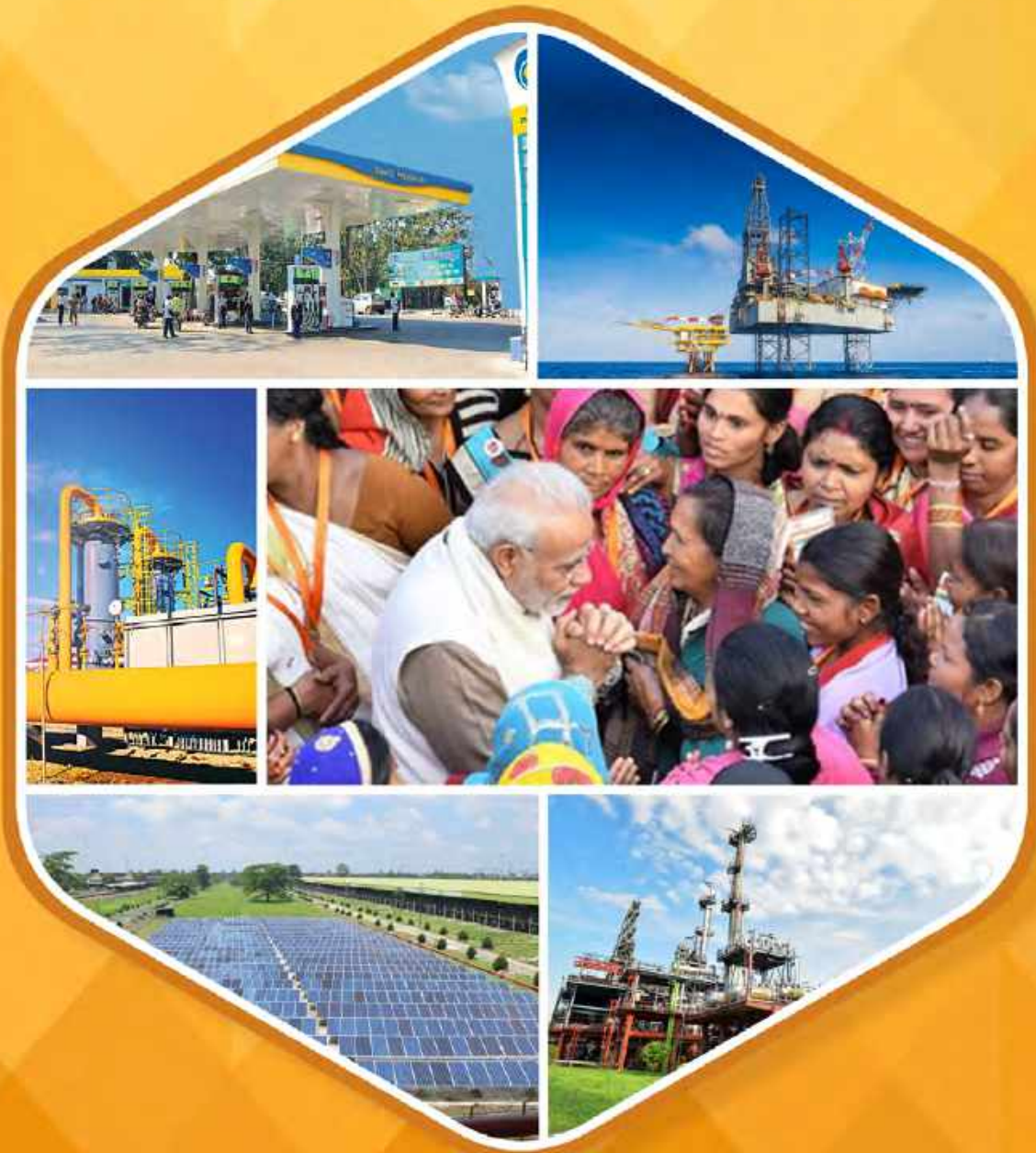




पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय
भारत सरकार
Ministry of Petroleum & Natural Gas
Government of India

ANNUAL
REPORT
2019-20

Energizing India's Progress

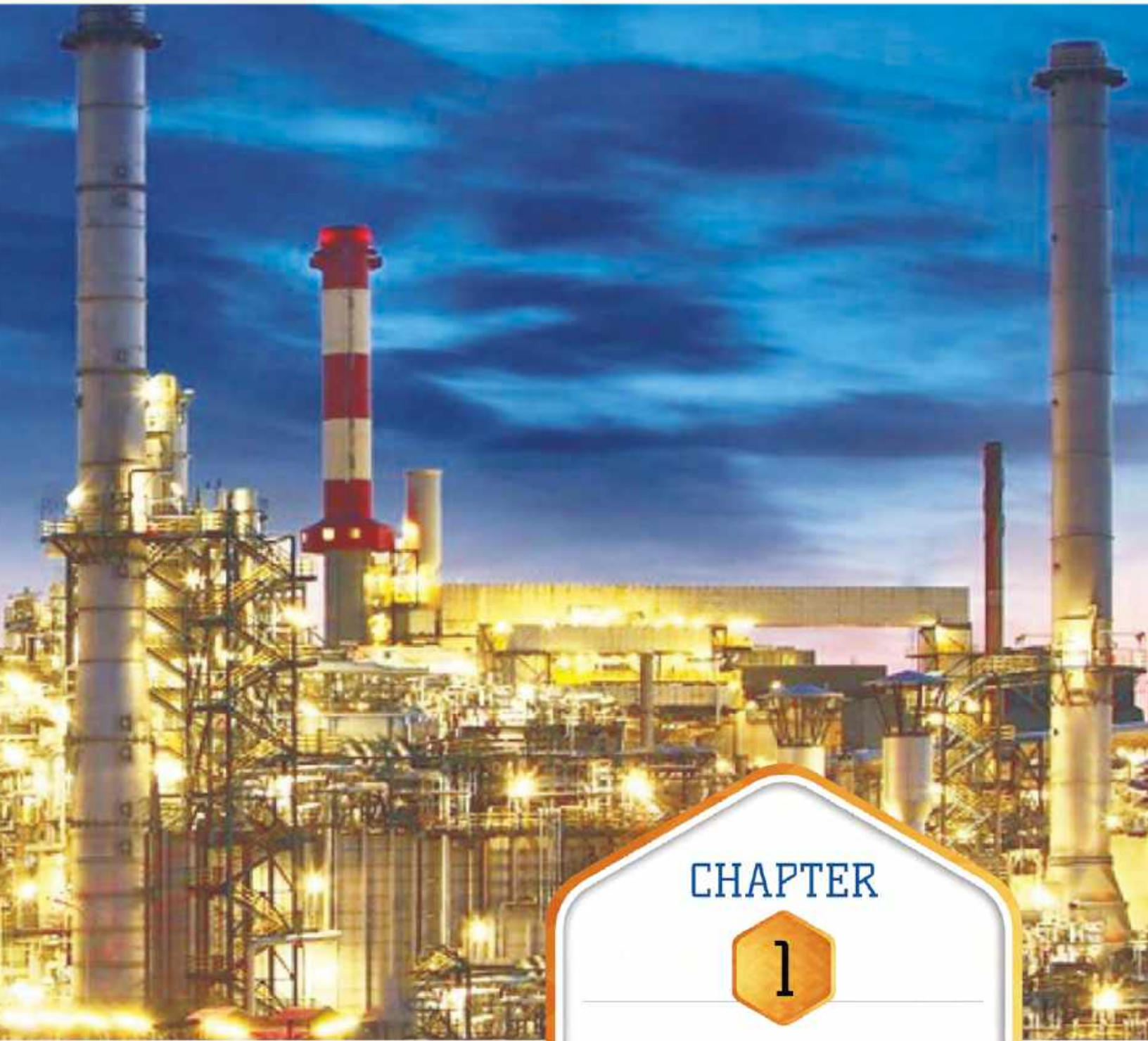




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CHAPTER

1

Introduction



Introduction

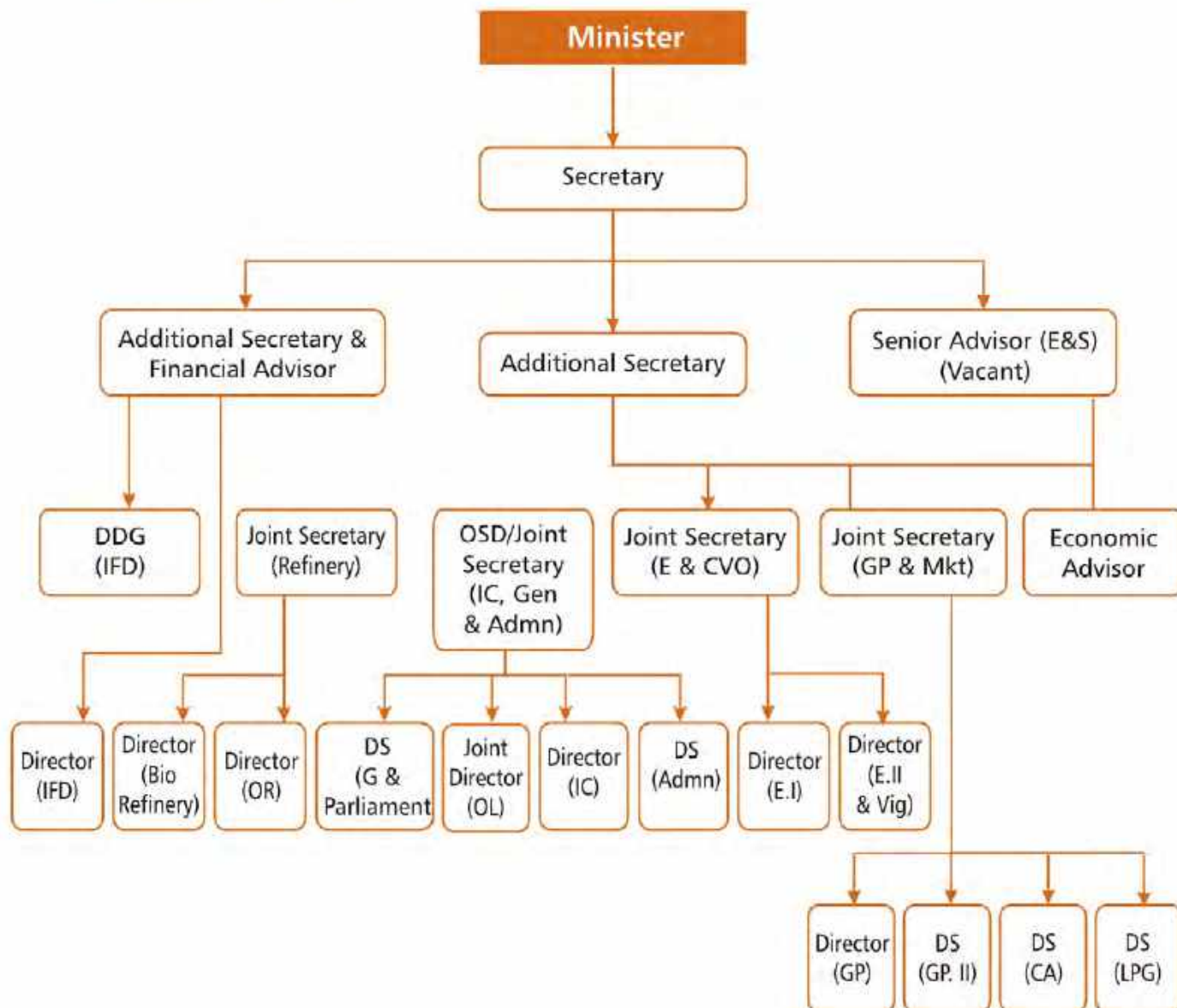
- 1.1 Shri Dharmendra Pradhan assumed the charge of Minister for Petroleum & Natural Gas with effect from 31st May, 2019.
- 1.2 Dr. M.M. Kuttu, IAS (AGMUT:1985) assumed the charge of OSD (P&NG) w.e.f. 1.5.2018 and subsequently assumed the charge of Secretary (P&NG) in the Ministry of Petroleum & Natural Gas with effect from 1st July, 2018.
- 1.3 Shri Rajiv Bansal, IAS (NL:1988) assumed the charge of Additional Secretary & Financial Advisor in the Ministry of Petroleum & Natural Gas w.e.f. 24th July, 2017 and has subsequently assumed the charge of Additional Secretary w.e.f. 16th December, 2019.
- 1.4 Shri Rajesh Aggarwal, IAS (MH:1989), assumed the charge of Additional Secretary & Financial Advisor in the Ministry of Petroleum & Natural Gas w.e.f. 18th December, 2019.
- 1.5 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.
- 1.6 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.
- 1.7 Shri B. N. Reddy, IAS:1993, assumed the charge of OSD (Joint Secretary level) in the Ministry of Petroleum & Natural Gas w.e.f. 27th February, 2019.
- 1.8 Shri Sunil Kumar, IAS:1995, assumed the charge of Joint Secretary in the Ministry of Petroleum & Natural Gas w.e.f. 1st May, 2019.
- 1.9 Ms. Indrani Kaushal, IES (1995) continues to hold the post of Economic Adviser in the Ministry of Petroleum & Natural Gas with effect from 1st June, 2016.
- 1.10 Shri Sukh Ram Meena, IAS (1993) continues to hold the charge of the post of Deputy Director General in the Ministry of Petroleum & Natural Gas with effect from 6th March, 2017.



Hon'ble Prime Minister visits BPCL Kochi Refinery



Organizational Chart of the Ministry of Petroleum & Natural Gas as on 04.02.2020





1.11 Introduction

India is the third largest energy consumer in the world after China and USA. It is also the fastest growing energy consumer, consuming around 809.2 million tonnes of oil equivalent (MTOE) in 2018. With a share of 5.8% of the World's primary energy consumption, India's energy requirement is fulfilled primarily by Coal, Crude Oil, Natural Gas and Renewable Energy. India's primary energy demand is expected to grow at a CAGR of 4.2% during 2017-2040, much faster than any major economy in the world. Oil and gas sector within the energy mix play a predominant role as over one third of the energy required is met by hydrocarbons. Growing economy and population growth are the main drivers for oil & gas demand, increasing every year.

Government has spearheaded a number of policy reforms and initiatives for increasing production and exploitation of domestic petroleum resources to address the priorities like Energy Access, Energy Efficiency, Energy Sustainability and Energy security. These are also expected to remove obstacles to infrastructure investment in oil and gas sector on the lines of ease of doing business, minimum government maximum governance and promote Make-in-India initiative.



**India's
primary energy demand is
expected to grow at a
CAGR of 4.2%
during 2017-2040**

1.12 Snapshot of selected major initiatives

1.12.1: Reforms in Exploration and Licensing Policy: Government notified 'Reforms in Exploration and Licensing Policy for

enhancing domestic exploration and production of oil and gas' on 28th February 2019 with the objective to intensify exploration activities, attract foreign and domestic investment and enhance domestic production. The major features of Policy Reforms are as under:

- i. Shifting of focus from 'revenue' to 'production' maximisation.
- ii. No Revenue Sharing with Government in Category- 11 & III sedimentary basins.
- iii. Boost to exploration activities by assigning greater weightage to exploration work programme.
 - (a) For unexplored areas in Category I basins, 70% weightage to Minimum Work Programme and 30% weightage to Revenue Sharing with cap of 50% at Highest Revenue Sharing point (HRP) and
 - (b) For Category II and III sedimentary basins 100% weightage for Minimum Work Programme,
- iv. Shorter exploration period for early development.
- v. Fiscal concessions for early monetization and commercial production. Marketing and Pricing freedom for natural gas.
- vii. The policy envisages bidding out of 66 small and marginal producing nomination fields operated by National Oil Companies (NOCs) to have collaboration with private E&P players for inducting new and innovative technology, infusing fresh investment and best management practices to enhance production of oil and gas by adopting Enhanced Oil Recovery /Improved Oil Recovery (EOR/IOR) methods. NIO for bidding out 66 fields has been issued by ONGC and OIL in end June 2019.
- viii. The MoU of ONGC and OIL were restructured with 50% weightage for physical production, other physical parameters 30%. Financial performance parameters 20%.
- ix. Redefining the Role of DGH by delegation of additional powers and functions to



DGH to strengthen the compliance/regulatory, developmental and coordination role of DGH.

- x. Simplified and investor friendly Model Bid documents including increasing of bidding cycle frequency from twice to thrice in a year.
- xi. Promoting Ease of Doing Business:
 - (a) Simplified contractual terms with emphasis on cutting down approvals of Government/DGH /Management Committee and expeditious grant of approvals.
 - (b) Setting up of Empowered Coordination Committee (ECC) under the chairmanship of Cabinet Secretary for expediting process of approvals.
 - (c) New Dispute Resolution Mechanism for amicable and speedy redressal of contractual dispute.
 - (d) Electronic Single Window mechanism based on IT workflow and processes for processing of approvals. Standard Operating procedures for grant of approvals under PSC have also been finalized.

1.12.2: Hydrocarbon Exploration Licensing Policy (HELP):

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. Till Dec 2019, under HELP/Open Acreage Licensing Policy (OALP), four OALP bidding rounds have been concluded in which 94 exploration blocks have been awarded covering an area of approx. 136,792 sq. km.

1.12.3: National Data Repository (NDR):

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. Total data uploaded in NDR till 31st October 2019 is 2.28 million line kilometres of 2D Seismic Data, 0.78 million square kilometres of 3D Seismic data and 17,432 exploratory wells.



Hon'ble Union Minister of P&NG and Steel review the HPCL Visakh Refinery modernization project



1.12.4: Discovered Small Field Policy (DSF):

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, in which 30 contracts for 43 discovered small fields were signed with 20 companies in March, 2017. It is expected that in-place locked hydrocarbons volume of 40 MMT oil and 22.0 BCM of gas will be monetized over a period of 15 year. Under DSF Bidding Round-11, 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. Total 23 contracts comprising 57 contract areas/discoveries were signed in March, 2019

1.12.5: 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). As on 31st November, 2019, Surface Coverage of 41,903 LKM, out of 48,243 LKM has been achieved under 2D Seismic data acquisition under National Seismic Programme.

1.12.6: Natural Gas Grid and City Gas Distribution (CGD): 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 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



The construction of additional 13500 Km long gas pipeline is under way to complete the Natural Gas Grid

clean energy in the eastern part of the country, the Government has approved a capital grant of ₹ 5,176 crore (40 percent 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 (PNG) to households, Industrial & commercial units as well as transportation fuel (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, 10th bidding round was launched in February 2019, which has expanded the coverage of CGDs to additional 50 new GAs covering 124 districts (part/full) in 14 States. As per the commitment made by the various entities for the 50 GAs during 10th CGD Bidding Round, 2,02,92,760 domestic PNG (piped natural gas) connections and 3,578 CNG (compressed natural gas) stations for transport sector would be installed during a period of 8 years up to 31st March 2029, in addition to 58,177 inch-km of steel pipeline. After completion of 10th Round of CGD bidding, CGD would be available in 232 GAs comprising 407 districts spread over 27 States and Union Territories covering approximately 70% of India's population and 53% of its geographical area.

1.2.7: Implementation of BS-IV & BS-VI: In a bid to reduce carbon emission, BS-IV autofuels has already been introduced in





Bharat Petroleum receives the FIPI Oil Marketing Company of the Year Award

the parts of the country and it will be implemented in entire country w.e.f. 1.4.2017 in phased manner. The Government has further decided that the country will leap frog directly from BS-IV to BS-VI fuel standards which will be implemented in the country w.e.f., 01.04.2020. As a proactive measure, and considering the recent rise in environmental pollution in Delhi and NCR, the implementation of supply of BS-VI has been preponed w.e.f. 01.04.2018 in NCT-Delhi, followed by major parts of NCR from 1st April, 2019. The 7 districts of Haryana in NCR has already been covered from 1st Oct, 2019 leaving 6 districts of Haryana in NCR, which would be covered along with nationwide supply of BS-VI quality fuels by 1st April, 2020.

1.12.8: Pradhan Mantri Ujjwala Yojana: "Pradhan Mantri Ujjwala Yojana" launched on 1.5.2016 is a flagship scheme aimed 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. The target for PMUY beneficiaries was

increased from 5 crore to 8 crore to be achieved by FY 2019-20. Now, the Government has extended the benefit of PMUY to such poor families who have been left out on account of their names not appearing in either the SECC list or 7 identified categories to cover all poor families of the country.

The target of releasing 8 crore LPG connections under PMUY scheme has been achieved on 7th September, 2019, 7 months in advance of the target date of 31st March, 2020. PMUY has enabled towards energy access of the poor families through provision of deposit free LPG connection to the adult woman member of BPL family. Government is bearing an expenditure upto ₹ 1600/- for each new connection.

1.12.9: PAHAL (DBTL Scheme): The Government of India has launched Direct Benefit Transfer for LPG consumer (DBTL) scheme namely, 'PAHAL', in 54 districts of the country on 15th November, 2014. Later the scheme has been extended to all over the country and as on 23rd December, 2019, total 25.87 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, new regime of transparency in subsidy management has been put in place empowering LPG consumers in the country. PAHAL has further helped in identifying 'ghost' accounts, multiple accounts and inactive accounts. This resulted in curbing diversion of subsidised LPG to commercial purposes.

As a part of subsidy management, the Hon'ble Prime Minister of India gave call to well-off LPG consumers to voluntarily surrender their subsidy by launching 'Give It Up' campaign. 'Give It Up' campaign has evoked huge response from socially committed individuals and has resulted in more than 1.03 crore consumers giving up their LPG subsidy voluntarily.

1.12.10: Promotion of Digital Payments: There has been a significant expansion of digital payment infrastructure at retail outlets. As on 31.12.2019, 1,30,602 POS terminals and 97,937 e-wallet facility have been provided at 55,578 petrol pumps across the country, 54,085 retail outlets have been enabled with BHIM UPI. All the LPG Distributors and City Gas distribution companies are enabled with BHIM UPI.

1.12.11: Direct Benefit Transfer Kerosene (DBTK): 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. This 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. So far, States/UTs of



National Policy on Bio-fuels - 2018 envisages a targets of 20% blending of ethanol in petrol by 2030

Haryana, Punjab, Andhra Pradesh, Delhi, Chandigarh, Daman & Diu, Dadar & Nagar Haveli, Puducherry and Andaman & Nicobar Islands have become 'Kerosene Free'. State/UT Governments of Karnataka, Telangana, Haryana, Nagaland, Bihar, Gujarat, Rajasthan, Goa, Chandigarh, Puducherry, Andhra Pradesh and Maharashtra have undertaken voluntary cut. Accordingly, kerosene allocation of these States has been rationalized.

1.12.12: 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.





SATAT has envisaged developing 5000 CBG plants with total CBG production capacity of 15 MMTPA by 2023

iv. With a thrust on Advanced Biofuels, the Policy indicates a viability gap funding scheme for 2G ethanol Bio refineries of ₹ 1969.50/- crores in 6 years.

1.12.13: Compressed Bio Gas Plants:

Compressed Bio Gas (CBG) is purified and compressed biogas, which is produced through a process of anaerobic decomposition from various waste/ biomass sources like agriculture residue, cattle dung, sugarcane press mud & spent wash of distilleries, sewage water, municipal solid waste (MSW), biodegradable fractions of industrial waste etc.

Sustainable Alternative Towards Affordable Transportation (SATAT) initiative was launched on 1.10.2018 to promote Compressed Bio Gas (CBG) as an alternative, green transport fuel for efficient management of biomass and organic waste. SATAT has envisaged developing 5000 CBG plants with total CBG production capacity of 15 Million Metric Tonne Per Annum (MMTPA) i.e. equivalent to 54 MMSCMD of gas by 2023. CBG plants will also produce a by-product i.e. bio-manure and the same can be utilized in farming sector. Under this initiative Indian Oil Corporation Limited, Bharat Petroleum Corporation Limited, Hindustan Petroleum Corporation Limited, Gail (India) Limited and Indraprastha Gas Limited have invited Expression of Interest (Eoi) from potential entrepreneurs to procure CBG at an assured price. In response of Eoi floated, till 31st December 2019 Oil PSUs have issued Letters of Intent (LoIs) for establishment of about 460 CBG plants across the country.

1.12.14: **Neighborhood First policy:** In line with Government's diplomatic approach of

"Neighborhood First", Prime Minister of India and Nepal, jointly inaugurated South Asia's first cross-border petroleum products pipeline from Motihari in India to Amlekhgunj in Nepal through video conference on 10th September, 2019. The 69 km pipeline, having a capacity of 2 MMTPA, is the first transnational petroleum pipeline from India and first South Asian oil pipeline corridor. The pipeline will ensure smooth, cost effective and environment friendly supply of petroleum products to Nepal.

India is also constructing a 130 km Indo-Bangla friendship pipeline (IBFPL) from Siliguri in India to Parbatipur in Bangladesh, which will supply 1 MMT of diesel to Bangladesh Petroleum Corporation for 20 year. This Pipeline will put in place a mechanism for assured, long-term, uninterrupted and eco-friendly supply of petroleum products to Bangladesh. To ensure sustained and affordable supply of LPG to the North Eastern region of India, Prime Minister Narendra Modi and Prime Minister of Bangladesh Sheikh Hasina jointly inaugurated the project to import Bulk LPG from Bangladesh on 5th October 2019.

Taking advantage of proximity, Indian PSU refineries i.e. IOCL and Numaligarh Refineries Ltd. are also working with Myanmar companies to supply petroleum products to that country. GAIL and IGL are also working with Myanmar Government agencies to establish city gas distribution in Yangon. ONGC Videsh Limited (OVL) increased its presence in the gas field by continuing its additional investments in the exploration and production asset.

1.13 Crude Oil and Natural Gas Production

The crude oil production during the year 2018-19 is at 34.20 Million Metric Tonnes (MMT) as against production of 35.68 MMT in 2017-18, showing a decline of 4.15%. Around 71% of crude oil production is by ONGC and OIL from



nomination regime and remaining 29% of crude production by Private/JVs companies from PSC regime. Crude oil production during April-December 2019-20 is 24.38 MMT. Shortfall in production was mainly due to declining production from old and marginal fields, delay in completion of some projects in western offshore, unplanned shutdown of wells, processing platform/plants, pipelines and bandh & blockade in Assam region.

Natural Gas production during the year 2018-19 is at 32.87 Billion Cubic Meters (BCM) which is 0.69% higher than production of 32.65 BCM in 2017-18. Around 83% of natural gas production is

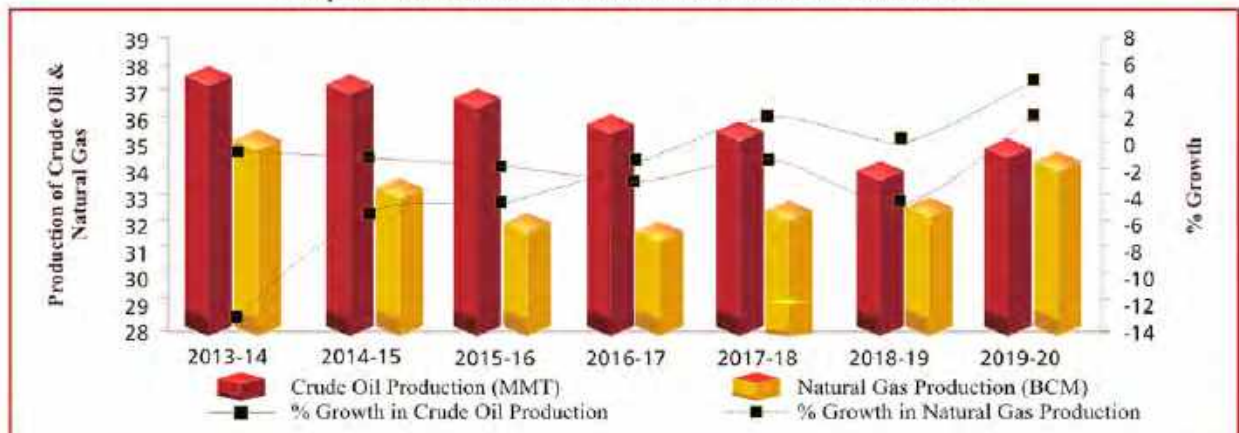
by ONGC and OIL from nomination regime and remaining 17% of natural gas production is by Private/JVs companies from PSC regime. Natural gas production during April-December, 2019 was 23.82 BCM. Shortfall in production in some fields was mainly due to decline of production from old and marginal fields, shutdown of plants of major customers, under performance of wells, issues and resistance from local groups for development projects in onland areas and unplanned shutdown of wells, processing platforms/ plants, pipelines. The trend in the production of crude oil and natural gas is depicted below (details in Appendix-III):

Table-1.1: Crude Oil and Natural Gas Production

Year	Crude Oil Production	% Growth in Crude Oil (MMT)	Natural Gas Production (BCM)	% Growth Natural Gas Production
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	35.68	-0.90	32.65	2.36
2018-19	34.20	-4.15	32.87	0.69
2019-20 *	35.04	2.45	34.55	5.11
2018-19 (Apr-Dec)	25.94	-	24.65	-
2019-20 (Apr-Dec) (P)	24.38	-6.02	23.82	-3.36

P: Provisional * : Target

Graph-1.1: Crude Oil & Natural Gas Production



1.14 Refining Capacity & Refinery Crude Throughput

India with refining capacity of 249.366 MMTPA is the fourth largest in the world after the United States, China and Russia. Crude Oil processed for the year 2018-19 is 257.20 MMT as against 251.93 MMT in 2017-18. Refinery capacity utilisation is

103.9% for the year 2018-19. Refinery production (Crude Throughput) during April-December, 2019 was 190.39 MMT which is 1.19% lower than crude processed (192.68 MMT) during April-December, 2018. This was mainly due to shutdown undertaken by few refineries. During 2019-20, most of refineries have undertake/planned shutdowns for implementation of quality upgradation projects in line with the target of introduction of BS VI autofuels all over the country w.e.f. April 1, 2020. The trend in Refining Capacity and Crude throughput is depicted below (details in Appendix-IV).



India with refining capacity of **249.36 MMTPA** is the fourth largest in the world

Table -1.2 Refinery Capacity & Refinery Crude Throughput (in terms of Crude Oil Processed)

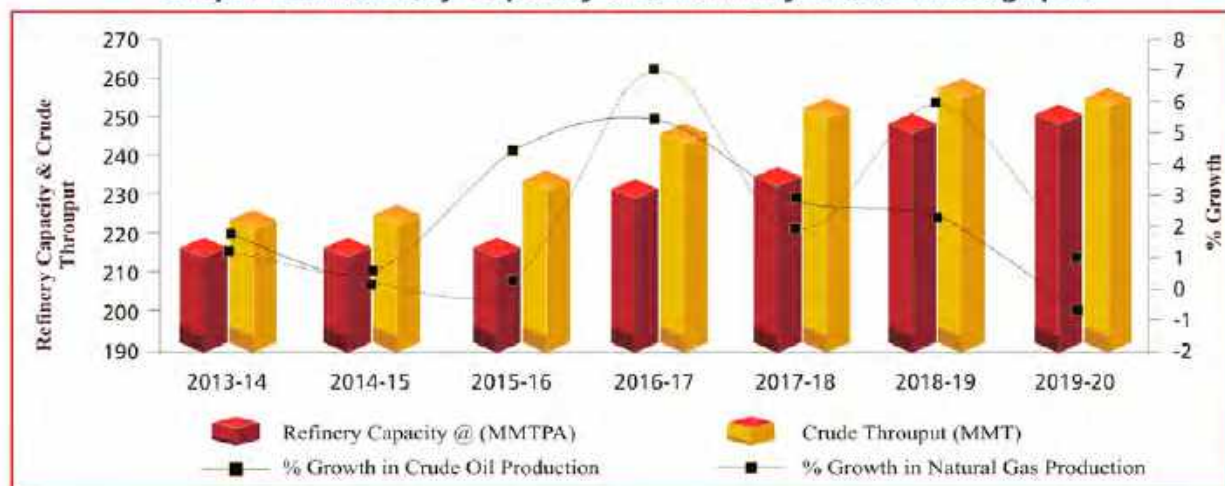
Year	Refining Capacity @ (MMTPA)	% Growth in Refining Capacity	Crude Throughput (MMT)	% Growth in Crude Throughput
2014-15	215.07	0.00	223.24	0.33
2015-16	215.07	0.00	232.86	4.31
2016-17	230.07	6.97	245.36	5.37
2017-18	233.97	1.70	251.93	2.68
2018-19	247.57	5.81	257.20	2.09
2019-20	249.37	0.73	254.74*	-0.96
2018-19 (Apr-Dec)	247.57	-	192.68	-
2019-20 (Apr-Dec)(P)	249.37	0.73	190.39	-1.19

P: Provisional

*: Target

@: As on 1st April of initial year

Graph-1.2: Refinery Capacity and Refinery Crude Throughput





1.15 Production and Consumption of Petroleum Products

The production of petroleum products is at 262.36 MMT in year 2018-19 as against 254.40 MMT achieved in 2017-18, showing an increase of about 3.13%. During the year 2018-19, the consumption of petroleum products in India was 213.22 MMT with a growth of 3.42% as compared to consumption of 206.17 MMT during 2017-18. During 2018-19, Diesel (HSD+LDO) accounted for the highest consumption share (39.5%) followed by Petrol/Motor Spirit (13.3%), LPG (11.7%), Petroleum Coke (10.0%), Naphtha (6.6%) and ATF (3.9%). Consumption of Kerosene (10.0%), Fuel Oil (2.3%), Lubes (5.6%) and Petcoke (16.8%) has shown negative growth. The decline in consumption of kerosene is associated with rapid expansion of electricity access and increase in domestic LPG consumption under Pradhan Mantri Ujjawala Yojana (PMUY) along with clean fuel expansion and also rationalization of SKO allocation to respective states. To tackle rising pollution levels, the government has laid out its long-term plans to reduce consumption of polluting fuels like coal, petcoke and other fossil fuels and replace them with non-fossil fuel sources like wind and solar.

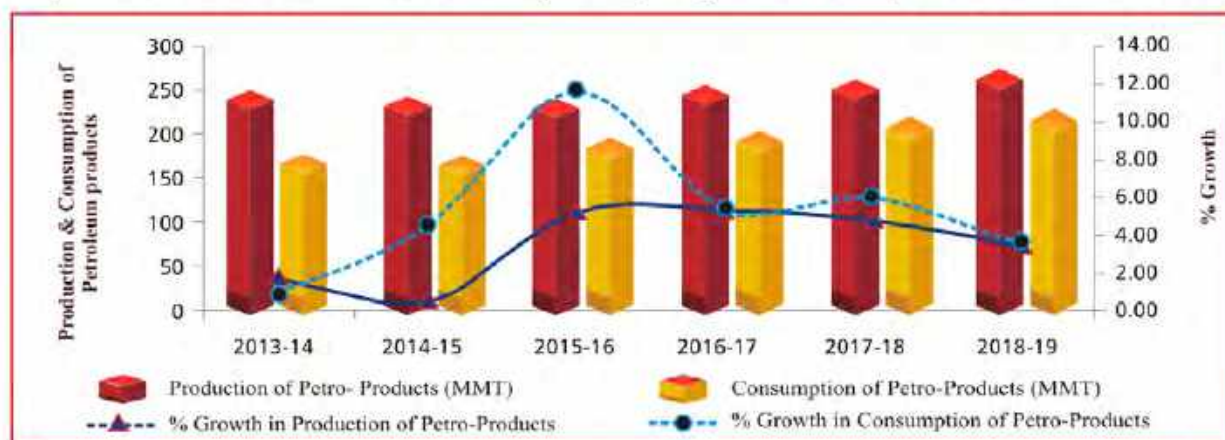
Year-wise production and consumption of petroleum products are depicted below (details in Appendix V & VI).

Table-1.3: Production and Consumption of Petroleum Products

Year	Production of Petro-Products (MMT)	% Growth in Production of Petro-Products	Consumption of Petro-Products (MMT)	% Growth in Consumption of Petro-Products
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	254.40	4.46	206.17	5.95
2018-19	262.36	3.13	213.22	3.42
2018-19 (Apr-Dec)	196.69	-	157.69	-
2019-20 (Apr-Dec)(P)	195.46	-0.62	160.25	1.62

P: Provisional

Graph-1.3: Production and Consumption (indigenous sales) of Petroleum Products



1.16 Import & Price of Crude Oil

Import of crude oil during 2018-19 was 226.50 MMT valued at ₹ 783183 crore as against import of 220.43 MMT valued at ₹ 566450 crore in 2017-18 which marked an increase of 2.75% in quantity terms and 38.26% in value terms as compared to the import of crude oil during 2017-18.

The prices of crude oil have shown a declining trend after July, 2014. As a result, the average price of Indian crude oil basket during 2015-16, 2016-17, 2017-18 and 2018-19 was recorded at \$46.17/bbl, \$47.56/bbl and \$56.43/bbl, \$69.88/bbl respectively. During 2018-19, the international crude oil price (Indian basket) dipped to 72.53 US \$/bbl in August, 2018 and started increasing thereafter and reached at \$85.16/bbl in October, 2018.

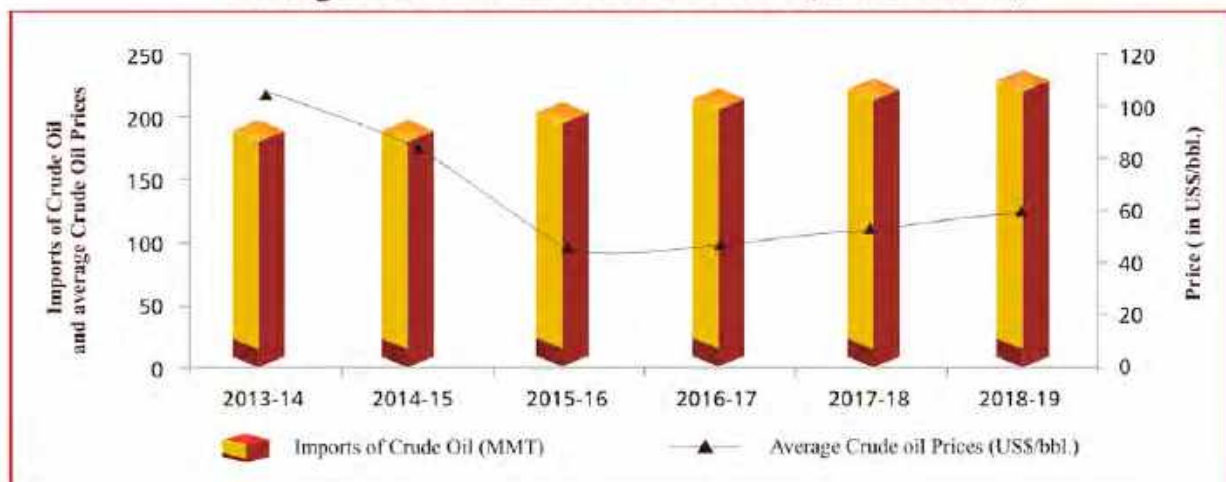
The trend in growth of crude oil imports and crude oil international (Indian Basket) prices is shown in Table-1.4 & Graph- 1.4A. The trend in prices of Indian basket crude oil during April, 2018 to December, 2019 is at Graph 4B.

Table-1.4: Imports of Crude Oil and Average Crude Oil Prices (Indian Basket)

Year	Imports of Crude Oil (MMT)	% Growth in Imports of Crude Oil	Value of 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
2014-15	189.44	0.10	687416	-20.52	84.16	-20.25
2015-16	202.85	7.08	416579	-39.40	46.17	-45.14
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	226.50	2.75	783183	38.26	69.88	23.84
2018-19 (Apr-Dec)	170.53	-	607512	-	71.72	-
2019-20 (Apr-Dec) (P)	168.59	-1.14	550174	-9.44	63.98	-10.79

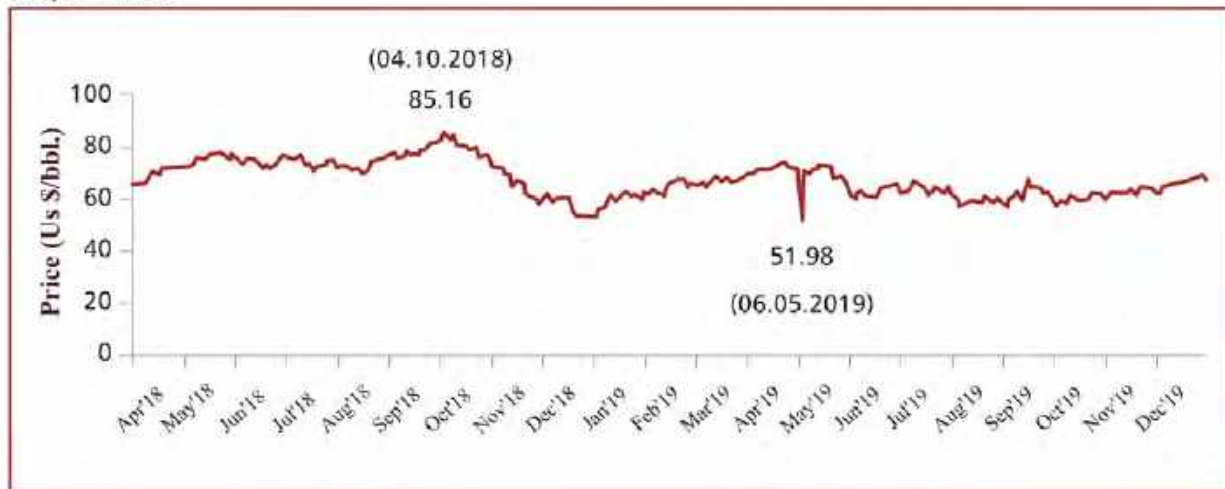
P: Provisional

Graph-1.4A: Quantity of Crude Oil Imports and Average International Crude Oil Prices (Indian basket)





Graph-1.4B:



1.17 Imports & Exports of Petroleum Products:

During 2018-19, import of petroleum products having decreased to 33.35 MMT valued at ₹113665 crore which shows decrease of 5.96% in quantity terms and 28.62% increase in value terms against 35.46 MMT imports of petroleum products valued at ₹88374 crore during 2017-18, while exports of petroleum products were 61.10 MMT valued at ₹267697 crore during the year 2018-19, which shows a decrease of 8.58% in quantity terms and 18.77% increase in value terms against the exports of 66.83 MMT valued at ₹225388 crore during 2017-18. The quantity of petroleum products imported during April-December, 2019-20 was 31.24 MMT valued at ₹ 90830 crore and 50.06 MMT of petroleum products, valued at ₹ 202311 crore were exported.

During April-December, 2019 the import of LNG was 18.66 MMT valued at ₹ 50396 crore. The trend in quantity of petroleum products and LNG imports & exports is depicted in Table-1.5 A & Graph-1.5 B (details in Appendix-VII).

Table-1.5 (A) : Imports & Exports of Petroleum Products & LNG

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
2014-15	21.30	27.57	63.93	-5.79	14.04	4.53
2015-16	29.46	38.28	60.54	-5.31	16.14	14.95
2016-17	36.29	23.19	65.51	8.22	18.75	16.18
2017-18	35.46	-2.28	66.83	2.01	20.71	10.42
2018-19	33.35	-5.96	61.10	-8.58	21.69	4.74
2018-19 (Apr-Dec)	23.38	-	46.89	-	16.66	-
2019-20 (Apr-Dec)(P)	31.24	33.62	50.06	6.75	18.66	11.95

*: Estimated P: Provisional



Table-1.5 (B): Value of Imports & Exports of Petroleum Products & LNG

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
2014-15	74644	-1.65	288580	-21.64	58359	9.17
2015-16	65361	-12.44	176780	-38.74	45038	-22.83
2016-17	71566	9.49	194893	10.25	41084	-8.78
2017-18	88374	23.49	225388	15.65	52122	26.87
2018-19	113665	28.62	267697	18.77	71867	37.88
2018-19 (Apr-Dec)	85256	-	211098	-	56167	-
2019-20 (Apr-Dec)(P)	90830	6.54	202311	-4.16	50396	-10.27

*: Estimated P: Provisional

1.18 Equity Oil and Gas from Abroad

Government is constantly working through energy diplomacy to make investments in other countries and create a mutually beneficial relationship. Today's Indian oil & gas PSUs have invested overseas to acquire quality producing oil and gas assets which not only brings equity oil to India, but also gives oil and gas companies the opportunity to work with global oil and gas majors. Today, Indian oil and gas companies have invested in 57 assets including exploratory block to producing assets and pipeline projects under 27 countries with investments worth approximately US \$ 36.12 billion till 31st December, 2019.

During last 3 years, Indian companies have acquired strategic stakes in overseas assets in UAE, Oman, Israel and Russia. For FY 2018-19, the share of equity oil and gas for Indian PSUs from these assets was approx. 24.722 MMTOE worth USD 5007.73 million. In current financial year (April – December 2019) equity oil & gas from overseas asset is 18.513 MMTOE.



During the last 3 years, Indian companies have acquired strategic stakes in overseas assets in UAE, Oman, Israel and Russia

1.19 Foreign Direct Investment Inflows

The Government of India permits Foreign Direct Investment (FDI) across the hydrocarbon value chain covering the upstream, downstream and midstream sector. The present FDI policy for petroleum & natural gas sector allows 100% automatic route for exploration and production, refining by the private companies (for public sector companies 49% on automatic route without any disinvestment 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 existing sectoral policy and regulatory framework in the oil and gas sector. Exploration and Production of oil and gas are capital intensive and high risk activities requiring use of expensive state-of-the-art technologies and best management practices. Accordingly, the Government is encouraging participation of the private sector, including foreign companies in exploration, production and transportation network for petroleum and natural gas, in order to supplement the domestic investment as well as the efforts of the national oil companies in meeting the rising demand of oil and gas and reducing import dependence. It may be observed that inflow of FDI in petroleum and natural gas has varied considerably over the years that could at least be partly due to the bulkiness of investments in the sector.



The highest FDI inflow was received in 2014-15 at ₹ 64957 Million contributing 6.4% of total FDI inflow in the economy. During the year 2019-20 (Apr-Sept), FDI inflow received was ₹ 768 Million contributing 0.04% of total FDI inflow in the economy. The trend in FDI inflows under Oil & Gas Sector are depicted in Table I.6.

Table I.6 : Year wise FDI inflows under Petroleum & Gas Sector

Year	FDI inflows				Annual Growth (%)			
	All Sector		P&NG Sector		All Sector		P&NG Sector	
	₹ Million	US\$ Million	₹ Million	US\$ Million	₹ Million	US\$ Million	₹ Million	US\$ Million
2014-15	1891071	30931	64957	1079	28.19	27.29	857.51	861.44
2015-16	2623216	40001	6770	103	38.72	29.33	-89.58	-90.45
2016-17	2916963	43478	11971	180	11.20	8.69	76.81	75.11
2017-18	2888885	44857	1561	24	-0.96	3.17	-86.96	-86.60
2018-19 (P)	3098667	44366	9402	138	7.26	-1.09	502.35	472.50

P: Provisional

1.20 Outlay for Ministry of Petroleum & Natural Gas

During the financial year 2018-19 actual expenditure of I&EBR ₹100308.70 crore against BE of ₹89335.09 crore, was utilised. Against proposed BE at ₹93639.30 crore for 2019-20, around ₹63021 crore (67.30%) has been utilized during April-December, 2019. Detailed Budget Estimates of the Ministry of Petroleum & Natural Gas are given in Annexure VI.

1.21 Strategic Crude Oil Storage

Three underground rock caverns for Strategic Petroleum Reserves (SPR) with total crude oil storage capacity of 5.33 MMT at Vishakhapatnam (1.33 MMT), Mangalore (1.50 MMT) and Padur (2.5 MMT) have been constructed and were dedicated to the nation by Prime Minister on 10th February 2019. The National oil company of Abu Dhabi ADNOC has already stored crude oil at its own cost at one of the two cavern of Mangalore SPRs, as per restated agreement signed with ADNOC on 10th February 2018. The Indian Strategic Petroleum reserves Ltd. signed an MoU with Saudi Aramco to explore possibility of filling one cavern of Padur, on the sidelines of PM visit to Saudi Arabia in October 2019. The Union Cabinet have given "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 Principle' approval is to take up the project under PPP model to reduce budgetary support of Government of India.

1.22 Non-Conventional Energy

1.22.1 EBP Programme: Ethanol Blended Petrol (EBP) Programme is aimed at achieving multiple outcomes such as addressing environmental concerns, reducing import dependency and providing boost to agriculture sector. Government in recent years has taken a series of steps to boost the indigenous production of ethanol. These include re-introduction of administered price mechanism, permitting additional feedstock sources for ethanol production, amending Industries (Development & Regulation) Act, 1951 for bringing exclusive control of the Central Government over denatured ethanol, reduction in Goods & Service Tax (GST) rates from 18% to 5% on ethanol utilized under EBP Programme, notifying National Policy on Biofuels – 2018 with a target of 20% ethanol blending by 2030 and an Interest Subvention Scheme for augmentation of ethanol production capacity. Presently, 13 States have already implemented the IDR Act amendment. This Ministry is regularly pursuing the matter with other States for implementation of amendment in the IDR Act.



From ethanol supply year 2018-19, additional sources like B-heavy molasses, sugarcane juice, damaged food grains like wheat and rice unfit for human consumption, surplus food grains and fruit and vegetable wastes have been permitted. Different prices of ethanol have been fixed depending upon the raw material used. The Ethanol Supply Year (ESY) is taken from 1st December to 30th November of the following year so as to align it with the sugarcane crushing season. For the ESY 2018-19, OMCs have procured 188.57 crore litres of ethanol for blending purpose. From the ESY 2019-20, the government has allowed sugar and sugar syrup as additional sources for making ethanol. The prices for ESY 2019-20 are as under :

S.No.	Source material	Price (₹ per Litre)
(i)	C-Heavy molasses	43.75
(ii)	B-Heavy molasses	54.27
(iii)	100% sugarcane juice/sugar/sugar syrup	59.48
(iv)	Damaged Food grains	50.36

Oil Marketing Companies (OMCs) have issued tenders for a requirement of 511 crore litres of ethanol in ESY 2019-20 as against 329 crore litres in ESY 2018-19. The OMCs have also been enhancing their ethanol storage capacity, which has increased from 5.39 crore litres in November, 2017 to 16.17 crore litres by December, 2019 thereby providing ethanol storage cover of 11-15 days at 10% blending levels at their depots. Work is in progress to further add 12.28 crore litres of additional storage capacity which will enhance the ethanol storage cover to over 15 days by July, 2020.

MoP&NG has also issued a 'Long Term Ethanol Procurement Policy' under EBP Programme on 11.10.2019.

1.22.2 2G Ethanol Programme: With an objective to augment ethanol supplies from sugarcane (known as 1st generation ethanol), the Government has allowed procurement of ethanol produced from other non-food feedstock like cellulosic and lignocellulosic materials, including petrochemical route (known as 2nd generation ethanol). In line with this decision, Oil's PSUs are establishing twelve 2G Ethanol bio-refineries in 11 states of the country with a total capacity of 1100 Kilo Liter per day (KLPD) involving an investment of ₹ 14,000 crore. List of 12 nos. of 2G Ethanol Projects is as under:-

Company	Location	Capacity (Kilolitres Per Day)	Feed Stock
IOCL	Panipat (Haryana)	100	Rice straw
	Gorakhpur (UP)	100	Rice Straw
	Dahej (Gujarat)	100	Cotton Stalk; MSW being explored
BPCL	Bargarh (Odisha)	100	Rice straw
	Bina (M.P.)	100	Wheat & Soya stalk
	Bhandara (Maharashtra)	100	Rice Straw
HPCL	Bhatinda (Punjab)	100	Rice straw/cotton stalk
	Badaun (UP)	100	Rice straw/bagasse
	Muzzafarpur (Bihar)	3 (Demo Plant)	Rice straw
	East/West Godavari (AP)	100	Rice straw/maize
NRL	Numaligarh (Assam)	185	Bamboo
MRPL	Davangere, (Karnataka)	60	Corn Cob.



The above plants are at various stages of development.

In order to improve the financial viability of the 2G ethanol projects, Government has launched "Pradhan Mantri JI-VAN (Jaiv Indhan- Vatavaran Anukool fasal awashesh Nivaran) Yojana" for providing viability gap funding to provide initial thrust to create 2G Ethanol capacity in the country and attract investments in this sector. In this scheme, financial support to twelve Integrated Bio ethanol Projects using lignocellulosic biomass & other renewable feedstock with total financial outlay of ₹ 1969.50 crore for the period 2018-19 to 2023-24 will be provided along with support to ten demo projects for 2G technology.

Hon'ble Prime Minister of India Shri Narendra Modi laid the foundation stone of Numaligarh Refinery Limited Bio-Refinery Project on 09.02.2019. Further, Minister, P&NG along with Chief Minister, of Uttar Pradesh laid the foundation stone of IOCL's Biofuel complex for production of second generation biofuels at Gorakhpur on 18.09.2019.

1.22.3 Biodiesel Programme: MoP&NG has issued Gazette Notification dated 30.4.2019 on the subject 'Guidelines for sale of Bio-diesel for blending with High Speed Diesel for transportation purposes-2019'. Marketing Division of this Ministry has also issued "The Motor Spirit and High Speed Diesel (Regulation of Supply, Distribution and Prevention of Malpractices) Amendment Order, 2019 dated 30.05.2019 vide Gazette Notification on 31.05.2019".

During the period April to December, 2019, 10.13 crore litres of biodiesel has been procured by OMCs for biodiesel blending. In order to encourage production of biodiesel from Used Cooking Oil (UCO), Oil Marketing Companies have floated Expression of Interest on 10.08.2019, for supply of biodiesel produced from UCO at 100 locations across the country and it was further extended to 200 locations on 10.10.2019. The ex-factory UCO based biodiesel price has been fixed for three years. The price for the first year has been fixed at ₹ 51/litre, for the second year at ₹ 52.7/litre and for the third year at ₹ 54.5/litre. GST and



Hon'ble Chief Minister, Jharkhand, Hon'ble Union Minister of Tribal Affairs and Hon'ble Union Minister of P&NG and Steel launch CNG supply, CNG-run vehicles and D-PNG supply in Ranchi





Hon'ble Union Minister of P&NG and Steel giving the Swachh Bharat Award to BPCL

transportation shall be payable in addition to this price.

World Biofuel Day 2019 was organised by Ministry of Petroleum & Natural Gas on 10th August, 2019. Minister of Health & Family Welfare, Science & Technology and Earth Sciences, Dr Harsh Vardhan was the Chief Guest on the occasion. This year the theme of the World Biofuel Day was "Production of Biodiesel from Used Cooking Oil (UCO)". On this occasion, a sticker on RUCO viz., Repurpose Used Cooking Oil and a mobile app to facilitate the collection of UCO was also released by FSSAI.

1.22.4 Bio-Jet (ATF): Of late, demand for cleaner aviation fuels (contributing 2% to global Green House Gas emissions) has gained significance. The first flight using 25% Biojet Fuel between Dehradun to Delhi operated by Spice jet was received by Minister, Petroleum and Natural Gas on 27.8.2018. Bio jet fuel used in the flight had been developed by CSIR laboratory in IIP, Dehradun using Jatropha seeds. In order to formulate a way forward, two committees have been formed by this

Ministry with mandate as follows:

- (a) First committee would look into the availability of feed stock across India for production of bio-jet fuel, current demand for bio-jet fuel, estimate of future requirements and its cost of production, etc.
- (b) Second committee would look into the formulation of standards along with specifications to be prepared in line with International Standards. It would also study the effects of Bio-jet fuel on various aircraft engines.

1.23 Goods & Services Tax (GST)

The Goods and Services Tax (GST) has been implemented 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. The petroleum sector is, thus, faced with a hybrid tax regime on account



Hon'ble Chief Minister of Jharkhand Shri Raghubar Das, Hon'ble Union Minister for Tribal Affairs Shri Arjun Munda and Hon'ble Union Minister for Petroleum & Natural Gas and Ministry of Steel Shri Dharmendra Pradhan inaugurated the supply of domestic Piped Natural Gas (PNG) and inaugurated Compressed Natural Gas (CNG) station in Jamshedpur, in the presence of several dignitaries

of being subject to levy of existing taxes i.e. excise duty and state sales tax for non-GST items and GST for the remaining petroleum products.

With the objective to promote a clean gas based economy in the country, amongst all excluded petroleum goods, inclusion of natural gas in the ambit of GST would be helpful in reducing carbon emission and for environment protection. In view of relatively low Central Sales Tax implications in respect of ATF and the grounds for ease of compliance coupled with removal of distortions, Crude oil, Petrol and HSD and ATF could also be considered for inclusion in the ambit of GST.

1.24 Swachh Bharat Mission

Ministry of Petroleum & Natural Gas received Swachh Bharat Award from Jal Shakti Ministry, under Swachhata Action Plan Category in Swachh Mahotsav 2019 held on 6th September, 2019. MoPNG has allocated a budget of ₹ 342.50 crore for

2018-19, but with the help of continuous monitoring Oil & Gas CPSEs, have achieved an expenditure figure of around ₹473 crore, showing an achievement of around 138%.

MoPNG, its attached offices and Oil & Gas CPSEs under the administrative control of MoPNG, celebrated Swachhta Pakhwada from 1st July 2019 - 15th July, 2019. On 16th September 2019, Minister of Petroleum & Natural Gas and Steel distributed the Awards to all the winners of the Swachhta Pakhwada 2019, and also to the winners of Inter-refinery Swachhta Ranking 2018-19.

A "Jan-Andolan" for Plastic Waste Management on the theme of "Say No To Single Use Plastic" was launched by the Ministry of Petroleum & Natural Gas from 11th September to 27th October, 2019 to pay homage to Mahatma Gandhi on his 150th birth anniversary. The campaign focused on spreading awareness against the menace of Single Use Plastic in view of its detrimental effort on earth's environment



adversely affecting humans, wildlife and habitat. This campaign saw huge participation by Oil & Gas fraternity, public, industry and other sections of society and have gone towards making "Swachhata Hi Seva-2019" Campaign a success.

1.25 Start up India

Under the Start-up India initiative of Oil and Gas Sector, proposals/applications were invited through open advertisement by the individual PSUs for funding and mentoring. The themes for the proposals included leveraging Internet of Things (IoT) in Upstream/Midstream/Downstream operation of Oil and Gas Public Sector Units (PSUs). Digitization of business processes, Green Fuels, Alternative Energy, Improved technologies for Hydrocarbon industry besides topics of societal relevance.

The PSUs under the Ministry of Petroleum and Natural Gas have created a corpus fund of ₹ 320 Crores. At present, a total no. of 160 Startups are being funded by the PSUs with a committed fund value of approximately ₹190 Crores.

1.26 Skill Development

Skill India initiative was launched by Prime Minister of India on 15th July, 2015. The Mission creates convergence across sectors and states in terms of skill training activities.

In line with National Skill Development Mission of the Govt. of India, Hydrocarbon Sector Skill Council (HSSC) was set up on 26.04.2016 to facilitate the skill development requirement in Hydrocarbon Sector.

Six Skill Development Institutes (SDIs) at Bhubaneswar, Vizag, Kochi, Ahmedabad, Guwahati and Rae Bareilly have been started by IOCL, HPCL, BPCL, ONGC, OIL and GAIL respectively. As on January, 2020, 14398 trainees have been trained in SDIs.

Several high priority trades have been identified in consultation with the Industry members for National Occupational Standard (NOS)/ Qualification Pack (QP) development. Till date 16 QPs have been approved by National Skill Qualification Committee (NSQC) and NSDC's Qualification Registration Committee (QRC).

Under the Pradhan Mantri Kaushal Vikas



At present, a total no. of 160 start ups are being funded by the PSUs with a committed fund value of ₹ 190 crore

Jyoti (PMKVY) Recognition of prior learning (RPL) Type-4 project, HSSC is in process of 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 Driver (Petroleum Products) Trades. Till March 2020, assessment of 72709 personnel has been completed.

1.27 Make in India

The Make in India initiative was launched by Prime Minister in September 2014 as part of a wider set of nation-building initiatives devised to transform India into a global design and manufacturing hub.

To roll out Make in India campaign in Oil and Gas Sector, a policy to provide Purchase Preference linked with Local Content (PP-LC) in all Public Sector Undertakings under Ministry of Petroleum & Natural Gas was approved by the Government on 12.04.2017. The policy aims to incentivize the growth in local content in goods and services by implementing oil and gas projects in India by providing purchase preference to the manufacturers/service providers who meet the local content targets in oil and gas business activities.

During the current financial year PP-LC Policy was reviewed by the Steering Committee constituted under the Policy by MoPNG. As per the recommendations of Steering Committee, Policy has been extended for a further period of one year w.e.f. 1.10.2019.

Ministry of Petroleum and Natural Gas on 6th August, 2018 prescribed Minimum Local Content (MLC) for High Speed Diesel (HSD) and Petrol as 10% each. MoPNG reviewed the MLC for MS and HSD and prescribed MLC for some additional petroleum products on 25th June, 2019.







CHAPTER

2

Exploration
&
Production



Exploration & Production

2.1 Context/ Background

2.1.1 The energy demand will rise with social and economic development of the country. The country is dependent on imports for about 83.8% of its crude oil requirement and to the extent of about 47.3% 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 during 1990-1997 known as Pre-NELP exploration Blocks. Subsequently, after implementation of New Exploration Licencing 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 the 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 Licencing Policy (HELP) coupled with operationalization of Open Acreage Licencing Programme (OALP)
- Monetization of the Ratna Offshore field
- Policy Framework for Extraction of CBM by Coal India Limited (CIL) and 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 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
- Policy Reforms in Exploration and Licencing Policy for enhancing domestic exploration and production of 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 73% oil and 84% in gas production (excluding JV share) in the country in the year 2018-19. ONGC produces nearly 63% of indigenous crude oil and 75% of country's gas production (excluding JV share), while OIL's share is around 10% of



indigenous crude oil and 9% of gas production (excluding JV share). The share of Private/JV companies in oil and gas production is 29% and 14% (excluding CBM) 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 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.



In the deepwater beyond the 400m isobath, the sedimentary area has been estimated to be about 1.32 million square kilometres

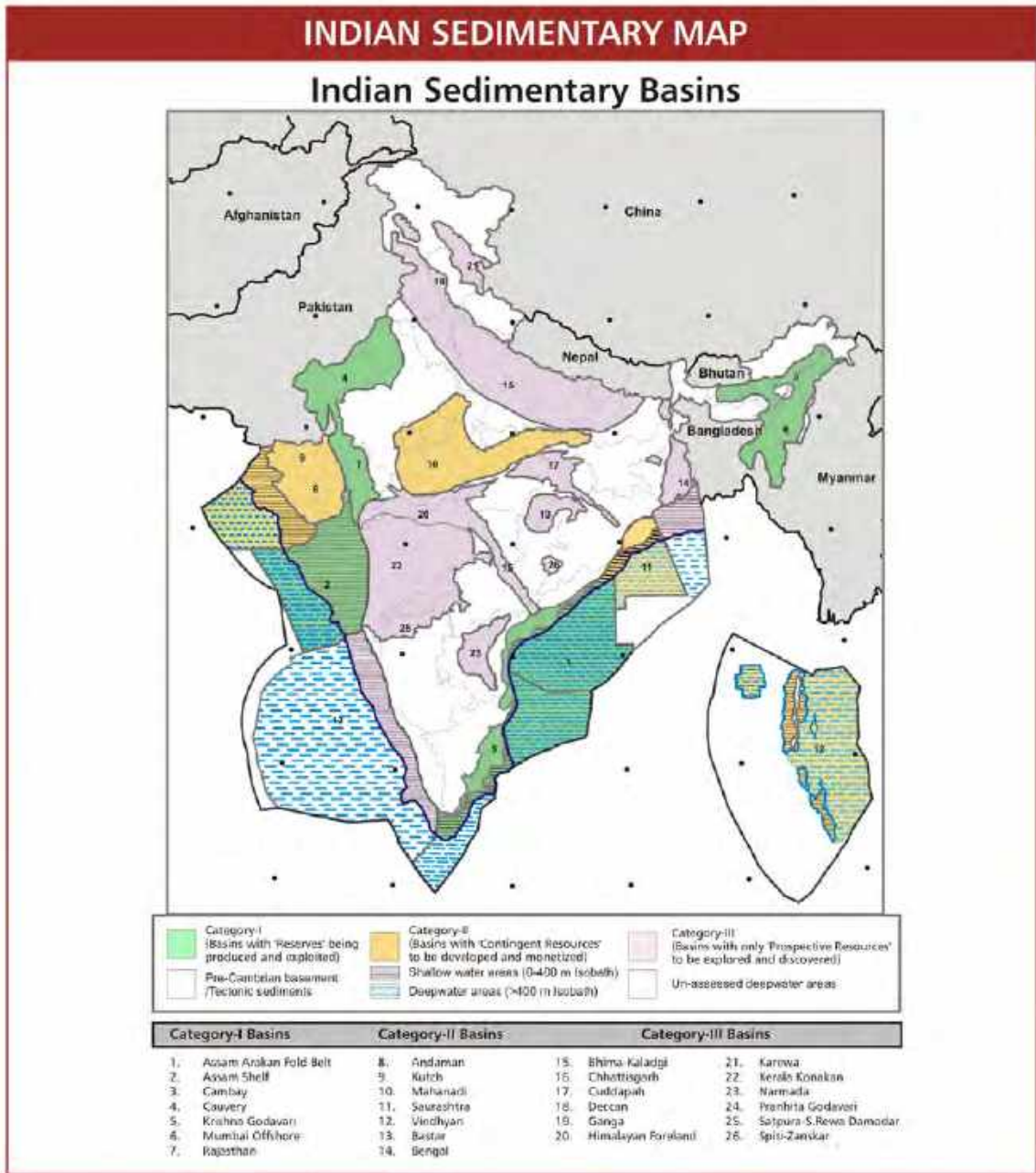
2.2 Sedimentary Basins in India

- 2.2.1** India has 26 sedimentary basins covering an area of 3.36 million square kilometres. The onland sedimentary basins of India have an aerial extent of about 1.63 million square kilometres; offshore sedimentary basins, upto the 400 meters isobath have an aerial extent of about 0.41 million square kilometres and in the deepwater beyond 400 meters 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:

Table 2.1: Categories of Indian Sedimentary Basins

Type of Basins	Area (Sq. Km.)	Hydrocarbons Prospectivity	Basins/ Region
Category I (7Basins)	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, Decan Syncline, Bhima-Kaladgi, Cuddapah, Pranhita-Godavari, Bastar, Chhattisgarh
Total	33,65,449		



2.2.3 Crude oil and Natural Gas production in the country is mainly confined to Category-I sedimentary basins. In addition, significant quantity of petroleum resources has been established in five category -II basins, however production is yet to commence from these basins.

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 and 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	No.	Basin Name	Prognosticated Resource (MMTOE)	
			Estimate 1995-96	Estimate (2017)
Category I (Basins with reserves being produced and Exploited)	1	Assam Arakan Fold Belt	1860	1632.8
	2	Assam Shelf	3180	6001.2
	3	Cambay	2050	2585.6
	4	Cauvery	700	1964.4
	5	Krishna Godavari	1130	9554.5
	6	Mumbai Offshore	9190	9646
	7	Rajasthan	380	4126
Category I Total			18490	35510.5
Category II (Basins with contingent resources to be developed and monetized)	8	Andaman	180	371.4
	9	Kutch	760	898.4
	10	Mahanadi	145	650.6
	11	Saurashtra	280	1325.2
	12	Vindhyan	Not Studied	632.5
Category II Total			1365	3878.1
Category III (Basins with only prospective resources to be explored and discovered)	13	Bastar	Not Studied	1.3
	14	Bengal	190	828.3
	15	Bhima-Kaladgi	Not Studied	3.2
	16	Chhattisgarh	Not Studied	25
	17	Cuddapah	Not Studied	5.1
	18	Deccan	Not Studied	11
	19	Ganga	230	128.4
	20	Himalayan Foreland	150	44.4
	21	Karewa	Not Studied	4
	22	Kerala Konakan	660	1244.6
	23	Narmada	Not Studied	18
	24	Pranhita Godavari	Not Studied	95.4
	25	Satpura-S.Rewa-Damodar	Not Studied	63
26	Spiti-Zanskar	Not Studied	11.1	
Category III Total			1230	2482.8
Deep Water Areas			7000	Deep water area estimated basin-wise & resources added to respective basins
Total (MMTOE)			28085	41871.4

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



2.3.2 As on 1st April 2019 in-place hydrocarbon volume of 10950 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 10950 MMT of oil and oil equivalent gas of in-place volumes, the ultimate reserves which can be produced are about 4259.5 MMT of oil and oil equivalent gas. The balance recoverable reserves are of the order of 1,909 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 2019 are as under:

2.3 : Reserves Status During the Year 2018-19 (as on 01.04.2019)

S. No.	Subject	Parameter	ONGC (Nomination)*	OIL (Nomination)*	PSC/RSC/DSF regime	Total
1	Initial In-place volume	Gas (BCM)	2229.97	382.57	1364.50	3977.04
		Oil (MMT)	5085.31	800.65	1129.39	7015.34
		O+OEG (MMT)	7315.28	1134.38	2493.89	10943.55
2	Ultimate Reserves	Gas (BCM)	1273.91	221.53	815.39	2310.83
		Oil (MMT)	1452.69	253.30	270.85	1969.83
		O+OEG (MMT)	2726.60	433.82	1086.24	4246.66
	Balance Recoverable Reserves	Gas (BCM)	560.39	127.06	620.57	1308.02
		Oil (MMT)	430.49	76.05	111.39	617.93
		O+OEG (MMT)	990.88	186.60	731.96	1909.44

*O+OEG= Oil and Oil Equivalent of Gas1 BCM (gas) = 1 MMT (OEG) (For ONGC & Pvt/Jvs)

**O+OEG= Oil and Oil Equivalent of Gas1 BCM (gas) = 0.8828 MMT (OEG) (For OIL)

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

S. 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	8.5
Total CBM Resources		2,599.48



Night View of GAIL Vijaypur plant



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 volume of about 294.8 BCM have been established by different operators as on 1st April 2019. State-wise and block-wise CBM reserves position is given below:

2.5 : Recoverable Coal Bed Methane Reserves as on 01.04.2019

State	Block	Operator	GIIP (BCM)	Ultimate Reserves (BCM)	Balance Recoverable Reserves (BCM)
Jharkhand	Bokaro	ONGC	30.182	3.680	3.680
	Jharia	ONGC	14.610	3.040	2.869
	North Karanpura	ONGC	9.530	1.462	1.462
Madhya Pradesh	Sohagpur East	RIL	47.700	16.700	16.682
	Sohagpur West	RIL	55.500	15.440	14.871
West Bengal	Raniganj East	ESSAR	60.770	28.120	26.829
	Raniganj North	ONGC	7.430	1.860	1.860
	Raniganj South	GEECL	69.092	5.287	4.224
Total (BCM)			294.814	75.589	72.477

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 geological understanding and new technology. With (CMPDI): in July, 2013 has estimated Shale Gas the increase in exploration spread and quantum jump resources of 45.8 TCF for one basin, namely Gondwana

- United States Geological Survey (USGS) in resource assessment of all sedimentary basins of January, 2011 estimated Technical Recoverable Shale Gas of 6.1 TCF in three basins namely Cambay, Krishna Godavari and Cauvery.

2.3.6 Re-assessment of Hydrocarbon Resources

The last hydrocarbon resources assessment exercise was carried out approximately two decades ago (1995-96). During the course of implementation of Pre-NELP and NELP rounds and other exploration and production activities, substantial geo-scientific 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 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 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 estimate of 28.08 billion tonnes.

2.4 Crude oil and Natural Gas

2.4.2 In FY 2019-20 (up to December, 2019), the share of offshore crude oil production is about 49.3%. The remaining crude oil production was from 6 States viz., Andhra Pradesh (0.7%), Arunachal Pradesh (0.2%), Assam (12.7%), Gujarat (14.5%), Rajasthan (21.3%) and Tamil Nadu (1.3%). The details of crude oil production in FY 2019-20 (up to December 2019) and last 5 years are as under:

Table 2.6 : State-wise Crude Oil Production Trends (Thousand Metric Tonnes)

State/Source	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20 (Upto Dec'19)
Onshore						
Andhra Pradesh	254	295	276	322	296	182
Arunachal Pradesh	69	57	55	50	4341	
Assam	4,473	4,185	4,203	4,345	4,309	3,090
Gujarat	4,653	4,461	4,605	4,591	4,626	3,527
Rajasthan	8,848	8,602	8,165	7,887	7,667	5,205
Tamil Nadu	241	261	284	345	395	310
Total Onshore	18,538	17,861	17,588	17,540	17,336	12,355
Share of PSUs (excluding JV share)	9,482	9,051	9,192	9,386	9,367	6,913
Share of Private/JV	9,056	8,810	8,396	8,154	7,969	5,442
Offshore						
Share of PSUs (excluding JV share)	16,194	16,543	16,284	16,240	14,969	10,829
Share of Private/JV	2,729	2,546	2,137	1,905	1,899	1,192
Total Offshore	18,923	19,089	18,421	18,145	16,868	12,021
Grand Total	37,461	36,950	36,009	35,684	34,203	24,376
Share of PSUs (excluding JV share)	25,676	25,594	25,476	25,625	24,335	17,747
Share of Private/JV	11,785	11,356	10,533	10,059	9,868	6,634



24.38 MMT
crude oil production
in FY 2019-20
(upto Dec' 19)

Production

2.4.1 Crude oil production in FY 2019-20 (April to December, 2019) is about 24.38 Million Metric Tonne (MMT). About 73% of crude oil is by ONGC and OIL from nomination regime (excluding JV share) and remaining 27% of crude oil production is by Private/JV companies from PSC regime.



2.4.3 Natural Gas production in 2019-20 (up to December, 2019) is about 23.85 Billion Cubic Metre (BCM). About 84% of natural gas production is by ONGC and OIL from nomination regime (excluding JV share) and remaining 16% of natural gas production was by Private/JV companies from PSC regime.

2.4.4 The share of offshore natural gas production in FY 2019-20 (up to December, 2019) is about 66.4%. The remaining natural gas production including CBM was from 10 States viz., Andhra Pradesh (2.9%), Arunachal Pradesh (0.1%), Assam (10.3%), Gujarat (4.2%), Rajasthan (5.6%), Tamil Nadu (3.5%), Tripura (4.9%), Jharkhand, Madhya Pradesh and West Bengal (2.0%). The details of Natural gas production in 2019-20 (up to December, 2019) and last 5 years are as under:

Table 2.7 : State-wise Natural Gas Production Trends (MMSCM)

State/Source	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20 (Upto Dec'19)
Onshore						
Andhra Pradesh	541	619	868	959.16	1081.31	688.84
Arunachal Pradesh	34	30	28	29.51	27.81	31.75
Assam	2958	3025	3128	3219.02	3289.06	2462.51
Gujarat	1527	1490	1580	1606.66	1402.22	1011.78
Rajasthan	1178	1338	1277	1441.93	1483.25	1343.80
Tamil Nadu	1192	1011	983	1207.22	1207.85	824.18
Tripura	1140	1332	1430	1440.37	1554.30	1173.64
CBM-WB, MP, Jharkhand	228	392	564	734.80	710.46	485.07
Total Onshore	8797	9237	9858	10638.69	10756.27	8021.58
Share of PSU (excluding JV share)	7474	7608	8141	8519.80	8354.77	6044.64
Share of Private/JV	1323	1629	1717	2118.89	2401.50	1976.94
Offshore						
Share of PSU (excluding JV share)	17272	16406	16883	17791.16	19041.80	13951.43
Share of Private/JV	7589	6605	5155	4219.46	3075.32	1877.35
Total Offshore	24861	23012	22038	22010.62	22117.12	15828.77
Grand Total	33658	32249	31897	32649.32	32873.37	23850.35
Share of PSUs (excluding JV share)	24746	24014	25024	26311.00	27396.57	19996.07
Share of Private/JV	8912	8234	6872	6338.34	5476.82	3854.29

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) blocks about 0.35 MMSCMD in December, 2019. Another three blocks, Raniganj (East) block operated by ESSAR is producing at the rate of 0.41 MMSCMD and Jharia and Bokaro operated by ONGC is

producing at the rate of 0.01 MMSCMD. CBM production of Sohagpur (West) and Sohagpur (East) operated by RIL is about 0.94 MMSCMD. Thus CBM production from 6 blocks in the country is about 1.7 MMSCMD in December, 2019 which includes test gas from 2 CBM blocks and commercial production from 4 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 Sq. Km. (48.5%) and Offshore area covers 1.73 Million Sq. Km. As of now, only 48% of the basinal areas have been 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 and Production

2.6.1 Government of India signed 310 production sharing contracts including 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 53 Revenue Sharing Contracts (RSCs) have been signed under two DSF Bidding Rounds (Discovered Small Field) involving 53 Contract Areas. Under HELP (Hydrocarbon Exploration and Licencing Policy), in Open Acreage Licencing Programme (OLAP), Bid Round I, II, III & IV 94 RSCs have been signed. At present, out of 310 PSCs & 147 RSCs signed so far under various bidding rounds (Discovered Field, PreNELP, NELP,HELP and DSF), 78 PSCs and 147 RSCs respectively 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 Licenses (PELs) were 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:** Government offered Petroleum Mining Lease (PML) of small/medium sized discovered fields (proven reserves were discovered by



**As on 1st April, 2019,
an investment of about
US \$ 42 Billion
on exploration and
production was made**

ONGC and OIL) to the private sector in August 1992. Production Sharing Contracts (PSCs) awarded during 1991-1993 had the distinctive feature of operators as private companies with ONGC/OIL as having participating interest. Government of India has signed 28 contracts (One PSC for Panna Mukta- PM) for 29 discovered fields under Pre-NELP Discovered (Small and Medium size fields) regime.

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 Licencing 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 53 Contract area, DSF-I & DSF-II Bid Rounds, based on Revenue Sharing Model.

f) **Hydrocarbon Exploration & Licencing Policy:** Under Hydrocarbon Exploration & Licencing Policy (HELP), Government has awarded 94 Exploratory Blocks on Revenue Sharing basis, in four bidding rounds, till December 2019

2.6.3 Under PSC Regime as on 1st April, 2019, an investment of about US\$ 42 billion on exploration and production was made. Out of this, investment of US\$6.3 billion on discovered fields, US\$ 8.7 billion on Pre-NELP exploration Blocks and US\$ 27.5 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 7 PEL and 358 PML blocks covering an area of about 60264.2 sq. Km. In addition, OIL is operating 3 PEL and 24 PML under nomination regime covering an area of 5068 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 31.12.2019

ONGC-Nomination									
Basin/State		PEL		PML				Total	
				Long term		Short term (7year)			
		No.	Area (Sq Km)	No.	Area (Sq Km)	No.	Area (Sq Km)	No.	Area (Sq Km)
Assam-Arakan	Assam	-	-	42	1920.99	4	875.29	46	2796.28
	Nagaland	3	1590	1	12	-	-	4	1602
	Tripura	-	-	16	1682.07	2	1345.99	18	3028.06
Cambay	Gujarat	-	-	166	5610.72	3	111.25	169	5721.97
	Tamil Nadu-Onland	-	-	25	660.14	3	2685.63	28	3345.77
Cauvery	Cauvery-Offshore	-	-	1	11	1	74.83	2	85.83
	Himalayan Foreland	1	1828	-	-	-	-	1	1828
Krishna - Godavari	Andhra Pradesh-Onland	-	-	35	1083.75	5	3465.48	40	4549.23
	KG-Offshore	1	283.05	11	894.29	2	186.81	14	1364.15
Kutch Offshore		1	420	1	840	2	786.5	4	2046.5
Saurashtra Offshore		-	-	1	392.52	1	1906.13	2	2298.65
Mumbai Offshore		1	985	24	15499.91	7	13168.23	32	29653.14
Jaisalmer	Rajasthan	-	-	4	809.57	-	-	4	809.57
Vindhyan	Madhya Pradesh	-	-	-	-	1	1135	1	1135
Total - ONGC		7	5106.05	327	29417.0	31	25741.1	365	60264.2
OIL-Nomination									
Basin/State		PML		PEL		Total			
		No.	Area (Km ²)	No.	Area (Km ²)	No.	Area Km ²)		
Rajasthan		-	-	2	460	2	460		
Assam-Arakan		3	332	22	4276	25	4608		
Total OIL		3	332	24	4736	27	5068		



2.7.2 Private/JV companies are operating 39 PEL and 64 PML blocks covering an area of 52862 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 under PSC regime as on 31.12.2019

BASIN	PEL		PML	
	PEL (No.)	Area (Sq.Km)	PML (No.)	Area (Sq.Km)
Assam-Arakan Fold Belt	1	3213		
Assam-Arakan Shelf	7	7043	3	139
Bengal	2	7941		
Cambay	8	1482	46	1397
Cauvery	3	1126	2	156
Krishna Godavari	5	4612	9	2467
Kutch	2	1878		
Mahanadi	1	832		
Mumbai	3	3650		
Rajasthan	2	3151	4	3287
Satpura-South Rewa-Damodar	1	789		
Saurashtra	1	552		
Vindhyan	3	9147		
Total	39	45416	64	7446

2.8 Exploratory Efforts by ONGC and OIL under Nomination Regime

ONGC and OIL have carried out 916720.8 line kilometre (LKM) of 2D seismic survey 141431.66 Sq. Km. of 3D seismic survey and drilled 6,545 exploratory wells since inception as on 31st December, 2019. 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 under Nomination Regime

Sr.No.	Company	Cumulative exploratory efforts as on 31.12.2019		
		2D seismic (LKM)	3D seismic (Sq. KM)	Exploratory Well (No)
1	ONGC Nomination	882442.64 (882443)	130139.83 (130140)	6157
2	Oil India Ltd. - Nomination	34,278.16	11,291.83	388
	Total	916720.8	141431.66	6545



2.9 Exploratory Efforts by Private / JV companies under PSC

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, 2019 are as under:

Table 2.11 : Exploratory Inputs in PSC Regime as on 01.04.2019

Basin Name	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	5,450	2,203	40
Bengal	5,247	4,573	11
Cambay	29,994	9,167	310
Cauvery	64,727	44,561	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	76,106	70,711	191
Kutch	2,985	8,345	19
Mahanadi	59,542	64,659	53
Mumbai	21,349	27,285	48
Pranhita Godavari	195	0	1
Rajasthan	14,157	16,396	305
Satpura-South Rewa-Damodar	2,050	304	2
Saurashtra	16,037	15,428	16
Vindhyan	3,918	369	6
Grand Total	3,90,173	2,96,893	1,077

2.9.2 Exploratory efforts carried out by PSUs, Indian Private and foreign companies under PSC regime as on 31st March, 2019 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	61,982	23,871	289
Indian Private Companies	1,21,014	1,07,177	327
PSUs	2,07,177	1,65,845	461
Total	3,90,173	2,96,893	1,077



2.10 Hydrocarbon Discoveries in 2019-20

The basin-wise exploratory efforts made by ONGC has made 10 hydrocarbon discoveries comprising of 6 discoveries in onshore acreages and 4 discoveries in offshore acreages under Nomination regime. Two hydrocarbon discoveries have been notified under PSC Regime too. The details of hydrocarbon discoveries made in 2019-20 up to December, 2019 are as under:

Table 2.13 : Hydrocarbon Discoveries in 2019-20 upto December 2019

Sl. No.	Company	Oil Discovery	Gas Discovery	Total
1	ONGC (Nomination)	5	5	10
2	OIL (Nomination)	-	1	1
3	PSC	1	1	2
	Total	6	7	13

2.11 National Data Repository (NDR)

2.11.1 The Government of India notified the Open Acreage Licensing Programme (OALP) as a part of the Hydrocarbon exploration and Licencing 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 National Data Repository (NDR) was launched by Government in June, 2017 to assimilate, preserve and upkeep the vast E&P data. 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. Till December, 2019, 2.319 Million LKM (Line Kilo Metres) of 2D seismic processed data, 0.787 Million Sq. Km. of 3D seismic processed data, 17,707 numbers of Well Log data, 35,823 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.

2.12 Shale Gas Exploration

2.12.1 In order to promote Shale Gas and Oil exploration in India, the Government of

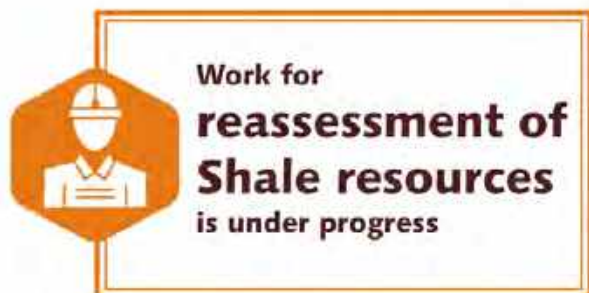
India on 14th December, 2013 notified the policy guidelines for exploration and exploitation of Shale gas and oil by National Oil Companies (NOCs) in their onland Petroleum Exploration Lease (PEL) / Petroleum Mining Lease (PML) blocks awarded under the nomination regimes.

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 was to carry out Shale Gas and Oil exploration activities in Cambay, Cauvery, Krishna-Godavari and Assam and Arakan Basins. Oil India Ltd was to carry 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. Till date ONGC has drilled total 28 wells in 23 blocks in four basins and OIL has drilled 4 wells in 4 blocks in two basins. Further, work for reassessment of Shale resources is under progress.

2.13 Gas Hydrate

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 is having encouraging results. NGHP-02 has





Work for
**reassessment of
Shale resources**
is under progress

discovered gas-hydrate-bearing sand reservoir system in the offshore Krishna Godavari basin. Further extensive studies are planned to assess the gas hydrate resource potential, reservoir characterization, reservoir delineation and geo-mechanical modelling for seafloor and wellbore stability and finalization of site(s) for pilot production for testing. KG deep offshore area block KG-DWN- 98/5 and KG-DWN-98/3 contain gas hydrate accumulations may be suitable sites for gas hydrate Pilot Production testing.

The current understanding from studies carried out in India for Gas Hydrates hinged on the various issues related to pilot testing, production modeling, geo mechanical modeling etc. To firm strategy for pilot testing, an action plan consisting of various phases is being firmed up. Phase 1 will deal with the planning effort in support of the NGHP-03 gas hydrate field test, which includes preparation and approval of action plan along with cost estimates, conducting studies pertaining to production test, reservoir simulation, flow modelling, sand ingress, risk & environmental impact assessment, MOD, MOEF & CC clearances, engineering design and finalisation of rig and other services tender. Pilot Production field test is divided into two phases 2 and 3. Phase 2 will deal with LWD and coring operations associated with identified site/(s) with primary goal to further characterize the geologic and engineering conditions of the sites under consideration for testing. Phase 3 will be the pilot production testing phase.

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 recent years. Some of the notable Policy reforms are listed as under:

2.14.1 Hydrocarbon Exploration and Licencing Policy / Open Acreage Licensing Programme (March 2016)

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 Programme (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 Programme (OALP) means potential investors/companies can carve out exploration acreages of their choice and submit Expressions of Interest round the year.

After the successful award of 87 blocks under first three bidding rounds of OALP (cumulative acreage of approximately 118,000 sq. km.), the Government undertook further steps to accelerate the





E&P sector and launched OALP - IV bid round on August 27, 2019 under a revised policy framework.

Under OALP-IV, Seven (7) Onland Blocks with an area of approximately 18,500 Sq. Km. were awarded in December 2019. OALP-IV has Five (5) blocks in Category-II basin and one (1) each in Category-I and Category-III Basin.

Blocks under OALP-Round-IV and all future Bid Rounds are being awarded under a more simplified and business friendly regulatory framework. Under this policy regime, the emphasis is on work programme, with no requirement for revenue share quotations for less explored Category II and III basins. A cap of 50% for revenue share in Category I basins has been introduced. A simple alternative dispute resolution mechanism is being implemented and a "single window" system of application for online clearances is also being put in place. OALP-IV has Five (5) blocks in Category-II basin and one (1)

each in Category-I and Category-III Basin.

Expression of Interest submission window for the OALP-V bid round was open till November 30, 2019 and companies had another opportunity to take part in the blossoming Indian E & P sector.

National Data Repository (NDR) was launched by Government in June, 2017 to assimilate, preserve and upkeep the vast data. Till December, 2019, 2.319 Million LKM (Line Kilo Metres) of 2D seismic processed data, 0.787 Million Sq. Km. of 3D seismic processed data, 17,707 numbers of Well Log data, 35,823 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)

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



Hon'ble Union Minister P&NG and Steel Visiting Sakhalin Oil Field in Russia's Far East during October 2019





**A total of 23
Contracts comprising
57 discovered small
fields/discoveries were
signed on March-2019**

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) O+OEG (Oil and Oil Equivalent Gas) in-place were offered for bidding. Bidding under DSF Bidding Round-II was launched on 9th August, 2018 and a total of 23 Contracts comprising 57 discovered small fields/discoveries were signed on March-2019.

2.14.3 National Seismic Programme (NSP) (October 2016)

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 LKM (Line Kilo Metres)). The estimated cost of the NSP project is ₹ 2,932.99 crore and is expected to be completed by 2020-21.

As on 31st December, 2019, out of 48,243 LKM, surface coverage of 43,112 LKM has been achieved under NSP.

2.14.4 Re-assessment of Hydrocarbon Resources (September 2015- November 2017)

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 reassessed 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.

2.14.5 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. 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 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.

2.14.7 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 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.

2.14.8 Policy Reforms in Exploration and Licensing Policy for enhancing domestic exploration and production of oil and gas (February 2019)

In a bid to increase exploration activities,

attract domestic and foreign investment in unexplored/unallocated areas of sedimentary basins, and enhance domestic production of oil and gas from existing fields and promote ease of doing business by streamlining and expediting the approval processes, the Government approved the policy on 28th Feb. 2019 with the following policy reforms:

a) Categorization of Sedimentary Basins:

Sedimentary Basins of India are classified into the following three categories:

Category-I Basins: Basins which have proven hydrocarbon resources with established commercial production.

Category-II Basins: Basins which have contingent resources which are yet to be converted to recoverable reserves and commercial production.

Category-III Basins: Basins which have prospective resources with no hydrocarbon discovery and few exploration inputs and data.

b) Increasing exploration activities in unexpected areas. In basins where no commercial production is there, exploration blocks would be bid out exclusively on the basis of exploration work programme without any revenue or production share to Government. Royalty and statutory levies, however, will be paid by Contractor.

For unallocated/unexplored areas of producing basins, the bidding will continue to be based on revenue sharing basis but more weightage to work programme. An upper ceiling on biddable revenue share has also been prescribed to prevent unviable bids. The policy also provides for shorter exploration period and fiscal incentive for commencement of early production. Contractor will have full marketing and pricing freedom for crude oil and





Hon'ble Union Minister P&NG and Steel inspecting the premises and system in place

- natural gas to be sold at arm's length basis through transparent and competitive bidding process
- c) To incentivize enhanced gas production, marketing and pricing freedom has been granted for those new gas discoveries whose Field Development Plan (FDP) is yet to be approved Fiscal incentive is also provided on additional gas production from domestic fields over and above normal production
 - d) To enhance production from existing nomination fields of ONGC and OIL, enhanced production profile will be prepared by both PSUs. For production enhancement, bringing new technology, and capital, NOCs will be allowed to induct private sector partners.
 - e) Measures are being initiated for promoting ease of doing business through setting up Empowered Coordination Committee for expediting statutory clearances and creation of Alternate Dispute Resolution mechanism for amicable resolution on disputed issues.
 - f) Redefining the Role of DGH by delegation of additional powers and functions to DGH to strengthen the compliance/ regulatory, developmental and coordination role of DGH.







CHAPTER

3

Pipelines &
Natural Gas



Pipelines & Natural Gas

India is not only 3rd largest energy consumer in the world after China and USA but also one of the fastest growing energy consumers. In 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 16800 Km long gas pipeline network is under operation in the country and

around 14200 KM pipeline network is approved/ under construction. Efforts are underway to complete the Gas Grid in a time bound manner.

In order to develop the national gas grid, the Government has taken a decision to provide a capital grant of ₹ 5176 crore (i.e. 40% of



At present, around
14200 KM
pipeline network is
approved/under
construction.

the estimated capital cost of ₹ 12,940 Crore) to GAIL for development of a 2655 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.

A MoU was signed among oil and gas CPSEs i.e. GAIL, IOCL, OIL, ONGC and NRL to form a joint venture company which will lay the pipeline connecting all north eastern State capital including Sikkim. Accordingly,



Engineers at GAIL, monitoring the pipeline operations



“Indradhanush Gas Grid Ltd” (IGGL) a JVC has been incorporated on 10.08.2018. This JVC is developing trunk pipeline connectivity in all North Eastern States i.e. Assam, Sikkim, Mizoram, Manipur, Arunachal Pradesh, Tripura, Nagaland and Meghalaya in a phased manner. PNGRB has also issued provisional authorization to IGGL on 14.09.2018 for the development of North-East gas pipeline grid. This project will also facilitate developing City Gas projects which will ensure the availability of clean cooking fuel to the households and environment friendly fuel to the industrial, commercial and transport sectors in major cities of North Eastern States. PIB has recommended for Capital Grant (60% of project cost) to improve viability of project and same has been concurred by CCEA. CCEA in its meeting held on 8.1.2020 has approved the project and VGF tune of ₹ 5559 crore.

Phase-II of Kochi-Kottanad-Managlore-Bangalore pipeline (KKBMP) project (887 Km) is under implementation. With the support of State Government, construction work on Kochi-Koottanad- Mangalore Section (444 Kms) in the State of Kerala is at advanced stage which is expected to be commissioned by March, 2020. Efforts are underway to start project activities on Koottanad-Bangalore Section (443 kms) passing through State of Tamilnadu. Execution of pipeline sections from Koottanad to Coimbatore (Kerala) and

Bangalore to Krishnagiri (Karnataka portion) have been taken up. The anticipated completion of the section Koottanad-Bangalore is 30 months from the availability of hindrance free RoU in Tamil Nadu.

IOCL is laying Ennore-Thiruvallur-Bangalore-Nagapattinam- Madurai – Tuticorin Natural gas pipeline (ETBNMTPL), length- 1421 km at an investment of around ₹ 6025 crore. Part section Ennore-Manali pipeline Section (21 Km) has been commissioned and gas supply to MFL, Manali (Fertilizer plant) has started. Further, Work on another section (Ramanad-Tuticorin pipeline – 162 Km) to supply gas to SPIC, Tuticorin (Fertilizer plant) is also at advanced stage.

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, the Country is having six (6) operational LNG re-gasification terminals operational with capacity of about 39.2 MMTPA (~ 141 MMSCMD). The terminal-wise details are as under-

Location	Owner & Operator	Capacity (MMTPA)
Dahej (Gujarat)	PLL	17.5
Hazira (Gujarat)	SHELL	5
Kochi (Kerala)	PLL	5
Dhabol (Maharashtra)*	GAIL (KLPL)	1.7
Mundra (Gujarat)	GSPC LNG Ltd	5
Ennore (Tamilnadu)	IOCL	5
Total Capacity (MMTPA)		39.2

(Note: *Name plate capacity is 5 MMTPA but in absence of the break-water, the terminal can only operate at 1.7 MMTPA)





In addition to above, following LNG terminals are under construction/proposed:

Location	Owner & Operator	Capacity (MMTPA)
Dhamra (Odisha)	Adani LNG Pvt Ltd	5
Dhabol Expansion	GAIL(KLPL)	3.3
Jaigarh (Maharashtra)	H-Energy	4
Jafrabad (Gujarat)	Swan Energy	5
Total Capacity (MMTPA)		17.3

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.

Till May 2014, coverage of CGD networks could be expanded to about 34 Geographical Areas (GAs) spread over 66 districts (part/full) in different part of the country. In 2014-17, additional 58 GAs spread over 70 districts (part/full) were covered for CGD networks till 8th round of CGD biddings. In 2018, with the successful conclusion of 9th CGD bidding round, the coverage of CGDs had been extended to additional 86 new GAs covering 174 districts (part/full) spread over 22 states and UTs. This has expanded the potential coverage of CGDs to about 50% of country's population spreading over 35% of India's area. Further, in February 2019, next bidding round (10th) has also expanded the coverage of CGDs to additional 50 new GAs covering 124 districts



1906 CNG stations
(as on 1.12.2019) are
supplying clean and
economical transportation
fuel to about 35.17 Lakh
CNG vehicles

(part/full) in 14 States. Above has resulted in expansion of CGD coverage from 34 Geographical Areas (GAs) spread over 66 districts (partial/full) in May 2014 to 229 GAs spread over more than 400 districts with a potential to cover about 53% of the country's area and 70% of country's population. Piped Natural Gas (PNG) supplies to domestic households has increased from the level of 25.4 lakh (May 2014) to 57.10 Lakh (as on 1.12.2019) for cooking purpose. Average annual growth of about 19% in PNG (Domestic) connection in last 5 years. 900 new Compressed Natural Gas (CNG) dispensing stations have been established in last 5 years. In total, 1906 CNG stations (as on 1.12.2019) are making clean and economical transportation fuel to about 35.17 Lakh CNG vehicles across the country.

In order to promote the expansion of City gas networks and enhance the usage of natural gas in cities, the Government has taken following steps-

- Domestic gas, which is cheaper than imported gas, has been allocated to meet the entire requirement of PNG (D) and CNG (T) segments of CGD sector and it has been kept under no cut category.





Bharat Petroleum's Installation

- ii. Public Utility Status granted to CGD Projects by Ministry of Labour and Employment (MoLE) .
- iii. Ministry of Defence (MoD) has issued guidelines for use of PNG in its residential areas/unit lines
- iv. Dept. of Public Enterprises (DPE) has issued guidelines to Public Sector Enterprises (PSEs) to have the provisions of PNG in their respective Residential complexes.
- v. Ministry of Housing & Urban Affairs (MOHUA) has issued advisory to State Governments on following aspects-
 - a. To standardize the Road Restoration /permission charges along with time bound permission in accordance with the local conditions.
 - b. Earmarking of land plot for development of CNG Stations at the planning stage of town/city and same should be specified in the revised Master Plan.
 - c. Relevant modification in building by-laws for providing gas pipeline infrastructure in residential & commercial buildings at architectural design stage.
- vi. Further, MoHUA has directed to CPWD & NBCC to have the provisions of PNG in all Government Residential complexes.
- vii. DIPP notified amended Rule 2018 to ease out process to set up CNG dispensing facilities at existing OMC ROs.







CHAPTER

4

Refining



Refining

4. Refining Capacity

4.1 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 62.00 Million Metric Tonnes Per Annum (MMTPA) in 1998 to 249.366 MMTPA at present, comprising of 23 refineries – 18 under Public Sector, 3 under Private Sector and 2 in Joint Venture (JV).

The capacity wise details of the refineries are given below:

Sl.no	Refineries	Name of the company	Name Plate Capacity (MMTPA)
PSU Refineries			
1	Digboi-1901#	Indian Oil Corporation Limited	0.65
2	Guwahati-1962		1.00
3	Barauni-1964		6.00
4	Koyali-1965		13.70
5	Bongaigaon-1974		2.35
6	Haldia-1975		7.50
7	Mathura-1982		8.00
8	Panipat-1998		15.00
9	Paradip-2016		15.00
10	Mumbai-1954	Hindustan Petroleum Corporation Limited	7.50
11	Visakhapatnam-1957		8.30
12	Mumbai-1955	Bharat Petroleum Corporation Limited	12.00
13	Kochi-1963		15.50
14	Manali-1965	Chennai Petroleum Corporation Limited	10.50
15	Nagapattinam-1993		1.00
16	Numaligarh-2000	Numaligarh Refinery Limited	3.00
17	Mangalore-1996	Mangalore Refinery and Petrochemicals Limited	15.00
18	Tatipaka, AP-2001	Oil and Natural Gas Commission	0.066
Total			142.066
JV Refineries			
19	Bina-2011	Bharat Oman Refinery Ltd.	7.80
20	Bathinda-2012	HPCL Mittal Energy Ltd.	11.30
Total			19.10
Private Sector Refineries			
21	DTA-Jamnagar-1999	Reliance Industries Limited	33.00
22	SEZ, Jamnagar-2008		35.20
23	Vadinar-2006	Nayara Energy Limited	20.00
Total			88.20
Grand Total			249.366

(# 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



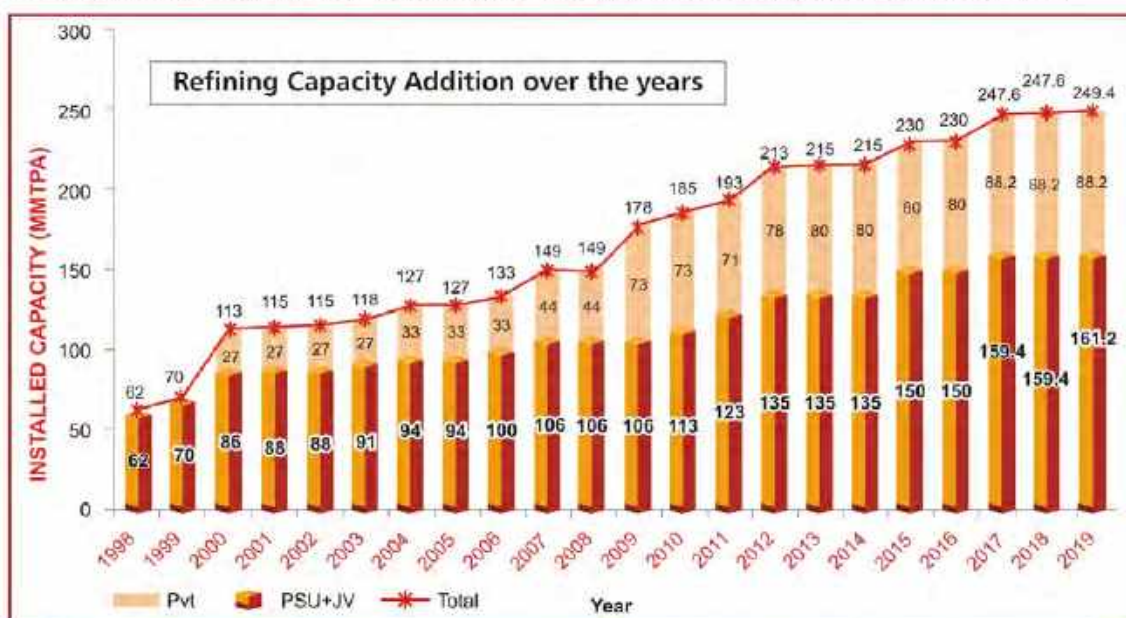
4.1.2 The refining capacity is not only sufficient for domestic consumption but leaving a substantial surplus also for export of petroleum products. Since 2001-02, India is a net exporter of petroleum products. During 2019-20 (From April, 2019- November, 2019), the country has exported 43.60 Million Metric Tonnes (MMT) of Petroleum products worth US Dollars 24.9 Billion (provisional). India is the largest exporter of petroleum products in Asia since August 2009.



India is the **largest exporter** of petroleum products in Asia since 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



4.3 Expansion of Existing Refineries

The Capacity expansion planned by 2022-23 is as under:

S.No.	Name of the Company	Location of the Refinery	Increase in Capacity, MMTPA
1	Indian Oil Corporation Limited (IOCL)	Barauni	3.00
2	Indian Oil Corporation Limited (IOCL)	Guwahati	0.20
3	Indian Oil Corporation Limited (IOCL)	Bongaigaon	0.35
4	Indian Oil Corporation Limited (IOCL)	Mathura	1.20
5	Indian Oil Corporation Limited (IOCL)	Haldia	0.50
6	Indian Oil Corporation Limited (IOCL)	Gujarat	4.30
7	Hindustan Petroleum Corporation Limited (HPCL)	Visakhapatnam, Andhra Pradesh	6.70
8	Hindustan Petroleum Corporation Limited (HPCL)	Mumbai, Maharashtra	2.00
9	RIL, DTA	Jamnagar, Gujarat	7.50



4.3.1 Green Field Refinery

S.No.	Name of the Company	Location of the Refinery	Capacity, MMTPA
1	HPCL Rajasthan Refinery Limited (HRRL)	Barmer, Rajasthan	9.00
2	West Coast Refinery	Maharashtra	60.00

4.4 Refinery Performance Improvement

4.4.1 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.

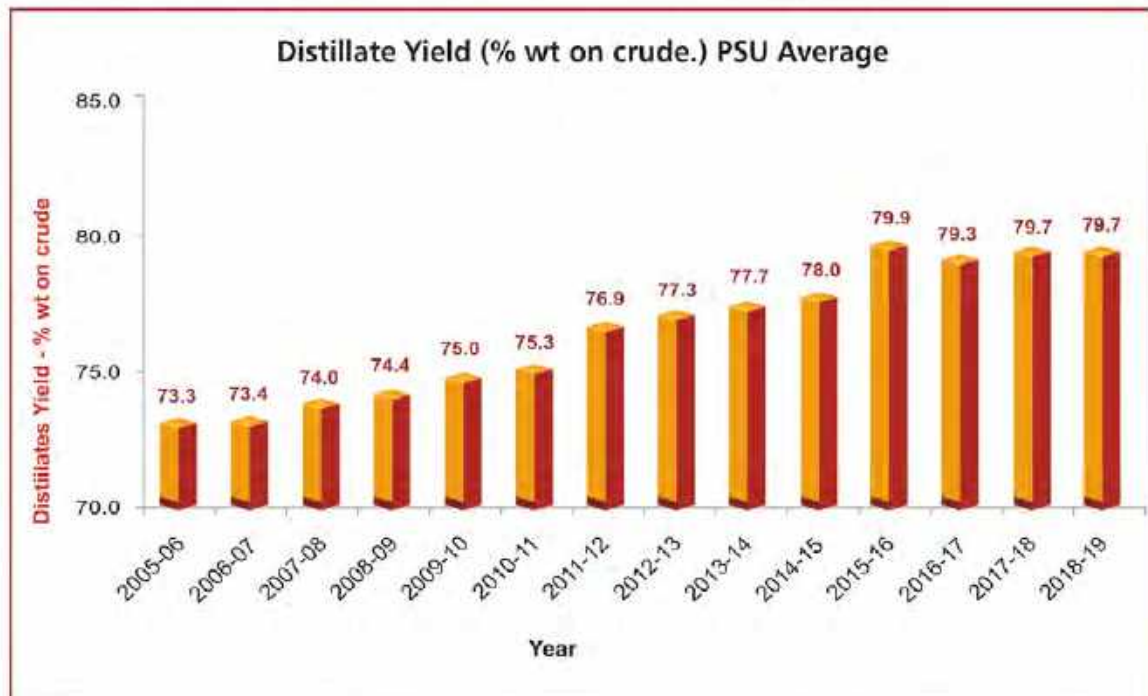
The Centre for High Technology (CHT) carried out a Performance Benchmarking Study of public sector Refineries through M/s Solomon Associates for consecutive cycles 2010, 2012, 2014, 2016 and 2018.

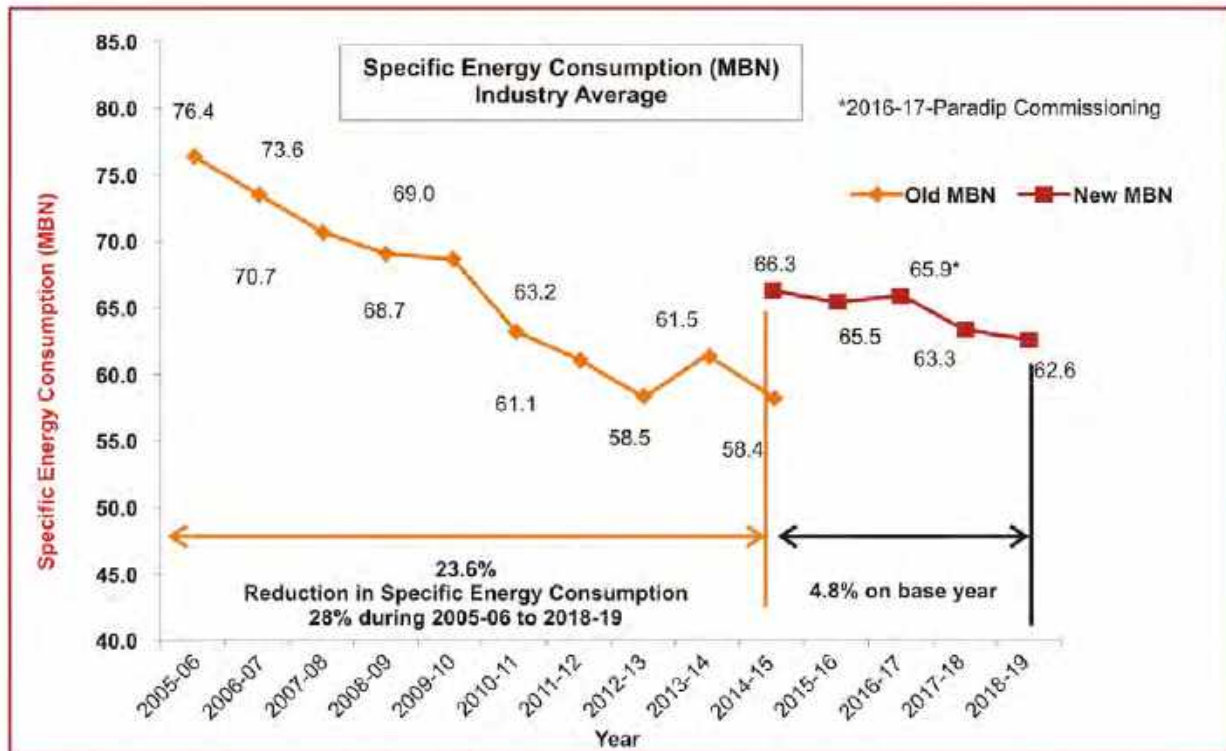
Adoption of modern technologies by Indian refineries and energy conservation measures has helped in increasing the



PSU refineries' average distillate yield has improved to 79.7% in 2018-19

distillate yield, quality upgradation of petrol/diesel and reduction in Specific energy consumption (MBTU/bbl/NRGF-MBN). The PSU refineries' average distillate yield (wt% on crude) has improved from 73.3% in 2005-06 to 79.7% in 2017-18 as depicted in Graph. Similarly, the industry average MBN has come down from 76.4 (Old) in 2005-06 to 62.6 (New) in 2018-19 as depicted in Graph. 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. 01.04.2017.

It has also been decided to leap frog directly from BS-IV to BS-VI emission norms in the country w.e.f. 01.04.2020. Ministry of Road transport & Highways vide Notification No. GSR 889(E) dated 16.09.2016 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. 01.04.2018, followed by major parts of NCR from 1st April, 2019. The 7 districts of Haryana in NCR has already been covered from 1st Oct, 2019 leaving 6 districts of Haryana in NCR, which would be covered along with nationwide supply of BS-VI quality fuels by 1st April, 2020.

4.6 Brief Description of the Refineries

4.6.1 Public Sector Refineries

a) Indian Oil Corporation Limited (IOCL) Refineries

i) Digboi Refinery (Assam) - Indian Oil Corporation Limited (IOCL) :

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 14.10.1981 and created a separate division. This division had both Refinery and Marketing operations. Digboi refinery is the oldest operating refinery in the world and produces premium grade Paraffin wax and micro-crystalline wax.

The present capacity of the Refinery is 0.65 MMTPA. The crude refining capacity utilisation of the refinery was 103.9% in 2018-19.



ii) Guwahati Refinery (Assam) - Indian Oil Corporation Limited (IOCL):

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

The present capacity of the Refinery is 1.00 MMTPA. The crude refining capacity utilisation of the refinery was 86.3 % in 2018-19.

iii) Barauni Refinery (Bihar) - Indian Oil Corporation Limited (IOCL) :

Barauni Refinery was commissioned in July, 1964. The refinery was set up in collaboration with the then Soviet Union. The refinery, which was originally designed for processing indigenous Assam crudes, was subsequently revamped and expanded and is now capable of processing imported crudes.

The present capacity of the Refinery is 6.00 MMTPA. The crude refining capacity utilisation of the refinery was 111.0% in 2018-19.

iv) Koyali Refinery (Gujarat) - Indian Oil Corporation Limited (IOCL) :

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

The present capacity of the Refinery is 13.70 MMTPA. The crude refining capacity utilisation of the refinery was 98.6% in 2018-19.

v) Bongaigaon Refinery (Assam) - Indian Oil Corporation Limited (IOCL) :

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 March 25, 2009. BRPL which was originally processing Assam crudes is now capable of processing imported crudes.



IOCL Barauni Refinery



The present capacity of the Refinery is 2.40 MMTPA. The crude refining capacity utilisation of the refinery was 106.9% in 2018-19.

vi) Haldia Refinery (West Bengal) - Indian Oil Corporation Limited (IOCL):

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. 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.

The present capacity of the Refinery is 7.50 MMTPA. The crude refining capacity utilisation of the refinery was 106.2% in 2018-19.

vii) Mathura Refinery (Uttar Pradesh) - Indian Oil Corporation Limited (IOCL):

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

The present capacity of the Refinery is 8.00 MMTPA. The crude refining capacity utilisation of the refinery was 121.7% in 2018-19.

viii) Panipat Refinery (Haryana) - Indian Oil Corporation Limited (IOCL):

Panipat Refinery was commissioned in 1998. Panipat refinery 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.

The present capacity of the Refinery is 15.00 MMTPA. The crude refining capacity utilisation of the refinery was 101.9% in 2018-19.

ix) Paradip Refinery (Odisha) - Indian Oil Corporation Limited (IOCL):

Paradip Refinery was dedicated to the nation by the Hon'ble Prime Minister 07.02.2016. 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 auxiliary industries.

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 15.00 MMTPA. The crude refining capacity utilisation of the refinery was 97.4% in 2018-19.

b) HPCL Refineries

i) Mumbai Refinery (Maharashtra) - Hindustan Petroleum Corporation Limited (HPCL)

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). HPCL-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.

The present capacity of the Refinery is 7.50 MMTPA. The crude refining capacity utilisation of the refinery was 115.6% in 2018-19.

ii) Visakh Refinery (Andhra Pradesh) - Hindustan Petroleum Corporation Limited (HPCL)

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. HPCL- 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 present capacity of the Refinery is 8.30 MMTPA. The crude refining capacity utilisation of the refinery was 117.7% in 2018-19.

c) BPCL Refineries

i) Mumbai Refinery (Maharashtra) – Bharat Petroleum Corporation Limited (BPCL).

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. BPCL-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.

The present capacity of the Refinery is 12.00 MMTPA. The crude refining capacity utilisation of the refinery was 123.1% in 2018-19.

ii) Kochi Refinery (Kerala) – Bharat Petroleum Corporation Limited (BPCL)

The Kochi Refinery Ltd (KRL) was set up in pursuance of formation agreement dated 27th April, 1963 between Govt. of India, Philips Petroleum Co. of USA and Duncan Brothers of Calcutta. The refinery has been amalgamated



HPCL Mumbai Refinery



with Bharat Petroleum Corporation Ltd in 2006. 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.

The present capacity of the Refinery is 15.50 MMTPA. The crude refining capacity utilisation of the refinery was 103.6% in 2018-19.

d) CPCL Refineries

i) Manali Refinery (Tamil Nadu) - Chennai Petroleum Corporation Ltd. (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). CPCL became a subsidiary of IOCL in 2001. CPCL-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.

The present capacity of the Refinery is 10.50 MMTPA. The crude refining capacity utilisation of the refinery was 97.8% in 2018-19.

ii) Cauvery Basin Refinery (Nagapattinam-Tamil Nadu) – Chennai Petroleum Corporation Limited (CPCL)

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

The present capacity of the Refinery is 1.00 MMTPA. The crude refining capacity utilisation of the refinery was 42.30% in 2018-19.

e) NRL Refinery

i) Numaligarh Refinery (ASSAM) - Numaligarh Refinery Limited (NRL)

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

The present capacity of the Refinery is 3.00 MMTPA. The crude refining capacity utilisation of the refinery was 96.7% in 2018-19.

f) MRPL Refinery

i) Mangalore Refinery (karnataka) - Mangalore Refinery and Petrochemicals Ltd. (MRPL)

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

The present capacity of the Refinery is 15.00 MMTPA. The crude refining capacity utilisation of the refinery was 108.2% in 2018-19.

g) ONGC Refinery

i) Tatipaka Refinery (Andhra Pradesh) – Oil & Natural Gas Corporation Limited (ONGC)

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 0.07 MMTPA. The crude refining capacity utilisation of the refinery was 100.2% in 2018-19.





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.

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 km long cross country crude pipeline from Vadinar to Bina (VBPL).

The present capacity of the Refinery is 7.80 MMTPA. The crude refining capacity utilisation of the refinery was 73.3% in 2018-19.

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 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.

The present capacity of the Refinery is 11.30 MMTPA. The crude refining capacity utilisation of the refinery was 110.40% in 2018-19.



ONGC Refinery



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. 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.

The present capacity of the Refinery is 33.00 MMTPA. The crude refining capacity utilisation of the refinery was 96.2% in 2018-19.

b) Reliance Industries Limited-SEZ (RIL-SEZ) (Private Sector), Jamnagar (Gujarat)

The refinery was commissioned in Dec 2008. 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.

The present capacity of the Refinery is 35.20 MMTPA. The crude refining capacity utilisation of the refinery was 106.2% in 2018-19.

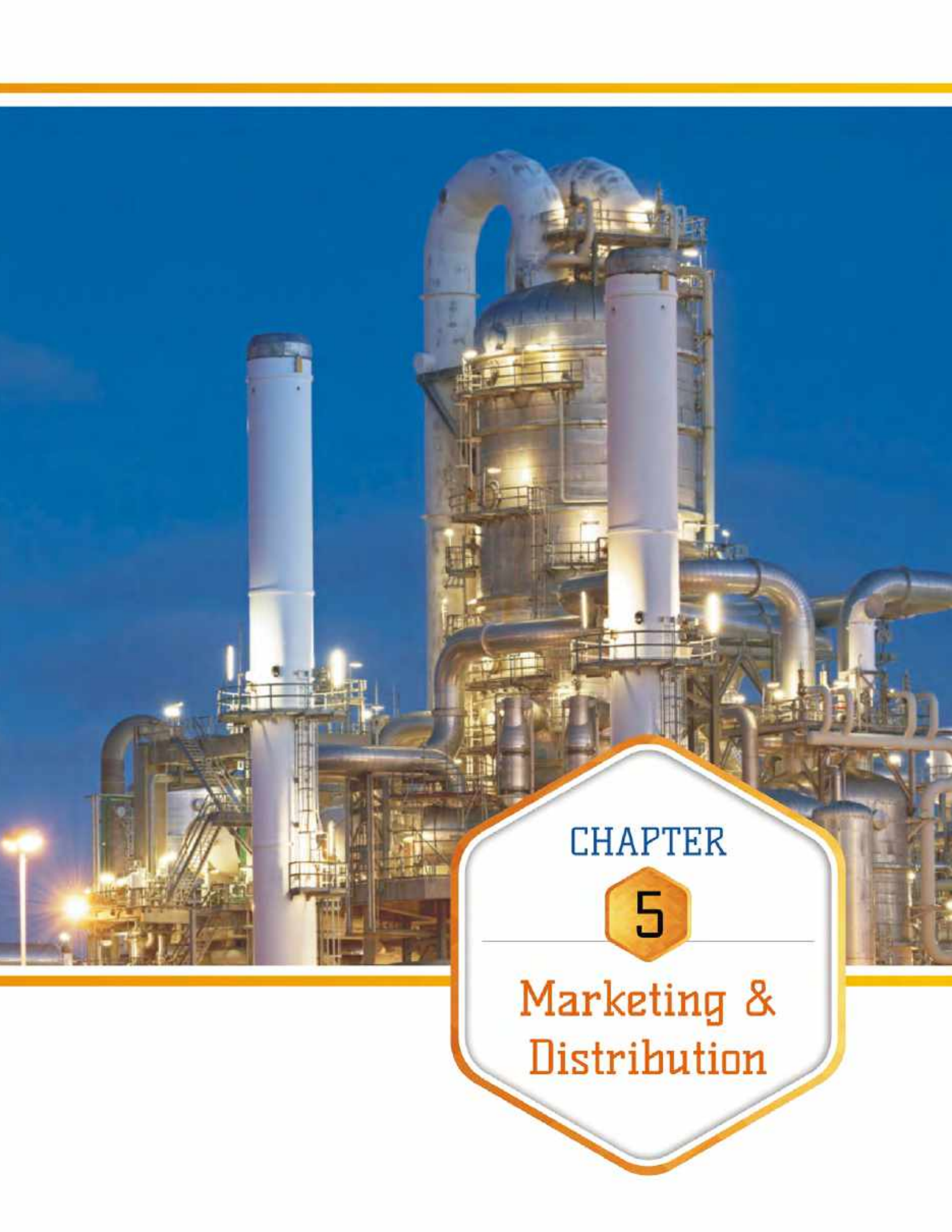
c) Nayara Energy Limited, Vadinar Refinery (Private Sector), Vadinar (Gujarat)

The refinery was commissioned in November, 2006. Vadinar refinery is the single-location second largest refinery in the country.

The present capacity of the Refinery is 20.00 MMTPA. The crude refining capacity utilisation of the refinery was 94.5% in 2018-19.







CHAPTER

5

Marketing &
Distribution



Marketing & Distribution

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, Essar, Shell etc. As on 01.01.2020, the National LPG coverage is 96.9%. There are 195 LPG Bottling Plants operated by Public Sector Oil Marketing Companies and 24,382 LPG Distributorships in the country as on 01.01.2020. Total 688 new LPG distributorship have been commissioned and 407 Letter of Intents (LOI) have been issued by OMCs to setup new distributorship from 01.04.2019 till 06.01.2020.

5.2 Initiatives Undertaken

5.2.1 PAHAL (DBTL Scheme)

The Government of India launched Direct

Benefit Transfer for LPG consumer (DBTL) scheme namely, 'PAHAL', in 54 districts of the country on 15.11.2014. Later the scheme extended to all over the country and as on 31.12.2019, 25.89 crore LPG consumers had 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, new regime of transparency in subsidy management has been put in place empowering LPG consumers in the country. PAHAL has further helped in identifying 'ghost' accounts, multiple accounts and inactive accounts. This resulted in curbing diversion of subsidised LPG to commercial purposes.

As a part of subsidy management, the Hon'ble Prime Minister of India gave call to well-off LPG consumers to voluntarily surrender their subsidy by launching



Hon'ble Prime Minister in a PMUY Programme



'GiveltUp' campaign. GiveltUp campaign has evoked huge response from socially committed individuals and has resulted in more than 1.03 crore consumers giving up their LPG subsidy voluntarily till 31st December, 2019.

5.2.2 Pradhan Mantri Ujjwala Yojana (PMUY)

"Pradhan Mantri Ujjwala Yojana" 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. The Hon'ble Prime Minister of India formally launched the scheme on 01.05.2016. Later, the Government decided to increase the target from 5 crore to 8 crore to be achieved by FY 2019-20. Now, the Government has extended the benefit of PMUY to such poor families who have been left out on account of their names not appearing in either the SECC list or 7 identified categories to cover all poor families of the country.

Under this 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, DGCC Card, Suraksha Hose and administrative /installation charges and the Government is bearing an expenditure upto ₹ 1600/- for each new connection.

The target of releasing 8 crore LPG connections under PMUY scheme has been achieved on 7th September, 2019, 7 months in advance of the target date of 31st March, 2020.

5.2.3 New LPG connections

New domestic LPG connections are released to the prospective customers once he/she approaches the concerned distributorship and fulfil the formalities. In FY 2018-19,



Target of releasing 8 crore LPG connections under PMUY scheme achieved 7 months ahead of target

4.51 crore new LPG connections were issued and nearly 1.39 crore new LPG connections have been released as on 6th January, 2020 in FY 2019-20.

5.2.4 Commissioning of New Distributorships

Currently, selection process for all types of distributorships is undertaken under Unified Guidelines for Selection of LPG distributorships. In FY 2018-19, 3,626 new LPG distributorships were commissioned and 2,912 LOIs were issued. In FY 2019-20, 407 LOIs have been issued and 688 new LPG distributorships have been commissioned across the country till 6th January, 2020.

5.2.5 Automation at OMC ROs

To Enhance customer confidence through Q&Q (Quality and Quantity) of fuel and minimizing chance of fraudulent transactions OMCs have automated all the feasible Retail outlets i.e. 55302 all across the country.

5.2.6 Promotion of Digital Payments Undertaken by MoP&NG

There has been a significant expansion of digital payment infrastructure at retail outlets. As on 31st December, 2019, 130602 POS terminals and 97937 e-wallet facility have been provided at 55578 petrol pumps across the country. 54085 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

6

International
Cooperation &
Engagement



International Cooperation & Engagement

Highlights of MoPNG's overseas engagement

As the centre of gravity shifts from the oil producing countries to the consuming nations, India has emerged as the focal point in the world of oil and gas as the third largest energy consumer in the world. This has resulted in India asserting its market influence in the global arena to reorder the anomalies currently existing in the global energy markets.

Today, oil and natural gas are major sources of primary energy in India, accounting 35.7% share in India's primary energy basket. India holds 0.26% of the world's proven oil reserve while accounting for 5% of global consumption, thus importing 83.7% of its overall oil consumption. Similarly, the country has 0.7% of the world's proven natural gas reserve, while accounting for 1.5% of the worldwide gas consumption, which results in India importing nearly 45.7% of its natural gas consumer through LNG. The high dependency on imported crude oil and natural gas has significant implications on energy security.

With the Indian economy expected to sustain current momentum in the coming years, the oil and natural demand will continue to rise in the country. In view of the demand supply gap of hydrocarbon in the country, acquiring oil and gas assets overseas is need of the hour for enhancing energy security, the Ministry of Petroleum and Natural Gas (MOP&NG) is engaged in oil diplomacy and is encouraging PSUs to adopt a global vision in their pursuit of hydrocarbon assets abroad.

MoPNG is working towards augmenting India's energy security by sustaining and promoting hydrocarbon engagement through oil diplomacy with foreign countries and international organisations in the field of Oil and Gas Sector. MoPNG is also facilitating Indian oil and gas Public Sector Undertakings (PSUs) to aggressively pursue opportunities for acquiring quality oil and gas assets overseas. Ministry is also encouraging the companies to diversify oil and gas sources to maintain a balanced portfolio and wherever necessary, takes up issues with relevant governments pertaining to overseas assets of Indian companies, including through visits at the level of



Hon'ble Prime Minister, Shri Narendra Modi jointly inaugurating Motihari - Amlekhgunj petroleum product pipeline with Hon'ble Prime Minister of Nepal, Shri K.P. Sharma Oli via video conference on 10th September 2019





Hon'ble Prime Minister, Shri Narendra Modi and H.E. Sheikh Hasina inaugurating the project for import of LPG from Bangladesh to North-Eastern States of India

Minister, Secretary and other senior officials of the Ministry and at bilateral and multilateral meetings. In this context, Joint Working Group meetings, Energy Dialogues and Joint Commission Meetings / Inter-Governmental Commission meetings are held regularly with important partner countries.

6.1 Key highlights of activities pursued by International Cooperation division during FY 2019-20 are as follows:

In pursuit of new avenues and to fortify existing bilateral cooperation in the hydrocarbon sector, International Cooperation is engaged with the neighbouring countries for promoting PM's foreign policy initiatives:

- Support 'Neighborhood First' and 'Act East'.
- Engage Africa
- Support the Strategic partnerships

6.1.1 Engagement with Nepal

- India has been supplying all of Nepal's petroleum products including petrol, diesel, ATF and LPG etc. requirements since 1970s. The contract between Indian Oil and Nepal Oil Corporation (NOC) was renewed for another five years in March, 2017.
- The Government of Nepal had requested



1" Oil Pipeline in Nepal, 69 Km Motihari - Amlekhgunj pipeline of capacity 2 MMTPA, inaugurated

the Government of India, during the visit of Hon'ble Prime Minister to Nepal on 3-4th August, 2014 for the construction of this petroleum products pipeline. Subsequently, a MoU was signed between IOCL and NOC for construction of petroleum products pipeline from Motihari (India) to Amlekhgunj (Nepal) in August 2015.

- On 10th September 2019, Hon'ble PM and H.E. PM of Nepal, jointly inaugurated South Asia's first cross-border petroleum products pipeline from Motihari in India to Amlekhgunj in Nepal through video conference. The pipeline will ensure smooth, cost effective and environment friendly supply of petroleum products to Nepal.
- The 69-km Motihari-Amlekhgunj pipeline, having a capacity of 2 MMTPA, is the first transnational petroleum pipeline from India and first South Asian oil pipeline corridor. It is also the first oil pipeline in Nepal.



- The 1st India–Nepal JWG meeting on Petroleum and Natural Gas took place in New Delhi on 13th January 2020 and wherein both sides discussed way to intensify areas of cooperation in hydrocarbons.

6.1.2 Engagement with Bangladesh

- Hon'ble Prime Minister Shri Narendra Modi and H.E. Sheikh Hasina, Prime Minister of the People's Republic of Bangladesh on 5th October 2019 jointly inaugurated the project to Import of Bulk LPG from Bangladesh.
- This will ensure sustained and affordable supply of LPG to our North Eastern states and also help in catering the increased demand of LPG in the region.
- India is constructing a 130 km pipeline from Siliguri in India to Parbatipur in Bangladesh which will supply 1million metric ton (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.

- The ground breaking of Indo-Bangla Friendship Pipeline (IBFPL) was witnessed by Hon'ble Prime Minister Shri Narendra Modi and Prime Minister Sheikh Hasina in September 2018.
- Indian companies are also working on building a land based 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 on the Indian and Bangladeshi side respectively. The pipeline will supply R-LNG from upcoming Dhamra LNG terminal in Odisha.
- As a goodwill gesture, India supplied 20,000 cooking stoves and kerosene oil to displaced persons in the Cox bazaar area.

6.1.3 Engagement with Myanmar

- Indian Oil & Gas PSUs till date have invested US\$ 1098.74 million in various E&P and pipeline projects in Myanmar.



Hon'ble Prime Minister, Shri Narendra Modi and Hon'ble President of Myanmar, Mr. U. Win Myint during the exchange of Agreements between India and Myanmar, at Hyderabad House, in New Delhi on February 27, 2020.





Hon'ble Prime Minister, Shri Narendra Modi meeting
Hon'ble Prime Minister of Bhutan, Dr. Lotay Tshering on 17th August 2019

- IOCL is pursuing setting up an integrated refinery cum petrochemical complex of 10 MMTPA capacity at Thanlyin in Myanmar.
- Indian companies are also pursuing various business opportunities in Myanmar including supply of petroleum products and its retail distribution, Lubes, paraffin wax, petrochemicals etc. in Myanmar

6.1.4 Engagement with Sri Lanka:

- IOC Lanka, a subsidiary of IOC is engaged in retail distribution of petroleum products in Sri Lanka. The company is looking to expand its retail outlet networks.
- Petronet LNG Limited (PLL) along with Sri Lanka Gas Terminal Company Limited and Japanese Consortium (JC) consisting of Sojitz Corporation and Mitsubishi Corporation in a Joint Venture (JV) are developing an FSRU LNG Receiving, Storage and Re-gasification Terminal of ~ 3 MMTPA capacity at Colombo Port, Sri Lanka.

6.1.5 Engagement with Bhutan:

- Other business opportunities pursued by Indian oil & gas companies include utilization of Upper Tank Farm at Trincomalee, marketing of ATF and LPG, Refurbishment of Existing Refinery/setting up of a new Refinery and setting up CGD and CNG market & infrastructure in Sri Lanka
- India continues to strengthen the engagements with Bhutan and supplies full requirement of petroleum products of Bhutan.
- At the request of the Royal Government of Bhutan, Hon'ble Prime Minister Shri Modi during his visit to Bhutan in August 2019 announced the enhancement of quantum of subsidized LPG to Bhutan from the present 700 MT to 1000 MT per month.
- This additional quantity of LPG will enable RGoB to meet the increasing domestic requirements and facilitate increased penetration of LPG in rural areas.





6.1.6 Engagement with Saudi Arabia:

- Saudi Arabia has been traditionally amongst the top supplier of crude oil and LPG to India, however, since the year 2017-18 it has become the 2nd largest crude supplier for India after Iraq.
- During the period 2018-19 India imported 39.8 MMT which is around 17.56% of the total crude imports. Similarly, during the period 2018-19 India imported 3.9 MMT of LPG from Saudi Arabia which is 29.6% of our total LPG imports.
- Indian companies are also engaged with Saudi Aramco for setting up world's largest single location refinery on west coast of Maharashtra. Saudi Aramco, along with ADNOC of UAE, have signed a MoU with the Indian promoters of Ratnagiri Refinery and Petrochemical plant. The estimated investment for this 60 MMTPA plant is around US \$45 billion.
- On the sidelines of PM visit to Saudi Arabia

on 29.10.2019 an MoU has been signed between Indian Strategic Petroleum Reserves Limited (ISPRL) and Saudi Aramco for exploring opportunity to fill One caverns in Padur SPRs.

6.1.7 Visit to Saudi Arabia

- To strengthen the bilateral cooperation, Minister Petroleum and Natural Gas, Shri Dharmendra Pradhan, visited to Saudi Arabia in September 2019 to meet new oil minister H.E. Prince Abdulaziz bin Salman to further enhance cooperation with Saudi Arabia in the entire value chain of hydrocarbon sector.

6.1.8 Engagement with UAE

- In year 2018-19, UAE was the 5th and 3rd largest Crude Oil and LPG import source for India respectively.
- India and UAE have transformed the energy relationship from buyer-seller to the level of strategic partners in the energy sector.



Hon'ble Union Minister of P&NG and Steel, Shri Dharmendra Pradhan meeting with H.E Prince Abdulaziz bin Salman, Minister of Energy of Saudi Arabia on 8th September 2019.



- 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. Subsequently, ISPRL signed MoU in Abu Dhabi with ADNOC on 12th November 2018, to explore possibility of storing crude oil at Padur SPR facility.
- A consortium of Indian Public Sector companies comprising OVL, IOCL and BPRL acquired 10% participating interest at a cost of US \$ 638.35 million in Abu Dhabi's offshore Lower Zakum oil field on Feb 10th, 2018. This is the 1st Indian upstream investment in a producing asset in the Gulf region and in the Middle East.
- Onshore Block-1 was awarded by ADNOC's during UAE's first bidding round 2018 to Urja Bharat Pte Limited (UBPL), a JV of BPRL and IOCL as joint operators, with participating interest of 50% each.
- ADNOC is partnering Saudi Aramco for setting up world's largest single location

refinery on west coast of Maharashtra. The MoU between ADNOC and Saudi Aramco was signed during June 2018.



MoU between ADNOC and Saudi Aramco to set up **world's largest** single location refinery in Maharashtra

6.1.9 Visit to UAE

- As a testimony to the strong relationship, in September 2019, Minister Petroleum and Natural Gas, Shri Dharmendra Pradhan, met H.E. Eng. Suhail Mohamed Faraj Al Mazrouei, Minister of Energy & Industry, UAE and H.E. Dr. Sultan Jaber, MoS and CEO of ADNOC during his visit to UAE in September 2019, for the Asian Ministers Energy Roundtable (AMER), where India is the co-host along with the UAE. India will co-host the ninth edition of Asian Ministerial Energy Roundtable in 2021.



Hon'ble Union Minister of P&NG and Steel, Shri Dharmendra Pradhan meeting with H.E. Eng. Suhail Mohamed Faraj Al Mazrouei, Minister of state UAE and CEO ADNOC on the sidelines of AMER8 on 10th September 2019





- On the sidelines of 8th AMER, Shri Pradhan also met his counterparts from Asian region and Heads of international energy organizations.



Hon'ble Union Minister of P&NG and Steel, Shri Dharmendra Pradhan at ADIPEC

- Minister of Petroleum & Natural Gas, Shri Dharmendra Pradhan, led an official and business delegation to UAE in November 2019 to participate in the Abu Dhabi International Petroleum Exhibition & Conference (ADIPEC) on 11th November 2019.



Hon'ble Minister of P&NG and Steel with delegates at ADIPEC 2019 in UAE on 11th November 2019



- Minister Shri Dharmendra Pradhan also inaugurated the Indian Pavilion set up by the Federation of Indian Petroleum Industry (FIPI) and Directorate General of Hydrocarbons (DGH) (Both institutions are under MoPNG) and addressed a roadshow conducted by DGH to highlight the path breaking reforms initiated in the petroleum sector in the last few years, and to attract investment in this sector by global oil and gas majors.

6.1.10 Engagement with USA

- Following Hon'ble Prime Minister's visit to US in June 2017 and meeting with President Trump, Indian companies started sourcing of US crude. Imports of US crude by Indian companies started in Oct 2017. The first crude consignment reached Paradip on 2nd Oct. 2017.
- Import of US crude by Indian companies in a short time since Oct 2017 has touched 7.3 MMT (valued at US \$ 3.7 billion). US has now become the 6th largest source for our crude oil imports. Similarly, in LNG imports US has now become our 5th largest LNG supplier.
- Indian companies have together contracted 6.6 MMTPA of LNG from the US. GAIL has signed two long term (20 years) LNG sourcing contracts with Dominion Energy Cove Point LNG LP and Sabine Pass Liquefaction LLC for 5.8 MMT. The first long term LNG Cargo of GAIL from USA for the India market arrived on 30th March 2018 at Dabhol.
- Indian companies have also invested approx. US\$ 552 million in various shale projects in USA.
- On 22nd September 2019, a roundtable was hosted between Hon'ble PM and US Energy sector CEOs in Houston. On the sidelines of the PM's roundtable, Tellurian and Petronet signed an MOU wherein Petronet and its affiliates intend to negotiate the purchase of up to 5 MMTPA of LNG from the proposed Driftwood LNG project.



Hon'ble Prime Minister, Shri Narendra Modi with leaders from Energy sector in Houston on 22nd September 2019





- In order to further strengthen the energy relations, India launched Strategic Energy Partnership with US in April 2018. The four Working Groups under the Strategic Energy Partnership dealing with Oil & Gas, Power & Energy Efficiency, Renewable Energy and Sustainable Development, are engaging regularly to finalize the specific action points and draw a roadmap.

6.1.11 Engagement with Russia

- Russia has been India's time-tested partner in the oil and gas sector. Our historic hydrocarbon relationship with Russia goes back to 70s 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.
- We have strengthened our hydrocarbon

engagement and there is an 'Energy Bridge' between our two countries. Russia is our largest oil and gas investment destination with over US\$ 15 billion investment so far. Indian oil & gas PSUs have stakes in various strategic oil & gas projects in Russia including Sakhalin-1, Vankorneft and Taas-Yuryakh. On the other hand, Rosneft's investment of nearly US\$ 13 billion in Vadinar refinery is the largest FDI investment in the Indian oil and gas sector.

- 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.
- Indian oil & gas PSUs are also pursuing a number of business opportunities in Russia including stakes in oil & gas projects in Russian Arctic and Far East region and



Hon'ble Union Minister of P&NG and Steel, Shri Dharmendra Pradhan meets Mr. Igor Sechin, CEO Rosneft in New Delhi on 17th September 2019.



exploring sourcing crude oil from Russia's Far East to Eastern coast of India via Eastern sea route.

- A Joint Statement on Cooperation between India and Russia in Hydrocarbon Sector for 2019-2024 was issued in Vladivostok, Russia after Hon'ble PM's annual bilateral summit with H.E. Russian President. The Joint Statement provides a Roadmap to deepen cooperation in the hydrocarbon sector, bilaterally and in third country projects.

- An MoU between Ministry of Petroleum & Natural Gas of Republic of India and Ministry of Energy of the Russian Federation on use of natural gas for transportation was signed on the sidelines of the Hon'ble Prime Minister's visit to Vladivostok September 05, 2019.

6.1.12 Visit to Russia

- Minister Petroleum and Natural Gas led delegation from Oil and Gas as well as Steel sectors to Moscow, Russia in August, 2019 to prepare the groundwork for Prime Minister's visit to Russia for the Eastern Economic Summit.
- As a follow up to the visit of Prime Minister to Vladivostok for the Eastern Economic Forum in September 2019, Minister of Petroleum and Natural Gas & Steel visited Vladivostok and also Sakhalin-1 Project.
- Hon'ble Minister P&NG visited Zvezda Shipbuilding complex in Vladivostok and Sakhalin oil field in Russia's Far East during October 2019.



Hon'ble Prime Minister, Shri Narendra Modi with H.E. Mr. Vladimir Putin, the President of Russian Federation, During Eastern Economic Forum, in Russia on September 04, 2019.

6.1.13 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:

- IEF is providing a global platform to both energy producers and consumers to deliberate upon global energy issues.
- India and IEF have a long-standing collaboration in energy sector. 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.

- On 10th September 2019, India co-hosted 8th Asian Ministerial Energy Roundtable (AMER8), an IEF Energy Dialogue Event at Abu Dhabi. India, the co-host of AMER8 will seek to advance these Ministerial dialogue outcomes when it convenes the AMER9 in 2021 in New Delhi.

B. Engagement with IEA:

- The IEA and India have a long-standing collaboration in energy sector. India became an association country on March 2017. Both India and IEA are working to expand the engagement in Oil and Gas Sector.



India co-hosted 8th Asian Ministerial Energy Roundtable in Abu Dhabi

- The IEA conducted “In Depth Review” of India’s energy policy which was launched on 10th January 2020. MoPNG had been closely engaged with IEA in preparing the report.
- Currently, IEA is assisting India in various areas including India’s Emergency response assessment, best practices in building SPRs, and increasing share of natural gas in India’s energy mix.



Hon'ble Union Minister of P&NG and Steel, Shri Dharmendra Pradhan meets Dr. Fatih Birol, Executive Director of the International Energy Agency (IEA) on sidelines of AMER8 on 10th September 2019





Hon'ble Union Minister of P&NG and Steel, Shri Dharmendra Pradhan with Dr. Fatih Birol, Executive Director, IEA at the launch of "In Depth Review" of India's energy policy on 10th January 2020

C. Engagement with OPEC:

- India–OPEC ministerial level institutional dialogue was instituted in June 2015. The 3rd India-OPEC Institutional Dialogue held in New Delhi on 17th October 2018 to discuss important issues relating to oil and gas sector.



Hon'ble Union Minister of P&NG and Steel, Shri Dharmendra Pradhan meets H.E. Mohammed Barkindo, OPEC Secretary General on sidelines of CERAWEK on 15th October 2019

- The Indian delegation was led by Minister PNG and the OPEC delegation led by Secretary General, OPEC.
- The next meeting of India-OPEC Institutional Dialogue is proposed to be held in year 2020.





OVERSEAS PROJECTS / ASSETS

Sl.No.	Country	Name of Asset	Participating Companies & P.I.
1.	Australia	EP 413	Norwest Energy - 27.945% BPRL - 27.803% AWE Perth Pty Ltd. - 44.252%
		Production License T/L1 (Yolla Field)	Beach Energy (Operations) Limited - 37.5% (Operator) Beach Energy (Bass Gas) Limited - 5% AWE Petroleum Pty Ltd - 22.5% AWE (Bass Gas) Pty Ltd - 12.5% Beach Energy Limited - 11.25% Prize Petroleum international Pte Ltd - 11.25%
		Retention Leases T/RL 2,3,4 & 5 (Trefoil & Others)	Beach Energy (Operations) Limited - 39% (Operator) AWE Petroleum Pty Ltd - 40% Beach Energy Limited - 11.25% Prize Petroleum International Pte Ltd - 9.75%
2.	Azerbaijan	ACG	ONGC Videsh : 2.31% BP (O) : 30.3746% AzACG : 25% Chevron : 9.5691% Inpex : 9.3072% Equinor (erstwhile statoil) : 7.2690% Exxon : 6.7914% TPAO : 5.7298% Itochu : 3.6489%
		BTC Pipeline	ONGC Videsh : 2.36% BP (O) : 30.1% SOCAR : 25% Chevron : 8.9% Inpex : 9.3072% Equinor (erstwhile statoil) : 8.71% TPAO : 6.53% Itochu : 3.4% TOTAL : 5% ENI : 5% Inpex : 2.5% CIECO : 2.5%
3.	Bangladesh	SS-04	ONGC Videsh (O) : 45% OIL : 45%
		SS-09	ONGC Videsh (O) : 45% OIL : 45%



Sl.No.	Country	Name of Asset	Participating Companies & P. I.
4.	Brazil	BC-10	ONGC Videsh : 27% Shell (O) : 50% QPI : 23%
		Block BM-SEAL-4	ONGC Videsh : 25% Petrobras (O) : 75%
		BM-SEAL-11 (2 blocks)	Petrobras : 60% IBV@ - 40% (BPRL - 20%)
		BM-C-30 (1 blocks)	IBV@ - 35.7% (BPRL - 17.85%) BP - 35.7% Total - 28.6%
		BM-POT-16 (2 blocks)	Petrobras : 30% IBV@ - 20% (BPRL - 10%) BP - 30% Petrogal - 20%
5.	Canada	PNW LNG Project	Petronas (Petronas Energy Canada Ltd.) : 62% (O) Sinopec-Huadian : 15% IML (Indian Oil) : 10% Japex : 10% Petroleum Brunei : 3%
6.	Colombia	MECL	ONGC Videsh : 25-50% SIPC : 25-50% Ecopetrol : 50%
		Block RC-9	ONGC Videsh : 50% Ecopetrol (O) : 50%
		Block RC-10	ONGC Videsh (O) : 50% Ecopetrol : 50%
		Block SSJN-7	ONGC Videsh : 50% Canacol Energy (CNE) (O) : 50%
		Block CPO-5	ONGC Videsh (O) : 70% Petrodorado : 30%
		LLA 69	ONGC Videsh : 50% SIPC : 50% (Operator MECL 100% JVC of ONGC VIDESH & SIPC)
		GUA OFF 2	ONGC Videsh : 100%
7.	East Timor	JPDA-06-103	Oilex-10% Japan Energy - 10% Videocon -20% GSPC - 20% BPR JPDA - 20% Pan Pacific Petroleum - 15%





Sl.No.	Country	Name of Asset	Participating Companies & P.I.
8.	Gabon	Block-Shakthi-II	OIL : 50.0 (Operator) IOCL : 50.00
9.	Indonesia	Nunukan	Pertamina Hulu Energi Nunukan Company - 64.5% BPRL Ventures Indonesia BV - 12.5% Videocon Indonesia Nunukan Inc. - 23%
10.	Iran	Block Farsi Farzad	ONGC Videsh (O) : 40% IOC : 40% OIL : 20%
11.	Iraq	Block - 8	ONGC Videsh : 100%
12.	Israel	Block - 32	ONGC Videsh (O) : 25% BPRL : 25% IOC : 25% OIL : 25%
13.	Kazakistan	Block Satpayev	ONGC Videsh : 25% Kaz Munai Gas : 75%
14.	Libya	Contract Area 43	ONGC Videsh : 25%
		Area 95/96	Sipex : 50.00 (Operator) OIL : 25.00
15.	Mozambique	Offshore Area 1, Rovuma Basin	ONGC Videsh : 10% BREML : 10% (ONGC Videsh : 6% & OIL : 40%) TOTAL (O) : 26.5%
16.	Myanmar	Blocks A-1 & A-3	ONGC Videsh : 17% MOGE : 15% POSCO International (O) : 51%
		Offshore Mid-stream Gas Pipeline (Pipeco1)	Kogas : 8.5% GAIL : 8.5%
		Onshore Gas Pipeline (SEAGP) (Pipeco2)	ONGC Videsh : 8.347% CNPC (O) : 50.9%
		Block B-2	ONGC Videsh (O) : 97% M&S : 3% (Carried)
		Block EP-3	ONGC Videsh (O) : 97% M&S : 3% (Carried)
17.	Namibia	PEL-0037	ONGC Videsh : 30% Tullow (O) : 35% Pancontinental Namibia (Pty) Limited : 30% Paragon Oil and Gas (Pty) Limited : 5%
18.	New Zealand	PEP-57090	ONGC Videsh : 100%



Sl.No.	Country	Name of Asset	Participating Companies & P.I.
19.	Nigeria	OML 142	Summit Oil : 30% (O) Suntera Nigeria 205 Ltd : 70%*
20.	Oman	Mukhaizana	Occidental Mukhaizna LLC : 45% (O) Indian Oil : 17%; Oman Oil Company S.A.O.C :20% Liwa Energy Limited : 15% Total E&P Oman : 2% Partex (Oman) Corporation : 1%
21.	Russia	Sakhalin - 1	ONGC Videsh : 20% ENL (O) : 30% Sodeco : 30% Roseneft Subsidiaries : 20%
		Vankorneft	Vankorneft (O) Rosneft Oil Company : 50.1% ONGC Videsh Vankorneft Pte Ltd : 25% Vankor India Ltd. : 23.9%
		Imperial Energy	ONGC Videsh : 100%
		License-61	OIL : 50.00 Petroneft Resources : 50.00
		Taas Yuryakh	Rosneft : 50.10 British Petroleum : 20.00 Taas India Pte Ltd. : 29.90
22.	South Sudan	GPOC (Block 1A, 1B, 4S)	ONGC Videsh : 25% CNPC : 40% Petronas : 30% Nilepet : 5%
		SPOC (Block 5A)	ONGC Videsh : 24.125% Petronas : 67.875% Nilepet : 8%
23.	Syria	AFPC	SSPD (O) : 62.5-66.67% ONGBV : 16.67-18.75% CNPC : 16.67-18.75%
		Block 24	ONGC Videsh : 60% IPR(O) : 25% TOM : 15%





Sl.No.	Country	Name of Asset	Participating Companies & P.I.
24.	UAE	Lower Zakum Concession	ADNOC : 60% (O) Inpex : 10% Total : 5% CNPC : 10%; Eni : 5% Falcon Oil & Gas B.V. : 10%*
		Onshore Block 1	BPRL International Singapore Pte. Ltd. (BISPL) -50% Indian Oil Singapore Pte. Ltd. (ISPL) -50%
25.	USA	Niobrara Shale Project	Verdad LLC : 60% (O) Haimo Oil & Gas LLC : 10%
		GAIL-Carrizo Eagle Ford Joint Venture (JV)	Formed unincorporated JV with M/s Carrizo Oil & Gas Inc. through GGUI, Participating Interest of GGUI in the JV is 20%
26.	Venezuela	San Cristobal	ONGC Videsh : 40% CVP-PDVSA : 56% PDVSA Social : 4%
		Carabobo Project-1	PdVSA : 71% (Operator : O) OVL : 11% Repsol : 11%
27.	Vietnam	Block 06.1	ONGC Videsh : 45% Roseneft Vietnam B.V. (O) : 35% Petro Vietnam : 20%
		Block 128	ONGC Videsh : 100%









CHAPTER

7

Development of
North-Eastern
Region



Development of North Eastern Region

7.1 Preamble

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 extreme North-Eastern corner 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, 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 662 ft) 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 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, Barekuri, Mechaki, Lakwa, Lakhmani, Geleki, Amguri, Kharsang, Charali, Borholla-Champang, Khoraghat, Baramura, Tichna, Gojalia, Rokhia, Khobal, Hortokihave been discovered by Oil India Limited (OIL) and Oil & Natural Gas Corporation Limited (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 engaged in the North East Region for exploration and exploitation of oil and gas for more than 60 years and generated a vast geo-scientific database and

geological understanding of the basin, 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 (MMT) per annum 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 is 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.



There is about
34% increase
in the prognosticated
hydrocarbon resources as
compared to previous
assessment.

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 Sq. Kms of 3D seismic data in North- East.
- 7.2.3** During 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 3550-3800m in the central basement high areas of Dikom-Kathaloni-Chabua-Matimekhana to more than 5500m in Mechaki areas towards the eastern flank of Upper Assam Basin.
- 7.2.4** As on 1.1.2020, OIL holds 3 exploration blocks in North East under nomination regime. OIL also holds 3 NELP exploration blocks in the North Eastern region. Under OALP, OIL was awarded 7 Blocks in OALP Round I & 3 Blocks in OALP Round III as operator in North East across Assam, Arunachal Pradesh, Nagaland & Tripura.
- 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 works helped refining the basin architecture and its evolution.
- 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 776 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 exploration geoscientists. A significant number of oil and gas fields, including Panidihing, Disangmukh,



1MWP solar power panels spread inside Numaligarh Refinery is a move towards renewable energy usage



Lakwa, Lakhmani, Sonari, Geleki, Demulgaon, Amguri and Charali, were discovered with this exploration philosophy.

7.2.8 During the past 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 65 PML blocks (46 in Assam, 18 in Tripura, 1 in Nagaland) in North East comprising both long term and short term PMLs. It also holds 3 PEL blocks in Nagaland under nomination regime. During 2019-20, as on 31.12.2019, it acquired 117.72 LKM of 2D and 78.65 SKM of 3D seismic data and drilled 13 exploratory wells. ONGC has declared one gas discovery (Sundaubari-12) in Tripura. Further exploratory efforts are in progress. Besides, ONGC is holding 1 pre-NELP block in NE

falling partly in Assam and Mizoram. In NE Region, ONGC acquired 387.8 LKM of 2D seismic data and drilled 2 exploratory wells.

7.3 Exploration Activities in North-East under the PSC Regime

Under the PSC regime, exploration blocks were first awarded in Assam in the year 1998 under Pre-NELP rounds of bidding. Subsequently, 31 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 9.1% of the total production. In 2018-19, crude oil production in North East is about 4.349 million metric tonne (MMT). In 2019-20 (till Dec 2019), crude oil production in North East is about 3.120 million metric tonne (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		2014-15	2015-16	2016-17	2017-18	2018-19	2019-20 (April to Dec.19)
Assam	OIL	3.405	3.219	3.250	3.367	3.282	2.332
	ONGC	1.061	0.965	0.953	0.975	0.990	0.731
	Pvt/JV	-	-	-	0.003	0.034	0.02
	Total	4.466	4.184	4.203	4.345	4.306	3.083
Arunachal Pradesh	OIL	0.007	0.006	0.008	0.007	0.009	0.017
	Pvt/JV	0.069	0.051	0.048	0.043	0.034	0.02
	Total	0.076	0.057	0.056	0.050	0.043	0.037
North East	Grand Total	4.542	4.241	4.259	4.395	4.349	3.120



7.4.2 From the table 7.1, it can be seen that in year 2018-19, OIL has the share of 75.7% in crude oil production in North East, followed by ONGC with a share of 22.8%. The share of Pvt/JV companies in crude oil production is about 1.5%, which is from the Kharsang field in Arunachal Pradesh.

7.4.3 The contribution in natural gas production by North Eastern States in year 2018-19 is about 11.2% of the total production. In 2018-19 natural gas production in North East is about 4282 million metric standard cubic metre (MMSCM). In 2019-20 (till Dec 2019) natural gas production in North East is about 3672 million metric standard cubic metre (MMSCM). The State-wise and company-wise trend of natural gas production in last 5 years is given below:

Table-7.2: Natural gas production in last five years in North-East (MMSCM)

State/ Region		2014-15	2015-16	2016-17	2017-18	2018-19	2019-20 (April to Dec.19)
Assam	OIL	2509	2618	2693	2659	1895	1866
	ONGC	449	405	435	508	483	352
	Pvt/Jv	-	-	-	53	324	248
	Total	2958	3023	3128	3220	2702	2466
Arunachal Pradesh	OIL	12	12	12	12	11	26
	Pvt/Jv	22	18	16	18	15	6
	Total	34	30	28	30	26	32
Tripura	ONGC	1140	1332	1430	1440	1554	1174
North East	Grand Total	4132	4385	4586	4690	4282	3672

7.4.4 From the table 7.2, it can be seen that in year 2018-19 ONGC has the share of 47.6% in natural gas production in North East, followed by OIL with a share of 44.5%. The share of Pvt/JV companies in natural gas production is about 7.9%.

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 Arunachal Pradesh and other 8 blocks are located in Assam.

In second round of Discovered Small Fields Policy 6 Contracts Areas (5 Blocks in Assam and 1 Block in Tripura) have been awarded 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 NOCs 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 Assam. So far ONGC has drilled 2 wells (1 each in Namti and Lakwa). OIL has acquired conventional three cores from Dibrugarh, Dumduma and Chabua PML of Assam. The evaluation results show poor prospectivity at these locations as





the shales are entered into early oil generation window. In Arunachal Pradesh, OIL

7.7 North East Vision 2030

7.7.1 The North-East Vision Document is 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 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





Under OALP Bid Round I, 19 exploration Blocks and under OALP Bid Round III, 5 blocks were awarded in North eastern region.

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 fulfil 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)

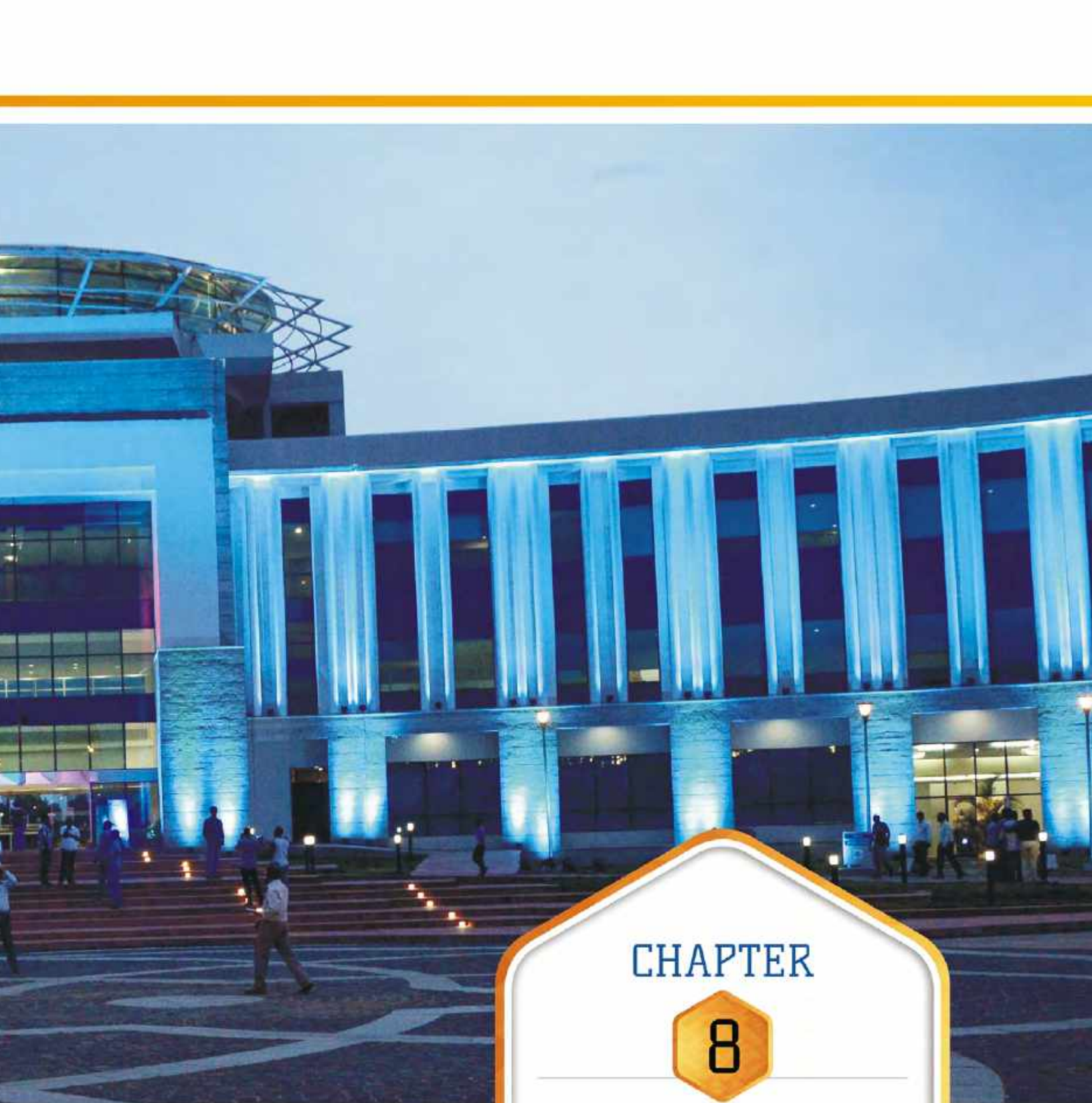
Oil E&P Companies are showing keen interest in the North-Eastern region. Under OALP Bid Round- I of Hydrocarbon Exploration & Licensing Policy (HELP), 19 exploration blocks were awarded and under OALP Bid Round -III 5 blocks were awarded in the North Eastern region.

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, 2019, 4583.4 LKM (76%) of 2D seismic data has been acquired.







CHAPTER

8

R & D and
New Technology



R&D New Technology

8.1 R&D By Indian Oil Corporation Limited (IOCL)

The R&D Centre of Indian Oil plays a key role for country's energy self sufficiency by developing economical, environment-friendly and socially responsible energy technological solutions. Apart from its core areas of fuels, lubricants & refining, the centre is focused on cutting-edge research in the area of Nanotechnology, Petrochemicals and Polymers, Bio and Solar Energy, Storage, Hydrogen and CCU Technologies.

The R&D centre of Indian Oil has filed 160 patents and was granted 107 patents (30 Indian and 77 overseas) during the year 2018-19. Indian Oil became the first oil & gas PSU to cross the milestone of 1,000 patents filing in April, 2019.

Indian Oil's extensive research in lubricant field resulted in replacement of many imported niche lubricant grades furthering the spirit of Make-in-India program. The two major lubricant indigenisation breakthroughs during 2019-20 are approval of Servo Super Synth 5W-50 lubricant for use in the Indian Army's "Russian make Battle Tank T90 and IOC's wind gear oil, "Servomesh WEG 320" in Suzlon turbine.

Taking cue from the GoI StartUp promotion program, Indian Oil's Start-up funding scheme has seen an allocation of ₹43 crores (in 2 rounds of funding) wherein 24 startups are being funded. Major areas of funding/support are artificial intelligence, Robotics, Societal relevance, pipeline surveillance & maintenance etc. Besides funding, Indian Oil is being closely involved by hand holding the identified Start UPs through dedicated Process Owners till achievement of Proof of Concept.



HPCL Scientist at Work at R&D Centre Bengaluru



8.2 R&D by ONGC

ONGC has established separate R&D institutes 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 2019-20, ONGC carried out R&D studies for conventional and Non-conventional Hydrocarbons at its different Institutes.

Following the DPE guidelines for MoU 2019-20, R&D project on "ASP (Alkali Surfactant Polymer Flooding) injection in Viraj Field" has been selected and the project has been completed by Institute of Reservoir Studies, ONGC, Ahmedabad) before its time schedule. Six oil wells have been converted to ASP Injector. The envisaged incremental oil gain in Viraj field is about 0.39 MMT by 2033-34. This ASP EOR process has already been implemented in the field from 12.07.2019.

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 in general. It also ideates promoting internships, visiting and



In the year 2019-20, ONGC carried out R&D studies for Conventional and Non-conventional Hydrocarbons at its different institutes

adjunct faculty programs, research oriented career programs through an ONGC Scholar Programme.

ONGC geoscientists and engineers will also have the opportunity of working with IITs. Under ONGC-Pan IIT Collaborative initiative, KDMIPE, Dehradun is the coordinating institute. Total 42 projects have been approved in different Phases (Phase-I:15, Phase-II:12, Phase-III:5, Phase-IV:10).

- ▶ **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. In fact, improving recovery factor to 40% is one of the strategic goals of ONGC. The salient R&D measures to enhance recovery factor are as under:
 - ▶ Field implementation of Polymer Flooding in North Kadi is in progress and is likely to commence in 2020-21.
 - ▶ For the first time, Bechraji Polymer flood pilot is planned in heavy oil (Average Viscosity of 270 cp) and envisaged potential is set to improve recovery by 4%. The Pilot project commenced on 06.05.2019.
 - ▶ Commercialization of ASP Flood in Viraj (K-IX+X) is in progress since July-2019. It envisages recovery of 0.39 MMT by 2034-35.
 - ▶ Immiscible gas injection in LBS-2 pay of Lakwa field was carried out. The envisaged peak oil rate is 196 m³/d having a plateau period of 7 years with incremental oil gain of 0.73 MMt by 2035. This envisages the recovery improvement from 14% to 24%.



- ▶ Study of Gravity Assisted Immiscible Gas Injection (EOR) in Bokabil pay of Khoraghat Field. The scheme envisages the recovery enhancement of 22.7% from 11.1% with an incremental oil gain of 0.15MMt.
- ▶ Miscible CO₂ in Gandhar field: Simulation studies for GS-9 and GS-11 envisages incremental oil gain of 3.63 MMt (GS-9 Sand: ~1.7 MMt; GS-11 Sand ~1.93 MMt) by 2042 with 75 (GS-9 Sand: 14 OP + 11 CO₂ Inj.; GS-11 Sand: 23 OP + 27 CO₂ Inj.) new well inputs.
- ▶ Simulation study of Miscible CO₂ injection in Central Block of GS-8 Sand of Gandhar Field.
- ▶ In-house software development for different studies like 'Quest' for Rapid Assessment of Recovery Potential, 'AcidEx' for matrix acidization job design, 'DWIJ' smart system for accessing digitized R&D reports, "Decline Curve Analysis & Voidage Replacement Ratio" for monitoring of production and injection of fields.

- ▶ **Capacitor-Resistance Model (CRM):** It is a data driven method for optimizing water injection and improving oil production.
- ▶ **EOR Ranker tool:** It can be used as a preliminary screening tool for ranking EOR methods in a field.

Other R&D Initiatives by ONGC:

- ▶ IEOT received Copyright for in-house developed software iSIMPLE from Copyright office, Government of India. "iSIMPLE" is specifically developed for carrying out Simplified Ultimate Strength analysis of fixed jacket offshore structures.
- ▶ IEOT carried out Optimization for Type-III underwater inspection joints based on criticality and member importance analysis for 11 plat forms during 2019.
- ▶ IEOT recommended for the suitable metallurgy for HPHT wells for block GS – OSN-2004/1 in Kutch- Saurashtra offshore area.



HPCL Scientist at Work at R&D Centre Bengaluru



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 2019-20 up to December, 2019, ONGC has registered 08 Patents and obtained 03 patents. The details are given below:

Patents filed-08

Sr. No	Name of work center /Institute	Title	Date of application
1	INBIGS	Scalable harvesting method for production of microalgal biomass feedstock	09.05.2019
2	CEWELL	A quantitative and robust method for computing total organic carbon using resistivity and density logs	26.06.2019
3	CEWELL	Method for characterizing fluid components of shale reservoirs using 2D NMR spectroscopy	23.07.2019
4	Rig move cell Drilling service Mumbai	Blue view system and a process for utilizing the system in offshore re-entry rig moves	13.08.2019
5	KDMIPE	A method for biomarker compounds separation identification and enrichment	06.09.2019
6	Energy Centre Trust (OEC)	A method for preparing efficient and scalable self-cleaning coating	20.09.2019
7	IDT	A System and Method for Activity Identification and Problem Prediction During Oil and Gas Well Drilling	07.10.2019
8	GHRTC	Autoclave apparatus for investigating visualization and ultrasonic characterization of gas hydrates	13.11.2019
Patents Obtained:3			
1	IOGPT	Enzyme application for well bore cleaning to remove mud cake in oil/Gas wells- To enhance the productivity	05.09.2019
2	KDMIPE	Well logging system for evaluation of water saturation for shale reservoir	15.11.2019
3.	IOGPT	Gelled acid emulsified system for Carbonate Reservoirs	03.12.2019

8.2.2 New Technologies inducted in ONGC

Concerted efforts to upgrade and induct technology are being continuously made in ONGC as per the industry requirement. During 2019-20, following technologies were evaluated/inducted.

- ▶ Remote sensing image processing software suite with extensions/ add-ons

for physics-based atmospheric correction. Software: ERDAS Imagine, Extension/ Plug-in: ATCOR: The Software will help in basic and advanced raster image data processing and pre-processing of multispectral/ hyperspectral visible-shortwave infrared as well as thermal infrared image data with built-in extension for radiative-transfer physics-based absolute atmospheric and in spectral





mapping of lithology and identifications of micro-seeps, thus providing an interpretative edge over already established verticals. It can perform 3D geospatial rendering and geo-processing, topographic analysis and manipulation of DEM/ DSM/ DTM data derived from stereo-photogrammetry, SAR or LIDAR for hydrographic and geomorphic derivatives.

- ▶ **CUDA FORTRAN Compiler Graphic processing units or GPUs** have evolved into programmable, highly parallel computational units with very high memory bandwidth. GPU designs are optimized for the computations found in graphics rendering, but are general enough to be useful in many data-parallel, computer-intensive programs common in high-performance computing (HPC).
- ▶ **CRAM (Common Reflection Angle Migration):** A new depth migration software which is a multi-arrival depth domain solution which works in local angle domain and outputs angle gathers in depth. CRAM is designed for detailed velocity model building and for precise imaging in areas with complex structure and velocity for 3D onshore and offshore data.
- ▶ **E-line Well Intervention Services:** A Rigless well intervention services deployed with the objective to retrieve GLVs and set these GLVs in the deviated zone (angle: 68°) to maximize production. The first E-line Intervention job was carried out in well HSC-2ZH of Heera field in Western Offshore Basin
- ▶ **Dual Zone Testing:** Dual zone DST has added immense value during testing in the Well B189#A by saving significant Rig days (approx. 5-6 days) and by providing real time data, opening a new chapter for future dual zone testing in a single DST run.
- ▶ **Down-hole Video Survey:** Technology for Real-time and/or Memory mode acquisition of video for various applications including mechanical inspection, formation damage analysis, fishing operations, detection of fluid, sand entry etc.

▶ **Wax Removal by Exothermic Chemical Reaction:** This new technology is developed by IOGPT " wherein exothermic reaction between sodium nitrite (NaNO₂) and ammonium chloride (NH₄Cl) liberates energy and high temperature for melting the paraffin deposits. Formulation has been successfully implemented in two wells Padra#78 and KTN#44 in Cambay Asset.

▶ **Reducing H₂S Content from Crude oil:** IOGPT recommended scheme of a stripper column was implemented in B-193 process complex having very high H₂S content. This brought down the H₂S content in dispatch oil to less than 40 ppm

8.2.3 R&D Expenditure in last 3 years and current year

FY	R&D Expenditure (₹ in Crore)
2016-17	592
2017-18	586
2018-19	583
2019-20 (as on 30.09.2019)	279
2019-20 BE	800

8.3 R&D by GAIL (India) Limited

R&D plays a critical role and is widely recognized to be the keystone of technological advance in Oil & Gas sector. Apart from contributing to economic growth, R&D is a crucial factor in determining the competitiveness of Oil & Gas firms in the marketplace, nationally and internationally. Indeed, the importance of Natural Gas energy to national security, economic well-being, and environmental sustainability makes GAIL to continuously invest in R&D. GAIL carries out joint R&D programs through partnerships with national Institutes / Laboratories on specific technologies pertaining to Biofuels & Biopolymers, Clean energy storage & development, Valorizations of CO₂, Pipeline Integrity Management & Waste to Energy.



8.3.1 Biofuels & Bio-polymers:

Under this initiative, high rate bio-Methanation technology with yield of more than 90% methane is planned to be developed in association with Indian Institute of Chemical Technology (IICT) Hyderabad. Moreover, GAIL has also Solicited Investment Proposals from Start-Ups in the Area of Bio-CNG to setup/supply Bio-Gas under the MoPNG's SATAT (Sustainable Alternative towards Affordable Transportation) initiative for mainstreaming the Bio gas technology.

Further, research work on production of value added bio-degradable polymers from Methane & CO₂ is being carried out with IIT Delhi.

8.3.2 Clean Energy Storage & Development :

Under clean energy storage, high surface area porous adsorbents are being developed for storing natural gas at low pressure and ambient temperature with sufficient energy density. The successful development & evaluation of these novel adsorbents shall lead to development of Adsorbed Natural Gas (ANG) technology which would be safer than CNG. In this direction GAIL's R&D has synthesized 2D and 3D Covalent Organic Framework (COF) based adsorbents for methane storage in association with NCL, Pune and IISER, Kolkata and are being subjected to extensive evaluations. Further, Metal Hydride based high temperature Thermal Energy Storage Systems for Waste Heat Utilization is also being developed in association with IISc, Bengaluru. Further, lab-scale studies on Methane production from marine hydrate are being carried out at IIT-Madras to develop Gas hydrates as a new source for Natural gas. GAIL is also participating in Gas Hydrate scientific drilling investigations under the National Gas Hydrate Program (NGHP).

8.3.3 Valorization of CO₂:

CO₂ is a potential Green House Gas and GAIL's research efforts are focused on developing technologies, for direct or indirect conversion



CSIR-IIP & GAIL
have developed a two-stage process for conversion of Waste plastic into hydrocarbons

of CO₂ to chemicals and energy products having high potential market and promising benefits. In this regard, Microbial fixation of CO₂ to biomass production and conversion of the same to valuable, fertilizers and biofuels are being implemented at GAIL's Petrochemical Plant at Pata. Further, scale-up to bench scale studies on TriReforming of CO₂ & Methane to Syngas using novel catalysts is being pursued at IIP, Dehradun. Further, a heterogeneous novel catalyst is being developed for direct hydrogenation of CO₂ to Methanol and DME. Apart from above, Electro chemical reduction of CO₂ is being pursued to mitigate the harmful environmental effect of CO₂.

8.3.4 Pipeline Integrity Management:

In this area, remote monitoring of Pipeline RoU through high resolution satellite images was continued in GAIL Bhavan portal. In addition a Low Altitude long Endurance (LALE) Unmanned Aerial System (UAS) for Surveillance, Reconnaissance and Asset Monitoring is being developed in association with IIT Kanpur.

Further, to understand and develop solutions for mitigating Microbial induced Corrosion, a research project on Microbial survey and characterization of microbial communicates in Gas pipelines, Heat exchangers and fire protection systems is being carried out through CECRI, Karaikudi.

8.3.5 Waste to Energy:

CSIR-IIP & GAIL has developed a two-stage process for conversion of Waste plastic into valuable hydrocarbons like Diesel, Gasoline & Aromatic fractions. The lab scale studies were carried out and the results were validated in bench-scale experiments.





Based on the successful results, GAIL & IIP have set-up a Pilot Plant of 1 TPD Waste Plastics to Valuable Hydrocarbons at IIP, Dehradun. The pilot project was inaugurated on 27/8/2019 by Dr. Harsh Vardhan, Hon'ble Minister of S&T, Earth Sciences, and Health & Family Welfare in the presence of Sh. Trivendra Singh Rawat, Hon'ble CM of Uttarakhand.

Successful Validation of technology parameters, in the Pilot plant, will pave the way for upgradation of technology to commercial level.

8.4 R&D by Oil India Limited

8.4.1 R&D activities are undertaken primarily with the focus of solving field related problems with regards to increasing oil & gas production by R&D Department of Oil India Limited at Duliajan. 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, microbial enhanced oil recovery etc. Majority of the projects during the current year are in continuation of the earlier projects and

studies. The continued ongoing projects and new projects/studies undertaken during the year 2019-20 are as under:

- i. Reservoir fluid identification through Geochemical Analysis of Sidewall cores
- ii. Rock-Eval pyrolysis study of core samples for study of source potential
- iii. Mineralogical study of various wells and elemental study of corroded tubing using SEM-EDX
- iv. Unconventional Hydrocarbon Studies
- v. Characterization of crude oils for understanding the flow and organic deposition behavior in OIL's operational areas of Assam
- vi. Surface Geochemical Study for Hydrocarbon Potential of NELP-IX Block (AA-ONN-2010/2) in Karbi Anglong area
- vii. X-ray diffraction analysis of samples from different formations of OIL's operational areas
- viii. Design of Solvent Formulation for Removal of Organic Deposits in Oil Wells
- ix. Solvent Stimulation Jobs at different locations
- x. Corrosion monitoring in Numaligarh-Siliguri Pipeline



HP Lubricant R&D Centre at Mumbai



- xi. Study on Root Cause Analysis of Failures in NAG Wells and Review of Completion Well Strategies
- xii. Corrosion Monitoring in Crude Oil and Gas Pipelines
- xiii. Optimisation of Corrosion Inhibitor Dosage for Acidization jobs
- xiv. Development of Oil Field Chemicals
- xv. Development of Liquid Flow Improver
- xvi. Development of Wax Dispersant additive for Branchline and Mainline crude
- xvii. Studies on development of "Low-temp" Demulsifier (LT-OSD)
- xviii. Optimization of Crude oil demulsification process at field installations
- xix. Control of Scale Formation at Various Field Locations
- xx. Flow Assurance Studies in different wells, pipelines and flowlines
- xxi. Performance Evaluation of Bactericides
- xxii. Remediation of hydrocarbon contamination at different locations using in-house developed bioremediation technology
- xxiii. Development & Field Trial of Essential Oil as Bactericide (MoU 2018-19 R&D Project)
- xxiv. Feasibility assessment of extending In-house Bioremediation technology for treatment of tank bottom sludge in CTF
- xxv. Periodic monitoring of corrosive bacterial population in Kathaloni OCS and ITF Tengakhat and Evaluation of Bactericide efficacy, generation of dosage plan for their control
- xxvi. Laboratory experiments pertaining to chemical EOR simulation study for Hapjan 2D block
- xxvii. Pilot Polymer Flooding Project in NHK 11D+18 block
- xxviii. Synthesis and extraction of surfactants from natural resources and their characterization for application in enhanced oil recovery in collaboration with IIT-ISM Dhanbad
- xxix. Joint Industry Project (JIP) on Carbonated Water Injection Carbonate water injection (CWI) with Heriot-Watt University, Edinburgh, UK.
- xxx. AAQM & Stack Emission Monitoring

8.4.2 List of registered patents:

- i. Formulations for Dissolution of Petroleum Sludge or Waxes and method for evaluation thereof
- ii. A Novel Method for Investigation of solubility of tank bottom sludge with solvents
- iii. Method for preventing wax deposition in oil wells with packers
- iv. An Apparatus and Resonant Energy Analysis method for Active Seismic Operations
- v. Method of quantification of low wax crude
- vi. Method to determine transformation of kerogen to oil/gas at different maturities using step-wise pyrolysis-gas chromatography
- vii. Bacteriophage mediated biocontrol in oil reservoirs

8.6.3 R&D Expenditure in last 3 years and current year upto 19.12.2019

(₹ in Crores)

Head	2017-18	2018-19	2019-20 (upto 31.12.2019)	2019-20
	Actual	Actual	Actual	BE
R&D	64.32	86.19	78.91	97.49





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CHAPTER

9

Bio-Fuels



Bio-fuels

9.1 Non-conventional Energy

India is one of the fastest growing economies in the world. The Development Objectives focus on economic growth, equity and human well being. Energy is a critical input for socio-economic development. The energy strategy of a country aims at efficiency and security and to provide access which being environment friendly and achievement of an optimum mix of primary resources for energy generation. Fossil fuels will continue to play a dominant role in the energy scenario in our country in the next few decades. However, conventional or fossil fuel resources are limited, non-renewable, polluting and, therefore, need to be used prudently. On the other hand, renewable energy resources are indigenous, non-polluting and virtually inexhaustible. India is endowed with abundant renewable energy resources. Therefore, their use should be encouraged in every possible way. Biofuels are derived from renewable bio-mass resources and, therefore, provide a strategic advantage to promote sustainable development and to supplement conventional energy sources in meeting the rapidly increasing requirements for transportation fuels associated with high economic growth, as well as in meeting the energy needs of India's vast rural population:-

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 2001, Government of India launched three pilot projects, two in Maharashtra and one in Uttar Pradesh for supplying ethanol blended petrol



188.5 crore litres of ethanol was blended in petrol which is the highest quantity in the history of the EBP programme

only to the retail outlets under their respective supply areas. Apart from the above field trials through pilot projects, R&D studies also were undertaken simultaneously. Both pilot projects and R&D studies were successful and established blending of ethanol upto 5% with petrol and usage of ethanol blended petrol in vehicles. Accordingly, Government of India, with effect from 01.01.2003 resolved to supply ethanol blended petrol in nine States and four Union Territories for sale of 5% ethanol blended Petrol. This was later increased to 10% w.e.f. 01.10.2008 and extended to 24 states and 5 Union Territories w.e.f. 1.04.2019. This Programme is aimed at achieving multiple outcomes such as:

- addressing environmental concerns,
- reducing import dependency, and
- providing boost to agriculture sector,

In order to augment the supply of ethanol, the Government on 10th December, 2014, decided to procure ethanol produced from other non-food foodstocks besides molasses, like cellulosic and lingo-cellulosic materials including petrochemical route. It was also decided to administer the price of ethanol under EBP Programme.

During Ethanol Supply Year (ESY) 2018-19 (01.12.2018-30.11-2019) 188.5 crore litres of ethanol was blended in petrol which is the highest quantity in the history of the EBP programme till date and increase of around 25% over previous year.

For ESY 2019-20, the Government has fixed an enhanced remunerative price for ethanol





Saksham Fit India Cycle day at Sangli (Maharashtra) on 19.01.2020

procurement based on raw material utilized as under:

- C heavy Molasses ₹ 43.75/- per litre,
- B heavy Molasses ₹ 54.27/- per litre,
- Sugarcane juice/ ₹ 59.48/- per litre
sugar / sugar syrup
- Damaged Food grains ₹ 50.36/- per litre.
GST & transportation charges are to be paid over and above these prices.

For the first time sugar and sugar syrup has been allowed for ethanol production to support the industry in liquidating their excess stocks.

Several representations were received from the various stakeholders of the ethanol industry to explore the possibility of long term contracts between Oil Marketing Companies and ethanol suppliers. Based on these representations the Government has come out with a long term ethanol procurement policy so that the industry can plan a long term investments in this sector.

The salient features of this policy are as under:

- The ethanol procurement quantity shall be estimated by the Oil Marketing Companies (OMCs) for a period of five years and will form part of the procurement tender.
- The annual ex-mill price from sugarcane based raw materials shall be declared by Government.
- A mechanism will be made by OMCs for change in transportation rates with the change in fuel prices over this long term contract period.
- Flexibility to introduce any new category of raw material for ethanol procurement.
- Mechanism to be available for induction of a new distillery /sugar mill or additional quantity offers by an existing ethanol supplier as well as a provision for exit by an existing / participating distillery / sugar mill as per ESY in the tender.

Ethanol meant for EBP Programme is



compulsorily denatured in the distillery itself, prior to its dispatch from the distillery premises. Thus, there should not be any requirement by States & UTs to regulate ethanol after it is denatured and rendered unfit for human consumption. Despite the above, several States & UTs continued to regulate ethanol movement by way of excise control, licenses, levy of import/export duty. In view of above, Government of India amended the Industries (Development and Regulation) Act, 1951 in 2016. As per the Notification, the State Governments & UTs can legislate, control and / or levy taxes and duties on liquor meant for human consumption; and denatured ethanol, which is not meant for human consumption, will be controlled only by the Central Government. The amended provisions of Industries (Development & Regulation) Act, giving control on production, movement and storage of ethanol to the Central Government, has now been implemented in 13 States Viz., Karnataka, Goa, Maharashtra, Gujarat, Bihar, Chhattisgarh, Tamil Nadu, Andhra Pradesh, Punjab, Himachal Pradesh, Madhya Pradesh, Haryana and Uttarakhand.

A scheme for extending financial Assistance to sugar mills through Interest subvention for enhancement and augmentation of the Ethanol Production capacity has been notified by Department of Food and Public Distribution. Under this scheme 328 proposals worth ₹16481.67 crore have been accorded in-principle approval which are estimated to add 533 crore litres per annum of ethanol distillation capacity.

With an aim to provide more choices of alternative automotive fuels to consumers, the following approvals have been given by the Government:

(i) Retailing of 100% Ethanol (E-100) as a transportation fuel on a pilot basis by Oil Marketing Companies at a few retail outlets in

areas where ethanol is sufficiently available. After assessment of the economic, operational and developmental aspects of usage of E100 as automotive fuel, the same may be expanded to other outlets.

(ii) Retailing of petrol blended with methanol (M15) as an automotive fuel by Indian Oil Corporation Ltd. at a few outlets in Assam and NE States on a pilot basis. Based on the outcome of this pilot and availability of methanol for blending, the same may be subsequently expanded to other retail outlets.

9.1.2 Bio-diesel Programme & Biodiesel from UCO.

Ministry of Petroleum & Natural Gas has issued Gazette Notification dated 30.04.2019 on the subject "Guidelines for sale of Biodiesel for blending with High Speed Diesel for transportation purposes" – 2019.

Marketing Division of this Ministry has also issued "The Motor Spirit and High Speed Diesel (Regulation of Supply, Distribution and Prevention of Malpractices) Amendment Order, 2019 dated 30.05.2019 vide Gazette Notification on 31.05.2019" to incorporate the above guidelines..

During the period April, 2019 to Feb., 2020, 10.13 crore litres of biodiesel has been procured by OMCs for biodiesel blending.

Recorded highest ever biodiesel procurement of 10.4 crore litres by Oil Marketing Companies for the period April, 2019-Feb., 2020

Presently, Bio Diesel is mainly being made through imported palm seed oil. In order to encourage production of biodiesel from Used Cooking Oil (UCO) to reduce imports, Oil Marketing Companies have floated Expression of Interest on 10.08.2019, for supply of biodiesel produced from UCO at 100 locations across the country. This has been extended to 200 locations on



10.10.2019. The ex-factory UCO based biodiesel price has been fixed for three years. The price for the first year has been fixed at ₹51/litre, for the second year at ₹52.7/litre and for the third year at ₹54.5/litre. GST and transportation shall be payable in addition to this price.

9.1.3 Second Generation Ethanol

The demand for petrol and diesel is ever increasing and for year 2022, the consumption of petrol and diesel is expected to be around 4,400 crore litres and 13,200 crore litres respectively. The National Policy on Biofuels announced in 2018 is aimed at accelerated promotion of Biofuels with indicative targets of achieving 20% blending of ethanol in Petrol and 5% blending of biodiesel in Diesel by 2030. Therefore, to maximise the production of ethanol in the country for the purpose of blending with

petrol, other options/routes for enhancing ethanol production need to be explored. Government has already allowed procurement of ethanol produced from other non-food feedstock besides molasses, like cellulosic and lignocelluloses materials including petrochemical route.

Lignocellulosic biomass is being considered as a prospective source of Second Generation (2G) ethanol for supplementing the rising demand of ethanol for EBP Programme. A October, 2018 report by Technology Information, Forecasting & Assessment Council (TIFAC), an autonomous organization under Department of Science & Technology indicated an availability of surplus biomass across country to the tune of 178 Million Tonnes per annum. Majority of this surplus biomass is presently being burnt by the farmers as a waste disposal activity which contributes towards the environment pollution.

Subsequent to opening up of alternate route i.e. Second Generation (2G) route for ethanol production, Public Sector Oil Marketing Companies under the administrative control of Ministry of Petroleum and Natural Gas are in the process of setting up 12 2G bio-refineries with an investment of ₹14,000 crores. List of 12 nos. of 2G Ethanol Projects is as under:-

List of 12 nos. of 2G Ethanol Projects

Company	Location	Capacity (Kilolitres Per Day)	Feed Stock
IOCL	Panipat (Haryana)	100	Rice stra
	Gorakhpur (UP)	100	Rice Straw
	Dahej (Gujarat)	100	Cotton Stalk; MSW being explored
BPCL	Bargarh (Odisha)	100	Rice straw
	Bina (M.P.)	100	Wheat & Soya stalk
	Bhandara (Maharashtra)	100	Rice Straw
HPCL	Bhatinda (Punjab)	100	Rice straw/cotton stalk
	Badaun (UP)	100	Rice straw/bagasse
	Muzzafarpur (Bihar)	3 (Demo Plant)	Rice straw
	East/West Godavari (AP)	100	Rice straw/maize
NRL	Numaligarh (Assam)	185	Bamboo
MRPL	Davangere, (Karnataka)	60	Corn Cob.



In order to encourage setting up of second generation bio-fuels plants, Government has launched as scheme namely i.e. "Pradhan Mantri JI-VAN (Jaiv Indhan- Vatavaran Anukool fasal awashesh Nivaran) Yojana" for providing financial support to integrated bio-ethanol projects, using lignocellulosic biomass and other renewable feedstock. The 2G scheme envisages setting up of twelve Commercial scale Second Generation Bioethanol projects and ten demonstrations scale 2G Bioethanol projects based on non-food biomass feedstocks and other renewable feedstocks with a total financial outlay of ₹ 1969.50 crore. Hon'ble Prime Minister of India Shri Narendra Modi laid the foundation stone of Numaligarh Refinery Limited Bio-Refinery Project on 09.02.2019. Further, Minister, P&NG along with Chief Minister, UP laid the foundation stone of IOCL's Biofuel complex for production of second generation biofuels at Gorakhpur on 18.09.2019.

9.1.4 Three days 2nd Bilateral Conference "EU-India Conference on Advance Biofuels" during 12th-14th March, 2019 at New Delhi, India

Ministry of Petroleum & Natural Gas jointly organised with the European Union a three days 2nd bilateral conference "EU-India Conference on Advanced Biofuels" during 12th-14th March, 2019 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 information exchange 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 8.6.2018 which is expected to give boost to the biofuel



IOT BioGas plant of capacity 290 TPD input at Namakkal, Tamil Nadu





Saksham publicity van at New Delhi flagged off by Dr. M. M. Kuty, Secretary, MoP&NG on 16.01.2020

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.
- iv. With a thrust on Advanced Biofuels, the Policy indicates a viability gap funding scheme for 2G ethanol Bio refineries of ₹1969.50/- crore in 6 years.

9.1.6 Joining of IEA Bioenergy TCP

Ministry of Petroleum and Natural Gas joined a Technology collaboration programme (TCP) under International Energy Agency (IEA) as its 25th Member on 25.01.2019. It is an international platform for co-operation among countries with the aim of improving co-operation and information exchange between countries that have national programmes in bio-energy research, development and deployment.

9.1.7 Celebration of World Biofuel Day on 10th August, 2019

World Biofuel Day is observed every year on 10th August to create awareness about the importance of non-fossil fuels as an alternative to conventional fossil fuels and to highlight the various efforts made by the Government in the Biofuel sector. The "World Biofuel Day" is being celebrated by the Ministry of Petroleum and Natural Gas since last four years. The theme for this year's "World Biofuel Day" Programme on



10th August, 2019 was "Production of Biodiesel from Used Cooking Oil". Minister of Health & Family Welfare, Science & Technology and Earth Sciences, Dr. Harsh Vardhan was the Chief Guest on the occasion. FSSAI released Repurpose Used Cooking Oil, "RUCO" sticker and Mobile app to facilitate the collection of UCO on this occasion. OMCS also released the EoI for procurement of Bio-Diesel from UCO.

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.

9.2 Fuel Conservation Initiatives

Petroleum Conservation Research Association (PCRA) engaged in promoting energy efficiency in various sectors of economy 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 carried out various chartered activities, through sectoral field activities. PCRA engineers and its empaneled experts reach out the targeted groups 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. Activities are carried out in a manner so as to increase the outreach of these programmes on fuel conservation and achieved a total of 15432 nos. of chartered activities during April-December, 2019. Total numbers of drivers



Saksham Painting final (Senior Category) held at New Delhi on 20.12.2019



trained through various training programmes during the period is 119434 nos. During the period, savings of 215378 Million Tonnes of Oil Equivalent (MTOE) has been quantified through its sectoral activities. PCRA also assisted industries in obtaining ISO 50001:2011 Energy Management System (EnMS), which is essentially an ISO procedure for energy management. 148 lacs students from more than 34286 schools participated in the National program of Essay, Painting & Quiz Competition in 2019.

In order to provide sustained impetus on fuel conservation efforts, PCRA also undertakes nationwide people centric mass awareness campaign, called "Saksham (Sanrakshan Kshamta Mahotsav) each year 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.

A number of policy initiatives with respect to fuel efficiency and conservation measure have been carried out/ initiated which include fuel efficiency norms for heavy, medium and light duty vehicles, standard & labelling program for tractors and tyres, development of high thermal efficiency PNG burner, mandatory BIS certification for LPG stoves etc.

These activities of fuel efficiency and conservation 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.

9.3 Impact of Crude Oil on CIF basis by Oil PSUs.

On the request of Oil PSUs and pursuance of



15432 nos. of chartered activities during April-December, 2019

this Ministry's efforts, Ministry of Shipping has granted advance 'NOC' to Oil PSUs for import of crude oil on CIF basis, upto 35% of their annual crude import for the year 2019-20.

9.4 Sustainable Alternative Towards Affordable Transportation {SATAT} initiative:

Sustainable Alternative Towards Affordable Transportation (SATAT) initiative was launched on 1.10.2018 to promote Compressed Bio Gas (CBG) as an alternative, green transport fuel for efficient management of biomass and organic waste.

SATAT has envisaged developing 5000 CBG plants with total CBG production capacity of 15 Million Metric Tonne Per Annum (MMTPA) i.e. equivalent to 54 MMSCMD of gas by 2023. CBG plants will also produce a by-product i.e. bio-manure and the same can be utilized in farming sector.

Under this initiative Indian Oil Corporation Limited, Bharat Petroleum Corporation limited, Hindustan Petroleum Corporation Limited, Gail (India) Limited and Indraprastha Gas Limited have invited Expression of Interest (Eoi) from potential entrepreneurs to procure CBG at an assured price. Till March 2020 Oil PSUs have issued about 494 Letters of Intent (Lois) to entrepreneurs for production and supply of CBG across the country.

To encourage establishment of CBG plants, Gail (India) Ltd has Solicited Investment Proposals from Start-Ups operating in the area of Renewable and Alternate Energy Sources.







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, Instagram, YouTube and My Gov. Fuel saving tips 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.

10.2 Chartered Activities

PCRA carried 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 out the targeted groups by conducting activities like Energy Audit, Fuel Oil Diagnostic Studies and walk-through Audits, Technical Seminars, Institutional Training Program, Driver Training Program, Transport Workshop, Fuel Efficiency Improvement Program for STU depots, 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. Activities are carried out in a manner so as to increase the outreach of these programs on fuel conservation and achieved a total of 17556 nos. of chartered activities during April-January 2020. Total drivers trained through various training programs during the period is 137868 nos. During the period, savings of 270781 MTOE has been quantified through its sectoral activities. PCRA also assisted industries in obtaining ISO 50001:2011 Energy Management System (EnMS), which is essentially an ISO procedure for energy management.

10.3 National Level Competition-2019 for School Children

Children, being the future of India, were also motivated through National Level Painting, Essay and quiz competitions during the year. 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,



Saksham National Essay Competition





Saksham National Quiz Competition Winners

Santhali, Manipuri, Sindhi and Dogri) for school students across the country. The Essay competition was conducted for Class 7-10, whereas the painting competition was conducted in 2 categories- Junior (Class 5-7) & Senior (Class 8-10). To bring more competitiveness, this year on ground events were held for essay competition at 14 cities to select national level winners. For painting competition, top 100 Junior and Senior

Level students were called at New Delhi for on ground activation to finalize the national level winners.

Online Quiz events were conducted in schools and two-member team was selected from each school. Subsequently, selected team participated in District and State level quiz online. The State Level Best teams were invited to participate in Quiz Zonals organized in Doordarshan Studios at Delhi, Kolkata, Bengaluru & Mumbai. The National Finals of the Quiz was held in Doordarshan Delhi studios. The Zonals and Finals were made into 5 episodes of one hour each, which was telecast from 18.01.2020 to 15.02.2020 on DD National. During the flagship program of National Level, which is unprecedented. A total of 2709 prizes were distributed to students (Laptop, Tablet, Cash & Japan trip).



Saksham National Quiz Competition



The first prize winners of the national level competition, at Singapore Science Centre

A whopping participation of 1.48 crore school children was recorded in Saksham National Competition 2019.

This year, the first prize winners of the national level competition-2018 were taken on 5-days study tour to Singapore. The winners were taken around places of interest for their learning including Singapore Science Centre, Newater Plant, Global Indian International School Smart Campus, along with amusement places.



The first prize winners of the national level competition, on Study Tour in Singapore

10.4 Sanrakshan Kshamta Mahotsav (Saksham)-2020

In order to provide sustained impetus on fuel conservation efforts, PCRA undertakes nationwide people centric mass awareness campaign, called "Saksham" starting 16th January, each year, in association with PSU Oil & Gas Companies. Tagline of this year's event was "Indhan Adhik Na Khapayein, Aao Paryavaran Bachayien". During this one-month drive, various sections of society viz. students, youths, farmers, housewives, drivers, industrial workers, etc. were engaged to profess and propagate the need to conserve fuel by judicious utilization of petroleum products. Sectorial emphasis was 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 2020' was held at India Habitat Centre, New Delhi



on 16th January 2020, where large number of Senior Officials from MoP&NG / other Ministries, Students, Teachers, Chairman/CMDs of Oil PSUs, Media etc. were present. Dr. M. M. Kutty, Secretary, MoP&NG was the chief guest of the function, who felicitated the first prize winners of National Level Competitions along with State Level Coordinators, State Governments and State Transport Undertakings. A publicity van was also flagged off by the chief guest.

State Level Coordinators also organized impressive Inaugural functions of 'Saksham 2020' at the State Capitals.

During the one-month campaign of Saksham-2020, number of mass awareness activities were planned to be carried out in Industrial, Transport, Domestic and Agriculture sector. Some of them are-

- a) Saksham Cycle Day in 200 cities throughout the country on 19th January 2020.
- b) Saksham walkathon in 624 districts on 2nd February 2020.
- c) Debate Competition/Group Talk/ Concerts/Talent Show/ Graffiti/Wall Painting Competition on Fuel Conservation in Schools/Colleges.
- d) Workshop in Engineering Colleges/ Technical Meet in Industrial Sectors on Fuel Conservation through Technical Meets/Workshops.



Saksham Punjabi Essay Competition Winner

- e) Group Talk at RWAs/Housing Societies /Colonies.
- f) Cycle Rally/Mass Rally/Human Chain by Club members/Online pledge/Quiz/Essay competition/ Fuel Efficient Cooking Competitions for women in residential societies for Clubs/Societies/NGOs/ Groups etc.
- g) Fuel Efficient Driving Contest for Cars/ LCVs/MCVs/HCVs.
- h) 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.
- i) LPG Panchayats and training of LPG delivery boys on LPG saving tips at all LPG Distributorships.
- j) Group Talk at all Retail Outlets & CNG Stations.
- k) Agriculture workshops for farmers.
- l) Workshops/Group Talks for STUs/ Fleet Operators (Organized/Unorganized Sector).
- 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 Feb'20 at PSU offices/locations/units etc.



10.5 Mega media campaign during Saksham-2020

Media campaigns was successfully run on Doordarshan, All India Radio, Lok Sabha TV, Pvt. FM Channels, Pvt. TV channels, and Digital Cinemas across the country educating people about the need for fuel conservation during Saksham-2020. The Appeal of Hon'ble Minister of P&NG was aired on Radio channels across the country.

Besides the mega campaign, many people connect and people engage activities were carried out on social media platforms. Some of them are Carpool photo contest, Slogan Contest, live coverage of several events like Saksham Day, Saksham National Competitions, Agroworld 2019, PCRA Van Flag off, Swachhata Pakhwada, PNG stove launch, Technical Conference on waste to energy and resource conservation at India Habitat Centre etc. Besides these, 18 Twitter trending activities were done between April 2019 to January 2020, gathering large number of impressions. 21 social media campaigns were done on all platforms on campaigns on special days like Yoga Day, Earth Day, Environment Day etc.

10.6 Online Driver Training (ODT) Application

PCRA has developed online driver training application that aims at providing good driving habits, maintenance tips and visual content, which in turn create mass awareness among the drivers and other people about effective ways of driving which not only save fuel and reduce fuel expenditure but also helps in reducing pollution. This app is freely available on Google Play Store and is easy to understand and use. This app also provides links to PCRA social media pages and to its website through which the user can get updates regarding the events of PCRA and can get detailed information about the organization.



10.7 Participation in Agro World Fair 2019

PCRA participated in one of the world's largest Agro event, AgroWorld'2019, organized by Indian Council of Food and Agriculture at NASC Complex, PUSA Campus New Delhi from 06th November to 8th November 2019. A number of activities including Augmented reality, Quiz, Nukkad natak shows, hourly lucky draws, Selfie point were the main attractions of the stall.

10.8 Foray in Mobile Towers

PCRA is acting as a facilitator to convert the DG sets installed for Mobile Towers to Natural Gas Service. This initiative has been taken up by PCRA to meet the existing challenge of air pollution in the NCR Region. Three sites (Two in Ghaziabad and one in Noida) have been commissioned by IGL and 19 are in various stages of completion as on date. Further, more than 3000 Mobile Tower locations have been identified for conversion to Natural Gas in the NCR area.



PCRA's participation in Agro World Fair 2019





Agro World Fair 2019

10.9 Activities under PAT Scheme

PCRA provides assistance to energy intensive industries by conducting Mandatory Energy Audits and Monitoring & Verification Audits in the PAT (Perform, Achieve and Trade) regime. During the current financial year, 20 PAT audits (Thermal Power Plant-14, Railways-2, Iron & Steel-1, Refinery-1, Petrochemical-2) have been completed, whereas the audit is in

progress in 3 units (Thermal Power Plant-2, Iron & Steel-1). Thus, PCRA facilitates the Industries to enhance their energy efficiency.

10.11 International collaboration

PCRA has signed MoU with ECCJ (The Energy Conservation Cell, Japan) on 10.12.2019 for 5 years for mutual collaboration in the field of energy efficiency and conservation.

10.10 Ongoing R&D projects

Currently, there are 4 ongoing R&D projects given in the table below:

S. N.	Project Title	Organization/ Institution
1	Improving thermal efficiency of LPG domestic cooking stoves.	BPCL Corporate R&D Centre, Greater Noida.
2	Integrated process for conversion of Lignocellulosic biomass to Bio-methanol and value added products.	Indian Institute of Technology (IIT), Delhi.
3	Design, Development and testing of a down draft biomass gasifier system complemented by Hydrogen enrichment through air-steam gasification.	"The Energy & Resource Institute (TERI) University, New Delhi" now known as "TERI School of Advanced Studies, New Delhi".
4	Development of Methodology for Traffic Circulation Plans around Metro Stations and their impact quantification using Microscopic Simulation.	CSIR-Central Road Research Institute (CRR), New Delhi.



10.12 Fuel Efficiency improvement program (FEIP)

PCRA has introduced FEIP to improve its existing 3 days' Driver Training Program. FEIP is a concept to keep focused attention on training of low performing drivers together with maintenance of low performing buses and measure their incremental performance. Through focused approach, the low performing drivers will be trained & guided by trainer on weekly basis for 3 weeks & their performance will be reviewed on KMPL basis at the end of the training. Similarly, the buses with lowest performance in KMPL will be targeted to carry out minor maintenance checks/rectification, after which performance of buses will be reviewed in 15 days. In case of non-improvement in their KMPL, major maintenance checks will be carried out and their performance will be reviewed again after 15 days. For every depot, the above exercise will be repeated for different sets of buses & drivers in three rounds covering about 30% low performing drivers & 30% low performing buses. This program will not only lead to fuel conservation but will also reduce breakdown of vehicles, increase road safety and ultimately reduce the vehicular pollution. PCRA has taken up 60 FEIP in the current financial year on a pilot basis. On successful completion and positive outcome, DTP will subsequently get subsumed in FEIP.

10.13 New policy initiatives

Number of policy initiatives with respect to fuel efficiency and conservation measure have been carried out/initiated like fuel efficiency norms for heavy, medium and light duty vehicles, standard & labelling program for tractors and tyres, development of high thermal efficiency PNG burner, mandatory BIS certification for LPG stoves etc.

a) Fuel Efficiency Norms for Heavy Duty Vehicles: The transport sector is the

major consumer of diesel and accounts for more than 70% of total diesel sales in India. Heavy duty vehicles (Trucks & Buses) have maximum HSD consumption share in transport sector. Mandating Fuel Economy norms for manufacturers/ importers will help in saving diesel consumed in this sector. BEE/Ministry of Power are in process to issue requisite notification. Thereafter, MoRTH will notify.

- b) Fuel economy norms for Light & Medium Commercial Vehicles: As, light & medium commercial vehicles (LCVs and MCVs) account for a significant share of HSD consumption in transport sector, it was decided to formulate action plan and monitor development of fuel economy norms for this segment of vehicles. BEE has notified the norms of Light & Medium Commercial Vehicles. MoRTH is required to notify the norms under Central motor vehicle rules (CMVR) and also issue the administrative procedure.
- c) Standard and Labelling of Tyres: Tyres, as a component, have been identified to have a huge potential for improving fuel efficiency of on road vehicles, as 73% of total tyre market of India is replacement market segment. The transport sector users are unaware of the fact that there is a wastage of the fuel of the order of 20% of fuel consumption on account of inefficient tyres. Keeping in view of above, PCRA is developing bandwidth and procedure of labelling program for automotive tyres. BEE is in the process of notification of Schedule. The voluntary phase of labelling is likely to start from 1st April 2020.
- d) Star and Labelling of Agricultural Tractors: In view of growing dependence of the country on import of crude oil and the fact that consumption of HSD by tractors is about 7.7 %, it has been felt imperative by the government to define norms for economic usage of diesel and



monitor progress from time to time for tractors in India. BEE is in the process of notification of Schedule. The voluntary phase of Labelling is likely to start from 1st April 2020.

- e) Development of high thermal efficiency PNG burner: Hitherto there was no BIS standard for stoves used for PNG and no stoves were manufactured for dedicated PNG use. The existing LPG stoves are being modified for use in PNG, which reduces the thermal efficiency. PCRA, in collaboration with IIP-Dehradun have developed a high thermal efficiency PNG stove through hardware interventions. BIS standard (IS 17153:2019) has also been published in the gazette on 11.06.2019. Field trials of the stove show savings of around 30% PNG. Presently the PNG stove is available through on-line stores, viz. Flipkart/Snapdeal/Amazon. Efforts are on to

make the PNG stoves available in local stores at major cities of India.

- f) Mandatory BIS certification for LPG stoves: With the initiation of PCRA, Department for Promotion of Industry & Internal Trade (DPIIT), Ministry of Commerce and Industry has issued the necessary Quality Control Order dated 03.12.2019 on making the BIS standard (IS 4246:2002) certification of domestic LPG stoves mandatory for all the domestic LPG stoves manufactured, imported or sold in India. This order shall come into force with effect from 01.06.2020.

These activities of fuel efficiency and conservation has been making positive contributions towards the Government's ambitious program on reduction of 10% of import of crude oil by the year 2021-22.







CHAPTER

11

Pricing



Pricing

11.1 Background

1. The pricing of petroleum products was brought under the 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.
2. Effective 01.04.2002, 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.
3. 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/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 per barrel 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 2015-16, 2016-17 and 2017-18 was recorded at \$46.17/bbl, \$47.56/bbl and \$56.43/bbl respectively. The price increased to \$ 69.88/bbl during 2018-19 and is at \$64.08/bbl during the current financial



Avg price of Indian basket of crude oil is at \$ 64.08 bbl during 2019-20 (upto 17th Jan' 20)

year 2019-20 (up to 17th January, 2020). The trend of Indian basket of crude oil during 2002-03 to 2019-20 is given at Annexure-I.

4. Even though APM was dismantled effective 1.4.2002, since 2004, the consumers of sensitive petroleum products viz. petrol (decontrolled w.e.f. 26.06.2010), diesel (decontrolled w.e.f. 19.10.2014), 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 OMCs with corresponding subsidization of prices for the consumers. The trend of under recovery on PDS kerosene is given in Annexure-II.



Automation at Bharat Petroleum's Retail Outlet



Trend of Crude Oil: Indian basket

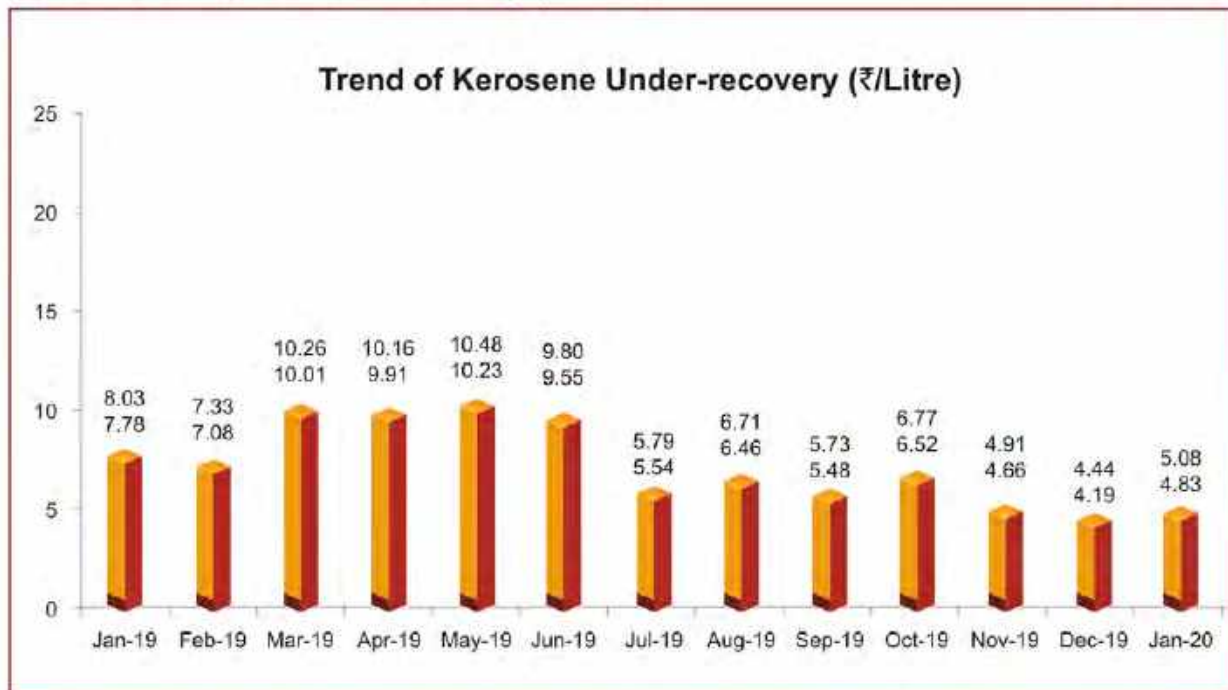
Annexure-I



Note: 2019-20 prices are up to 17/01/2020

Trend of Kerosene Under-recovery (₹/Litre)

Annexure-II



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





11.2 Petrol and Diesel

1. 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.
2. 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.

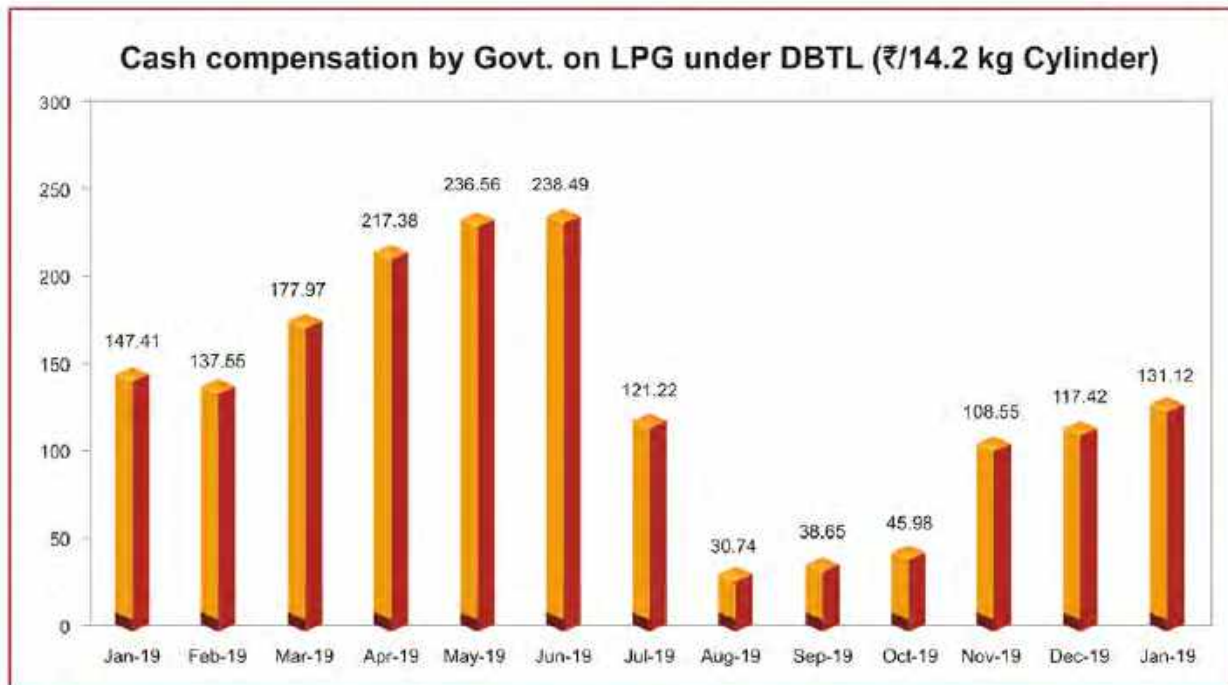
11.3 Domestic LPG (Subsidised)

1. 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.

2. 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.
3. Based on the refinery gate price as on 1st January, 2020, the non-PMUY consumers are getting a total DBTL subsidy of ₹157.86/Cylinder (including uncompensated costs of OMCs) under the DBTL scheme at Delhi. The details of cash compensation by Government on LPG under DBTL from January, 2019 is given in **Annexure-III**.

Annexure-III



Note:- The cash compensation effective Aug-19 is for non-PMUY customers.





Deivery of HP Gas at Consumer homes

11.4 PDS Kerosene

1. 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.
2. Effective 1st Oct, 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.
3. 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 and similarly a reduction of 12% for the year 2018-19 in comparison to the allocation of 2017-18. The allocation for 2019-20 has been further reduced by 29 % in comparison to the allocation for 2018-19. 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 availed 'Cash incentive for voluntary cut in kerosene allocation' scheme. As on date, 9 State Governments/UTs have already cut down their PDS Kerosene allocation to nil.
4. Based on the refinery gate price effective 1st January, 2020, the OMCs are currently (as on 16.01.2020) incurring under-recovery of ₹ 4.83/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 Crores)

Particulars	2015-16	2016-17	2017-18	2018-19	H1, 2019-20 (P)
PDS Kerosene	11,496	7,595	4,672	5,950	1,349
Domestic LPG	18	-	-	-	-
Total Under-recoveries (A)	11,515	7,595	4,672	5,950	1,349
Total DBTL related subsidies (B)	22,011	12,905	20,905	31,539	11,279
DBTK Subsidy (claims) (C) *	-	11	113	117	-
Other Subsidies (D)	-	3,293	-	-	-
Total Subsidy/ Under-recovery on Petroleum Products & Natural Gas (A+B+C+D)	33,526	23,804	25,690	37,606	12,628
# on payment basis.					



HPCL Flex Speed carousel at Cherlapally LPG Plant HPCL



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

*DBTK claim for 2018-19 includes amount of ₹ 37.72 crores held back from the claim for November 2018 to March 2019 due to non-receipt of Quarterly Utilisation Certificate (QUC) from the State Government. No claim has been received for 2019-20 till date.

11.6 Pricing of crude oil

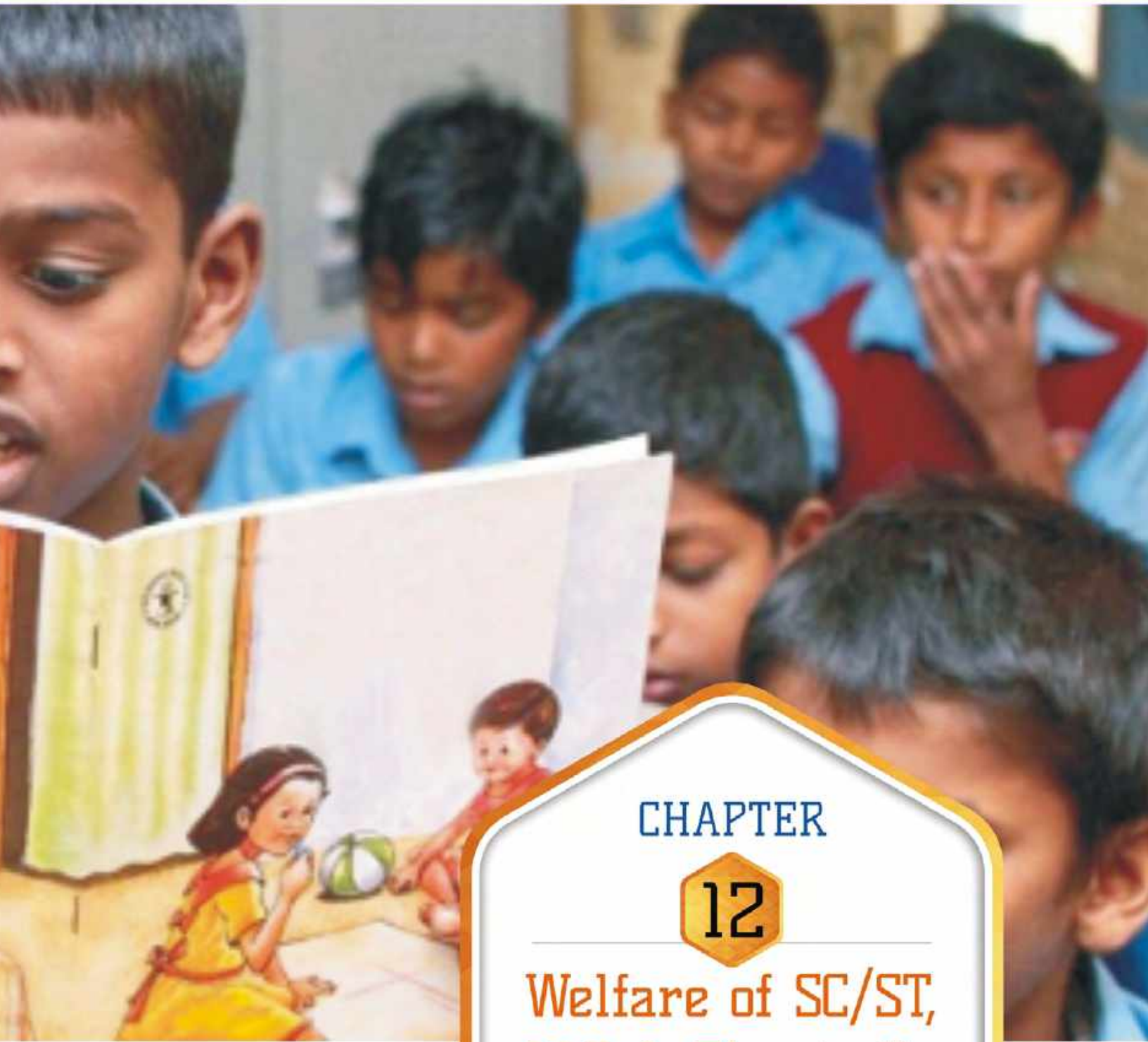
Indian basket of crude oil represents the average of crude oil processed by Indian refineries in the ratio of actual processing of sweet crude and sour crude in the immediate preceding year. For sweet crude oil price, the daily Platts assessments for

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 & Physically
Handicapped



WELFARE OF SCHEDULED CASTES, SCHEDULED TRIBES, OTHER BACKWARD CLASSES AND DIVYANGJAN

12.1 Context / Background

The guidelines in respect of the reservation for the Scheduled Castes, Scheduled Tribes, Other Backward Classes 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 and the Public Sector Undertakings (PSUs) under its 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.



Right intervention at the right time



12.2 Details of backlog vacancies in respect of SC, ST, OBC, PWD in PSUs/Organizations under this Ministry as on 31.12.2019.

PSU	Number of backlog Vacancies in respect of SC, ST, OBC and PWD (Direct Recruitment)															
	Group A				Group B				Group C				Group D			
	SC	ST	OBC	PWD	SC	ST	OBC	PWD	SC	ST	OBC	PWD	SC	ST	OBC	PWD
ONGC	11	05	17	77	0	0	0	0	0	0	0	66	0	0	0	03
BPCL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OIL	6	6	1	5	0	0	1	1	2	5	1	15	0	0	0	0
EIL	-	2	9	7	-	-	-	1	-	-	-	1	-	-	-	-
CPCL	-	-	-	-	-	1\$	-	1	3	-	7#	6	-	-	-	-
OVL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HPCL	0	0	0	0	*	0	11	1	0	-	-	-	-	-	-	-
IOCL	10	23	32	46	No recruitment, under taken in Group 'B'				1	4	14	53	3	2	5	24
MRPL	2	1	12	4	NIL				10	9	1	9	NIL	1	NIL	
NRL	6	2	1	3	-	-	-	-	(-)6	(-)8	(-)24	2	(-)1	(-)6	-	(-)1
GAIL	9	14	17	13	0	2	17	5	12	5	5	13	1	5	4	0
BLL	0	5	0	3	0	0	0	2	*							
OIDB	NIL															
RGIPT	6*	2**	7*	0	0	0	5***	0	4***	0	3***	0	NA	NA	NA	NA

CPCL: \$ - Also reserved for PwBD

- Out of 7,2 posts are reserved for PwBD

*HPCL has no posts classified under Group 'B' & 'D' as the entry in Non-Management grades have been reclassified in Group 'C'

BPCL: There is no backlog of vacancies in direct Recruitment amongst SC's, STs and OBCs.

BLL: *There has been no recruitment in Group-C & D due to surplus manpower and hence, no backlog vacancies in these groups.

RGIPT: *Teaching cadre plus admin staff cadre

**Only teaching cadre

***Only admin staff cadre



12.3 Special Recruitment Drive for Persons with Disabilities (PWDs)

Hon'ble Supreme Court on 28.4.2015 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 Ministry of Petroleum & Natural Gas and PSUs under the administrative control of this Ministry. As on 31.12.2019 the position for the filling up of vacancies for Persons with Disabilities are as under:

(₹ in Crores)

S.No.	Step –Wise Details	Posts
1	No. of posts in the Ministry and Oil PSUs reported Hon'ble Supreme Court	359
2.	No. of Posts already filled in	303
3.	Remaining posts to be filled up by 31.12.2019	56



Hon'ble President of India, Shri Ram Nath Kovind, meeting the students of "CSRL Super 30 " of GAIL Utkarsh

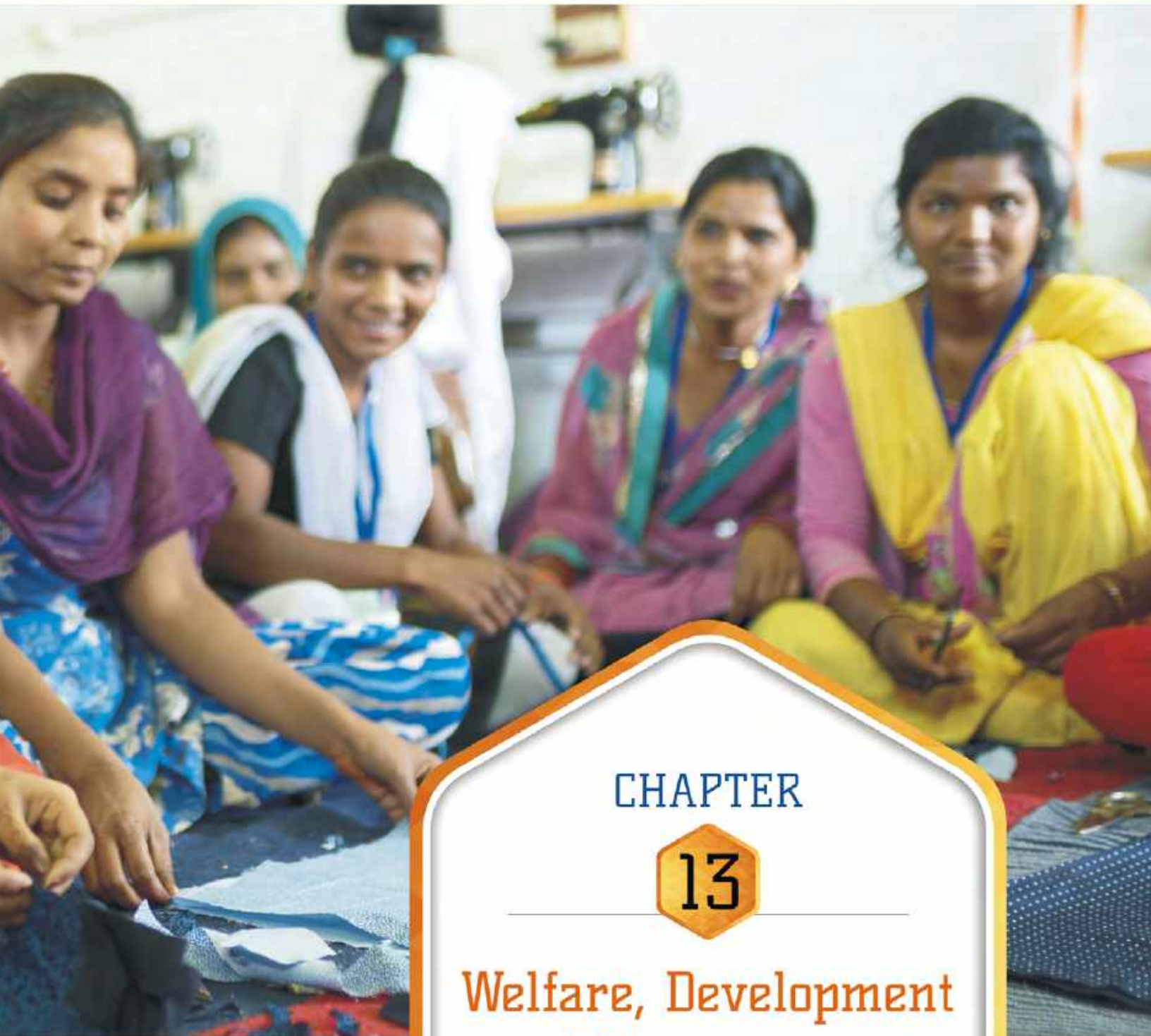




Education to Girl Child







CHAPTER

13

Welfare, Development
and Empowerment
of women



WELFARE, DEVELOPMENT AND EMPOWERMENT OF WOMEN

13.1 Ministry of Petroleum & Natural Gas and Public Sector Undertakings /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 31.12.2019 in the oil PSUs is tabulated as below:

Sl. No.	Name of PSU	Total No. of Employees	Total No. of Women Employees
1.	ONGC	30558	2221
2.	BPCL	11386	1070
3.	OIL	6791	419
4.	EIL	2836	333
5.	CPCL	1618	88
6.	OVL	295	35
7.	HPCL	9788	927
8.	IOCL	33437	2895
9.	MRPL	1939	132
10.	NRL	911	44
11.	BLL	1093	98
12.	GAIL	4693	305
13.	RGIPT	70	5
14.	OIDB	16	3

13.2 In line with the guidelines laid down by Hon'ble Supreme Court in the Case of Vishakha v/s State of Rajasthan and orders issued by Department of Personnel & Training / Ministry of Women & Child Development, an Internal Complaint Committee (Women Cell) is constituted in the Ministry for prevention and redressal of complaints of sexual harassment of working women. Presently Smt. Perin Devi, MoPNG is the chairperson of the committee with four other members, including one member from NGO. The Committee holds its meetings on regular intervals.





Young Executive at site office







CHAPTER
14
Undertakings/
Organisations



Undertaking/Organisations

14.1 MAHARATNA PSUS

14.1.1 Indian Oil Corporation Limited (INDIAN OIL)



Indian Oil's core business has been refining, transportation and marketing of petroleum products. In line with India's growing energy demand, 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 117th among the world's largest corporation in the prestigious Fortune 'Global 500' listing for the year 2019.

Indian Oil has been constantly exploring various overseas opportunities in oil & gas sector with special focus on neighbouring countries. MoUs were signed during the year 2018-19 with partners in neighbouring countries of Bangladesh and Myanmar to explore the possibility of joint cooperation in upstream and downstream hydrocarbons sector. Indian Oil is evaluating multiple opportunities in Bangladesh, Myanmar, Nepal, Saudi Arabia, Azerbaijan and Africa.

With the objective of expanding the level of cooperation and engagement in Nepal in line with Govt's 'Neighbourhood First Policy', Indian Oil opened its Representative Office in Nepal in July 2019.

a) Financial Performance:

Indian Oil's turnover (Revenue from Operation) ₹ 6,05,924 crore for the year 2018-19 as against ₹ 5,06,428 crore during 2017-18. During the year 2018-19, Indian Oil registered a profit (after tax) of ₹ 16,894 crore as against ₹ 21,346 crore in

2017-18. GRM stood at US\$ 5.41/bbl in 2018-19 as against US\$ 8.49/bbl in 2017-18.

b) Physical Performance:

Indian Oil refineries achieved the highest ever crude oil throughput of 71.82 MMT during the year 2018-19 with capacity utilization of 103.8 %, as against a throughput of 69.0 MMT with a capacity utilization of 99.7% during the year 2017-18. Indian Oil refineries also achieved excellent energy parameters of Specific Energy Consumption, Energy Intensity Index and Fuel & Loss at 71.3%, 97.9% and 8.57% in 2018-19 as against 72.6%, 98.5% and 8.75% respectively registered for the year 2017-18.

Indian Oil refineries are well poised to rollout BS-VI fuels w.e.f. 01.04.2020 in the entire country.

The refineries of Indian Oil at Mathura and Panipat have already commenced BS-VI grade auto fuel supplies well in time to meet the 1st April 2018 timeline for National Capital Territory and timelines of 1st April 2019 for supply in 14 districts of National Capital Region (NCR) and 1st Oct'19 in the remaining 7 districts of NCR.

In order to achieve more flexibility in the refining operations, 9 new crude oil grades were included in Indian Oil's crude oil basket during the year 2018-19, taking their number to 180.

During 2019-20, Indian Oil has entered into term contract with various National Oil Companies to import US crude oil grades. Indian Oil has imported 1.93 MMT of US crude oil with value of approximately 980 Million USD for the delivery period of Apr'19 to Nov'19.

Indian Oil has an extensive network of pipelines across the length and breadth of the country for supply of crude oil and



products. As on 31.03.2019, the total length of the pipelines was 14,231 km with capacity of 94.16 MMT of crude / product pipelines and 21.69 MMSCMD of gas pipelines.

Indian Oil's first trans-national pipeline viz. the 69 km long Motihari-Amlekhgunj Pipeline (of which 36 km is in Nepal) for transportation of petroleum products from Motihari in Bihar (India) to Amlekhgunj TOP in Nepal was completed eight months ahead of the stipulated schedule. The Pipeline was formally inaugurated jointly by Hon'ble Prime Ministers of India and Nepal on 10.9.2019 and is operational.

Indian Oil pipelines achieved the highest ever throughput for the fifth consecutive year, registering a throughput of 88.53 MMT during the year 2018-19 as against 85.68 MMT in 2017-18, registering a growth of 3.3%. The gas pipelines also achieved the highest ever throughput of 1,834 MMSCM during the year 2018-19, as against a throughput of 1,683 MMSCM in 2017-18.

Indian Oil continued to match the pace of growth in the country and maintained the

top place in terms of market share and achieved the highest sales of 79.96 MMT of petroleum products during the year 2018-19, as against 77.13 MMT during the year 2017-18.

During the year 2018-19, Indian Oil recorded the highest Petrochemicals sales of 2.64 MMT (domestic and exports) as against a sale of 2.37 MMT in 2017-18, recording a growth of 11.4%. Indian Oil's offerings include Polymers, Linear Alkyl Benzene, Purified Terephthalic Acid, Glycols and Butadiene. Indian Oil's PROPEL brand is a leading brand in the Indian petrochemicals market. During the year 2018-19, Indian Oil received approvals for its various polymer grades from about 20 major Indian and international OEMs. With focus on developing import substitution grades, three new polymer grades were rolled out during 2018-19 and 50 developmental projects were taken up with customers and OEMs.

Indian Oil is making significant investments across the Natural Gas value chain to build infrastructure and to enhance availability of green fuel in the country. During the year 2018-19, Re-gasified Liquefied Natural Gas



Hon'ble Union Minister of P&NG and Steel, Shri Dharmendra Pradhan inaugurating India Oil & Gas Industry Pavilion at ADIPEC 2019 at Abu Dhabi



(R-LNG) sale of Indian Oil was 1.86 MMT. In addition, 2.10 MMT of R-LNG was internally consumed in three refineries, viz. Panipat, Mathura and Gujarat. As on 31st December 2019, Indian Oil has in its portfolio 58 R-LNG customers

Indian Oil has been a pioneer in India through its 'LNG at Doorstep' service. During the year 2018-19, Indian Oil sold 36.12 TMT of LNG through trucks, registering a growth of 30.5% over the previous year. During the year 2018-19, Indian Oil imported 20 cargoes (1.32 MMT) of LNG, against 17 cargoes (1.13 MMT) in 2017-18. Indian Oil is expanding its LNG sourcing infrastructure for catering to the growing demand in the country and has commissioned a 5-MMTPA LNG Import Terminal at Ennore near Chennai through a joint venture, which is a first of its kind on the East coast of India.

Indian Oil is operating / implementing City Gas Distribution (CGD) Networks in 11 Geographical Areas (GAs) through its two Joint Venture Companies, Green Gas Ltd. (GGL) in Lucknow & Agra GAs and Indian Oil-Adani Gas Pvt. Ltd. (IOAGPL) in Allahabad, Chandigarh, Panipat, Daman, Ernakulam, Udham Singh Nagar, Dharwad, South Goa & Bulandshahar GAs. Indian Oil also participated in the 9th & 10th rounds of CGD Bidding invited by the Petroleum & Natural Gas Regulatory Board (PNGRB) and received authorisation for developing CGD Networks in 17 GAs on its own and in 12 GAs through its JV Companies, GGL & IOAGPL.

c) Marketing & Associated Infrastructure:

During the year 2018-19, Indian Oil commissioned 648 retail outlets (fuel stations, including 335 Kisan Seva Kendra outlets in rural areas) taking their total number to 27,702. Apart from the largest network of retail outlets, 125 Terminal/ Depots, 91 LPG Bottling Plants, 6960 consumers pump, 11,964 LPG Distributors, 3889 SKO/LDO dealers and 116 AFS are some of the vital components of the logistic network. The total network comprising

50,847 touch points as on 31st March 2019 was strengthened from 48,172 touch points last year.

All the retail outlets of Indian Oil have been automated as on 31st March, 2019. During the year 2018-19, 5,033 retail outlets were solarised, which is the highest number of retail outlets solarised in a year. Cumulatively, 14,173 retail outlets have been solarised with an installed capacity of about 77 MW as on 31st March 2019. A new initiative, fuel @ doorstep was launched during 2018-19 to ensure door-to-door delivery of products to specific categories of institutional customers.

Indian Oil continued to meet the fuel requirement of defence and railways during the year 2018-19. In order to ensure uninterrupted availability of petroleum products in Leh & Ladakh during winter season, when the region gets isolated from rest of the country, Indian Oil successfully completed Advance Winter Stocking exercise much before the closure of roads. Indian Oil also maintained uninterrupted supply line of petroleum products, including ATF and LPG, in the state of Kerala during flood.

During the year 2018-19, Indian Oil released the highest new domestic LPG connections to more than 2 crore customers, out of which 1.68 crore connections were released under Pradhan Mantri Ujjwala Yojana (PMUY), the flagship scheme of the Government of India, to the women of poor households.

During Apr-Dec 2019, Indian Oil released new domestic LPG connections to 67.5 lakh customers, out of which, 41.1 lakh connections were released under PMUY. The target of 8 crore LPG connections under PMUY was achieved well ahead of target date with the handing over of 8 crore PMUY connection by Hon'ble Prime Minister on 7th September 2019.





Hon'ble Prime Minister Dedicates to the Nation

Balasure-Haldia-Durgapur section of Indian Oil's Paradip-Haldia-Durgapur LPG Pipeline

During 2018-19, SERVO, the leading lubricant brand of Indian Oil, registered a growth of 4% in overall finished lubricants and 8.7% in retail lubricants to achieve the top position in retail lube market. During the year 2018-19, 123 SERVO grade approvals were obtained from Original Equipment Manufacturers (OEMs).

Indian Oil's flagship lubricant brand SERVO maintained its market leadership position during the period Apr-Dec 2019 in finished lubricants. 27 new lube grades were introduced during Apr-Dec'2019 and 23 product approvals were obtained from OEMs. In the overseas markets, SERVO now has a global presence in 31 international markets. Indian Oil has commissioned DEF (Diesel Exhaust fluid) manufacturing facility at Manesar Plant in Nov 2019. Indian Oil has also commercialized BS VI compliant Servo lubricants as well as IMO 2020 compliant Servo Marine Oil for shipping Industry.

The Aviation Service of Indian Oil continued to maintain its leadership position with a

market share of 60% during the year 2018-19. With the commissioning of nine new Aviation Fuel Stations (AFS) in 2018-19, Indian Oil as on 31st March 2019 has 116 AFS in the country.

d) Alternative Energy:

As on 31st March 2019, Indian Oil has an installed capacity of 216 MW of renewable energy, including 167.6 MW of wind and 48.6 MW of solar (comprising 20.5 MW grid-connected solar PV and 28.1 MW off-grid solar). During the year 2018-19, 14.2 MW of solar PV capacity was added.

Indian Oil has commissioned three waste-to-energy plants of 5 tonnes per day capacity each under Swachh Bharat Abhiyan. The total power generated during the year 2018-19 from these waste-to-energy plants was about 40,250 units (kWh).

During April 2019 to Nov 2019, 10 crore litres of biodiesel (B-100) was blended in diesel out of which 3.98 crore litres was



Hon'ble Union Minister of P&NG and Steel, Shri Dharmendra Pradhan inaugurated Indian Oil's 5MTPD Bio-methanation plant in September 2019

blended by Indian Oil.

e) Sustainable Development:

In view of the recent developments on climate change and sustainable development goals, there is an increased thrust on sustainable development. Indian Oil has taken cognizance of the fact and has been pursuing carbon management through energy conservation, energy efficiency, renewable energy & carbon sequestration; water management through reducing consumption, recycling & rain-water harvesting; and waste management through reduce, reuse & recycle initiatives.

Indian Oil is replacing conventional lighting with LED lights across all its installations. Cumulatively, 4.5 lakh conventional light fittings have been replaced with LED as on 31st March 2019. During the year 2018-19, 2.1 lakh saplings were planted at various locations of the Corporation. Waste paper recycling is another major initiative of the Corporation and during the year 2018-19, 137 tonnes of waste paper was recycled through designated recyclers. As on 31st

March 2019, Indian Oil has installed 608 rainwater harvesting systems to harvest 3 billion liters of rainwater annually.

f) Exploration & Production:

Indian Oil is actively engaged in upstream Exploration & Production (E&P) activities through Participating Interest (PI), joint ventures and wholly-owned subsidiaries. As on 31st March 2019, the upstream portfolio of Indian Oil consists of 10 domestic blocks including 4 discovered small fields (DSF) & 2 coal bed methane blocks, and 12 overseas blocks, with Participating Interest (PI) ranging from 3% to 100%. The overseas E&P portfolio of Indian Oil is spread over 10 countries, viz., Canada, Gabon, Israel, Libya, Nigeria, Oman, Russia, UAE, USA & Venezuela.

During the year 2018-19, Indian Oil's share of production from upstream assets increased by 65% compared to 2017-18, registering an increase in volume from 2.66 MMT to 4.39 MMT. The Corporation's 2P reserves increased by 45% during 2018-19 over 2017-18 (from 743 MMboe to 1,079 MMboe).



g) Corporate Social Responsibility (CSR):

Indian Oil has been actively engaged in various CSR activities over the years, which cover the entire gamut of social welfare/upliftment activities across the nation. The thrust areas under CSR inter-alia include health care and sanitation, education and employment-enhancing vocational skills, empowerment of women and socially/economically backward groups, etc. During the year 2018-19, Indian Oil spent the entire budget of ₹ 490.60 crore on various CSR activities.

h) Contribution to Exchequer:

Indian Oil has consistently been the largest contributor to the Government exchequer in the form of duties, taxes and dividend. During the year 2018-19, ₹ 1,93,422 crore was paid to the exchequer as against ₹ 1,90,670 crore paid in 2017-18. An amount of ₹ 1,01,395 crore was paid to the Central Exchequer and ₹ 92,027 crore to the State Exchequer in 2018-19 as against ₹ 1,03,362 crore and ₹ 87,308 crore paid in 2017-18 respectively.

i) Some of the Major Awards & Recognitions during 2018-19 and 2019-20:

- ▶ Indian Oil emerged as one of the 'best companies to work for' in India for 2019 in a study conducted by Great Place to Work Institute in association with The Economic Times.
- ▶ Indian Oil was felicitated as the Best Performer in Maharatna category for promotion of SC/ST entrepreneurs by the Ministry of Micro, Small and Medium Enterprises, Govt. of India.
- ▶ Indian Oil was conferred the Global HR Excellence Award-2019 at the World HRD Congress held at Mumbai
- ▶ Indian Oil earned the prestigious 'Vigilance Excellence Award' of the Central Vigilance Commission for its outstanding vigilance awareness initiatives.
- ▶ Indian Oil won the prestigious ISTD (Indian Society for Training & Development) National Award for innovative training practices.
- ▶ Indian Oil bagged Petrotech-2019 Special Technical Award for "Greening of the Oil and Gas Business and Sustainability" jointly with Engineers India Limited for BS-VI DHDT project at Halidia Refinery, employing R&D developed IndeDiesel® technology.
- ▶ Indian Oil was awarded 'Dainik Jagran CSR Award-2019' under Poverty Eradication category amongst PSUs for the vegetable cellar project at Leh, Jammu & Kashmir. Indian Chamber of Commerce (ICC) also declared Indian Oil the winner in PSE Excellence Awards among Maharatna PSUs for its innovative vegetable cellar project undertaken for farmers in Leh.
- ▶ Indian Oil bagged the 'Company of the Year' Award in petrochemicals at the 10th edition of IndiaChem-2018 at Mumbai. The prestigious award has been instituted jointly by the Department of Chemicals & Petrochemicals, Govt. of India, and FICCI.
- ▶ Indian Oil was bestowed the Global HR Skill Development Award-2019 in Talent Management category by the Energy and Environment Foundation.
- ▶ Indian Oil R&D Centre bagged the prestigious "R&D Company of the Year" Award in Downstream India Excellence Awards-2019.
- ▶ Indian Oil has received "Sustainably Growing Corporate of the Year" & Mathura Refinery bagged "Refinery of the Year" award at FIPI Oil & Gas Awards 2019.
- ▶ Indian Oil was conferred Sustainability 4.0 Award 2019 jointly by Frost &





Sullivan and TERI in recognition of its comprehensive sustainability initiatives as a Leader in the Mega Large Business Process Sector.

- ▶ Union Minister of Railways and Commerce & Industry and Minister of State for Commerce & Industry, felicitate Indian Oil with Super Buyer Award-2019 for excellence in Government e-Market Place (GeM) procurement.
- ▶ Indian Oil won the National CSR Award (instituted by the Ministry of Corporate Affairs, GoI), under Women and Child Development category for its Assam Oil School of Nursing project at Digboi.
- ▶ Indian Oil was awarded 1st amongst PSUs in "3rd Innovative Practices Awards, 2019 for Sustainable Development Goals (SDGs)" category by UN Global Compact Network India (UNGONI).

14.1.2 Oil and Natural Gas Corporation Limited (ONGC)



Oil and Natural Gas Corporation Ltd. (ONGC) was incorporated on 23rd June, 1993 under the Companies Act, 1956 to transform the statutory Commission into a Public Limited Company. Government of India shareholding is 62.78% as on 31.12.2019.

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

(i) Major highlights for the year 2019-20 upto December, 2019

a) Exploration

- ▶ ONGC acquired 116.7 LKM of 2D, 2372.2 SKM of 3D seismic data and drilled 60 exploratory wells till 01.01.2020.
- ▶ During the year 2019-20, as on 31.12.2019, a total of 10 hydrocarbon discoveries have been made by ONGC in its nominated acreages. Out of these, 6 are in onshore and 4 in offshore acreages. Two on-land discoveries in Nomination have been monetized by ONGC viz. Billakuru-1 and Vanjijur-3). Besides, other discoveries of previous years i.e., R-10-1 and R-7-1 have also been monetized.
- ▶ During 2019-20, Madanam field has been monetized through extended production testing. FDP (Field Development Plan) of Pandanallur Field under NELP Block, CY-ONN-2004/2 is also under implementation and the field has been monetized through extended production testing. Other monetized discoveries in PSC regime includes Uber-2, Aliabet-2, 3, 4, Nadiad-4.
- ▶ ONGC has achieved surface coverage of 38528.98 LKM (91.3 %) of 2D Seismic survey and completed the processing of 33424.2 LKM (78.8 %) of 2D seismic data under NSP. Interpretation of processed data of Mahanadi, Rajasthan, Ganga, Deccan Synclise North & South, Bhima, Kaladagi, KG & Chhattisgarh completed.
- ▶ With the culmination of fourth round of Open Acreage Licensing Policy (OALP) bidding, ONGC was awarded 17 blocks (OALP-I to IV) as an operator in onshore and offshore areas falling in 3 tier category Indian sedimentary basins adding exploration acreage of 33573.23 SKM.





Hon'ble Union Minister of P&NG and Steel, Shri Dharmendra Pradhan participating in a tree plantation drive at ONGC Hazira Plant

b) Production and Development

- Up to Q-III, FY 2019-20, ONGC's standalone crude oil and natural gas production respectively is 15.387 MMT and 17.918 BCM. This is 96.72% and 97.29% respectively of the crude oil and natural gas production during the same period of FY 2018-19. 07 projects (05 Development & 02 Infrastructure) have been completed in 2019-20 upto December, 2019. The list of completed projects are given as under:

Sl. No	Project Name
1	NW B-173A : Development Plan
2	Field Development Plan of NELP Block KG-ONN-2003/1- - Nagyalanka -KG, ONLAND
3	NBP-Ph-IV: Development Plan
4	Development of BSE-11 Block
5	Construction of 1 ETP and 3 ETP cum WIP, Assam
6	Assam Redevelopment project
7	Daman Development Project

- Ramp up Oil production from Ratna & R series:** Production of Ratna & R-series has been ramped up from 300 bbl/day in Aug' 2019 to 5,400 bbl/day in Dec'19 mainly from 05 newly drilled development wells R-10A#1 and R-10A#3 put on production in Sept'2019 and wells R-10A#4 and R-7A#1 put on production in Nov'2019.
- Crude Oil Sales Agreement with IOCL for North East:** ONGC and IOCL signed maiden Crude Oil Sales Agreement (COSA) for North East (NE) on 01.10.2019 at New Delhi.
- Gas production commenced from ONGC operated NELP blocks Uber and Aliabet on 15.08.2019 and 16.08.2019 respectively.
- The baton of Panna-Mukta operations was handed back to ONGC by the current operator BGEPIL (British Gas Exploration & Production India Ltd). This is a first of its kind event in the history of India's oil & gas industry that a producing asset is



transferred from one operator to another. The twin fields are currently producing about 10,000 barrels of oil and 4 MMSCM of gas per day.

- ▶ Uran plant has achieved a technological milestone to produce 1200 MT/day C2-C3 against 1000 MT/day by developing and implementing an innovative idea to attain the process chilling in Ethane Propane Recovery Unit (EPRU) during non-availability of the Propane compressor.
- ▶ **Oil flows from Nagayalanka field Development Scheme:** After commencing production from Nagayalanka by re-entering the existing well NAG-1ZST on 17.05.2018, production started from first new development well, NAG-SEV-1 of the field development scheme on 12.04.2019 post hydro-frac job.
- ▶ ONGC successfully commissioned Hazira Dahej Naphtha Pipeline at OPaL in Dahej on 5 December 2019. The pipeline is the arterial feed line of OPaL and would save Rs 200-250 crore annually, which was otherwise being borne towards logistic charges for transportation of Naphtha through sea route.
- ▶ During the period April'19 to Dec'19, a total of 338 wells have been drilled, which includes 60 exploratory, 252 development and 26 sidetrack wells.

c) Technical

- ▶ Completed drilling of the NELP block KG-DWN-98/2 development campaign and drilled 10 wells during 2019-20.
- ▶ For the first time in ONGC, 2 objects of the well B-189#A of Western offshore were tested independently with a single run of DST string with Wireless technology, through Dual Zone Single Test String.

- ▶ Another area taken up by ONGC for technological advancement is SATCOM Up-gradation. This Project is intended to overhaul the obsolete SATCOM infrastructure to bring state-of-the-art technology to provide higher spectral efficiency.
- ▶ Mobile based e-mail access has been extended through IBM Verse with enhanced features.
- ▶ To enhance Information Security (IS) awareness, following major activities have been carried out during the year:
 - Publishing of Information Security quarterly e-Newsletter through ONGC portal.
 - Conducted periodic Information Security awareness sessions across all work centers.

(ii) Major Initiatives during the year 2019-20 (upto December, 2019)

- ▶ ONGC carried out safe & efficient rig evacuation & re-manning due to cyclone PHETHAI in East Coast minimizing force majeure time by optimizing resources. Also salvaged the rig "Olinda Star" in record time from Cyclone PHETHAI with combined team efforts of ONGC, Rig Contractor, SMIT Salvage team, Coast Guard & Indian Navy.
- ▶ 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 2019-20 up to December, 2019, ONGC has registered 08 Patents and obtained 03 patents.
- ▶ ONGC 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.

- ▶ **Fractured Basement:** Concerted efforts for Basement exploration- a frontier exploration play, has been taken up by ONGC as a major initiative.

During 2019-20, 3 exploratory wells for exploration of hydrocarbons in basement were drilled and further exploratory efforts are in progress. Presently 3 wells viz. Kuargaon-13 in Assam Shelf, SMH-2 in Mumbai offshore and Nannilam-23 in Cauvery basin are under drilling for Basement play.

a) Drilling Initiatives:

- New generation ecofriendly Mixed Metal Complex (MMH-MMO) based drilling fluid has been successfully introduced for the first time for drilling loss-prone Bassein formation of two wells (BB_SS#1/ & BF_SS#3) in Bassein & Satellite field of Mumbai offshore.
- For the first time in Cambay Asset, eco-friendly, Micro-bubble Drilling Fluid System (developed by IDT) has been used as a pilot project at an inclined development Well-.
- POC, Proof of Concept, predictive software from M/s e-drilling, for stuck pipe & cutting bed (ECD monitoring) analysis at B173A_A#6XH well.
- First time in Deepwater, QCBS methodology was adopted in hiring DP 3000m WD rig.
- For the first time, Chain- Saw advance technology drilling bit is being introduced for drilling of highly abrasive inter bedded formation in Rajahmundry Asset.

b) Well Services initiatives:

- **Fracturing through Monobore Completions:** Executed first ever Hydro-fracturing job through 5 ½" mono-bore completions in GMJ#220 by WSS Ahmedabad.
- **Successfully tested HP-HT well YS-6-2** of Eastern offshore Object I with Baradril NX wt. of 14.6 ppg (Micronized Baryte in Calcium Bromide Base) as Annulus fluid. Maximum temperature recorded during the testing of this object was ~4300F at 4982m.



Hon'ble Union Minister of P&NG and Steel, Shri Dharmendra Pradhan inspecting heavy oil samples at ONGC Mehsana Asset



- Implementation of micro-seismic mapping of frac job in GMJ#222 to carry out micro-seismic monitoring of 12 frac-jobs in the Western Onshore region.

c) Technical Services initiatives:

- Pilot project on Real-Time Operational Visibility & Predictive Analytics in E1400M1 Rig Ahmedabad is being implemented on proof of concept (POC) basis. The system will provide creation of history, data trending, condition based notifications and basic framework for advanced analytics.
- To streamline maintenance activities and improve maintenance compliance, CMMS (Computerized Maintenance Management System) was implemented in all Onshore/Offshore Assets as well in all the plants of ONGC.

Energy management / conservation initiatives:

▶ **Solar Energy:**

- Many of the ONGC's Office and Residential complexes have Rooftop and ground mounted solar power plants. Un-manned platforms in offshore areas also use solar energy for lightning purposes. The total installed capacity of solar power generation of ONGC is 27.00 MW as on 01.01.2020.
- Around 54000 LED lights have been installed as on date across various work centers of ONGC in the year 2019-20.

- ▶ **Dynamic Gas Blending:** After successful implementation of Dynamic Gas Blending (DGB) in Ankleshwar at three Rigs, implementation is underway at drilling rig Armcue-1 at Assam Asset..

- ▶ **Rain Water Harvesting (RWH) projects:** RWH projects/systems are implemented /being implemented at different work centres of ONGC under the umbrella of

Sustainable Water Management. The harvested water is being used for beneficial use like gardening, toilet flushing, etc. and also for recharging of ground water aquifers.

- ▶ **Clean Development Mechanism (CDM) Projects:** ONGC has 15 registered CDM projects with United Nations Framework Convention on Climate Change (UNFCCC) that yield (potential) Certified Emissions Reductions (CER) approx. 1.98 million yearly.

- ▶ **Paperless Office project:** In line with the 'Digital India Campaign' of Government of India all offices of ONGC will be functioning in paperless mode through Digitization, Integration and Standardization by Harnessing Automation (DISHA) which will ensure instant transfer of files across different users and work centres of ONGC.

iii) Major Awards & Recognitions:

- ▶ IPSHEM, Goa has been declared winner of Golden Bird Best Training Award 2019 (Diamond Award) on 2 June 2019, for its outstanding contribution towards excellence in best training practices by conducting quality HSE trainings.

- ▶ ONGC has jumped 37 notches to secure the 160th position at the 2019 Fortune Global 500 list.

- ▶ **Three ONGCians conferred with Arjuna Awards:**

- ▶ Arjuna Awards were conferred to three ONGCians – Harmeet Desai, B Sai Praneeth and Swapna Barman.

- ▶ ONGC bagged four major honors in the Dun & Bradstreet (DNB) PSU Awards 2019 two for exploration and one each in CSR and Swachh Bharat.





Hon'ble Union Minister of P&NG and Steel, Shri Dharmendra Pradhan, giving the "Project Management Company of the Year" 2019 to GAIL CMD & Director (Projects), Dr. Ashutosh Karnatak accompanied by Director (Marketing) Shri Gajendra Singh, Director (Business Development) Shri Manoj Jain, Director (Finance) Shri A. K. Tivari and Executive Director (Projects) Shri M V Iyer

- ▶ IEOT,ONGC was conferred with Infrastructure Nominee award-2018 in the category of OIL & Mining category at the Going Digital Event at Mumbai on 21.08.2019.
- ▶ ONGCian Ankita Raina bags Singles and Doubles Title in Women's Tennis Association (WTA) International Ranking Tournament conducted at Solapur, India from 2-8 December, 2019.

14.1.3 GAIL (India) Limited



GAIL (India) Ltd. was incorporated in August, 1984 as a Central Public Sector Undertaking (PSU) under the Ministry of Petroleum & Natural Gas (MoP&NG), with the mission of "accelerating and optimizing the effective and economic use of Natural Gas and its fractions for the benefit of the national economy". Government of India now holds 51.76% shares of the company. GAIL became a Navratna in 1997 and

Maharatna since February 2013, the highest status conferred to any PSU.

GAIL started as a Gas Transmission Company during the late eighties and has grown organically by setting up a large network of Natural Gas pipelines of approx. 12,200 Km; two LPG Pipeline systems of approx. 2000 Km; five Gas Processing plants for production of LPG and other liquid hydrocarbons with a combined production capacity of around 1.4 MMTPA and a gas based integrated petrochemical plant of capacity 810 KTPA of polymer. GAIL is 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. Petronet LNG, a JV of GAIL, operates two LNG regasification terminals at Dahej & Kochi. GAIL is also the promoter of Konkan LNG Private Limited which operates LNG regasification terminal at Dhabol for import of LNG. GAIL has renewable portfolio of 129 MW including 118 MW of wind and 11 MW of solar energy. GAIL has installed



India's 2nd largest solar roof top of 6 MW grid connected captive solar power plant at Pata Petrochemical complex. GAIL is a pioneer in city gas distribution (CGD) business in India. It has presence in 62 Geographical Areas across India with 10 JVs and one wholly owned subsidiary.

GAIL has overseas presence in five countries with offices in Houston, Singapore and Yangon. It has a wholly owned subsidiary, GAIL Global (USA) Inc. (GGUI) in USA. GGUI has formed subsidiary, GAIL Global (USA) LNG LLC (GGULL) which has booked 2.3 MMTPA capacity in Dominion Cove Point LNG liquefaction project. GAIL has another wholly-owned subsidiary company viz. GAIL Global (Singapore) Pte. Ltd., for trading LNG, and for undertaking overseas investments.

GAIL has integrated into upstream business of Exploration & Production with participating interests in 9 blocks in India and 2 in Myanmar. Besides, GAIL has 4.17% equity partnership in South East Asia Gas Pipeline Company (SEAGP) which is transporting gas from Myanmar to China. GAIL has made investments in three companies in downstream business at Egypt and China.

GAIL has executed a long-term LNG Sale and Purchase Agreement with Sabine Pass Liquefaction LLC for purchase of 3.5 Million Tons per Annum (MMTPA) and Gazprom Marketing and Trading Singapore for supply of 2.5 MMTPA of LNG. GAIL has also committed to source 38 MMSCMD of natural gas through transnational pipeline from TAPI pipeline.

a) Physical and Financial performance

Table-14.2 : Physical Performance of GAIL

Parameters	Units	Performance in 2018-19	Performance in 2019-20 (Up to Sept 2019)	Projected Performance in 2019-20 (As per RE)
Gas Transportation	MMSCMD	107.43	107	108
Gas Marketing	MMSCMD	96.93	96	98
Liquid Hydrocarbon Production	TMT	1320	627	1289
Petrochemical Production	TMT	751	363	810
LPG Transportation	TMT	3975	1826	3861

Table-14.3 : Financial Performance of GAIL

Parameters	Units	Performance in 2018-19	Performance in 2019-20 (Up to Sept 2019)	Projected Performance in 2019-20 (As per RE)
Turnover	₹ Crore	74808	36286	73713
Gross Margin (EBDITA)	₹ Crore	10773	4412	9337
Profit Before Tax	₹ Crore	9085	3516	7542
Profit After Tax	₹ Crore	6026	2352	5009



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 approx. 2600 kilometres 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. ₹ 14,900 crore. Govt accorded ₹ 5176 Crore 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 U.P., 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, U.P.) and the other at Dhamra RLNG 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 en route of pipeline at Varanasi, Patna, Ranchi, Jamshedpur, Cuttack and Bhubaneswar are 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). Phulpur-Dobhi section (Phase-I) has been commissioned. Execution of phase-II & III are underway and the entire project is schedule to be completed by Dec 2020.



GAIL Engineers at work at Plant



**ii) Kochi – Kootanad - Bengaluru/
Mangalore Pipeline (Phase-II)**

Construction of Kochi – Kootanad-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 in 2020 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 has entered into coal gasification by setting up surface coal gasification based urea project at Talcher. The project, with an estimated cost of ₹ 13,300 crore (Approx.) is envisaged for the production of 2200 MTPD ammonia and 3300 MTPD urea. A joint venture company Talcher Fertilizers Limited has been formed with consortium partners namely GAIL, Coal India Limited (CIL), Rashtriya Chemicals and Fertilizers (RCF) and Fertilizer Corporation of India Limited (FCIL).

c) Achievements

GAIL is executing around 2,600 Km long Jagdishpur-Haldia-Bokaro-Dhamra pipeline (JHBDPL) as a part of the 'Urja Ganga' Project. GAIL is also constructing approx. 720 Km long NG pipeline from Barauni to Guwahati as an integrated extension to the JHBDPL Project. The proposed pipeline up to Guwahati would inter-connect with the upcoming approx. 1600 Km 'Indradhanush' pipeline network conceived to operate in North-East by newly formed JV Indradhanush Gas Grid Limited (IGGL). GAIL also received authorization to lay the Srikakulam (Andhra Pradesh) - Angul (Odisha) pipeline.

GAIL also supports CGD infrastructure along "Pradhan Mantri Urja Ganga Pipeline Project". In line with Government of India's initiatives such as Sustainable Alternative towards Affordable Transportation (SATAT), GAIL is promoting compressed biogas as an alternative fuel.

GAIL has also executed agreements for LNG supply to the upcoming/revived Fertilizer units in the domestic market. GAIL has already executed gas sales agreement with upcoming fertilizer plants along JHBDPL i.e. Gorakhpur (Uttar Pradesh), Sindri (Jharkhand), Barauni (Bihar) and Matix (WB). Efforts are also on to market RLNG to other anchor customers like refineries and steel plants along upcoming and existing pipelines.

To expand its petrochemical portfolio, GAIL is in the process of setting up a 500 KTA propane dehydrogenation and polypropylene (PDHPP) plant at Usar and one 60 KTA PP plant at Pata. GAIL also entered into JV with CIL, RFCL, FCIL to form Talcher fertilizer Limited (TFL) to produce surface coal gasification based urea, taking a step forward to reduce import dependence of fertilizers. GAIL is also an equity partner in Ramagundam Fertilizers and Chemicals Limited.

GAIL has managed to deliver excellent performance over the years. During the last financial year, GAIL registered highest ever Turnover & Profit of ₹ 74,808 crore & ₹ 6,026 crore respectively, with an Excellent MoU Rating for FY 17-18.

d) Major Accolades / Awards received during 2019-20

- GAIL was conferred the prestigious Dun & Bradstreet Award in the category Gas - Processing, Transmission & Marketing.
- GAIL also won FIPI Award for Project Management – Company of the Year.
- Pata Petrochemical Complex bagged 1st position in 16th National Awards for Excellence in Cost Management.





Bharat Petroleum's Corporate R&D Centre received the Best Innovation in R&D Award by CHT

14.1.4 Bharat Petroleum Corporation Limited (BPCL)



a) Activities and Performance 2019-20

Bharat Petroleum Corporation Limited, 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 30.11.2019 is ₹ 2635 crores and ₹ 2,169.25 crores respectively.

BPCL has Refineries at Mumbai and Kochi with a combined refining capacity of 27.50 MMTPA as on 30th November 2019. The Mumbai and Kochi Refinery are certified for ISO 9001, ISO 14001 and OHSAS 18001, had throughput of 9.67 MMT and 10.96 MMT respectively during 2019-20 (up to November 2019).

BPCL with 11,451 employees has an all-India

presence through its extensive marketing networks on 30th Nov 2019. The Market Sales of BPCL is 28.52 MMT with market share of 24.50% with PSU (Apr.-Nov. 2019).

b) Marketing Profile

BPCL has a robust distribution network comprising of 40POL depots, 15 major installations, 23 TOPs, 52 LPG bottling plants, 58 Aviation Service Stations, 15421 Retail Outlets, 6042 LPG Distributorships, 1001 SKO Agencies, 3 lubricant blending/filling plants & 1 Lube filling Plant and 2241 KM BPCL group product pipelines as on 30.11.2019.

c) Financial Performance

The financial performance (RE) of the Corporation during April – September 2019: Gross Sales Turnover ₹ 1,60,317.92 crores and Profit After Tax (PAT) ₹ 2,783.57 crores.

d) Exploration and Production

BPCL and its group companies have Participating Interests (PI) in 27 blocks in eight countries along with equity stake in



two Russian entities, holding the license to 4 producing assets in Russia. Out of the twenty-seven blocks, fifteen are located in India and twelve overseas. Seven of the fifteen blocks in India were acquired under different rounds of New Exploration Licensing Policy (NELP), five blocks were awarded under the recently concluded Discovered Small Fields ('DSF') Bid Round – I and three blocks under the Open Acreage Licensing Policy Bid Round I. Out of overseas blocks, five are in Brazil, two are in UAE and one each in Mozambique, Indonesia, Australia, Timor Leste and Israel. BPRL and its consortia have a total of 26 discoveries in respect of Blocks held in five countries i.e. Brazil, Mozambique, Indonesia, Australia and India. During the year 2018-19, a consortium of BPRL and IOCL was awarded the Onshore Block 1 concession in Abu Dhabi after emerging as the winning bidder in the Abu Dhabi 2018 Block Licensing Round. The award marks entry of BPRL as an Operator of overseas assets for the first time in the prospective UAE region and is consistent with its stated strategic objective of balancing its portfolio by adding exploration assets in prolific basins to its existing E&P portfolio.

BPRL has invested approx. ₹ 23500 crores for its projects (till November 2019).

e) Completed / Ongoing Projects

Refinery Projects

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 crores and completed in June 2019.

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 crores and completed in August 2019.

BS VI Motor Spirit Block Project (MSBP) at Kochi Refinery for 100% BS VI MS production

The objective of MS Block project is to maximize BS VI MS and to minimize Naphtha production. The approved cost of the project is ₹ 3288.96 crores. The approved cost of the project is ₹ 3288.96 crores and is currently on going.

Setting up of facilities for production of Polyol, Propylene Glycol, and Mono Ethylene Glycol at Kochi Refinery

The project envisages production of value added petrochemical such as Polyols/ Propylene Glycol/ Mono Ethylene Glycol from Polymer grade Propylene and enhance petrochemical portfolio.

The firm up cost and schedule from Board will be obtained after design and engineering. The project is currently on going.

2G Ethanol Bio Refinery at Bargarh, Odisha

The project envisages setting up 2nd Generation Bio Ethanol Refinery to produce 100 KLPD Ethanol. Ethanol produced will be used for blending in Motor Spirit (MS). The approved cost of the project is ₹ 1607 crores and is currently on going.

f) Marketing Projects

LPG Import Facility at Haldia

The project envisages construction of 2X 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 Crores and is currently on going.



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 fire fighting facilities. The approved cost of the project is ₹ 282.64 crores and is currently on going.

Product pipeline from Irugur to Devanagonthi (Bangalore)

The project envisages laying of 294 Km long product pipeline line from Irugur (Coimbatore) to Devanagonthi (Bengaluru) for economic and safe evacuation of products from the Kochi refinery. The estimated cost of the project is ₹ 678 crores.

Project is on hold from December 2014 due to RoU clearance in Tamil Nadu. Project is being revived with help of Tamil Nadu Government. PNGRB have approved project completion schedule up to 31.10.2021.

Multiproduct Pipeline from Bina terminal to POL terminal at Kanpur

The project envisages laying of 340 Km long product pipeline for a throughput of 3.5 MMTPA from Bina despatch terminal to POL terminal at Panki, Kanpur for evacuation of products from the Bina refinery. The estimated cost of the project is ₹1524.06 crores and is currently ongoing.

POL depot at Bokaro (Radhanagar)

The project envisages resitment of existing Ranchi & Dhanbad depot to a new site at Radhanagar (Bokaro) in Jharkhand due to revised safety standards and to meet the market demands. The estimated cost of the project is ₹ 248.55 crores and is currently ongoing.

Costal Terminal at Krishnapatnam

The project envisages development of a costal terminal on lease land from Krishnapatnam Port Company Ltd. with costal input and dispatches by rail and road. The estimated cost of the project is ₹ 580.20 crores and is currently ongoing..

g) Corporate Social Responsibility

In alignment with the vision of 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 BPCL current year's CSR work has been the projects as a part of "Swachh Bharat Mission" of Government of India in which BPCL have continued their work at Swachha Iconic Places i.e. Madurai Meenakshi Temple and Sri Adi Shankaracharya Janmabhoomi Tirth in Kalady. BPCL has also supported Skill Development Institute in Kochi, and Foundation Stone for the extended Campus at Etammanoor was laid by Hon'ble PM.

CSR expenditure by BPCL stands at ₹ 91.48 Crs during the current year till Nov 2019 and during 2018-19 was ₹ 177.94 Crs.

h) Contribution to Exchequer

BPCL has contributed to the Government exchequer in the form of duties, taxes and dividend. During the year 2018-19, ₹ 95,035 crore was paid to the exchequer as against ₹ 89,725 crore paid in 2017-18. An amount of ₹ 48,562 crore was paid to the Central Exchequer and ₹ 46,473 crore to the State Exchequer in 2018-19 as against ₹ 46,899 crore and ₹ 42,826 crore paid in 2017-18 respectively.

i) Major Accolades / Awards received:

- ▶ BPCL won five Public Relations Society of India (PRSI) National Awards for Excellence in the field of Communications and Public Relations.
- ▶ BPCL received the Federation of Indian Petroleum Industry (FIPI) Oil & Gas Award 2019, under the category 'Oil Marketing - Company of the Year' for leading performance for Direct and Retail Sales through customer-centric initiatives, 2nd December, 2019



- ▶ Corporate HSSE bagged the Golden Peacock Sustainability Award for outstanding contribution, commitment, professionalism and actions that made a visible impact on Sustainability and the Environment. 19th November, 2019
- ▶ The Corporate Research & Development (CRDC) team of BPCL bagged the Federation of Indian Chambers of Commerce and Industry (FICCI) Chemicals and Petrochemical Award 2019 under the category 'Sustainability Award for the Best Green Product in the Petrochemical Sector', November 2019.
- ▶ BPCL Bags 'Best-In-Class Supply Chain and Procurement Diversity Initiative' Award from Express, Logistics & Supply Chain (ELSC) for widening of acceptable crude oil baskets and their ranking based on economics, which helped in sourcing of a record 8 new crude oil grades in the year 2018-19. 3rd October 2019
- ▶ Corporate HSSE was awarded with the 'Energy and Environment Foundation Global Award 2019 - Gold Category' in recognition of its outstanding contribution, professionalism, commitment and action towards positive impact on the environment. 23rd August, 2019
- ▶ BPCL (Mumbai Refinery) has been conferred with the "Leaders Award" under the prestigious "Sustainability 4.0 Awards – 2018", conducted jointly by Frost & Sullivan and TERI (The Energy & Resources Institute), 12th June, 2019
- ▶ In the prestigious Fortune Global 500 list for 2019, BPCL's rank is 275, a jump from last year's 314. BPCL's rank is 628 in the Forbes Global 2000 list for 2019, a considerable rise from the rank of 672 in the 2018 list.
- ▶ For its outstanding global, financial and industry performance, BPCL has been ranked among the top 20 Oil and Gas Refining and Marketing companies in the Platts Top 250 Global Energy Company Rankings for 2019.
- ▶ Mumbai Refinery has been adjudged as the winner of the 'MQH – Best Practices



Bharat Petroleum wins the OISD Award for LPG Marketing Organisations for the 9th consecutive year



Competition' under the Manufacturing category, conducted by IMC Ramkrishna Bajaj National Quality Award (RBNQA) Trust, Mumbai. 14th March, 2019

- ▶ Confederation of Indian Industry (CII) conferred the 'Prize for Leadership in HR Excellence' Award on BPCL for the year 2018-19, 13th March, 2019
- ▶ BPCL's 'PETROTECH 2019' pavilion, developed on the four pillars of Hon'ble Prime Minister's vision for the Energy Future of India - Energy Access, Energy Security, Energy Sustainability and Energy Efficiency, was accorded the Winner for the Best Display at the exhibition. 11th February, 2019
- ▶ BPCL was awarded the second runner up prize in the Maharatna Category by Ministry of MSME (Micro, Small and Medium Enterprises) for exemplary performance for the work done under Public Procurement Policy. 5th February, 2019
- ▶ BPCL was conferred with the coveted Golden Peacock Award for CSR 2018 for its initiative, 'Solid Waste Management Project in 3 Municipalities in Chennai'. 17th January, 2019
- ▶ For the 9th consecutive year, BPCL LPG SBU has been conferred with the Oil Industry Safety Directorate (OISD) safety award under the category of 'LPG Marketing Organization', 12th January, 2019
- ▶ CRDC received the Innovation Award 2017-18 by M/s Centre for High Technology (CHT) for the Best Innovation in R&D Institute for development and commercial trial of indigenous cost effective dewaxing catalyst - BHARAT : HiCAT. 12th January, 2019.

14.2 NAVRATNA PSUS

14.2.1 Hindustan Petroleum Corporation Limited (HPCL)



Hindustan Petroleum Corporation Limited (HPCL) is a Schedule 'A' Central Public Sector Enterprise (CPSE) and a S&P Global Platts top 250 Global energy company ranked at 55 with Annual Sales of ₹ 2,95,713 Crore during FY 2018-19. HPCL has a strong presence in Refining & Marketing in India with about 21% Market share in the PSU category. HPCL has been conferred with the status of 'Maharatna' in October 2019.

a) Physical Performance

The provisional total sale of products for HPCL during Apr-Dec'19 was 30.05 Million Metric Tonnes (MMT) with a growth of about 5.1% over historical. During Apr-Dec'19, HPCL processed 12.63 MMT of crude at refineries and recorded Pipeline throughput of 15.47 MMT.

b) Financial Performance

During Apr-Sep'19, HPCL has achieved Profit After Tax (PAT) of ₹ 1,863 Crore as compared to ₹ 2,811 Crore of the same period in 2018-19.

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 TMTPA (installed capacity)

In addition, HPCL holds 48.99% equity stake in JV company, HPCL-Mittal Energy Limited (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 3,775 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, 43 Aviation Service Facilities, 50 LPG Bottling Plants, 6 Lube Blending Plants, 41 Inland Relay Depots and 31 Exclusive Lube Depots. The customer touch points constitute of 16,017 Retail Outlets, 1,638 SKO/LDO dealers, 248 Lube distributors, 118 Clearing & Forwarding Agents and 6,039 LPG Distributorships with a customer base of over 8.4 crore domestic LPG consumers as of December 2019.

d) Exploration & Production

HPCL undertakes Exploration & Production (E&P) of hydrocarbons through its wholly owned subsidiary company Prize Petroleum Company Limited (PPCL). During 2018- 19, PPCL achieved total production of 31,265 barrels of crude oil from domestic oil field at Hirapur, Gujarat.

PPCL has a wholly owned subsidiary namely Prize Petroleum International Pvt 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 4,29,541 BoE (Barrels of Oil Equivalent) from Yolla producing field (T/L1) in Australia.

e) Projects Completed

To strengthen the supply infrastructure, HPCL has completed and commissioned various pipeline projects viz. i) Capacity expansion of Mundra Delhi Pipeline (MDPL) along with extension of branch pipeline from Palanpur to Vadodara (235 km) and construction of green field marketing terminal at Vadodara ii) 169 KM long Uran Chakan LPG pipeline of 1 MMTPA capacity (with BPCL at 50:50 sharing basis) iii) Ramanmandi Bahadurgarh Pipeline (RBPL) capacity expansion project iv)

Capacity expansion of Visakh Vijayawada Secunderabad Pipeline (VVSPL) and OSTT/Jetty sub-sea Pipeline. Addition of the pipeline infrastructure as above shall lead to enhanced logistics efficiencies in addition to the environmental benefits.

POL supply network was strengthened with commissioning of new railway tank wagon gantry at Visakh black oil terminal, revamp of the existing tank wagon facility at Jabalpur depot and tank wagon decantation facilities at Kolkata Terminal. The existing POL depot at Meerut has been revamped to enhance capacities and to meet the latest OISD norms.

LPG supply infrastructure was augmented with commissioning of a new LPG bottling plant at Warangal (Telangana) with bottling capacity of 60 TMTA. A new LPG plant of capacity 120 TMTA has been commissioned at Sugauli in east Chaparan district of Bihar in 2019-20. LPG cylinder storage facility to store about 34000 filled LPG cylinders has been completed in Leh to ensure continued availability of LPG cylinders for distribution in Ladakh region during the winter period.

ATF supply infrastructure has been enhanced with commissioning of new Aviation Service facilities at Ranchi & Kolhapur.

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. Project execution is well in progress.

In addition, HPCL is setting up a new 9 MMTPA capacity green field refinery-cum-petrochemical complex at Barmer District of Rajasthan through a joint venture company, HPCL Rajasthan Refinery Ltd.(HRRL). Licensor selection for all process units is





HPCL Health Care

completed and construction activities are in progress at site.

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

The HP Green R&D Centre is being expanded with construction of labs for Petrochemicals & Polymers; Engine & Battery labs and Tribology lab along with associated facilities.

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 projects. The major ongoing pipeline infrastructure projects of HPCL include (i) Extension of VVSPL from Vijayawada to Dharmapuri and construction of marketing terminal at Dharmapuri (ii) Extension of the existing LPG pipeline from Hassan in Karnataka to Cherlapalli in Telangana. HPCL

is also participating in development of India's longest LPG pipeline from Kandla to Gorakhpur (2,757 km) along with IOCL and BPCL.

To meet the growing requirement of LPG in the country and for enhancing the import capacities, Construction of 80 TMT LPG cavern at Mangalore is in progress. New LPG plants are being set up at Patalaganga (Maharashtra), Barhi (Jharkhand), Gonda (Uttar Pradesh), Rayagada (Orissa) and Golpada (Assam).

To expand presence in Natural Gas business, HPCL is constructing a 5 MMTPA 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. To expand the CGD Business, HPCL is setting up CGD networks in GAs of Ambala –Kurukshetra (Haryana)



and Kolhapur (Maharashtra) districts through a joint venture company HPOIL Gas Pvt. Ltd. (HPOIL). Also HPCL is setting up CGD network in GA of Sonipat District (Except areas already authorized) & Jind District in the state of Haryana. In the 10th City Gas Distribution (CGD) bidding round by PNGRB, HPCL has won 9 GAs in the states of Uttar Pradesh, Uttarakhand and West Bengal

'HPCL Middle East FZCO', HPCL's wholly owned subsidiary company in Dubai (UAE) for marketing of lubricants/petroleum products in the markets of Middle East and has commenced business operations in UAE.

14.2.2 Oil India limited (OIL)



1. Preamble

Oil India Limited (OIL), a Government of India Enterprise, and Navaratna Company under the 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 ₹ 1,084.41 Crores. As on 31.12.2019, Government of India's shareholding is 59.57% of the paid-up equity share capital of OIL.

2. Domestic Portfolio

The domestic operations of the Company are spread over areas under onshore Petroleum Exploration License (PEL) and Petroleum Mining Lease (PML) in Assam, Arunachal Pradesh, Mizoram, Andhra Pradesh, Puducherry and Rajasthan. Besides, the Company has also ventured into shallow water in Krishna Godavari (KG) Basin.

OILs domestic acreage includes 3 (three) Petroleum Exploration License (PEL) covering an area of about 331.75 sq.km and

22 (twenty two) Petroleum Mining Lease (PML) spread over an area of about 4723 sq.km granted on nomination basis. These acreages are in the states of Assam, Arunachal Pradesh and Rajasthan.

The Company also has acreage under NELP as Operator comprising of 4 (four) onshore blocks with an area of 4133.46 sq. km. in Assam, Mizoram and Andhra Pradesh / Puducherry. OIL has 2 (two) blocks under NELP as non-operator with 5301 sq.km. in Gujarat-Kutch (Shallow Offshore), West Bengal (Onshore). OIL has 2 (two) blocks with 121 sq.km. in Assam & Arunachal Pradesh under Pre-NELP JVs as non-operator viz Kharsang PSC (PI-40%) & Block AAP-ON-94/1 (Dirok - PI-44.086%).

The company also holds Non-operating participating interest (40%) in AA / ONDSF / Kherem / 2016 awarded under DSF-I Bid round. OIL has also been awarded 2 (two) blocks in Tripura and Krishna-Godavari Offshore areas covering an area of 141 sq.km under DSF-II Bid round as an Operator.

The Company also has acreage under OALP-I Bid Round as Operator comprising of 9 (nine) onshore blocks with an area of 7907 sq. km. in the states of Assam, Arunachal Pradesh and Rajasthan. In the FY 2019-20, OIL has been awarded 12 (twelve) blocks covering an area of 34,230 sq.km under OALP-II & III Bid round as an Operator. These acreages are in Odisha, Tripura, Assam, Nagaland, Rajasthan and offshore areas in Andaman and Kerla-Konkan.

3. Exploration Activities

The present exploration activities of Oil India Limited is in progress in Assam, Mizoram, Andhra Pradesh (KG Basin), Rajasthan. Moreover, exploration activities for OALP-I,II & III & DSF-II Block in Assam, Arunachal, Nagaland, Tripura, Rajasthan, Odisha, & Andaman, Kerala-Konkan in Kerala offshore & GSKW in KG offshore areas are in progress. Additionally, OIL has been allotted



a total of 6032 LKM (Revised) for Acquisition, Processing and Interpretation (API) of 2D seismic data under the National Seismic Programme (NSP) campaign of DGH. The state-wise break-up of 2D seismic API is as under :

Area / Sector	Name of the Area	Revised Target in LKM	Achievement in LKM
Area – 1, Sector – I	Assam – Arunachal Pradesh	2,414	2416.20
Area-1, Sector – II	Assam – Arunachal Pradesh	738	604.56
Area-2, Sector – IV	Mizoram – Tripura	1,125	1143.48
Area – 2, Sector – II	Manipur	870	4.74
Area – 2, Sector – III	NC Hills	885	329.16

4. Physical Performance

Parameter	Unit	2018-19 (Actual)	2019-20	
			Target (BE)	Actual (Upto Dec'19)
Seismic survey				
2D	GLKM	20.92	770	400.06
3D	SQKM	460.86	310	45.88
Drilling				
Exploratory	'000Mtr	37.544	85.970	42.400
	Wells	15	22	8
Development	'000Mtr	81.000	94.050	52.538
	Wells	22	27	19
Total (Exp+Dev)	'000Mtr	118.544	180.020	94.938
	Wells	37	49	27
Crude Oil Production *	MMT			
Assam		3.28155	3.7278	2.3325
Arunachal Pradesh		0.00860	0.0090	0.0166
Rajasthan (Heavy Oil)		0.00298	0.0022	0.0056
Total		3.29313	3.7380	2.3547
Natural Gas Production*	MMSCM			
Assam		2481.93	2892	1855.131
Arunachal Pradesh		12.24	13	25.834
Rajasthan		227.74	215	189.387
Total		2,721.91	3120	2070.353
LPG Production	'000T	33.730	36.00	20.496

* Excluding JV shares



4.1 Discoveries made (No.)

The Company has made 1 (one) High Pressure & High Temperature gas discovery during the 2019-20 in the NELP-VI Block in KG-ONN-2004/1.

4.2 Reserves Position (2P) as on 1.4.2019

As a result of exploration and development activities, as on 01.04.2019 OIL has established 2P/BE in-place volume of 800.65 MMT (Oil) & 382.57 BCM (Gas) (1134.39 MMTOE O+OEG) in the domestic sector. The 2P/BE remaining producible oil & gas volume of the company stand at 76.05 MMT and 127.06 BCM respectively (186.60 MMTOE O+OEG).

5. Crude Oil Transportation

OIL operates a total network of 1243 km of Crude Oil Pipeline and 654.3 km of Product Pipeline. The Duliajan-Bongaigaon sector of NBPL (Nahorkatiya Barauni Pipeline) with a length of 557 km having 6.0 MMTPA capacity runs through Assam, West Bengal and Bihar and transports crude oil produced from oilfields in Upper Assam to the public sector refineries at Numaligarh, Guwahati and Bongaigaon. During the FY 2019-20

(till second quarter) OIL transported 3.25 MMT of crude oil with pipeline utilization of 72.36 % and 0.84 MMT of products with pipeline utilization of 97.45%.

The natural gas produced in Assam is sold to different customers, viz. BVFCL, BCPL, AGCL, APGCL, NEEPCO, IOC (AOD), and APL and nearby Tea gardens. Since March, 2011 OIL is supplying gas to Numaligarh Refinery. The non-associated gas produced by OIL in Rajasthan is sold to Rajasthan Rajya Vidyout Utpadan Nigam Limited (RRVUNL).

OIL also produces Liquefied Petroleum Gas (LPG) in its plant at Duliajan, Assam.

6. 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 (in Rajasthan, Madhya Pradesh & Gujarat) and 14 MW of Solar Energy Projects (in Rajasthan & Assam).



CMD, OIL, Shri Utpal Bora handing over a cheque to Hon'ble Chief Minister of Assam, Shri Sarbananda Sonowal as contribution of Oil PSEs towards Assam Chief Minister's Relief Fund for Assam flood



7. Diversification

OIL has undertaken selective diversification of its portfolio, mainly by acquiring stakes in downstream business. OIL holds 26% stake in Numaligarh Refinery Limited, 10% stake in Brahmaputra Cracker and Polymer limited and 23% stake in DNPL (Duliajan Numaligarh Pipeline Limited). OIL acquired 49% equity stake in 500 TPD Methanol and 200 TPD Formaldehyde project of Assam Petrochemical Limited.

OIL has also ventured into the arena of City Gas Distribution (CGD) in consortium with M/s HPCL for development of CGD network in Ambala & Kurukshetra and Kolhapur.

The Consortium of Assam Gas Company Ltd (AGCL), Oil India Ltd(OIL), and GAIL Gas Ltd(GAIL Gas) won the bids for development of CGD network in Kamrup & Kamrup Metropolitan Districts and Cachar, Hailakandi and Karimganj Districts under 9th round of CGD bidding.

8. Overseas Portfolios

OIL's overseas E & P portfolio is spread over 09 countries covering Libya, Gabon, Nigeria, Venezuela, USA, Mozambique, Bangladesh, Russia and Israel. The portfolio includes 5 (five) producing assets spread across Russia, USA & Venezuela, 2 (two) discovered and development assets in Mozambique and Nigeria and 5 (five) exploratory assets in Libya, Gabon, Bangladesh and Israel. In addition to the above, OIL has 10% PI in 741 Km long Multiproduct pipeline construction and operation project in Sudan which was completed in 2005.

As on 31.03.2019, oil & gas reserves position stood at 43.4092 MMTOE of 5 overseas producing assets namely Niobrara Shale Oil in USA, License-61, Vankorneft & Taasyurah in Russia and Carabobo in Venezuela. During 2018-19, production from overseas assets corresponding to OIL's Participating Interest was 2.376 MMTOE, the highest till date. During the current financial year for the period covering April–December 2019, OIL's share of cumulative production from overseas assets stood at 1.639 MMTOE.

The status of the major developments in the blocks is as under:-

8.1 Producing Assets

i. Vankorneft, Russia (Rosneft: 50.1%, OIL /IOCL/ BPRL : 23.9%, OVL : 26%)

OIL along with Indian Consortium partners IOCL and BPRL has acquired 23.9% stake in JSC Vankorneft, Russia w.e.f 5th October 2016. Eighty percent (80%) of crude is sold through ESPO pipeline to China, and remaining 20% is sold to European countries/ domestic market, Gas is sold domestically at state controlled prices. As on 31.03.2019, the 2P reserve position corresponding to OIL's Participating Interest in this asset has been estimated at 16.94 MMT of oil and 6.72 BCM of gas. During 2018-19, OIL's share of production in asset stood at 1.84 MMTOE. During the current financial year for the period April–December 2019, OIL's share of cumulative production from this asset stood at 1.180 MMTOE.

ii. Taas-Yuryakh: Russia (Rosneft: 50.1%, OIL/IOCL/ BPRL: 29.9%, British Petroleum: 20%)

OIL along with Indian Consortium partners IOCL and BPRL has acquired 29.9% stake in LLC Taas-Yuryakh Neftegazodobycha (TYNGD), Russia w.e.f 5th October 2016. TYNGD is a developing asset with current production level of 3.894 MMTPA and expected peak production of 5 MMTPA by 2021. The asset has significant gas reserves as well, which is expected to be monetized by 2023. As on 31.03.2019, the 2P reserve position corresponding to OIL's participating interest in this asset has been estimated at 12.15 MMT of oil. During 2018-19, OIL's share of production in asset stood at 0.43 MMTOE. During the current financial year for the period April–December 2019, OIL's share of cumulative production from this asset stood at 0.40 MMTOE.

iii. Russia: License 61 [OIL-50% and PetroNeft Resources Limited-50% (Operator)]



OIL acquired 50% share in License 61, Russia (Area: 4991 sq km) on 3rd July 2014 from PetroNeft Resources Plc (PR). As on 31.03.2019, OIL's share of 2P hydrocarbon reserve position in the asset is 6.3074 MMT. During 2018-19, OIL's share of production in the asset stood at 0.043 MMT. During the current financial year for the period April–December 2019, OIL's share of cumulative production from this asset stood at 0.027 MMTOE.

iv. USA: Liquid rich Shale Asset [Verdad Resources Acquisitions LLC-60%; OIL-20%, IOCL-10%, Haimo Oil & Gas LLC-10%]

OIL acquired 20% in Carrizo Oil & Gas Inc's ("Carrizo") liquid rich shale assets in the Denver - Julesburg (D-J) Basin in Colorado, USA which became effective from 1st October, 2012. As on 31.03.2019, the 2P reserve position corresponding to OIL's participating interest in this asset has been estimated at 0.718 MMT of oil and 0.210 MMTOE of gas. During 2018-19, OIL's share of production in asset stood at 0.020 MMTOE. During the current financial year for the period April–December 2019, OIL's share of cumulative production from this asset stood at 0.013 MMTOE.

v. Venezuela: Project Carabobo [Corporation Venezuelan del Petroleo (CVP)-71%, INDOIL Netherland BV 7% (IOCL-3.5%, OIL-3.5%), OVL-11%, Repsol YPF (Spain)- 11%]

The project located in the northern central part of Venezuela, involves production of heavy crude, setting up of upgrader and market for the upgraded crude for a period of 25 years with a possibility of 15 years' additional extension. The mixed company contract was signed on 12th May, 2010 and the mixed company got incorporated as Petrocarabobo SA on 29th July, 2010. As on 31.12.2019, 76 wells have been drilled in the block. As on 31.03.2019, the 2P reserve position corresponding to OIL's Participating Interest in Project Carabobo has been estimated at 0.3964 MMT. During

2018-19, OIL's share of production in asset stood at 0.036 MMT. During the current financial year for the period April–December 2019, OIL's share of cumulative production from this asset stood at 0.021 MMTOE.

8.2 Development Assets

I. Mozambique: Rovuma Area1 (Anadarko (Operator - 26.5%), Mitsui - 20%, ENH - 15% (Carried), BPRL - 10%, BREML - 10%, OVL - 10%, PTTEP - 8.5%)

OIL along with OVL acquired 10% participating interest in Area 1 Mozambique through acquisition of 100% shares in Videocon Mozambique Rovuma 1 Limited [since renamed as Beas Rovuma Energy Mozambique Limited (BREML)- OVL 60%, OIL- 40%] on 7th January, 2014. OVL also acquired 10% participating interest in the project from Anadarko on 28th February, 2014. The project has recoverable resources ranging between 50-75 TCF with certified reserves (2P) of 31.90 TCF in Golfino - Atum and Prosperidade.

ii. Nigeria: Block OML 142 (Formerly OPL 205) [OIL-17.5%, IOCL-17.5%, and Suntera Resources-35% in JV Suntera Nigeria 205 (70% interest in block), Summit Petroleum - 30% (Operator)]

The processing and interpretation of the 125 sq km of acquired 3D seismic data has been completed. Based on the interpreted results, consortium has started re-entry operations in the Otien 1 well (Discovery Well). Currently, Extended Well Test production from a single zone of Otien # 1 well is under progress. Condensate production from a single zone (i.e., zone-8) of Otien # 1 well commenced on 28th June, 2018.

8.3 Exploratory Assets

I. Bangladesh: Blocks SS-04 and SS-09 [OIL-45%; OVL-45%; Bapex:10% (Carried)]

The OIL-OVL consortium was awarded the shallow offshore Blocks SS-04 and SS-09 in the Bangladesh Bid Round-2012. The total area of the two blocks is 14,295 sq. km with





Workers at OIL on-site

Block SS04 spread over 7,269 Sq km. and Block SS-09 spread over 7,026 sq. km. The Production Sharing Contracts for both blocks were signed on 17th February, 2014 in Dhaka, Bangladesh. One location each for both the blocks have been released.

ii. Libya: Area 95/96~4 Blocks [SIPEX (Operator)- 50%, IOCL-25%, OIL-25%]

The consortium has completed drilling of five wells against MWP of commitment of drilling 08 (Eight) wells. All the drilled wells struck oil and gas. Drilling of sixth well was in progress when the unrest began and all operations in Area-95/96 were suspended since May, 2014. The block is currently under Force Majeure due to adverse law and order situation in Libya.

iii. Gabon: Block Shakthi-II [OIL (Operator)- 50%, IOCL-50%]

An oil discovery was made in the third well (Lassa-1). It was OIL's first discovery in Overseas as Operator. Two appraisal wells (Lassa-2 & 3) were drilled as per the MWP of Phase-1 of New PSC (G4-245). The Consortium has entered into Phase -II

exploration period of the PSC during which two wells are to be drilled as per MWP commitment. The Consortium has entered into Phase -II exploration period of the PSC during which two wells are to be drilled as per MWP commitment. The status of the work till 31.12.2019 is given below:

- Completed Well Design & Engineering job for both the locations.
- Completed EIA study & obtained Environmental Clearance Certificate from DGEPN of the Ministry of Forest & Environment
- Civil Construction for Approach Road & Plinth is in progress.
- Tender process for Hiring of Rigs Services is in final stage & within 1-2 weeks time, LOA may be issued
- Tendering for other support services of Drilling is in progress.

iv. Block 32, Israel (OIL: 25%; IOCL:25%; BPRL: 25%, ONGC Videsh Ltd: 25%- Operator)

OIL as part of a consortium of Indian Public Sector companies, viz., ONGC Videsh Ltd. (OVL), Bharat Petro Resources Ltd. (BPRL) and Indian Oil Corporation Limited (IOCL)



was awarded an offshore exploratory Block - License 412/32. The license has been granted w.e.f 27th March 2018 and is valid till 26th March 2021. The Block with a total area of 357 sq km is located in Levant Basin, Mediterranean Sea, Israel towards south of Tamar Block. The water depths are estimated to be more than 1500m and the reservoir level are ranging between 3800-7000 m TVD.

In line with the committed work programme, reprocessing of seismic data has been completed by August 2019.

Currently, re-interpretation job is being carried out which is expected to be completed by March 2020.

8.4. Pipeline

Sudan: Product Pipeline [OIL-10% PI and OVL-90% PI]

The Project involved construction of 12" X 741 Km long Cross country Multi Product Pipeline from Al-Rawyan to Port Sudan. Project was completed in record time of 15 months against target of 16 months, and got commissioned in 2005.

9. Financial Performance

Parameter	2018-19 (Actual)	2019-20		
		Target	Actual upto 30.09.2019	Anticipated (2019-20)
Plan Outlay	3,180.81	4,105.20	1,850.01	3,675.00 *
Total Income	15,170.00	NA	6,977.62	14,104.76
Net Profit	2,590.14	NA	1,252.03	2,276.89

Note * : Anticipated Plan Outlay for FY 2019-20 is approved figure of 2019-20 (RE).

10. Corporate Social Responsibility

Oil India Limited is a Responsible Corporate Citizen with full commitment to the principles of Corporate Social Responsibility (CSR), towards achieving the inclusive and holistic development of its areas of operation and the society as a whole. OIL's Social Vision "Oil India is Responsible Corporate Citizen deeply committed to the socio-economic development in its areas of operation," and its CSR Policy, have been the strong guiding force behind its CSR initiatives, all with the larger purpose of making a difference to the lives of the people and local communities in meaningful ways. The company has embarked upon various CSR projects under key thrust areas in the fields of Health & Sanitation, Swachh Bharat Abhiyaan, Education, Sustainable Livelihood Generation, Skill/ Capacity building, Projects on Women empowerment, Environment and

Sustainability, Promotion of Art, Culture and Heritage, Development of Sports, Augmentation of Rural Infrastructure.

11. List of Awards and Accolades for the year 2019 by OIL (Till December 2019) :

Following are details regarding Awards and Accolades received by OIL for for the year 2019 by OIL (Till December 2019) :

1. Golden Peacock Award for "Excellence in Corporate Governance" for various path breaking initiatives undertaken by OIL towards achieving excellence in Corporate Governance by Institute of Directors (IoD), India.
2. "Fame Safety Excellence Award 2019" in Platinum category towards Safety Excellence during National Conference on Environment, sustainability & Safety-2019 and National Award Ceremony-2019.





Engineers India Limited AGM 2019

3. The "Best PSU award" by CSR Times for OIL's CSR initiatives in the area of Healthcare, Education and Skill Development at the National CSR Summit & CSR Times Award 2019.
4. National level prestigious "Kalinga Safety Award-2018" in Silver category during Odisha State Safety Conclave (OSSC)-2019 held at Bhubaneswar on 22nd November-2019 for performance year 2018 in recognition of the excellent safety practices.
5. Apex India Foundation Awards under different categories including, Apex India Life Time Achievement Award, 2019, "Golden Award" under Apex India Occupational Health & Safety Award, 2019 for excellence in HSE and "Platinum Award" under Apex India Energy Efficiency Award 2019 in Petroleum Exploration Sector.
6. Pipeline Department of Oil India Limited has been declared the Winner of Grow Care India Safety Awards 2019, PLATINUM AWARD in Petroleum Storage & Transportation Sector for outstanding achievement in Safety Management.

14.2.3 Engineers India Limited (EIL)



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 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, Telengana.

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. The portfolio of services offered by the company includes:

i) Pre-Project Services

- ▶ Feasibility Studies
- ▶ Environment Impact Assessment Technology & Process Licensor selection
- ▶ Cost Estimation

ii) Project Implementation Services

- ▶ Project Management
- ▶ Process Design and Front End Engineering
- ▶ Basic and Detailed Engineering
- ▶ 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 2836 as on 31.12.2019.

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.

A) Performance Highlights of 2019-20 (up to December, 2019)

i) Business Secured

During the current financial year (up to December, 2019), EIL secured new business worth Rs 1471 crores.

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

ii) Domestic Jobs

- ▶ Engineering, Procurement and Construction Management Services for Crude Oil Terminal (COT) at Paradip, Paradip Numaligarh Crude Oil Pipeline (PNCPL) and NRL Siliguri Product Pipeline (NSPPL) for NRL



- ▶ Project Management Consultancy Services for LPG Cavern at Mangalore for HPCL
- ▶ Project Management Consultancy Services for Chhara LNG Terminal in Gir Somnath District, Gujarat for HSEPL
- ▶ EPCM Consultancy Services for 60 KTA Poly Propylene Unit at Pata for GAIL
- ▶ PMC Services for Petro Resid Fluid Catalytic Cracker Unit along with Sulphur Recovery Unit, Associated Facilities including U&O at Mumbai Refinery and Polypropylene Unit along with Associated Facilities at Rasayani for BPCL
- ▶ Overall Project Management and EPCM Services for Capacity Expansion of Panipat Refinery from 15 MMTPA to 25 MMTPA (P-25 Project) - PMC Phase I for IOCL
- ▶ Primary Project Management Consultancy Services for Balance Jobs of Dabhol LNG Terminal of M/s. Konkan LNG Pvt. Ltd for GAIL
- ▶ Design, Engineering and Technical Studies, Supervision & Assistance for Crude Handling Facilities Project in Gulf of Kutch off Vadinar, Gujarat for IOCL
- ▶ Additional work for PMC Services contract for Construction of Data Centre, Office Complex & Residential Complex for UIDAI
- ▶ PMC Services for Installation of GTC at Gandhar for GAIL
- ▶ PMC Services for Augmentation of LHC Storage Facility at GAIL, Vijaipur
- ▶ Additional work for EPCM Services contract for Western Gateway Project Early Production facilities for WCPL
- ▶ Consultancy Services & Construction Management for addition of 11th Rectifier Group(Swing Group) between Potline-3 & Line- 4 at NALCO's Smelter Plant at Angul, Odisha
- ▶ Additional work for Consultancy Services contract for Delayed Coker Unit & allied facilities under Distillate Yield Improvement for IOCL at Haldia
- ▶ DFR & PMC Services for New SPM facility at Padur for ISPRL
- ▶ Project Management Consultancy Services for new STG Project at HMEL, Bhatinda



EIL-CSR-distribution of assistive aids in Odisha





- ▶ Feasibility Study for Capacity Expansion of Paradeep Refinery from 15 MMTPA to 25 MMTPA for IOCL
- ▶ EPCM Consultancy Services for replacement of Regenerator Column of Gas Sweetening Unit at GAIL, Pata
- ▶ Preparation of Feasibility Report Based on ICC Configuration for Proposed West Coast Refinery of RRPCL– Roha Site.
- ▶ Consultancy Services for preparation of BDEP for Oxygen Enrichment Technology in IREP-SRU for BPCL Kochi Refinery
- ▶ Lender's Independent Engineer for HPCL Rajasthan Refinery Limited (HRRL) 9 MMTPA Refinery cum Petchem Project for SBI
- ▶ Consultancy Services for Establishing Asset Integrity Management System for Petrochemical Static Assets at GGSPAP for HMEL, Bhatinda

iii) Overseas Jobs

- ▶ Project Management Consultancy Services for Construction of a Crude Oil Refinery Plant in Mongolia for Mongol Refinery State Owned LLC
- ▶ Additional work for 650,000 BPSD Refinery and 600,000 TPA Polypropylene Plant at Lekki Free Trade Zone, Nigeria for Dangote Oil Refining Company Limited
- ▶ Front End Engineering & Design (FEED) Services for Automatic Overfilling Protection (AOP) and Flammable Gas Detectors for HC Tanks in ADNOC Refining Locations in UAE
- ▶ FEED Services for Hail Oil Field Water Injection Project (WIP) for ADNOC in UAE
- ▶ Engineering Services for Instrument Air Network Upgrade Project and Oily Water Treatment Plant Upgrade Project for ADNOC Offshore in UAE
- ▶ FEED services for Power Supply Re-arrangement of 11 KV Distribution Network FED from SS-0 by constructing new 132/33/11KV substation at Ruwais Refinery East for ADNOC Refining

c) Financial Performance

The turnover and profit before tax of the company for FY 2019-20 (up to September 2019) was ₹ 1459 crore and ₹ 358 crore, respectively. The details of the financial performance of the company for 2019-20 (up to September, 2019) are attached in Annexure-I and Annexure-II.

d) Policy Initiatives Undertaken (up to December, 2019)

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:

- ▶ Consolidation of Succession Plan to ensure availability of talent pipeline to fill key positions
- ▶ Work-Life Balance and Leadership Development Initiatives designed/organised specifically for women to bring inclusivity at the work place
- ▶ Leadership development program –AAROHAN organized which is aimed at building best in class leaders, across levels (business leaders, functional leaders & young leaders)
- ▶ Need based Technical Training conducted for domestic and international clients in specialised Domain areas which generates revenue for the Company.
- ▶ Continuous upgradation of HR Software for seamless integration with special focus on F&A system by leveraging the use of IT in HR
- ▶ Assessment & Development Centres (ADCs) conducted for senior executives to assess the behavioural competencies and identify developmental areas.
- ▶ Revisit & Review of HR policies to bring in better employee engagement





EIL MOU 2019-20 signing with Secretary MoPNG

- ▶ Implementation of HR Audit findings to build robust systems and processes
 - ▶ Creation of a Learning Culture through regular Knowledge Sharing Sessions
- (ii) **Technology & Sustainable Development**
- (a) **Technology development projects initiated:**
- 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
 - Development of 3-D CFD Model of Fluidized bed coal Gasifier
 - Optimization of SRU plant for 99.9 wt % overall sulphur recovery with utility and energy improvement
 - Biofuels studies in domain of 2G and 3G with process optimization studies
 - Process development and Basic Engineering & Design Package (BEDP) preparation for Alkaline waste water treatment using CO₂ enriched gases
 - Development of process scheme for reference fuel
- (b) **Technology commercialization efforts made:**
- Design of Oxygen enrichment facilities for capacity enhancement of two SRUs upto 25% (2x 421 TPD) at BPCL-Kochi
 - Adequacy check and revamp of existing TGTUs post 25% capacity enhancement in BPCL KR IREP SRUs.
 - Providing technical service for the units in Sulphur block for BOREL, Bina refinery.
 - Implementation of pressure filtration system (PFS) for SRUs at ONGC Hazira.
 - Preparation of technical proposal for design of SRU and TGTU for NREP at NRL
 - Preparation of BEDP for commercial scale desalter for CDU/VDU
 - Process development and BEDP preparation for Alkaline waste treatment using CO₂ enriched gases
 - BEDP Preparation for EngHOG Technology for IOCL-PR for PR-25 project



- Base line energy audit of two petrochemical plants and submission of report to BEE
- c) **R&D activities likely to be initiated in the remaining three months of 2019-20:**
 - Development of novel process for recovering Anhydrous Ammonia from Refinery sour gases with experimental data based simulation modelling
 - Basic Design and Engineering package for an efficient and cost effective commercial scale Amine purification process and offering it to customer.
 - Offering of commercial scale Desalter technology BEDP to a customer
 - Detailing for facility development i.e. Catalyst Lab and Particle solid research Lab is underway
 - Base line energy audit of six petrochemical plants and submission of report to BEE

iii) **Initiatives taken for strengthening technology tie ups:**

- ▶ **Renewal of membership for FY2019-20 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

iv) **Patents filed / granted:**

- ▶ **The following Patents filed earlier were granted this year:**
 - An absorbent liquid and a process for removal of acid gases using the same
 - A process for recovering hydrogen from off gas stream and a system thereof
 - Low pressure process for recovering H₂S from Claus tail gas and a system for absorbing H₂S

▶ **The following new patents have been filed till December 2019:**

- A self-sustaining process and system for heat recovery and improving efficiency by reducing fuel
- Design of Desalter System
- ▶ Three new patents are under process of filing

14.3 MINIRATNA CATEGORY – 1 CPSE

14.3.1 Balmer Lawrie & Co. Limited (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 ₹ 300 crores and ₹ 114.00 crores respectively as on 31st March, 2019. Balmer Lawrie Investments Ltd., a Government Company holds 7,04,52,900 equity shares of ₹ 10 each (totaling to about 61.8% of paid-up equity capital) of the Company. The Company achieved Net Turnover of ₹ 1856.72 crores during 2018-19 as against ₹ 1796.00 Crores in 2017-18, representing a marginal increase of around 3% over the previous year. The Profit before Tax of ₹ 280.10 Crores in 2018-19 as against ₹ 261.12 Crores in 2017-18, the increase being attributable to improved performance of various SBUs, particularly, increase in volume of sales of Barrels & Drums and higher level of operation in the Travel & Vacations Segments. The Company has achieved the highest ever profit in its history.



14.3.2 Chennai Petroleum Corporation Limited (CPCL)



1. Chennai Petroleum Corporation Limited (CPCL) Refineries

(i) Manali Refinery (Tamilnadu)

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 CPCL refineries is 11.5 MMTPA with Manali refinery capacity at 10.5 MMTPA and CBR Refinery capacity at 1.0 MMTPA. The crude refining capacity utilisation of Manali Refinery was 97.8% in 2018-19.

CPCL's Manali Refinery is one of the most

complex refineries in India with Fuel, Lube, Wax and Petrochemical feedstock's 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

(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 1.0 MMTPA. 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. The crude refining capacity utilisation of the refinery was 42.3 % in 2018-19 due to limited availability of suitable crudes.

2. Shareholding pattern

Shareholding pattern of CPCL as on 31.12.2019 is as under:

Description	% of shares
Indian Oil Corporation Limited	51.9
Naftiran Inter-trade Co. Ltd	15.4
Public (including Employees)	9.0
Bodies Corporate	0.7
Banks, FIs and Insurance Companies	4.0
Mutual Funds and UTI	11.4
Non-Resident Indians/OCBs/FN/Foreign Portfolio Investors/Non-Resident Indians (Non Repatriable)/Alternative Investment Fund	7.7
Total	100.0

3. Details of Backlog Vacancies in respect of SC, ST, OBC, PWD in PSUs /Organizations under this Ministry as on 31st December, 2019:

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
CPCL	0	0	0	0	0	15	0	1	3	0	7#	6	0	0	0	0



4. Women Employees

The number of women employees' vis-à-vis total number of employees as on 31st December, 2019 in the oil PSUs is tabulated as below:

Total No. of Employees	Total No. of Women Employees
1706	88

5. Performance data

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 feedstock's production facilities. CPCL's second refinery is with a capacity of 1.0 MMTPA is located in Nagapattinam at Cauvery Basin (CBR).

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 neighboring 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.

i) Physical Performance

The company processed 10695 Thousand Metric Tonnes (TMT) of crude oil in the year 2018-19 and processed 7625 TMT of crude oil for the period April to December, 2019.

CPCL achieved the highest ever Total Distillates of 77.5% in 2019-20 (Up to December, 2019). The MBN during the

period is 83.0 against the earlier best of 83.1 in 2018-19.

₹ in Cr

Parameter	2018-19 Actuals	2019-20 (up-to Dec'19)
Crude Throughput in MMT	10.695	7.625
Total Distillate %	74.4	77.5

ii) Financial Performance

During the FY 2018-19, CPCL achieved a turnover of ₹ 52177 Cr. For the current FY 2019-20, the turnover up-to December 2019 is ₹ 36867 Cr. The details of financial performance are given below:

₹ in Cr

Parameter	2018-19 Actuals	2019-20 (up-to Dec'19)
Turnover	52201	36880
Profit Before Tax	(298)	(628)
Profit After Tax	(213)	(440)

iii) Projects

a) Major Projects Completed Auto Fuel BS VI project - DHDT Revamp: To produce 100% BS VI quality Diesel, the DHDT unit was revamped from the existing 1.8 MMTPA capacity to 2.4 MMTPA. The revamped unit was commissioned on 22nd November, 2019.

b) Major Projects under Implementation

- **Auto Fuel BS - VI Project - FCC Gasoline Desulphurization unit:** A new FCC Gasoline Desulphurization unit of 0.6 MMTPA capacity and other associated facilities are being installed to meet BS-VI quality norms for MS. The mechanical completion is expected by Feb, 2020.

- **Re-Gasified Liquefied Natural Gas (RLNG):** Usage of RLNG as Feed & Fuel in Hydrogen Reformers in place of Naphtha, as Fuel in place of Naphthain Gas Turbines and as fuel in place of Fuel Oil in Process Heaters and Utilities Boilers, is under implementation at an estimated cost of ₹ 421 Cr.



Implementation of RLNG usage in one HGU (Plant 214), Process Heaters, 3 GTs and one Boiler was carried out. Remaining facilities will be commissioned in a phased manner.

c) Future Projects

Refinery Expansion Project at CBR: CPCL is planning for a new 9 MMTPA Refinery cum Petrochemical complex at CBR. Detailed Feasibility Report has been prepared and the same is under investment approval. The estimated cost of the project is ₹ 28983 Cr. \pm 10% and the anticipated completion is by 2023.

6. 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 focus on health, education, women empowerment, Swatch Bharat activities,

infrastructure development, etc., for ensuring sustainable development of the society to which it belongs. CPCL has spent ₹ 18.9 Cr. during 2018-19 for various CSR initiatives. During 2019-20, CPCL has spent an amount of ₹ 12.7 Cr. towards various CSR activities upto December, 2019.

CPCL actively engages itself for development of two aspirational districts namely Virudhunagar and Ramanathapuram through CSR activities. Major area of CSR activities carried out during the year 2019-20 are Health, Education, Woman Development, Swachh Bharat, Divyangjans rehabilitation, etc.



RLNG – Pressure Reducing Station at CPCL, Manali Refinery



14.3.3 Mangalore Refinery and Petrochemicals Limited (MRPL)



Mangalore Refinery and Petrochemicals Limited (MRPL) is a "Schedule-A" CPSE and a subsidiary of Oil and Natural Gas Corporation Limited (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 16.43 MMT during the year 2018-19 against 16.31 MMT during the previous year 2017-18 registering an increase of 0.73%. MRPL earned a Profit After Tax (PAT) of ₹ 332 crore during the financial year 2018-19 against profit of ₹ 2444 crore earned during the financial year 2017-18. Company has declared dividend of ₹ 1/- per equity share of ₹ 10/- each for 2018-19.

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 2018-19 has been 2050 TMT with a sales value of ₹ 8034 crores which is about 35% higher than previous year sales value of ₹ 5940 crores.

MRPL continues to enhance its market share for Polypropylene with introduction of new and niche grades. The company has enhanced its sales value in FY 2018-19 to ₹ 4180 crores compared to the previous year sales value of ₹ 2639 crores. 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 993 TMT. Company also sold about 123 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 1021 TMT of petroleum products to STC Mauritius with a sales value of ₹ 4192 crores in FY 2018-19.

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. One new retail outlets at Gubbi in Tumakur district of Karnataka was commissioned in the FY 2018-19.

MRPL holds 51% of the equity share of the ONGC Mangalore Petrochemicals Limited (OMPL). OMPL has setup an Aromatic Complex with an annual capacity 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 ₹ 719 crores during FY 2018-19 against turnover of ₹ 543.29 crores in the previous FY 2017-18.

PROJECTS

BS VI Upgradation

As per Auto Fuel Policy and Directives from Ministry of Petroleum and Natural Gas, the entire country has to move towards BS VI quality specifications for MS and HSD by 1st April 2020. The project involves setting of new units and additional facilities. M/s Engineers India Ltd has been appointed as Engineering, Procurement and Construction Management Consultant for



the job. Environment Clearance for the project has been obtained.

Critical ordering activities have been completed and deliveries have commenced. Site activities are in full swing. Mechanical completion and commissioning of the new facilities will be achieved progressively to meet ministry guidelines.

CCR#2 unit revamp

The existing CCR-2 unit was revamped to increase the Capacity of NHT/ Plat former/ CCR from 79 m³/hr. to 90m³/hr & RSU from 122 m³/hr to 145 m³/hr thereby yielding higher quantity of MS. The feedstock to the unit is heavy naphtha from Crude distillation units and Hydrocracker units.

The unit after revamp was successfully commissioned on 19th October 2018 and is currently operating with 100% capacity.

UOP is the Licensor and M/s L&T Chiyoda was appointed as EPCM consultant for the project.

Railway Siding for Pet Coke evacuation

Dispatches by Railway Wagons will make MRPL products conveniently available in competitive markets and improve commercial realization to MRPL.

Construction of Railway siding for smooth evacuation of Petcoke is being carried out. The Railway siding is being executed by M/s Konkan Railway Corporation Ltd and M/s Mecon have been appointed as the EPCM consultant to execute the balance of the Project consisting of Closed conveyor system, Loading silos with Rapid Loading Systems, Measuring devices, facilities to control environmental pollution etc.

The project is mechanically complete and pre-commissioning activities are under progress.

Desalination Plant

To mitigate the risk of river water as a single source of water, a desalination plant is being set up near the sea. This plant of current capacity 30MLD (expandable to 70MLD) will cater to the future water requirement of the company. Project is approved by MoEF & CC for Environmental

Clearance and formal grant of EC obtained on 18.04.2019.

M/s Fichtner India is the PMC for the project and M/s VA Tech Wabag is the LSTK contractor. The plant is scheduled to be completed by 2020.

2G Ethanol

MRPL is in a process of setting up 2G Ethanol project in the State of Karnataka in line with the national vision for reducing import dependency of crude oil. 2G Ethanol is produced from Agro residues viz Corn cobs, Rice straw, Wheat stalk, Corn Stalk etc. Land for the same is allotted by KIADB at Harihara, Davangere. Licensor has been selected and Basic Engineering Design Package preparation is in progress by the licensor.

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 Bharat Petroleum Corporation Limited (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 31.03.2019 was ₹ 5,551 crores.

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 despatched 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.

i) 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 Apr-Dec'19 of the current financial year are as follows:

Table No. 14.5 : Physical Performance of NRL

Parameter	2016-17	2017-18	2018-19	2019-20 (Apr-Dec)
Crude Receipt (TMT)	2,751	2,849	2,820	1,873
Crude Throughput (TMT)	2,683	2,809	2,900	1,759
Capacity Utilisation (%)	89.4	93.6	96.67	99.40
Distillate Yield (%)	86.5	86.68	87.1	84.49
Specific Energy Consumption (MBN)*	72.3	64.8	66.6	85.95
Energy Intensity Index (EII)	95.2	88.3	87.9	63.88

Table No. 14.6 : Financial Performance of NRL

Parameter	2016-17	2017-18	2018-19	2019-20 Apr-Dec (Provisional)
Sales Turnover (Rs./Cr.)	13,945	15,922	18,511	11,069
PBT (Rs./Cr.)	3,148	3,142	3,052	1,668
PAT (Rs./Cr.)	2,101	2,045	1,968	1,329
GRM (\$/bbl)	8.50	11.43	11.80	9.65
Net Worth	5,181	5,044	5,551	6,632*

(NB : * Net worth upto Q3 2019-20 is before the dividend declaration)

ii) Projects

Projects under Implementation

a) Refinery Expansion from 3 to 9 MMTPA:

The Cabinet Committee on Economic Affairs (CCEA) of the Government of India has accorded investment approval for NRL's 3 to

9 MMTPA expansion project on 16.01.2019. The approved cost of the project is ₹ 22,594 crores. Govt. of India has also approved an amount of ₹ 1,020 crores as capital subsidy for the project. The integrated refinery expansion project has three components –
(i) Setting up a new 6 MMTPA refinery at Numaligarh, Golaghat, Assam;
(ii) Construction of Paradip-Numaligarh



Crude Oil pipeline of 1398 km in length and 9 MMTPA capacity;

(iii) Numaligarh-Siliguri Product Pipeline of 654 km in length and 6 MMTPA capacity

Present Status of the project is detailed below:

- Public Hearing for EC completed successfully on 25.10.2019
- Application for obtaining Environmental Clearance from MOEF & CC is being made.
- Configuration of the new Expansion Project finalised. The process of Licensor selection for 06 nos. of Licensed units is under progress based on the configuration.
- The process of selection of various PMC & EPCM consultants is under progress.
- Pre-project enabling activities have started at site.
- Financial progress
of the project: Expenditure ₹ 45 Cr
Commitment ₹ 218 Cr

b) Indo-Bangla Pipeline:

NRL is constructing a 130 km long and 1 MMTPA capacity product pipeline from Siliguri in West Bengal to Parbatipur in Bangladesh. The total project cost for construction of the Indo-Bangla Friendship Pipeline from (IBFPL) from Siliguri to Parbatipur (Bangladesh) is ₹ 346.06 crores. Out of the above, NRL's investment in the project will be ₹ 60.80 crores for the India portion of the pipeline. The remaining amount of ₹ 285.24 crores for Bangladesh portion shall be funded by Govt. of India as grant-in-aid. The project is targeted to be completed by December, 2020. Over all physical progress is 21.3% as on December, 2019.

c) Bio-refinery project:

NRL has formed a Joint Venture (JV) 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 Netherland. The bio-refinery will produce fuel grade ethanol from bamboo,



World Environment Day -2019 celebration at OISD



which is a ligno-cellulosic bio-mass for the first time in the country in a commercial scale using second 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. Details of the project are as follows:

- Project Cost - ₹ 1,750 Cr
- Commissioning – Nov'21
- Environment Clearance – Obtained in 2017
- EPCM: EIL appointed as EPCM
- Current Status: Physical Progress 7.5%
- Financial Progress:
 - Expenditure ₹ 78 Cr
 - Commitment ₹ 478 Cr
- Loan agreement signed with PNB for ; ₹ 1025 Cr

d) North East Gas Grid:

A Gas Grid connecting all State capitals in the North Eastern region is being constructed to supply PNG and CNG in the region. A trunk gas pipeline from Barauni to Guwahati will connect NE Gas Grid to the National Gas Grid. A JV Company has been incorporated as "Indradhanush Gas Grid Limited" with equal equity participation from IOCL, GAIL, ONGC, OIL and NRL. NRL's refinery expansion has been considered as an anchor customer,

constituting around 50% of the total throughput of the pipeline grid. The estimated cost of the project is ₹ 9,265 crores out of which 60% is approved by CCEA, Govt. of India as Viability Gap Funding (VGF). A total of 1656 km of gas pipeline will be laid as part of the project. The project is being implemented in three phases:

Phase-I: Sections with plain agricultural terrain and no EC requirement (Guwahati, Numaligarh, Itanagar, Dergaon/Jorhat, Dimapur)

Phase-II: Section in hilly terrain and having requirement of EC (Shillong, Silchar, Panisagar, Banaskandi, Agartala, Aizawl)

Phase-III: Sections in hilly terrain, requirement of EC and feasibility of laying pipeline linked to highway width widening (Dimapur, Kohima, Imphal)

14.3.5 ONGC Videsh Ltd. (OVL)



ONGC Videsh Ltd., is 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. ONGC Videsh produced about 29.5% of oil and 22.1% of oil and natural gas of India's domestic production in FY'19. ONGC Videsh holds 675.721 MMTOE of 2P Reserves and 706.675 MMTOE of 3P reserves spread across the globe.

In terms of reserves and production, ONGC Videsh is the second largest petroleum company of India, next only to its parent ONGC. ONGC Videsh has cumulatively invested US\$ 29.28 billion (Total Inception to date up to March 2019) in overseas acquisitions and on capital expenditure. The company has produced 143.331 MMTOe of crude oil and gas since inception to FY 2018-19.



ONGC Videsh operates in highly competitive international oil and gas sector by competing with the best in the industry. Over the years, ONGC Videsh has built inherent capabilities and expertise in its areas of operations. ONGC Videsh has developed strong partnership alliance with a host of IOCs and NOCs including ExxonMobil, British Petroleum, Shell, ENI, Total, Repsol, Equinor, Chevron, Petrobras, Sodeco, Socar, Rosneft, ADNOC, Posco International, Kazmunaigaz (KMG), Petro Vietnam, CNPC, Sinopec, PDVSA, Petronas and Ecopetrol.

ONGC Videsh has highly skilled human resource with excellent technical and management capabilities. The company has built facilities for evaluation, interpretation, economic modeling, FEED, design and execution of oil and gas projects and enjoys the technical and human resource support from ONGC. ONGC Videsh has developed core expertise in due diligence, techno-commercial evaluations, bid negotiations and transaction documentations.

Presently, ONGC Videsh has stake in 39 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), Kazakhstan (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), Syria (2 projects), UAE (1 project), Venezuela (2 projects), and Vietnam (2 projects).

ONGC Videsh adopts a balanced portfolio approach and maintains a combination of producing, discovered, exploration and pipeline assets. ONGC Videsh has oil and gas production from 14 Assets, 4 Assets where hydrocarbons have been discovered and are at various stages of development, 18 Assets are under various stages of Exploration and 3 projects are pipeline projects. Through geographical spread of overseas investment, ONGC Videsh has enhanced its annual equity production to the level of 14.833 MMToE during 2018-19.

The overseas engagement and specific development for ONGC Videsh during FY 2019-20 are given below:

- **Rovuma Area-1, Mozambique:** The consortium has executed long-term LNG offtake agreements with major Asian and European customers totaling more than 11.1 million tonnes per annum exceeding the threshold target to achieve FID. Consortium has taken Final Investment Decision (FID) on 18th June 2019.
- **GPOC, South Sudan:** First oil achieved from El-Nar and El-Toor field of Block 1, 2 & 4 on 30th April 2019 and 30th May 2019 respectively. Presently the Block is producing crude oil @43500 bbl/day (approx).

14.3.6 Bharat Petro Resources Limited (BPRL)



Bharat PetroResources Limited (BPRL), a 100% subsidiary of Bharat Petroleum Corporation Ltd. (BPCL), has Participating Interest (PI) in 27 blocks in 8 countries along with Equity stakes in 2 companies in Russia that hold the license to 4 Producing assets. Out of the 27 blocks, 15 are located in India and 12 Overseas. BPRL is Joint Operator in one overseas block i.e. Onshore 1 Abu Dhabi and Operator in two onshore blocks in Cambay Basin, India.

7 Indian blocks were acquired under various NELP bid rounds, 5 blocks were awarded under the Discovered Small Fields Bid Round 1 and 3 blocks were awarded in the Open Acreage Licensing Policy (OALP) Bid Round 1. Out of the Overseas blocks, 5 are in Brazil, 2 are in UAE and 1 each in Mozambique, Indonesia, Australia, Timor Leste and Israel. BPRL and its consortia have a total of 26 discoveries in respect of Blocks held in 5 countries i.e. Brazil, Mozambique, Indonesia, Australia and India.

In Mozambique, the Exploration phase has been completed and an estimated 75 Tcf Natural Gas Resources discovered in the



Block. Final Investment Decision (FID) for the 2-Train (2 x 6.44 MMTA) initial onshore LNG project to support development of Golfinho-Atum field has been taken by the Area 1 concessionaires on 18.06.2019. First cargoes will commence after construction concludes, which is estimated in 2024.

In Brazil, an Extended Well Testing is planned in Farfan area during 2019-20 for acquiring sub- surface and reservoir data needed for preparation of the development plan.

In Indonesia, there has been discovery of oil and natural gas in Badik 1 & West Badik 1 wells. The Plan of Development (POD) for the Badik & West Badik prospects have been approved by the Ministry of Energy and Mineral Resources, Indonesia. Thereafter, the Parang-1 discovery was also ranked amongst the Top 10 discoveries of the world for 2017 by IHS Markit. Front End Engineering Design (FEED) for Badik & West Badik Development and the 3D seismic acquisition over Parang & adjoining prospects have been completed during the year 2018-19. The appraisal of the Parang discovery and further exploration in the adjoining prospect (Keris) to enable an integrated development of the fields

In 2018, Bharat PetroResources Limited (BPRL), along with ONGC Videsh and Indian Oil Corporation Limited acting jointly as the Indian Consortium were awarded 10% Stake in Lower Zakum Concession, Offshore Abu Dhabi. This is the first time that Indian oil and gas companies have been given a stake in the development of Abu Dhabi's hydrocarbon resources. BPRL through its subsidiary has 30% stake in the SPV of the Indian Consortium that holds 10% stake in the Lower Zakum Concession. The Concession, which has a term of 40 years with an effective date of 9th March 2018, was signed on 10th February 2018. The current production of this field is about 400,000 bopd and Indian Consortium

annual share shall be about 2 MMT. BPRL's share of the equity crude has been lifted by BPCL group refineries.

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.

During the year 2019, a consortium of BPRL and IOCL was awarded the Onshore Block 1 concession in Abu Dhabi after emerging as the winning bidder in the Abu Dhabi 2018 Block Licensing Round. The award marks entry of BPRL as an Operator of overseas assets for the first time in the prospective UAE region. . The Concession granted by the SPC, on behalf of the Abu Dhabi government, has an effective concession period of 35 years and in the Exploration Phase will be operated by M/s. Urja Bharat Pte Limited (UBPL), a 50:50

SPV incorporated for the purpose by the Indian consortium in Singapore. The commercial license of UBPL, UAE has been received and the UBPL, UAE branch office is commissioned. The appraisal plan for the existing discoveries in the block has been approved and 3D seismic data acquisition in the block is in progress for the exploration acreage.

BPRL is the Lead Operator of one onland block CB-ONN-2010/8 in Cambay basin Gujarat, the Field Development Plan has been approved by DGH and the development activities are being undertaken.

The Madanam discovery in the block CY-ONN- 2002/2 in Cauvery basin, India is currently under development and the commercial oil production has commenced. BPRL has acquired Participating Interest (PI) in 2 blocks awarded under OALP – 1, i.e. CY-ONHP-2017/1 and AA-ONHP-2017/12 with 40% PI and 10% PI respectively on 26th November 2019. BPRL was earlier awarded 1 block, viz. CB-ONHP-2017/9 under OALP Bid Round 1 in October 2018.



BPRL has invested approx. ₹ 23500 crores for its projects (till November 2019)

14.4 Other CPSES

14.4.1 Balmer Lawrie Investments Limited (BLIL)



The 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 and Subsidiaries of BLIL:

- BLIL does not have any joint venture with any corporate entity.
- 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 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)



Objectives and Functions of the Board 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.

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, MOPNG, Additional Secretary, Department of Expenditure, Joint Secretary (Exploration), MOPNG, Chairman IOCL, ONGC, GAIL, BPCL and HPCL, Director General of Hydrocarbons, Director (R&D) IOCL and Secretary, OIIB 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 OIIB cess levied and collected on production of crude oil, as per provisions of OIIB Act, 1974. So far OIIB has received an amount of ₹ 902.40 crore from the Central Govt, which has accumulated into ₹11,873 crore (Provisional) as on 31st December 2019 through internal generation.

c) Deployment of Funds

During 2019-20 (upto 31st December 2019), OIIB has released grants to institutions viz. DHG, PCRA, CHT, OIIS, PPAC and for other R&D activities amounting to ₹ 213.35 crore. Additionally, Indian Strategic Petroleum Reserves Ltd. (ISPRL), a wholly owned subsidiary of OIIB has been entrusted with the construction of strategic storage for crude oil at three locations. During 2019-20 (upto 31st December 2019), an amount of ₹ 6.35 crore was released to ISPRL as grant for pre-project activities for Phase-II SPRs.



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; Refineries & Gas Processing Plants; Product & Crude Pipelines

and Marketing (POL & LPG) which are implemented on self-regulatory basis by the Oil & Gas companies.

OISD's mission is to assist Oil and Gas Industry in India to achieve highest standards in safety by conformance to the standards of safety and risk management, adopting the best practices and minimizing losses while achieving sustainability.

a) Safety Audits by OISD: FY 19-20

OISD carries out periodic safety audits of all types of Oil & Gas installations to monitor their compliance level with the OISD standards, recommendation of incident investigated by OISD and statutory regulations. OISD Safety Audit Performance for the year 2019-20 + is as indicated below:

Table No. 14.9 :

Actions	Unit	Plan	Actual as on 31.12.19	Projection (Jan'20to Mar'20)	Total
Core Audits					
Refineries, GPP & CTFs	No	17	10	7	17
Mktg. Installations	No	70	76	20	96
E&P Onshore	No	50	51	0	51
E&P Offshore	No	16	08	08	16
Cross Country PL	KM	8000	6348	1748	8096
Single Point Mooring (SPM)	No	02	01	04	05
Jetty Pipelines	No	01	0	01	01
Pipelines Central Tank farms	No	01	04	0	04

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 across the Oil & Gas Industry. These audits are conducted for green-field developments and for major additional facilities at existing locations, to ensure ab initio compliance to the OISD standards at the construction stage itself.

Status of PCSA carried out during 2019-20:

Table No. 14.10 :

Actions	Unit	Actual as on 31.12.19
Pre Commissioning Safety Audits (PCSA2019-20)		
Refineries & Gas Processing plants	No	30
Mktg. Installations	No	28
Cross Country Pipelines	KM	733



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. 12 Mobile Offshore Drilling Units, 10 Offshore Platforms and 03 SPMs have been accorded 'consent to operate' during the year 2019-20, till Dec'19.

d) Technical Seminars / Conferences / Workshops

Technical Seminars/Conferences/Workshops for the Oil industry are conducted by OISD to discuss the latest technological developments, case studies etc.

During the year 2019-20 OISD has organized two days' workshop for auditors on 'Audit of LPG Bottling Plant' at IOCL's LPG Bottling plant, Mysore, Karnataka during 25th – 26th April, 2019.

It is planned to organize three more Workshops/Seminars by March, 2020.

e) The Safety Council

To ensure proper implementation of various aspects of safety in the Oil & Gas industry, Government of India has set up a 'Safety Council' at the Apex in January, 1986 under the administrative control of MoP&NG as a special self-regulatory industry agency for safety matters & procedures in respect of Hydrocarbon sector.

Safety Council is headed by the Secretary of MoP&NG as Chairman & includes members comprising Additional Secretary, Joint Secretaries, Chief Executives of all Public Sector Undertakings, at least two Chief Executives from Private/ JV Companies on rotational basis, Statutory bodies such as Chief Controller of Explosives, Director General of Mines Safety, Adviser (Fire), Secretary, Central Electricity Board and Director General of Factory Advice Service and Labour.

Safety Council is assisted by Executive Director, Oil Industry Safety Directorate (OISD) who also acts as the member secretary of the Safety Council. To review the safety performance, the Safety Council



History scripted when the first consignment of imported Miri Crude Oil to be processed at NRL docked at Haldia Port on 26.06.19



meets once a year and 36th meeting of the Council was held on 6th August'2019.

Key issues discussed & reviewed during the meeting are as under:

- ▶ Major activities undertaken in 2018-19 & activity plan for 2019-20
- ▶ OISD Safety audit compliance status (ESA/SSA)- Sector/ Company wise
- ▶ Root cause analysis of major onsite incidents-discussions on recent incidents across industry segment
- ▶ Approval of Actual Expenditure of OISD in FY 2018-19 and Budget Estimate for FY 2019-20
- ▶ Approval of revision of 08 nos of OISD standards

f) Revision of OISD Safety Standards

OISD develops Standards/Guidelines/ Recommended Practices for oil and gas sector through 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 committee members. These standards cover inbuilt design safety, asset integrity and best operating practices in the various facets of Oil & Gas Industry. 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 Oil & Gas sector as 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 2019-20 OISD revised 08 numbers of the existing Safety Standards. These standards, after their approval in the 36th Safety Council Meeting have been released for implementation by the Industry.

List of OISD Standards revised during the year 2019-20:

OISD-STD-112	Safe Handling of Air-Hydrocarbon Mixtures and Pyrophoric Substances
OISD-STD-131	Inspection of Boilers
OISD-STD-140	Inspection of Jetty Pipelines
OISD-RP-157	Safety in Transportation of Bulk Petroleum Products (Rail and Road)
OISD-RP-167	POL Tank Lorry Design & Safety
OISD-STD-188	Corrosion Monitoring and Control of Offshore & Onshore Pipeline
OISD-RP-205	Recommended Practices for Crane Operation, Maintenance & Testing (For Upstream)
OISD-GDN-211	Safety in Petroleum Laboratories

g) Incident Investigation & Analysis

OISD investigates major incidents 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 periodical bulletins 'News-letter' and 'Suraksha Chetna'; Safety Alerts and Case Studies; Seminars and Workshops. During 2019-20, five major incidents have been investigated by OISD.



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. Installations/ 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 are also encouraged and presented with such awards.

'Oil Industry Safety Awards' for the year 2018-19 are expected to be organized in March, 2020.

h) Other Major Activities

i) 54th Steering Committee meeting

54th Steering Committee meeting was held on 6th May, 2019 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 Revised OISD Standards – 08 Nos.
- ▶ OISD's ESA Plan Vs Actual for the year 2018-19 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.

ii) ISO 9001:2015 Re-certification of OISD

In the year 2013, existing systems and procedures of OISD were validated through Certification of ISO 9001: 2008 by M/s DNV

and OISD became the first ISO 9001 Certified Organization amongst all the OISD grantee Organizations.

In the year 2019-20, the ISO certification of OISD has been revalidated as ISO 9001: 2015 by M/s DNV

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 advice on any midcourse 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 2019-20 (upto December 2019)

DGH is monitoring the E&P activities and contractual performance under Production Sharing Contracts (PSC), Revenue Sharing Contract (RSC) and Coal Bed Methane (CBM) contracts regime. The brief achievements resulting from Exploration, development and production activities during 2019-20 upto December 2019 in contractual regime are as under:

- i) One oil and one gas discovery notified
- ii) Drilling of 7 Exploratory and 106 Development wells completed in FY 2019-20 till 31.12.2019.

- iii) Awarded 39 Blocks, covering an area of 77508 SKM, under OALP-II, III & IV bid rounds.
- iv) Crude Oil Production of 6.63 MMT, Gas Production (including CBM): 3854 MMSCM in FY 2019-20 till December, 2019 under PSC Regime
- v) 4 Field Development Plans (FDP) and 8 Revised Field Development Plans (RFDP) have been approved
- vi) Commerciality declared for 6 hydrocarbon discoveries in 4 blocks

c) National Seismic Programme (NSP)

ONGC and OIL have been entrusted with the task of surveying in the un-appraised areas. OIL has been assigned to carry out 2D seismic API of 6,032 Line Kilometre (LKM) falling in North eastern part of India covering states of Assam, Arunachal Pradesh, Manipur, Tripura and Mizoram. ONGC has been assigned to carry out 2D seismic API of about 42,211 LKM in 22 sedimentary basins of India viz, Cambay, Kutch, Saurashtra, Rajasthan, Pranhita-Godavari, Krishna-Godavari, Cuddapah, Bastar, Cauvery, Vindhyan, Narmada, South Rewa, Satpura-Damodar and Chattisgarh, Bengal, Mahanadi-NEC, Ganga, Deccan Synclise, Bhima-Kaladgi, Himalayan Foreland, Spiti-Zaskar, Karewa and Andaman-Nicobar basins.

d) National Data Repository (NDR)

National Data Repository (NDR) has been established to consolidate and store all the Geo-scientific data generated till date and in future. The objective of NDR policy is to assimilate, preserve and regulate the E&P data generated by various companies over the last several decades and held within the



As on 31st December, 2019, surface coverage of ~ 43112 LKM, out of 48,243 LKM has been achieved under 2D Seismic data acquisition under National Seismic Programme.

Agency	Target (LKM)	Data acquisition (since inception) (LKM)	Percentage (%)
ONGC	42211	38528.98	91.28
OIL	6032	4583.4	75.98
Total	48243	43112.38	89.37

National Data Repository (NDR) in order to enable systematic disclosure, sharing and dissemination and to standardize the norms for accessibility within the overall provisions of the different Acts, Rules, Government policies and other guidelines as may be applicable. Data Sharing, Accessibility & Dissemination through NDR and augmentation of data in NDR is a continuous process as data is acquired on a perpetual basis from the Operators. NDR will facilitate the received data dissemination in the following manner:

- Data can be accessed through web portal
- Users can preview processed seismic image file of 2D/3D data, log data, reports and raw seismic data
- Users can view the data in data rooms available in DGH
- The geological prospectivity can be assessed through scanning of data
- Field data/raw data can be bought by user or investor for value addition including processing

NDR will support future offer and award of blocks through Open Acreage Licensing Policy (OALP) by allowing interested investors to access visualize and purchase E&P data. The key beneficiaries of NDR are E&P Companies, Government Agencies, Universities, Research Institutes, etc.

e) Survey through Non-Exclusive and Multi Client Policy

Under this Policy, service providers have been invited for carrying out Non-exclusive Multi-Client GeoScientific Surveys/Activities relating to Hydrocarbons in offshore and/or onland part of India at their cost and sell geoscientific data to the potential investors while submitting only project Fee and data set to the Government. DGH is administering this Policy on behalf of the Government of India. Government is the owner of the data acquired under this Policy. So far, 2 Proposals for carrying out 18,720-line kilometre of surveys in Krishna Godavari basin and Eastern offshore of Andaman Islands have been received by DGH. One proposal is for reprocessing of seismic data in western offshore area.

f) National Gas Hydrates Program (NGHP)

In India, Gas Hydrate research and exploratory activities are being steered by the Ministry of Petroleum & Natural Gas under National Gas Hydrate Program (NGHP).

NGHP-Expedition-01 exploration program carried out in 2006 for mapping gas hydrates zones in Krishna-Godavari, Kerala-Konkan, Mahanadi and Andaman offshore and Total 39 holes at 21 sites were drilled.



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. NGHP-02 has discovered gas-hydrate-bearing sand reservoir system in the offshore Krishna Godavari basin.

Further extensive studies are planned to assess the gas hydrate resource potential, reservoir characterization, reservoir delineation and geo-mechanical modelling for seafloor and wellbore stability and identification of sites for pilot production for testing. KG deep offshore Area 'B' & 'C' contain gas hydrate accumulations may be suitable sites for gas hydrate production testing under NGHP Exp-03.

An Advisory Committee of International experts and an Indian Scientists is constituted for firming up way forward strategy. Advisory committee members opined that India may migrate from exploration to production testing phase which is currently in experimental stage. The experts indicated that there exists substantial data gap at present which requires to be addressed before designing and planning production testing. Technology for production of gas from gas hydrate is not yet matured and is at research and development stage world over. Thorough studies are required to be undertaken to look into the various aspects of pilot testing of Gas Hydrates specifically in sand bearing reservoirs which will be key parameters for making exploitation strategy. Various studies are being planned before entering into the next NGHP expedition.

g) Implementation of Policies

DGH has been entrusted for implementation of exploration and production related policies including 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. During the year, Government has delegated additional functions and approval powers to strengthen the DGH.

h) Information Technology

A number of new online applications have been 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, Production Sharing Contract Management System (PSC-MS), Essentiality Certificate Management System (ECMS), Expat Clearance from Ministry of Home Affairs etc.

Development of Single-window Clearance for expediting statutory approvals/clearances

DGH has developed a 'Single-window clearance' portal to expedite and facilitate various clearances /submissions/approvals pertaining to Exploration & Production Operations. The portal will enable operators to submit and track following applications online through single sign-in:



- 1) Petroleum Exploration License (PEL) - Petroleum Mining Lease (PML) to Central/ State Government
- 2) Expat Clearance from Ministry of Home Affairs (MoHA)
- 3) Vessel Clearance from Ministry of Defence (MoD)
- 4) Environment Clearance from Ministry of Environment, Forest & Climate Change (MoEF&CC)
- 5) Status of Forest/Wildlife clearance from MoEF&CC
- 6) DGH Production Sharing Contract Management System (PSC-MS)
- 7) Essentiality Certificate Management System (ECMS)

The system is mapped in a way to achieve last point clearance from all concerned authorities in Centre and State Governments. The issuance of certificates/approvals will be through the portal.

The Single-window clearance portal is currently live and all applications along with relevant document submission will henceforth be through this online portal (<https://online.dghindia.org:8443/dghoneclick>).

This will ensure expeditious processing and disposing off applications through the online portal under the umbrella of 'Single-window clearance portal'.

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

Major activities undertaken during 2019-20 :

I. Performance Benchmarking :

Performance benchmarking study of the PSU refineries for the Study Cycle 2018 have been completed by M/S Solomon Associates, USA. A workshop on "How to use data" was conducted on 19th / 20th November 2019. The participants comprised of a multidisciplinary team from all the PSU refineries. In the workshop, Solomon Associates deliberated on various KPI's used in benchmarking along with its significance and methodology of calculation. The final results of the study were presented in November 2019.

Performance Benchmarking Study for Pipelines (Liquid, Gas, LPG and SPMs) for 2018 cycle was initiated M/S Solomon Associates (SA), USA in January, 2019 for the first time. The Data Coordinators'



Seminar was conducted by SA with participants from Pipelines on 22nd / 23rd February, 2019 at CHT. The Study results were shared in October, 2019.

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 the year 2018-19. CHT was actively associated with BEE for target setting and has been monitoring the progress. Monitoring and Verification Audit of the Designated Consumers has been completed by BEE in association with CHT, Auditors and participating DC's.

A Energy Reduction Roadmap till 2030 in PSU Refineries have been prepared based on the Energy Efficiency Improvement studies for Process Side through EIL and for utilities side through PCRA along-with upcoming planned projects and revamps at the refineries. The roadmap is aligned with India's NDC of 33-35% reduction in Specific Energy Consumption by 2030 over the base year of 2005. The roadmap has also assigned a midterm (2023-24) and long term target (2030) for each PSU refineries.

- ▶ **Development of Water Consumption Norms and Reduction of Water Footprint for Refineries** through EIL has been carried out to enable preparation of a water reduction roadmap with a short term (<2 years) and a long term (>2 years) target. EIL is already in the process of submission of the final reports.
- ▶ **Approach paper on demand side steam management** based on best practices and Indian realities through M/s KBC, Singapore has been prepared and the report has been finalized after

presentation to the stakeholders and incorporating their suggestions.

- ▶ **Performance Improvement Programme of PSU Refineries**: CHT along with the industry finalized refinery-wise consultants for carrying out comprehensive refinery performance improvement programme of 7 PSU refineries (HPC-Mumbai and Visakh, BPC-Mumbai and Kochi, IOC- Panipat, Paradip and Mathura) in the first phase.

The Study for balance refineries (IOC- Barauni, Gujarat, Haldia, Bongaigaon, Guwahati, Digboi, CPCL-Manali and NRL shall be taken up in 2nd Phase and the activities of EOI finalization shall begin in Feb 2020.

- ▶ In order to improve energy efficiency and reduce energy consumption, CHT in association with the refineries organize surveys every year in the areas of 1) Furnace/Boiler efficiency and 2) Steam leak. These two areas are taken up every alternate year. Survey in area of steam leak was carried out in Jan 2019 and Furnace/Boiler efficiency shall be taken up in Jan 2020.

III. 24th Refining & Petrochemicals Technology Meet (RPTM) :

24th RPTM, organized by CHT in association with MRPL, will be held during 19th to 21st January, 2020 in Bengaluru. The Theme of the Meet is "Driving Refineries and Petrochemicals towards Sustenance". Around 1500 delegates/invitees from India and abroad are expected to participate in the Meet. 24th RPTM will have presentation of around 80 papers spread over 15 Technical Sessions and about 77 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 2019-20, SAC had four meetings till December 2019: 84th meeting on 22nd April, 2019, 85th meeting on 5th July, 2019, 86th meeting on 16th August, 2019 and 87th meeting on 13th December, 2019. 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
- ▶ Saksham Awards (based on Steam Leak and Furnace Efficiency Surveys)
- ▶ 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 2018-19, Saksham Award for 2019 and Innovation Awards for 2018-19 have been finalized by the Committee and will be presented to the winners during the Inaugural function of the 24th Refining & Petrochemicals Technology Meet (RPTM) on 19th January, 2020 in Bengaluru.

VI. Implementation of PM JI-VAN Yojana

Pradhan Mantri JI-VAN Yojana was announced in March, 2019 for promotion

of 2G ethanol by providing Viability Gap Fund (VGF) for setting up of 12 commercial units (combined capacity of ~40 crore liter per annum) and 10 demonstration units at semi commercial level. CHT has been nominated as nodal agency for implementation PM JI VAN Yojana. Request for Selection (RFS) for short listing of eligible Project Developers (PD) was issued on 26th August, 2019 with a cut-off date of 22nd November, 2019. Six proposals for commercial projects and one proposal for demonstration project have been received against RFS. Scientific Advisory Committee (SAC) on Hydrocarbons of MoP&NG is the nodal body for recommending the eligible Project proposals. The Proposals were deliberated during 87th meeting of SAC held on 13th December, 2019 and two commercial and one demonstration Project Proposal have been recommended for consideration.

VII. Development of Catalyst

Manufacturing Plant in India :

With a view to set up world class Catalyst Manufacturing Unit in India-under Make in India, Expression of Interest (EOI) have been issued from bidders having global reach for marketing of catalysts and catalyst manufacturing capability. The proposed catalyst plant is envisaged to be set up as a Joint Venture between an established Catalyst Manufacturer/Supplier and one or more PSUs under MoP&NG.

VIII. Feasibility study for production of ethanol at Refineries using waste gases through M/S LanzaTech, USA:

Based on Techno-economic Assessment, Studies for shortlisted PSU refineries have been planned in phases. The study for 1st phase of refineries is in progress.





IX. Feasibility & Business Model for Reference Fuel by EIL & IOC R&D

Reference Fuels are used by OEMs for testing their vehicles. These fuels are imported mainly from Germany. The study has been planned in three phases. The study for Phase-1 is in progress.

X. 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. Currently 14 Activity Committees are in place and 10 Activity Committee Meeting have been planned, out of which 7 have already been completed.

XI. 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 completed in May, 2019. A correlation programme was carried out with refineries, marketing and R&D Centers in NCR region for BS-VI grade MS and HSD only and completed during the period of July-October, 2019.

XII. Swachhata Ranking for PSU/JV Refineries

Swachhata Ranking of PSU/JV Refineries is a new initiative of the Ministry of Petroleum & Natural Gas, started in 2017. Refineries are ranked based on the Swachhata Index developed by Centre for High Technology. Swachhata Ranking for 2018 for PSU/JV

Refineries was finalized and was presented to the winners by Hon'ble Minister of Petroleum & Natural Gas and Steel on 16.9.2019.

14.5.5 Rajiv Gandhi Institute of petroleum Technology (RGIPT)



(a) Rajiv Gandhi Institute of Petroleum Technology, Jais, Amethi:

Campus Infrastructure: RGIPT has started operating from permanent campus at Jais, Amethi since October 2016. The campus is now having 2 academic units that hosts Department of Petroleum Engineering, Chemical Engineering, Management studies and Basic Sciences & Humanities. This is a fully residential campus with a hostel of 1000-bed capacity with required amenities.

Academic programme: Currently, two B. Tech. and two M. Tech. programmes in each of the Petroleum Engineering, and Chemical Engineering discipline is offered along with a MBA programme. The Institution is offering two new B. Tech. programmes in Computer Science & Engineering and Electronics & Instrumentation Engineering and two integrated dual degree programmes in Petroleum Engineering and Chemical Engineering from 2020-21 academic year onwards with the approval of academic Senate, Board of Governors and General Council. These programmes will supplement the Petroleum Engineering and Chemical Engineering programmes and fulfill the projected requirement of domain specific industries in the area of digitization of technologies and operations. The Institution also offers PhD programmes in all areas of basic sciences, Humanities, Petroleum engineering and Chemical Engineering. The faculty members have received more than 30 extra mural research project grants from DST, CSIR, DAE etc. The





Hon'ble Vice President of India Shri M. Venkaiah Naidu interacts with IPE students

campus currently hosts 550 UG and PG students in several disciplines along with 32 faculty members and 38 administrative staff members.

Industry-Academia Interface: Being a domain specific Institution and the oil PSUs being the promoters of RGIPT, the Institution has always given maximum emphasis to the requirements of the domain Industries. Several, short courses for the industry officials from IOCL, CPCL, OIL, BPCL and ONGC is conducted throughout the year. Several officials are also pursuing part-time PhD in the Institution. MoUs have been signed with several industries and some are under process to facilitate joint research activity, and overseas training programme. Team from RGIPT is regularly visiting R&D units of PSUs and delivering presentations about the expertise and facilities available in RGIPT and exploring avenues for joint research activities.

b) Sivasagar Assam Centre of RGIPT:

Objective of setting up of RGIPT Assam Centre

The objective of setting up of Assam Centre is to offer programmes of education and training of skilled technical manpower at the certificate, diploma and post diploma level in various areas of petroleum, petrochemical and allied sectors. There is also plan to offer training & certificate programmes (refresher and induction) for working professionals of oil and gas, petrochemical and allied companies, to serve as a Skill Development Centre for the North-East Region and to offer B. Tech in Fire Safety Engineering.

Project History:

- (A) The total land allocated to the RGIPT Centre by State Govt of Assam is 100 acres.
- (B) Steps were taken to provide the basic infrastructure facilities for starting the





Diploma Courses and approval was taken from MoPNG for setting up of a temporary campus on its own land at Sivasagar.

- (C) An educational Campus has since been constructed on RGIPT land by CPWD, Assam.
- (D) RGIPT has further sanctioned funds to CPWD for construction of an Engineering Workshop for students. Construction of the said Engineering Workshop by CPWD is currently going on. For offering skill based advanced Diploma Courses like Petroleum & Piping Engineering RGIPT Assam Centre is the only institute in the nation to offer these advanced Diploma Courses. It is extremely essential to provide hands on training to the students.

Academic activities status:

- (A) RGIPT Assam Centre at District Sivasagar was launched for offering programs of education and training of skilled technical manpower at the certificate, diploma and post diploma level in various areas in the domain of petroleum, petrochemical and allied sector to serve as a Skill Development Center for the North-East Region.
- (B) The academic session at RGIPT Assam Centre, Sivasagar started from 18th September 2017 in 3 diploma courses in Petroleum Engineering, Chemical Engineering and Piping Engineering with 30 students in each discipline from the premises of Sivasagar Commerce College and later, after one year, the classes were shifted to the Temporary Campus constructed at RGIPT's own land. For the 1st Three Batches, admission is done through Polytechnic Admission Test (PAT) conducted by Directorate of Technical Education (DTE), Assam Govt. In the first Three Batches, there are total of 264 students. The students are all Class X pass out, selected through PAT.

Future Plan

- Construction of hostel, laboratories, library, boundary wall, etc.
- Establishment of Academic, Administrative, Accounts & Audit and other allied sections to promote self-governance
- The cadre structure and sanctioning positions for teaching and non-teaching cadre staff shall be presented before Board of Governors.

c) Bangalore Energy Institute, Bengaluru, a Centre of RGIPT

- ▶ Academic activities from Bangalore Centre commenced in September 2018 from a temporary campus at Muddenahalli, hired from Visveswariah Technological University (VTU). Currently students are undergoing the M. Tech Programme in Renewable Energy and increase in students strength is expected from year to year.
- ▶ Nine faculty members who are M. Tech graduates with Doctoral qualifications have been appointed as Faculties on Contract basis.
- ▶ **Land:** The Karnataka State Government has allotted 150 acres of land at Village Kambalipura, Hoskote Taluk, Bangalore in the year 2015 which is given free of cost and Lease-cum-Sale Agreement is already registered.
- ▶ **Make-shift Campus:** In order to shift the academic activities from temporary campus to Kambalipura Land, a Make-shift Campus of 3500 sq. meter area with an Academic-cum-Admin block and 2 blocks of Hostels for girls & boys is being put up on the land. CPWD has tendered for the task and campus is expected to be completed by July.

14.5.6 INDIAN INSTITUTE OF PETROLEUM AND ENERGY (IIPe)



The Establishment of Petroleum University in Andhra Pradesh named as "Indian Institute of Petroleum and Energy (IIPe)" is a part of



Andhra Pradesh Reorganisation Act, 2014. Gazette Notification regarding Andhra Pradesh Reorganisation, 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 set up at Visakhapatnam 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.

Enactment: The institute has been enacted as an Institute of National Importance at par with IITs vide 'The Indian Institute of Petroleum and Energy Act, 2017 (No. 3 of 2018).

(a) Programs/Courses:

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.

IIPE has made MOUs with 'the University of Houston (UoH)' and 'Texas A & M University (TAMU)', USA for interaction and collaboration between faculty, staff and students and faculty exchange programs; with M/s. Petro Bazar for sharing of knowledge in Petroleum and Energy field on a common platform across the students and faculty and with NRDC for developing patents and intellectual properties.

Industry-Academia Interaction was held in the month of June 2019 inaugurated by the His Excellency Hon'ble Vice President of India Shri M Venkaiah Naidu for improvement of the quality of academics in collaboration with IIM (V), NRDC, AP Chamber of Commerce, Andhra University and AP State Government.

(b) Admission Data

Discipline	Intake	Existing Students			
		2016-17	2017-18	2018-19	2019-2020
Petroleum Engineering	50	46	42	46	59
Chemical Engineering	50	47	41	40	49
Total	100	93	83	86	108

The first batch of B.Tech students will graduate by June, 2020

(c) Permanent Campus

The Government of Andhra Pradesh has made available an area admeasuring about 201.80 acres in Visakhapatnam for building permanent campus for IIPE at Vangali Village, Sabbavaram Mandal, Visakhapatnam District vide proceedings of the District Collector, Visakhapatnam. However, immediate progress could not be made thereafter regarding the infrastructure development at the campus, due to the stay in the Hon'ble High Court of Andhra Pradesh over the claim of land.

District Collector, Visakhapatnam issued proceedings alienating land admeasuring 175.74 acres and 26.06 acres. The master plan and the architectural designs are under progress.

IIPE has made MOUs with APIIC for construction of boundary wall in the alienated land and with CPWD for construction of building as per plan approvals submitted by the licensed architecture agency.





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 Governing Body under the chairmanship of Secretary, P&NG and senior officials of MoP&NG and Chief Executives of major oil and gas PSUs as members, provides necessary supervision and guidelines in the functioning of PPAC. It is attached to the Ministry of Petroleum and Natural Gas (MoP&NG) to assist the Government, inter alia, in discharging of the following functions:

- 1) Administration of subsidy on PDS Kerosene and domestic LPG and freight subsidy for far-flung areas;
 - 2) Maintenance of an information data bank and communication system to deal with emergencies and unforeseen situations;
 - 3) Analyzing the trends in the international oil market and domestic prices;
 - 4) Forecasting and evaluation of petroleum import and export trends.
- 1. Important Database and dissemination of regular MIS Reports on oil and gas sector:** PPAC maintains data related to production, consumption, import and export of crude and petroleum products and oil infrastructure. It also maintains data related to production of natural gas, import of LNG and consumption of natural gas and on the CGD

sector. Under the mandate of PPAC, many daily, fortnightly, monthly, six-monthly and annual reports are published on PPAC's website <http://ppac.gov.in> as well as on the mobile app "PPACe" available on Apple App store and Google Play store. These reports pertain to daily prices of crude oil and petroleum products, Industry Sales Review, LPG Sales, crude oil processing and production, POL products imports & exports, consumption and import of Natural Gas etc. Besides the regular Reports and inputs on Petroleum products, PPAC also carries out many studies on the Demand, Supply, Transportation and Pricing of MS, HSD, LPG, Gas etc. The Reports by the PPAC assist the Policy makers and are also much demanded and appreciated by the Industry as well as other institutions and organisation in oil and gas sector.

2. Price Trends of Petroleum products and impact of subsidy/under-recoveries:

- i) **Crude oil:** Due to India's reliance on imports to meet the domestic demand, the prices of crude oil and petroleum products in the international markets have an 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 started rising and reached to \$ 69.88/ bbl during 2018-19 and is at \$ 63.75/ bbl during the current financial year 2019-20 (up to 16th December, 2019).
- 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 Oil Marketing Companies (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.

- 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.
- 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 Retail Selling Price (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 earlier.

Based on the above, the total increase in RSP (excluding state taxes/GST and other elements) of PDS Kerosene since July, 2016 till 16th December, 2019 has been ₹18.23/litre.

Effective 1st Oct, 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.

- 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 2018-19 was ₹ 43,844 crore in comparison to ₹ 28,684 crore in 2017-18. The same is ₹ 14,214 crore for the period April-September, 2019.

3. Important Activities:

Some of the important activities during 2019-20 undertaken by PPAC were as follows:

- i) Domestic natural gas pricing and ceiling price for gas produced from discoveries in deep water, ultra- deep water and high pressure-high temperature areas: fir notification and issuance were under the provisions of the New Domestic Natural Gas Pricing Guidelines, 2014: Domestic Natural Gas prices were notified for the periods 01.04.2019 to 30.09.2019 and from 01.10.2019 to 31.03.2020 in line with the New Domestic Natural Gas Pricing Guidelines, 2014.
- ii) "Highly Commended" award and shield of "Outstanding Contribution" to PPAC from MoDW&S (Ministry of Drinking Water & Sanitation) for initiatives under Swachh Bharat Abhiyan: PPAC for another successive year in a row bagged the prestigious special award "Highly Commended" and the shield for "Outstanding Contribution" from MoP&NG and MoDW&S for the sincere efforts in activities undertaken during the Swachhta fortnight in July, 2019. The exemplary work by PPAC employees was recognized and acknowledged and the





awards were given by the Honourable Minister in September, 2019. PPAC was amongst the top performer organizations of MoP&NG.

14.5.8 Petroleum Conservation Research Association(PCRA)



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. Over the years, PCRA has enlarged its role in improving productivity in use of various sources of energy.

PCRA undertake studies to identify the potential and to make recommendations for achieving conservation of petroleum products in various sectors of the economy. It sponsors R&D activities for the development of fuel-efficient equipment / devices and organizes multi-media campaigns for creating mass awareness for the conservation of petroleum products. Fuel oil utilization studies, energy audits, introduction of equipment bank concept, use of energy vans, development of oil consumption norms, model depot projects, driver training programs, workshops/exhibitions, consumer meets, education films/TV spots, hoarding/ electronic display, distribution of printed literature, R&D projects are other activities.

PCRA aims at making oil conservation a national movement. As part of its mandate, PCRA is entrusted with the task of creating awareness amongst the masses about the

importance, methods and benefits of conserving petroleum products & emission reduction. To take the message to the people, PCRA uses all possible and effective media for mass communication. These include electronic and press media e.g. TV, Radio, Electronic displays; Press at the National and State level printed literature for specific target groups; outdoor publicity through Hoarding, Bus panels, Kiosks, Balloons, Banners Tran-sliders etc.

The focus of all the messages is easy to implement and practical conservation tips for the industrial, transport, agriculture & domestic sectors. For effective communication to the target groups in semi-urban and rural areas, messages are made in regional languages. Field interactive programs like seminars, Technical meets, Consumer meets, Workshops, Clinics, van-publicity, Exhibitions, Kisan melas are conducted for dissemination of conservation messages and demonstration of conservation techniques. To give impetus to the oil conservation movement, PCRA utilizes various platforms like the World environment day, World energy day, various festivals etc.

Over the years, PCRA has developed a number of films, TV spots and radio jingles in various languages for promoting oil conservation. PCRA also publishes quarterly a journal and a newsletter. Active Conservation Techniques (ACT), is a journal containing articles on technology by energy experts. It also brings out successful case studies leading to conservation of energy.

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 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.”

With regard to Natural Gas Pipelines till December, 2019, PNGRB has authorized approx. 30,800 Km Natural Gas Pipeline network across the Country, out of this approx. 16,800 Km is operational and approx. 14,000 Km is under construction.

In 2019-20, PNGRB has authorized Kanai-Chhata-Srirampur Natural Gas Pipeline to Consortium of H-Energy and Srikakulam-Angul Natural Gas Pipeline to GAIL (India) Limited.

Till 8th CGD Bidding Round, there are 93 CGD Networks across 24 States/UTs in the country. In order to expand the coverage of CGD Networks, PNGRB has granted authorization for 86 GAs under 9th CGD Bidding Round and 50 GAs under 10th CGD Bidding Round. After completion of 10th CGD Bidding Round, PNGRB has so far authorized 229 CGD Networks across the Country spread over 27 States/UTs and States of Gujarat, Goa, Haryana and UTs of Delhi, Chandigarh, Diu & Daman and Dadra Nagar Haveli are fully covered with CGD Networks.

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 (MoPNG), 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 9.5 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 with Sovereign crude procured through funds provided by the Government.

Transfer of Crude oil from ISPRL Mangalore to Padur was carried out in December 2018 by commissioning of 42 inch, 36 Km pipeline between Mangalore and Padur. This was followed by successful commissioning of ISPRL Padur strategic caverns.

All the three facilities i.e. Visakhapatnam, Mangalore & Padur were dedicated to the Nation by Hon'ble Prime Minister on 10th February 2019.

ISPRL Crude was first time released for Mangalore Refinery and Petrochemicals Limited (MRPL) from Mangalore Cavern in Aug 2019. Subsequently crude oil was released from Padur facility also to MRPL in Oct 2019.

Various Agreements & MoUs with Overseas National Oil Companies

The Mangalore facility has two compartments of 0.75 MMT each. One of the compartments has been given to Abu Dhabi National Oil Company (ADNOC). An agreement was signed between ADNOC and ISPRL on 10th Feb 2018, permitting ADNOC to use one compartment at Mangalore. ADNOC has stored approx. 5.8 Million Barrels of crude at ISPRL's Mangalore cavern. It can use a portion of this oil as commercial supply to its customers in India, while the rest will remain as strategic storage to be released to meet emergencies such as supply disruptions due to natural disaster or geopolitical factors.

For ADNOC, storing oil in India will allow the

company to competitively meet market demand in India and across the fast developing south East Asian economies. This is the latest among several investment proposals India is working on to turn its west Asian oil suppliers into strategic investors in the country's oil economy.

In addition, ISPRL signed a MoU with Saudi ARAMCO on 28th of October 2019 on the sidelines of the visit of Hon'ble Prime Minister to Riyadh, for sharing one of the four compartment at Padur. Further discussions are underway to convert this MoU to a definitive agreement.

Commercial utilization of ISPRL facilities

ISPRL on behalf of ADNOC successfully loaded first commercial consignment containing approx. 8,68,000 Barrels of Das grade crude oil to HPCL, Vizag on 11-13th Dec 2019 as per the terms of Agreement between ADNOC and ISPRL.

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.

Land acquisition activities for both the locations i.e. Chandikhol, Odisha and Padur II, Karnataka are in progress. Environment Impact Assessment for both the sites is being done in association with NEERI. Discussion are underway to float an International Request for Qualification (RFQ) globally for prospective investors to participate in Phase 2 of SPR Projects under Public Private Partnership (PPP) mode.



14.5.11 Society For Petroleum Laboratory (SFPL)



Fuel Testing Laboratory (FTL) situated at Noida, is registered in the name of Society For Petroleum Laboratory (SFPL), was set up in the year 2000 in compliance of the directives by Hon'ble Supreme Court of India for checking quality of auto liquid in NCT/NCR to minimize vehicular pollution.

Operation and Management of Fuel Testing Laboratory is outsourced by SFPL to CSIR-Indian Institute of Petroleum (IIP) a reputed CSIR Laboratory in the field of Petroleum. FTL

conducts test on fuel samples, viz. petrol, diesel & kerosene oil against the prevailing Bureau of Indian Standards (BIS) specifications applicable for NCT/NCR. The samples are drawn and submitted to FTL Noida by Government Enforcement Agencies and PSU Oil Marketing Companies from NCT/NCR.

Society for Petroleum Laboratory (SFPL) has been allocated an amount of ₹ 209 lakhs under Grant-in-aid for financial year 2019-20 under General Head (non salary after deducting previous FY's unspent balance of ₹ 35,76,580/-) and ₹ 14 lakhs under Salary head.



SKILL DEVELOPMENT INSTITUTE

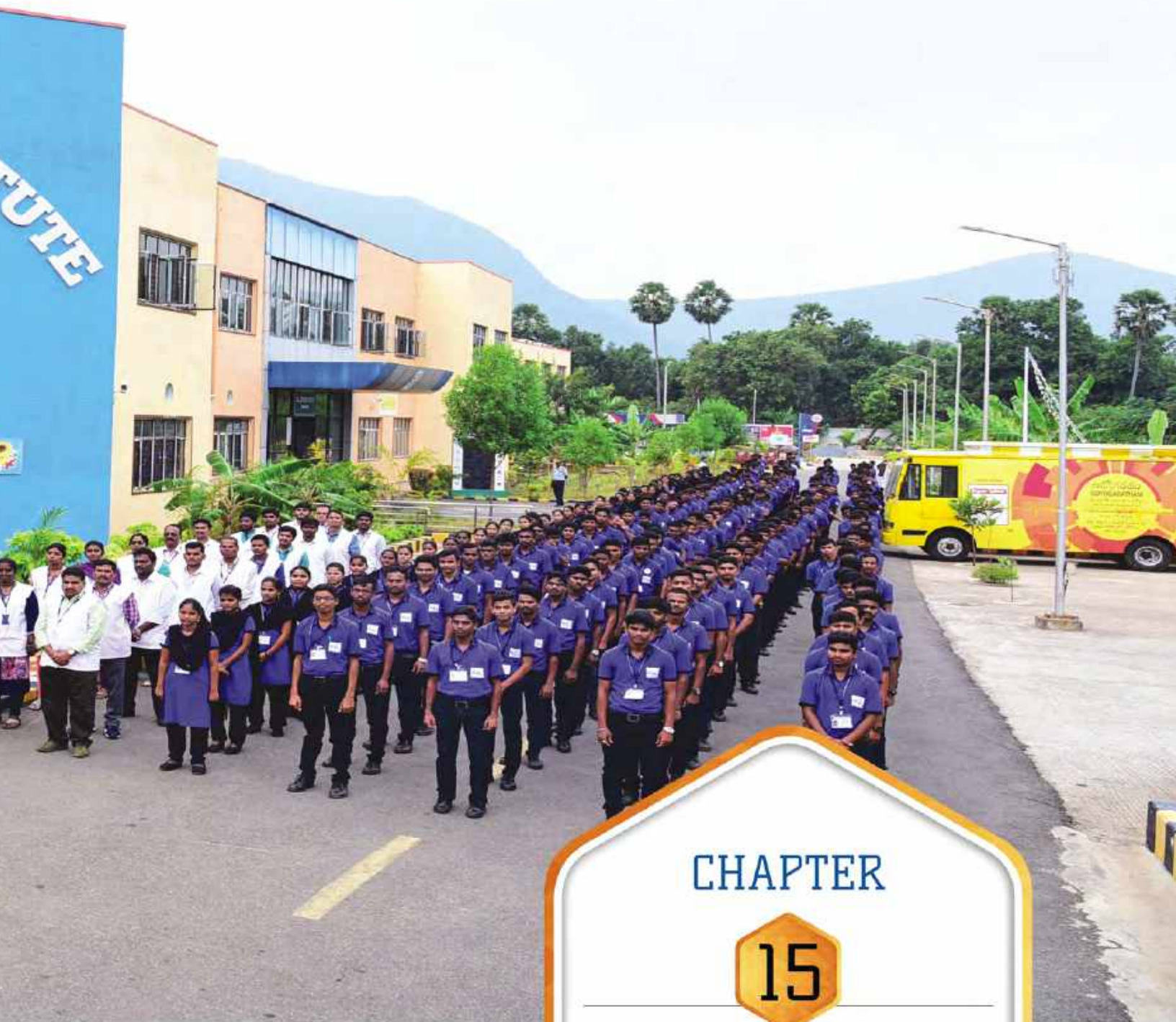


VISAKHAPATNAM

Touching Lives ... Everyday ...

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 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 Hon'ble Minister for Petroleum and Natural Gas. The Committee consists of fifteen non-official members including six members of Parliament, 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.

Similarly, an Official Language Implementation Committee is also functioning in the Ministry under the Chairmanship of Joint Secretary (G). 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 10 offices of our PSUs which includes offices of ONGC Videsh, IOCL, BPCL, HPCL, GAIL, Balmer Lawrie, OISD 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 104 Offices of our PSUs under Rule 10 (4) of Official Language Rules, 1976. With



Rajbhasha Puruskar 2020



a view to assess the progress of official language in our PSUs and in pursuance of the targets fixed in the Annual Programme 2019-20 issued by the Department of Official Language, senior officers of the Ministry inspected more than 46 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 officials 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 01st September, 2019 to 15th September, 2019. During this occasion, a Message from the Hon'ble Minister was issued to all our officers as well as to all the 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. Hon'ble Secretary, PNG awarded the successful candidates of hindi fortnight in a prize distribution ceremony convened on 16th september, 2019 in Constitution Club, New Delhi.

The Ministry had introduced a Rajbhasha Shield Scheme for our 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, MOP&NG. Prize distribution ceremony was convened on 16th september, 2019 in Constitution Club, New Delhi.

One of the important tasks 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



**As on 31st Dec 2019,
96.35% of public
grievances received
stand disposed.**

documents including the Parliament Questions, Cabinet Notes, Parliamentary, Standing Committee, Consultative Committee material, MOUs etc. was done well in time.

15.2 Public Grievance

In accordance with guidelines of the Cabinet Secretariat, Government of India, the Public Grievance Cell has been functioning in the Ministry of Petroleum & Natural Gas (MoPNG). 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 MoPNG has also been evolved so as to ensure speedy and expeditious redressal of the public grievances. The review of pendency of PGs in the MoPNG and Oil & Gas PSUs is undertaken regularly by Senior Officers.

During the year 2019-20, out of total number of 20341 PGs received, 96.35% stands disposed of as on 31st December, 2019.





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 2019, 2130 applications/receipts and 183 appeals have been received under RTI Act, 2005 in the Ministry.



Hon'ble Union Minister of P&NG and Steel, Shri Dharmendra Pradhan interacting with delegates at Petrotech 2019



15.4 Flagship Scheme

Start-Up India

Under the Start-up India initiative of Oil and Gas Sector, proposals/applications were invited through open advertisement by the individual PSUs for funding and mentoring. The themes for the proposals included leveraging Internet of Things (IoT) in Upstream/Midstream/Downstream operation of Oil and Gas Public Sector Units (PSUs). Digitization of business processes, Green Fuels, Alternative Energy, Improved technologies for Hydrocarbon industry besides topics of societal relevance.

The PSUs under the Ministry of Petroleum and Natural Gas have created a corpus fund of ₹ 320 Crores. At present, a total no. of 160 Startups are being funded by the PSUs with a committed fund value of approximately ₹190 Crores.

Skill Development

Skill India initiative was launched by Prime Minister of India on 15th July, 2015. The Mission creates convergence across sectors and states in terms of skill training activities.

In line with National Skill Development Mission of the Govt. of India, Hydrocarbon Sector Skill Council (HSSC) was set up on 26.04.2016 to facilitate the skill development requirement in Hydrocarbon Sector.

Six Skill Development Institutes (SDIs) at Bhubaneswar, Vizag, Kochi, Ahmedabad, Guwahati and Rae Bareilly have been started by IOCL, HPCL, BPCL, ONGC, OIL and GAIL respectively. As on January, 2020, 14398 trainees have been trained in SDIs.

Several high priority trades have been identified in consultation with the Industry members for National Occupational Standard (NOS)/ Qualification Pack (QP) development. Till date 16 QPs have been approved by National Skill Qualification Committee (NSQC) and NSDC's Qualification Registration Committee (QRC).

Under the Pradhan Mantri Kaushal Vikas Yojna (PMKVY) Recognition of prior learning (RPL) Type-4 project, HSSC is in process of



**As on November 2019,
the SDIs have imparted
training to
14398 trainees
in various trades.**

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 Driver (Petroleum Products) Trades. Till March 2020, assessment of 72709 personnel has been completed.

Make in India

The Make in India initiative was launched by Prime Minister in September 2014 as part of a wider set of nation-building initiatives devised to transform India into a global design and manufacturing hub.

To roll out Make in India campaign in Oil and Gas Sector, a policy to provide Purchase Preference linked with Local Content (PP-LC) in all Public Sector Undertakings under Ministry of Petroleum & Natural Gas was approved by the Government on 12.04.2017. The policy aims to incentivize the growth in local content in goods and services by implementing oil and gas projects in India by providing purchase preference to the manufacturers/service providers who meet the local content targets in oil and gas business activities.

During the current financial year PP-LC Policy was reviewed by the Steering Committee constituted under the Policy by MoPNG. As per the recommendations of Steering Committee, Policy has been extended for a further period of one year w.e.f.1.10.2019.

Ministry of Petroleum and Natural Gas on 6th August, 2018 prescribed Minimum Local Content (MLC) for High Speed Diesel (HSD) and Petrol as 10% each. MoP&NG reviewed the MLC for MS and HSD and prescribed MLC for some additional petroleum products on 25th June, 2019.







CHAPTER

16

Appendices



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 of 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, 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 Pipeline (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 there under.
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 (RGIT) Act, 2007
33. Matter pertaining to Indian Institute of Petroleum & Energy (IIFE), 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).



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 Institute of Petroleum Energy
10. Society for Petroleum Laboratory





Production of Crude Oil and Natural Gas

Appendix-III

State/ Region	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19 (P)	2019-20 (Apr - Dec) (P)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
I. Production of Crude oil (TMT)							
Andhra Pradesh	297	254	295	276	322	296	182
Arunachal Pradesh	111	76	57	55	50	43	41
Assam	4710	4466	4185	4203	4345	4309	3090
Gujarat	5061	4653	4459	4605	4591	4626	3527
Rajasthan	9180	8848	8602	8165	7887	7667	5205
Tamil Nadu	226	240	255	284	345	395	310
Offshore	18203	18924	19089	18421	18145	16868	12021
Total	37788	37461	36942	36009	35684	34203	24376
of which							
ONGC-Nomination	22246	22264	22360	22218	22249	21042	15387
OIL-Nomination	3466	3412	3226	3258	3376	3293	2355
PSC Regime	12076	11785	11356	10532	10059	9868	6634
II. Production of Natural Gas (MMSCM)							
Andhra Pradesh	1171	541	619	868	959	1081	689
Arunachal Pradesh	41	34	30	28	30	28	32
Assam	2868	2958	3025	3128	3219	3289	2432
Gujarat	1657	1527	1490	1580	1607	1402	1012
Rajasthan	982	1178	1338	1277	1442	1483	1344
Tamil Nadu	1304	1192	1011	983	1207	1208	824
Tripura	822	1140	1332	1430	1440	1554	1174
Jharkhand (CBM)	3	2	2	3	4	4	4
Madhya Pradesh (CBM)	6	2	1	6	200	357	257
West Bengal (CBM)	156	224	389	555	531	350	224
Offshore	26395	24861	23012	22038	22011	22117	15829
Total	35407	33657	32249	31897	32649	32873	23821
of which							
ONGC-Nomination	23284	22023	21177	22088	23429	24675	17919
OIL-Nomination	2626	2722	2838	2937	2881	2722	2047
PSC Regime	9497	8912	8235	6872	6338	5477	3854

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



Installed Capacity and Refinery Crude Throughput

Appendix-IV

Refinery	Installed Capacity	Refinery Crude Throughput						
	01.04.2019	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19 (P)	2019-20 (Apr-Dec) (P)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
a) PUBLIC SECTOR	142066	119547	121183	127087	137388	145234	150976	107892
IOCL, Guwahati	1000	1019	1006	904	864	1024	863	757
IOCL, Barauni	6000	6478	5944	6545	6526	5819	6661	4906
IOCL, Koyali	13700	12960	13285	13820	13994	13811	13505	9417
IOCL, Haldia	7500	7952	7650	7776	7689	7655	7965	5012
IOCL, Mathura	8000	6641	8515	8860	9230	9240	9737	6987
IOCL, Digboi	650	651	591	562	533	666	676	487
IOCL, Panipat	15000	15098	14191	15282	15638	15654	15281	11095
IOCL, Bongaigaon	2350	2328	2403	2442	2486	2402	2513	1712
IOCL, Paradip	15000	-	-	1817	8230	12730	14616	11945
Total IOCL	69200	53126	53586	58007	65191	69001	71816	52316
BPCL, Mumbai	12000	12684	12821	13371	13541	14054	14773	11015
BPCL, Kochi	15500	10285	10356	10712	11820	14095	16051	12325
Total BPCL	27500	22969	23177	24083	25362	28149	30823	23340
HPCL, Mumbai	7500	7785	7408	8013	8510	8641	8671	5949
HPCL, Vishakhapatnam	8300	7776	8770	9220	9335	9635	9773	6690
Total HPCL	15800	15561	16179	17234	17846	18276	18444	12639
CPCL(MRL), Manali	10500	10065	10251	9100	9725	10289	10271	7625
CPCL(MRL), Narimanam	1000	559	531	544	531	500	423	0
Total CPCL	11500	10624	10782	9644	10256	10789	10695	7625
NRL, Numaligarh	3000	2613	2777	2520	2683	2809	2900	1759
MRPL, Mangalore	66	14589	14632	15532	15965	16130	16231	10146
ONGC, Tatipaka	15000	65	51	67	86	80	66	66
(b) PRIVATE SECTOR	88200	88229	88533	88662	91093	91163	88041	67523
RIL, Jamnagar	33000	30307	30867	32428	32823	33153	31752	24047
RIL, SEZ-Jamnagar	35200	37720	37174	37133	37351	37317	37393	27929
Total RIL	68200	68027	68042	69561	70174	70470	69145	51976
NEL, Vadinar	20000	20202	20491	19101	20919	20693	18896	15548
(c) JOINT VENTURE	19100	14721	13526	17116	16882	15538	18189	14969
BORL, Bina	7800	5450	6209	6402	6360	6708	5716	5821
HMEL, Bathinda	11300	9271	7318	10713	10521	8830	12473	9148
Grand Total	249366	222497	223242	232865	245362	251935	257205	190385



Production of Petroleum Products

Appendix-V

State/ Region	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19 (P)	2019-20 (Apr -Dec) (P)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
LPG	10030	9840	10568	11326	12380	12786	9455
Motor Spirit	30275	32325	35321	36593	37784	38039	28987
Naphtha	18505	17391	17861	19946	20006	19786	14997
Kerosene	7418	7559	7503	6041	4408	4072	2291
ATF	11220	11103	11789	13831	14594	15479	11504
HSD	93759	94428	98588	102484	107904	110535	82739
LDO	423	358	429	629	562	562	487
Fuel Oil (FO+LSHS)	16853	17080	18479	19121	20030	20479	6514
Lube Oils	941	946	1037	1029	1036	949	685
Bitumen	4785	4632	5157	5185	5277	5803	3703
Petroleum Coke	12068	12448	13322	13936	14754	14676	11194
Others	14479	13027	11870	13430	15671	19195	22907
Petroleum Products	220756	221136	231923	243551	254405	262361	195462
of which							
Refineries	216456	217141	227907	239256	249797	257430	191873
Fractionators	4300	3994	4016	4294	4608	4931	3589

Note: Figures may not tally due to rounding off P: Provisional
Source: Oil Companies



Consumption of Petroleum Products

Appendix-VI

Products	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19 (P)	2019-20 (Apr-Dec) (P)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
LPG	16294	18000	19623	21608	23342	24907	19501
Motor Spirit	17128	19075	21847	23765	26174	28284	22850
Naphtha	11305	11082	13271	13241	12889	14131	9823
SKO	7165	7087	6826	5397	3845	3460	1896
ATF	5505	5723	6262	6998	7633	8300	6082
HSDO	68364	69416	74647	76027	81073	83528	62776
LDO	386	365	407	449	524	598	468
Fuel Oil (FO+LSHS)	6236	5961	6632	7150	6721	6564	4542
Lubes/Greases	3305	3310	3571	3470	3884	3668	2733
Bitumen	5007	5073	5938	5935	6086	6708	4527
Petroleum Coke	11756	14558	19297	23964	25657	21346	16238
Others	5956	5870	6352	6593	8339	11723	8818
Total Consumption	158407	165520	184674	194597	206166	213216	160254

Notes: Consumption includes sales by oil companies, own consumption & direct private imports.

P: Provisional

Source: PPAC



Appendix-VII

Imports / Exports of Crude Oil and Petroleum Products

ITEM	2016-17			2017-18			2018-19			2019-20 (Apr-Dec) (P)		
	TMT	₹ Crore	Million USD	TMT	₹ Crore	Million USD	TMT	₹ Crore	Million USD	TMT	₹ Crore	Million USD
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Imports												
Crude Oil	213932	470159	70196	220433	566450	87803	226498	783183	111915	168589	550174	87297
Product												
LPG	11097	32124	4775	11380	37875	5849	13235	49939	7178	10855	34663	4908
MS	476	1617	239	174	581	91	670	3104	445	1812	8252	1170
Naphtha	2777	8374	1240	2212	8161	1261	2082	9665	1391	1403	5499	779
ATF	338	1109	163	300	1159	178	259	1392	200	68	309	45
SKO	0	0	0	0	0	0	0	0	0	0	0	0
HSD	1008	2959	438	1361	4269	660	555	2486	360	1665	7039	999
LOBS/ Lube oil	2131	8625	1276	2539	12075	1860	2457	13349	1910	1876	9069	1286
Fuel Oil	925	1848	273	1213	3231	499	1419	4782	596	2323	6458	916
Bitumen	951	1638	242	950	1902	293	877	2149	309	918	2145	304
Petcoke	14416	7929	1174	12777	11100	1709	7926	10350	1494	7859	8132	1154
Others	2169	5342	793	2556	8020	1237	3869	16449	2358	2463	9264	1315
Total Product Import	36287	71566	10614	35461	88374	13637	33348	113665	16341	31241	90830	12874
Total Import	250219	541725	80810	255894	654824	101440	259846	896848	128255	199829	641003	91171
Exports												
LPG	317	1168	173	359	1501	231	417	1976	283	338	1364	193
Petrol	15417	52920	7895	14036	54580	8464	12885	60419	8641	9755	44140	6271
Naphtha	8727	24616	3666	8951	29075	4505	5963	28893	4137	6562	24076	3412
Aviation Turbine Fuel	7271	22294	3324	7183	25348	3931	7389	34030	4867	5396	23117	3279
Kerosene	15	54	8	17	68	10	19	98	14	16	77	11
Diesel	27302	79857	11905	29717	99454	15420	27833	123519	17625	24164	99311	14074
LDO	151	399	59	18	37	6	99	364	50	0	0	0
Lubes	13	104	15	13	118	18	8	106	15	6	72	10
Fuel Oil	2248	3930	583	2525	5291	817	2197	6537	923	1310	3264	461
Bitumen	38	37	6	64	119	18	23	72	10	19	67	9
Petcoke/CBFS	673	804	121	561	687	107	1124	3255	463	443	1087	154
Others	3344	8710	1294	3387	9110	1412	2140	8429	1208	2047	5739	815
Total Export	65513	194893	29049	66833	225388	34940	61096	267697	38236	50055	202311	28688
Net Import	184706	346832	51760	189061	429436	66500	198750	629152	90020	149774	438693	62483
Net Product Export	29226	123327	18436	31372	137014	21303	27747	154031	21895	18814	111481	15814

Source: Oil companies and DGC&S
(P): Provisional



Appendix-VIII

Internal & External Budgetary Resources

(Figures in ₹ Crore)

Products	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19		2019-20	
	Actual	Actual	Actual	Actual	Actual	BE	Actual	BE	Actual (Apr-Dec)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
OVL	35357	7172	6783	17617	6798	5886	5827	5161	3897
ONGC	32470	29997	30110	28006	72902	32077	29450	32921	18793
OIL	9351	3774	3622	11083	8154	4300	3181	4105	2608
GAIL ²	4070	1632	1512	1814	3680	4722	7143	5339	2654
IOCL	16661	14314	11485	20737	21457	22862	28208	25084	17801
HPCL ³	2642	2670	1430	5757	7210	8425	12438	9500	5853
BPCL ⁴	4374	6875	8287	16949	8998	7400	10993	7900	9239
MRPL	1449	2747	1502	616	1281	744	1072	818	972
CPCL	229	466	1272	1269	1020	1010	1314	1105	783
NRL	372	103	70	503	420	428	465	455	320
BALMER	120	80	45	74	83	125	132	40	23
LAWRIE									
EIL	0	0	0	0	0	1356	87	1212	78
Total (I&EBR)	107092	69829	66119	104426	132004	89335	100309	93639	63021

1. Due to typo error, in NRL during actual 2017-18 amount of ₹ 419.03 crore is printed as ₹ 419.93 crore owing to which Total actual 2017-18 has been inadvertently printed as ₹132003.88 crore instead of ₹ 132002.98 crore.
2. IEBR of GAIL ₹ 5339 crore excludes Budgetary support (VGF) of ₹ 1512 crore proposed for Jagdishpur Haldia-Bokaro Dhamra Pipeline .
3. For HPCL, IEBR of ₹ 9500 crore includes ₹ 500 crore of HRRL a subsidiary of HPCL.
4. For BPCL, BE 2019-20 of ₹ 7900 crore includes CAPEX of ₹ 800 crore of BPRL a subsidiary of BPCL.

Source: Ministry of Petroleum and Natural Gas



PSU-WISE VARIATION IN PROFIT BEFORE TAX (PBT) AND PROFIT AFTER TAX (PAT) 2018-19 VIS-À-VIS 2017-18

Appendix-IX

ONGC

VARIATION IN PBT and PAT from Actual 2017-18 vis-a-vis Expected 2018-19 is mainly due to the following :

1. Crude oil price assumed for RE 2018-19 was \$65/bbl, whereas in Actual in 2017-18, average realization was \$55.19/bbl.
2. Similarly, Natural gas price assumed for RE 2018-19 was \$3.21/MMBTU against which actual 2017-18 realization was \$2.69/MMBTU.
3. Exchange rate assumed in RE 2018-19 was ₹70/\$ whereas the same was ₹64.45/\$ in 2017-18.

IOCL

Variation in estimated PBT in 2018-19 vis-avis 2017 is mainly on account of estimated inventory losses and exchange 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 \$3.16/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 the lower refining and marketing margin also coupled with incurrance of significant foreign exchange losses on account of Rupee depreciation.

EIL

The estimated profit during FY 2018-19 lower than the profit during FY 2017-18 as in 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 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 RE2018-19 is prepared with Brent crude price assumption of US\$75/bbl and exchange rate assumption ₹ 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 FY 2018-19 (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.

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 FY 2018-19.

Balmer Lawrie & Co. Ltd

No significant variance for the year 2018-19 as compared to 2017-18.



Position of ATN in respect of Audit Observation included in the Annual Report as well as those included in earlier Annual Reports. **Appendix-X**

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 ATN not sent by the Ministry even for the first time	No. of ATN sent but returned with observations and Audit is awaiting their resubmission by the Ministry	No of ATNs which have been finally vetted by Audit but have not been submitted by the Ministry of PAC/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	-
17	2019	11	13	14	3

Paras contained in Inspection Reports :

A total of 36 Inspection Reports (IR) Paras from 04 IR were outstanding against this Ministry as on 31.12.2018. As on date, 15 Paras have been settled in the latest audit held during 01.01.2019 to 27.03.2019 and 10 new paras have been added for the Financial Year 2017-18. Hence, as per the latest intimation by the Audit on 23.07.2019, a total of 31 Para from 04 IR have been shown pending including new paras for the year 2017-18.



Audit Report No. 7 of 2019 on Marine Logistics Operations in Oil and Natural Gas Corporation Limited (ONGC)

The Marine Logistic Services of ONGC provide vital support to the offshore platforms and rigs through vessels and by storing and supplying various types of materials/equipment required for smooth exploration and production operations.

C&AG commented that ONGC had not planned for adequate number of Offshore Supply Vessels (OSVs), resulting in compromise of mandatory safety (standby) duty. Besides, ONGC's decision to reduce OSVs instead of costlier Platform Supply Vessels (PSVs) increased the cost of marine logistics operations by ₹ 25.99 crore. C&AG pointed out deficiencies in awarding of new vessel construction contract to an inexperienced contractor solely on the basis of experience of the foreign technical collaborator. Against scheduled delivery of 12 vessels by December 2011, the contractor could deliver only seven vessels by March 2018.

C&AG commented on the inordinate delay in finalization of tender for hiring of tanker due to which Company had to procure fuel through costlier alternative source leading to additional cost of ₹ 163.44 crore. Further, it was also commented that as against requirement of two barges, ONGC hired only one barge leading to an extra expenditure of ₹ 307.58 crore to the Company on account of more costly HFHSD sourced from OMCs.

C&AG Pointed out non-implementation of recommendations of the consultant to schedule vessels on fixed basis than on an ad-hoc basis in order to reduce the turnaround time of supply vessels. According to C&AG, the excess vessel trips to drilling rigs as compared to average trips made by vessels to similar type of rigs in European waters indicated an increased cost of ₹ 376.10 crore to the Company. PSVs (with higher day rate) meant for supply duty, were increasingly deployed for standby duty at Western Offshore which led to increase in cost of logistic operation of ₹ 181.72 crore.

C&AG found deficiencies in deck space utilization, which was below optimum levels and was also not properly verified. Use of containers and Cargo Carrying Units (CCUs) for loading on vessels leading to improved deck space utilization was not implemented substantial portion of bulk cargo carried was returned undelivered as Return on Board. Besides, ONGC did not have an effective control mechanism to check the fuel consumption supplied free of cost to hired vessels. C&AG also commented on ONGC's failure to limit the Turnaround time (TAT) of vessels to global norm of

6 hours at the shorebase, which resulted in extra operational cost of ₹ 181.78 crore.

C&AG noted that Nhava Supply Base (NSB) is presently managed with fragile infrastructure and outdated system resulting in increased cost of operations and increase in vessel requirement. NSB up-gradation project, though initiated in 2003, is yet to be implemented contributing to operational constraints affecting the TAT. With regard to utility management, C&AG commented that around 83 per cent of water supplied to NSB by MIDC through pipeline was tapped en-route. Besides, insufficient supply of water at NSB adversely affected the offshore operations. C&AG also commented on lack of internal control at NSB and inadequate physical verification of stores and spares which led to the stock account remaining unreconciled and disparity in consumption of stores. Stock was kept in open area without any segregation between scrap and usable material.

C&AG found deficiencies with regard to safety in marine logistics operations. Non adherence to procedures laid down in Marine Operations Manual by vessel operators and selective adoption of guidelines lead to compromise of safety in Marine logistics operations. Besides, ONGC does not have a separate marine cadre to supervise quality of services provided by its Operation and Maintenance contractor and to ensure adherence to standards defined by the Company for chartered vessels.

C&AG recommended ONGC/Ministry the following :

- Introduce fixed scheduling of vessels and consider utilization of Cargo Carrying Units for optimum deck space utilization. Deploy Platform Supply Vessels for supply duty in place of Offshore Supply vessels.
- Include cost and consumption pattern of fuel by the vessels as a parameter in evaluation of the bids for hiring of vessels.
- Standard Operating Procedures for Shorebase Operations need to be finalized and implemented.
- Devise and implement an integrated up-gradation plan for Nhava Supply Base (NSB) in line with the international best practices, and operate NSB as an integrated Material Management warehouse.
- Ensure full compliance with the safety, rescue and emergency response standards adopted by the Company. Develop a cadre of marine professionals with vessel related competency.

Ministry accepted all the recommendations of C&AG.



Report No.13 of 2019 of CAG of India on Union Government (Commercial)-Compliance Audit Observations

Audit observed that India Oil Corporation Limited (IOCL) paid entry tax to the extent ₹ 528.01 crore for transfer of High Speed Diesel Oil and Motor Spirit from its Barauni Refinery/Terminal to Patna Terminal through pipeline for the retailers/direct customers and also for OMCs during the period from 2008-09 to June 2014. Though the above entry tax was un-adjustable, IOCL, however, recovered ₹ 187.25 crore of the above un-adjustable entry tax from the consumers in the state of Bihar with an expectation of recovering the balance amount of un-adjustable entry tax by December 2019. Audit thus noted that the action of IOCL towards shifting the burden of avoidable expenditure of entry tax on the consumers was unjustified and inequitable.

(Para 6.5)

Audit observed that there was abnormal delay in taking final decision by Bongaigaon Refinery of Indian Oil Corporation Limited to replace the defective Heat Exchanger even after pointed out by Engineers India Limited and also by the Technical Department of the company. Thus, running of defective Heat Exchanger led to lower generation of high value distillate product (MS) by the refinery with consequential loss of revenue of ₹ 324.90 core.

(Para 6.6)

BPCL/IOCL discontinued the earlier policy of distributing gold coins to employees on completion of 15/20/25 years of service as per Ministry's direction since it was inconsistent with DPE guidelines. However, the Companies introduced a new policy of distributing pre-loaded card voucher or an item/memento/emblem (other than gold/silver) of employee's choice though this was also in contravention of DPE/Ministry guidelines. The Oil Marketing Companies incurred an irregular expenditure of ₹107.63 crore for distribution of article/preloaded card as per the new scheme which was in contravention of DPE guideline/direction of Administrative Ministry.

(Para 6.1)

Performance Audit Report of the comptroller and Auditor General of India (Report No. 14 of 2019) on 'Pradhan Mantri Ujjwala Yojana' (Ministry of Petroleum and Natural Gas)

Major Audit findings :

I. Distribution of LPG connections under PMUY

In order to rule out existing LPG connection in

beneficiaries' household, de-duplication was carried out on Aadhaar of all family members. Audit noticed that out of 3.78 crore LPG connections, 1.60 crore (42 per cent) connections were issued only on the basis of beneficiary Aadhaar which remained a deterrent in de-duplication.

(Para 3.1)

- Laxity in identification of beneficiaries was noticed as 9897 LPG connections were issued against Abridged Household List Temporary Identification Number (AHL TINs - a unique number of 29 digits assigned to each member of BPL household under SECC) where names of all family members and the beneficiary were blank in SECC-2011 list. Similarly, 4.10 lakh connections were issued against AHL TINs where entire detail of family, except that of one member, was blank in SECC-2011 list.

(Para 3.2.1 & 3.2.2)

- PMUY envisaged release of LPG connection in the name of woman. However, audit observed that due to lack of input validation check in software of Indian Oil Corporation Limited (IOCL), 1.88 lakh connections were released against AHL TIN of males.

(Para 3.2.3)

- In 52271 cases, connections were issued by linking names of persons with names of beneficiaries appearing in SECC list by using conjunction URF/OR/ALIAS to project that both the names pertain to the same consumer.

(Para 3.2.4)

- Lack of input validation check in IOCL software allowed issue of 0.80 lakh connection to beneficiaries aged below 18 years. Similarly, data analysis revealed that 8.59 lakh connections were released to beneficiaries who were minor as per SECC-2011 data which was in violation of PMUY guidelines and LPG Control Order, 2000.

(Para 3.2.5)

- Data analysis revealed mismatch in names of 12.46 lakh beneficiaries between PMUY database and SECC-2011 data. Further, test check in field audit revealed that AHL TINs of 784 (18per cent of 4348 KYCs verified) intended beneficiaries were used by LPG distributors to extend benefits to unintended persons.

(Para 3.2.7)



- Deficiencies in de-duplication to restrict issuance of duplicate connections were noticed in 12465 cases. Further, lack of input validation check allowed release of 42187 connections against invalid AHL TINs which did not exist in SECC-2011 data.

(Para 3.3.1 & 3.3.2)

- Delay of more than 365 days was noticed in installation of 4.35 lakh connection against stipulated time period of seven days.

(Para 3.5)

II. Compliance to safety standards

- Departure from safety norms were noticed during test check of 18558 KYC records as per installation inspection report was not available in 2531 cases (13.64 per cent). Similarly, installation certificates were not available in 2367 cases (12.75 per cent)

(Para 4.1.1 & 4.1.2)

- Instances of unsafe LPG practices by PMUY beneficiaries were also observed as the stoves were kept on ground / below the level of cylinder, non-standard hose pipe was being used etc. as noticed during beneficiary survey.

(Para 4.1.4)

III. Infrastructure preparedness

- Inadequate efforts in commissioning targeted 10000 new LPG distributorships by OMCs led to a compelling situation for existing LPG distributors to supply cylinders either at long distance or from godown/designated points instead of door delivery.

(Para 5.3.1)

- Delay of more than 10 days (ranging up to 664 days) was noticed in delivery of 36.62 lakh LPG refills against the stipulated delivery period of seven days. Further, the poor performance of LPG distributors in adherence to Targeted Delivery Time (TDT) norms of Marketing Disciplinary Guidelines (MDG) was not monitored by the OMCs.

(Para 5.3.1.3 & 5.3.1.4)

- Expenditure Finance Committee (EFC) and Petroleum Planning and Analysis Cell (PPAC)-Credit Rating Information Services of India Limited (CRISIL) had highlighted the importance of small 5 Kg cylinders to make PMUY successful considering high refill cost as a barrier to LPG usage, however, inadequacy of efforts was noticed in this direction as only 92005 (0.24 per cent) beneficiaries were provided 5 Kg cylinder connections.

(Para 5.4)

IV. Transition of BPL households to LPG

- Encouraging the sustained usage of LPG remains a big challenge as the annual average refill consumption of 1.93 crore PMUY consumers (who have completed more than one year as on 31 March 2018) was only 3.66 refills as worked out by audit. Similar analysis for 3.18 crore PMUY beneficiaries as on 31st December 2018 revealed that refill consumption declined to 3.21 refills per annum.

(Para 6.2.1)

- Risk of diversion of domestic cylinders for commercial use was noticed as 1.98 lakh PMUY beneficiaries had an average annual consumption of more than 12 cylinders which seems improbable in view of their BPL status. Similarly, 13.96 lakh beneficiaries consumed 3 to 41 refills in a month. Further, IOCL and Hindustan Petroleum Corporation Limited (HPCL) in 3.44 lakh instances issue 2 to 20 refills in a day to a PMUY beneficiary having single bottle connection.

(Para 6.2.3)

- Low consumption of refills (up to three) by 0.92 crore loanee consumers had hindered recovery of outstanding loan of ₹ 1234.71 crore.

(Para 6.4.1)

V. Financial Management

- Though year-wise target for release of PMUY connections was revised (September 2017) to two crore connections each for the years 2016-17 to 2019-20, neither the Revised Estimates for 2017-18 nor the Budget Estimates



for 2018-19 was allocated in line with the revision of targets or for meeting the shortfall for the previous years. This led to partial settlement of OMC's claims in these years due to shortfall in the budget.

(Para 7.1)

- There was excess parking of funds under Corporate Social Responsibility (CSR) pool which was contributed on the directives of Ministry of Petroleum & Natural Gas (MoPNG) without any realistic assessment thereof. As such, an amount of ₹ 261.85 crore was laying idle which could have been utilized elsewhere in other deserving projects.

(Para 7.2)

Recommendations :

- Aadhaar numbers of all adult family members of existing as well as new beneficiaries should be entered in the system to make de-duplication effective.
- Appropriate input controls, data validations and mandatory fields should be deployed in distributors' software to restrict issuance of LPG connections to ineligible beneficiaries;
- E-KYC needs to be initiated to reap twin benefits viz. capturing correct information and authenticating genuineness of the PMUY beneficiaries.
- LPG connections issued to minor beneficiaries may be transferred in the name of adult family member if the family is otherwise found eligible under PMUY.
- The feasibility of sharing the AHL TIN with the beneficiaries may be explored by MoPNG in coordination with MoRD.
- Massive safety campaigns need to be organized in order to ensure safe usage of LPG by PMUY beneficiaries.
- The option of subsidizing the cost of mandatory inspection may be explored to avoid risk hazards in the absence of regular inspections.
- As the target of releasing PMUY connections has been broadly achieved, PMUY beneficiaries in nil/low consumption category need be encouraged for sustained usage.
- Cases of high consumption of refills should be regularly reviewed to curb diversion.
- Considering the audit findings on the basis of limited test check of sample cases, the entire LPG databases as well as physical records need to be scrutinized to identify and restrict release of connections to ineligible/male/minor beneficiaries / multiple connections.
- MoPNG, in consultation with concerned ministries, may develop a comprehensive roadmap for assessing the outcome in terms of measurable benefits like improvement in health of women and reduction in Household Air Pollution.
- Third Party Audit, as envisaged in the scheme, may be got carried out to assess the implementation of scheme.





Notes





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पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय
भारत सरकार
Ministry of Petroleum & Natural Gas
Government of India

