate the preservation, upkeep and storage of data and samples pertaining to petroleum exploration, drilling, production of reservoirs etc. and to cause the preparation of data packages for acreage on offer to companies.
- vii) Assist Government in Contract Management functions.
- viii) Exploration & Development of unconventional hydrocarbon resources like Gas Hydrate, Shale gas/oil and oil shale.
- ix) All other matters incidental thereto and such other functions as may be assigned by Government from time to time.

b) DGH Achievements for the FY 2018-19 upto December 2018

DGH is monitoring the E&P activities and contractual performance under Production Sharing Contracts (PSC), Revenue Sharing Contract and Coal Bed Methane (CBM) contracts regime. The brief achievements resulting from Exploration, development and production activities during 2018-19 upto December 2018 in contractual regime are as under:

- i) 2 crude oil discoveries notified
- ii) 1,928 square kilometres (SKM) of 3D Survey completed
- iii) Drilling of 17 exploratory wells and 79 development wells have been completed
- iv) Crude Oil Production of 7.513 MMT, Gas Production (including CBM): 4,180 MMSCM in 2018-19 upto December, 2018 in PSC Regime
- v) 5 Field Development Plans (FDP) of 2 blocks/ fields and 3 Revised Field Development Plans (RFDP) of 2 blocks approved
- vi) Commerciality declared for 6 hydrocarbon discoveries in 4 blocks

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Hydrocarbon Exploration and Licensing Policy (HELP) and Discovered Small Field (DSF) Policy. The online international competitive bidding process is managed by DGH. The award of acreages/ block is made based on the recommendations of DGH in a transparent manner. Government has delegated additional approval powers to strengthen the DGH.

h) Information Technology

In 2018-19, a number new online applications were developed and enhancements to the existing applications were carried out by the in-house team of DGH such as Benchmarking and Analysis System, Vessel Clearance Management System (VCMS), Environment Clearance facilitation System, Data Management, Data room Booking System, Rig Module, etc.

14.5.4

Centre for High Technology (CHT)



Established in 1987, Centre for High Technology (CHT) acts as the Technical Wing of MoP&NG for implementation of scientific and technological programmes of Govt. of India. Major functions of CHT include:

- » Performance Benchmarking of Refineries and Pipelines
- » Performance Improvement in Refineries through Best Practices, Special Studies, Operational Improvement and Process Technology
- » Energy Efficiency Improvement in Downstream Hydrocarbon Sector
- » Petroleum Product Quality Improvement
- » Sharing of Best Practices and Information & Knowledge Dissemination
- » Integration with Alternative Energies and New Initiatives in Downstream Sector for Future Sustainability
- » Promoting Innovations and R&D in Downstream Hydrocarbon Sector. Co-ordination of activities of Scientific Advisory Committee (SAC) on Hydrocarbons of MoP&NG

a) Major Activities Undertaken by CHT during 2018-19

- i) **Performance Benchmarking:** Performance Benchmarking of PSU refineries for the Study

Cycle 2018 has been initiated through M/s Solomon Associates (SA), USA. The Data Coordinators' Seminar was conducted by SA with participants from all refineries on 29th/30th November, 2018 at CHT. The Study Results will be available by November, 2019.

Performance Benchmarking Study for Pipelines (Liquid, Gas, LPG and SPMs) for 2018 cycle has also been initiated for the first time.

ii) Refinery Performance Improvement

- » **Energy Efficiency Improvement Study of PSU Refineries:** Refineries are included in PAT (Performance Achieve and Trade), under which each refinery is mandated to meet the Specific Energy Consumption Targets set for 2018-19. CHT was actively associated with BEE for target setting and has been monitoring the progress. CHT also initiated Energy Efficiency improvement studies for PSU refineries for Process Side through EIL and for Utilities Side through PCRA which were completed.

A Roadmap for Energy Reduction in PSU refineries till 2030, aligning with India's NDC of 33-35 % reduction in Specific Energy Consumption over base year of 2005, has been prepared.

- » **Development of Water Consumption Norms and Reduction of Water Footprint for Refineries** through EIL has been initiated and currently in progress.
- » **Approach Paper on demand side steam management** based on the best practices and Indian realities is planned through M/s KBC, Singapore and is expected to be completed by March, 2019.

- » **Performance Improvement Programme of PSU Refineries:** CHT, along with industry, finalised refinery-wise consultants for undertaking comprehensive Performance Improvement Programme of 9 PSU refineries in the First Phase. The Study for balance refineries will be taken up in 2nd phase.

- » In order to improve energy efficiency and reduce energy consumption, CHT, in association with refineries, organizes Surveys every year in the areas of i) Furnace/ Boiler Efficiency and ii) Steam leak. These two areas

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are taken-up every alternate year. Survey in the area of Furnace/ Boiler Efficiency was conducted during January, 2018. Survey in the area of Steam Leak will be conducted during January, 2019.

iii) **23rd Refining & Petrochemicals Technology Meet (RPTM):** 23rd RPTM, organised by CHT in association with BPCL, will be held during 12th to 14th January, 2019 in Mumbai. The Theme of the Meet is 'Aligning Refineries towards Sustainable Future'. Around 1000 delegates/invitees from India and abroad are expected to participate in the Meet. 23rd RPTM will have presentation of around 80 papers spread over 15 Technical Sessions and about 60 papers in Poster Sessions along with 16 Exhibition Stalls.

iv) **Indigenous Technology Development:** CHT co-ordinates the activities of Scientific Advisory Committee (SAC) on Hydrocarbons of MoP&NG in identifying and funding of research projects for downstream hydrocarbon sector. SAC approves and steers projects of national importance and refining operations. SAC is headed by Dr Anil Kakodkar, an eminent Scientist and DAE Chair Professor, BARC.

During 2018-19, SAC had two meetings till December 2018: 82nd meeting on 11th September 2018 and 83rd meeting on 17th November, 2018. SAC had detailed review of the on-going projects and new project proposals.

v) **Performance Awards:** CHT is actively associated with the following Annual Awards instituted by Ministry of Petroleum & Natural Gas, Government of India:

- » Refinery Performance Improvement Award
- » Oil & Gas Conservation Fortnight (OGCF) Award
- » Innovation Award

The Awardees for the first two categories are selected by the selection committee set up by MoP&NG. For the Innovation Award, the Awardees are selected by the committee constituted by Chairman, SAC, based on guidelines of Governing Council of CHT.

Refinery Performance Improvement Awards for 2017-18, OGCF Award for 2018 and Innovation

Awards for 2017-18 have been finalised by the Committee and will be presented to the winners during the Inaugural function of the 23rd Refining & Petrochemicals Technology (RPTM) on 12th January, 2019 in Mumbai.

vi) **Knowledge Dissemination and Experience Sharing Activity Committee Meetings:** With the aim of sharing of best operational practices & improvements and dissemination of information on latest developments, CHT organised various Activity Committee Meetings in critical areas/ technologies in refining sector and pipelines operations. A new Activity Committee Meeting on 'Quality Control' was started. Currently, 15 Activity Committees are in place.

- » A Compendium on Best Practices, including Takeaways from Activity Committee Meetings and Innovations in refining sector was prepared and shared with all refineries.
- » Discussion Forums on 10 major areas concerning the downstream hydrocarbon has been created on CHT portal. Specific queries can be posted by the authorised coordinators from PSU companies for seeking answers from an Expert Panel.
- » A Workshop on 'Improvement in Project Execution Strategies' was organised by CHT & EIL on 8th December, 2018 at EIL, Gurgaon.

vii) **Lab Co-relation Programme:** CHT initiated 'Inter Laboratory Correlation Programme' for better coordination of product quality at industry level. MS, HSD and ATF have been covered under this programme. The First Level of the Programme comprising one refinery from each zone & labs was completed in October, 2018. The Second Level, covering intra-zone, involving all refineries and major PPL/ Mktg. installations of the zone and one R&D lab was launched on 11th December, 2018 and is expected to be completed by May 2019.

viii) **Swachhata Ranking for PSU/JV Refineries:** Started in 2017, Swachhata Ranking of PSU/JV Refineries is a new initiative of the Ministry of Petroleum & Natural Gas. Refineries are ranked based on the Swachhata Index developed by Centre for High Technology. Swachhata Ranking for 2018 for PSU/JV Refineries is currently in progress.

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14.5.5

Rajiv Gandhi Institute of Petroleum Technology (RGIPT)



The Government of India as an Institute of National Importance under an Act of Parliament has established Rajiv Gandhi Institute of Petroleum Technology (RGIPT). The objective of the Institute is to offer technical and managerial educational programmes in the domain of Petroleum and Energy sectors. It has started academic programmes with a vision to create aspirations in the youth of the country towards the petroleum sector. It has also the mandate to serve as the fountainhead for nurturing world-class human capital capable of being the future leaders of technology and innovations in the entire hydrocarbon value chain with a view to serve both domestic and global needs in the sector. The institute is co-promoted by six oil PSUs and the Oil Industry Development Board (OIDB) under the patronage of the Ministry of Petroleum and Natural Gas.

The RGIPT offering undergraduate, postgraduate and doctoral programmes from its Jais, Amethi main campus. These programmes are:

- » B. Tech. in Petroleum Engineering (60 seats)
- » B. Tech. in Chemical Engineering (60 seats)
- » MBA (HR, Finance, Marketing, Energy Management) (50 seats)
- » M. Tech in Petroleum Engineering (20 seats)
- » M. Tech in Chemical Engineering (20 seats)
- » PhD in various Engineering, Basic Sciences and Humanities subjects

a) Major Highlights of the Year

RGIPT had successfully entered into 11th year of academic activities with around 500 students. The highlights are as follows:

- i) The seventh batch (academic session 2014-18) of B. Tech. (Chemical Engineering and Petroleum Engineering) graduated in the month of May 2018. The B. Tech. had a batch of total 63 students and out of which thirty students have been placed in various oil PSUs and private companies through campus placements drive.
- ii) The batch of 6 M. Tech. (Petroleum & Chemical Engineering) also graduated this year.

- iii) RGIPT has also entered into an agreement with Indian Oil Corporation Ltd. (IOCL) to provide 2-week residential training to their recently promoted officials. So far, training for the five batches of IOCL officials have been completed in the month of November 2018.
- iv) Prof. K. B. Akhilesh, President - BoG has been awarded with GUSI Peace Prize, 2018 by International Manila, Philippines.
- v) Prof. P. K. Bhattacharya, Director- RGIPT received Distinguished Speaker Award-2018 from Indian Institute of Chemical Engineers at CHEMCON-18.
- vi) Shri Anand Kumar (2nd year Petroleum Engineering Student) and Ms. Mrigya Fogat (1st year Petroleum Engineering Student) were 2 of the 5 Indians who got selected for the 4th edition of the World Petroleum Council Mentoring Program. The students will get a chance to attend the 6th WPC Youth Forum in St. Petersburg (23rd-28th June 2019), Russia and 23rd World Petroleum Congress in Houston, Texas, USA from 6th to 10th December, 2020.
- vii) NRC-ICSSR sponsored National Conference on 'Mapping Urbanization in India from Socio-Spatial perspectives' has been organized on 25th August, 2018 by two faculty members- Dr. Susham Biswas & Dr. Anirban Mukherjee.

b) Sivasagar, Assam Center

RGIPT Assam Centre has started offering diploma courses in Petroleum Engineering, Chemical Engineering and Piping Engineering from academic session 2017-18. The total intake in each course is 30. The admission in these courses have been done in the academic years 2017-18 and 2018-19 based on Polytechnic Admission Test (PAT), conducted by Directorate of Technical Education (DTE), Assam. The Institute has recruited 12 faculty members and other administrative staff for Assam Center.

The Government of Assam has allotted 100 acres land to RGIPT to develop the residential campus. A temporary campus has been constructed on the land comprising classrooms, staff rooms, canteen, etc and classes have started from academic session 2018-19 from there.

c) Bangalore Energy Institute

The Karnataka State Government has allotted 150 acres of land at Village Kambalipura, Hoskote Taluk, Bangalore free of cost in the year 2015 for setting up of Bangalore Center of RGIPT. The revised DPR has been submitted to MoP&NG envisaging the

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project cost of ₹ 1800.00 crore (₹ 800 crore for capital expenditure and ₹ 1000 crore for Endowment Fund).

The main objective of the Bangalore Energy Institute (BEI) would be to drive economic growth, technological property development (through patents), energy innovation and entrepreneurship. The Institute would lead innovative research, producing graduates that will be highly sought, and enabling dynamic knowledge and technology transfer. It would strive to achieve national priorities of Indian energy sector.

Academic activities from Bangalore centre commenced from academic session 2018-19 with three M. Tech programmes, namely- M. Tech. in Renewable Energy, M. Tech. in Power and Energy Systems Engineering and M. Tech. Energy Science and Technology from the rented premise of Visveswaraya Technological University-PG Centre (VTU). There shall be an intake of 12 students in each programme. A total nine faculty members have been recruited for Bangalore centre.

14.5.6

Indian Institute of Petroleum and Energy (IIPE), Visakhapatnam



The Establishment of Petroleum University in Andhra Pradesh named as 'Indian Institute of Petroleum & Energy (IIPE)' is a part of Andhra Pradesh Reorganization Act, 2014. Gazette notification regarding Andhra Pradesh Reorganization Act, 2014 was issued on 1st March, 2014. The 13th Schedule of the Act, among other items, provides for establishment of a Petroleum University in the successor state of Andhra Pradesh. The Institute is to be set up with the objective to meet the quantitative and qualitative gap in supply of skilled man power for the petroleum sector and to promote research activities needed for the growth of the sector recognizing the challenges as a domain specific institute in research in emerging areas like shale gas, Coal Bed Methane, Gas Hydrates, Renewable Energy etc.

Academic Year 2016-17

TABLE 14.11

Discipline	Intake	Existing Students	Total		Total		Total	
			Male	Female	Gen	OBC	SC	ST
Petroleum Engineering	50	46	41	5	25	13	7	1
Chemical Engineering	50	47	42	5	25	13	7	2
Total	100	93	83	10	50	26	14	3

The prestigious Indian Institute of Petroleum and Energy (IIPE), found its location in the heart of Visaladapatnam, proudly called, the City of Destiny.

A Society has been registered titled Indian Institute of Petroleum & Energy with members comprising of, C&MD HPCL (President), Secretary-Industries & Commerce Department, AP Government, Chairman IOCL, C&MD ONGC, C&MD GAIL, C7MD Oil India Limited, ED-HR HPCL (Secretary), and FA&CAO OIBD (Treasurer). Under the aegis of the Society, IIPE is being run as an Institute of National importance, at par with IITs, as announced by Union Cabinet of India. This shows a practical example of industry-academia interaction.

- » Full time Director has been appointed from 1st May, 2017 for a tenure of 5 years.
- » **Enactment:** The Institute has been enacted as an Institute of National Importance at par with IITs vide '**The Indian Institute of Petroleum & Energy Act, 2017 (No.3 of 2018)**'.

a) Board and Support

The Chairman & Managing Director of HPCL, Shri M. K. Surana is the Chairman of IIPE Board and all the infrastructural support / development is extended by HPCL apart from endowment contribution from public Sector Oil and Gas Companies.

b) Programs

Presently two programs B. Tech. (Petroleum Engineering) and B.Tech. (Chemical Engineering) with 50 seats each are being offered and the students are admitted based on their JEE (Advance) ranks. IIT Kharagpur is the mentoring Institute for IIPE.

Currently IIPE is having student strength of 262 with a faculty strength of 16 and non-faculty strength of 10 as of this day.

c) Admission Data

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Academic Year 2017-18

TABLE 14.12

Discipline	Intake	Existing Students	Total		Total		Total	
			Male	Female	Gen	OBC	SC	ST
Petroleum Engineering	50	42	36	6	18	14	8	2
Chemical Engineering	50	41	29	12	14	16	8	3
Total	100	83	65	18	32	30	16	5

Academic Year 2017-18

TABLE 14.13

Discipline	Intake	Existing Students	Total		Total		Total	
			Male	Female	Gen	OBC	SC	ST
Petroleum Engineering	50	46	43	3	28	14	4	0
Chemical Engineering	50	40	37	3	24	13	3	0
Total	100	86	80	6	52	27	7	0

d) Permanent Campus

The Government of Andhra Pradesh has made available an area admeasuring about 201.80 acres in Visakhapatnam for building permanent campus for IPE at Vangali Village, Sabbavaram Mandal, Visakhapatnam District vide proceedings of the District Collector, Visakhapatnam dated 24th November, 2017.

Foundation Stone for the permanent campus was laid by Chief Minister of Andhra Pradesh, Shri Nara Chandra Babu Naidu on 20th November, 2016 in the august presence of the then Minister for Urban Development and HE Vice President of India, Sri M. Venkaiah Naidu, Minister of Petroleum & Natural Gas, Shri Dharmendra Pradhan, former Minister of Civil Aviation, Shri P. Ashok Gajapathi Raju and former Minister of State for Science & Technology Shri Sujana Chowdary.

District Collector, Visakhapatnam issued proceedings dated 9th March, 2018 alienating Ac 175.74 Cts land excluding the portion which is in sub-judice.

MoUs were signed with Texas A&M University (TAMU) and University Houston (UoH) in June, 2018 for faculty exchange, research collaboration and students exchange program.

Presently there are three batches of students in the campus with first batch coming to third year.

14.5.7

Petroleum Planning & Analysis Cell (PPAC)



Petroleum Planning & Analysis Cell (PPAC) was created as an attached office of MoP&NG w.e.f. 1st April, 2002 after dismantling of the Administered Pricing Mechanism (APM) in the petroleum sector and abolition of the erstwhile Oil Coordination Committee (OCC). The mandate of PPAC, as stated in the Government resolution dated 30th March, 2002, is to assist the Government, inter alia, in discharge of the following functions:

- » Administration of subsidy on PDS Kerosene and domestic LPG and freight subsidy for far-flung areas;
- » Maintenance of an information data bank and communication system to deal with emergencies and unforeseen situations;
- » Analyzing the trends in the international oil market and domestic prices;
- » Forecasting and evaluation of petroleum import and export trends;
- » Operationalizing the sector specific surcharge schemes, if any.

PPAC maintains data related to production, consumption, import and export of crude and petroleum products, and oil infrastructure. It also

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maintains data related to production of natural gas, import of LNG and consumption of natural gas and on the CGD sector.

a) Price trends of petroleum products and impact of subsidy/under-recoveries

- i) **Crude oil:** Due to India's over reliance on imports to meet the domestic demand, the prices of crude oil and petroleum products in the international markets have a decisive influence on the domestic prices of petroleum products. The prices of crude oil, after continuously being at the level of more than \$100/bbl for over three years, started falling sharply during the second half of 2014. As a result, the average price of Indian crude oil basket during 2015-16, 2016-17 and 2017-18 was recorded at \$46.17/bbl, \$47.56/bbl and \$56.43/bbl respectively. The price has increased to \$72.81/bbl during the current financial year 2018-19 (up to 13th December, 2018).
- ii) **Petrol and Diesel:** The Government has made the prices of petrol and diesel market determined effective 26th June, 2010 and 19th October, 2014 respectively. Since then, the OMCs take decision on prices of petrol and diesel in line with changes in international market and domestic conditions. The OMCs have not only increased but also decreased the prices of petrol and diesel in line with changes in international prices and rupee dollar exchange rate.
- iii) **Domestic LPG (Subsidised):**
 - » Effective 1st January 2015, the PAHAL (DBTL) scheme, 2014 has been implemented in the entire country wherein the subsidy on Domestic LPG is being transferred to the eligible consumers directly to their bank accounts.
 - » PMUY scheme was launched on 1st May, 2016 for providing free LPG connections by Oil Marketing Companies (OMCs) to women belonging to the below poverty line (BPL) households and then whose names are appearing in the Socio- Economic Caste Census 2011. The said scheme was revised in March, 2018. Under the revised scheme, a total of 8 crore BPL households would be covered over a period of 4 years (till 2019-20) with additional inclusion of BPL families covered under either one of the following categories:

- » Antyodaya Ann Yojana (AAY)
- » Pradhan Mantri Awas Yojana (Gramin)
- » SC/ST households
- » Forest dwellers
- » Most backward classes
- » Tea and Ex- Tea Garden tribes
- » People residing in islands and river islands.

Till 13th December, 2018, 5.84 crore connections were issued under the scheme as per website www.pmujiwalayojana.com.

iv) PDS Kerosene

During the period 1st July, 2016 to 1st February, 2017, there was an increase of ₹3.23/litre in the issue price of PDS SKO. Further effective 1st April, 2017 Government had authorized PSU OMCs to increase the RSP of PDS Kerosene by ₹ 0.25 per litre (excluding state taxes) per fortnight during the period from 1st April, 2017 to 31st July, 2017. Thereafter, effective 1st August, 2017 Government authorized PSU OMCs to increase the RSP of PDS kerosene by ₹ 0.25 per litre (excluding GST) per fortnight till the reduction of Government subsidy to "NIL", or until further orders, whichever is earlier.

Based on the above Government authorizations, the total increase in RSP (excluding state taxes/GST and other elements) of PDS Kerosene since July, 2016 till 1st December, 2018 is ₹11.98/litre.

v) Subsidy/ Under-recovery

The total subsidy/under-recovery on petroleum products (including DBTL subsidy, PMUY subsidy, DBTK subsidy and Natural gas subsidy for North East) for the year 2017-18 was ₹28,684 crore in comparison to ₹27,301 crore in 2016-17. The same is ₹20,672 crore for the period April-September, 2018.

b) Important Activities

Some of the important activities undertaken by PPAC, were as follows:

i) De-novo study of SKO wholesale dealers' commission

MoP&NG had advised PPAC in December, 2017 that a de-novo study may be conducted for revision of wholesale dealers' commission on PDS kerosene. Accordingly, PPAC conducted a detailed study based on comprehensive

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questionnaires and audited financial statements of 320 wholesale dealers. The samples covered both urban and rural areas as well as dealers having underground storage facilities and those storing the product in barrels. This sample size was drawn on the basis of the state's PDS kerosene allocation and covered all the states and UTs getting allocation of PDS kerosene. The report of the study was submitted to MoP&NG in June, 2018.

ii) **Study on Parallel Marketing system**

PPAC carried out an in-house study on Parallel Marketing System of LPG in India during 2018-19. The purpose of the study was to provide policy makers with a comprehensive document on the parallel marketing system covering various aspects so as to assist them in policy formulation for this sector. The study was based on in-house data and information collected by PPAC over the past few years. It included various developments that have taken place in the Parallel Marketing System of LPG since its introduction in 1993 by the Government of India. It covered the current status of the Parallel Marketing System including inter alia, the number and type of players operating in the country, their market share in various segments, their LPG sales in various regions, infrastructure created by them etc. The study concluded with highlighting various issues affecting the growth of the system in a disciplined manner and also provided suggestions to address these issues. The report was submitted to MoP&NG in August, 2018.

iii) **Domestic natural gas pricing determination and issuance under the provisions of the New Domestic Natural Gas Pricing Guidelines, 2014**

Domestic Natural Gas prices were notified for the periods 1st April, 2018 to 30th September, 2018 and from 1st October, 2018 to 31st March, 2019 in line with the New Domestic Natural Gas Pricing Guidelines, 2014.

iv) **Domestic Natural Gas price ceiling in accordance with MoP&NG notification dated 21st March, 2016 for gas produced from discoveries in deep water, ultra- deep water and high pressure-high temperature areas**

Domestic natural gas price ceiling was notified for the periods 1st April, 2018 to 30th September, 2018 and from 1st October, 2018 to 31st March, 2019 in line with the notification issued by MOP&NG.

v) **PPAC authorised as nodal body to collect petroleum sector data (Implementation of SAS)**

In March, 2017 MoP&NG nominated PPAC as the nodal body for collection, compilation and analysis of all data related to the oil and gas sector. For computerization of the entire database of PPAC, an order was placed for procuring SAS software and its customization was undertaken. A series of workshops on master data, input formats and periodic reports were held in New Delhi and Mumbai in January, 2018 with OMCs, upstream companies, DGH, gas companies and CGD entities and inputs from data providers were taken to finalize the formats of inputs and reports to be generated. The Demand module of SAS has been completed and is live in progress since September, 2018. Through this module, the user can analyse historical and current data on POL sales year wise/ company wise/ product wise/ district wise etc. Currently, new formats pertaining to production of crude oil & natural gas and oil & natural gas processing, import-export and LPG data are being configured in the SAS system.

vi) **Energy Data Transparency Exhibition at the International Energy Forum (IEF) 16**

PPAC showcased its data collection activities during the Energy Data Transparency Exhibition in the IEF 16, in April, 2018. Director General, PPAC was the Indian lead speaker at the JODI Information Seminar on the topic titled "Benefit of energy data transparency for national administration/energy company". Director General, PPAC also chaired the session on "India's energy and oil outlook" in the 3rd technical meeting on "Asian Energy & Oil Outlook" organized by OPEC at Vienna.

vii) **"Highly Commended" award and shield of "Outstanding Contribution" to PPAC from MoDW&S (Ministry of Drinking Water &**

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Sanitation) for initiatives under Swachh Bharat Abhiyan

MoP&NG and MoDW&S constituted a special award 'Highly Commended' and also presented a shield for 'Outstanding Contribution' to PPAC for the sincere efforts in activities undertaken by MoP&NG during the Swachhta fortnight. The exemplary work done by PPAC employees during the Swachhta fortnight was recognized and acknowledged by MoP&NG and MoDW&S in a public function in July, 2018. PPAC also participated actively in the cleanliness drive 'Swachhta hi Sewa' and was amongst the top performers amongst grantee organizations of MoP&NG.

14.5.8

Petroleum Conservation Research Association (PCRA)



The Oil crisis of 1970s brought into sharp focus the need for conservation of petroleum products to enhance energy security and reduce import bill of country. The Government in response set up the Petroleum Conservation Action Group (PCAG) in 1976, which reported that a conservation potential of about 20% existed in major sectors of the economy. PCAG was subsequently reconstituted on 10th August 1978 as Petroleum Conservation Research Association (PCRA), a registered society under the aegis of Ministry of Petroleum & Natural Gas, Government of India.

PCRA is a National Government Agency engaged in promoting conservation of petroleum products and energy efficiency in various sectors of economy. It helps the Government in proposing policies and strategies for petroleum conservation to reduce the excessive dependence of the country on oil requirement. Some of the notable policy initiatives implemented/ in-progress are, development of fuel economy norms of heavy duty vehicles, development of fuel economy norms for light and medium commercial vehicles, bringing energy efficiency in tractor segment by setting up of fuel efficiency benchmark/ standard and labelling program for tractors, star-rating programs for LPG stoves, diesel mono pump sets and diesel generators.

PCRA aims at making oil conservation a national movement. In this regard PCRA undertakes various people centric activities to create awareness about the need and ways of fuel conservation and environment protection. These activities include agriculture workshops for villager/ farmers, domestic workshops for youth/ housewives, transport workshops for drivers, exhibitions, seminars and consumer meets. Recently, PCRA has also undertaken an initiative of Saksham Cyclothon to promote cycling as an alternative non-mechanized means for short distance travel. In order to promote fuel conservation among the masses PCRA also develops education films, TV spots, printed literatures etc.

PCRA also conducts driver training programs to provide practical training on eco-driving practices to drivers of commercial vehicle. PCRA also undertakes a number of activities in industrial sector to promote energy efficiency which include energy audit, ISO 50001 and Perform-Achieve-Trade (PAT) for designated consumers.

14.5.9

Petroleum and Natural Gas Regulatory Board (PNGRB)



The Petroleum and Natural Gas Regulatory Board (PNGRB) was constituted under the PNGRB Act, 2006 (NO. 19 of 2006) notified via Gazette Notification dated 31st March, 2006. The Act provides for the establishment of PNGRB to protect the interests of consumers and entities engaged in specified activities relating to petroleum, petroleum products and natural gas and to promote competitive markets and for matters connected therewith or incidental thereto. The Board under the Act has to regulate the refining, processing, storage, transportation, distribution, marketing and sale of petroleum, petroleum products and natural gas excluding production of crude oil and natural gas so as to ensure uninterrupted and adequate supply of petroleum, petroleum products and natural gas in all parts of the country. The vision of PNGRB is as under:

"To create a vibrant energy market with rapid and orderly growth through facilitation of flow of investments into the basic infrastructure for efficient transportation and distribution of petroleum, petroleum products and natural gas at minimum

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cost and high level of protection of consumer interests through fair trade practices and competition amongst the entities so as to ensure the enhanced competitiveness of Indian economy and customer satisfaction.'

In year 2017-18 (till 5th Jan. 2018), the Board has granted authorization to lay, build, operate or expand Kakinada-Vijayawada-Nellore Natural Gas pipeline on common carrier or contract carrier basis. Further, the Board has approved the authorization of Jagdishpur- Haldia -Bokaro-Dhamra Natural Gas Pipeline as well as six (06) City Gas Distribution (CGD) networks namely Varanasi, Patna, Ranchi, Jamshedpur, Bhubaneshwar and Cuttacken-route JHBDPLas per the Central Government Policy directive under section 42 of the PNGRB Act, 2006. Other CGD projects viz. Karnal (Haryana), Ambala & Kurukshetra (Haryana), South Goa (Goa), Yanam (Puducherry), Bagpat (Utttar Pradesh) and Kolhapur (Maharashtra) have been approved under 8th round of CGD bidding. Board has approved various amendments in the

regulations related to technical and safety standards for Petroleum, Petroleum Products and Natural Gas Pipelines.

At present, 96 Geographical Areas (GAs) across 23 States/Union Territories (UTs) are operational. Details are at **Table No.14.14**. In order to expand the coverage of CGD network, PNGRB had granted authorization for 84 GAs in 9th CGD Bidding Round. With the completion of 9th CGD Bidding Round, CGD would be accessible in 180 GAs covering approximately 280 districts (263 complete and 17 part) spread over 26 States and UTs. Details of GAs authorized under 9th CGD bidding round are at **Table No.14.15**.

PNGRB has also launched 10th CGD Bidding Round for development of CGD Network covering 50 Geographical Areas spread over 14 states and 124 districts (112 full and 12 part) on 8th November, 2018. Bid can be submitted by 5th February, 2019 **Table No.14.16**.

TABLE NO. 14.14 : LIST OF GEOGRAPHICAL AREAS COVERED BEFORE 9th CGD BIDDING ROUND

Sl. No.	Geographical Areas	State/Union territory	Authorized Entity
1	Dewas (part) District	Madhya Pradesh	GAIL Gas Limited
2	Kota (part) District	Rajasthan	Rajasthan State Gas Limited
3	Mathura (part) District	Uttar Pradesh	JV of DSM Infratech Private Limited & Saumya Mining Private Limited
4	Kakinada	Andhra Pradesh	Bhagyanagar Gas Limited
5	Sonipat (part) District	Haryana	GAIL Gas Limited
6	Meerut (part) District	Uttar Pradesh	GAIL Gas Limited
7	Chandigarh (UT) and Panchkula (part), SAS Nagar (part) & Solan (part) Districts	Chandigarh, Haryana, Punjab & Himachal Pradesh	Indian Oil-Adani Gas Private Limited
8	Allahabad (part) District	Uttar Pradesh	Indian Oil-Adani Gas Private Limited
9	Jhansi (part) District	Uttar Pradesh	Central UP Gas Limited
10	Jalandhar (part) District	Punjab	Jay Madhok Energy Private Limited
11	Bhavnagar	Gujarat	Gujarat Gas Limited
12	Jamnagar	Gujarat	Gujarat Gas Limited
13	Kutch West	Gujarat	Gujarat Gas Limited

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Sl. No.	Geographical Areas	State/Union territory	Authorized Entity
14	Kutch East	Gujarat	Jay Madhok Energy Private Limited
15	Ludhiana (part) District	Punjab	Jay Madhok Energy Private Limited
16	Bengaluru Rural and Urban Districts	Karnataka	GAIL Gas Limited
17	Panipat District	Haryana	Indian Oil-Adani Gas Private Limited
18	Palghar District and Thane Rural	Maharashtra	Gujarat Gas Limited
19	Raigarh District (excluding areas already authorized)	Maharashtra	Mahanagar Gas Limited
20	UT of Dadra & Nagar Haveli	Dadra & Nagar Haveli	Gujarat Gas Limited
21	UT of Daman	Daman and Diu	Indian Oil-Adani Gas Private Limited
22	Amritsar District	Punjab	Gujarat State Petronet Limited
23	Pune District (excluding areas already authorized)	Maharashtra	Mahesh Gas Limited
24	Ernakulam District	Kerala	Indian Oil-Adani Gas Private Limited
25	Udham Singh Nagar District	Uttarakhand	Indian Oil-Adani Gas Private Limited
26	Haridwar District	Uttarakhand	Haridwar Natural Gas Private Limited
27	East Godavari District (excluding area already authorized)	Andhra Pradesh	Godavari Gas Private Limited
28	West Godavari District	Andhra Pradesh	Godavari Gas Private Limited
29	Tumkur District	Karnataka	Megha Engineering & Infrastructure Limited
30	Krishna District (excluding area already authorized)	Andhra Pradesh	Megha Engineering & Infrastructure Limited
31	Dharwad District	Karnataka	Indian Oil-Adani Gas Private Limited
32	Belgaum District	Karnataka	Megha Engineering & Infrastructure Limited
33	Bhatinda District	Punjab	Gujarat State Petronet Limited
34	Saharanpur District	Uttar Pradesh	Bharat Petroleum Corporation Limited
35	Amreli District	Gujarat	Gujarat Gas Limited
36	Patan District	Gujarat	Sabarmati Gas Limited
37	DahejVagra Taluka	Gujarat	Gujarat Gas Limited
38	Rupnagar District	Punjab	Bharat Petroleum Corporation Limited
39	North Goa District	Goa	Goa Natural Gas Private Limited
40	Dahod District	Gujarat	Gujarat Gas Limited

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Sl. No.	Geographical Areas	State/Union territory	Authorized Entity
41	Banaskantha District	Gujarat	IRM Energy Private Limited
42	Anand District (excluding areas already authorized)	Gujarat	Gujarat Gas Limited
43	Panchmahal District	Gujarat	Gujarat Gas Limited
44	Fatehgarh Sahib District	Punjab	IRM Energy Private Limited
45	Yamunanagar District	Haryana	Bharat Petroleum Corporation Limited
46	Ratnagiri District	Maharashtra	Unison Enviro Private Limited
47	Rewari District	Haryana	Indraprastha Gas Limited
48	Dhar District	Madhya Pradesh	Naveriya Gas Private Limited
49	Rohtak District	Haryana	Bharat Petroleum Corporation Limited
50	Solapur District	Maharashtra	IMC Limited
51	South Goa District	Goa	Indian Oil-Adani Gas Private Limited
52	Karnal District	Haryana	Indraprastha Gas Limited
53	Ambala and Kurukshetra Districts	Haryana	Consortium of HPCL & Oil India Limited
54	Kolhapur District	Maharashtra	Consortium of HPCL & Oil India Limited
55	Bulandshahr (part) District	Uttar Pradesh	Indian Oil-Adani Gas Private Limited
56	Bagpat District	Uttar Pradesh	Consortium of Essel Gas Company Limited & Avinash EM Projects Private Limited
57	NCT of Delhi	Delhi	Indraprastha Gas Limited
58	Mumbai & Greater Mumbai	Maharashtra	Mahanagar Gas Limited
59	Bareilly (part) District	Uttar Pradesh	Central UP Gas Limited
60	Kanpur (part) District	Uttar Pradesh	Central UP Gas Limited
61	Pune City including Pimpri-Chiechwad & adjoining contiguous areas Hinjewadi, Chakan, Talegaon	Maharashtra	Maharashtra Natural Gas Limited
62	Vijayawada	Andhra Pradesh	Bhagyanagar Gas Limited
63	Thane Urban and adjoining municipalities	Maharashtra	Mahanagar Gas Limited
64	Indore (including Ujjain City) (part) District	Madhya Pradesh	Aavantika Gas Limited
65	Hyderabad	Telangana	Bhagyanagar Gas Limited
66	Agra	Uttar Pradesh	Green Gas Limited
67	Gandhinagar, Mehsana, Sabarkantha	Gujarat	Sabarmati Gas Limited
68	Gwalior (part) District	Madhya Pradesh	Aavantika Gas Limited

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TABLE NO. 14.15 : CGD AUTHORIZATIONS IN 9th CGD BIDDING ROUND

Sl. No.	Geographical Area (GA)	State/Union Territory	Winning Entity
1	Srikakulam Visakhapatnam & Vizianagaram Districts	Andhra Pradesh	Sub-Judice
2	Cachar, Hailakandi & Karimganj Districts	Assam	Consortium of Assam Gas Company Limited, Oil India Limited and GAIL Gas Limited
3	Kamrup & Kamrup Metropolitan Districts	Assam	Consortium of Assam Gas Company Limited, Oil India Limited and GAIL Gas Limited
4	Aurangabad, Kaimur & Rohtas Districts	Bihar	Indian Oil Corporation Limited
5	Begusarai District	Bihar	Consortium of Think Gas Investments PTE Limited
6	Gaya & Nalanda Districts	Bihar	Indian Oil-Adani Gas Private Limited
7	Diu & Gir Somnath Districts	Daman and Diu & Gujarat	IRM Energy Private Limited
8	Surendranagar District (Except areas already authorized)	Gujarat	Adani Gas Limited
9	Barwala & Ranpur Talukas	Gujarat	Adani Gas Limited
10	Navsari District (Except areas already authorized), Surat District (Except areas already authorized), Tapi District (Except areas already authorized) & the Dangs District	Gujarat	Adani Gas Limited
11	Junagadh District	Gujarat	Torrent Gas Private Limited
12	Kheda District (Except areas already authorized), Morbi District (Except areas already authorized) & Mahisagar District	Gujarat	Adani Gas Limited
13	Narmada (Rajpipla) District	Gujarat	Gujarat Gas Limited
14	Porbandar District	Gujarat	Adani Gas Limited
15	Panchkula District (Except areas already authorized), Sirmaur, Shimla & Solan (Except areas already authorized) Districts	Haryana & Himachal Pradesh	Indian Oil-Adani Gas Private Limited
16	Bhiwani, Charkhi Dadri & Mahendragarh Districts	Haryana	Adani Gas Limited
17	Hisar District	Haryana	Consortium of Haryana City Gas Kapil Chopra Enterprise & Rati Chopra
18	Jhajjar District	Haryana	Sub-Judice
19	Sonipat District (Except areas already authorized) & Jind District	Haryana	Hindustan Petroleum Corporation Limited
20	Nuh & Palwal Districts	Haryana	Adani Gas Limited

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Sl. No.	Geographical Area (GA)	State/Union Territory	Winning Entity
21	Bilaspur, Hamirpur & Una Districts	Himachal Pradesh	Bharat Gas Resources Limited
22	Bokaro, Hazaribagh & Ramgarh Districts	Jharkhand	Indian Oil Corporation Limited
23	Giridih & Dhanbad Districts	Jharkhand	GAIL Gas Limited
24	Chitradurga & Davanagere Districts	Karnataka	Unison Enviro Private Limited
25	Udupi District	Karnataka	Adani Gas Limited
26	Ballari&Gadag Districts	Karnataka	Bharat Gas Resources Limited
27	Bidar District	Karnataka	Bharat Gas Resources Limited
28	Dakshina Kannada District	Karnataka	GAIL Gas Limited
29	Ramanagara District	Karnataka	Maharashtra Natural Gas Limited
30	Kozhikode & Wayanad Districts	Kerala	Indian Oil-Adani Gas Private Limited
31	Malappuram District	Kerala	Indian Oil-Adani Gas Private Limited
32	Kannur, Kasaragod & Mahe Districts	Kerala & Puducherry	Indian Oil-Adani Gas Private Limited
33	Palakkad & Thrissur Districts	Kerala	Indian Oil-Adani Gas Private Limited
34	Bhopal & Rajgarh Districts	Madhya Pradesh	Consortium of Think Gas Investments PTE Limited
35	Guna District	Madhya Pradesh	Indian Oil Corporation Limited
36	Rewa District	Madhya Pradesh	Indian Oil Corporation Limited
37	Satna & Shandol Districts	Madhya Pradesh	Bharat Gas Resources Limited
38	Ahmednagar & Aurangabad Districts	Maharashtra	Bharat Gas Resources Limited
39	Valsad (Except areas already authorized), Dhule & Nashik Districts	Maharashtra & Gujarat	Maharashtra Natural Gas Limited
40	Latur & Osmanabad Districts	Maharashtra	Unison Enviro Private Limited
41	Sangli & Satara Districts	Maharashtra	Bharat Gas Resources Limited
42	Sindhudurg District	Maharashtra	Maharashtra Natural Gas Limited
43	Angul & Dhekanal Districts	Odisha	Bharat Gas Resources Limited
44	Sundargarh & Jharsuguda Districts	Odisha	GAIL Gas Limited
45	Balasore, Bhadrak & Mayurbhanj Districts	Odisha	Adani Gas Limited
46	Bargarh, Debagarh & Sambalpur Districts	Odisha	Bharat Gas Resources Limited
47	Ganjam, Nayagarh & Puri Districts	Odisha	GAIL Gas Limited
48	Jagatsinghpur & Kendrapara Districts	Odisha	Bharat Gas Resources Limited
49	Jajpur & Kendujhar Districts	Odisha	Bharat Gas Resources Limited
50	Karaikal & Nagapattinam Districts	Puducherry & Tamil Nadu	Torrent Gas Private Limited

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Sl. No.	Geographical Area (GA)	State/Union Territory	Winning Entity
51	Puducherry District	Puducherry	Consortium of SKN Haryana City Gas Distribution Private Limited and Chopra Electricals
52	SAS Nagar District (Except areas already authorized), Patiala & Sangrur Districts	Punjab	Torrent Gas Private Limited
53	Ludhiana District (Except area already authorized), Barnala & Moga Districts	Punjab	Consortium of Think Gas Investments PTE Limited
54	Jalandhar District (Except areas already authorized), Kapurthala & SBS Nagar Districts	Punjab	Consortium of Think Gas Investments PTE Limited
55	Barmer, Jaisalmer & Jodhpur Districts	Rajasthan	Consortium of AG & P LNG Marketing PTE Limited & Atlantic Gulf & Pacific
56	Alwar (Other than Bhiwadi) & Jaipur Districts	Rajasthan	Torrent Gas Private Limited
57	Kota District (Except area already authorized), Baran & Chittorgarh (Only Rawatbhata Taluka) Districts	Rajasthan	Torrent Gas Private Limited
58	Bhilwara & Bundi Districts	Rajasthan	Adani Gas Limited
59	Chittorgarh (Other than Rawatbhata Taluka) & Udaipur Districts	Rajasthan	Adani Gas Limited
60	Dholpur District	Rajasthan	Essel Gas Company Limited
61	Kanchipuram District	Tamil Nadu	Consortium of AG & P LNG Marketing PTE Limited & Atlantic Gulf & Pacific
62	Chennai & Tiruvallur Districts	Tamil Nadu	Torrent Gas Private Limited
63	Coimbatore District	Tamil Nadu	Indian Oil Corporation Limited
64	Cuddalore, Nagapattinam & Tiruvarur Districts	Tamil Nadu	Adani Gas Limited
65	Ramanathapuram District	Tamil Nadu	Consortium of AG & P LNG Marketing PTE Limited & Atlantic Gulf & Pacific
66	Salem District	Tamil Nadu	Indian Oil Corporation Limited
67	Tiruppur District	Tamil Nadu	Adani Gas Limited
68	Bhadradri Kothagudem & Khamman Districts	Telangana	Megha Engineering & Infrastructures Limited
69	Jagtial, Peddapalli, Karimnagar & Rajanna Sircilla Districts	Telangana	Indian Oil Corporation Limited
70	Jangaon, Jayashankar Bhupalpally, Mahabubabad, Warangal Urban & Warangal Rural Districts	Telangana	Megha Engineering & Infrastructures Limited
71	Medak, Siddipet & Sangareddy Districts	Telangana	Torrent Gas Private Limited
72	Medchal-Malkajgiri, Ranga Reddy & Vikarabad Districts	Telangana	Megha Engineering & Infrastructures Limited

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Sl. No.	Geographical Area (GA)	State/Union Territory	Winning Entity
73	Nalgonda Suryapet & Yadadri Bhuvanagiri Districts	Telangana	Megha Engineering & Infrastructures Limited
74	Gomati District	Tripura	Tripura Natural Gas Company Limited
75	West Tripura (Except areas already authorized) District	Tripura	Tripura Natural Gas Company Limited
76	Bulandshahr District (Except areas already authorized), Aligarh & Hathras Districts	Uttar Pradesh	Indian Oil-Adani Gas Private Limited
77	Allahabad District (Except areas already authorized), Bhadohi & Kaushambi Districts	Uttar Pradesh	Indian Oil-Adani Gas Private Limited
78	Amethi, Pratapgarh & Raebareli Districts	Uttar Pradesh	Bharat Gas Resources Limited
79	Auraiya, Kanpur Dehat & Etawah Districts	Uttar Pradesh	Torrent Gas Private Limited
80	Faizabad & Sultanpur Districts	Uttar Pradesh	Green Gas Limited
81	Gorakhpur, Sant Kabir Nagar & Kushinagar Districts	Uttar Pradesh	Torrent Gas Private Limited
82	Meerut District (Except areas already authorized), Muzaffarnagar & Shamli Districts	Uttar Pradesh	Indraprastha Gas Limited
83	Moradabad (Except areas already authorized) District	Uttar Pradesh	Torrent Gas Private Limited
84	Unnao (Except areas already authorized) District	Uttar Pradesh	Green Gas Limited
85	Dehradun District	Uttarakhand	GAIL Gas Limited
86	Burdwan District	West Bengal	Indian Oil-Adani Gas Private Limited

TABLE 14.16 : List of proposed Geographical Areas to be covered under 10th round CGD bidding

Sl. No.	State	Geographical Area
1	Andhra Pradesh	Anantpur and Cuddapah Districts, Nellore District
2	Andhra Pradesh, Tamil Nadu and Karnataka	Chittoor, Kolar and Vellore Districts
3	Bihar	Araria, Purnia, Katihar and Kishanganj Districts, Arwal, Jehanabad, Bhojpur and Buxar Districts, Khagaria, Saharsa and Madhepura Districts, Lakhisarai, Munger and Bhagalpur Districts, Muzafarpur, Vaishali, Saranand Samastipur Districts
4	Bihar and Jharkhand	Nawada and Kodarma Districts, Deoghar, Sheikhpura and Jamui Districts
5	Haryana	Kaithal District
6	Haryana and Punjab	Sirsa, Fatehabad and Mansa (Punjab) Districts
7	Jharkhand	Chhatra and Palamu District, Seraikela-Kharsawan District, West Singhbhoom District

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Sl. No.	State	Geographical Area
8	Karnataka	Bagalkot, Koppal and Raichur Districts, Chikmagalur, Hassan and Kodagu Districts, Gulbarga and Bijapur Districts, Mysore, Mandya and Chamarajnagar Districts Uttar Kanada, Haveri and Shimoga Districts
9	Kerala	Alappuzha, Kollam and Thiruvananthapuram Districts
10	Madhya Pradesh	Ashoknagar District, Gwalior (Except already authorized) and Sheopur Districts, Morena District, Raisen, Shajapur and Shehore Districts, Shivpuri District, Sidhi and Singrauli Districts, Ujjain (except area already authorized), Dewas (except area already authorized) and Indore (except area already authorized) Districts
11	Madhya Pradesh and Chattisgarh	Anuppur, Bilaspur and Korba Districts
12	Madhya Pradesh and Rajasthan	Jhabua, Banswara, Ratlam and Dungarpur Districts
13	Madhya Pradesh and Uttar Pradesh	Jhansi (Except area already authorized), Bhind, Jalaun, Lalitpur and Datia Districts
14	Punjab	Firozpur, Faridkot and Muktsa Districts, Hoshiarpur and Gurudashpur Districts
15	Rajasthan	Ajmer, Pali and Rajsamand Districts, Jalor and Sirohi Districts
16	Uttar Pradesh	Azamgarh, Mau and Balia Districts, Bareilly (Except area already authorized), Pilibhit and Rampur Districts, Basti and Ambedkarnagar Districts, Farukhabad, Etah and Hardoi Districts, Gonda and Barabanki Districts, Jaunpur and Ghazipur Districts, Kanpur (except area already authorized), Fatehpur and Hamirpur Districts, Mainpuri and Kannauj Districts, Mirzapur, Chandauli and Sonbhadra Districts, Shahjahanpur and Badaun Districts
17	Uttar Pradesh and Uttarakhand	Bijnor and Nainital
18	West Bengal	Darjeeling, Jalpaiguri and Uttar Dinajpur, Howrah (Except Area already authorized) Districts and Hoogly Districts (Except Area already authorized), Nadia (Except Area already authorized) Districts and North 24 Pargana Districts (Except Area already authorized), South 24 Pargana (Except Area already authorized) District

14.5.10

Indian Strategic Petroleum Reserves Limited (ISPRL)



Keeping in view India's high import dependence for oil and gas and in the interest of meeting the objective of country's energy security, Ministry of Petroleum and Natural Gas (MoP&NG), in pursuance to the decision of the Union Cabinet on 7th January, 2004 took up construction of crude oil reserve facilities as a buffer to deal with any situation of supply chain disruption due to external reasons. A Special Purpose Vehicle (SPV) called Indian Strategic Petroleum Reserve Limited (ISPRL) was created on 16th June, 2004. ISPRL has been mandated to build and operate strategic

crude oil reserves. Subsequently, on 9th May, 2006, ISPRL became a fully owned subsidiary of Oil Industry Development Board (OIDB).

a) ISPRL Phase - I

Under Phase I of Strategic Petroleum Reserve (SPR) programme, Government through ISPRL, has built SPR facilities with a total capacity of 5.33 MMT at three locations viz. Visakhapatnam (1.33 MMT), Mangalore (1.5 MMT) and Padur (2.5 MMT). The total reserve of Phase-I of SPR is currently estimated to supply approximately 10 days of India's crude requirement.

The facilities at Vishakhapatnam and one compartment of Mangalore storage facility have already been filled with crude oil and commissioned

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with Sovereign crude procured through funds provided by the Government.

A Definitive Agreement was signed on Oil Storage and Management between ISPRL and Abu Dhabi National Oil Company (ADNOC) of UAE for filling of Second compartment at Mangalore. Under the Agreement, ADNOC would store 5.86 million barrels of crude oil in one of the caverns of the Mangalore Strategic Petroleum Reserve (SPR) facility created by ISPRL. The first cargo of ADNOC crude oil (VLCC named "New Inspiration"), was received on 21st May, 2018 by Joint Secretary (IC), MOP&NG, Director Marketing Sales & Trading, ADNOC and CEO & MD, ISPRL in the presence of other senior officials from various Companies / Government Authorities at an event at ISPRL, Mangalore.

This was followed by two more shipments of 2 million barrels each. One was received on 6th October, 2018 (Pacific Glory) and the final shipment on 3rd November, 2018 (Al-Salmi). ADNOC has completed filling up its share of crude oil at Mangalore in November, 2018 as per the Agreement.

The SPR facility at Padur is an underground rock cavern with a total capacity of 2.5 MMT having four compartments of 0.625 MMT each. The Padur facility has been commissioned in December, 2018. The crude oil from Mangalore Cavern B was transferred to Padur for commissioning through 36km pipeline from Mangalore to Padur.

The Union Cabinet approved the filling of Strategic Reserves at Padur, Karnataka by overseas National Oil Companies (NOCs) on 8th November, 2018.

Pursuant to the decision ISPRL signed a Memorandum of Understanding with Abu Dhabi National Oil Company Limited on 12th November, 2018 for storage of crude oil in two compartments (total approximately 9.6 million barrels) of Padur phase I storage.

b) ISPRL Phase - II

The Union Cabinet on 27th June, 2018 gave "In Principle" approval for establishing 6.5 MMT Strategic Petroleum Reserves at two locations Chandikhol (4 MMT) in Odisha and at Padur (2.5 MMT) Karnataka including dedicated SPM's for the two SPR's. The 'In

Principal' approval is to take up the project under PPP model to reduce budgetary support of Government of India.

On completion of 6.5 MMT storage envisaged in Phase II, there will be an additional storage capacity created to cover another 12 days of crude oil requirement. Thus, the total cover would be approximately 22 days.

Roadshows involving consultation process and one on one interactions were done in New Delhi, Singapore and London. Minister of Petroleum and Natural Gas and Skill Development, Shri Dharmendra Pradhan inaugurated the ISPRL Road Show at Delhi.

14.5.11

Society for Petroleum Laboratory (SFPL)



Society for Petroleum Laboratory (SFPL) is an independent laboratory registered under the Societies Registration Act. It was set up and made operational under the guidance and direction of MoP&NG in 2000 in compliance with Supreme Court directive of July 1998. The basic objective of setting up of this laboratory at Noida is to monitor the quality of transportation fuels independently, which acts as a deterrent to malpractices of fuel adulteration and/or prevention of selling substandard quality fuels to the consumers. Funding to the Society for meeting annual expenses for operation and management of FTL is granted by MoP&NG from the Budget under "Grants-in-Aid".

Society for Petroleum Laboratory (SFPL) has been allocated an amount of ₹242 lakhs under Grant-in-aid for financial year 2018-19 (₹1,93,46,262 lakhs under General Head (after deducting previous FYs unspent balance of ₹36,53,738/- under this head) and ₹12 lakhs under salary head.

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In Every Way ...



Chapter 15

General



General



15.1 PROGRESSIVE USE OF HINDI IN OFFICIAL WORK

With a view to promote official language Hindi in the official work in the Ministry and its undertakings, the Ministry of Petroleum & Natural Gas (MOP&NG) took a number of steps so as to increase its usage. These steps include organizing of Hindi Workshops, on the spot inspections of the sections of the Ministry and its undertakings, organizing of Hindi fortnight, organizing meetings of Hindi Advisory Committee, Official Language Implementation Committee, etc.

There is a Hindi Advisory Committee functioning in the Ministry under the Chairmanship of Minister for Petroleum and Natural Gas. The Committee consists of six Members of Parliament, nine non-official members as its members, besides senior officers of the Ministry and PSUs of the Ministry as its official members. The function of the committee is to render advice to the Ministry for promotion of official language in official work. The minutes of the meeting held on 21st December, 2017 has been circulated and the concerned officers have been requested to take follow-up actions on the suggestions given by the Members of the Committee in the meeting. The term of the Hindi Advisory Committee expired on May, 2018 and it is being reconstituted.

Similarly, an Official Language Implementation Committee is also functioning in the Ministry under the Chairmanship of Joint Secretary (M). The function of this committee is to review the progress of official language in the Ministry and its undertakings and give suggestions for the promotion of the same. Regular meetings of the committee were organized during the year under review and follow up action was taken on the suggestions of the committee.

The Committee of Parliament on Official Language visited 17 offices of our PSUs which includes offices of ONGC, IOCL, BPCL, HPCL, GAIL, CHT, OISD, CPCL, ISPRIL, etc., and reviewed the progress of official language in these offices. A number of times, the Committee appreciated the efforts taken by these offices for the promotion of Hindi. Follow up action has been taken on the assurances given to the Committee by these offices. Senior officers of the Ministry also took part in these meetings.

During the year under review, the Ministry notified 32 Offices of Oil & Gas PSUs under Rule 10(4) of Official Language Rules, 1976. With a view to assessing the progress of official language in our PSUs and in pursuance of the targets fixed in the Annual Programme 2018-19 issued by the Department of Official Language, Senior Officers of the Ministry inspected more than 72 offices of our PSUs and reviewed the progress of Hindi in these offices. On the spot suggestions were given to the officers concerned for removing the deficiencies.

With a view to assist the officials to do their maximum work in Hindi and to remove their hesitation to do the same, regular Hindi workshops were conducted in the Ministry. Large number of official attended these workshops and benefitted from the suggestions given in these workshops. As a result of this, percentage of Hindi correspondence in the Ministry has increased considerably.

In pursuance of the directions of the Department of Official Language, Hindi Fortnight was organized in the Ministry from 1st September, 2018 to 15th September, 2018. During this occasion, a Message from the Minister for Petroleum & Natural Gas was issued to all our officers as well as to all the

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PSUs. Various activities including different Hindi Competitions were conducted during this fortnight. Large number of officials of the Ministry participated in these competitions and successful candidates were given awards. Secretary, P&NG awarded the successful candidates of Hindi Fortnight in a prize distribution ceremony convened on 27th September, 2018 in Speaker Hall, Constitution Club, New Delhi.

The Ministry had introduced a Rajbhasha Shield Scheme for oil & gas PSUs to enable them to compete with each other for the use of Hindi in official work in their respective organizations. Under this scheme, suitable awards were given to the successful PSUs by the Secretary, P&NG in a prize distribution ceremony convened on 27th September, 2018 in Speaker Hall, Constitution Club, New Delhi.

One of the important task assigned to the Hindi Division of the Ministry is of translation of various documents of the Ministry. The Hindi Division successfully carried out these responsibilities. The translation of various documents including Parliament Questions, Cabinet Notes and Parliament Standing Committee material was done well in time.

15.2 PUBLIC GRIEVANCES

In accordance with guidelines of the Cabinet Secretariat, Government of India, the Public Grievance Cell has been functioning in MOP&NG. The Cell has been attending to the grievances of members of the public against the Public Sector Oil & Gas Companies and other organizations under the administrative control of this Ministry.

All possible efforts are being taken to ensure the regular monitoring of the public grievances received through Department of Public Grievances (DPG), Department of Administrative Reforms and Public Grievances (DARPG) and other Departments of the Government as well as the members of the public.

An online system called "Centralized Public Grievance Redressal and Monitoring System (CPGRAMS) has been introduced in the month of June, 2008. With the aid of CPGRAMS, public grievances from the public and others are received speedily, analysed promptly according to its subject and forwarded to the concerned for faster resolution.

In addition, a systematic mechanism in MoP&NG has also been evolved so as to ensure speedy and expeditious redressal of the public grievances. The review of pendency of PGs in the MoP&NG and Oil & Gas PSUs is undertaken regularly by Senior Officers.



As on 31.12.2018,

95.41% of Public Grievances received stand disposed

During the year 2018-19, out of total number of 18095 Public Grievances received, 95.41% stands disposed of as on 31st December, 2018.

15.3 RIGHT TO INFORMATION

Right to Information (RTI) Act-2005 has been implemented in the Ministry of Petroleum & Natural Gas as per Gazette Notification of Government of India dated 15th June, 2005. RTI Act is inter-alia designed to promote transparency and accountability in the functioning of public authorities.

As per provision of the Right to Information Act-2005, the Under Secretary / Assistant Director / DDO in the Ministry of Petroleum & Natural Gas have been designated as Central Public Information Officers (CPIO) in respect of their work allocations. Accordingly, the Director/Deputy Secretary/Economic Adviser in the Ministry of Petroleum & Natural Gas have been designated as First Appellate Authority (FAA). The list of CPIO/FAA of this Ministry is being updated regularly in view of change in allocation of work.

Information under Section 4(2) of RTI Act 2005 i.e. to provide information Suo Motu to the public at regular interval is being regularly updated on the Ministry's website.

An on-line system called RTIMIS has been introduced by DoP&T. With the aid of this online system, applications and appeals received from public are being speedily disposed of within the stipulated time frame. To provide information to people in timely and trouble free manner and to promote transparency, all Oil & Gas PSUs and other organisations under the administrative control of this Ministry are now on DoP&T's online RTIMIS portal.

In order to ensure digitalization of records, RTI applications and appeals received in physical form are being scanned, uploaded and forwarded to concerned CPIO and FAA of the Ministry for speedy and timely disposal.

During January to December 2018, 2544 applications/receipts and 170 appeals have been received under RTI Act, 2005 in the Ministry.

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15.4 FLAGSHIP SCHEME

15.4.1 StartUp India

The CPSEs have set up their StartUp fund aggregating to ₹320 crore for 3 years. The oil & gas PSUs under this Ministry have selected a total of 61 StartUp Projects for funding, incubating and mentoring, support and signed MOU with various IITs/IIMs/other academic institutions for mentoring/ support for the first round of StartUp

15.4.2 Skill Development

12 Qualification Packs (QPs) of Priority Trades related to oil and gas sector have been approved for imparting training at 6 Skill Development Institutes (SDIs) i.e. Bhubaneswar (Odisha), Ahmedabad (Gujarat), Kochi

(Kerala), Guwahati (Assam), Visakhapatnam (Andhra Pradesh) and Rae Bareilly (Uttar Pradesh).

Under the Pradhan Mantri Kaushal Vikas Yojana (PMKVY) Recognition of Prior Learning (RPL) Type-4 projects, Hydrocarbon SSC is in process for certifying the large uncertified workforce engaged with the dealers, distributors and contractors of IOCL, HPCL and BPCL in Retail Outlet Attendant (oil & Gas), LPG Delivery Personnel and Tank Lorry (Petroleum Products) trades.

15.4.3 Engagement of Apprentices

CPSEs under MoP&NG have engaged 10.21% of total workforce apprentices



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2	24	42	50	64	70	82	90





Skill Development Institute, Bhubaneswar



Skill Development Institute, Visakhapatnam

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Appendices

Appendix- I

Ministry of Petroleum & Natural Gas (Petroleum Aur Prakritik Gas Mantralaya)

1. Exploration for, and exploitation of petroleum resources, including natural gas and Coal Bed Methane, gas hydrates and shale gas.
2. Production, supply, distribution, marketing and pricing of petroleum, including natural gas, Coal Bed Methane and petroleum products.
3. Oil refineries, including Lube Plants.
4. Additives for petroleum and petroleum products.
5. Blending and blending prescriptions for bio-fuels including laying down the standards for such blending.
6. Marketing, distribution and retailing of bio-fuels and its blended products.
7. Overall coordination concerning bio-fuels, National Policy on Bio-fuels, policy/scheme for supporting manufacturing of bio-fuels, setting up of a National Bio-fuel Development Board and strengthening the existing institutional mechanism and research, development and demonstration on transport, stationary and other applications of bio-fuels.
8. Lube Blending and greases.
9. Conservation of Petroleum products.
10. Planning, development, control and assistance to all industries dealt with by the Ministry.
11. Strengthening energy security by acquiring oil and gas equity abroad and participation in transnational oil and gas pipeline projects.
12. Creation and administration of strategic petroleum reserve through Indian Strategic Petroleum Reserves Limited (ISPRL).
13. Petroleum Planning and Analysis Cell (PPAC).
14. All attached or subordinate offices or other organization concerned with any of the subjects specified in the list, including Directorate General of Hydrocarbons (DGH), Centre for High Technology (CHT), Oil Industry Development Board (OIDB), Petroleum Conservation Research Association (PCRA), etc.
15. Planning, development and regulation of oilfield services.
16. Administration of Engineers India Limited, including their subsidiaries and joint ventures.
17. Public sector project falling under the subject included in this list except such projects which are specifically allotted to any other Ministry / Department.
18. The Oil Fields (Regulation and Development) Act, 1948 (53 of 1948).
19. The Oil and Natural Gas Commission (Transfer of undertaking and Repeal) Act, 1993 (65 of 1993).
20. The Petroleum Pipelines (Acquisition of right of User in Land) Act, 1962 (50 of 1962).
21. The ESSSO (Acquisition of Undertaking in India) Act, 1974 (4 of 1974).
22. The Oil Industry (Development) Act, 1974 (47 of 1974).
23. The Burmah – Shell (Acquisition of Undertaking in India) Act., 1976 (2 of 1976).
24. The Caltex (Acquisition of Shares of Caltex Oil Refining (India) Limited and of the Undertaking in India of Caltex (India) Limited Act, 1977.
25. Administration of the Petroleum Act, 1934 (30 of 1934) and the rules made thereunder.
26. Administration of Balmer Lawrie Investment Limited and Balmer Lawrie and Company Limited.
27. Petroleum & Natural Gas Regulatory Act, 2006.
28. Matter pertaining to M/s Biecco Lawrie Limited
29. Matters pertaining to Gas Authority of India Limited (GAIL).
30. Matter pertaining to natural gas pipelines.
31. Matter pertaining to LNG terminals.
32. The Rajiv Gandhi Institute of Petroleum Technology (RGIPT) Act, 2007
33. Matter pertaining to Indian Institute of Petroleum & Energy (IPE), Act 2017 (3 of 2018)
34. Liquefied Petroleum Gas (Regulation of Supply and Distribution) Order, 2000.
35. Matter pertaining to Direct Benefit Transfer of LPG (DBTL) PAHAL.
36. Matter pertaining to Direct Benefit Transfer in Kerosene (DBTK).
37. Matter pertaining to Pradhan Mantri Ujjwala Yojana (PMUY).

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Appendix- II

List of Public Sector Undertakings and other organizations under the administrative control of the Ministry of Petroleum & Natural Gas

I. Oil Companies in which Government of India has shareholding as on 31.03.2018

1. Oil & Natural Gas Corporation Limited 68.07%
2. Indian Oil Corporation Limited 57.34%
3. Hindustan Petroleum Corporation Limited (Govt. Share transferred to ONGC)
4. Bharat Petroleum Corporation Limited 54.93%
5. Gail (India) Limited 54.43%
6. Engineers India Limited 57.02%
7. Oil India Limited 66.60%
8. Biecco Lowrie & Co Limited 99.56%
9. Balmer Lawrie & Co Limited 59.67%

II. Subsidiaries and other Companies

1. ONGC Videsh Limited -Wholly owned by ONGC
2. Mangalore Refinery & Petrochemicals Limited - Subsidiary of ONGC
3. Bharat Petro Resources Limited -Subsidiary of BPCL
4. Chennai Petroleum Corporation Limited -Subsidiary of IOCL

5. Numaligarh Refineries Limited -Subsidiary of BPCL
6. Certification Engineers International Limited -wholly owned by EIL
7. EIL Asia Pacific Sdn BHD -wholly owned by EIL
8. GAIL Gas Limited -wholly owned by GAIL

III. Other Organisations

1. Oil Industry Development Board
2. Petroleum Conservation Research Association
3. Oil Industry Safety Directorate
4. Centre for High Technology
5. Petroleum Planning & Analysis Cell
6. Directorate General of Hydrocarbons
7. Rajiv Gandhi Institute of Petroleum & Technology
8. Petroleum and Natural Gas Regulatory Board
9. Indian Strategic Petroleum Reserves Limited
10. Indian Institute of Petroleum Energy
11. Society for Petroleum Laboratory

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Appendix- III

PRODUCTION OF CRUDE OIL AND NATURAL GAS

State/Region	2013-14	2014-15	2015-16	2016-17	2017-18 (P)	2018-19 (Apr-Dec) (P)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
I. Production of Crude oil (TMT)						
Andhra Pradesh	297	254	295	276	322	226
Arunachal Pradesh	111	76	57	55	50	32
Assam	4710	4466	4185	4203	4345	3286
Gujarat	5061	4653	4459	4605	4591	3477
Rajasthan	9180	8848	8602	8165	7887	5848
Tamil Nadu	226	240	255	284	345	290
Offshore	18203	18924	19089	18421	18145	12778
Total	37788	37461	36942	36009	35684	25938
of which						
ONGC-Nomination	22246	22264	22360	22218	22249	15908
OIL-Nomination	3466	3412	3226	3258	3376	2517
PSC Regime	12076	11785	11356	10532	10059	7513
II. Production of Natural Gas (MMSCM)						
Andhra Pradesh	1171	541	619	868	959	820
Arunachal Pradesh	41	34	30	28	30	22
Assam	2868	2958	3025	3128	3219	2482
Gujarat	1657	1527	1490	1580	1607	1058
Rajasthan	982	1178	1338	1277	1442	1106
Tamil Nadu	1304	1192	1011	983	1207	910
Tripura	822	1140	1332	1430	1440	1144
Jharkhand (CBM)	3	2	2	3	4	2
Madhya Pradesh (CBM)	6	2	1	6	200	269
West Bengal (CBM)	156	224	389	555	531	263
Offshore	26395	24861	23012	22038	22011	16573
Total	35407	33657	32249	31897	32649	24650
of which						
ONGC-Nomination	23284	22023	21177	22088	23429	18416
OIL-Nomination	2626	2722	2838	2937	2881	2061
PSC Regime	9497	8912	8235	6872	6338	4173

P: Provisional CBM: Coal Bed Methane

Note: 1. Production of Crude oil includes Condensate

2. Figures may not tally due to rounding off

Source: ONGC, OIL & DGH

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Appendix- IV

PETROLEUM REFINING CAPACITY IN INDIA

(in MMTPA)

Sl. No.	Refinery Location & Year of Commissioning	Capacity as on 1 st April					
		2013	2014	2015	2016	2017	2018
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A	Public Sector	120.066	120.066	120.066	135.066	138.966	142.066
	Indian Oil Corporation Ltd. (IOCL)	54.200	54.200	54.200	69.200	69.200	69.200
1	Digboi, Assam - 1901	0.650	0.650	0.650	0.650	0.650	0.650
2	Guwahati, Assam - 1962	1.000	1.000	1.000	1.000	1.000	1.000
3	Barauni, Bihar - 1964	6.000	6.000	6.000	6.000	6.000	6.000
4	Koyali, Gujarat - 1965	13.700	13.700	13.700	13.700	13.700	13.700
5	Haldia, West Bengal - 1975	7.500	7.500	7.500	7.500	7.500	7.500
6	Mathura, Uttar Pradesh - 1982	8.000	8.000	8.000	8.000	8.000	8.000
7	Panipat, Haryana - 1998	15.000	15.000	15.000	15.000	15.000	15.000
8	Bongaigaon, Assam - 1974	2.350	2.350	2.350	2.350	2.350	2.350
9	Paradip, Odisha-2016	-	-	-	15.000	15.000	15.000
	Bharat Petroleum Corporation Ltd. (BPCL)	21.500	21.500	21.500	21.500	24.400	27.500
10	Mumbai, Maharashtra - 1955	12.000	12.000	12.000	12.000	12.000	12.000
11	Kochi, Kerala - 1963	9.500	9.500	9.500	9.500	12.400	15.500
	Hindustan Petroleum Corporation Ltd. (HPCL)	14.800	14.800	14.800	14.800	15.800	15.800
12	Mumbai, Maharashtra - 1954	6.500	6.500	6.500	6.500	7.500	7.500
13	Visakh, Andhra Pradesh - 1957	8.300	8.300	8.300	8.300	8.300	8.300
	Chennai Petroleum Corporation Ltd. (CPCL)	11.500	11.500	11.500	11.500	11.500	11.500
14	Manali, Tamil Nadu - 1965	10.500	10.500	10.500	10.500	10.500	10.500
15	Narimanam, Tamil Nadu - 1993	1.000	1.000	1.000	1.000	1.000	1.000
	Numaligarh Refinery Ltd. (NRL)	3.000	3.000	3.000	3.000	3.000	3.000
16	Numaligarh, Assam-1999	3.000	3.000	3.000	3.000	3.000	3.000
	Oil & Natural Gas Corporation Ltd. (ONGC)	0.066	0.066	0.066	0.066	0.066	0.066
17	Tatipaka, Andhra Pradesh - 2001	0.066	0.066	0.066	0.066	0.066	0.066
	Mangalore Refinery & Petrochemical Ltd. (MRPL)	15.000	15.000	15.000	15.000	15.000	15.000
18	Mangalore, Karnataka- 1996	15.000	15.000	15.000	15.000	15.000	15.000
B	Private Sector	80.000	80.000	80.000	80.000	80.000	88.200
	Reliance Industries Ltd. (RIL)	60.000	60.000	60.000	60.000	60.000	68.200
19	Jamnagar, Gujarat - 1999	33.000	33.000	33.000	33.000	33.000	33.000
20	Jamnagar (SEZ), Gujarat - 2008	27.000	27.000	27.000	27.000	27.000	35.200
	Nyara Energy Ltd. (NEL)	20.000	20.000	20.000	20.000	20.000	20.000
21	Vadinar, Gujarat - 2006	20.000	20.000	20.000	20.000	20.000	20.000
C	Joint Venture (JV)	15.000	15.000	15.000	15.000	15.000	17.300
	Bharat Oman Refinery Ltd. (BORL)	6.000	6.000	6.000	6.000	6.000	6.000
22	Bina, Madhya Pradesh - 2011	6.000	6.000	6.000	6.000	6.000	6.000
	HPCL Mittal Energy Ltd. (HMEL)	9.000	9.000	9.000	9.000	9.000	11.300
23	Bathinda, Punjab - 2012	9.000	9.000	9.000	9.000	9.000	11.300
	Total Refinery Capacity	215.066	215.066	215.066	230.066	233.966	247.566

Source: Oil Companies

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Appendix - V

REFINERY CRUDE OIL PROCESSED

(in TMT)

Refinery	Refinery Crude Throughput					
	2013-14	2014-15	2015-16	2016-17	2017-18 (P)	2018-19 (Apr-Dec (P))
(1)	(2)	(3)	(4)	(5)	(6)	(7)
(a) PUBLIC SECTOR	119547	121183	127087	137388	145234	113137
IOCL, Guwahati	1019	1006	904	864	1024	707
IOCL, Barauni	6478	5944	6545	6526	5819	4933
IOCL, Koyali	12960	13285	13820	13994	13811	10266
IOCL, Haldia	7952	7650	7776	7689	7655	5999
IOCL, Mathura	6641	8515	8860	9230	9240	7375
IOCL, Digboi	651	591	562	533	666	509
IOCL, Panipat	15098	14191	15282	15638	15654	12296
IOCL, Bongaigaon	2328	2403	2442	2486	2402	1832
IOCL, Paradip	-	-	1817	8230	12730	10547
Total IOCL	53126	53586	58007	65191	69001	54465
BPCL, Mumbai	12684	12821	13371	13541	14054	10985
BPCL, Kochi	10285	10356	10712	11820	14095	11770
Total BPCL	22969	23177	24083	25362	28149	22755
HPCL, Mumbai	7785	7408	8013	8510	8641	6529
HPCL, Vishakhapatnam	7776	8770	9220	9335	9635	7313
Total HPCL	15561	16179	17234	17846	18276	13842
CPCL(MRL), Manali	10065	10251	9100	9725	10289	7499
CPCL(MRL), Narimanam	559	531	544	531	500	307
Total CPCL	10624	10782	9644	10256	10789	7805
NRL, Numaligarh	2613	2777	2520	2683	2809	2199
MRPL, Mangalore	14589	14632	15532	15965	16130	12027
ONGC, Tatipaka	65	51	67	86	80	44
(b) PRIVATE SECTOR	88229	88533	88662	91093	91163	66474
RIL, Jamnagar	30307	30867	32428	32823	33153	24716
RIL, SEZ-Jamnagar	37720	37174	37133	37351	37317	27939
Total RIL	68027	68042	69561	70174	70470	52655
NEL, Vadinar	20202	20491	19101	20919	20693	13820
(c) JOINT VENTURE	14721	13526	17116	16882	15538	13069
BORL, Bina	5450	6209	6402	6360	6708	3660
HMEL, Bathinda	9271	7318	10713	10521	8830	9410
Grand Total	222497	223242	232865	245362	251935	192681

Source: Oil Companies



Appendix- VI

PRODUCTION OF PETROLEUM PRODUCTS

(in TMT)

Products	2013-14	2014-15	2015-16	2016-17	2017-18 (P)	2018-19 (Apr-Dec) (P)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
LPG	10030	9840	10568	11326	12380	9474
Motor Spirit	30275	32325	35321	36593	37784	28422
Naphtha	18505	17391	17861	19946	20006	15089
Kerosene	7418	7559	7503	6041	4408	3082
ATF	11220	11103	11789	13831	14594	11525
HSD	93759	94428	98588	102484	107904	82777
LDO	423	358	429	629	562	519
Fuel Oil (FO+LSHS)	13405	11919	9727	9962	9486	7549
Lube Oils	941	946	1037	1029	1036	719
Bitumen	4785	4632	5157	5185	5277	4045
Petroleum Coke	12068	12448	13322	13936	14754	11222
Others	17927	18188	20622	22589	26215	22264
Total Production of Petroleum Products	220756	221136	231923	243551	254405	196689
of which						
Refineries	216456	217141	227907	239256	249797	193011
Fractionators	4300	3994	4016	4294	4608	3678

Note: Figures may not tally due to rounding off

P: Provisional

Source: Oil Companies

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Appendix- VII

CONSUMPTION OF PETROLEUM PRODUCTS

(in TMT)

Products	2013-14	2014-15	2015-16	2016-17	2017-18 (P)	2018-19 (Apr-Dec) (P)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
LPG	16294	18000	19623	21608	23342	18125
Motor Spirit	17128	19075	21847	23765	26174	21076
Naphtha	11305	11082	13271	13241	12889	10490
SKO	7165	7087	6826	5397	3845	2629
ATF	5505	5723	6262	6998	7633	6196
HSDO	68364	69416	74647	76027	81073	62126
LDO	386	365	407	449	524	427
Fuel Oil (FO+LSHS)	6236	5961	6632	7150	6721	4872
Lubes/Greases	3305	3310	3571	3470	3884	2911
Bitumen	5007	5073	5938	5935	6086	4555
Petroleum Coke	11756	14558	19297	23964	25657	16535
Others	5956	5870	6352	6593	8339	7461
Total Consumption	158407	165520	184674	194597	206166	157403

Notes: Consumption includes sales by oil companies, own consumption & direct private imports and sales by SEZ units in Domestic Tarrif Area (DTA)

P: Provisional

Source: PPAC

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Appendix- IXA

ACTUAL EXPENDITURE DURING 2013-14 TO 2017-18

(Figures in ₹ crore)

Sl. No.	CPSE	2013-14	2014-15	2015-16	2016-17	2017-18
		Actual	Actual	Actual	Actual	Actual
A. Internal & Extra Budget Resources (I&EBR) by CPSEs						
1	OVL	35357.00	7171.55	6782.96	17616.99	6797.98
2	ONGC	32469.54	29997.46	30110.43	28006.41	72901.58
3	OIL	9350.97	3773.76	3622.25	11083.24	8154.44
4	GAIL	4069.78	1632.18	1511.75	1814.05	3680.46
5	IOCL	16660.61	14313.68	11484.74	20736.93	21457.20
6	HPCL	2641.87	2669.61	1430.09	5757.26	7209.72
7	BPCL	4373.58	6874.75	8287.00	16948.55	8997.76
8	MRPL	1448.74	2747.36	1502.03	616.40	1281.31
9	CPCL	228.60	465.90	1272.00	1269.11	1020.32
10	NRL	372.14	102.77	70.27	503.35	419.03
11	BALMER LAWRIE	119.55	79.79	45.37	73.75	83.18
12	EIL	0.00	0.00	0.00	0.00	0.00
	Total	107092.38	69828.81	66118.89	104426.04	132002.98
B. Gross Budgetary Support (GBS) of MoPNG						
1	Scheme for LPG connection to Poor Households- PMUY (Ujjwala)	0.00	0.00	0.00	2500.00	2251.81
2	Rajeev Gandhi Institute of Petroleum Technology (RGIPT)	0.00	0.00	48.00	100.00	121.75
3	Payment to Indian Strategic Petroleum Reserve Ltd. (ISPRL) for strategic Crude Oil Reserve	0.00	0.00	1153.00	2001.00	0.00
4	Setting up Petroleum University in Andhra Pradesh (Indian Instt. of Petroleum Energy)	0.00	0.00	0.00	32.00	1.00
5	Financial Aid for Phulpur-Dhamra-Haldia Pipeline Project of GAIL	0.00	0.00	0.00	450.00	400.00
	Total GBS	0.00	0.00	1201.00	5083.00	2774.56

* = Provisional

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Appendix- IXB

BE FOR 2018-19 AND ACTUAL EXPENDITURE (APRIL-DEC 2018)

(Figures in ₹ crore)

Sl. No.		2018-19	
		BE	Actual (Apr-Dec.18) *
A. IEBR of Oil & Gas CPSEs			
1	OVL	5886.00	3559.71
2	ONGC	32077.12	20436.80
3	OIL	4299.99	2351.82
4	GAIL	4722.00	4267.78
5	IOCL	22862.34	19083.02
6	HPCL	8425.00	7209.09
7	BPCL	7400.00	7073.14
8	MRPL	744.00	565.71
9	CPCL	1010.00	709.78
10	NRL	428.00	230.05
11	BALMER LAWRIE	125.00	111.14
12	EIL	1355.64	73.43
	Total (A)	89335.09	65671.47
B. Central Expenditure of MoPNG **			
1	Scheme for LPG connection to Poor Households- PMUY (Ujjwala)	3200.00	2929.00
2	Rajeev Gandhi Institute of Petroleum Technology (RGIPT)	-	-
3	Payment to Indian Strategic Petroleum Reserve Ltd. (ISPRL) for strategic Crude Oil Reserve	700.00	64.00
4	ISPRL Phase-II (Construction of Caverns)	1.00	0.00
5	Setting up Petroleum University in Andhra Pradesh (Indian Instt. of Petroleum Energy)	32.00	24.00
6	Centre of Excellence for Energy Assam & Bangalore	2.00	0.00
7	Financial Aid for Phulpur-Dhamra-Haldia Pipeline Project of GAIL	1674.00	1206.60
8	Direct Benefit Transfer for LPG (DBTL)	16477.80	16477.80
9	Other Subsidy for LPG payable including NE Region	608.00	498.58
10	Project Management	92.00	92.00
11	Direct Benefit Transfer for Kerosene (DBTK)	96.00	96.00
12	Other Subsidy for Kerosene payable including NE Region	4200.00	3152.59
13	ISPRL : O&M Expenses	80.00	63.08
14	Petroleum and Natural Gas Regulatory Board (PNGRB)	18.37	13.80
15	Society for Petroleum Laboratory (SFPL)	2.42	1.44
16	Secretariat Economic Services	32.45	26.10
	Total (B)	27216.04	24644.99

* Provisional

**Central Expenditure comprises Revenue and Capital. This excludes transfers to States.

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Appendix X

EARNING OF OIL PSUS

The Profit Before Tax (PBT) and the Profit After tax (PAT) earned by Public Sector Undertakings (PSUs) in the Oil Sector during 2017-18 are ₹ 102407.77 crore and ₹ 69579.35 crore respectively. Similarly, the PBT and PAT for 2018-19 are expected to be about ₹ 90315.42 crore and ₹ 61229.50 crore respectively.

PROFORMA

(₹ In crore)

Sr. No.	Name of PSUs	Profit Before Tax (PBT)		Profit After Tax (PAT)		% GOI holding as on 31.03.2018
		2016-17	2017-18	2016-17	2017-18	
		(Actual)	(Estimated)	(Actual)	(Estimated)	
1.	ONGC	28,892.47	38,796.64	19,945.26	26,048.39	67.72%
2.	IOCL	32,564.28	12,865.00	21,346.12	12035.00	56.98%
3.	GAIL	6,958.00	7,372.00	4,618.00	4,845.00	53.59%
4.	OIL	3,709.80	4,779.81	2,667.93	3,109.56	66.13%
5.	BPCL	11,198.00	10,662.00	7,919.00	5,268.00	54.31%
6.	EIL	568.00	517.00	378.00	336.00	52.02%
7.	ONGC Videsh Ltd.	1,103.06	4,150.03	981.45	2,359.70	Nil
8.	HPCL*	9,202.00	6,799.00	6,357.00	4,423.00	
9.	MRPL	3,350.70	1,420.12	2,224.12	923.87	Nil
10.	CPCL	1,458.00	50.00	913.00	10.00	Nil
11.	NRL	3,142.34	2,643.82	2,044.65	1,700.98	Nil
12.	Balmer Lawrie & Co. Ltd. \$	261.12	260.00	184.82	170.00	
		102407.77	90315.42	69579.35	61229.50	

* Government of India's total paid up equity shareholding of 51.11% in Hindustan Petroleum Corporation Limited have been acquired by ONGC on 31.01.2018

\$ There is no direct holding by GoI in Balmer Lawrie & Co. Ltd. Balmer Lawrie Investment Limited, a Government Company holds 61.8% of shares in Balmer Lawrie & Co. Ltd. Central Government holds 59.57% in Balmer Lawrie Investments Ltd.

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Appendix XI

PSU-WISE VARIATION IN PROFIT BEFORE TAX (PBT) AND PROFIT AFTER TAX (PAT) 2018-19 VIS-A-VIS 2017-18

ONGC

Variation in PBT and PAT from Actual 2017-18 vis-à-vis Expected 2018-19 is mainly due to the following:

1. Crude oil price assumed for RE 2018-19 is \$65/bbl, whereas in Actual in 2017-18, average realization was \$55.19/bbl.
2. Similarly, Natural gas price assumed for REC 2018-19 is \$3.21/MMBTU against which actual 2017-18 realization was \$2.69/MMBTU.
3. Exchange rate assumed in RE 2018-19 is ₹70/\$ whereas the same was ₹64.45/\$ in 2017-18.

IOCL

Variation in estimated PBT in 2018-19 vis-à-vis 2017-18 is mainly on account of estimated inventory losses and exchange losses during 2018-19 as against inventory gains and exchange gains in FY 2017-18.

GAIL

Increase in estimated profitability for RE 2018-19 vs FY 2017-18 is mainly due to expected increase in profit from marketing of Natural Gas and expected increase in average product price realization.

OIL

The increase in PBT and PAT in Year 2018-19 (estimated) against FY 2017-18 (actual) is primarily due to the variation in price realization. The crude actual price realization in year 2017-18 was \$55.72/bbl whereas it has been estimated at \$65/bbl for the year 2018-19. The natural gas actual price realization for year 2017-18 was \$2.69/MMBTU as against estimated price realization at \$3.36/MMBTU for the year 2018-19.

BPCL

Reduction in PAT and PBT in FY 2018-19 vis-à-vis FY 2017-18 is due to increase in crude price results in to lower refining and marketing margin also coupled with incurrence of significant foreign exchange losses on account of Rupee depreciation.

EIL

The estimated profit during FY 2018-19 lower that the profit during FY 2017-18 as in the Financial Year 2017-18, there were one time profits to the tune of ₹103 crore on account of:

1. Waiver of Liquidated damages in one of the Turnkey contract executed by company during previous years, impact on the profit was ₹38 crore

2. Receipt of Change Order from two of their clients in consultancy segment, in which work was done in previous years. The financial impact of the same on profit to the tune of ₹65 crore in terms of accounting principles.

ONGC Videsh Limited (OVL)

The main reason for increase in profitability and PBT is improvement in crude price and exchange rate assumption compare to FY 2017-18 actual prices. The RE 2018-19 is prepared with Brent crude price assumption of US\$75/bbl and exchange rate assumption of ₹72/US\$ compare to actual Brent crude price of US\$57.49/bbl and exchange rate of ₹64.47/US\$ in FY 2017-18.

HPCL

Profit Before Tax of ₹9202 crore for FY 2017-18 includes Marketing Inventory gain of about ₹220 crore and exchange fluctuation gain of about ₹320 crores.

In H1 of FY 2018-19, HPCL incurred exchange fluctuation loss of ₹1420 crore, and marketing inventory gain of about ₹2200 crores. With reduction in crude and product prices in the month of November & December, the inventory gain in H1 of FY2018-19 is likely to reverse the second half year of FY 2018-19.

Average Indian Basket crude price has increased from \$56/bbl in FY 2017-18 to \$72/bbl in FY2018-19 (till date), and Rupee has depreciated from ₹64/\$ average in FY 2017-18 to ₹70/\$ average in FY 2018-19 (till date). These factors will adversely affect the profitability for FY 2018-19.

MRPL

The variation in expected PBT and PAT in 2018-19 vis-à-vis PBT and PAT in 2017-18 are mainly on account of lower margin in FY 2018-19, exchange rate variation resulting in Foreign Exchange loss and inventory loss in FY 2018-19 in contrast to inventory gain in FY 2017-18.

CPCL

Decrease in PBT and PAT for FY 2018-19 vis-à-vis 2017-18 is mainly due to unfavourable movements in the international prices of crude and products.

Normal Corporate Tax rate of 34.944% considered for calculation of PAT for FY2018-19.

Balmer Lawrie & Co. Ltd

No significant variance for the year 2018-19 as compared to 2017-18.

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Appendix XII

Paras contained in Inspection Reports:

A total of 35 IR Paras out of 04 Inspection Reports (IR) was outstanding against this Ministry as on 31.12.2017. As on date, 23 Paras have been settled in the latest audit held during 18.01.2018 to 17.04.2018 and 12 new Paras have been added for the Financial Year 2016-17. Hence, as per the latest intimation by the Audit on 08.06.2018, a total of 25 Paras out of 02 IR have been shown pending including new paras for the year 2016-17.

Position of ATN in respect of Audit Observations included in the Annual Reports as well as those included in earlier Annual Reports

Sl. No.	Year	No. of Paras/ PA reports on which ATNs have been submitted to PAC/ COPU after vetting by Audit	Details of the Paras/PA reports on which ATNs are pending		
			No. of ATNs not sent by the Ministry even for the first time	No. of ATNs sent but returned with observations and Audit is awaiting their re-submission by the Ministry	No. of ATNs which have been finally vetted by Audit but have not been submitted by the Ministry to PA/COPU
1.	2003	3	-	-	-
2.	2004	21	-	1	-
3.	2005	49	-	1	-
4.	2006	31	-	-	-
5.	2007	27	-	-	-
6.	2008	23	-	3	-
7.	2009-10	14	-	3	-
8.	2010-11	5	-	2	-
9.	2011-12	4	-	4	-
10.	2012-13	4	-	3	-
11.	2013	-	1	4	-
12.	2014	-	2	5	-
13.	2015	-	9	-	-
14.	2016	3	12	-	-
15.	2017	3	3	18	6
16.	2018	9	6	19	-

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2	24	42	50	64	70	82	90





