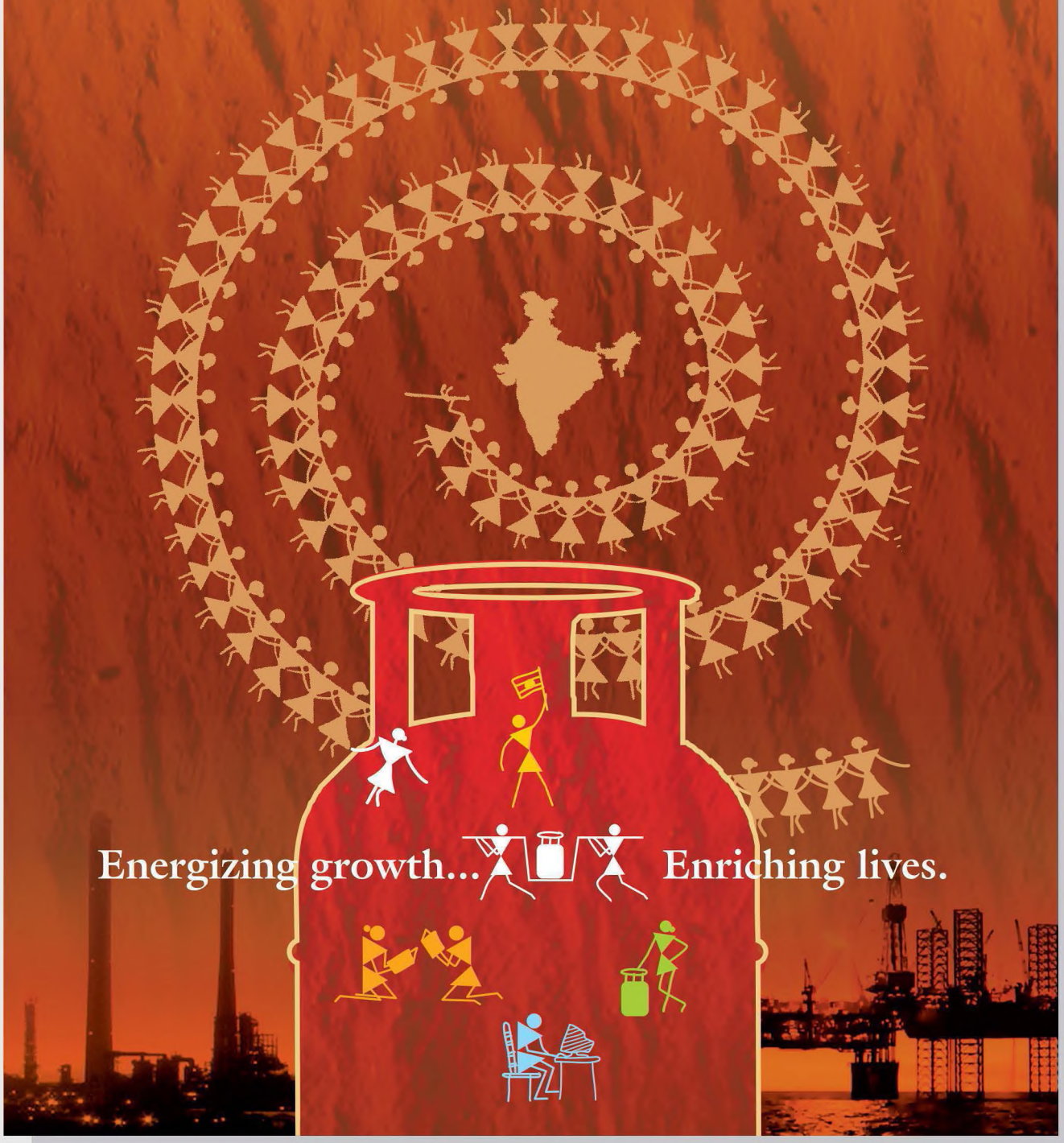
MINISTRY OF PETROLEUM & NATURAL GAS
Government of India

ANNUAL REPORT
2015 - 2016



CONTENTS

chapter 1

Introduction

Introduction

1.1 The Ministry of Petroleum and Natural Gas is concerned with exploration and production of Oil & Natural Gas (including import of Liquified Natural Gas), refining, distribution and marketing, import and export and conservation of petroleum products. The work allocated to the Ministry is given in Appendix-I. The names of the Central Public Sector Enterprises and other organizations under the Ministry are listed in Appendix-II.

1.2 Shri Dharmendra Pradhan continues to hold the charge of Minister of State (Independent Charge) for Petroleum & Natural Gas with effect from 27th May, 2014.

1.3 Shri Saurabh Chandra, IAS (UP: 1978) continued to hold the charge of Secretary, PNG till the date of his superannuation i.e. 30.4.2015

1.4 Shri K.D. Tripathi, IAS (AM: 1980) assumed the charge of Secretary (P&NG) in the Ministry of Petroleum & Natural Gas with effect from 1st May, 2015.

1.5 Dr. Subhash Chand Khuntia IAS (KN: 1981) relinquished the charge of Special Secretary & Financial Advisor in the Ministry of Petroleum & Natural Gas on his appointment as Secretary, Department of School Education on 15.06.2015.

1.6 Shri Ajay Prakash Sawhney, IAS (AP: 1984) assumed the charge of Additional Secretary in the Ministry of Petroleum & Natural Gas with effect from 23rd March, 2015.

1.7 Shri Anant Kumar Singh, IAS (UP: 1984), assumed the charge of Additional Secretary & Financial Advisor in the Ministry of Petroleum & Natural Gas w.e.f. 1st September, 2015.

1.8 Shri U.P. Singh, IAS (OR: 1985) earlier holding the post of Joint Secretary in the Ministry has been appointed as Additional Secretary by upgrading the post of Joint Secretary as Additional Secretary in the Ministry of Petroleum & Natural Gas w.e.f. 30th July, 2015.

1.9 Ms. Urvashi Sadhwani, (IES: 1982) assumed the charge of Senior Advisor in the Ministry of Petroleum & Natural Gas with effect from 9th November, 2015.

1.10 Dr. (Smt) Archna S. Mathur (IES : 82) continued to hold the charge of Economic Advisor, PNG till the date of her promotion to the post of Senior Economic Advisor.

1.11 Dr. Neeraj Mittal, IAS (TN: 1992) relinquished the charge of Joint Secretary (M) in the Ministry of Petroleum and Natural Gas on completion of his Central Deputation Tenure on 4.6.2015.

1.12 Shri Sandeep Poundrik, IAS (BH: 1993) continues to hold the post of Joint Secretary in the Ministry of Petroleum & Natural Gas with effect from 8th October, 2014.

1.13 Shri Ashutosh Jindal, IAS (MT: 1995) assumed the charge of the post of Joint Secretary in the Ministry of Petroleum & Natural Gas w.e.f. 17th February, 2015.

1.14 Shri Sunjay Sudhir, IFS (1993) assumed the charge of the post of OSD (Joint Secretary level) in the Ministry with effect from 14th December, 2015 and subsequently assumed the charge of the post of Joint Secretary in the Ministry of Petroleum & Natural Gas w.e.f. 12th January, 2016.

1.15 Shri Alok Chandra, IES (1992) continues to hold the charge of the post of Advisor (IFD) in the Ministry of Petroleum & Natural Gas with effect from 29th May, 2014.

1.16 Smt. Sushma Rath, CSS earlier holding the post of Director in the Ministry assumed the charge of Joint Secretary (In-situ) in the Ministry of Petroleum & Natural Gas with effect from 5th August, 2015.

Hon'ble Prime Minister Shri Narendra Modi inaugurating the Urja Sangam - 2015 on 27.03.2015

1.17 PRINCIPAL ACHIEVEMENTS

The important statistical data relating to the physical performance of the Oil and Gas sector is given at Appendix-III to VII.

1.18 URJA SANGAM 2015

Hon'ble Prime Minister, Shri Narendra Modi inaugurated 'Urja Sangam 2015' on 27th March, 2015 at Vigyan Bhavan, New Delhi. The aim of this biggest global hydrocarbon meet was to showcase India's potential in the hydrocarbon sector to the world and create an investor-friendly atmosphere, besides positioning India's thought leadership by creating a new "Energy Security" platform. On the global level, the summits aim was to firm up cooperation agreements with key global players.

Highlighting the import dependence of the nation, Hon'ble PM emphasized on working together to achieve energy security of the country. He urged all stakeholders to increase the domestic production of Oil and Gas to reduce import dependence from 77% to 67% by the year 2022, when India celebrates its 75 years of independence, which he called as Amrit Parv. Hon'ble Prime Minister lauded execution of world's largest cash transfer LPG subsidy scheme PAHAL in a time bound manner. Speaking on the occasion Hon'ble Minister of State for Petroleum & Natural Gas [I/C] Shri Dharmendra Pradhan talked about the initiatives the government has taken under the leadership of Hon'ble Prime Minister, Shri Modi. He emphasized upon the role of petroleum companies in the national economy and underlined the need of Energy Security for the country.

1.19 PERFORMANCE OF PETROLEUM AND NATURAL GAS SECTOR

Efficient and reliable energy supplies are a pre-condition for accelerating the growth of the Indian Economy. The Indian Economy is at present the world's fastest growing economy with actual growth rates of 7.6, 7.7 and 7.3% in Q1, Q2 and Q3 of the year 2015-16 respectively. While the energy needs of the country are increasing continuously, the energy resources that are indigenously available are limited and may not be sufficient in the long run to match these energy requirements. The Ministry of Petroleum and Natural Gas has taken several initiatives for increasing production and exploitation of all domestic petroleum resources including natural gas, coal bed methane and shale gas as well as distribution, marketing and pricing of petroleum products.

1.20 Ensuring Energy Security:

The Ministry of Petroleum and Natural Gas has rolled out an elaborate plan to reassess hydrocarbon resources in Indian's sedimentary basins by March, 2016. Also a project has been approved to carry out survey works of all un-appraised sedimentary basins. Reforms have been made in the production sharing contracts to instill confidence among the investors. On 2nd September, 2015, the Cabinet has approved the Discovered Small Fields Policy for development of 69 hydrocarbon discoveries made by national oil companies; Oil & Natural Gas Corporation Ltd. (ONGC) and Oil India Ltd. (OIL) with the objective to augment the domestic production of oil and gas. An attempt has been made to club many reforms including providing marketing and pricing freedom, permitting exploration throughout the contract period, being governed by a single license for exploration and production of all forms of hydrocarbons and adopting a simple and easy to administer revenue sharing model, guided by the vision of Hon'ble Prime Minister on Minimum Government, Maximum Governance and ease of doing business. Recently, Government has approved Hydrocarbon Exploration Licensing Policy (HELP) for Award of Hydrocarbon Acreages with New Contractual System and Fiscal Model along-with the open acreage policy which is designed in such a way that it will usher a new era in the exploration and production of hydrocarbons in India.

The Government has approved a transparent New Gas Pricing Formula linked to the global market, striking a fine balance between incentivizing exploration and production of gas in the country while protecting the consumer affordability. A 15,000 km of Gas Pipeline has been planned to complete the Gas Grid. Out of the proposed 15,000 km gas pipeline, about 13,000 km have already been authorized and these projects are at various stages of implementation. To expedite the completion of national gas grid, a proposal for developing gas pipelines through Viability Gap Funding mechanism has also been explored. The

Inauguration of Jagdishpur - Haldia Pipeline by Hon'ble Prime Minister Shri Narendra Modi at Patna on 25.07.2015

Ministry is closely monitoring all the projects costing Rs 100 crore & above being implemented by oil & gas Central Public Sector Enterprise. As a result of intensive review and monitoring, 15 projects worth Rs 30053.30 crore have been completed during the year till December 2015 and another 10 projects, worth Rs 41744.52 crore are expected to be completed by March 2016. There are 8 on-going projects presently being undertaken by state owned companies with an estimated cost of Rs 5888.56 crore in North Eastern States including DHDT unit, oil pumping stations, tank farms, gas gathering stations etc. The new state of the art Crude Distillation Unit (CDU) of Bharat Petroleum's Mumbai Refinery with a capacity of 6.0 MMTPA was dedicated to the nation by Hon'ble Chief Minister of Maharashtra and Hon'ble Minister of State (I/C) for Petroleum and Natural Gas (P&NG) at the Mumbai Refinery. Hon'ble Prime Minister of India dedicated Numaligarh Refinery Limited, Wax Plant and 15 million metric tonnes per annum (MMTPA) state-of-the-art Paradip Refinery of Indian Oil Corporation Limited (IOCL) to the nation on February 05, 2016 and February 07, 2016 respectively.

There have been sustained efforts towards managing demand of petroleum products and ensuring availability at affordable prices to the common man. The `PAHAL' Scheme launched in the country on January 1, 2015, to streamline subsidies, has been acknowledged by the Guinness Book of World Records for being the largest cash transfer scheme. The direct transfer of subsidy has reduced the diversion of subsidized LPG cylinders for household cooking to commercial and industrial sectors. Government has also launched a 'GiveItUp' campaign giving a call to the well-off sections of the country to voluntarily give up LPG subsidy. The subsidy saved from the 'GiveItUp' campaign is being utilized for providing new connections to the BPL families under the 'GiveBack' campaign. While many consumers have given up subsidy voluntarily, Government has decided that the benefit of the LPG subsidy would not be available for LPG consumers, if the consumer or his/her spouse had taxable income of more than Rs 10 lakhs in the previous financial year. In line with Digital India Vision, Government launched Sahaj, through the portal mylpg.in to enable customers to register for new LPG connections online, as well as make online payments for the same. Government has also launched a LPG emergency helpline number 1906 for the cooking gas consumers across the country. Year 2016 has been launched as the "Year of LPG Consumers", with focus on increasing accessibility and availability of cooking gas in the country. Encouraged with the success of direct transfer of subsidy to LPG users in their bank accounts, the

Hydrocarbon Vision-2030 for North - East India launched by Shri Dharmendra Pradhan, MoS (IC), PNG

Government proposed to roll out a similar programme for kerosene in select districts across 8 states, to target the really needy sections of the society, with effect from April 1, 2016.

Several petroleum sector-specific measures under "Clean India" initiative have been undertaken, in line with the vision laid down by Hon'ble Prime Minister to realize a Clean and Green fuel-based economy in the country. Under Clean India Initiative, there is a major push to connect major cities with "Green Highways", which would have vehicles running on CNG and LNG with adequate re-fuelling stations. Apart from CNG, a plan is being worked out to connect one crore households through Piped Natural Gas (PNG) network in 5 years in a Mission Mode.

In addition, the Government is also aggressively pursuing oil and gas opportunities overseas for strengthening the country's energy security. Oil companies are present in 25 countries. Several engagements have been made with oil producing nations in the recent past to secure India's interests. A delegation led by Hon'ble Minister of State (I/C), (P&NG) attended the 6th OPEC International Seminar held in Vienna in June, 2015 to enhance the cooperation between India and OPEC countries. A Memorandum of Understanding was signed between India and Nepal in August, 2015 for cooperation in the field of hydrocarbon sector. India also participated in the 22nd Steering Committee Meeting of TAPI in Ashgabat in August, 2015 to discuss the pipeline project with other partner countries-Turkmenistan, Afghanistan, and Pakistan. Hon'ble Vice President of India accompanied by Hon'ble Minister of State (I/C), MoPNG visited Turkmenistan during December, 2015 for the ground breaking ceremony of the TAPI Pipeline.

4th India-Africa Hydrocarbon Conference was held from 21-22 January 2016 in New Delhi. A total of 21 African countries, including 9 at Ministerial level viz. Mauritius, Morocco, Algeria, Sudan, South Sudan, Tunisia, Senegal, Equatorial Guinea and Liberia participated in the conference.

These concerted efforts are expected to lead closer towards enhancing energy security of the nation. The status of production of crude oil and natural gas as well as production, trade and consumption of petroleum products has been briefly discussed in the following paragraphs. The detailed trends in the sector are elaborated in the respective tables across different chapters.

1.21 Crude Oil and Natural Gas Production:

The targeted crude oil production for the year 2015-16 is at 37.046 million metric tonnes (MMT) as against production of 37.461 MMT in 2014-15, showing a decrease of about 1.11%. The crude oil production during April-December, 2015 was at 27.952 MMT i.e. marginal decrease of 0.79% over production of 28.174 MMT achieved during the corresponding period last year. Production was affected mainly due to decline in onshore production from old and ageing fields and operational problems particularly in Gujarat, Rajasthan and North East, apart from prolonged bandhs and blockades in Assam.

For the year 2015-16, production of natural gas is targeted at 35.280 Billion Cubic Meters (BCM), i.e. 4.83 % higher than production of 33.656 BCM in 2014-15. The natural gas production during April-December, 2015 was 24.697 BCM i.e. decrease of 2.76% over production of 25.397 BCM during corresponding period of last year. Shortfall in natural gas production is mainly attributed to lower production from Bassein & Satellite fields, KG-D6, M&S Tapti and Panna-Mukta, restricted production due to repair of pipelines in Gujarat and Andhra Pradesh and lower off-take by potential customers particularly in Assam, Rajasthan and Tamil Nadu.

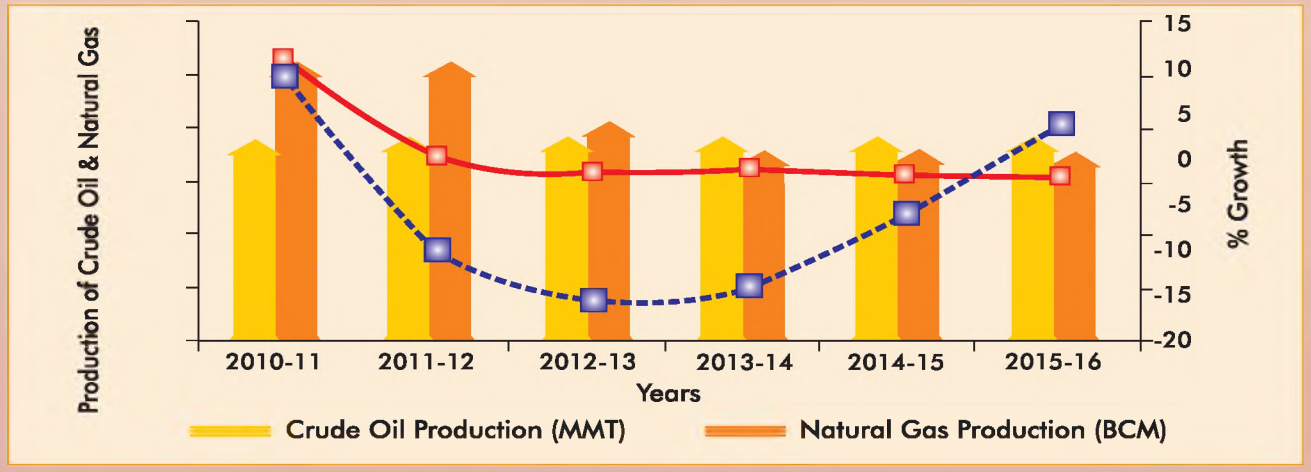
The trends in the production of crude oil and natural gas for the years 2010-11 to 2015-16 have been depicted below (details in Appendix- III):

Table-1: Crude Oil and Natural Gas Production

Year	Crude Oil Production (MMT)	% Growth in Crude Oil Production	Natural Gas Production (BCM)	% Growth in Natural Gas Production
2010-11	37.684	11.85	52.219	9.94
2011-12	38.090	1.08	47.559	-8.92
2012-13	37.862	-0.60	40.679	-14.47
2013-14	37.788	-0.19	35.407	-12.96
2014-15	37.461	-0.87	33.656	-4.95
2015-16**	37.046	-1.11	35.280	4.83
2014-15 (Apr-Dec)	28.174	-	25.397	-
2015-16 (Apr-Dec)*	27.952	-0.79	24.697	-2.76

*: Provisional **: Targeted Production

Graph-1: Crude Oil & Natural Gas Production



1.22 Refining Capacity & Refinery Crude Throughput:

There has been considerable increase in refining capacity in the country over the years, although there was no capacity expansion during 2 015-16, as of December, 2015. The refining capacity stood at 215.066 MMTPA as on 01.04.2015. Refinery Crude Throughput (Crude Oil Processed) for the year 2015-16 is targeted at 224.242 MMT as against 223.242 MMT in 2014-15, showing a marginal increase of about 0.45%. Crude throughput during April-December, 2015 is at 170.711 MMT, marginally higher by 2.41% against 166.688 MMT during April-December, 2014.

The trend in Refining Capacity and Crude throughput are depicted below (details in Appendix- IV).

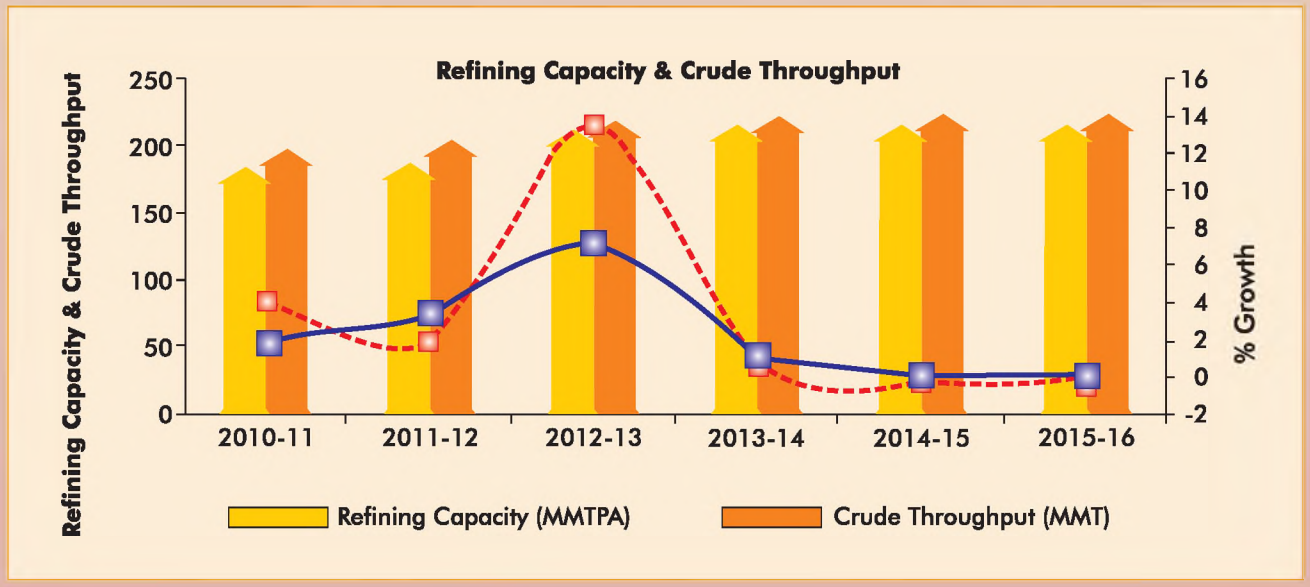
Table-2: Refinery Capacity & Refinery Crude Throughput (in terms of Crude Oil Processed)

Year	Refining Capacity @ (MMTPA)	% Growth in Refining Capacity	Crude Throughput (MMT)	% Growth in Crude Throughput
2010-11	183.386	4.22	196.989	2.19
2011-12	187.386	2.18	204.121	3.62
2012-13	213.066	13.70	219.212	7.39
2013-14	215.066	0.94	222.497	1.50
2014-15	215.066	0.00	223.242	0.33
2015-16**	215.066	0.00	224.242	0.45
2014-15 (Apr-Dec)	215.066	-	166.688	-
2015-16(Apr-Dec)*	215.066***	-	170.711	2.41

*: Provisional @: As on 1st April of initial year **: Projected Production

*** Refining capacity has since been enhanced by 15MMTPA with the grass roots refinery at Paradip being dedicated to the nation by Hon'ble Prime Minister on 07.02.2016

Graph-2: Refinery Capacity and Refinery Crude Throughput



1.23 Production and Consumption of Petroleum Products

The production of petroleum products is targeted at 220.964 MMT in year 2015-16 as against 221.136 MMT achieved in 2014-15. During April-December, 2015, production of petroleum products was at 170.345 MMT i.e. an increase of 2.98% over 165.412 MMT of production achieved during the corresponding period last year.

During the year 2015-16, the consumption of petroleum products in India is estimated at 176.972 MMT with a growth of 6.92% as compared to consumption of 165.520 MMT during 2014-15. The consumption of petroleum product during April-December, 2015 is 134.310 MMT i.e. an increase of 9.50% over 122.659 MMT in April-December, 2014.

Year-wise production and consumption of petroleum products since 2010-11 to 2015-16 (April-December)are depicted below (details in Appendix V-VI).

Table-3: Production and Consumption of Petroleum Products

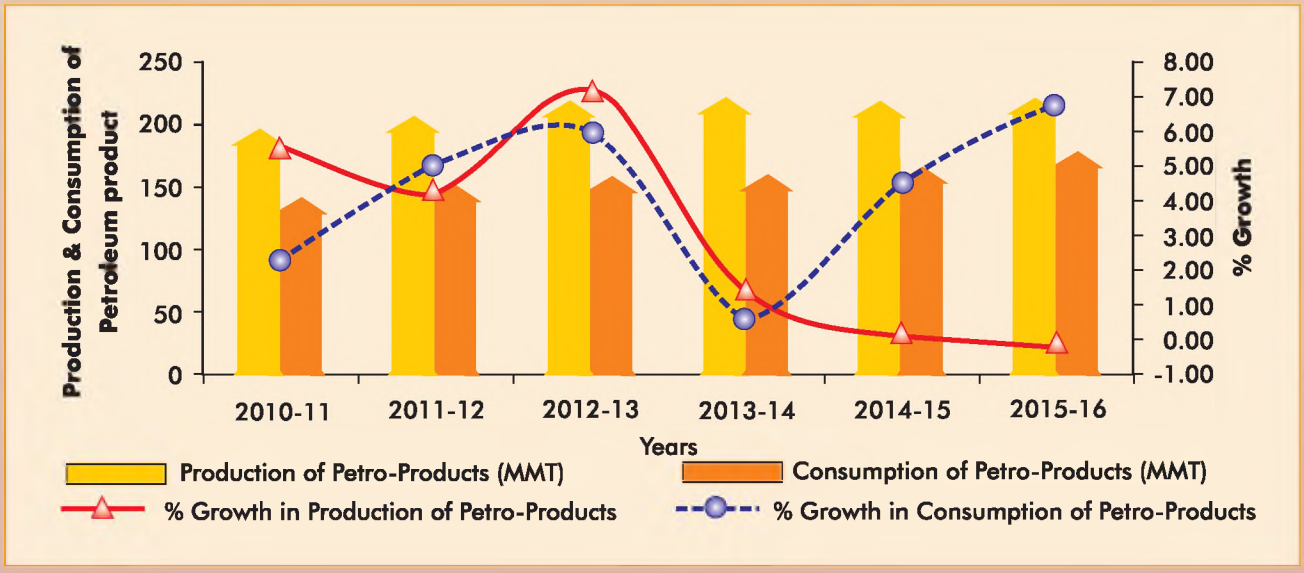
Year	Production of Petro-Products (MMT)	% Growth in Production of Petro-Products	Consumption of Petro-Products (MMT)	% Growth in Consumption of Petro-Products
2010-11	194.821	5.53	141.040	2.35
2011-12	203.202	4.30	148.132	5.03
2012-13	217.736	7.15	157.057	6.02
2013-14	220.756	1.39	158.197	0.73
2014-15	221.136	0.17	165.520	4.63
2015-16**	220.964	-0.08	176.972	6.92
2014-15 (Apr-Dec)	165.412	-	122.659	-
2015-16(Apr-Dec)*	170.345	2.98	134.310	9.50

*: Provisional **: Targeted Production

Notes: 1. Production of petroleum products includes Production of Petroleum Products from fractionators.

2. Consumption of Petroleum Products excludes refinery fuels but includes imports.

Graph-3: Production and Consumption (indigenous sales) of Petroleum Products



1.24 Import of Crude Oil:

Import of Crude Oil during April-December, 2015 was 149.416 MMT valued at Rs. 3,41,067 crore which marked an increase of 5.05% in quantity terms and 41.37% decrease in value terms over the same period of last year. The decline in value terms is related to reduced crude oil prices by around 70% from June'14 to Dec'15. During the year 2014-15, the import of crude oil was 189.435 MMT valued at Rs. 6, 87,416 crore.

Global prices of crude oil had stayed above US $100 /bbl since February, 2010. However, since September, 2014 these prices have taken a sharp downturn. From June 2014 when they stood at US $ 111.66 /bbl, they have plummeted and shown a steady decline to US $ 38.21 /bbl in December, 2015. This sharp fall can be attributed to weakening of demand in economies of Asia, especially China, and Europe in addition to a production glut. Further, exploration of shale gas by countries like the United States and Canada to reduce their dependence on oil imports has led to lower demand of oil. This has also resulted in reduced retail prices of diesel, domestic LPG and kerosene.

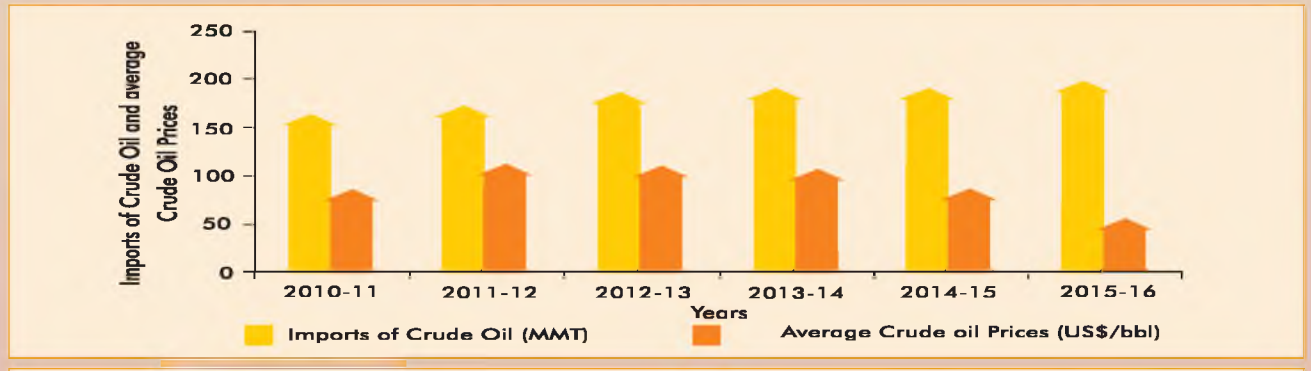
The trend in growth of crude oil imports and crude oil international (Indian Basket) prices is shown in Table-4 & Graph- 4A. The trend in prices of Indian basket crude oil during April-December, 2015 is at Graph 4B

Table-4: Import of Crude Oil and average Crude Oil Prices (Indian basket)

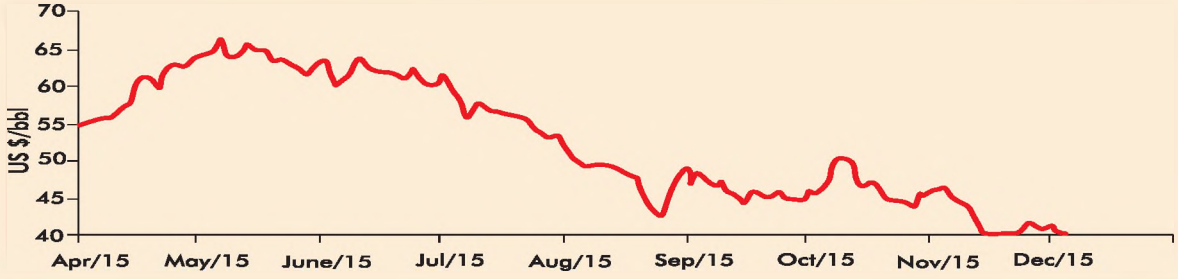
Year	Imports of Crude Oil (MMT)	% Growth in Imports of Crude Oil	Average Crude oil Prices (Indian basket US$/bbl.)	% Growth in Average Crude oil Prices
2010-11	163.595	2.72	85.090	21.98
2011-12	171.729	4.97	111.890	31.50
2012-13	184.795	7.61	107.970	-3.50
2013-14	189.238	2.40	105.520	-2.27
2014-15	189.435	0.10	84.156	-20.25
2015-16**	199.222	5.17	-	-
2014-15 (Apr-Dec)	142.238	-	94.690	-
2015-16 (Apr-Dec)	149.416*	5.05	50.910	-46.24

*Provisional. **: Estimated Imports (April, 2015 to December, 2015)

Graph-4A: Quantity of Crude Oil Imports and Average International Crude Oil Prices (Indian basket)



Trend in Prices of crude oil (Indian Basket) in April-December, 2015



1.25 Imports & Exports of Petroleum Products:

During April-December, 2015-16 imports of petroleum products were 21.175 MMT valued at Rs. 52,224 crore, which shows an increase of 36.01% in quantity terms and 12.52% decrease in value terms, against the corresponding period of previous year. The quantity of petroleum products imported during 2014-15 was 21.301 MMT valued at Rs. 74,644 crore.

During April-December, 2015-16 the exports of petroleum products were 43.779 MMT valued at Rs. 1,38,839 crore, which shows a decrease of 10.84% in quantity terms and 42.52% in value terms, against the exports of 49.100 MMT valued at Rs. 2,41,543 crore for the same period of last year. During 2014-15, 63.932 MMT of petroleum products, valued at Rs. 2,88,580 crore were exported.

During April-December, 2015-16 the import of LNG was 14.959 MMT valued at Rs. 44,389 crore which marked an increase of 22.87% in quantity terms and 14.07% in value terms, against imports of 12.175 MMT valued at Rs. 51,658 crore for the same period of previous year. During 2014-15, 14.092 MMT of LNG, valued at Rs. 57,384 crore was imported.

The trends in quantity of petroleum products and LNG imports & exports are depicted below in Table-5 & Graph-5 (details in Appendix-VII).

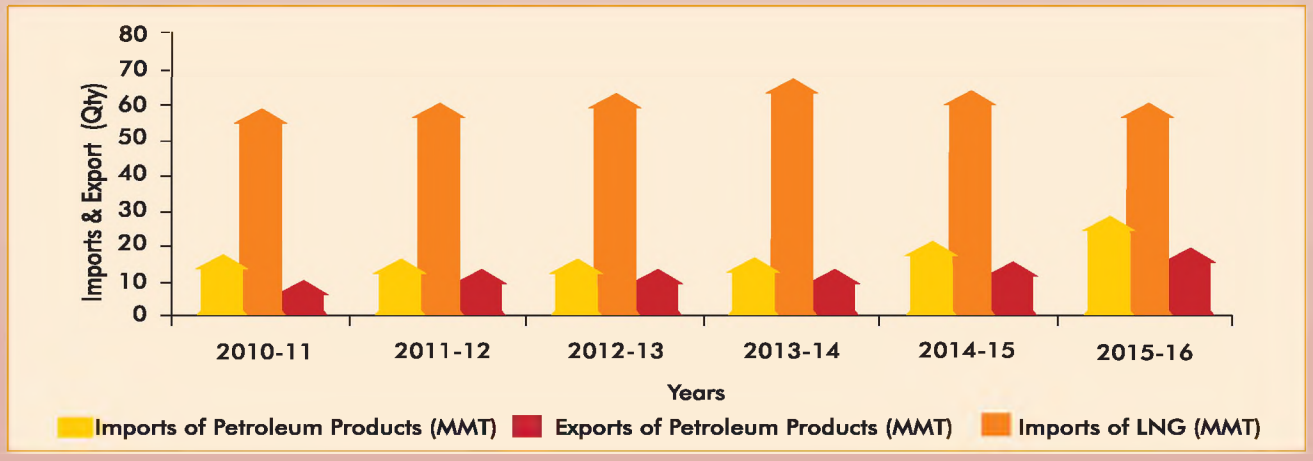
Table-5: Imports & Exports of Petroleum Products

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
2010-11	17.379	18.51	59.077	15.49	9.931	8.56
2011-12	15.849	-8.80	60.837	2.98	13.214	33.06
2012-13	15.774	-0.48	63.408	4.23	13.136	-0.60
2013-14	16.718	5.99	67.864	7.03	13.032	-0.79
2014-15	21.301	27.41	63.932	-5.79	14.092	8.13
2015-16**	28.233	32.54	58.372	-8.70	19.946	41.54
2014-15 (Apr-Dec)	15.569	-	49.100	-	12.175	-
2015-16 (Apr-Dec)*	21.175	36.01	43.779	-10.84	14.959	22.87

*: Provisional **: Estimated on the average of Apr.,15 to Dec.,15

Note: Imports of LNG data available upto Dec'15.

Graph-5: Trend in Imports & Exports of Petroleum Products and imports of LNG



Shri Dharmendra Pradhan, Minister of State (IC) Petroleum & Natural Gas and Shri K. D. Tripathi, Secretary, MoP&NG and other senior officers of MoP&NG on the occasion of the New Year celebrations on 01.01.2016

1.26 Equity Oil and Gas from Abroad:

In order to supplement domestic availability of crude oil & natural gas, the Government has been encouraging acquisition of assets abroad. Oil companies are present in 25 countries with investments worth $US 21 billion. Oil & Natural Gas Corporation Videsh Limited (OVL) has produced about 5.533 Million Metric Tons (MMT) of oil and 3.341 BCM of gas during the year 2014-15 from its assets abroad in Sudan, Vietnam, Venezuela, Russia, Syria, Brazil, South Sudan and Colombia. During the current year, for the period of April-December, 2015, production of crude oil is 4.137 MMT and Natural gas production is 2.558 BCM. The targeted crude oil & natural gas production for 2015-16 is about 5.360 MMT & 3.242 BCM respectively.

1.27 Foreign Direct Investment Inflows:

In order to attract Foreign Direct Investment (FDI) in the sector, the FDI policy has been further liberalized. FDI for petroleum refining by CPSEs has been allowed with 49% foreign equity under the automatic route instead of approval through Foreign Investment Promotion Board. Year-wise FDI inflows under Petroleum & Gas sector is given in Table-6 below. 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 investment in the sector. The highest FDI inflow was received in 2011-12 at Rs. 9955.17 crore contributing 6.03% of total FDI inflow in the economy. During the year 2014-15, FDI inflow received was Rs. 6495.67 crore contributing almost 3.44% of total FDI inflow in the economy.

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

Years	FDI inflows				Annual Growth (%)			
	All Sectors		P&NG Sector		All Sectors		P&NG Sector	
	Rs. Crore	US$ Million	Rs. Crore	US$ Million	Rs. Crore	US$ Million	Rs. Crore	US$ Million
2010-11	97320	21383	2543	556	-20.95	-17.23	96.09	109.55
2011-12	165146	35121	9955	2030	69.69	64.25	291.45	264.82
2012-13	121907	22424	1193	215	-26.18	-36.15	-88.02	-89.42
2013-14	147518	24299	678	112	21.01	8.37	-43.12	-47.75
2014-15	189107	30931	6496	1079	28.19	27.29	857.51	861.44
2015-16 (Apr-Nov)*	160198	24808	313	49	-	-	-	-

*:Provisional

1.28 Plan Outlay for Ministry of Petroleum & Natural Gas:

The actual Plan Expenditure in 2014-15 was Rs. 69,828.81 crore against Budget Estimate of Rs. 80,634.82 crore. Budget Estimates of the Ministry of Petroleum & Natural Gas in 2015-16 is Rs. 75,235.72 crore. This comprises of Rs.50.00 crore as GBS and Rs. 75,185.72 crore of Plan investment through I&EBR of oil & gas CPSEs. Against this, Rs. 45,028.24 crore has been utilized during April-December, 2015 by the oil & gas CPSEs. Detailed Budget Estimates of the Ministry of Petroleum & Natural Gas in 2015-16 are given in Appendix-VIII.

1.29 Strategic Crude Oil Storage:

Taking into account the oil security concerns of India, the Government has decided to set up Strategic Crude Oil Storage of 5.33 million metric tonnes (MMT) at three locations in the country viz. Visakhapatnam (1.33 MMT), Mangalore (1.5 MMT) and Padur (2.5 MMT). These are being constructed by Indian Strategic Petroleum Reserves Ltd (ISPRL) at a capital cost of Rs.4098.5 crore. The project at Visakhapatnam has been commissioned and strategic part of the storage has been filled with crude oil procured by IOCL and HPCL on behalf of the Government.

The projects at Mangalore and Padur have been completed, barring the connecting pipeline, which connects the strategic locations at Mangalore and Padur to the port for crude filling and evacuation. The Mangalore Project is anticipated to be completed by March, 2016 and the Padur facility is likely to be completed by April, 2016. A Working Group set up by the Ministry of Petroleum and Natural Gas to prepare a comprehensive Approach paper on Status and Prospects of Crude Oil Reserves in India has assessed the storage requirements for crude oil and petroleum products to be 13.32 MMT by 2019-20. ISPRL has prepared Detailed Project Report for 12.5 MMT Strategic Storage of Crude oil in Phase II. The locations chosen are Chandikhol (3.75MMT) in Odisha, Padur (2.5MMT) in Karnataka, Rajkot (2.5 MMT) in Gujarat and Bikaner (3.75 MMT) in Rajasthan.

1.30 Non-Conventional Energy:

Ethanol Blended Petrol:

The Ethanol Blended Petrol (EBP) Programme started by the Government in 2003 had been extended to the entire country, barring the North-Eastern States, Jammu & Kashmir, Andaman & Nicobar Islands and Lakshadweep, by 2006. In November 2012, the Government implemented 5% mandatory ethanol blending with Petrol across the country with procurement price of ethanol to be decided between Oil Marketing Companies (OMCs) and suppliers of ethanol. In December 2014, the Government took a decision to procure ethanol at a fixed delivered price ranging between Rs.48.50 to Rs.49.50 per litre (including all taxes and transportation cost), depending upon the distance of distillery from the depot/installation of the OMCs. Ethanol production from non-food feedstocks, other than molasses, has also been allowed to be procured, subject to meeting the relevant BIS Standards.

Due to these efforts, for the sugar year 2014-15, against Oil Industry requirement of 128.17 crore litres of Ethanol, a quantity of 86.52 crore litre has been finalized and 67.42 crore litre has been procured, doubling the supply of ethanol as compared to previous sugar year. For Sugar year 2015-16, quantity of ethanol offered by Sugar Industry is 120 crore litres. Contracts have been signed for 99 crore litres till date.

Bio-diesel Programme

Government has allowed direct sale of Bio-diesel (B100) to bulk consumers like Railways and State Transport Corporations by private manufacturers, their authorized dealers and Joint Venture of OMCs authorized by the Ministry. 5 % bio-diesel blending in diesel has already started from 10th August, 2015. Currently bio-diesel is being sold by OMCs in more than 750 retail outlets.

1.31 New and Renewable Energy:

The 12th Plan envisages development of Renewable and un-conventional energy sources to the tune of 5 million tons of oil equivalent (MTOE) by Oil CPSEs. Accordingly, Oil CPSEs have taken various initiatives for Renewable Energy in the areas of Solar and Wind Energy projects and under Non-Conventional Energy projects on Coal Bed Methane, Basin Centered Gas, Under Ground Coal Gasification, etc. till date.

Indian Oil Corporation Ltd., Bharat Petroleum Corporation Ltd. and Hindustan Petroleum Corporation Ltd. are progressively using solar energy for lighting their retail outlets. So far, 4822 of their retail outlets have been powered by solar energy. The target is to increase the number to 7200 retail outlets by 31st March, 2017.

Fluidised Catalytic Cracking (FCC) Pilot Plant at IndianOil's R&D Centre

Hon'ble Prime Minister Shri Narendra Modi addressing the gathering in Odisha after dedicating the Paradip Refinery to the Nation on 07.03.2016

1.32 Fuel Conservation Campaign:

In an effort to conserve precious petroleum products and to use clean fuels, the Ministry of Petroleum & Natural Gas in association with Petroleum Conservation Research Association (PCRA) launched a mass awareness national campaign during the Oil & Gas Conservation Fortnight. R&D activities by sponsoring projects for development of energy efficient products / processes; formulating Standards & Labeling Programmes for equipment consuming petroleum products and developing Fuel Economy Norms for heavy duty vehicles are some of the initiatives undertaken by the Ministry in association with PCRA.

This year special focus has being given to address the growing concerns of the ill effects which petroleum fuels are causing to human life and environment. In this direction, Ministry through PCRA initiated various activities for implementation by Oil Marketing Companies to bring awareness amongst the consumers for using cleaner fuels.

1.33 Achievements at a glance

1.33.1 PAHAL (Pratyaksh Hasthantarit Labh) is the world's largest Direct Benefit Transfer Scheme which has been acknowledged by the Guinness Book of World Records as the largest cash transfer programe (households). More than 14.88 crore consumers are registered to avail subsidy under PAHAL.

1.33.2 After successful implementation of DBT in LPG, it has been decided to implement DBT in PDS Kerosene in 33 districts in 9 states w.e.f. 01/04/2016.

1.33.3 Nearly 88 lakh (as on 17.03.2016) LPG consumers have become part of the `Give It Up' campaign across the country. Number of connections released to BPL families, in lieu of surrender of LPG connections are 58 lakh.

1.33.4 A new state-of-art refinery of a capacity of 15MMTPA with INDMAX technology has been set up at Paradip, Odisha with an approximate cost of Rs.34,555 crore. The refinery has been dedicated to the nation by Hon'ble Prime Minister on 07/02/2016. The refinery will result in increase of refining capacity of the country from 215.066 MMTPA to 230.066 MMTPA.

1.33.5 Under Auto Fuel Vision & Policy - 2025, The Oil Marketing Companies have been advised to be ready to leapfrog directly from BS-IV to BS-VI fuel standards by.01/04/2020.

1.33.6 The Government has commissioned a strategic crude oil reserve at Visakhapatnam (1.33 Million Metric Tonnes (MMT) and taken up construction of two more strategic crude oil reserves at Mangalore (1.5 MMT) and Padur (2.5 MMT). Feasibility report for creation of storage in Phase 2 at Chandikhol (3.75 MMT), Padur (2.5 MMT), Rajkot (2.5 MMT) and Bikaner (3.75 MMT) has been prepared.

1.33.7 New Reforms

- **Pradhan Mantri Ujjwala Yojana for LPG -** On 29.02.2016 a new scheme was announced for providing 5 crore LPG connections to BPL households. This will be implemented over the period of 3 years. The connection will be given in the name of a woman of the household.
- **Hydrocarbon Exploration Licensing Policy (HELP)-** Policy provides for a uniform licensing system to cover all hydrocarbons such as oil, gas, coal bed methane etc. under a single licensing framework coupled with open acreage policy.

- **Marketing and Pricing freedom for new gas production from Deepwater, Ultra Deepwater and High Pressure High Temperature Areas-** The marketing freedom so granted would be capped by a ceiling price arrived at on the basis of landed price of alternative fuels. The policy guidelines would be applicable to future discoveries as well as existing discoveries which are yet to commence commercial production as on 1.1.2016.
- **28 PSC Extension -** 28 small, medium sized fields discovered by national oil companies (ONGC & OIL) were awarded to private joint ventures through Production Sharing Contract (PSC) between 1994 - 1998 for the periods varying from 18 to 25 years. These contracts are affected from different points of time. The earliest of PSCs were signed in the year 1994. Out of 28 PSCs, 2 fileds in which the duration of the PSCs had expired in 2013 had been granted extension up to 2018. The remaining PSCs would start expiring from 2018.
- **Ratna Field -** Monetization of the Ratna offshore field through assigning it to the original licensee, ONGC. The Ratna Offshore field, located south west of Mumbai, was discovered in 1971 by ONGC. The field was tendered out and tentatively awarded to ESSAR Oil Ltd. in 1996. Ever since the due to a number of administrative and legal uncertainties, which were raised and exmained at various times, the contract was never finalized.

1.33.8 20 new Geographical Areas (GAs) have been awarded by PNGRB to develop CGD networks. More than 30 lakh households have been connected with PNG supplies.

1.33.9 `e-SV' is the electronic subscription voucher which has the details of number of cylinders and pressure regulator loaned to the consumer against the security deposit and is emailed to the consumers upon release of LPG connection online.

1.33.10 A new web-based application at www.mylpg.in for consumers has been made available in 13 languages and online payment for LPG has been launched since January 2016.

1.33.11 For the first time, reservation of 27% of new Retail Outlets for citizens falling under Other Backward Castes category has been implemented, in addition to 22.5% reservation for Scheduled Castes/Scheduled Tribes.

1.33.12 National Gas Hydrate Project Phase-II, has been conducted successfully in eastern offshore.

1.33.13 It is proposed to build another 15,000 km of gas pipeline in addition to existing gas pipeline of 15000 km to complete the National Gas Grid.

1.33.14 Pooling of gas for supply of natural gas to fertilizer and power sector would help in increased production of fertilizer and revival of stranded gas based power plants in the country.

1.33.15 In pursuance of the decision of the Cabinet taken on 16th January, 2015, a notification has been issued to allow the sale of Bio-diesel (B100) to bulk consumers like Railways, State Transport Corporations and other bulk consumers.

1.33.16 Retailing of bio-diesel blended diesel by Oil Marketing Companies has started on World Biofuel Day, i.e., 10th August, 2015.

1.33.17 MOP&NG working jointly with Ministry of Coal, has issued enabling notification to permit Coal India Limited (CIL) & its subsidiaries to undertake CBM operations in the coal mining lease areas held by them to augment CBM gas production in the country and make the mines safe for operations.

1.33.18 CPSEs and its joint ventures under the administrative control of MoP&NG under took a series of initiatives under the Swachh Bharat Mission. To reduce the drop-out rate among girl students, Oil & Gas CPSEs constructed more than 20,000 school toilets under Swachh Vidayalaya Abhiyan. CPSEs have also adopted various villages, water bodies and locations around their areas of operations for maintaining cleaniness & hygine. CPSEs have also initiated "Waste to Fuel" Programme in 8 identified cities on a pilot basis.

1.33.19 Modernisation/upgradation of BPCL, Mumbai Refinery

BPCL Mumbai Refinery has installed a New Crude & Vaccum Unit with 6 MMTPA capacity. It was dedicated to the Nation by Shri Dharmendra Pradhan, Minister of State (I/C) Petroleum & Natural Gas on 28.12.2015 in the presence of Chief Minister of Maharashtra. It is a highly integrated unit with all latest technological features. It will process different type of crudes to make products for treatment in various downstream units of Refineries.

1.33.20 Jagdishpur - Haldia Pipeline - Foundation stone was laid by Hon'ble Prime Minister, Shri Narendra Modi for Jagdishpur - Haldia Pipeline on 25.07.2015

1.33.21 Announcement for Mega Refinery - The Public Sector Oil Companies, IOCL, BPCL, HPCL and EIL are planning to invest approx Rs 1.5 lakh Crore in setting up India's biggest refinery on the West Coast.

1.33.22 North East Vision - North East India is the Gangotri of hydrocarbon sector in our country. Realising its potential and importance the Minister of Petroleum and Natural Gas released the Hydrocarbon Vision 2030 for North East India on 9th February in Guwahati. The vision envisages an investment of 1.3 lakh crore till 2030 in Hydrocarbon sector in NE India encompassing exploration and production, crude oil, product and natural gas pipelines and significant increase in marketing network to improve the access and variability of petroleum products in these areas.

chapter 2

Exploration & Production

Exploration & Production

2.1 Preamble

2.1.1 The energy demand will rise with social and economic development in the country. Current hydrocarbon demand is much more than the domestic crude oil and natural gas production. India is the 4th largest consumer of energy after China, USA and Russian Federation. The country is dependent on imports for about 80.2% of its crude oil requirement and to the extent of about 40% in case of natural gas. A large amount of foreign exchange goes on import of crude oil and Liquefied Natural Gas (LNG) in order to meet the energy needs of people of India. 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 Exploration and Production sector has been opened up after implementation of New Exploration Licensing Policy (NELP) and Coal Bed Methane (CBM) Policy. These policies provide a level playing field 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 the upstream sector, the two Upstream National Oil Companies (NOCs) viz., Oil and Natural Gas Corporation Limited and Oil India Limited play a dominant role with a total share of about 71.7% in oil and gas production in the country. Presently, ONGC produces nearly 59.4% of indigenous crude oil and 65.6% of country's gas production, while OIL's share is 9.1% of indigenous crude oil and 8.1% of gas production. The share of Private/ JV companies in oil and gas production is 31.5% and 26.3% respectively.

2.1.4 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 DGH setting up were - 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 entrusted with certain responsibilities concerning the Production Sharing Contracts for Discovered fields/Exploration blocks, promotion of investment and monitoring of E&P activities.

2.2 Sedimentary Basins in India

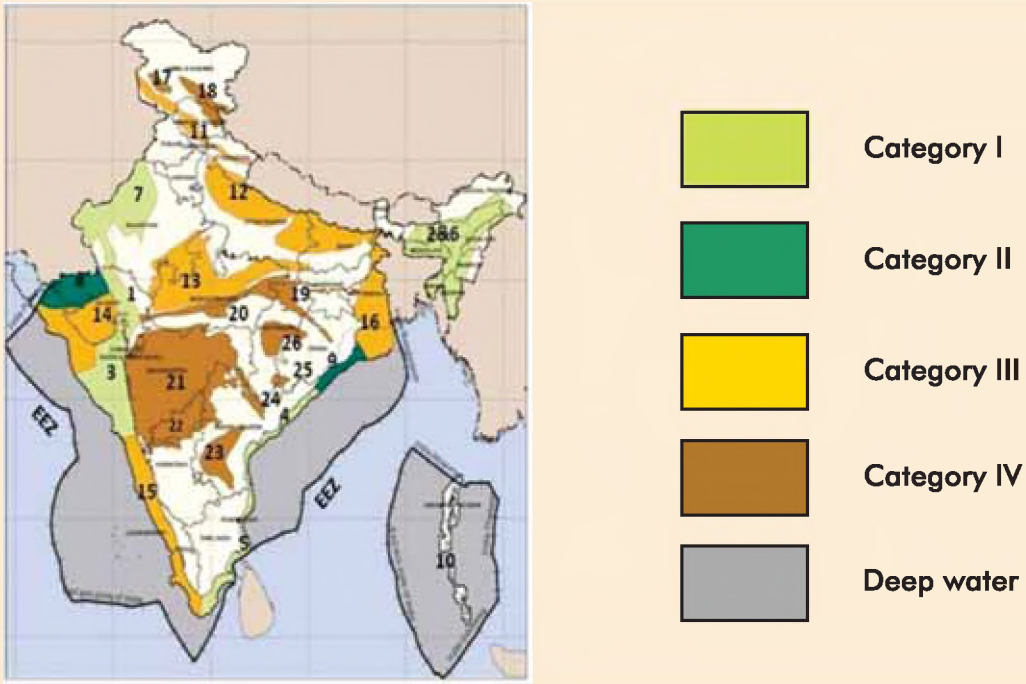
2.2.1 India has 26 sedimentary basins covering an area of 3.14 million square kilometres. The sedimentary basins of India, onland and offshore up to the 400m isobath, have an aerial extent of about 1.84 million sq. km. In the deepwater beyond the 400m isobath, the sedimentary area has been estimated to be about 1.30 million sq. km.

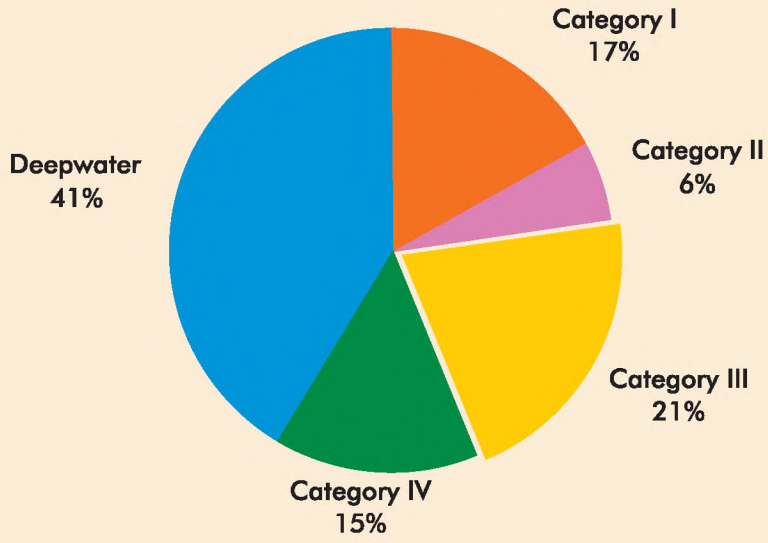
2.2.2 The Indian sedimentary basins have been broadly divided into four categories based on their degree of prospectivity as presently known which is as under:

Table 2.1: Categories of Indian sedimentary basins

Type of basins	Area (Sq. KM)	Hydrocarbons Prospectivity	Basins/ Region
Category I (7 Basins)	532500	Established commercial production	Cambay, Assam Shelf, Mumbai offshore, Krishna Godavari, Cauvery, Assam Arakan Fold Belt and Rajasthan
Category II (3 Basins)	182000	Known accumulation of hydrocarbons but no commercial production as yet	Kutch, Mahanadi-NEC & Andaman-Nicobar
Category III (6 Basins)	660000	Indicated hydrocarbon shows that are considered geologically prospectivity.	Himalayan Foreland, Ganga, Vindhyan, Saurashtra, Kerala-Konkan-Lakshadweep & Bengal
Category IV (10 basins)	461200	Uncertain potential which may be prospective by analogy with similar basins in the world.	Karewa, Spiti-Zanskar, Satpura-South Rewa-Damodar, Narmada, Decan Syneclise, Bhima-Kaladgi, Cuddapah, Pranhita-Godavari, Bastar, Chhattisgarh
Deepwater	1299000	-	East & west cost from 400 m water depth to EEZ
Total	**3134700**		

2.2.3 Crude oil & natural gas production in the country is from 7 basins under category-I and deepwater areas. In category-II basins, hydrocarbon discoveries have been made but commercial production is yet to commence. The distribution of total Indian sedimentary area of 3.14 million square kilometre under different categories and deepwater is presented as under:





2.3 Estimated Resources of Crude oil & Natural Gas

2.3.1 Conventional Hydrocarbon Resources

The prognosticated conventional hydrocarbon resources in 15 sedimentary basins and deepwater areas of the country are of the order of 28.1 billion tonnes (oil and oil equivalent of gas). The basin-wise details are as under:

Table 2.2: Estimated Hydrocarbon Resources in India

Basin	Offshore (MMT)	Onland (MMT)	Total (MMT)
Mumbai	9190	-	9190
Assam-Arakan Fold Belt	-	1860	1860
Cambay	-	2050	2050
Upper Assam	-	3180	3180
Krishna-Godavari	555	575	1130
Cauvery	270	430	700
Rajasthan	-	380	380
Kutch	550	210	760
Andaman-nicobar	180	-	180
Kerala-konkan	660	-	660
Saurashtra Offshore	280	-	280
Ganga Valley	-	230	230
Bengal	30	160	190
Himalayan Foreland	-	150	150
Mahanadi	100	45	145
Deep Water	7000	-	7000
Total	**18815**	**9270**	**28085**

Shri Dharmendra Pradhan, MoS (IC), PNG on a visit to MHN Platform, western offshore on 14.05.2015

2.3.2 As on 1.4.2015, In-place hydrocarbon volume of 11,234 million tonnes of oil and oil equivalent gas could be established through exploration by ONGC, OIL and Private/JV companies. So, about 60% of resources are under "yet to find category". Out of 11,234 MMT of oil and oil equivalent gas of In-place volumes, the ultimate reserves which can be produced are about 4217 MMT of oil and oil equivalent gas since inception. The balance recoverable reserves are of the order of 1888 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 1.4.2015 are as under:

Table 2.3: Crude Oil and Natural Gas Reserve Position as on 1.4.2015

	Initial In-Place (MMT)			Ultimate Reserves (MMT)			Balance Recoverable Reserves (MMT)		
	Oil	Gas	O+OEG	Oil	Gas	O+OEG	Oil	Gas	O+OEG
ONGC	5229	2415	7644	1493	1297	2790	454	541	995
OIL	798	357	1155	247	198	445	83	115	198
Pvt/JV	975	1460	2435	215	767	982	98	597	695
Total	**7002**	**4232**	**11234**	**1955**	**2262**	**4217**	**635**	**1253**	**1888**

O+OEG: Oil and Oil Equivalent of Gas

2.3.2 Unconventional Hydrocarbon Resources

CBM Resources

2.3.2.1 The estimated Coal Bed Methane (CBM) resources are of the order of 2600 Billion Cubic Metres (BCM) or 91.8 Trillion cubic feet (TCF) spread over in 11 states in the country. The state-wise details of CBM resources are as under:

Table 2.4: Coal Bed Methane Resources in India

Sl. No.	State	Estimated CBM Resources (BCM)
1	Jharkhand	722.08
2	Rajasthan	359.62
3	Gujarat	351.13
4	Orissa	243.52
5	Chattisgarh	240.69
6	Madhya Pradesh	218.04
7	West Bengal	218.04
8	Tamilnadu	104.77
9	Andhra Pradesh	99.11
10	Maharashtra	33.98
11	North East	8.50
	Total CBM Resources	**2599.48**

2.3.4 Recoverable CBM Reserves

In order to harness CBM (Coal Bed Methane) 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. Recoverable CBM reserves of about 280.3 BCM (9.90 TCF) have been established by different operators as on 01.04.2015. Block wise reserves are given below:

Table 2.5: Recoverable Coal Bed Methane Reserves as on 1.4.2015

S. No.	Block Name	Operator	Reserve Established (BCM)	State
1	SP(East)-CBM-2001/I	RIL	47.86	Madhya Pradesh
2	SP(WEST)-CBM-2001/I	RIL	55.50	Madhya Pradesh
3	Raniganj (South)	GEECL	54.37	West Bengal
4	RG(East)-CBM-2001/I	ESSAR	60.88	West Bengal
5	Raniganj (North)	ONGC	7.36	West Bengal
6	NK-CBM-2001/I	ONGC	9.63	Jharkhand
7	BK-CBM-2001/1	ONGC	30.02	Jharkhand
8	Jharia	ONGC	14.72	Jharkhand
	Total		**280.34**	

2.3.4 Shale Gas / Oil Resource

It is estimated that a number of sedimentary basins (Gangetic plain, Gujarat, Rajasthan, Andhra Pradesh & other coastal areas) in India, including the hydrocarbon bearing ones - Cambay, Assam-Arakan, & Damodar - have large shale deposits. Various agencies have made different estimates of shale gas and oil in the Indian sedimentary basins.

i. M/s Schlumberger: 300 to 2100 TCF of shale gas resource for the country.

ii. Energy Information Administration (EIA), USA in 2011: 290 TCF of shale gas in 4 basins (Cambay Onland, Damodar, Krishna Godavari Onland & Cauvery Onland).

iii. Energy Information Administration (EIA), USA in 2013: 584 TCF of shale gas and 87 billion Barrels of shale oil in 4 basins (Cambay Onland, Damodar, Krishna Godavari Onland& Cauvery Onland).

iv. ONGC: 187.5 TCF of shale gas in 5 basins (Cambay Onland, Ganga Valley, Assam & Assam Arakan, Krishna Godavari Onland & Cauvery Onland.

v. Central Mine Planning and Design Institute (CMPDI): 45 TCF of shale gas in 6 sub-basins (Jharia, Bokaro, North Karanpura, South Karanpura, Raniganj & Sohagpur).

vi. United States Geological Survey (USGS) has also estimated technically recoverable shale gas resources of 6.1 TCF in 3 basins (Cambay Onland, Krishna Godavari Onland & Cauvery Onland). Further, USGS has indicated that these basins have also potential for shale oil.

2.3.5 Re-assessment of Hydrocarbon Resources

The last Hydrocarbon resources assessment exercise was carried out approximately two decades ago. During the course of implementation of pre-NELP (New Exploration Licensing Policy) and NELP rounds and other exploration and production activities, substantial geoscientific data have been generated. New oil and gas fields have also been discovered by utilizing improved geological understanding and new technology. With the increase in exploration spread and quantum jump in availability of geo-scientific data generated under NELP, there is a need to revisit the hydrocarbon resource assessment of all sedimentary basins of India. A Multi Organization Team (MOT) comprising of representatives of ONGC, OIL and DGH is carrying out estimation of hydrocarbon resource potential in the country. The exercise of re-assessment of hydrocarbon resources for all the sedimentary basins in the country is in progress. This project is likely to be completed in 2016-17.

2.4 Crude Oil & Natural Gas Production

2.4.1 Crude oil production in 2015-16 upto December 2015 is about 27.952 Million Metric Tonne (MMT) by ONGC, OIL and Private/ JV Companies. About 68.5% of crude oil is by ONGC and OIL from nomination regime and remaining 31.5% of crude oil production is by Private/JV companies from PSC regime.

2.4.2 In 2015-16, the share of offshore crude oil production was about 50.2%. The remaining crude oil production was from 6 States viz., Andhra Pradesh (0.7%), Arunachal Pradesh (0.2%), Assam (12.1%), Gujarat (12.5%), Rajasthan (23.7%) and Tamil Nadu (0.6%). The details of crude oil production in 2015-16 upto December 2015 and last 5 years are as under:

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

State/Source	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16 (upto Dec)
Onshore						
Andhra Pradesh	305	305	295	297	254	225
Arunachal Pradesh	116	118	120	111	68.88	42
Assam	4,724	5,025	4,863	4,709	4,473	3,173
Gujarat	5,904	5,778	5,332	5,061	4,653	3,326
Rajasthan	5,149	6,553	8,593	9,180	8,848	6,505
Tamil Nadu	233	246	238	226	241	194
Total Onshore	16,431	18,025	19,441	19,584	18,538	13,465
Share of PSUs	11,031	11,231	10,605	10,171	9,482	6,805
Share of Private/JV	5,400	6,794	8,836	9,413	9,056	6,660
Offshore						
Share of PSUs	16,972	16,328	15,617	15,541	16,194	12,529
Share of Private/JV	4,282	3,733	2,804	2,663	2,729	1,958
Total Offshore	21,254	20,061	18,421	18,204	18,923	14,487
Grand Total	37,685	38,086	37,862	37,788	37,461	27,952

Natural Gas Production

2.4.3 Natural gas production in 2015-16 upto December 2015 is about 24.696 Billion Cubic Metre (BCM) or 89.8 MMSCMD by ONGC, OIL and Private/ JV Companies. About 73.7% of natural gas production was by ONGC and OIL from nomination regime and remaining 26.3% of natural gas production was by Private/JV companies from PSC regime.

2.4.4 The share of offshore natural gas production in 2015-16 was about 74%. The remaining natural gas production including CBM was from 10 States viz., Andhra Pradesh (1.5%), Arunachal Pradesh (0.1%), Assam (8.9%), Gujarat (4.6%), Rajasthan (3.4%), Tamil Nadu (3.6%), Tripura (3.3%), Jharkhand (0.01%), Madhya Pradesh (0.01%) and West Bengal (0.6%). The details of Natural gas production in 2015-16 upto December 2015 and last 5 years are as under:

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

State/Source	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16 (upto Dec)
Onshore						
Andhra Pradesh	3.8	3.7	3.4	3.2	1.5	1.6
Arunachal Pradesh	0.1	0.1	0.1	0.1	0.1	0.1
Assam	7.4	8	8	7.9	8.1	8.2
Gujarat	6.2	6	5.6	4.5	4.2	4.0
Rajasthan	1.2	1.6	1.9	2.7	3.2	3.7
Tamil Nadu	3.1	3.5	3.3	3.6	3.3	2.8
Tripura	1.7	1.8	1.8	2.3	3.1	3.6
CBM-WB, MP, Jharkhand	0.1	0.2	0.3	0.4	0.6	1.0
Total Onshore	23.5	24.9	24.3	24.7	24.1	25.0
Share of PSU	21.5	23	22.2	21.8	20.5	20.5
Share of Private/JV	2	1.9	2.2	2.9	3.6	4.5
Offshore						
Share of PSU	48.2	48.1	49.6	49.2	47.3	46.3
Share of Private/JV	71.4	57.3	37.5	23.1	20.8	18.5
Total Offshore	119.6	105.4	87.1	72.3	68.1	64.8
Total	143.1	130.3	111.4	97	92.2	89.8

Coal Bed Methane (CBM) Production

2.4.5 Commercial production of CBM in India has already commenced w.e.f. July 2007 in Raniganj (South) block in West Bengal operated by Great Eastern Energy Corporation Limited (GEECL). Current CBM production in the Raniganj (South) block is about 0.4 MMSCMD. Another two blocks, Raniganj (East) block operated by Essar Oil Limited is producing at the rate of 0.65 MMSCMD and Jharia operated by ONGC is producing at the rate of 4838 SCMD. Incidental CBM production from Sohagpur (East) and Sohagpur (West) is about 2580 SCMD which is being used for internal consumption. Thus, Current CBM production from 5 blocks in the country is about 1.1 MMSCMD.

2.5 Hydrocarbon Potential of Indian Sedimentary basins

2.5.1 Indian sedimentary basins need intensive exploration efforts for enhancing crude oil & natural gas supply in the country. The Hydrocarbon potential has been witnessed where exploratory inputs have been expended. The following facts are important to understand the potential of hydrocarbons in the country.

- About 48% of the sedimentary area has been apprised. This means, more than half of the Indian sedimentary basins have the undiscovered potential of hydrocarbons.
- Total prognosticated hydrocarbon resources are estimated at about 28,000 million tonnes in the sedimentary basins of the country, out of which 11, 234 MMT in-place reserves have been established by ONGC, OIL and Private/JV companies as on 1.4.2015, which means about 60% hydrocarbon reserves are yet to be discovered. Thus, Indian sedimentary Basins have ample hydrocarbon potential for future exploration and production.

2.6 Appraisal status of Indian Sedimentary Basins

2.6.1 As per India Hydrocarbon Vision 2025, 100% Indian sedimentary area is to be appraised. As of now, about 48% area has been appraised. About 4% of sedimentary basinal area has been declared as "NO GO" area by Ministry of Defence/MOEF.

2.7 Blocks Awarded for Exploration & production

2.7.1 National Oil Companies, viz, ONGC and OIL are carrying out hydrocarbon exploration and production (E&P) activities in the country since inception. Consequent upon liberalization in petroleum sector in 1990s, the participation of foreign and Indian companies in the exploration and development activities to supplement the efforts of national oil companies was observed to narrow the gap between supply and demand.

2.7.2 Government of India has signed production sharing contracts for 28 discovered blocks, 28 exploration blocks under pre-NELP regime and 254 blocks under NELP regime with National Oil Companies and private (both Indian and foreign)/ Joint Venture companies as licensee for blocks. At present out of, 310 exploration blocks awarded so far under various bidding rounds (Discovered Field, Pre-NELP & NELP), 125 blocks/fields are operational. 17 blocks under nomination are being operated by ONGC and OIL. Petroleum Exploration Licenses (PEL) for domestic exploration & production of crude oil and natural gas were granted under four different regimes over a period of time:

1. **Nomination Basis:** Petroleum Exploration License (PEL) was 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.
2. **Pre-NELP Discovered Field:** 28 Petroleum Mining Lease (PML) was granted under small / medium size discovered field Production Sharing Contract (PSCs) during 1991 to 1993 where operators of blocks were private companies and ONGC/OIL has the participating interest.
3. **Pre-NELP Exploration Blocks:** 28 Exploration Blocks were 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.
4. **New Exploration Licensing Policy (NELP) -1999 onwards:** Under NELP, exploration blocks were awarded to Indian Private and foreign companies through international competitive bidding process where National Oil Companies viz, ONGC and OIL are also competing on equal footing.

2.7.3 Out of total 310 blocks (including Pre-NELP & NELP), 132 exploration blocks have been relinquished and 44 blocks are under process of relinquishment. Currently E&P activities in 125 blocks are in progress. PEL is awaited for 9 Blocks. The PSC regime-wise/ round-wise details of operational and relinquished blocks are as under:

Table 2.8: Blocks awarded under Production Sharing Regime

Bidding Round	Operational	PEL Awaited	Under Relinquishment	Relinquished	Total
Field	26	-	-	2	28
Pre-NELP	12	-	3	13	28
NELP I	4	-	2	18	24
NELP II	4	-	1	18	23
NELP III	5	-	5	13	23
NELP IV	5	-	5	10	20
NELP V	6	-	3	11	20
NELP VI	13	-	13	26	52
NELP VII	16	1	7	17	41
NELP VIII	23	2	4	3	32
NELP IX	11	6	1	1	19
Total	**125**	**9**	**44**	**132**	**310**

2.7.4 The pace of exploration for oil and gas has increased after the introduction of NELP regime. The awarded 254 blocks are located in onland (111), offshore shallow water (62) and deepwater (81) areas. As a result of exploratory activities, several unexplored and poorly explored areas, in particular offshore and deepwater areas have been appraised through geophysical surveys and exploratory drilling.

2.8 Awarded NELP blocks

2.8.1 Under NELP, Production Sharing Contracts (PSCs) for 254 exploration blocks have been signed for blocks awarded in onland, shallow water and deepwater areas. The details of the nine NELP bidding rounds are given below:

Table 2.9: Exploration Blocks awarded under 9 rounds of NELP

Parameter	NELP I	NELP II	NELP III	NELP IV	NELP V	NELP VI	NELP VII	NELP VIII	NELP IX
No. of Blocks Offered	48	25	27	24	20	55	57	70	34
No. of Blocks Bid for	28	23	24	21	20	52	45	36	33
No. of Bids Received	45	44	52	44	69	165	181	76	74
No. of blocks awarded	25	23	23	21	20	52	44	34	19
No. of PSCs signed	24	23	23	20	20	52	41	32	19

2.8.2 NELP bidding rounds have attracted many private and foreign companies in addition to PSUs. Before the NELP, a total 35 E&P Companies (5 PSUs, 15 Private and 15 Foreign) were working in Nomination and Pre-NELP regime. After the conclusion of nine rounds of NELP bidding, the total number of companies has increased to 117 (11 PSUs, 58 Private and 48 foreign Companies as Operators and Non-operators/Consortium Partners).

2.8.3 IOC, GAIL, BPCL and their subsidiaries like Bharat Petro Resources Ltd (Subsidiary of BPCL), Prize Petroleum Company Limited (Subsidiary of HPCL), have participated in various NELP bidding rounds and have been awarded exploration blocks in India. In addition to CPSE, GSPC have participated in various NELP bidding rounds and have been awarded exploration blocks in India.

2.8.4 Under the nine rounds of NELP bidding held so far, the committed exploration investment is about US$ 11.73 billion. As against this an investment to the tune of US$ 15.40 billion has been expended by the contractors for exploration activities mainly, 2D/3D seismic survey and exploratory drilling in the awarded blocks. In addition, about US$ 9.66 billion has been incurred by the contractors for carrying out development activities mainly, drilling and setting of production facilities. The details of NELP investments are as under:

Table 2.10: Investment under NELP (US$ Million)

NELP Committed Investment			Actual Investment as on 1.4.2015	
NELP Rounds	**Exploration Investment Commitment**	**Actual Exploration Investment**	**Actual Development Investment**	**Total Investment**
NELP-I	1082.23	4605.29	7799.47	12404.76
NELP-II	775.41	908.73	33.94	942.67
NELP-III	978.18	3342.62	1818.43	5161.05
NELP-IV	1135.05	2095.39	4.54	2099.93
NELP-V	847.22	1002.21	0.37	1002.58
NELP-VI	3570	2299.03	0.00	2299.03
NELP-VII	1504.61	694.65	0.00	694.65
NELP - VIII	1102.25	379.10	0.00	379.10
NELP-IX	733.66	75.83	0.00	75.83
Total	**11728.61**	**15402.86**	**9656.75**	**25059.60**

2.9 Petroleum Exploration Licence (PEL) and Petroleum Mining Lease (PML)

2.9.1 PEL is granted for a period of 7 years in onland and shallow water areas and for 8 years in deepwater and frontier areas for exploration activities as per PSC provisions under NELP. Petroleum Mining Lease (PML) is awarded for 20 years for producing Hydrocarbons as per The Oilfields Regulation & Development Act, 1948 and P&NG Rules, 1959.

2.9.2 Under Nomination regime, ONGC and OIL are operating 17 PEL and 358 PML blocks covering an area of 103091 Sq. Km. The basin-wise details

of PEL/PML operated by ONGC and OIL are as under:

Table 2.11: Basin-wise operative PEL & PML under Nomination Regime as on 1.1.2016

Company / Operator	Basin	PEL		PML		Total	
		No.	Area (Sq. Km.)	No.	Area (Sq. Km.)	No.	Area (Sq. Km.)
OIL Nomination	Rajasthan	-	-	2	460	2	460
	Assam-Arakan	5	1230	20	4546	25	5776
	Total -OIL	5	1230	22	5006	27	6236
ONGC Nomination	Assam-Arakan	6	2059	62	5948	68	8006
	Cambay	-	-	159	5802	159	5802
	Cauvery	-	-	32	3611	32	3611
	Saurashtra	1	16557	-	-	1	16557
	Himalayan Foreland	1	1828	-	-	1	1828
	Krishna Godavari	1	1190	49	6213	50	7403
	Kutch	-	-	2	1673	2	1673
	Mumbai	2	16487	26	30395	28	46882
	Rajasthan	-	-	5	885	5	885
	Vindhyan	1	3058	1	1150	2	4208
	Total -ONGC	**12**	**41179**	**336**	**55676**	**348**	**96855**
	Grand Total	**17**	**42408**	**358**	**60682**	**375**	**103091**

Shri Dharmendra Pradhan, MoS (IC), PNG on a visit to Japanese Vessel Chikyu for gas hydrate exploration campaign on 25.06.2015

2.9.3 Private/JV companies are operating 99 PEL and 55 PML blocks covering an area of 1,64,114 Sq. Km. The basin-wise details of PEL/PML operated by private/JV companies are as under:

Table 2.12: Basin-wise PEL & PML with Pvt./ Joint Venture Companies as on 1.1.2015

Basin	PEL		PML		Total	
	No.	Area (Sq. Km.)	No.	Area (Sq. Km.)	No.	Area (Sq. Km.)
Andaman-Nicobar	5	16970	-	-	5	16970
Assam-Arakan Fold Belt	6	11151	-	-	6	11151
Assam-Arakan Shelf	1	3213	2	63	3	3276
Bengal	13	13197	-	-	13	13197
Cambay	3	11733	39	1060	42	12793
Cauvery	35	11171	1	75	36	11246
Ganga	7	23154	-	-	7	23154
Himalayan-Foreland	1	2552	-	-	1	2552
Krishna Godavari	-		6	1517	6	1517
Kutch	10	15809	-	-	10	15809
Mahanadi	5	6267	-	-	5	6267
Mumbai	3	13689	3	2678	6	16367
Rajasthan	5	12059	4	3287	9	15346
Saurashtra	2	5542	-	-	2	5542
Vindhyan	3	8927	-	-	3	8927
Total	**99**	**155434**	**55**	**8680**	**154**	**164114**

2.10 Minimum Work Programme (MWP) under PSC Regime

2.10.1 Minimum Work Programme (MWP) comprises the details of exploration surveys like 2D seismic, 3D seismic, Gravity Magnetic, Geo chemical surveys, processing & interpretation etc., along with drilling of exploratory wells. The basin-wise exploratory inputs since inception in NELP and Pre-NELP blocks as on 1.1.2016 are as under:

Table 2.13: Exploratory Inputs under PSC Regime as on 1.1.2016

Basin	2D Seismic (LKM)	3D seismic (Sq.Km.)	Exp. Wells
Andaman-Nicobar	26776	13515	6
Rajasthan	14157	16374	308
Assam-Arakan Fold Belt	1352	613	2
Assam-Arakan Shelf	4108	1757	29
Bengal	5247	4573	6
Cambay	19668	9309	267
Cauvery	64727	44560	45
Deccan Syneclise	476	-	-
Ganga	6476	1683	7
Himalayan-Foreland	810	-	1
Kerela Konkan	50091	14233	8
Krishna Godavari	76186	71844	168
Kutch	2985	8469	12
Mahanadi	59542	64662	51
Mumbai	22549	25207	43
Pranhita Godavari	195	-	1
Satpura-South Rewa-Damodar	2050	304	2
Saurashtra	16037	12179	17
Vindhyan	3345	369	6
Total	**376776**	**289652**	**979**

Note: LKM - Line kilometre

2.11 Exploratory Efforts by PSUs under nomination regime

2.11.1 ONGC and OIL have carried out 916327 line kilometre (LKM) of 2D seismic survey 124163 Sq. Km of 3D seismic survey and drilled 6150 exploratory wells since inception as on 1.1.2016. The details of exploratory efforts in terms of 2D, 3D seismic and exploratory wells are as under:

Table 2.14: Exploratory Inputs by ONGC and OIL as on 1.1. 2016

S. No.	Company (Operator)	Cumulative exploratory efforts as on 1.1.2016		
		2D Seismic (LKM)	3D Seismic (SQ. KM)	Exploratory Wells (Nos.)
1	ONGC- Nomination	882317	112376	5804
2	Oil India Ltd. -Nomination	34010	11787	346
	Total	**916327**	**124163**	**6150**

2.12 Exploratory Efforts by Private/JV Companies

2.12.1 Indian Private Companies have carried out 1,10,701 line kilometre (LKM) of 2D seismic survey, 1,07,760 Sq. Km of 3D seismic survey and drilled 312 exploratory wells since inception as on 1.1.2016. The company-wise details are as under:

Table 2.15 : Exploratory Inputs by Indian Private Companies as on 1.1.2016

Company (Operator)	Cumulative exploratory efforts as on 1.1.2016		
	2D Seismic (LKM)	3D Seismic (SQ. KM)	Exploratory Wells (Nos.)
Adani Welspun Exploration Ltd.	-	1195	1
Assam Company Ltd.	338	40	2
Essar Oil Ltd.	4608	949	21
Focus Energy Ltd.	11339	5786	113
Geo Enpro	52	114	2
Hindustan Oil Exploration Company Limited	626	1495	11
Interlink Petroleum Ltd.	-	64	2
Jay Polychem (India) Ltd.	-	136	2
Jubilant Oil & Gas Private Limited.	416	642	16
Mercator Petroleum Private Limited.	741	163	4
Omkar Naturals Resources Pvt. Ltd.	350	83	-
Prize Petroleum Company Ltd.	2050	304	2
Reliance Industries Ltd.	90015	96454	132
Selan Expl. Tech. Ltd.	166	132	4
Sintex Oil & Gas Pvt. Ltd.	-	203	-
Grand Total	**110701**	**107760**	**312**

2.13 Exploratory Efforts by Foreign Companies

2.13.1 Foreign Companies have carried out 61,982 line kilometre (LKM) of 2D seismic survey, 23,871 Sq. Km of 3D seismic survey and drilled 286 exploratory wells since inception as on 1.1.2016. The company-wise details are as under:

Table 2.16: Exploratory Inputs by Foreign Companies as on 1.1.2016 since inception

Company (Operator)	Cumulative exploratory efforts as on 1.1.2016		
	2D Seismic (LKM)	3D Seismic (SQ. KM)	Exploratory Wells (Nos.)
BHP Billiton Pty. Ltd.	12819	-	-
British Gas Exploration and Production (India) Ltd.	1376	5187	15
Cairn Energy India Pty Ltd.	21181	8092	228
ENI (India) Ltd.	5141	3170	1
Geo-Global Resources Inc.	476	-	-
Geo-Petrol International Inc.	206	-	-
Hardy Exploration & Production (India) Inc.	518	722	4
Heramac Ltd.	21	35	1
Naftogaz	290	250	6
Niko Resources Limited.	161	1277	23
OAO Gazprom	2108	530	3
Oilex-NL Holdings Ltd	-	178	1
Petrogas	199	786	3
Premier Oil North East India.	233	-	1
Santos International Operations Pty. Ltd.	17253	3644	-
Grand Total	**61982**	**23871**	**286**

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2.14 Exploratory Efforts by PSU Companies

2.14.1 PSU Companies have carried out 202849 line kilometre (LKM) of 2D seismic survey, 157274 Sq. Km of 3D seismic survey and drilled 376 exploratory wells since inception as on 1.1.2016. The company-wise details are as under:

Table 2.17: Exploratory Inputs by PSU Companies as on 1.1.2016 since inception

Company (Operator)	Cumulative exploratory efforts as on 1.1.2016		
	2D Seismic (LKM)	3D Seismic (SQ. KM)	Exploratory Wells (Nos.)
Oil and Natural Gas Corporation Ltd.	196592	140283	239
Oil India Ltd.	3995	7178	25
Bharat Petro Resources Ltd	21	173	2
GAIL (India) Limited.	-	500	-
Gujarat State Petroleum Corporation Ltd.	1900	8698	92
Indian Oil Corporation Ltd.	-	277	11
National Thermal Power Corporation	340	165	7
Grand Total	202849	157274	376

2.15 Hydrocarbon Discoveries in 2015-16

2.15.1 ONGC, OIL and Private/JV companies have made 21 hydrocarbon discoveries. The company-wise details of hydrocarbon discoveries made in 2015-16 upto December, 2015 provisionally are as under:

Table 2.18: Hydrocarbon Discoveries in 2015-16 upto December 2015

S.No.	Company	Crude oil Discovery	Natural Gas Discovery	Total
1	ONGC	6	8	14
2	OIL	1	3	4
3	Cairn India	1	-	1
4	Mercator Petroleum Limited	2	-	2
	Total	**10**	**11**	**21**

2.16 Hydrocarbon Discoveries in NELP blocks

2.16.1 So far a total of 145 hydrocarbon discoveries (53 crude oil and 92 natural gas) have been made under the NELP regime in 48 blocks. 81 hydrocarbon discoveries have made by NOCs (ONGC & OIL) and State PSU (GSPCL) and the remaining 64 discoveries have been made by Private/Foreign Companies as operators.The details of Company-wise hydrocarbon discoveries made are as under:

Table 2.19: Hydrocarbon Discoveries in NELP Blocks

Sl. No.	Company (Operator)	Oil Discovery	Gas Discovery	Total Discoveries
1	ONGC	20	35	55
2	Oil India Ltd.	1	1	2
3	Gujarat State Petroleum Corporation Ltd.	14	10	24
4	Reliance Industries Ltd.	12	39	51
5	Jubilant Oil and Gas Pvt. Ltd.	2	4	6
6	Focus Energy Ltd.	-	1	1
7	Niko Resources Ltd.	-	2	2
8	Naftogaz	1	-	1
9	Jay Polychem India Pvt Ltd.	1	-	1
10	MPL	2	-	2
	Total	**53**	**92**	**145**

2.16.2 Currently 15 NELP hydrocarbon discoveries are under development. The details of hydrocarbon discoveries which are likely to be put on production in next five years are as under:

Table 2.20: Hydrocarbon Discoveries under Development in NELP Blocks

Sl No	Discovery Name	Block	Operator	Basin/Location	Oil / Gas	First Oil/Gas by (Tentative)	Envisaged Production
1	ANK-40s	CB-ONN-2003/2	GSPC	Cambay On Land	Oil	2016-17	Peak production~ 73.5 BOPD.
2	D-02, D-06, D-19 & D-22	KG-DWN-98/3	RIL	Krishna Godavari Deep Water	Gas	2016-17	Peak Production~ 10 MMSCMD
3	D-34	KG-DWN-98/3	RIL	Krishna Godavari Deep Water	Gas	2017-18	Peak Production~ 12.9 MMSCMD
4	Kathalchari-1	AA-ONN-2002/1	JOGPL	Assam Arakan On Land	Gas	2017-18	Peak Rate~ 0.3 MMSCMD
5	SE-02, SE-03, SE-04, SE-05, SE-08 & SE-10	CB-ONN-2002/3	GSPC	Cambay On Land	Oil	2016-17	Initial Production ~ 189 BOPD
6	Vadatal-3, Vadatal-5	CB-ONN-2004/2	ONGC	Cambay On Land	Oil	2016-17	Vadatal-3 : Peak Production ~ 1035 BOPD Vadatal-5 : Peak Production ~ 633 BOPD

2.17 National Data Repository (NDR)

2.17.1 National Data Repository (NDR) is being implemented by DGH. Entire country's E&P data will be uploaded in NDR so that any interested party from around the globe can have access to these data and show interest to invest in India. Integration of Software at NDR site has been completed. So far 536119 LKM of 2D seismic, 134455 SKM of 3D seismic data, 989 well data and 7434 technical reports have been uploaded. NDR is likely to be operational in 2016.

2.18 Shale Gas/Shale Oil

2.18.1 Recognizing the importance of the Shale Gas and Oil resources in India, the Government of India on 14.10.2013 has 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.

2.18.2 As per policy guidelines, ONGC Ltd. and Oil India Ltd have to carry out Shale Gas and Oil exploration in 50 and 5 blocks respectively for assessment under Phase-I. ONGC is carrying out Shale Gas and Oil exploration activities in Cambay, Cauvery, Krishna-Godavari and Assam and Arakan Basins. Oil India is carrying out Shale Gas and Oil exploration activities in Assam and Rajasthan basins. ONGC has completed drilling of 14 wells. OIL is carrying out data collection and G&G studies for the well location.

2.19 Gas Hydrate

2.19.1 World over gas hydrate is at R&D stage. To meet the challenges of exploring gas hydrate, which is at a research stage the world over, MoPNG / DGH have signed MoU with various agencies for sharing of knowledge and scientific data:

i) MoU with USGS,

ii) MoU with US-DOE,

iii) MoU with US-MMS (now called US -BOEM)

iv) MoU with JOGMEC, Japan

v) MoU with GFZ-POTSDAM, Germany

vi) MoU with IFM-GEOMAR, Germany

Current Status

The NGHP (National Gas Hydrate Program) carried out Expedition-01 in the year 2006. The NGHP Expedition-01 established presence of gas hydrate in KG, Mahanadi and Andaman deep waters in numerous complex geologic settings.

The objective of the NGHP Expedition-2 was to identify sand bearing depositional systems with the gas hydrate stability zone on the east coast of India within the Krishna Godavari and Mahanadi deepwater Basins. NGHP Expedition-02 commenced on the 3rd March 2015, where a Japanese drillship 'CHIKYU' was commissioned to collect Gas Hydrate samples and related information thereof in Deep waters of Krishna Godavari and Mahanadi basins in presence of DGH/ONGC personnel. Total 42 wells has been drilled and cored in NGHP Expedition-2. NGHP Expedition-2 was completed on the 28th July 2015. As the initial results of NGHP Exp-02 are encouraging, collation and interpretation of all data is now primary to identify sites for pilot production testing.

2.20 Policy initiatives to be taken for enhancing crude oil & gas Production

2.20.1 A number of new initiatives have been taken in the last one year to promote Exploration and Production activities in the country. A multi-dimensional approach has been adopted for furthering the objective of enhancing energy security of the country through increased domestic production and improved investment climate in the country. The policy initiatives taken by the Government for exploration and development of oil and gas in the country are as under:

2.20.2 Recent approved Policies

(a) Hydrocarbon Exploration Licensing Policy (HELP)

Hydrocarbon Exploration Licensing Policy (HELP) for Award of Hydrocarbon Acreages with New Contractual System and Fiscal Model along-with the open acreage policy approved by cabinet on 10.03.2016 is designed in such a way that it will usher a new era in the exploration and production of hydrocarbons in India. The salient features of this policy are as under:

1. The operator can explore and produce conventional as well as un-conventional hydrocarbon such as CBM, Shale etc under a **single license.**

2. Opening up of India's sedimentary basins through **open acreage policy:** This will provide option for the companies for selection of Exploration blocks. They will also not be required to wait till the formal bid round is launched by the government as the open acreage area will be available throughout the year for bidding.

3. Fiscal Model based on **revenue sharing** instead of profit sharing with no cost recovery. A very simple and easy to administer fiscal model has been developed. This is in tune with the recommendations of CAG, Ashok Chawla Committee and Rangarajan Committee.

4. **Pricing and marketing freedom** for crude oil and gas: This is a major incentive provided to the investors as the producers will be free to market the gas and crude oil.

5. **Reduced royalty for offshore areas:** Under NELP for shallow water royalty rate is 10%, which has been brought down to 7.5% under HELP. Similarly for deep water NELP blocks have royalty of 5% for first seven years and 10% afterwards. This has been made as 0% for first seven years followed by 5%. For ultra deep water blocks under HELP the royalty after seven years will be only 2%. For onshore areas royalty has been kept same i.e. 12.5% for oil and 10% for gas so that there is no impact on revenue to the state governments.

6. **Exploration will be allowed through-out the contract period:** One of the major restrictions under PSC was regarding exploration after the completion of exploration phase. The HELP

addresses the same and allows exploration throughout the contract period.

7. **Exploration Phase** for onshore areas have been **increased** from 7 years to 8 years and for offshore increased from 8 years to 10 years.

8. Proposed revenue sharing contract designed on the philosophy of 'Ease of Doing Business' requiring minimum regulatory burden for monetising these fields including pricing and marketing freedom.

9. Role of MC has been redefined to concentrate on technical aspects of contract implementation, reservoir safety and production/reserve monitoring and removing control on budget and expenditure.

10. Freedom to E&P companies to invest in the block and no annual budget approval is required. Government audit is limited to revenue and production only.

11. This policy envisages significant reduction in administrative discretion through greater freedom to the operator and increased transparency.

(b) 28 PSC Block Extension

28 PSC- 28 small, medium sized fields discovered by national oil companies (ONGC & OIL) were awarded to private joint ventures through Production Sharing Contract (PSC) between 1994 - 1998 for the periods varying from 18 to 25 years. These contracts are affected from different points of time. The earliest of PSCs were signed in the year 1994. Out of 28 PSCs, 2 fileds in which the duration of the PSCs had expired in 2013 had been granted extension up to 2018. The remaining PSCs would start expiring from 2018. The extension of this PSCs would be considered for 10 years both for Oil & Gas fields or economic life of the field, whichever is earlier.

(c) Marketing and Pricing freedom for new gas production -

The CCEA has approved a proposal on 10.3.2016 to grant marketing including pricing freedom for the gas produced from High Pressure High Temperature, Deepwater and Ultra Deepwater areas. The marketing freedom so granted would be capped by a ceiling price arrived at on the basis of landed price of alternative fuels. The policy guidelines would be applicable to future discoveries as well as existing discoveries which are yet to commence commercial production as on 1.1.2016. The decision is expected to improve the viability of some of the discoveries already made in such areas and also would lead to monetization of future discoveries as well. The reserves which are expected to get monetized are of the order of 6.75 tcf or 190 BCM or around 35 mmscmd considering a production profiled of 15 years.

(d) Ratna field

Monetization of the Ratna offshore field through assigning it to the original licensee, ONGC. The Ratna Offshore field, located south west of Mumbai, was discovered in 1971 by ONGC. The field was tendered out and tentatively awarded to ESSAR Oil Ltd. in 1996. Ever since the due to a number of administrative and legal uncertainties, which were raised and exmained at various times, the contract was never finalized. As this field has remained without exploitation for over 20 years

since its initial tendering, the government has now decided that it will be assigned to ONGC on nomination basis. This will enable this long pending and proven oil reserve to come into production, and create new employment.

(e) Discovered Small Field Policy

On 2nd September, 2015, the Union Cabinet chaired by the Prime Minister, Shri Narendra Modi, gave approval to the Discovered Small Field Policy for development of hydrocarbon discoveries made by national oil companies; Oil & Natural Gas Corporation Ltd. (ONGC) and Oil India Ltd. (OIL). These discoveries could not be monetized for many years due to various reasons such as isolated locations, small size of reserves, high development costs, technological constraints, fiscal regime etc.

Under the new policy, 67 oil fields which have been held by ONGC and OIL for many years, but have not been exploited, will be opened for competitive bidding. Under this policy, exploration companies will be able to submit bids for exploiting these oil fields. These oil fields have not been developed earlier as they were considered as marginal fields, and hence were of lower priority.

With appropriate changes in policy, it is expected that these fields can be brought into production. In keeping with the principle of `Minimum Government Maximum Governance', significant changes have been made in the design of the proposed contracts. The earlier contracts were based on the concept of profit sharing. Under the profit sharing methodology, it became necessary for the Government to scrutinize cost details of private participants and this led to many delays and disputes. Under the new regime, the Government will not be concerned with the cost incurred and will receive a share of the gross revenue from the sale of oil, gas etc.

The second change is that the licence granted to the successful bidder will cover all hydrocarbons found in the field. Earlier, the licence was restricted to one item only (e.g. oil) and separate licence was required if any other hydrocarbon, for example, gas was discovered and exploited. The new policy for these marginal fields also allows the successful bidder to sell at the prevailing market price of gas, rather than at administered price. This decision is expected to stimulate investment as well as higher domestic oil and gas production.

(f) Policy on Testing Requirements in NELP PSCs

Government has approved a policy on Testing Requirement in NELP blocks on 29.04.2015. The policy would help in monetization of 10 discoveries in 5 NELP blocks by resolving this long pending dispute associated with testing requirements. Six discoveries each pertain to the blocks operated by ONGC and Reliance Industries Limited (RIL). The reserves associated with these discoveries which are expected to get monetized are of the order of three trillion cubic feet (TCF) with an associated value of around 90,000 crore. This initiative will help in enhancing domestic production of natural gas which in turn reduces import dependency of the country. The policy will also establish clarity to the contractors on this issue and will obviate the chances of disputes as have happened in past and would thus lead to improved investment climate in the country.

An offshore oil platform

(g) Permission of Extraction of CBM to Coal India Limited (CIL) & its subsidiaries in coal Mining area

Recently the Government has permitted Coal India Limited (CIL) & its subsidiaries to undertake CBM operations in the coal mining lease areas held by them. This decision will not only help augmenting CBM gas production in the country but will also make the mines safe for operations. Further, Ministry is actively pursuing the issue of simultaneous work between existing CBM operators and other lease holders by signing a co-development agreement between both of them.

(h) National Gas Hydrate

National Gas Hydrate Project 2 was conducted successfully in Eastern offshore from 9th March 2015 to 31st July 2015. This massive R&D exercise with participation of 100 scientists has led to very encouraging results and producible gas hydrates have been discovered in KG deep offshore areas. We are proud that India is leading in the Gas Hydrate Project.

2.20.3 Other Policy Initiatives

Besides, the initiatives which have been completed in last one year, there are many more which have been started and are at advanced stage and are likely to yield results in next couple of months. Some of these initiatives have been brought out as under:

A. Enhance production from the existing field by adopting Improved Oil Recovery (IOR)/Enhanced Oil Recovery (EOR) measures using induction of latest technology.

B. Bring into production new discoveries at the earliest. In tune with Government's stated principle of ease of doing businesses, a policy framework for early monetization of hydrocarbon discoveries under PSC regime has been approved by the Government. This policy has addressed rigidities in the timelines of the PSC and has allowed the contractors to start production at the earliest. 40 cases have been already resolved under this policy framework.

C. Facilitate enhanced exploration activities through following measures-

i. Appraisal of about 1.5 million Sq. km. un-appraised area of the Indian Sedimentary Basins. ONGC and OIL have been asked to conduct surveys in these basins on behalf of the Govt. of India. The surveys are likely to commence in October, 2015 and will be carried out in 5 years.

ii. Re-assessment of Hydrocarbon Resources of the Country in next 30 months. The study will be completed in 30 months after award of contract. Process for award has been initiated.

iii. Setting up of National Data Repository (NDR). Physical completion of hardware and software has been completed and data population is in progress.

iv. Policy approved for exploration and exploitation of Shale Gas/ Shale Oil resources by National Oil Companies under the nomination regime. As per the policy, ONGC and OIL have identified 50 and 5 blocks respectively. Subsequent to G&G study, these NOCs will drill minimum one well per 200 sq.km. of PML area to assess prospectivity of shale Oil/Gas in these blocks. The timeline for assessment and drilling of pilot wells is three years which would be completed by October 2016.

v. Policy approved for Non-exclusive Multi-client Speculative Survey for assessment of unexplored sedimentary basins. 7 proposals have been received and consent has been accorded for carrying out the surveys.

Pipelines & Natural Gas

chapter

3

Pipelines and Natural Gas

3.1 Pipeline Network

At present, 15,000 km of Gas Pipeline network exists in the country. Government has focused to develop an ecosystem of national gas grid across the country. In order to complete the grid, another 15,000 km of additional gas pipeline has been planned. Out of the proposed 15,000 km gas pipeline, about 13,000 km has already been authorized and these projects are at various stages of implementation. The sponsoring authority i.e.GAIL (India) Limited has completed survey work for the project. Based on survey report, the route of the pilot PPP project has also been revised to Bokaro-Ranchi-Talcher-Paradip-Angul pipeline section for optimizing pipeline infrastructure in the region. In order to provide thrust for gas grid development, government support to fund pipeline projects are also under consideration. A pipeline of about 312 Km connecting Coal Bed Methane (CBM) block at Shadhol,Madyha Pradesh to existing natural gas corridor i.e. Hazira-Vijyapur-Jagdishpur pipeline at Phulpur, Uttar Pradesh is expected to be operational within scheduled time i.e. June 2016. In eastern part of the country, GAIL expedited its efforts to implement Jagdishpur-Haldia Pipeline (JHPL) project. Construction of JHPL Phase -I was inaugurated by Hon'ble Prime Minister of India on 25th July 2015 wherein he referred to it as "Energy Highway of Eastern India". Phase-I includes 341 km mainline from Phulpur (UP) to Dobhi (Bihar) and 414 km spur lines to various demand centers like FCI-Gorakhpur, IOCL - Barauni, City Gate Stations of Varanasi and Patna. Project is under execution and is being synchronized with anchor load customers including revival of fertilizer plants.

Pipelines : Lifelines of the Petroleum Business

3.2 Gas Production and Supply position

As per the BP statistical review 2015, India is the fourth largest energy consumer in the world with oil and gas constituting about 37.47% of primary energy consumption, of which 28.33% comes from crude oil and 7.14% comes from Natural gas. Coal constitutes around 56.47% of total energy consumption in the country.

Global primary energy consumption increased marginally by 0.95% in 2014 over 2013 but remained well below the 10-year average (CAGR for 2004-14) of 2.1%. In comparison, Asia Pacific region grew at 2.35% over last year and 4.59% for 2004-14 period where as India grew 7.1% compared to 2013 and 6.33% for 2004-14 period leading the pack.

The growth rate (CAGR) for 2004-14 period for natural gas in the world has been 2.33%, Asia Pacific 6.03% and India at 4.74%. Natural gas constitutes only 7.14% of total primary energy consumed in India during 2014, compared to 23.71% in the world, 11.45% in Asia Pacific, 30.25% in USA. As can be seen from above, the share of natural gas is substantially low in India compared to world and Asia-Pacific region which implies that the share of natural gas in India's primary energy basket is going to increase in the future.

Total daily average domestic gas production during 2015-16 H1 (April 2015 to September 2016) was around 86.59 MMSCMD and supply was 70.52 MMSCMD. Total consumption of natural gas in the country in the same period last year was around

123.25 MMSCMD which consist of 69.98 MMSCMD of conventional domestic natural gas (56.78% of total consumption), 0.55 MMSMCD of Coal Bed Methane (0.44% of total consumption) and 52.72 MMSCMD of imported R-LNG (42.78% of total consumption).

The projection of demand as made by the working group on Petroleum and Natural Gas Sector for the 12th five year plan (2012-17) is as under:

Table: Year Wise and sector wise demand of natural gas (MMSMCD)

Sector	2015-16	2016-17	2017-18	2018-19
Power	189	207	225	243
Fertilizer	113	113	113	113
City Gas	39	46	47	50
Industrial	25	27	28	32
Petrochemicals/ Refineries/ Internal Consumption	72	72	72	76
Sponge Iron/ Steel	8	8	9	9
Total Demand	**446**	**473**	**494**	**523**

A view of GAIL's Petrochemical Complex at Pata, District Auraiya, Uttar Pradesh

Pipe stacks for offshore pipeline project at Paradip

3.3 Regasification infrastructure in the country

LNG is imported into the country on long, medium/short term and spot basis. The import of LNG on long/ medium term basis is done to meet the deficit in the country due to shortage of supply from domestic production whereas the procurement of LNG on spot basis is done from time to time to meet the short term demand-supply gap and also to serve peak requirement of customers which are not met through term tie-ups.

As on date, India has four LNG regasification terminals situated in the western coast of India. The details of existing and upcoming regasification terminal in the country are as under:

S.No.	Entity	Location	Current Capacity (MMTPA)	Augmented/ New capacity	Status & Expected Date
1	PLL	Dahej, Gujarat	10	15	Augmentation to 15 MMTPA work is in progress and will be ready by the end of 2016, which will be further expanded to 17.5 by 2019.
2	PLL	Kochi, Kerala	5	-	Current utilization is only about 2% of installed capacity. The completion of KKBMPL is must for utilization of the project.
3	HLPL	Hazira, Gujarat	5	-	
4	GAIL/RGPPL	Dabhol, Maharashtra	5	-	Operates at ~1.3 MMTPA in absence of breakwater

3.4 City Gas Distribution (CGD)

City Gas Distribution (CGD) segment is one of the fastest growing end-user segments of natural gas and is becoming an integral part of the economic development of India. It has two distinct segments - Compressed Natural Gas (CNG) predominantly used as auto-fuel and Piped Natural Gas (PNG) used in domestic, commercial and Industrial segments.

Petroleum & Natural Gas Regulatory Board (PNGRB) has been set up under the PNGRB Act, 2006 w.e.f. 01.10.2007. This Act provides legal framework for the development of natural gas pipelines and city or local gas distribution networks in the country. With establishment of PNGRB, implementation of City Gas Distribution (CGD) projects including Piped Natural Gas (PNG) & Compressed Natural Gas (CNG) in various cities are being awarded by PNGRB through bidding process.

At present, 25 CGD entities are either operating or developing CGD network in 67 cities/ geographical areas in 18 States / UTs of the country. PNGRB has invited bids for 34 more new GAs under sixth bidding round. So far, there are over 2.55 Million CNG vehicles being catered by 1026 CNG stations. As far as consumption is concerned, CGD sector showed growth of 8.35% from 354.96 MMSCM in Dec' 2014 to 384.60 MMSCM in Dec' 2015. Also, expected sectoral gas demand for 2015-16 is 39 MMSCMD (Source: PPAC)

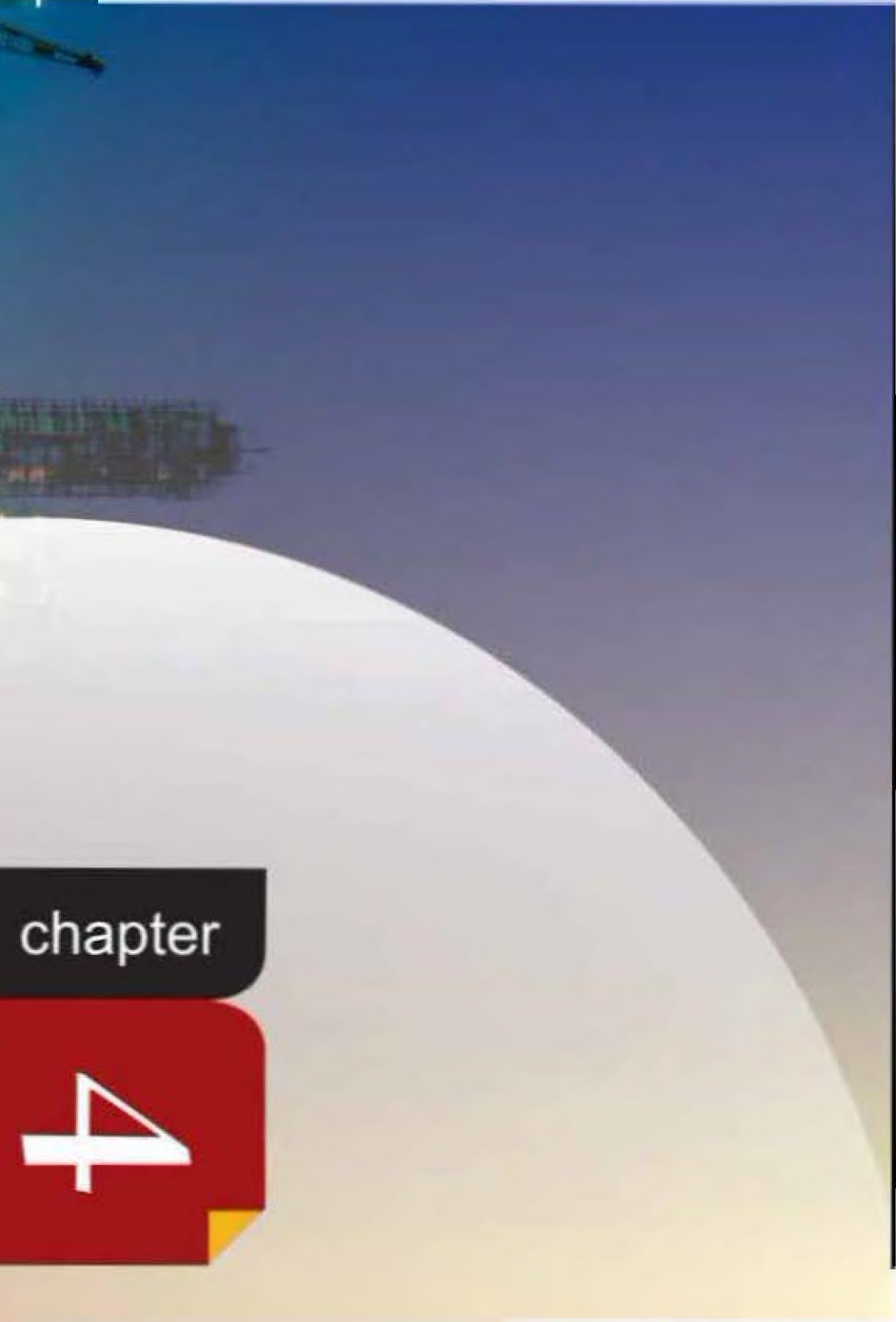
Further, Govt. of India is taking number of policy measures to increase the use of natural gas in CGD sector, some of which are as follows:

1. Replacing costly and polluting fuels with natural gas
2. Mandating CNG in various cities (E.g. Delhi, Mumbai) and increasing CNG stations in Delhi/NCR
3. Ban on polluting industrial fuels
4. Inclusion of more number of cities by Petroleum and Natural Gas Regulatory Board (PNGRB) for development of City Gas Distribution (CGD) network
5. Allocation of domestic gas for domestic PNG and CNG segments for faster roll out of PNG connections and CNG stations in a given city/ geographical area

3.5 PIPED NATURAL GAS (PNG)

Government of India has envisaged to connect one Crore households through PNG network in next 5 years. At present, more than 30.60 lakh households and 28,800 industrial and commercial gas customers are using piped natural gas supplies. Further, in order to expedite CGD network expansion, GoI has accorded highest priority in domestic gas allocation to CNG (transport) and PNG (domestic households) Segments. There are 25 CGD Entities which are developing and operating in 67 Geographical Areas (GAs) in 18 State(s)/ UTs. This includes 17 new GAs which have been authorized by Petroleum and Natural Gas Regulatory Board (PNGRB) through 4th and 5th round of CGD Bidding in year 2014 & 2015. These new GAs are Ernakulam District (Kerala), Bengaluru Rural and Urban Districts (Karnatka), Raigarh District (Maharashtra), Pune District (Maharashtra),Thane District (Maharashtra),UT of Daman, UT of Dadar & Nagar Haveli, Panipat District (Haryana), Amritsar District (Punjab), East Godavari (AP), Krishna (AP), West Godawari (AP), Belgaum (Karnataka), Tumkur (Karnataka), Dharwad (Karnataka), Haridwar (Uttarakhand), Udham Singh Nagar (Uttarakhand). Further, PNGRB invited bids for more new GAs (districts) under the 6th rounds of CGD bidding. PNGRB has received bids for 20 GAs and bid evaluation process is underway. Government has decided to meet 100% demand of CNG and PNG sector through supply of domestic gas. Further, GAIL has been authorized to supply 10% over and above the allocation of gas to meet any fluctuations in demand. Domestic gas has also been diverted from non-priority sector to meet the additional demand for city gas distribution networks.

Refining


chapter
4

Refining

4.0 Introduction

4.01 The Indian Petroleum refining sector has come a long way since crude oil was discovered and the first Refinery was set up at Digboi in our country more than a century and decade ago. The present Mumbai Refinery of HPCL was the first modern Refinery to be set up after independence by Esso in 1954, which was followed by setting up of Refineries by other oil majors. Since then, refineries were established by the Government, Private sector & Joint sector.

4.02 Indian refining industry has done well in establishing itself as a major player globally and today we are the 4th largest country in the world in terms of refining capacity which is presently 230.066 Million Metric Tonnes Per Annum (MMTPA) after USA, Russian Federation and China. There are 23 refineries in India, out of which 18 are in public sector, 3 in private sector and 2 are Joint Ventures. The details of Refining capacity of various countries of the World are given hereunder:

Oil: Refinery capacities

Country	Qty (MMT)*
US	885.91
Canada	97.87
Mexico	75.78
Argentina	30.97
Brazil	111.28
Netherlands Antilles	15.93
Venezuela	64.88
Other S. & Cent. America	79.12
Belgium	38.64
France	68.46
Germany	102.60
Greece	24.80
Italy	98.79
Netherlands	63.46
Norway	15.74
Russian Federation	315.60
Spain	77.00
Sweden	21.71
Turkey	30.52
United Kingdom	68.10
Other Europe & Eurasia	255.94
Iran	98.84
Iraq	54.48
Kuwait	46.61
Saudi Arabia	140.52
United Arab Emirates	56.92
Other Middle East	72.10
Africa	176.92
Australia	26.70
China	702.00
India	**230.07**
Indonesia	54.53
Japan	186.70
Singapore	75.39
South Korea	143.76
Taiwan	59.61
Thailand	61.82
Other Asia Pacific	90.85

*** for 2014**

4.03 The capacity, configuration and complexity of the refineries have undergone major changes with phase-wise capacity expansion and modernization.

Starting with a simple hydro skimming refinery configuration in 1950s, comprising simple crude oil distillation, naphtha/kerosene/ATF treatment and catalytic reforming for upgrading naphtha to petrol, the PSU refineries started adopting state-of-art modern technologies. The refineries established in the sixties by Govt. undertakings were based on processing of indigenous crude oils of low sulfur origin available in North East and Gujarat basin. The refineries were characterized by low crude oil prices, simple configuration with no secondary processing, low energy recoveries and high sulphur fuel oil acceptable as internal fuel.

4.04 The first oil shock of 1973 heralded a major change in the refining industry and the process configuration and technology. Secondary processing facilities like Fluid Catalytic Cracking Units to upgrade low value streams to high value middle distillates were installed in many of the refineries.

4.05 Configuration of Indian refineries further underwent a major change in late 1980's and early 1990's. There was increased emphasis on maximisation of middle distillates as well as better stability of products, with configurations showing shift from FCC towards Hydrocracking process and a combination of both. The first hydrocracker in the country was commissioned in Gujarat refinery of IOCL in 1993. All new grassroot refineries started considering installation of hydrocrackers, cokers.

4.06 Refinery configurations in late 1990's were dictated by the product quality up-gradation due to environmental considerations. These include lead free gasoline, low sulfur diesel and fuel oil besides other improvement in properties along with the ever increasing demand for middle distillates. The configurations therefore were modified to include:

- Incorporation of processing units such as Continuous Catalytic reforming (CCR), Hydrocracker,
- Hydrotreating / Hydrodesulphurisation facilities to generate low sulfur fuels and fuel oil for internal use
- Elimination/reduction of residue through Delayed Coking / Visbreaking and integration with Power generation

4.07 Paradip Refinery

To meet burgeoning energy demands of the future IndianOil has augmented its refining capacity by setting up a 15 MMTPA grassroots refinery at Paradip in Odisha with approx. cost of 35000 Crore. This refinery at Paradip is most modern refineries with state-of-the-art technologies from various are of technology licensors across the world.

Refinery is located at Paradip, Odisha and is about 90 Km by road from Cuttack and about 120 Km from Bhubaneswar. Refinery site is spread over a total area of 3,344 acres, which is divided by Santra Creek (200 m wide) into two parts.

Project was approved on 28.2.2009 and was commissioned in November in 2015. Post commissioning of the project, it was dedicated to the Nation by Hon'ble Prime Minister Shri Narender Modi on 7.2.2016.

Salient Features: 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 cheaper high sulphur heavy crudes with an average API of 27. PDRP comprises of following major process units:

Sl.	Process Unit	Licensor	Capacity
1.	Atmospheric & Vacuum Distillation Unit (AVU)	Open art - Foster Wheeler	15.0 MMTPA
2.	Diesel Hydro treating Unit (DHDT)	Shell Global, Netherlands	5.2 MMTPA
3.	VGO Hydro treating Unit (VGOHDT)	Axens, France	5.4 MMTPA
4.	Fluidised Catalytic Cracking Unit (INDMAX)	IOC-R&D	4.1 MMTPA
5.	Delayed Coking Unit (DCU)	Foster Wheeler, USA	4.4 MMTPA
6.	Naphtha Hydro treating (NHT)/ Catalytic Reforming Unit (CRU)	UOP, USA	3.9/2.9 MMTPA
7.	Alkylation Unit	ExxonMobil, USA	650 TMTPA of Alkylate
8.	Propylene Recovery Unit (PRU)	Basell, Italy	1.9 MMTPA
9.	Sulphur Recovery Unit (SRU)	Black & Veatch, USA	2 x 525 TPD of sulphur

MMTPA = Million Metric Tones Per Annum, TMTPA = Thousand Million Tones Per Annum, TPD = Tones Per Day

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. Energy Intensity Index of Paradip Refinery is expected to be 78.6, which is in 1st quartile.

Many first-time technological features, viz., Flue Gas desulphurisation facilities, vapour recovery system in South Jetty etc. have been the hallmark of Paradip refinery. These features will ensure environment friendly operation of the refinery with minimum impact to the nature.

Objectives and Benefits

This refinery is envisaged to meet projected petroleum products deficit in Eastern India as well as to capture export potential in South East Asia. The immediate impending growth of ancillary and auxiliary industries around the Refinery will serve as an economic stimulus for industrial development in the region.

4.08 Mega Refinery on West Coast

The Public Sector Oil Companies, IOCL, BPCL, HPCL and EIL are planning to invest approx Rs 1.5 lakh Crore in setting up India's Biggest refinery on the West Coast. The proposed refinery would have a capacity of 60 MMTPA which will be build in 2 phases-40 +20 MMTPA. It would be accomapanied by a petrochemical complex.

4.1 REFINING CAPACITY

4.1.1 At present, the refining capacity in India is 230.066 Million Metric Tonnes Per Annum (MMTPA) 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 Table 4.1:

Sr. No.	Refinery Location	Name of the Company	Name Plate Capacity (MMTPA)*
		PSU Refineries	
1	Digboi-1901#		0.650
2	Guwahati-1962		1.000
3	Barauni-1964		6.000
4	Koyali-1965		13.700
5	Bongaigaon-1974	Indian Oil Corporation Limited	2.350
6	Haldia-1975		7.500
7	Mathura-1982		8.000
8	Panipat-1998		15.000
9	Paradip-2016		15.000
10	Mumbai-1954	Hindustan Petroleum Corporation Limited	6.500
11	Visakhapatnam-1957		8.300
12	Mumbai-1955	Bharat Petroleum Corporation Limited	12.000
13	Kochi-1963		9.500
14	Manali-1965	Chennai Petroleum Corporation Limited	10.500
15	Nagapattinam-1993		1.000
16	Numaligarh-2000	Numaligarh Refinery Limited	3.000
17	Mangalore-1996	Mangalore Refinery and Petrochemicals Limited	15.000
18	Tatipaka, AP-2001	Oil and Natural Gas Commission	0.066
		Total	**135.066**
		JV Refineries	
19	Bina-2011	Bharat Oman Refinery Ltd.	6.000
20	Bathinda-2012	HPCL Mittal Energy Ltd.	9.000
		Total	**15.000**
		Private Sector Refineries	
21	DTA-Jamnagar-1999	Reliance Industries Limited	33.000
22	SEZ, Jamnagar-2008	Essar Oil Limited	27.000
23	Vadinar-2006		20.000
		Total	**80.000**
		Grand Total	**230.066**

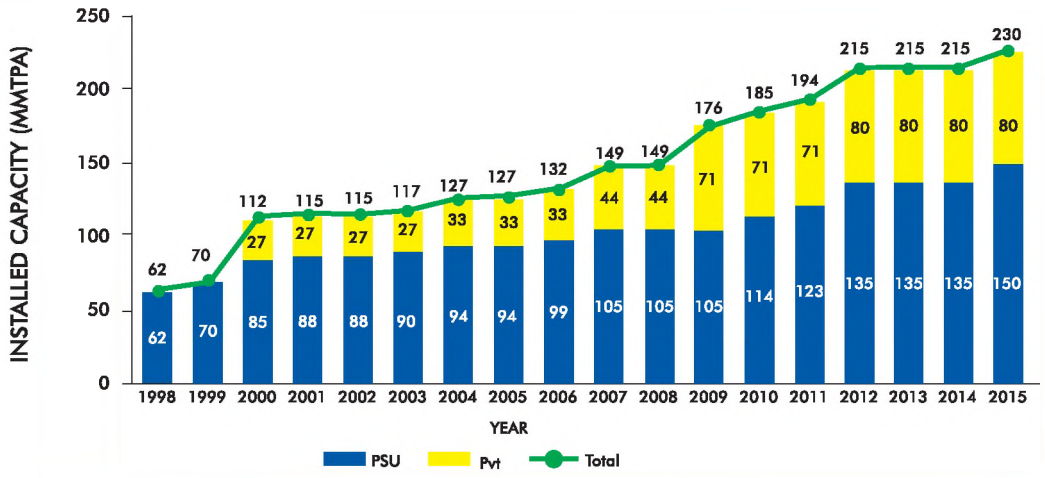
(# Refinery was set up at Digboi in 1901 by Assam OilCompany Ltd and later on IOCL took over the refinery on 14.10.1981) *MMTPA-Million Metric Tonne Per Annum

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 2015-16 (upto Dec, 2015), the country has exported 43.779 Million Metric Tonnes (MMT) of Petroleum products worth US Dollars 21.438 BIllion (provisional). India is the largest exporter of petroleum products in Asia since August 2009.

4.2 REFINING CAPACITY ADDITION OVER THE YEARS

4.2.1 The graphical representation of the refining capacity addition over the years shown in Graph 4.2.

Graph 4.2: Refining Capacity addition over the years



4.3 EXPANSION OF EXISTING REFINERIES

4.3.1 The Capacity expansion planned by Ministry is as under Table 4.2:

S.No.	Name of the Company	Location of the Refinery	Increase in Capacity, MMTPA
1	Indian Oil Corporation Limited (IOCL)	Barauni	3.000
2	Hindustan Petroleum Corporation Limited (HPCL)	Visakhapatnam, Andhra Pradesh	6.700
3.	Numaligarh Refinery Limited (NRL)	Numaligarh, Assam	6.000
4	Bharat Oman Refinery Limited (Bharat Petroleum Corporation Limited & Oman Oil Company, Joint Venture), Bina	Bina, Madhya Pradesh	1.800
5	Bharat Petroleum Corporation Limited (BPCL)	Kochi, Kerala	6.000

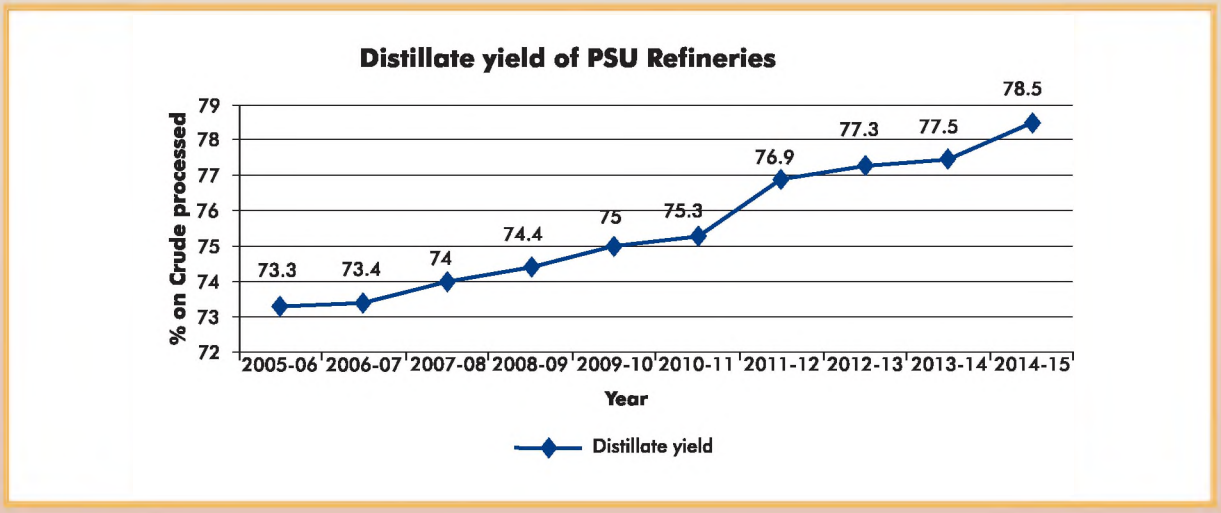
4.4 REFINERY PERFORMANCE IMPROVEMENT

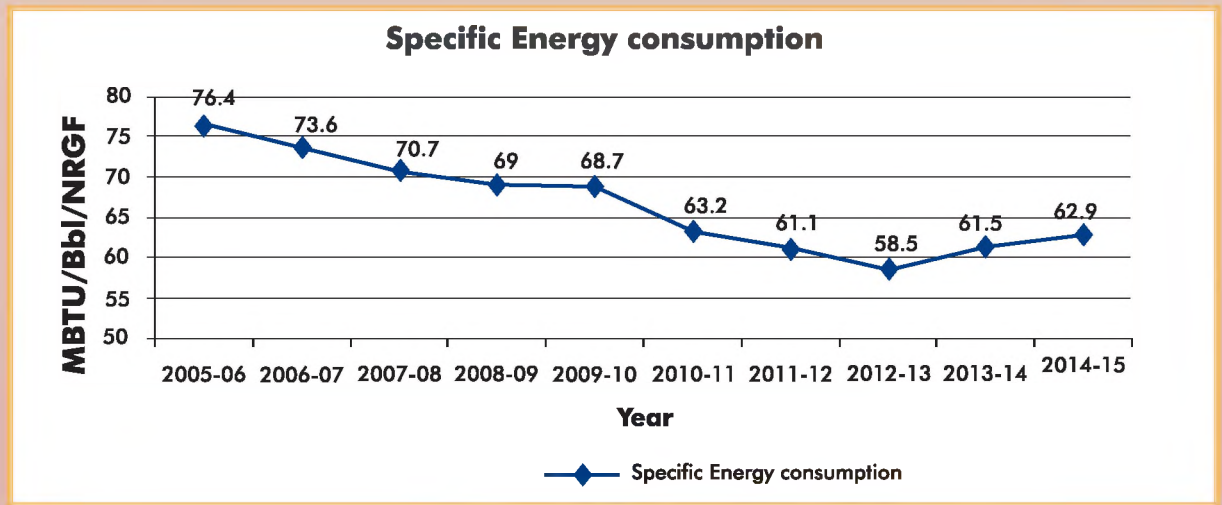
4.4.1 Indian public refineries are equipped with modern technologies and continuously upgrade the technologies in line with the International trend and as per the requirement. Indian refineries have accorded top priority to reduce the energy consumption through various energy conservation measures.

4.4.2 The Centre for High technology (CHT) carried out a Performance Benchmarking Study of 15 public sector Refineries through M/s Solomon Associates for three consecutive cycles 2010, 2012 and the study for 2014 is in progress. The study reports involved comparison of various Key Performance Areas (KPAs) and parameters like Energy Efficiency Index, Volume Expansion Index, Operational Availability, Process Utilization, Maintenance & Personnel Index, Operational Costs, margins, Transportation Fuel, Production costs etc., with Indian as well as regional peers. The result of these studies have shown wide performance gaps between Indian, CPSE refineries and the best performing Asian and Global refineries. Most of the CPSE refineries are in the last quartile in terms of performance in respect of key parameters. Industry level Group is working to improve those KPAs.

4.4.3 Further, adoption of modern technologies by Indian refineries and energy conservation measures has helped in increasing the distillate yield, quality upgradation of petrol/diesel and reduction in Specific energy consumption (MBTU/Bbl/NRGF-MBN). The industry average distillate yield (wt% on crude) has improved from 73.3% in 2005-06 to 78.5% in 2014-15. Similarly the industry average MBN has come down from 76.4% in 2005-06 to 62.0% in 2014-15 as depicted in graph 4.3.

Graph 4.3





4.5 Auto Fuel Policy

4.5.1 Auto Fuel Policy-2003

The Govt. of India constituted a Committee of Experts on 13th September, 2001 under the chairmanship of Dr. R.A.Mashelkar, DG, CSIR to recommend an Auto Fuel Policy for the country. The Committee recommended a road map for upgradation of fuel quality in the country apart from other recommendations. The road map and the action taken by the Ministry in implementation of the same are tabulated in table 4.3.

Table 4.3.: Auto Fuel Policy-Road map and Action taken

S. No.	Road Map	Action Taken
1	Supply of Euro-III standard auto fuels in 13 identified cities & BS-II standard auto fuels in rest of the counry w.e.f.1.4.2005	Due to production, import & other logistics constraints, the actual implementation was phased over six months for different states/locations i.e. up to September 2005.
2.	Supply of BS-IV auto fuels (MS/HSD) in the NCR & 13 identified cities from 01.04.2010	Implemented w.e.f 01.04.2010 in NCR-Delhi (comprising of 108 towns, of which 17 ar class I cities), Mumbai, Chennai, Kolkata, Bangalore, Kanpur, Agra, Pune, Surat, Ahmedabad,Hyderabad, Lucknow & Sholapur
3.	Supply of BS-III auto fuels (MS/HSD) in the rest of counry from 01.04.2010	As per the revised approval of the Government, implemented in a staggered manner between April 01, 2010 and September 22, 2010 due to production and logistic issues involved.

Hon'ble Prime Minister Shri Narendra Modi and Minister of State(I/C), PNG Shri Dharmendra Pradhan at the time of inauguration of paradip refinery dedication to the nation on 7.2.2016

The Ministry of Petroleum & Natural Gas has decided to go beyond Auto Fuel Policy recommendations & to expand BS-IV auto fuels to 50 more cities by March 2015 with preference to most polluted cities, state capitals and cities with million plus population, subject to logistic constraints. Supply of BS-IV fuels have already been expanded to following 26 cities till 2013-14.

(i) 7 cities i.e. Puducherry, Mathura, Vapi, Jamnagar, Ankleshwar, Hissar & Bharatpur in 2011-12.

(ii) 6 cities i.e. Silvasa, Daman, Diu, Aligarh, Rae Bareilly & Unnao in April to October 2012.

(iii) 4 cities i.e. Karnal, Kurukshetra, Yamunanagar & Valsad on 1st March, 2013.

(iv) 3 cities i.e. Medak, Nizamabad and Mehbubnagar on 5th July, 2013.

(v) 6 cities i.e Vrindaban, Kosi Kalan, Hindaun city, Dholpur, Ahmednagar, Mahabaleshwer on 1st January, 2014

The remaining 24 cities have been supplied BS-IV Auto Fuels w.e.f 15th March, 2015.

4.5.2 Auto Fuel Vision and Policy 2025

The Ministry of Petroleum and Natural Gas vide order dated 19th December, 2012 has constituted an Expert Committee for drafting the Auto Fuel Vision and Policy-2025 under the Chairmanship of Shri Saumitra Chaudhuri, Member, Planning Commission, with the following terms of reference:

(i) Recommend roadmap for auto fuels quality till 2025 for the country,taking into account achievement under the last Auto Fuel Policy, emission reduction of in-use vehicles, growth of vehicles and supply and availability of fuels.

(ii) Recommend suitable mix of auto fuels including gas and its specifications considering:

(a) availability of infrastructure and logistics of fuel supplies;

(b) processing economics of auto fuels;

(c) improvement in quality of fuel vis-à-vis improvement in vehicle engine technology

(iii) Recommend vehicular emission norms for various categories of vehicles and roadmap for their implementation;

(iv) Recommend use of alternate fuels to minimize impact on environment;

(v) Recommend fiscal measures for funding requisite upgradation of oil refineries, logistics and removal of inter-fuel pricing distortions.

Ministry of Petroleum & Natural Gas vide order dated 19.01.2015 has notified for implementation

Shri Dharmendra Pradhan, MoS (IC), PNG and Shri Devendra Fadnavis, Chief Minister, Maharashtra and Secretary, MoPNG dedicating the Crude Distillation Unit at BPCL Refinery to the Nation on 28.10.2015

of BS-IV auto fuels in the entire country w.e.f 01.04.2017 in a phased manner. Further, an Interministrial Meeting was held on 06.01.2016 on the issue of introduction of BS-VI auto fuels in the country in which Hon'ble MoS(IC), MoP&NG, Minister for Road Transport & Highways, Hon'ble Minister for Heavy Industries & Public Enterprises, Hon'ble MoS (IC), Environment, Forests & Climate Change were present and it was decided that the country will leap frog directly from BS-IV to BS-VI fuel standards and BS-VI standards will be implemented in the country w.e.f 01.04.2020.

4.6 BRIEF DESCRIPTION OF THE REFINERIES

Public Sector Refineries

IOCL Refineries

4.6.1 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 14th October,1981 and created a separate division. This division had both Refinery and Marketing operations.

The present capacity of the Refinery is 0.650 MMTPA. The crude refining capacity utilisation of the refinery was 91% in 2014-15.

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

4.6.2 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.

The present capacity of the Refinery is 1.00 Million Metric Tonnes Per Annum (MMTPA). The crude refining capacity utilisation of the refinery was 100.6% in 2014-15.

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.

4.6.3 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 present capacity of the Refinery is 6.00 MMTPA. The crude refining capacity utilisation of the refinery was 99.1% in 2014-15.

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

4.6.4 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.

The present capacity of the Refinery is 13.700 MMTPA. The crude refining capacity utilisation of the refinery was 97% in 2014-15.

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.

4.6.5 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 25th March, 2009.

The present capacity of the Refinery is 2.350 MMTPA. The crude refining capacity utilisation of the refinery was 102.3% in 2014-15.

BRPL which was originally processing Assam crudes is now capable of processing imported crudes. It also has a Petrochemical Complex consisting of Xylene, Di-Methyl Terepthalate (DMT) and Polyester Staple Fibre (PSF) Units.

4.6.6 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.

The present capacity of the Refinery is 7.500 MMTPA. The crude refining capacity utilisation of the refinery was 102% in 2014-15.

Haldia refinery is the only refinery of IndianOil 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.

4.6.7 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.

The present capacity of the Refinery is 8.000 MMTPA. The crude refining capacity utilisation of the refinery was 106.4% in 2014-15 (lower planned shutdown for undertaking major FCC revamp jobs).

It is first Green Refinery of Indian equipped with elaborate environment monitoring system and ecological park. It also uses natural gas to control SO_2 emissions from the refinery.

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

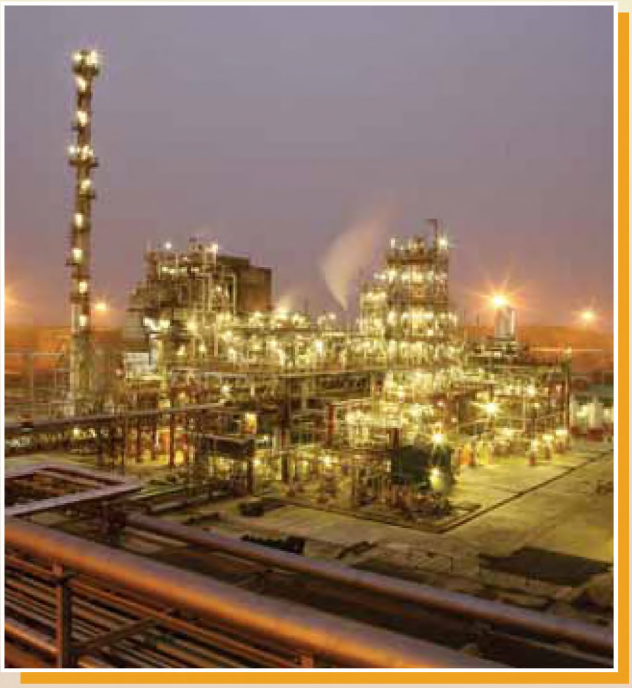
Panipat Refinery was commissioned in 1998.

The present capacity of the Refinery is 15.000 MMTPA. The crude refining capacity utilisation of the refinery was 94.6% in 2014-15.

Panipat refinery is the most modern refinery of Indian Oil Corporation Ltd. The Purified Terepthalic 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.

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

Paradip Refinery has been dedicated to the Nation by the Hon'ble Prime Minister on 7.2.2016. Paradip Refinery is Indian Oil's most prestigious and capital intensive project till date and this is the 11th refinery of group of Indian Oil Corporation Ltd. The Refinery is located at Paradip, Orissa. 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 Million Metric Tonne Per Annum (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. Energy Intensity Index of Paradip Refinery is expected to be 78.6, which is in 1st quartile.

NRL Refinery

HPCL Refineries

4.6.10 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 Stan Vac was named ESSO India Limited. In 1969, Lube India Ltd came into existence for manufacturing Lube Oil Base Stock (LOBS). On 15th July, 1974 the undertakings of ESSO and Lube India Ltd were nationalized and merged to form Hindustan Petroleum Corporation Limited (HPCL).

The present capacity of the Refinery is 6.500 MMTPA. The crude refining capacity utilisation of the refinery was 114% in 2014-15.

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.

4.6.11 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.

The present capacity of the Refinery is 8.300 MMTPA. The crude refining capacity utilisation of the refinery was 105.6% in 2014-15.

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 VisakhRefinery. The Indian Strategic Petroleum Reserves Ltd. (ISPRL) is coming up nearby the refinery.

BPCL Refineries

4.6.12 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.

The present capacity of the Refinery is 12.000 MMTPA. The crude refining capacity utilisation of the refinery was 106.8% in 2014-15.

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.

4.6.13 Kochi Refinery (Kerala) - Bharat Petroleum Corporation Limited (BPCL)

The Kochi Refinery Ltd (KRL), a public sector undertaking 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 with Bharat Petroleum Corporation Ltd in 2006.

The present capacity of the Refinery is 9.500 MMTPA. The crude refining capacity utilisation of the refinery was 109% in 2014-15.

The refinery is equipped to receive crude oil in Very Large Crude Carriers (VLCC). Kochi refinery has undertaken an ambitious expansion plan to

Kochi Refinery of BPCL

enhance refining capacity to 15.5 MMTPA and also to diversify into petrochemical manufacturing for value addition.

CPCL Refineries

4.6.14 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.

The present capacity of the Refinery is 10.500 MMTPA. The crude refining capacity utilisation of the refinery was 97.6% in 2014-15.

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. Under its Renewable Energy Initiative, a Wind Energy Farm with a capacity of 17.6 MW was commissioned at Pushpathur, Tamil Nadu in 2007.

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

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

The present capacity of the Refinery is 1.000 MMTPA. The crude refining capacity utilisation of the refinery was 53.1% in 2014-15.

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.

NRL Refinery

4.6.16 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%).

The present capacity of the Refinery is 3.000 MMTPA. The crude refining capacity utilisation of the refinery was 92.6% in 2014-15.

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

Shri Dharmendra Pradhan, MoS (I/c), PNG inaugurates Polypropylene unit at MRPL on 05.04.2015

MRPL Refinery

4.6.17 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 present capacity of the Refinery is 15.000 MMTPA. The crude refining capacity utilisation of the refinery was 97.5% in 2014-15.

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.

ONGC Refinery

4.6.18 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 0.066 MMTPA. The crude refining capacity utilisation of the refinery was 76.7% in 2014-15.

Under Phase-II, an additional refinery of same capacity of 0.066 MMTPA is under construction.

Joint Venture Refneries

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

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

The present capacity of the Refinery is 6.000 MMTPA. The crude refining capacity utilisation of the refinery was 103.5% in 2014-15.

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).

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

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

The present capacity of the Refinery is 9.000 MMTPA. The crude refining capacity utilisation of the refinery was 81.6% in 2014-15.

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.

Private Sector Refineries

4.6.21 Reliance Industries Limited (Domestic Tariff Area)(RIL-DTA) (Private Sector), Jamnagar (Gujarat)

The refinery was commissioned in July 1999.

The present capacity of the Refinery is 33.000 MMTPA. The crude refining capacity utilisation of the refinery was 93.5% in 2014-15.

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 and a Captive Power Plant with an installed capacity of 450 MW power through Gas Turbines & Steam Turbines.

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

The refinery was commissioned in Dec 2008.

The present capacity of the Refinery is 27.000 MMTPA. The crude refining capacity utilisation of the refinery was 137.7% in 2014-15.

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.

4.6.23 Essar Oil Limited (EOL) (Private Sector), Vadinar (Gujarat)

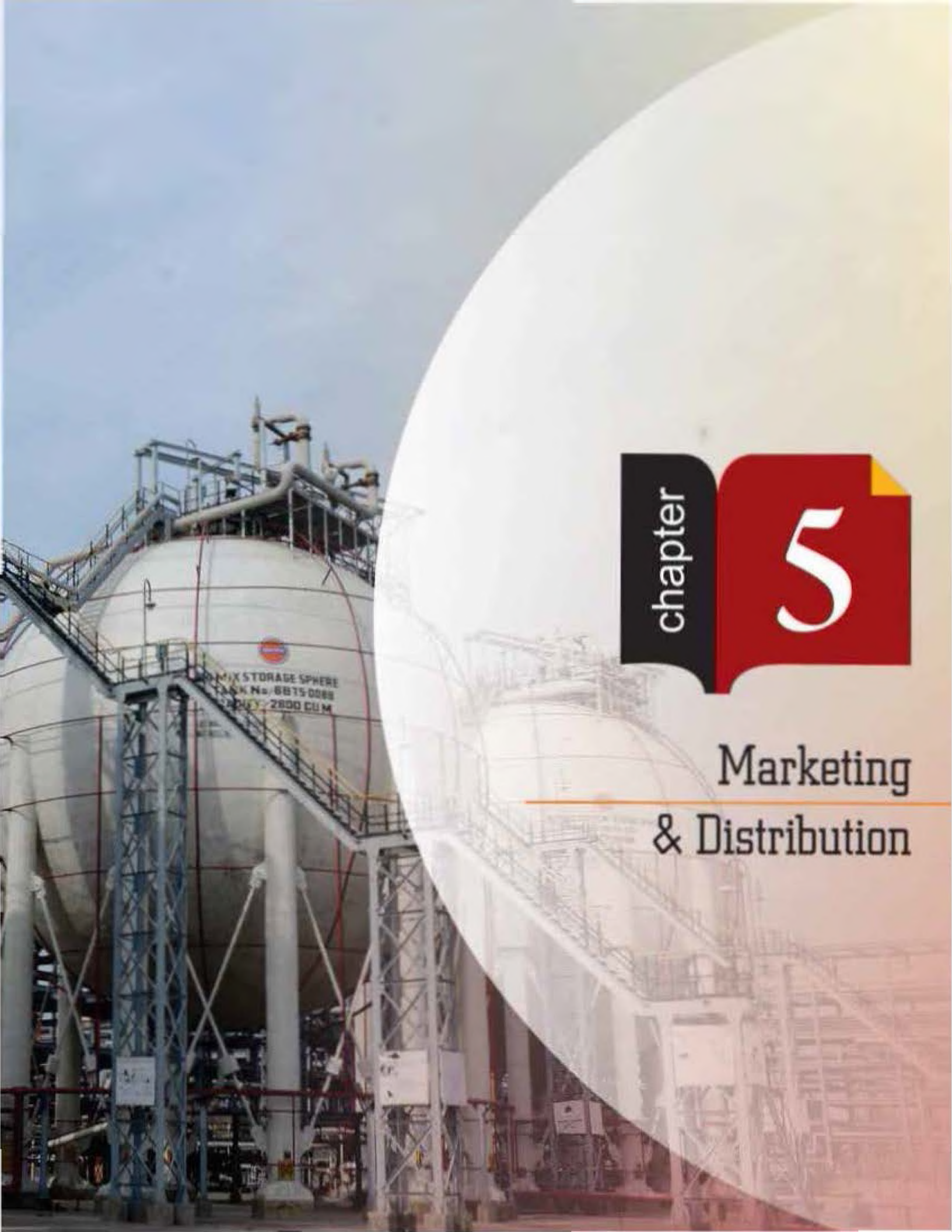
The refinery was commissioned in November, 2006.

The present capacity of the Refinery is 20.000 MMTPA. The crude refining capacity utilisation of the refinery was 102.5% in 2014-15.

Essar refinery is the single-location second largest refinery in the country.

Announcement of Mega Refinery Western Coast of India on 25.01.2016


MIH STORAGE SPHERE
TANK No.: 68-TS-008A
CAPACITY: 2800 CuM



chapter 5

Marketing & Distribution

Marketing & Distribution

5.1 RETAIL MARKETING INFRASTRUCTURE

The retail marketing of petroleum products in India is done by the Public Sector Oil Marketing Companies (0MCs) i.e. Indian Oil Corporation Ltd (IOCL), Hindustan Petroleum Corporation Ltd (HPCL), Bharat Petroleum Corporation Ltd. (BPCL), Numaligarh Refinery Ltd. (NRL), Mangalore Refinery & Petrochemicals Ltd. (MRPL) and private Companies like Reliance, Essar and Shell.

There are 321 Terminal/Depots, 188 LPG Bottling Plants, 54,978 Retail Outlets, 17,398 LPG Distributorships, 6,563 SKO/LDO Dealers in the country as on 31.12.2015. The prices of sensitive petroleum products such as SKO and Liquid Petroleum Gas (LPG) are controlled by Government. All other products are deregulated and are subject to market forces. The Ministry broadly regulates the distribution policies of the sensitive petroleum products.

5.2. DEMAND & SUPPLY OF SENSITIVE PETROLEUM PRODUCTS

5.2.1 MS/HSD/SKO

Demand of MS, HSD and SKO was fully met during 2014-15 and 2015-16 (April -December). The quantity of petrol made available during 2014-15 was 19.07 MMT. The quantity of Diesel made available during 2014-15 was 69.33 MMT.

The actual availability of MS in the country in the current financial year 2015-16 (April-December) (Provisional) is 16.15 MMT. The actual availability of HSD in the current financial year 2015-16 (April-December) (Provisional) is 55.12 MMT. The allocation of SKO for the year 2015-16 is 86,85,384 KL which has been released over four quarters during the year out of which 64,30,308 KL has been utilized upto December-2015.

5.2.2 Allocation of PDS Kerosene to States/UTs

Superior Kerosene Oil (SKO) is one of the sensitive petroleum products distributed through Public Distribution System (PDS). Allocation of PDS SKO is made by the Government of India to different States/Union Territories (UTs) on a quarterly basis for distribution under Public Distribution System (PDS) for cooking and lighting only. PDS kerosene has been allocated to States/UTs based on historical allocations. Further distribution within the States/UTs through their PDS network is the responsibility of the concerned States/UTs.

For the current year 2015-16, quota of PDS Kerosene with respect of various States/UTs has been rationalized based on factors such as increase in domestic LPG & PNG connections, non-lifting of PDS SKO quota by the State/UT concerned and subject to an upper limit on the per capita SKO allocation for non-LPG and PNG population and with an additional criterion of a mandatory cut of 2% and a maximum cut of 10%. During 2015-16 total quantity of PDS-SKO allocated is 868 crore litres against 897 crore litres last year.

Customer service at HPCL's Retail Outlet

Indane LPG cooking gas - Reaching the doorsteps of consumers

5.3 CHALLENGES IN MARKETING OF SENSITIVE FUEL PRODUCTS:

5.3.1 Adulteration of MS/HSD by PDS SKO

Several technological and regulatory measures have been taken to contain adulteration and prevent diversion.

a. Regulatory measures: Control Orders issued by the Government to prevent fuel adulteration, under the Essential Commodities Act 1955, empowers the State Governments to take action against those indulging in adulteration. Marketing Discipline Guidelines (MDG) have been implemented to take action against R.O. dealers for irregularities/ malpractices.

b. Automation of Retail Outlets: In order to monitor the activities at retail outlets by adopting the latest technological improvements, automation of retail outlets is being implemented, There are nearly 24,764 number of ROs selling more than 100 KL of fuel per month. In nearly 16,441 ROs automation has been completed and in 13,519 ROs. No Automation - No Operation (NANO) has been implemented w.e.f. 01st January, 2016.

c. Tamper proof locking system: OMCs have introduced new tamper proof tank-truck locking systems to prevent en-route adulteration by transporters.

d. Third Party Certification of Retail Outlets: OMCs are required to obtain third party certification for all the retail outlets selling more than 100 KL per month. Number of ROs whose third party certification has been done as on 01-01-2016 is 18993.

e. GPS tracking of Tank Trucks: In order to prevent adulteration during transportation, OMCs have been directed to install GPS for complete monitoring of the movement of all the company owned/dealer owned/ contractor owned tank trucks. Nearly 40551 tank trucks have been covered with Vehicle Management System by OMCs as on 01-01-2016 covering nearly 91% of tank trucks.

5.4 Retail Marketing Infrastructure

The retail marketing of petroleum products in India is done by the Public Sector Oil Marketing Companies (OMCs), namely: Indian Oil Corporation Limited (IOC), Bharat Petroleum Corporation Limited (BPCL) and Hindustan Petroleum Corporation Limited (HPCL) and Private Companies such as Reliance, Essar and Shell etc.

In the Public Sector, as on 31.12.2015, there are 188 LPG Bottling Plants, and as on 31.12.2015, there are 17398 Distributorships in the country. The prices of sensitive petroleum products such as SKO and LPG are controlled by the Government. All other products are deregulated and are subject to market forces. The Ministry regulates the distribution policies of the sensitive petroleum products including petrol (MS)/Diesel (HSD)

5.5 Demand and supply of LPG

The actual availability of LPG in the country in the year 2015 is 10.2 MMT. LPG as on automotive fuel was introduced in India after the issuance of the LPG (Regulation of Use in Motor Vehicles) Order in the year 2001 by Ministry of Petroleum & Natural Gas. PSU Oil Companies as well as Private players have set up AUTO LPG Dispensing Stations (ALDS) in various parts of the country to dispense AUTO LPG to registered vehicles with permanently fitted Auto LPG tanks and approved LPG conversion kits as notified by Ministry of Surface Transport, Government of India. As on 31.12.2015, total 681 nos. of ALDS have been set up by OMCs and the LPG consumed under ALDS is 127 TMT for 2015-2016, till 31.12.2015

5.6 IMPROVEMENT OF DISTRIBUTION

5.6.1 LPG

In compliance of the Vision 2015 and to spread distribution network in rural areas and un covered areas, "Rajiv Gandhi Gramin LPG Vitaran Yojana" (RGGLVY) for establishing small size LPG distribution agencies, was launched on 16.10.2009. As on 31.12.2015, 5256 Nos. of RGGLVs have been commissioned by OMCs.

5.6.2 BPL SCHEME UNDER CSR FUND OF PSU OIL COMPANIES

To facilitate LPG coverage for Below Poverty Line (BPL) families in the country, a scheme for providing one time grant to BPL families for release of new LPG connection through Regular LPG distributors and Rajiv Gandhi Gramin LPG Vitaran (RGGLV) is in operation in the country. As per the scheme, the security deposit (Presently up to Rs. 1600/-) for one LPG cylinder and pressure regulator is paid from the fund created by ONGC, OIL, GAIL, BPCL, HPCLand IOC, for this purpose. Now, this ministry has extended the CSR fund scheme for BPL families through regular distributorships also for the year 2015-16.

5.7 SUBSIDY LEAKAGE IN LPG AND SKO DISTRIBUTION

To reduce the subsidy burden in Kerosene and LPG several initiatives have been undertaken by the Ministry including capping and de - duplication of duplicate LPG connections. These are detailed as under:-

5.7.1 Capping of subsidized LPG Cylinders

With effect from 14th September, 2012, number of subsidized domestic LPG cylinders per household was restricted to 6 per annum. This cap was subsequently revised to 9 and then to12. The aim of the capping scheme is to restrict the number of subsidized cylinders resulting in reduction in subsidy burden of the Government.

5.7.2 De-duplication of LPG Connections

As per the Liquefied Petroleum Gas (Supply and Distribution) Order, 2000, every domestic LPG consumer (household) is entitled for one subsidized connection. However, there could be multiple connections registered with public sector Oil Marketing Companies (OMCs) either in same name or in different name but in same address of household. The presence of multiple connections has led to leakage of subsidy. To detect such multiple connections, OMCs under the guidance of MoP&NG have prescribed a Know Your Customer (KYC) Process for new connections and undertaken a de - duplication exercise. This exercise is expected to result in saving of subsidy. As a result of the OMCs de duplication exercise of the LPG consumers, as on 30.11.2015, 686117 connections have been blocked so far.

5.7.3 PAHAL (DBTL Scheme)

Government of India implemented Direct Benefit Transfer for LPG Consumer (DBTL) Scheme, namely PAHAL, in 54 districts of the country on 15.11.2014 and in remaining districts of the country on 1st January, 2015 for direct transfer of LPG subsidy to the consumer. LPG consumers, who join the PAHAL Scheme, get the LPG cylinders at market price and receive LPG subsidy (as per their entitlement) directly into their bank accounts. All domestic LPG consumers have been given two alternatives in the scheme. If LPG consumer has Aadhaar number, he/she will have to link it to his/her LPG consumer number and bank account. Alternatively, if he /she do not have Aadhaar number, he/she can link his bank account directly to his LPG consumer ID. This alternative ensures that no LPG consumer is denied subsidy for want of Aadhaar number. The PAHAL scheme aims to prevent diversion of subsidized LPG into commercial sector and thereby helps in expanding LPG coverage without increasing subsidy burden on Government and to ensure that nobody can misuse the LPG subsidy of genuine LPG consumers. This would reduce the leakage in subsidy and thus save public money. As on 31.12.2015, approximately 14.83 crore consumers (90.53%), had joined the PAHAL scheme.

5.7.4 Direct Benefit Transfer in Kerosene (DBTK)

Government has decided to implement Direct Benefit Transfer in Kerosene (DBTK) w.e.f 01.04.2016 in 33 districts identified by 9 state government namely, Chhattisgarh, Haryana, Himachal Pradesh, Jharkhand, Madhya Pradesh, Maharashtra, Punjab, Rajasthan and Gujarat.

LPG Bottling Plant at Dhanaj

Where direct transfer of subsidy is introduced, the consumer will pay the non - subsidized price of kerosene at the time of purchase. Subsequently, the amount of subsidy will be directly transferred to the bank account of the beneficiary. To avoid any inconvenience to the beneficiary during the initial purchase through payment of non-subsidized price, an initial amount of subsidy shall be credited to all eligible beneficiaries.

With a view to incentivize States/UTs to implement DBT in kerosene, it has been decided that the States be given cash incentive of 75% of subsidy savings during the first two years, 50% in the third year and 25% in the fourth year. In case the states voluntarily agree to undertake cuts in kerosene allocation, beyond the savings due to DBT, a similar incentive be given to those States/UTs.

5.7.5 GiveItUp

Government has launched an initiative to encourage domestic LPG consumers, who can afford to pay the market price for LPG, to voluntarily surrender their LPG subsidy. This will enable the Government to Utilize the Limited resources to reach out to the economically backward classes. This will not only help women and children lead a healthy life, free of smoke and drudgery but also improve our environment. Every LPG consumer, who surrenders LPG subsidy is linked to a Below Poverty Line (BPL) household who gets LPG connection in turn. As on 31.12.2015, 58.51 lakh customers have given up LPG subsidy.

5.8 EMPOWERING LPG CONSUMER AND IMPROVEMENT IN SERVICES

Several consumer empowering initiative in LPG Marketing - Project "Lakshya" was launched with a view to improve the LPG supply chain.

5.8.1 MyLPG.

Various features such as LPG usage, LPG booking status, LPG refill history, request for surrender of connection, subsidy availed and transferred, rating of distributor by cylinder delivery time, rating the distributor on the five perceived parameters and Aadhaar linking status, filing of complaint against LPG distributor etc., have been provided for use of consumer at www.MYLPG.in. Further, detailed data on the consumers who have opted out of LPG Subsidy, Scroll of Honour, GiveItUp Champions & Beneficiaries etc., is also available at www.MyLPG.in.

5.8.2 Rating of distributors based on Delivery Performance

Each distributor is now being rated from 5 stars to 1 star (***** to *) based on his delivery performance. The aim is to measure, increase and improve the delivery performance of each distributor. Rating of distributor helps a consumer in deciding the change of distributor. It also motivates distributor to improve delivery times so as to retain consumers and act as a monitoring mechanism for public sector Oil Marketing Companies (OMCs) Sales Officers to make efforts to improve the performance of low rating distributors.

5.8.3 SMS/IVRS

The SMS/IVRS system is a customer oriented initiative, launched to facilitate a genuine customer for making a refill booking round the clock, seven days a week (24/7) and also circumvents the problems sometimes earlier faced by customers of finding Distributor's telephones lines busy. In this system, a consumer can book gas not only from his/her personal registered telephone/mobile numbers, but also from an un-registered telephone number. However, LPG customers, who do not have a landline/mobile number, can continue to visit the distributorship for booking their refills.

5.8.4 LPG Distributor Portability

In order to provide greater choice to customer to select his distributor by switching from his old distributor to another better star rating distributor and to bring competition among distributors, Portability was launched on 05.10.2013. Under this scheme, the customer will be allowed to get transferred connection within the cluster of distributers, identified with common Area of Operation, intra and intercompany (across IOC-BPCL-HPCL).

5.8.5 5 Kg. LPG Cylinders

The scheme has been launched to cater to a new category of consumers that have emerged in big cities who are mobile and do not want a permanent LPG connection but may still require LPG for their needs. Initially, the scheme was launched at company Owned Retail Outlets in

Indane Nanocut cylinders being launched

Shri Dharmendra Pradhan, MoS (IC), PNG launching 'SAHAJ' facility

Mumbai, Chennai, Kolkata and Bangalore. Subsequently Government has allowed the sale of 5 kg. LPG cylinders with/without Domestic Pressure Regulator (DRP) through PSU Oil Marketing Companies (OMCs) retail outlets, which are accessible to all and are open for longer hours. LPG sold under the scheme is called Free Trade LPG (FTL). Subsequently, sale of 5 kg. FTL cylinder has been extended to LPG distributorships points and Kirana/general store also to further enhance the convenience of the target consumers. As on 31.12.2015, the scheme is under operation in 239 markets of the country from 954 outlets (261 retail outlets, 497 distributorship points and 196 kirana/general stores). At the time of free sale, cost of first equipment (DRP plus cylinder), cost of product at prevailing non-domestic 5 kg. cylinder price and administrative charges will be payable. At the time of subsequent refill, only the cost of product is payable. Up to 31.12.2015, OMCs have enrolled 56041 new customers with refill sales of 126212.

5.8.6 E-SV (SAHAJ)

Public Sector Oil Marketing Companies (OMCs) launched facility by the name 'e-SV' 'Sahaj', on pilot basis in May, 2015. Sahaj is the electronic Subscription Voucher emailed to the customer upon release of LPG connection online. Subscription Voucher indicates the number of cylinders and pressure regulator loaned to the customers against the security deposit. The facility enables the customer to register, make online payment for availing LPG connection at his/her doorstep without visiting the LPG distributorship. The Sahaj initiative was launched on 30.08.2015 in 12 cities. Online new LPG connection is released after intercompany de-duplication in all the distributers where National Information Centre (NIC) has extended the facility. For the remaining districts, connection will be released as per the existing process of Intra Company de-duplication till NIC extends similar facility to the remaining districts.

5.8.7 Online Refill Payment

As part of 'Digital India' Initiative, Public Sector Oil Marketing Companies (OMCs) have launched the facility for Online New Connections (SAHAJ), in which customer is also having an option for making the online payment through Net banking and credit/debit card for release of new LPG connections. By this facility customer can now book & pay online for the refills booked by Net-banking/ debit/credit cards.

chapter 6

International Cooperation and Engagement Abroad

International Cooperation & Engagement Abroad

6.1 The role of International Cooperation Division is to strengthen India's energy security by sustaining and promoting engagement with foreign countries and international organizations in the field of Petroleum and Natural Gas. In this context, the Government is encouraging oil companies to aggressively pursue equity oil and gas opportunities overseas. India is actively engaged in bilateral and multi lateral cooperation with foreign counties. To strengthen the country's energy security, the Ministry of Petroleum & Natural Gas is engaged in oil diplomacy. India's oil PSUs in particular are being encouraged to adopt a global vision in their pursuit of hydrocarbon assets abroad. In this mission, the International Cooperation (IC) Division provides a comprehensive international template / framework along with active diplomatic support to the oil companies.

6.2 The major components of MoP&NG's oil diplomacy are:

(i) Engaging with Governments of hydrocarbon-rich countries for seeking exploration & production blocks on nomination basis or Government-to-Government basis;

(ii) Participating in the Global Energy Dialogue through multilateral fora, such as the International Energy Forum and the International Energy Agency;

(iii) Leveraging India's pre-eminent position in the International Energy Forum to effectively ventilate issues of direct concern to India, such as transparency in oil markets and pricing issues;

(iv) Entering into collaborative arrangements with international organizations in the energy sector, such as the International Energy Agency through Memoranda of Understanding, Agreements/ Declarations for cooperation in the areas of specific relevance to an emerging economy like India;

(v) Pursuing the acquisition of oil & gas assets abroad, with the objective of increasing the oil & oil equivalent gas available for the country.

(vi) Entering into collaborative arrangements with international organization, to facilitate technical assistance in R&D, data sharing, statistical model building and analytical tools for energy sector forecasts, etc.

6.3 The mechanisms for achieving Oil Diplomacy objectives are:

(i) Meetings at the level of Heads of State/ Government/Oil Minister of hydrocarbon-rich countries;

(ii) Inter-Governmental Agreements with oil and gas-rich countries;

(iii) The instrumentality of Joint Working Groups with oil & gas-rich countries;

(iv) Through Memoranda of Understanding/ Declarations of Cooperation with the Governments of oil-rich countries and the relevant international organizations;

(v) Bilateral meetings at the level of the Minister and Secretary;

Prime Minister, Shri Narendra Modi meeting the President of the Federal Republic of Nigeria, Mr. Muhammadu Buhari, during the 3rd India Africa Forum Summit, in New Delhi on October 28, 2015

Mozambique visit from 9th to 11th April 2015 to discuss the issues of existing investment and further expansion in areas of Oil & Gas

(vi) Attending important Ministerial meetings of international organizations, such as the International Energy Forum, etc.;

(vii) Utilizing the services of Indian High Commissions/ Embassies abroad for issues relating to the country's energy security;

(viii) Holding high-level conferences, such as the India-Africa Hydrocarbons Conference, Petrotech, etc., to seek engagement with oil & gas producing countries/international oil companies.

6.4 In order to explore new avenues and fortify existing bilateral cooperation in the hydrocarbon sector, the Minister/Minister of State led a number of delegations on visits abroad and also received foreign delegations in India. List of important visits by Minister/Minister of State and foreign delegations to India are shown below:

1) JODI Conference:

Shri Saurabh Chandra, Secretary, Ministry of Petroleum and Natural Gas inaugurated the 12th International Joint Organization Data Initiative (JODI) Conference. The Conference was held from 8th to 10th April, 2015. It was attended by officers of International Organizations dealing with the energy sector. Participants from 25 countries and Indian participants from across the energy sector joined the event. Secretary appraised the gathering of the reforms that have taken place in the Indian oil and gas sector in last few months.

2) 6th OPEC International Seminar

A delegation led by Shri Dharmendra Pradhan, Hon'ble Minister (I/C),(P&NG) visited Vienna, Austria on 3-4 June, 2015 to attend the 6th OPEC International Seminar. During his bilateral meeting with Secretary General of OPEC, the two agreed to set up an institutional dialogue between Indian and OPEC at the leve3l of Minister (PNG), and Secretary General, OPEC. This is for the first time OPEC invited India for starting an institutional dialogue. This will benefit India since OPEC has a prominent role in shaping global oil price and it would be useful that they get buyer's perspective while doing so.

3) India Kazakhstan IGC:

The 12th meeting of the India-Kazakhstan Intergovernmental Commission on Trade, Economic, Scientific, Technological, Industrial and Cultural Cooperation was held on 16-17 June, 2015 in New Delhi, India. The Indian delegation was led by Minister of State, Ministry of Petroleum and Natural Gas of the Republic of India Mr. Dharmendra Pradhan.

4) 2nd India Canada Energy Dialogue

A delegation led by Shri Dharmendra Pradhan, Hon'ble Minister (I/C), (P&NG) visited Canada to participate in the 2nd India Canada Energy Dialogue in Calgary on July 5, 2015. Canadian side was led by Hon'ble Mr. Greg Rickford, Federal Canadian Minister for Natural Gas. The two sides agreed on the following:-

(i) To pursue government to government cooperation on energy policy, R&D by sharing of policy framework.

(ii) Facilitate interaction of Indian companies with relevant oil and gas companies in Canada, especially in the LNG sector; and explore potential in refinery and petrochemical sector;

(iii) Pursue regulator to regulator cooperation in the field of energy safety, security and transportation, discussing on best practice.

The Minister of State for Petroleum and Natural Gas (Independent Charge), Shri Dharmendra Pradhan addressing the 6th International Seminar of OPEC on oil market stability, in Vienna on 03.06.2015

Inauguration of 4th India - Africa Hydrocarbon Conference by Shri Dharmendra Pradhan, MoS (IC), PNG on 21.01.2016 at New Delhi

(iv) Facilitate technological cooperation in field of hydroelectric power development, environmental conservation, construction of transmission towers in snow clad areas and collaborate on clean coal technology.

5) 22nd Steering Committee Meeting of TAPI

A delegation led by Shri Dharmendra Pradhan, Hon'ble Minister of State(I/C) (P&NG) to the 22nd Steering Committee Meeting of TAPI natural gas pipeline project in Ashgabat on August 6, 2015. During the 22nd Steering Committee Meeting, it was decided that the 4 participating countries would form a consortium to build the pipeline. With this in view it was decided that GAIL & OVL would undertake the following:

i. Technical personnel from the GAIL along with the other member countries would examine the techno-commercial viability of the investment and percentage of shareholding that India can consider to commit in the TAPI project.

ii. GAIL would relook into the financial feasibility including the gas price and transportation cost in the backdrop of new arrangement for the consortium.

iii. GAIL would make a detailed assessment of possibility of extracting Turkmen gas through Iran.

iv. GAIL would resume technical level discussions for export of re-gasified LNG (RLNG) to Pakistan via Wagah Border.

v. ONGC Videsh Limited would send a letter of interest to Turkmenistan on a service contr4act model for development of the upstream sector.

6) 4th India-US Energy Dialogue

A delegation led by Shri Ajay Prakash Sawhney, Additional Secretary, Ministry of Petroleum and Natural Gas to attend 4th India-US Energy Dialogue during 14-18 September, 2015. The meeting of the Working Group on oil & gas under the 4th India US Energy dialogue was held on 16th September 2015 at Washington DC, USA.

The issues discussed included Investment in India's upstream oil & gas sector, USDTA grants for Indian PSU's and private companies, development of unconventional hydrocarbons, safety benchmarks, strategic oil reserves and technologies for better fuel efficiency. The most significant areas for cooperation between US and India in the energy sector are:

i. Exploration and exploitation of gas hydrates

ii. Shale Gas

iii. Development of fuel efficiency norms for Heavy Duty Vehicles

7) 4th India-Kuwait Joint Working Group (JWG)

4th India-Kuwait Joint Working Group (JWG) meeting on Hydrocarbon held on 15-16 September, 2015 at New Delhi. The most significant areas of discussion between the two sides centered on:

i. Operationalsing of OPAL project.

ii. Cooperation in upstream sector in India and third countries

iii. Capacity building of Kuwaiti personnel in Indian R&D centers

iv. Extension of credits lines etc.

Ground breaking ceremony of TAPI pipeline in presence of Hon'ble Vice President of India Shri Hamid Ansari, Afghan President Shri Ashraf Ghani, and Prime Minister of Pakistan Shri Nawaj Sharif at Turkmenistan from 12 - 13 December 2015

8) 23rd Steering Committee Meeting of TAPI

A delegation led by Secretary, Ministry of Petroleum and Natural Gas to attend 23rd Steering Committee(SC) meeting of TAPI on 24th October, 2015 in Ashgabat, Turkmenistan. The Parties agreed on the shareholding percentages in the TAPI Pipeline Company Limited(the Company) as follows: (i) Turkmengaz (85%); (ii) Afghan Gas Enterprise(5%); (iii) Inter State Gas Systems(Private) Limited (5%); and GAIL(India) Limited (5%).

Ashgabat (Turkmeinstan) from 6th - 7th August, 2015 for Steering Committee meeting of TAPI Natural Gas Pipeline Project

9) 6th Ministerial Energy Roundtable

A delegation led by Hon'ble Minister of State (I/C) for Petroleum & Natural Gas attended the 6th Asian Ministerial Energy Roundtable (AMER) on 9th - 10th November, 2015 in Doha, Qatar organized by Governments of Qatar and Thailand (next Chair) in association with the International Energy Forum. AMER focused on the following important energy issues and challenges: "Oil markets: a new normal or just another cycle, and what it meant for Asia"; "gas and coal in Asia's energy mix: interactions and uncertainties" and "delivering on the clean energy agenda: prospects and the role for policy".

10) Ground -breaking ceremony of the Turkmenistan-Afghanistan-Pakistan-India (TAPI) Gas Pipeline

Shri Dharmendra Pradhan Minister of State (I/C) for Petroleum and Natural Gas accompanied Hon'ble Vice President Hamid Ansari to Turkmenistan from 11-13 December 2015 for the 'ground-breaking' ceremony of the Turkmenistan-Afghanistan-Pakistan-India (TAPI) Gas Pipeline in Mary (Merv), Turkmenistan and the 20th Anniversary of Turkmenistan's Permanent Neutrality. During the visit, all four countries formally agreed to set up TAPI Ltd. Afghan President Ashraf Ghani and Pakistan PM Nawaz Sharif also attended the events.

11) 1st Joint Working Group meeting between India and Iran

1st JWG meeting between India and Iran on Oil, Gas and Petrochemicals was held on 26th December 2015 at New Delhi and the issues related to export of crude oil from Iran, development of Farzad - B gas field, setting up of petrochemical industry at Chabahar FTZ, pipeline and CNG projects; and NICO stocks and CPCL dividend were discussed and both the sides agreed to explore ways and means to expedite these projects.

12) 4th India-Africa Hydrocarbon Conference

4th India-Africa Hydrocarbon Conference was held from 21-22 January 2016 in New Delhi. This was a follow up of the 3rd India Africa Forum Summit held in October 2016. A total of 21 African countries, including 9 at Ministerial level Viz. Mauritius, Morocco, Algeria, Sudan, South Sudan, Tunisia, Senegal, Equatorial Guinea and Liberia participated in the Conference. Other delegations led by Senior Officials included Nigeria, Ghana, South Africa, Egypt, Tanzania, Kenya, Mozambique, Uganda, Libya, Cote d'Ivore, Gabon

MoU between IndianOil, OIL & Roseneft being signed in the presence of Hon'ble Prime Minister, Shri Narendra Modi and Mr. Vladimir Putin, Hon'ble President of Russia on 24.12.2015

Signing of MoU for construction of Petroleum Products Pipeline from Raxaul (India) to Amlekhgunj (Nepal), Kathmandu on 23rd - 25th August

and Sierra Leone. The Conference saw enthusiastic representation from Petroleum regulators, CEOs of National Oil Companies and experts in the field of petroleum from both Africa and India. The two day conference showcased India's accomplishments and techno-commercial capabilities spanning upstream, midstream and downstream sectors as also India's unique value proposition for the rapid development for the African hydrocarbon industry.

On the margins of the Conference, Shri Dharmendra Pradhan Minister of State (I/C) accompanied by Secretary (P&NG) and Senior Officials of MoP&NG and CMDs of Oil PSUs met the dignitaries from various African countries and conveyed to the leadership of the African countries that India was keen to intensify its hydrocarbon cooperation with the African counties on upstream, midstream and downstream area. He stressed upon the potential to graduate to an energy partnership between India and the African nations.

The Conference also had country presentations panel discussions, G2G and B2B meetings. Total participation exceeded 500, including nearly 200 foreign participants. Hon'ble Minister of State (I/C) for Petroleum & Natural Gas announced additional 250 fully funded scholarships to African countries in the hydrocarbon sector under the 50,000 scholarships announced by Hon'ble Prime Minister during the 3rd IAFS. The valedictory address was delivered by Minister of External Affairs Smt Sushma Swaraj.

6.5 Memorandum of Understanding (MoU)

A Memorandum of Understanding (MoU) was signed between India and Government of Nepal for the construction of Petroleum Products Pipeline from Raxaul (India) to Amlekhgunj (Nepal) and re-engineering of Amlekhgunj Depot and Allied Facilities on 24th August, 2015.

6.6 An overview of international operations of oil PSUs

MoP&NG is encouraging the domestic oil and gas companies to emerge as global energy players, to pursue interests in hydrocarbons wherever they exist, to acquire equity in raw material-producing assets, with an overarching objective of enhancing the country's energy security.

Doha (Qatar) from 9th - 10th November, 2015 the 6th Asian Ministerial Energy Roundtable

Our oil companies are present in 25 countries namely, Australia, Azerbaijan, Bangladesh, Brazil, Canada, Colombia, East Timor, Gabon, Indonesia, Iran, Iraq, Kazakhstan, Libya, Mozambique, Myanmar, New Zealand, Nigeria, Russia, South Sudan, Sudan, Syria, USA, Venezuela, Vietnam, Yemen.

ONGC Videsh presently has participation in 36 E&P projects in 17 countries namely Azerbaijan (2 projects), Vietnam (2 projects), Russia (2 projects), Sudan (2 projects) and South Sudan (2 projects), Iran (1 project), Iraq (1 project), Libya (1 project), Myanmar (4 projects), Syria (2 projects), Bangladesh (2 projects), Brazil (2 projects), Mozambique (1projects), Colombia (8 projects), Venezuela (2 projects), Kazakhstan (1 project) and New Zealand (1 project) and is actively seeking more opportunities across the world.

ONGC Videsh has oil and gas production from 13 projects in 10 countries, namely, Russia (Sakhalin-1 and Imperial Energy), Syria (Al-Furat Petroleum Co.), Vietnam (Block 06.1), Colombia (MECL), Sudan (Greater Nile Petroleum Operating Company), South Sudan (Greater Pioneer Operating Company and Sudd Petroleum Operating Company), Venezuela (San Cristobal), Brazil (BC-10), Azerbaijan (ACG) and Myanmar (Block A-1 &A3). Presently there is no production from AFPC, Syria project which is under force Majeure since December, 2011 after EU imposed sanctions on Syria. There are 4 projects where hydrocarbons have been discovered and are at various stages of development. Out of these 4 projects, first oil production from Carabobo1, Venezuela, through early accelerated production system started in December; 2012 and 17 projects are under various stages of exploration. ONGC Videsh also has stake in 2 pipeline projects (1 each in Sudan & Azerbaijan).

Bharat Petro Resources Limited (BPRL), a 100% subsidy has of Bharat Corporation Limited. (BPCL), hold Participating Interest (PI) in 7 projects in 5 countries namely, Brazil (3 Projects), Mozmbique (1 Project), East Timor (1 Project), Australia (1 Project), Indonesia (1 Project).

6. 7 The International Cooperation Division provides support in many of the initiatives of PSUs to acquire overseas assets through diplomatic support. PSUs overseas oil & gas and pipeline assets are listed below:

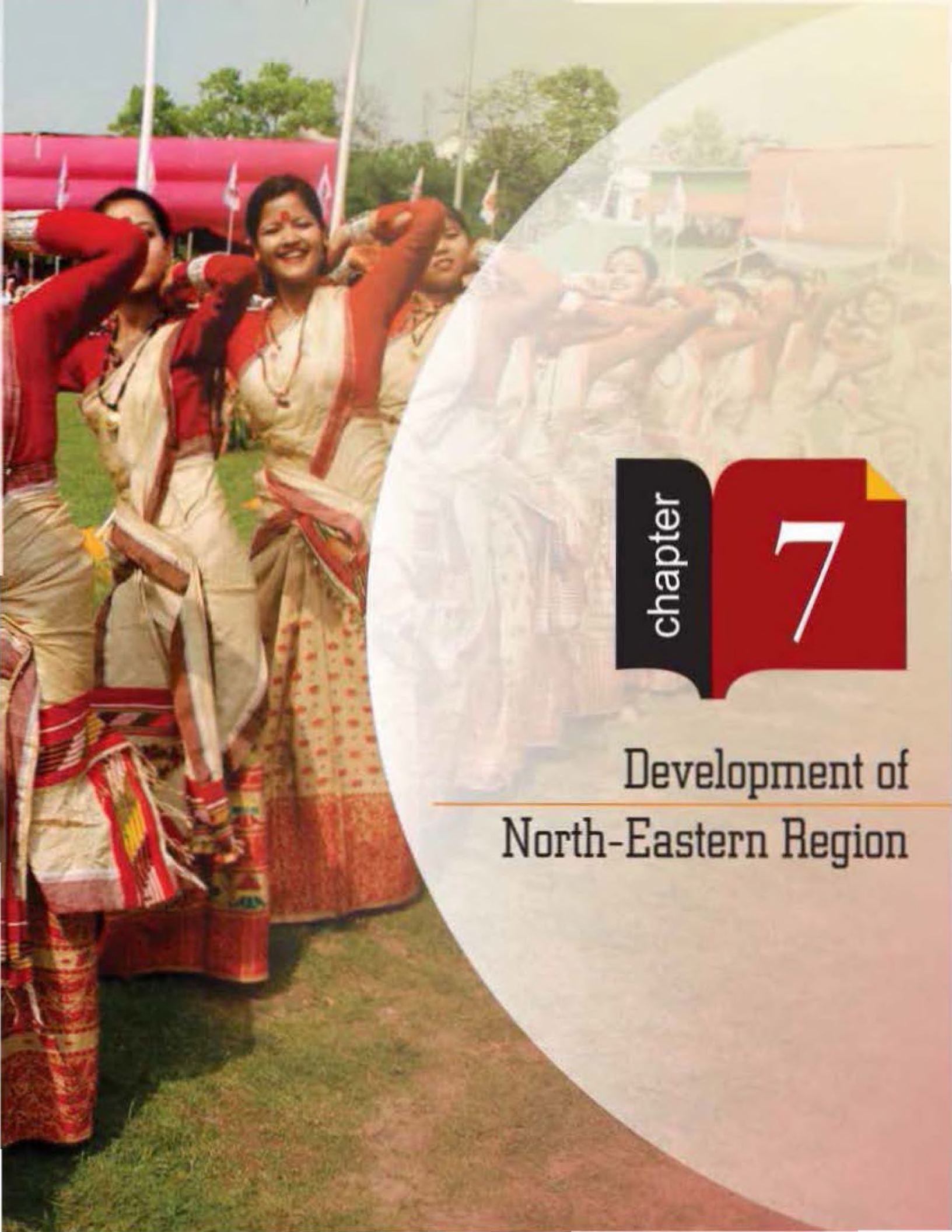
Overseas Projects/Assests

Sl. No.	Country	Name of the Project	Participating Companies and their Share
1.	Vietnam	Block 06.1, Offshore	ONGC Videsh-45% TNK-35% (Operator) Petrovietnam-20%
		Block 128, Offshore	ONGC Videsh-100%
2.	Russia	Sakhalin-1, Offshore	ONGC Videsh - 20% Exxon Mobil -30% (Operator) Sodeco - 30% SMNG - 11.5% RN Astra - 8.5%
		Imperial Energy, Russia	ONGC Videsh-100%
3.	Sudan	GNPOC, Block 1, 2 & 4, Sudan	ONGC Videsh - 25% CNPC - 40% Petronas - 30% Sudapet - 5% (Jointly Operated)
		Khartoum-Port Sudan Pipeline (741 Km), Sudan	ONGC Videsh-90% (Operator) OIL-10%
4.	South Sudan	GPOC, Block 1, 2 & 4, South Sudan	ONGC Videsh - 25% CNPC - 40% Petronas - 30% Nilepet - 5% (Jointly Operated)
		SPOC/Block 5A, South Sudan	ONGC Videsh- 24.125% Petronas-67.875% Nilepet - 8% (Jointly Operated)
5.	Myanmar	Block A-1, Myanmar	ONGC Videsh - 17% Daewoo-51% (Operator)

Sl. No.	Country	Name of the Project	Participating Companies and their Share
			KOGAS - 8.5% GAIL - 8.5% MOGE - 15%
		Block A-3, Myanmar	ONGC Videsh - 17% Daewoo-51% (Operator) KOGAS - 8.5% GAIL - 8.5% MOGE - 15%
		Shwe Offshore Mid-Stream Project, Myanmar	ONGC Videsh - 17% Daewoo-51% (Operator) KOGAS - 8.5% GAIL - 8.5% MOGE - 15%
		Onshore Gas Transportation Pipeline, Myanmar	ONGC Videsh - 8.347% CNPC-SEAP - 50.9% (Operator) Daewoo - 25.041% GAIL - 4.1735% KOGAS - 4.1735% MOGE - 7.365%
		Block B-2,	ONGC Videsh - 97% (Operator) M&S - 3%
		Block EP-3, Myanmar	ONGC Videsh - 97% (Operator) M&S - 3%
6.	Mozambique	Rovuma Area-1	ONGC Videsh - 16% Anadarko - 26.5% (Operator) OIL - 4% ENH - 15% Mitsui - 20% BPRL - 10% PTTEP - 8.5%
7	Iraq	Block 8, Iraq	ONGC Videsh - 100%
8.	Iran	Farsi Offshore Block, Iran	ONGC Videsh - 40% (Operator) IOC - 40% OIL - 20%
9.	Libya	Block 43, Libya Area 95-96	ONGC Videsh- 100% Sonatrach - 50% Indian Oil - 25% OIL - 25%
10.	Syria	Block 24, Syria	ONGC Videsh - 60% IPR International - 25% (Operator) Tri Ocean Mediterranean - 15%

Sl. No.	Country	Name of the Project	Participating Companies and their Share
		Al Furat Petroleum Co., Syria	Himalaya Energy (Syria) B.V. - 33.33% to 37.5% Shell - 66.67% to 62.5% (Operator -Al Furat Petroleum Company)
11.	Brazil	Block BM-SEAL-4, Brazil	ONGC Videsh-25% Petrobras -75% (Operator)
		BC-10, Brazil, Offshore	ONGC Videsh - 27% Shell - 50% (Operator) Qatar Petroleum International - 23%
12.	Colombia	Mansarovar Energy Colombia Limited (MECL), Colombia	ONGC Videsh-25-50%, Sinopec-25-50% Ecopetrol-50% (Jointly Operated)
		Block RC-8, Colombia	ONGC Videsh - 40% (Operator) Ecopetrol - 40% Petrobras - 20%
		Block RC-9, Colombia	ONGC Videsh - 50% Ecopetrol - 50% (Operator)
		Block RC-10, Colombia	ONGC Videsh - 50% (Operator) Ecopetrol - 50%
		Block LLA-69, Colombia	ONGC Videsh - 50% SIPC - 50% (Jointly Operated)
		Block GUA OFF 2, Colombia	ONGC Videsh - 100%
13	Venezuela	San Cristobal Project,	ONGC Videsh-40% PDVSA-60% (Jointly Operated)
		Carabobo-1 Project, Venezuela	ONGC Videsh - 11% IOC - 3.5% OIL - 3.5% Petronas - 11% PDVSA - 71% (Jointly Operated)
14	Kazakhstan	Satpayev Project, Kazakhstan	ONGC Videsh - 25% KMG - 75% (Operator)
15.	Azerbaijan	ACG, Azerbaijan	ONGC Videsh-2.7213% BP-36% (Operator) SOCAR-12% Chevron-11% INPEX-11% Exxon-8% StatOil-8% TPAO-7% ITOCHU-4%

Sl. No.	Country	Name of the Project	Participating Companies and their Share
		BTC Pipeline (1760 Km), Azerbaijan	ONGC Videsh-2.36% BP-30.1% (Operator) SOCAR-25% StatOil-8.71% TPAO-6.53% ITOCHU-3.4% Chevron-8.9% INPEX-2.5% ENI-5% TOTAL-5% Conoco Philips-2.5%
16.	Bangladesh	Block SS4, Bangladesh	ONGC Videsh - 45% (Operator), OIL - 45% BAPEX - 10%
		Block SS9, Bangladesh	ONGC Videsh - 45% (Operator), OIL - 45% BAPEX - 10%
17.	New Zealand	Block- 14TAR-R1,	ONGC Videsh - 100%
18.	Indonesia	Nunukan Block	BPRL- 12.5% PT Pertamina Hulu Energy-35% (operator) PT Medico - 40% Videocon Indonesia -12.5%
19.	Australia	Block EP - 413 (onland)	BPRL- 27.803%
20.	East Timor	Block JPDA 06-103	BPRL- 20%
21.	USA	Niobrara Shale Oil/Condensate JV asset	Carrizo (Niobrara) LLC - 60% OIL - 20% IndianOil - 10% Haimo Oil & Gas -10%
22.	Canada	Pacific Northwest LNG Project	Progress Energy Canada Ltd. - 62% Sinopec - 15% Indian Oil - 10% Japex - 10% Petroleum Brunei - 3%
23.	Nigeria	OPL- 205 OML - 142	Summit Oil 30% Suntera Nigeria 205 Ltd - 70%* * Suntera 50%, Indian Oil 25%
24.	Gabon	Shakthi	OIL - 45% IndianOil - 45% Marvis Pte Ltd - % New PSC: OIL - 50% IndianOil - 50%
25.	Yemen	82	Medco - 45% Kuwait Energy - 25% IOC- 15% OIL- 15%



chapter 7

Development of North-Eastern Region

Development of North-Eastern Region

7.1 Preamble

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, which was involved in the business of timber, coal, tea & construction of railway lines, drilled the first commercial well Digboi-1 (September 1889 -November 1890, total depth of 662ft) with an initial production of 200 gallons per day, opened up a new chapter in exploration and production of oil in this part of the world and the oil industry of India was officially born. During the subsequent years before independence of India, Digboi oil field was extensively developed and searched for new oil fields continued.

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.

3. Since then, both the National Oil Companies viz., OIL and ONGC have proven substantial amount of producible hydrocarbons and have technical know-how of producing and managing complex reservoirs and contributing to about 8 MMT per annum of oil plus oil equivalent of gas (O+OEG) from their producing assets in North-East.

4. The total prognosticated hydrocarbon resources (O+OEG) of Upper Assam Shelf basin are estimated to be the order of 3180 MMT and for Assam-Arakan Fold Belt basin, the total prognosticated hydrocarbon resources is of the order of 1860 MMT. Thus, there is a total 5040 MMT of prognosticated hydrocarbon resources in the North- East. About 2224 MMT of in-place hydrocarbon reserves have been established so far by E&P companies, which means about 56% of hydrocarbon resources are under "yet to find" category.

5. The two National Oil Companies (NOCs) , namely, ONGC and OIL have been engaged in the North East Region for exploration and exploitation of oil and gas for more than 55 years and generated a vast geo-scientific database and geological understanding of the basin.

6. With the advent of New Exploration Licensing Policy (NELP) by the Government in 1999, the E & P activities were further intensified by award of new acreages to various national and international E & P Companies on the basis of open bidding system. This has helped in inducting new technology in drilling and production of hydrocarbon as well as enhancing geo-scientific knowledge and overall understanding of Assam-Arakan Basin.

7.2 Exploration Activities in North-East under the Nomination Regime:

1. Oil India Limited 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.

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.

3. OIL started its seismic survey campaign in the year 1976-77 and till date have acquired more than 25,000 GLKM of 2D seismic data and nearly 8500 Sq. Km of 3D seismic data in Upper Assam Basin.

4. 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 3550-3800 m in the central basement high areas of Dikom-Kathaloni-Chabua-Matimekhana to more than 5500 m in Mechaki areas towards the eastern flank of Upper Assam Basin.

5. In 1993-94, OIL made efforts to explore North bank of river Brahmaputra. Extensive 2D seismic data acquisition was done and no. of drillable prospects identified. Since then, a total of 8 wells have been drilled in the North Bank. However, there is no commercial success as yet.

6. Currently, OIL holds 2 exploration blocks in the state of Assam and 3 blocks in Arunachal Pradesh under nomination regime. From 2000 onwards, OIL is aggressively participating in NELP exploration blocks apart from nomination blocks and holds 8 exploration blocks under NELP regime.

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

8. The first wild cat well of ONGC was drilled on Disangmukh structure in 1960, however, the first commercial oil discovery was on Rudrasagar structure in the same year. As a result of initial successes encountered in pursuing structural prospects the focus remained on identification of such prospects through seismic data. Since then ONGC has drilled more than 700 exploratory wells in the state of Assam.

9. The reservoirs of Barail Group belonging to Upper Eocene to Lower Oligocene age and those of Tipam Group of Upper Miocene age proved to be most prolific and drew significant attention of explorationists. A significant number of oil and gas fields, including Panidihing, Disangmukh, Lakwa, Lakhmani, Sonari, Geleki, Demulgaon, Amguri and Charali, were discovered with this exploration philosophy.

10. During the past nearly five decades, it has been ONGC's endeavour to prove the extension of the established hydrocarbon bearing areas of Sivasagar and Dhansiri Valley of North Assam Shelf and at the same time step out and explore new areas. In the process it has established hydrocarbon fields in the logistically difficult areas of Cachar and neighbouring states of Tripura and Nagaland.

11. Currently ONGC holds 3 exploration blocks each in the states of Assam and Nagaland under nomination regime. In addition, ONGC holds 7 exploration blocks under NELP regime in North East.

7.3 Exploration Activities in North-East under the PSC Regime

1. Under the PSC regime, exploration blocks were first awarded in the States of Assam in the year 1998 under Pre-NELP rounds of bidding. Subsequently, blocks were awarded under various rounds of NELP. The 31 awarded blocks (Assam-21, Manipur- 2, Mizoram- 3, Nagaland-2 and Tripura-3) cover an area of 43,722 Sq. km. Out of these, 14 blocks are operational, 5 blocks have been proposed for relinquishment by operators and 12 blocks have been relinquished (Assam-10, Tripura - 1 and Mizoram-1). In addition, there are 2 discovered fields that are in operation under PSC regime, namely, Kharsang in Arunachal Pradesh and Amguri in Assam.

2. The following exploration activities have been carried out as on 31.12 2015 under the PSC regime in the awarded blocks/fields:

   a. Acquisition of 5415 Line Kilometer (LKM) of 2D seismic data & 2,370 Sq. Km of 3D seismic data completed.

   b. Drilling of 64 wells including 31 exploratory wells have been carried out

   c. A total of 7 hydrocarbon discoveries (gas) have been made (1 in Assam, 1 in Mizoram and 5 in Tripura)

   d. Expenditure to the tune of US$ 643 Million has been incurred under PSC for exploration, development and production activities.

7.4 Crude Oil & Natural Gas Production in North-East

1. The contribution in crude oil production by North Eastern States is about 12.3% of the total production. In 2015-16 upto December 2015, crude oil production in North East is about 3.215 million metric tonne (MMT) from the states of Assam (3.173 MMT) and Arunachal Pradesh (0.042 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		2011-12	2012-13	2013-14	2014-15	2015-16 upto December 2015
Assam	OIL	3.821	3.639	3.445	3.405	2.447
	ONGC	1.203	1.222	1.263	1.061	0.726
	Total	5.024	4.861	4.708	4.466	3.173
Arunachal Pradesh	OIL	0.026	0.022	0.021	0.007	0.004
	Pvt/JV	0.092	0.099	0.09	0.069	0.038
	Total	0.118	0.121	0.111	0.076	0.042
North East	ONGC	1.203	1.222	1.263	1.061	0.726
	OIL	3.847	3.661	3.466	3.412	2.451
	Pvt/JV	0.092	0.099	0.09	0.069	0.038
	Total	5.142	4.982	4.819	4.542	3.215

2 From the table 11.1, it may be observed that OIL has the share of 75.1% in crude oil production, followed by ONGC with a share of 23.4%. The share of Pvt/JV companies in crude oil production is about 1.5%, which is from the Kharsang field in the state of Arunachal Pradesh.

3 The contribution in natural gas production by North Eastern States is about 9% of the total production. In 2015-16 upto December 2015, natural gas production in North East is about 3264 million metric standard cubic metre (MMSCM) from the states of Assam (2258 MMSCM), Arunachal Pradesh (23 MMSCM) and Tripura (983 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		2011-12	2012-13	2013-14	2014-15	2015-16 upto December 2015
Assam	OIL	2392	2425	2409	2509	1955
	ONGC	504	485	459	449	303
	Total	2896	2910	2868	2958	2258
Arunachal Pradesh	OIL	18	19	19	12	9
	Pvt/Jv	23	22	22	22	14
	Total	41	41	41	34	23
Tripura	ONGC	644	647	822	1140	983
North East	ONGC	1148	1132	1281	1589	1286
	OIL	2410	2444	2428	2521	1964
	Pvt/JV	23	22	22	22	14
	Total	3581	3598	3731	4131	3264

4 From the table 11.2, it may be observed that OIL has the share of 61% in natural gas production in North East, followed by ONGC with a share of 38.5%. The share of Pvt/JV companies in natural gas production is about 0.5%, which is from the Kharsang field in the state of Arunachal Pradesh.

5. The production from Champang field of Nagaland started in 1980-81 with 0.0002 MMT of crude oil and subsequently reached a peak of 0.1363 MMT during the year 1989-90. The operations in Nagaland have been suspended w.e.f. 11.05.1994 as per the directives of the State Govt. and has not yet resumed.

7.5 Alternate Hydrocarbon Sources in North East

1 Coal Bed Methane (CBM) : In order to harness the CBM potential in the North-East, 1 CBM block, namely, AS-CBM-2008/IV has been awarded in the state of Assam, covering an area of about 113 Sq. Km. The block was awarded under CBM IV round of bidding to the Consortium of M/s Dart Energy and OIL. The estimated CBM resource in this block is about 60.3 BCM. The block is currently under exploration.

2 Shale Gas: Based on the data available from conventional oil/gas exploration in the country for the last so many years, it appears that few sedimentary basins, including Assam Arakan Basin may be prospective from Shale gas point of view. Resource estimation for Shale Oil/Gas has been taken up for various Indian basins, including Assam Arakan. In October 2013, MOP&NG 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 5 blocks respectively. Out of 55 blocks, 3 blocks operated by ONGC and 4 blocks operated by OIL are in the state of Assam.

7.6 North East Vision 2030

1 Hon'ble Minister of State (IC) for Petroleum and Natural Gas, Shri Dharmendra Pradhan today released the Hydrocarbon Vision 2030 for north-east India in February 2016, outlining steps to leverage the hydrocarbon sector for development of the region in Guwahati. Ministry of Petroleum and Natural gas (MoPNG) has consciously and constantly focused efforts towards making hydrocarbons a tool to enable social and economic development. One such initiative has been the Hydrocarbon Vision 2030 for North East Region.

Shri Dharmendra Pradhan, MoS (IC), PNG releasing the document on "Hydrocarbon Vision- 2030" for North-East India at Guwahati on 09.02.2016

Shri Dharmendra Pradhan, MoS (IC), PNG on the occasion of the launch of "Hydrocarbon Vision- 2030"

2 The Vision Document has been a focused and consultative exercise to develop a common and shared aspiration for benefiting people of the north east 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. CRISIL Infrastructure Advisory has been the Knowledge Partner to develop this Vision report.

3. 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.

4. 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.

5. Beyond production, the focus areas include exploring hydrocarbon linkages and trade opportunities with Bangladesh, Myanmar, Nepal & Bhutan; implementation of 'Make In India' in the region; development of health & medical facilities; industrial policy & infrastructure related action points; focus on skill development; and employment generation requirement in the region. The vision statement lays out a detailed roadmap for the entire hydrocarbons value chain, covering upstream, midstream and downstream segments. This report includes an action plan - of immediate, medium-term and long-term initiatives - to help achieve the objectives.

6. 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.

chapter 8

R&D and New Technologies

R&D and New Technologies

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

8.1 INDMAX

INDMAX is a flagship technology of IndianOil for conversion of heavy residue feedstock to high yields of light olefins, LPG and gasoline. The first unit of 100 TMTPA capacity was commissioned in June, 2003 at Guwahati Refinery which is in operation since then contributing significantly to GRM. Based on the success, a mega scale plant of capacity 4.17 MMTPA capacity has been commissioned on 3rd December, 2015 in IOCL latest refinery at Paradip, Odisha. This plant as well as the refinery was dedicated to the Nation by Hon'ble Prime Minster on 7th Feb 2016. In line with PM's Vision to enhance the LPG footprint across the nation, IndianOil has decided to set up another plant of INDMAX of capacity 0.74 MMTPA at Bongaiogaon Refinery.

8.2 OCTAMAX technology

OCTAMAX process converts C4 olefins obtained from refinery LPG stream to high Octane gasoline blending component, which improves RON of gasoline pool meeting BS-IV/VI specs. A 55 kTA plant is being set up at Matura refinery employing indigenously developed R&D technology. The foundation stone of the unit was laid by Hon'ble MoS Petroleum & Natural Gas on 6th March 2016 at Mathura Refinery. The plant is scheduled to be commissioned in Oct 2017. Concurrently, the same technology is being planned for adoption at two other refineries of IndianOil.

8.3 Shock Wave Assisted Fracking

In yet another step towards providing leadership in quest of indigenisation in import intensive oil and gas industry, ONGC has undertaken an important initiative for innovation in the field of fracturing, while significantly addressing environmental concerns. ONGC entered into a MoU with Super Wave Technology Pvt. Ltd. (SWTPL) on 18th February 2015 for doing research on alternative technology for hydraulic fracturing. SWTPL is a company incorporated by Society for Innovation and Development, Indian Institute of Science, Bangalore. The MoU was signed in the gracious presence of Hon'ble Prime Minister of India Shri Narendra Modi.

With this partnership, ONGC will provide assistance to SWTPL for developing Shock Wave Assisted Fracking Technology, an alternate to the conventional hydraulic fracturing which if proven effective as a substitute to hydraulic fracturing, in particular for shale gas exploitation, will be a game changer for the oil & gas industry. Once successful, the technology will be jointly patented by ONGC and SWTPL for further commercial benefits worldwide.

A Contract has since been executed by ONGC with SWTPL on 15th October 2015 and further progress in the project has been made.

Hydraulic fracturing is a very popular stimulation technique in which fluid is pumped at high rates into the oil & gas bearing formation to 'frac' the tight/'shale reservoir so that oil and gas can easily flow into the wellbore and then to the surface.

The conventional hydraulic fracturing requires huge quantity of energy in form of pumping very high quantity of water at very high pressures which is an issue of concern.

Shock Waves are one of the most efficient energy dissipation phenomena. Fracking of sandstone/ shale reservoirs for improvement of oil/gas production is one of the potential applications of these waves as envisaged by M/s Super- Wave Technology Pvt. Ltd.(SWTPL), promoted by serving professors of Indian Institute of Science (IISc) having shareholding agreement with M/s Indian Scientific Innovation Company Ltd. (ISICL) a company incorporated by the Indian Institute of Science (IISc), Bangalore

In the present project, SWTPL proposes to use shock/blast waves for initiating fractures/features in sandstone/shale reservoirs located initially at depths of 1000-1500m.

Various methods of controlled shock/ blast wave generating tools that can be integrated with the existing deep well boring paraphernalia will be developed in this project.

8.3.1 Proposed Methodology :

In this project it is proposed to use shock/ blast waves for initiating fractures/ fissures in sandstone/ shale rock deposits below the earth located at depths of 1000-1500 meters.

- In the proposed field trials, different methods of shock/ blast wave generation in the oil wells will be implemented to identify the most optimum method that is suitable for sandstone/ shale rock fracking.
- Once the technology is successfully proven at the desired depths in a typical vertical oil well further work can be carried out to extend the implementation of the technology in horizontal

wells as well and also going to greater depths below the earth.

- Establish a shock wave technology calibration rig in IISc to optimize the working of the following methods of generating shock waves in deep oil wells.

  – SHOCK/BLAST TUBE

  – HYDRAULIC PLUNGER

  – H2-O2 DETONATION

  – STEAM GENERATION

  – MICROWAVE METHOD

  – LASER METHOD

  – PIEZO CRYSTAL METHOD

8.4 Status of Shock Wave Assisted Fracking Project

ONGC has signed a Contract on 15th October 2015 for a collaborative R&D project with M/s Super- Wave Technology Pvt. Ltd.(SWTPL) Bangalore, promoted by serving professors of Indian Institute of Science (IISc) having shareholding agreement with M/s Indian Scientific Innovation Company Ltd. (ISICL), a company incorporated by the Indian Institute of Science (IISc) Bangalore.

8.4.1 Present Status

1. Design studies of a Deep Well Calibration Rig has been completed. In this rig, formation pressures of up to 60 MPa (8700 psi) for well depths up to 3 km can be recreated on sandstone samples in the laboratory. Optimization as well as calibration experiments using hydro fracking as well as all the shockwave assisted fracking tools will be performed using this rig.
2. Two different test configurations in the Deep Well Calibration Rig have been implemented based on the sample shapes cubical(150mm) called True Triaxial and cylindrical (100x150mm) Conventional Triaxial system.
3. The fabrication of the Deep Well Calibration Rig (5 m x 3 m x 1.4 m) is currently underway and proposed date of installation is March 31st,2016. Since the overall weight of the rig is approximately 5 tons, an elaborate machine foundation for erecting the rig has been completed at the Laboratory for Hypersonic and Shockwave Research (LHSR), IISc, Bangalore.
4. A special purpose Single Girder Electric Overhead Travel (SGEOT) crane of 2.5 ton capacity (7m in all the three directions) is being fabricated to facilitate easier operation of the rig.
5. Design studies on the development of a fracking tool using shockwaves/blast waves have been carried out and a detailed procedure of the preparation of the samples and the analysis of core samples has been laid out.

MoU being signed between ONGC and Super Wave Technology Pvt. Ltd., for alternate technology to conventional hydraulic fracturing in the presence of Hon'ble Prime Minister Shri Narendra Modi and Shri Dharmendra Pradhan, MoS (IC) PNG at Bangalore 18.02.2015

chapter

9

Bio-Fuels

Bio-Fuels

9.1 Bio-fuels:

9.1.1 Energy demand across the transport sector is the highest across major sectors in terms of end usage. As vehicle ownership expands, so will the demand for petroleum products. It is estimated that the demand for diesel and petrol will rise from 69.4 MMT and 19.1 MMT respectively in the year 2014-15 to 110 MMT and 31.1 MMT by the year 2021-22 if the present situation prevails. Therefore, bio-fuels seek to provide a higher degree of national energy security in an environment friendly and sustainable manner by supplementing conventional energy resources, reducing dependence on imported fossil fuels and meeting the energy needs of India's vast rural population by use of even non-food feedstocks. Government has been promoting and encouraging production and use of a) ethanol derived from sugar molasses and/or second generation biofuels (biomass, agricultural waste etc.) for blending with petrol and b) biodiesel derived from inedible oils, tree borne oil seeds and oil waste for blending with diesel.

9.2 EBP Programme:

9.2.1 Government of India launched Ethanol Blended Petrol (EBP) Programme in January, 2003 for sale of 5% ethanol blended Petrol. Currently this programme is being carried out in 21 States and 4 UTs with immediate target to achieve 10% ethanol blending in Petrol. In order to support the Domestic Industry, Government decided during 2013 to source ethanol from domestic sources only.

9.2.2 In the past, Ethanol supplies were enough to meet only 30% of the blending requirement of Oil Marketing Companies. In-order to give a stimulus to this programme, Government in December'2014 took series of steps in a planned manner. The ethanol procurement price was enhanced and delinked from the crude price being offered in the past. Alternate route including Lignocelluloses route for Ethanol production was opened. OMCs also eased the procurement process for the benefit of suppliers including floating monthly EOIs. A Steering Committee and Working Group on Bio-fuels was set up in MoP&NG. In order to generate interest among all the stake holders, a National seminar on "Bio Fuel Programme in India - The Way Forward" was organised by Ministry of Petroleum & Natural Gas on 13th July 2015, at Vigyan Bhavan New Delhi. Apart from sessions on Bio diesel, Bio Ethanol this seminar had presentations on New Technologies & Initiatives. The session on New Technologies and Initiatives looked at various resources such as agriculture residues, Municipal solid waste and plastic wastes and leading edge technologies for converting them to into fuels which can replace

Shri Dharmendra Pradhan, MoS (IC), PNG, addressing the gathering on the World Bio Fuel Day on 10.08.2015

Oil & Gas Conservation Fortnight at IndianOil

the fossil fuels. This seminar was followed by a consultative workshop on Waste/Plastic to Fuel on 20th July, 2015 at India Habitat Center, New Delhi.

9.2.3 Also, for better coordination with the States, Sugar Mills and other stakeholders, MoP&NG appointed Nodal Officers from OMCs.

9.2.4 All these steps helped in doubling the ethanol supplies during the Sugar Year 2014-15 wherein 67.42 crore litres has been supplied for blending in Petrol. Blending to the tune of 10% was carried out in six States during major part of 2014-15 based on ethanol availability.

9.2.5 With renewed synergy among all the Stake Holders, OMCs floated tender for uniform 10% blending across all the notified States for Sugar Year 2015-16. The finalized quantity is 120 crore litres which is double the quantity for Sugar Year 2014-15. It is expected that OMCs will be able to achieve 5% blending in current sugar year for the first time since the launch of EBP Programme in India.

9.3 2nd Generation Ethanol through Lignocelluloses Route:

9.3.1 The increasing demand of ethanol for blending in petrol has necessitated steps beyond traditional molasses route. After the Government's decision to open alternate route for ethanol production, OMCs have been asked to establish a project each of reasonable scale for producing ethanol from multi-feedstock lignocelluloses using indigenous technology including that being developed by DBT. These pilot projects are to cover different varieties of lignocelluloses feedstock available in large quantities in different areas of the Country.

9.3.2 A two day workshop was also organized by Ministry of Petroleum & Natural Gas on 11/12 Jan 2016 to understand the status of both Indigenous as well as Worldwide technologies. This was followed by a National seminar on "Lignocelluloses to Ethanol- Roadmap for India" on 11 February 2016 at New Delhi. Apart from creating a roadmap this seminar was also aimed at sensitizing the potential investors and attract investments into this sector.

9.4 Bio-diesel Blending Programme

9.4.1 To encourage production of Biodiesel in the country, MoP&NG announced the "Bio-diesel Purchase Policy", in 2005, which became effective from 1st January 2006. However, no bio-diesel could be procured till 2014. With renewed focus on Bio-fuels, the Government on 16.01.2015 allowed direct sale of biodiesel by manufacturers/ suppliers of biodiesel/their authorized dealers and Joint Ventures (JVs) of OMCs as authorized by MoP&NG to all consumers. Initially the bulk supply has been allowed for bulk consumers like Railways, State transport undertakings, and other bulk consumers having a minimum requirement of one truck tank load for their own consumption.

9.4.2 On 10th Aug 2015, Ministry also announced Marketing of High Speed Diesel blended with Bio-diesel (B-5) in selected retail outlets of OMCs in New Delhi & Vishakhapatnam (by HPCL), Haldia (by BPCL) and Vijayawada (by IOCL). As on 21st February, 2016 more than 1036 Retail Outlets across 6 States namely Andhra Pradesh, Telangana, Tamilnadu, West Bengal, Odisha and Gujarat are selling B-5.

9.4.3 OMCs have contracted 4.6 crore liters of bio-diesel for the first time during Dec'2015 against which supplies are being made. Tender has been floated for a projected requirement of 143 crore liters during 2016-17 which is yet to be concluded.


A1
Petrol
Petrol

Pricing

chapter

10

Pricing

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

10.2 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 under the Budget. To administer these budgetary subsidies, the Government formulated a 'PDS kerosene and domestic LPG subsidy scheme' in 2002. Under this scheme it was decided that these subsidies will be phased out in 3-5 years.

10.3 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 crude basket further increased to $105.52/bbl in 2013-14. However, the price of crude oil and petroleum products in the international markets started sliding after July 2014 and the average price of Indian basket crude oil in 2014-15 was $84.16. The downward trend in international prices has continued in 2015-16 and the lowest price of Indian basket crude oil has been recorded at $ 29.24/bbl on 7.1.2016. The average price of Indian basket crude oil in 2015-16 is $ 50.50/ bbl. (up to 07.01.2016). The trend of Indian Basket of Crude Oil during 2002-03 to 2015-16 is at Annexure-I.

10.4 Even though APM was dismantled effective 1.4.2002, since 2004, the consumers of sensitive petroleum products viz. Petrol (decontrolled w.e.f.26.6.2010), Diesel (decontrolled w.e.f.19.10.2014), PDS Kerosene and Domestic LPG were being insulated from the impact of high international oil prices by the Public Sector Oil Marketing Companies (OMCs), namely Indian Oil Corporation Ltd. (IOCL), Hindustan Petroleum Corporation Ltd.(HPCL) and Bharat Petroleum Corporation Ltd. (BPCL). In spite of international oil prices remaining persistently high, the retail selling price of the sensitive petroleum products were kept lower than what is warranted by the international oil prices. This resulted in under recoveries of OMCs with corresponding subsidization of prices for the consumers. The trend of under recovery in the two sensitive petroleum products i.e. PDS kerosene and Subsidized Domestic LPG is given in Annexure–II.

10.5 The under-recoveries arising out of selling petroleum products at a price below the prevailing international prices are being shared by all the stakeholders under the Burden Sharing Mechanism in the following manner:

(i) Government through budgetary support;

(ii) Public Sector Upstream Oil companies namely, Oil and Natural Gas Corporation (ONGC), Oil India Limited (OIL) and GAIL (India) Limited (GAIL) by way of price discount on Crude oil and products.

(iii) Public Sector Oil Marketing Companies, by absorbing a part of the under-recovery.

10.6 The Government has made the price of Diesel market determined both at Refinery Gate and Retail level for all consumers with effect from the midnight of 18-19 October 2014. After launch of DBTL effective 1st January 2015, its consumers get the LPG cylinders at market price and receive LPG subsidy directly into their bank accounts.

10.7 The actual under-recovery in 2014-15 was Rs.72314 crore out of which Diesel accounted for only Rs.10935 crore. The Government provided

cash compensation of Rs.27308 crore while upstream companies contributed Rs.42822 crore. The OMCs incurred under-recovery of Rs. 3971 crore on Subsidized Domestic LPG during 2014-15 under DBTL scheme which was fully compensated by the Government. During the period April-December 2015, the under recoveries of the OMCs amounted to Rs.10000 crore. The Government has provided cash compensation of Rs.7117 crore while upstream companies contributed to Rs. 1980 crore. The unmet under - recoveries of OMCs amounts to Rs. 302 crore. As per the current rates, the under recovery of OMCs for the year 2015-16 is estimated at Rs.11573 crore (excluding subsidy under DBTL Scheme) and under recovery on Domestic LPG subsidy under DBTL scheme is estimated at Rs.16499 crore. The Government has provided cash compensation of Rs.9649 crore (at the rate of Rs. 18/- per KG) to the OMCs towards LPG subsidy under DBTL scheme during Apr-Oct 2015. Effective November 2015, the Government has decided that a fixed fiscal subsidy of Rs. 15/- per KG (admissible on cylinders of all sizes under the PAHAL Scheme) will be payable to the buffer amount by OMCs. Similarly, the Government has approved the budgetary support for Kerosene under-recovery for financial year 2015-16 at a rate of Rs. 12 per litre and the remaining under-recovery will be borne by the upstream oil companies.

10.8 The OMCs are currently incurring under-recovery of Rs. 6.78 per litre on PDS Kerosene and the Government is providing a subsidy of Rs.46.71 per cylinder under DBTL (at Delhi market as on 1st March 2016).

10.9 The product wise and total under recoveries of the OMCs from 2002-03 to 2015-16 (for the period April-December 2015) are given below:

Year	Petrol	Diesel	PDS Kerosene	Domestic LPG	Total Under-recoveries	
	Rs. Crore				Rs. Crore	$ Billion
2002-03	-	-	2,067	3,363	5,430	1.12
2003-04	-	-	3,751	5,523	9,274	2.02
2004-05	150	2,154	9,480	8,362	20,146	4.48
2005-06	2,723	12,647	14,384	10,246	40,000	9.03
2006-07	2,027	18,776	17,883	10,701	49,387	10.90
2007-08	7,332	35,166	19,102	15,523	77,123	19.17
2008-09	5,181	52,286	28,225	17,600	103,292	22.50
2009-10	5,151	9,279	17,364	14,257	46,051	9.71
2010-11	2,227*	34,706	19,484	21,772	78,190	17.15
2011-12	0	81,192	27,352	29,997	1,38,541	28.89
2012-13	0	92,061	29,410	39,558	1,61,029	29.57
2013-14	0	62,837	30,574	46,458	1,39,869	23.12
2014-15	0	10,935*	24,799	36,580	72,314	11.83
9M, 2015-16	0	0	9,993	8	10,000	1.54
Total	**24,791**	**412,039**	**253,868**	**259,948**	**950,646**	**191.03**

* Under-recovery on petrol is up to 25.6.2010 and on Diesel up to 19.10.2014 only.

Total under recoveries of OMCs on Subsidized Domestic LPG under DBTL scheme is as follows:

Rs. crore

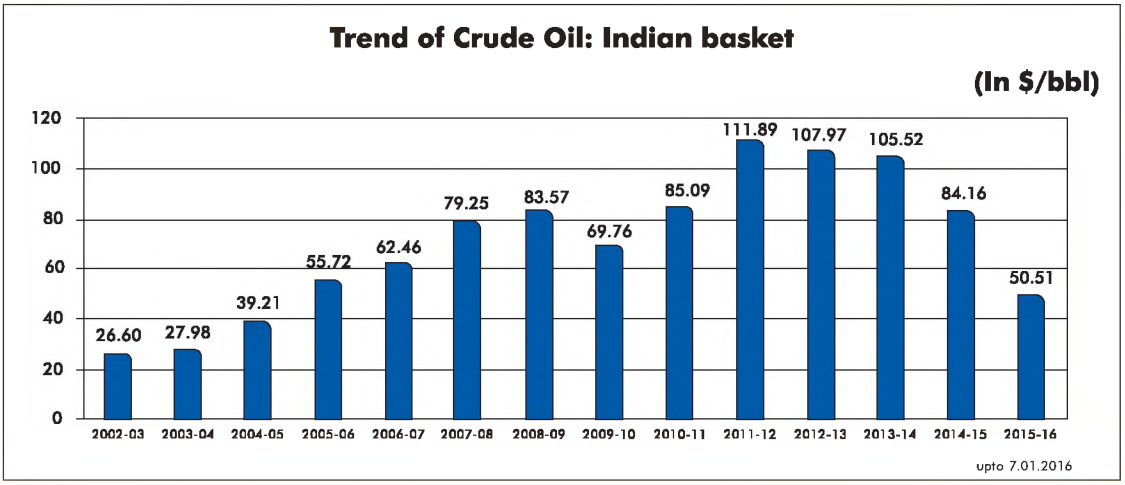
Particulars	2013-14	2014-15	2015-16 (Estimate)
Dom. LPG subsidy under DBTL	3869	3971	16499
Government cash compensation sanctioned	3838	3971	9649 (Apr-Oct'15)

10.10 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 2014-15, Indian refineries processed 72.28% sour crude and 27.72% sweet crude. Therefore, for 2015-16, Indian Basket of crude oil represented the daily price assessment by Platts for benchmark under "Brent" (sweet crude) and average of "Dubai" and "Oman" (sour crude) in the ratio of 27.72:72.28.

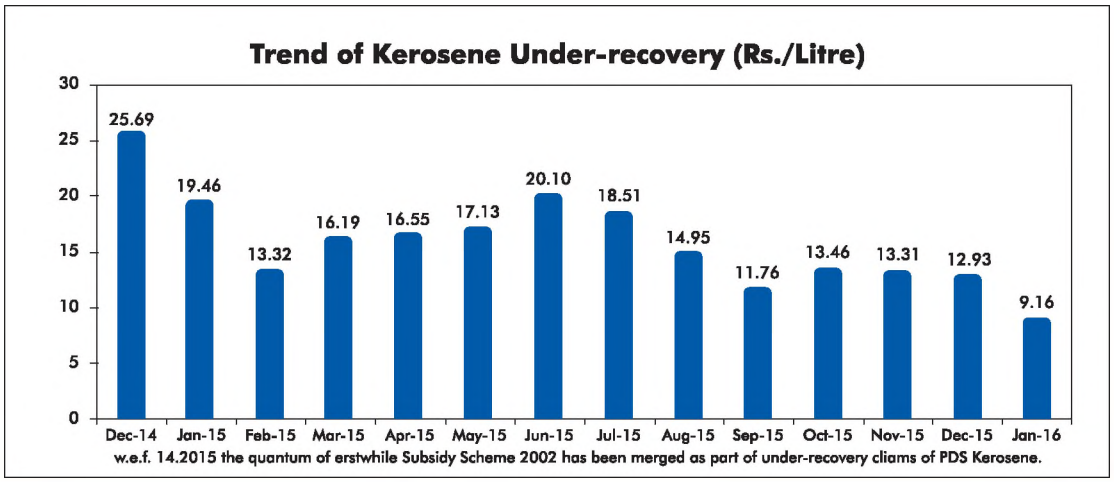
Domestic crude oil producing companies are also offered international crude oil prices benchmarked to international crude that corresponds to their crude assay. Import of crude oil takes place at international prices.

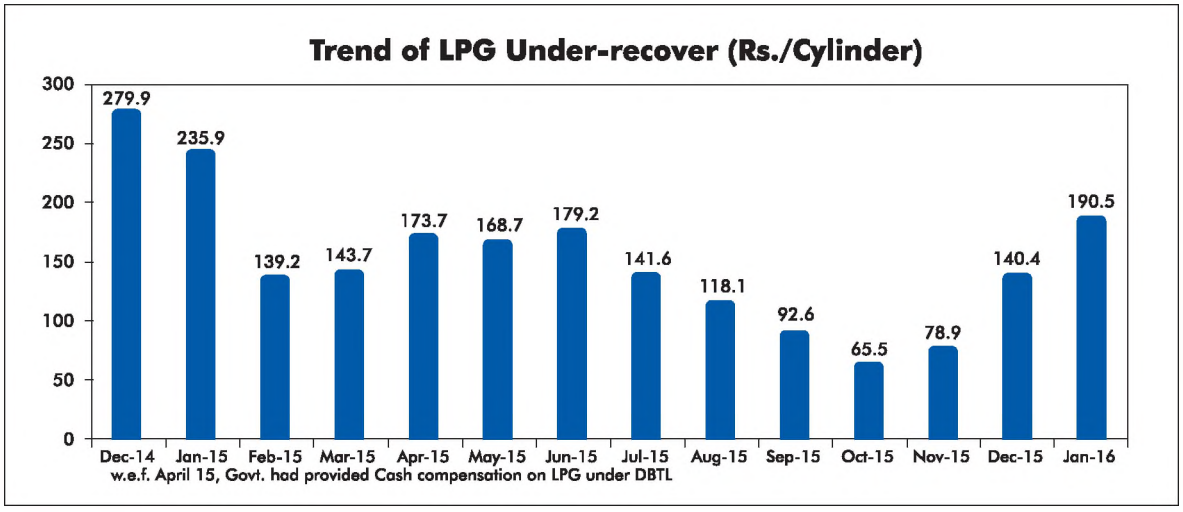
Retail selling of Petrol and Diesel at a fuel station

Annexure-I



Annexure-II






HP


chapter
11
Undertaking/
Organisations

Undertakings/Organisations

11.1 MAHARATNA PSUS

11.1.1 Indian Oil Corporation Ltd. (IndianOil)

Indian Oil Corporation Limited (IOCL) is India's flagship Maharatna National Oil Company with business interests encompassing the entire hydrocarbon value chain of R&M, R&D, E&P, Petrochemical and Marketing of natural gas. By venturing into Renewables and Nuclear Energy, the company has grown and evolved itself from a pure petroleum refining and marketing company to a fully fledged energy company.

Financial Performance

Indian Oil Corporation (IndianOil) is India's largest commercial enterprise, with a turnover (Inclusive of Excise Duty & sale of services) of Rs. 4,50,756 crore for the year 2014-15 against Rs. 4,57,571 crore during 2013-14. During the year 2014-15, IOCL registered a profit (after tax) of Rs. 5273 crore against Rs. 7019 crore in during 2013-14. GRM stood at US$ 0.27/bbl in 2014-15 as against US$ 4.24/bbl in 2013-14.

Physical Performance

IndianOil refineries together achieved a crude oil throughput of 53.59 million tonnes during the year 2014-15 with a capacity utilisation of 98.9 per cent, as against a throughput of 53.13 million tonnes during the previous year. They achieved the best ever combined distillate yield of 78.8 wt% during the year as against the previous best of 78.1 wt% achieved during 2012-13 & 2013-14.With focussed efforts towards energy conservation, the refineries achieved the best ever overall specific energy consumption at 54.4 MBN(MBTU/BBL/NRGF) against the previous best of 55.8 MBN achieved during 2013-14. During the year, 14 new crudes, including high-TAN crudes, have been processed for the first time in the Corporation's various refineries in an attempt to widen the crude basket and to tie up new crude sources as a measure for de-risking.

Crude Oil Pipeline through is 47.779 MMT, with a capacity during the year 2014-15 as against 45.857 MMT during the year 2013-14. Product Pipeline through is 27.905 MMT during the year 2014-15 as against 27.212 MMT during the year 2013-14. The gas pipeline too achieved the highest-ever throughput of 1,364 MMSCM, surpassing the previous best throughput of 1,168 MMSCM registered in 2013-14. The total length of the pipeline network for crude oil, product and gas pipelines as on 31st March, 2015, was 11,221 km.

IOCL continued to dominate the domestic market in core product categories, i.e. petrol, diesel and LPG, by selling 68.47 million tonnes of petroleum products (excluding naphtha for own use) during the year, as against 67.14 million metric tonnes during the previous year. The corporation is on course to meet the timelines as per advice of MoP&NG for improvement of BS-IV Grade in phases to cover the whole of the country by 01.04.2017.

The modified DBTL scheme named PaHaL was rolled out initially in 54 districts on 15th November 2014 and thereafter on 'pan-India' basis from 1st January 2015. With the percentage of cash-transfer-compliant Indane LPG customers touching 82 per cent, Rs. 2,360 crore was directly transferred to the customer's accounts as permanent advance and Rs. 2,324 crore as subsidy.

During the year, the petrochemicals sales, including exports, touched a new high with sales of 2.49 million tonnes, against 2.12 million tonnes during the previous year, posting a growth of 17 per cent on year-on-year basis. During the year, the Corporation registered gas sales of 1.81 million tones against 1.94 million tonnes in the previous year. The lower sales were mainly due to the steep increase in the long-term LNG price vis-a-vis the international spot LNG prices since November 2014. LNG sales through the Corporation's unique "LNG at the Doorstep" initiative also fell to 0.023 MMT from 0.030 MMT in 2013-14 on account of higher long-term LNG price and availability of alternative fuels at lower prices.

Marketing & Associated Infrastructure

To maintain its leadership position in the market place, IOCL commissioned 947 retail outlets (fuel stations, including 369 Kisan Seva Kendra outlets in rural areas) during the year, raising their total number to 24,405. The network comprising 42,982 touch points as on 31st March 2015 was strengthened from 41,640 touch points last year. Largest and most extensive network of retail outlets, numbering, 24,405 (18175 regular RO & 6230 KSK) along with 135 Terminal/Depots, 6399 consumers pump, 3919 SKO/LDO dealers and 98 AFS are some of the vital component of this network, ensuring availability of product stand inventory at the doorstep of the customers. Indane

LPG cooking gas reaches the doorsteps of 8.8 crore households. The contribution of KSK outlets to total sales during the year reached a new high of 12.9 per cent in Petrol (Retail) and 12.8 per cent in Diesel (Retail). 1,610 retail outlets were fully automated during the year, taking the total number of automated retail outlets to 7,687. The concept of NANF (No Automation, No Fuelling) was extended to over 1,270 more retail outlets during the year. The city-specific automation programme was implemented in retail outlets of 25 cities during the year, taking the total number of such cities to 29.

Exploration & Production

Significant headway has been made in the Corporation's drive to build its E&P portfolio, which now consists of participating interests in 10 domestic and seven overseas active assets.

IOCL has three producing assets, viz., Niobrara Shale Project (USA), Pacific Northwest LNG Project (Canada) and Carabobo Project (Venezuela). During the year, the production from these assets increased to 3,299 mboe(million barrels oil equivalent) from 1,754 mboe in 2013-14, registering an 88 per cent rise. The proved and proved-developed reserves have increased from 1.66 mtoe (million tonnes oil equivalent) as on 31st March, 2014 to 2.18 mtoe as on 31st March, 2015, an increase of 32 per cent.

The cumulative total investment in the domestic assets stands at US$ 353.80 Million (equivalent to Rs. 1849.63 crore), and a sum of US$ 1,572.98 Million (equivalent to Rs. 9200.37 crore) has been invested in overseas projects. During the year, IOCL had two discoveries in Gujarat-Kutch offshore blocks, GK-OSN-2009/1 & GK-OSN-2009/2, and the plan of development of the Assam block, AAP-ON-94/1, has been approved. Additionally, during the year, a major milestone was reached as the development and production phase of the two CBM blocks in Jharkhand (BK-CBM-2001/1 and NK-CBM-2001/1) began after sustained gas flow from the test wells in both the blocks.

Major Projects

The details of projects completed during 2014-15 are as under:

- Installation of a gas turbine along with Heat Recovery Steam Generator (HRSG) at Gujarat Refinery
- Sulphur pelletising units at Panipat Refinery and Mathura Refinery
- New tap-off point at Jasidih, Jharkhand, on the Haldia-Barauni-Kanpur pipeline
- Tikri Kalan terminal on Panipat-Delhi pipeline
- Effluent treatment plant modernisation project at Barauni Refinery
- LPG bottling plants at Mysore and Tirunelveli

IOCL has a planned Capex of Rs. 56,200 crore during XII plan against actual expenditure of Rs. 48,655 crore in XI plan period. Out of planned Capex of XII plan, the company has already invested Rs. 40,352 crore in the first three years of plan period (2012-13 to 2014-15). Some of major ongoing projects are listed below:

Approved Project	Approved/Anticipated cost (Rs. Crore)
15-MMTPA grassroots refinery at Paradip, Odisha	34,555
5-MMTPA LNG import terminal project at Ennore (through a Joint Venture company)	5151
Polypropylene project at Paradip Refinery	3150
Distillate yield improvement project at Haldia Refinery	3076
Paradip-Raipur-Ranchi product pipeline and associated tap-off points	1793
Debottlenecking of Salaya-Mathura crude oil pipeline	1584
Paradip-Haldia-Durgapur LPG pipeline	913
Paradip-Hyderabad Pipeline	2321
Augmentation of Paradip-Haldia-Durgapur LPG pipeline and its extension up to Patna and Muzaffarpur	1823
LPG import terminal at Paradip(690 Crore) and Kochi (714.25 Crore)	1404.25

The major process units of IOCL's flagship Paradip Refinery are under commissioning. Hon'ble Minister of State (I/c), Shri Dharmendra Pradhan flagged off the first consignment of products, comprising HSD, SKO and LPG from the refinery in November 2015. This state-of-the-art 15 MMPTA refinery is now ready to supply products in a phased manner.

CSR & Contribution to Exchequer

IndianOil pursued Corporate Social Responsibility initiatives with renewed vigour during the year, especially as part of Swachh Bharat Abhiyan. Construction of toilets and sanitation facilities in schools was taken up in a big way under the Swachh Vidyalaya Abhiyan. Skills development is another key initiative of the Government and IndianOil would be playing a major role in setting up skills development centres across the nation and conducting appropriate programmes. IndianOil also took the lead in providing succour to the people hit by natural calamities, be it the floods in Jammu & Kashmir, Cyclone Hudhud in Andhra Pradesh, or the devastating earthquake in Nepal. The Corporation worked in close coordination with the defence forces and the local administrations in rescue and relief operations, and restored supplies of petroleum products in the affected areas at the earliest. IOCL expenditure in 2014-15 (including overheads) was Rs 113.79 Crore.

During the year 2014-15, Rs. 98,326 crore was paid to the exchequer as against Rs. 86,164 crore paid in the previous year. An amount of Rs. 36,190 crore was paid to the Central Exchequer and Rs. 62,136 crore to the State Exchequers as against Rs. 27,293 crore and Rs. 58,871crore paid in the previous year to the Central and State Exchequers respectively.

Major Awards

- IndianOil was conferred the SCOPE Meritorious Award-2014 (Gold Trophy) for CSR and Responsiveness by the President of India. The award was instituted by the Standing Conference of Public Enterprises.
- IndianOil won the 'Reader's Digest Most Trusted Brand' Gold Award for the 8th time in a row in the Petrol Station category. The award is in recognition of Indian Oil's constant Endeavour to provide world-class fuels and services to customers at its fuel stations.
- IndianOil won the annual Express Logistics and Supply-chain Leadership Award for the seventh time in a row, in the category of 'Excellence-Oil &Gas.' The award is one of the most coveted industry recognitions.
- IndianOil has been adjudged as the second Best Company in Public Sectorin India by the annual survey conducted by the Great Place to Work

(GPW) Institute, India, and The Economic Times in 2014.

- IndianOil won the 'Global Human Resources Development Award-2014'in the category 'Improved Quality of Working Life' instituted by the International Federation of Training & Development Organisations (IFTDO).
- IndianOil's R&D Centre was adjudged the winner in the category of Innovation in Green Polymeric Materials & Products at the 4th National Awards for Technology Innovation in Petrochemical & Downstream Plastics Processing Industry. Indian Oil's Petrochemicals Group was adjudged runner-up for 'Innovation in Polymeric Material' at the same event.
- IndianOil also won the 9th BML Munjal Award for Business Excellence through Learning and Development in the Public Sector category.
- IndianOil Marketing Division has bagged an award under the 'Innovation Architect' category for a bouquet of applications designed and developed by its IS group at the 9th Annual Symposium & Awards ceremony organised by CIO-100, an exclusive forum of corporate representatives who have contributed significantly to the IT industry.
- IndianOil's Haldia and Panipat refineries won the prestigious Greentech Environment Award-2015 and Greentech Safety Award-2014 in Platinum category for outstanding achievement in environment protection and safety respectively. Panipat refinery was conferred the Greentech EnvironmentAward-2014 in Gold category. The awards were conferred by Greentech Foundation, Delhi.
- The Quality Control Department of Marketing Division HO was conferred the Golden Peacock National Quality Award-2014 given out by the Institute of Directors, being one of the most well-known corporate excellence awards worldwide.
- The Governor of Maharastra, Mr. C Vidyasagar Rao, presented the Navshakti Sanman Sandhya CSR award to IndianOil, in recognition of its stellar efforts in enriching Corporate Social Responsibility with various social initiatives.
- IndianOil - North Zone won the prestigious OISD (Oil Industry Safety Directorate) award in the POL Marketing Organisations category for the year 2012-13.
- IndianOil was bestowed with the 'Best Vendor' award by M/s. Hyundai Motors in 'Oil & Chemicals - After-Market' category.

11.1.2 OIL AND NATURAL GAS CORPORATION LIMITED (ONGC)

Introduction

Oil and Natural Gas Corporation Ltd. (ONGC), engaged in exploration and exploitation of oil, natural gas and value added products (VAP), was incorporated on June 23, 1993 under Companies Act 1956, pursuant to Govt. of India's decision to transform the statutory Commission into a Public Limited Company, through Parliament Act for Oil and Natural Gas Commission (Transfer of Undertaking and Repeal Act, 1993). The authorized and paid up capital of ONGC as on 31.3.2015 is Rs.15000 crore and Rs. 4277.76 Crore respectively; share of Government of India being 68.94%. ONGC Videsh Limited is a wholly owned subsidiary, of which the entire equity of Rs. 10,000 crore as on 31.3.2015 is held by ONGC. Mangalore Refineries and Petrochemicals Ltd.(MRPL) is another partially owned subsidiary where ONGC has 71.62% equity stake with management control.

Major operational Highlights for the Year 2015-16 upto December 2015

- The state of the art FPSO (Floating Production Storage & Offloading) unit deployed at Cluster-7 marginal field dedicated to the nation by Hon'ble Minister of State (Independent Charge), MoP&NG on 14th May, 2015.
- Additional Process Units (APU) of Uran plant also dedicated to the nation by Hon'ble Minister on 15th May, 2015.
- Process facilities of HRD process complex under Heera and South Heera Redevelopment Phase-II Project commissioned on 13th August, 2015.
- ONGC Board approved the "Neelam Redevelopment Plan for Exploitation of Bassein & Mukta pay of Neelam field" on 13th August, 2015 with project cost of Rs. 2818.88 Crore. The project envisages incremental production of 2.76 MMT of Oil and 4.786 BCM of gas by the year 2034-35 and is scheduled to be completed by May, 2019.
- ONGC Board approved Re-development of Gamij Field under Stage Gate process in Ahmedabad Asset in its 269th Board meeting held on 28th May, 2015. This project envisages cumulative production of 3.788 MMT of oil by 2032-33 at a total investment

of Rs. 1881.2 Crore. The project scope includes drilling of 280 wells, construction of surface facilities and pipelines etc.

- LP gas compressor package for recovering flare gas at North Kadi GGS-IV, Mehsana Asset was commissioned on 12th May, 2015. With the commissioning of this facility, low pressure gas flaring has been drastically reduced.

Policy initiatives undertaken by ONGC

Strategic goals set for 2030; as per ONGC Perspective Plan 2030

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

Strategic Initiatives

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

1. Acquisition, Processing and Interpretation of seismic data
2. Drilling and Production technology
3. IT and communication.

Drilling Services' initiatives

- First time in ONGC, Pad drilling in Gamij field has been taken up and two Pad of five wells, one pad of 7 wells and one pad of 3 wells has already been completed. Total 22 well has been completed as one date.

- State-of-the-art AC-VFD rig EV-2000-6 commissioned in Karaikal on 18.09.2015 for further strengthening the drilling fleet. The rig is equipped with Top drive, advance instrumentation system & latest solid control equipment and with many advance features.
- Moving a step further in its in-house benchmarking efforts, IDT, ONGC is in the process of engaging an International Agency for benchmarking of Drilling operations of ONGC as per international standards.

Well Services' initiatives

- Successfully fractured first ever Shale gas well Jambusar#55 (27 MT), with in-house design and resources to assess the shale gas potential.
- Radial drilling carried out in four wells KL#333, NJ#06, AM#79 & SK#67 for the first time to enhance reach in the reservoir and increasing flow path.
- Successfully carried out Rig less fishing jobs at well no.GMJ#35, GMJ#141 & WSR#6 for replacement of broken Polish rods thereby putting back these wells on production in shortest possible time.

Information Consolidation for Efficiency (ICE)

- Planning and deployment of Rigs is enabled on ICE system based Rig Bar Chart, Process of GTO preparation through ICE system is mapped and rolled out. Developed the Rig Plan report quarterly and annually (with day wise breakup)
- Completed the generation of a report for subcontracting of contract by the main LSTK contractor.
- M/s BSI conducted surveillance audit on 26th & 27th August, 2015 at both data centers and ISO/IEC 27001:2013 certification of ICE ERP Data Centers for Information Security Management retained.

Infocom initiatives

- Consultant hired for implementation of Paperless Office Project in ONGC.
- Towards Digital India initiative, e-greetings and e-Learning portals launched.
- MOU signed with M/s Matrix International Limited for availing cheaper Data & Voice Services while travelling abroad.
- More than 100 EC/EPC sessions held through Video conferencing resulting in reduced travel time for senior executives and enabling faster decision making.

Initiatives in human resource

ONGC has always been a pioneer amongst the public sectors for the innovative initiative it undertakes for improving the effectiveness of HRM. ONGC has adopted some of the best HR practices to enhance their knowledge and skill levels, encourage its employees' involvement, empowerment and improving the satisfaction level of its people for achieving Organizational Objectives.

11.1.3 GAIL(India) Limited

GAIL (India) Ltd., one of the seven Maharatna CPSEs, is India's largest company dealing with marketing and transportation of natural gas. GAIL is the youngest PSU to be accorded Maharatna Status. GAIL owns and operates a network of about 11000 km of natural gas high pressure trunk pipelines with a pan-India capacity of around 206 MMSCMD of natural gas. Average gas transmission during the previous year (FY 2014-15) was 92 MMSCMD.

GAIL is the only company in India which owns and operates exclusive pipelines for LPG transmission for third party usage. It owns and operates two LPG pipeline transmission systems with a total length of 2038 km. Out of this 1415 km of pipeline network transports LPG from western to northern parts of India (Jamnagar-Loni Pipeline) and the balance 623 km of pipeline transports LPG in the country's southern part (Vizag-Secundrabad Pipeline). The LPG transmission system has a capacity to transport up to 3.8 MMTPA of LPG. During the previous year, LPG transmission throughput was around 3.09 MMTPA.

GAIL also has significant presence in petrochemical segment. With the commissioning of the second petrochemical plant at Pata, Uttar Pradesh, GAIL now owns and operates gas based integrated petrochemical plants with a combined capacity of 810 KTA. Further, GAIL also owns and operates 6 LPG plants having total capacity to produce 1.3 MMTPA LPG / Liquid Hydrocarbons.

In addition to above, GAIL has its presence in City Gas Distribution (CGD) business, Exploration and Production through equity and Joint Venture participations. Besides, GAIL has overseas presence in five countries.

Physical and Financial Performance

Physical

Parameters	Units	Performance in 2015-16 (Up to Sept 2015)	Projected Performance in 2015-16 (As per RE)
Gas Transportation	MMSCMD	88.88	91.49
Gas Marketing	MMSCMD	71.58	72.3
Liquid Hydrocarbon Production	TMT	534	1172
Petrochemical Production	TMT	136	490
LPG Transportation	TMT	1375	2916

Financial

Parameters	Units	Performance in 2015-16 (Up to Sept 2015)	Projected Performance in 2015-16 (As per RE)
Turnover	Rs. Crore	26607	50182
Profit Before Tax	Rs. Crore	1311	1693
Profit After Tax	Rs. Crore	865	1224
Gross Internal Generation (PAT + Depreciation)	Rs. Crore	1495	2495

Projects

- Construction of Jagdishpur-Haldia Pipeline project Phase -I was inaugurated by Hon'ble Prime Minister of India on 25th July 2015.
- North-East's first Petrochemical Plant by Brahmaputra Cracker and Polymer Limited (BCPL), subsidiary of GAIL with 70% equity participation has been commissioned and was dedicated to the nation by Hon'ble Prime Minister of India on 5th Feb 2016.
- Execution of Petrochemical Complex-II project at Pata and Vijaipur has been completed.
- For effective use of commissioned trunk pipelines, execution of Last Mile Consumer Connectivity is being carried out in GAIL. During the year till Dec 2015, GAIL has completed 102.32 km of pipelines for 33 consumers to supply gas @ 0.195 MMSCMD.
- GAIL has floated tender to hire upto 11 LNG ships/ carriers to ferry gas from the US, with a condition that three of them would be made in India.

11.2 NAVRATNA PSUS

11.2.1 Bharat Petroleum Corporation Ltd. (BPCL)

Activities and Performance of BPCL : 2015-16

Bharat Petroleum Corporation Ltd., (BPCL) a Government of India Undertaking (Navratna), came into existence on 24th January, 1976 subsequent to the Government of India acquiring Burmah-Shell Oil Storage & Distribution Company of India and Burmah-Shell Refineries Limited.

BPCL is an integrated oil company in the downstream sector engaged in refining of crude oil and marketing of petroleum products. The Authorized Share Capital and Paid up Capital of the company as on 31.12.2015 is Rs.2500 crore and Rs.723.08 crore respectively.

BPCL has Refineries at Mumbai and Kochi with a combined refining capacity of 21.5 MMTPA. The Refineries are certified for ISO 9001, ISO 14001 and OHSAS 18001, had throughput of 9.93 MMT and 7.97 MMT respectively during 2015-16 (up to December 2015).

BPCL with 12,741 employees has an all-India presence through its extensive marketing network with Market Sales of 26.7 MMT & market share of 22.9%.

Marketing Profile

BPCL has a robust distribution network comprising of 116 storage depots, 12 major installations, 23 TOPs, 50 LPG bottling plants, 38 Aviation Service Stations, 13178 Retail Outlets, 4395 LPG Distributorships, 2 lubricant blending plants and 2872 KM cross-country pipeline as on 31.12.2015.

Financial Performance

The financial performance (RE) of the Corporation during April - September 2015: Gross Sales Turnover Rs. 1,11,338 crs and Profit After Tax (PAT) Rs. 3394.20 crs.

Exploration and Production

BPRL, a 100% subsidiary company Bharat Petroleum Corp. Ltd. (BPCL) has participating interests in 17 exploration blocks in consortium with various partners in India and abroad. BPRL has participating interest in these blocks directly / through wholly owned subsidiary companies.

Out of these 17 blocks, 7 are in India, 6 in Brazil, and 1 each in Mozambique, Indonesia. Australia and East Timor. BPRL's total acreage till end December 2015 is about 24,375 sq km, of which about 88% is offshore.

The Indian blocks were acquired under various NELP bid rounds and foreign blocks were acquired through the bidding/farm in process.

BPRL consortium has had a total of 22 discoveries till date (10 in Mozambique, 7 in Brazil, 3 in India and 1 each in Indonesia and Australia). In Mozambique, the Exploration phase has been completed and an estimated 75+ Tcf Recoverable Natural Gas Resources discovered in our Block. The current proposal is to monetize the resource through the LNG route by setting up an onshore LNG plant (Initially 2 trains of 6 MMTPA each) for which land has been allocated.

So far BPRL has invested about Rs 10,100 crores for its projects.

Ongoing Projects

Replacement of CDU/VDU at Mumbai Refinery

The project envisages installation of new state of art integrated Crude & Vacuum Distillation unit (CDU/VDU) of capacity 6 MMTPA as a replacement of old Crude and Vacuum units to enhance safety & environment with improved mechanical integrity. The approved cost of the project is Rs.1419 crs and has been commissioned on 30.11.2015.

Conversion of CRU to Isomerization Unit at Mumbai Refinery

The project envisages conversion of Catalytic Reformer Unit (CRU) to Isomerization Unit (ISOM) along with associated facilities. This would enable Mumbai Refinery to meet 100% Euro IV MS production. The approved cost of the project is Rs.725 crs and shall be completed by December 2016.

Installation of Diesel Hydrotreatment Unit (DHT) & associated facilities to produce 100% BS IV HSD at Mumbai Refinery. The project envisages installation of 2.6 MMTPA capacity DHT to meet the government Mandate of producing 100% BS-IV HSD w.e.f. April 2017. The project also involves setting up of associated facilities i.e. new Amine Regeneration Unit (ARU) with 3.2 MMTPA and Sour Water Stripped Unit (SWS) with 1.2 MMTPA, to maximise capacity of SRU trains C& D and new Gas Turbine with HRSG for additional power and steam requirement. The approved cost of the project is Rs.2443 crs and is slated for completion in December 2017.

Integrated Refinery Expansion Project (IREP) at Kochi Refinery

The project envisages expansion of the capacity of Kochi refinery by 6 MMTPA from the present 9.5 to 15.5 MMTPA and modernize the refinery to produce auto fuels conforming to Euro -IV/V specs. The approved enhanced cost of the project is Rs.16504 crs. and is expected to be mechanically completed by May 2016.

Propylene Derivatives Petrochemical Project (PDPP) at Kochi Refinery

The project envisages production of niche Petrochemicals utilizing Polymer Grade Propylene produced from the Petro FCCU being set up as a part of IREP. PDPP project envisages production of Acrylic Acid, Oxo Alcohols and Acrylates, utilizing approximately 250,000 MT per annum of Polymer Grade Propylene. The approved cost of the project is Rs.4588.29 crs. and is scheduled for mechanical completion in May 2018.

CSR

BPCL has a strong commitment towards CSR. The main thrust areas amongst others in CSR are Education, Water Conservation, skill Development, Health, Hygiene & Community development. The highlight of our current year's CSR work has been the successful construction and commissioning of 1910 Toilet blocks in Government schools across 7 states in 26 Districts under the 'Swachh Bharat - Swachha Vidyalaya Mission with commitment to fund the maintenance of these toilets for a period of three year in collaboration with the concerned State authorities.

Contribution to Exchequer

BPCL's contribution to the Exchequer (RE) during April- September 2015 is Rs.30,142 crs.

Major Accolades / Awards received:

- BPCL has been awarded by Indian Chamber of Commerce (ICC) the "Corporate Governance & Sustainability Vision Award 2015" for taking a leadership role and making a significant difference by undertaking various initiatives in the areas of Corporate Governance and Sustainability.
- BPCL has also been declared the winner of the 2014 ICAI Award in Corporate Social Responsibility in the Rural Development Category by the Institute of Chartered Accountants of India.
- BPCL conferred the prestigious National Institute of Personnel Management (NIPM) award 2015 for best HR practices.
- BPCL has been ranked 8th in the 'The Best Companies for CSR' list. This was a study of 214 (165 private & 40 public sector) companies taken from the 'Economic Times - 500' companies.
- BPCL's Mumbai Refinery was awarded the 1st Prize OF THE '4th FICCI Quality Systems Excellence Award for Manufacturing-2015' under the Large Size category.
- BPCL's Mumbai Refinery became the 1st PSU to be conferred the Overall Leader award under 'Green Manufacturing Excellence award-2015(GMEA)" by M/s. Frost & Sullivan.
- BPCL's Kochi Refinery received the Kerala State Pollution Control Board (KSPCB) Award from the Govt. of Kerala.
- BPCL has been recognized as a 'LEADER IN ENGAGING MILLENIALS' for its initiative 'Young Age' at the prestigious HR Excellence awards organized by BWI Business World.
- BPCL has been declared Public Sector Unit of the year at the premier edition of the ICICI Lombard & CNBC - TV 18 India Risk Management awards.
- BPCL conferred with CII SCALE Special award for INNOVATION under USER INDUSTRY category.
- BPCL bestowed with EFI National Award for Excellence in Employee Relations - 2015 for significant achievement in employee relations.

11.2.2 Hindustan Petroleum Corporation Limited (HPCL)

Hindustan Petroleum Corporation Limited (HPCL) is a Navaratna and a Global Fortune 500 Company, ranked at 327 with an annual Sales of Rs.2,17,061Crore during FY 2014-15 and having a strong presence in Refining & Marketing in India with about 21% Marketing share in the PSU category in the country.

The 2014-15 performance of the Corporation has qualified for 'Excellent' rating in terms of the MOU signed with the Government of India (basis self-evaluation).

Physical Performance

As on September 2015, the total sale of products was 16.51 MMT, achieving a growth of 5.12% over historical. Pipeline throughput was 8.85 MMT and refineries processed 7.96 MMT of crude.

Financial Performance

As on September 2015, the Corporation has earned a profit of Rs.1267.54 Crore as compared to Rs.896.25Crore of the same period in 2014-15.

Marketing and Associated Infrastructure

HPCL owns and operates Refineries at Mumbai & Visakh with a capacity of 6.5 MMTPA & 8.3 MMTPA respectively. HPCL also owns the largest Lube Refinery in the country at Mumbai for producing Lube Oil Base Stocks with a capacity of 450 TMTPA. HPCL, in collaboration with M/s. Mittal Energy Investments Pte Ltd., is operating a 9 MMTPA capacity Refinery at Bathinda in Punjab and also holds an equity of about 16.95% in the 15 MMTPA Mangalore Refinery and Petrochemicals Ltd. (MRPL).

HPCL has the second largest share of product pipelines in India with a product pipeline network is about 3,014kms. For transportation of petroleum products and a vast marketing network consisting 13 Zonal Offices in major cities and 106 Regional Offices facilitated by a Supply & Distribution Infrastructure comprising of 36 Terminals/TOPs, 69 Inland Relay Depots, 36 Aviation Service Stations, 46 LPG Bottling Plants, 7 Lube Blending Plants and 22 Exclusive Lube Depots. The customer touch points constitute 13,561 Retail Outlets, 4,195 LPG Distributorships, 1,638 SKO / LDO dealerships, 221 CNG Outlets, 218 Auto LPG Dispensing stations and 97 Commissioning & Forwarding Agents as of December, 2015.

Exploration & Production

The details of various E&P activities undertaken by HPCL are given as below:

"In order to become an integrated hydrocarbon company, HPCL has put specific focus on its upstream activities. The corporation has made a strategic move by forming a wholly owned subsidiary "Prize Petroleum Company Limited" as its independent upstream arm. HPCL/Prize are in

HPCL Retail Outlet

the process of consolidating their E&P activities and building internal capability by developing infrastructure and competent team.

HPCL/Prize are continuously pursuing various E&P opportunities in India and abroad to have a balanced portfolio of exploratory, developing and producing oil and gas assets. During the year 2014-15, Prize has acquired stake in two oil & gas assets in Australia. One of these assets is producing and other has discoveries. Two additional development wells have been drilled in the producing asset in Australia during 2015-16. Both of these wells have been put on production. Prize is also operating two marginal producing fields in Cambay Basin in India.

HPCL has Participating Interest in 20 exploration blocks in India in consortium with other E&P companies. Out of these, there is a discovery in one of the blocks for which FDP has been approved by DGH. Exploration work is in progress in one block and 18 blocks are in the process of relinquishment.

In the year 2015-16, HPCL / Prize is likely to invest about Rs. 110 Crores in E&P activities.

New Projects

Refinery projects:

HPCL is in the process of taking up 2 major Refineries expansion projects for optimum capacity utilization of secondary processing facilities namely Visakh Refinery Modernisation Project (VRMP) & Mumbai Refinery Expansion Project (MREP) primarily to meet the objectives of maximization of crude refining capacity from 8.33 MMTPA to 15MMTPA for VRMP and from 6.5 MMTPA to 9.5 MMTPA for MREP. HPCL is also planning to set up a Green field Petrochemical Complex in A.P. along with M/s GAIL.

Marketing projects:

HPCL has taken up a number of infrastructure projects for capacity expansion, viz., New LPG Bottling Plants at Karimnagar and Panagarh in West Bengal.New LPG Bottling Plants at Sholapur, Bhopal are in various stages of completion. A 442 kms. Long Rewari-Bharatpur-Mathura-Kanpur product pipeline is completed and commissioned in October 2015. The implementation of projects for laying 2 Product Pipelines i.e., (i) 164kms. Long UranChakan LPG product pipeline and (ii) 397 kms. long Mangalore -Hassan-Mysore-Solur LPG Pipeline are under progress.

In the Natural Gas segment, HPCL has initiated the project activities for setting up a 5 MMTPA LNG Terminal at Chhara, Gujarat in a JV partnership with M/s. S.P. Ports Pvt. Ltd. (a group company of M/s. Shapoorji Pallonji). Further, HPCL is participating in two separate Joint Venture companies for laying building and operating three natural gas pipelines.

11.2.3 Oil India Limited (OIL)

Oil India Limited (OIL), a Government of India Enterprise, 'A 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 the Company is Rs. 2,000 crore and the paid up capital is Rs. 601.14 crore as on first April, 2015.

OIL's in-country operation spreads over various onshore PML and PEL areas in the states of Assam & Arunachal Pradesh, Mizoram, Andhra Pradesh, Pondicherry and Rajasthan. Besides, OIL is venturing into both shallow and deep water in KG basin, Cauvery and Andaman offshore either jointly or in partnership with other consortium partners.

OIL is currently holding overseas exploration blocks and PIs in other business ventures in ten countries, viz. Libya, Gabon, Nigeria, Yemen, Bangladesh, Myanmar, Venezuela, Mozambique, Russia and USA. In addition OIL also holds stake in 741 Km long pipeline construction and operation project in Sudan completed in 2005.

OIL holds 26% stake in Numaligarh Refinery Limited, 10% stake in Brahmaputra Cracker and Polymer limited, 23% stake in Duliajan - Numaligarh Pipeline Limited and 49% stake in Assam Petrochemicals Limited.

OIL owns and operates a Trunk crude oil Pipeline in the Northeast region of the country for transportation of crude oil produced by OIL as well as ONGCL in the region to feed Numaligarh, Guwahati and Bongaigaon refineries. OIL also own and operates a branch pipeline to feed Digboi refinery. At present, OIL is pumping of imported crude to Bongaigaon refinery through its existing Barauni-Bongaigaon Trunk pipeline. OIL also produces Liquefied Petroleum Gas (LPG) in its plant at Duliajan, Assam.

The natural gas produced in Assam is sold to different customers, viz. BVFCL, APGCL, NEEPCO,

IOC (AOD), APL, NRL and nearby Tea gardens. The non-associated gas produced by the Company in Rajasthan is sold to Rajasthan Rajya Vidyout Utpadan Nigam Limited (RRVUNL). OIL commenced supply natural gas to M/s BCPL from October, 2015 onward for meeting their requirement for pre-commissioning activities of their cracker plant. OIL is preparing itself for regular delivery of natural gas to BCPL.

Main Achievements during 2015-16 upto Decmeber 2015

- Oil India Ltd has made 4 hydrocarbon discoveries duing 2015-16 upto December 2015.
- Oil India Ltd, in June, 2015 has signed an agreement with M/s Belorusneft - the national oil company of Belarus for joint pursuit of search and evaluation of new hydrocarbons exploration, production, and transportation projects across the globe.
- Oil India Limited jointly with Indian Oil Corporation Ltd, in December, 2015 has signed an agreement with M/s Roseneft Oil Company, Russia for entering and investing in upstream onshore Projects in the Russian Federation.

Strategic Initiatives

Given the challenges that the rapidly changing global environment poses to E&P players including OIL, a need was felt to have a comprehensive study of the organization structure, talent strategy and business processes to deliver the desired growth. Therefore, it was decided to develop a long term Perspective Plan with intermediate milestone for OIL for relooking comprehensively at the strategy to incorporate changes if any, based on the changing environment. It is envisaged that the restructuring exercise would deliver improved performance on key indicators, backed by more robust interfaces and improved practices. These initiative has been christened as project "UDAAN".

OIL has developed Perspective Plan 2030 during the year 2015-16 with intermediate milestones for 2020 and 2025. The 2030 growth aspirations that OIL is targeting are:

- Production of 15 MMTOE in 2030.
- Significant International growth.
- Selective, profitable diversification in the energy space.
- Becoming known as one of the top 10 mature asset globally.
- Being the most preferred E&P Company in India.

Technology Upgradation :

A High Performance Computing centre (HPCC) as commissioned on 30.05.2015 for 2D / 3D onland and offshore seismic data processing. The essence of having the HPCC setup is to have an open architecture technology on the hardware front and have the latest suites of Geophysical application software under one roof to address diverse imaging & compute challenges.

Policy Initiative undertaken by OIL :

i. In view of the mandatory relinquishment policy of Government of India in respect of pre-NELP nominated PELs, OIL is prioritizing activities in such areas for conversion of PELs in to Mining Leases (MLs), wherever discovery and commercial produce ability are established. Systematic implementation of recommendations of various geo-scientific consultative studies in the recent past for exploration of stratigraphic traps, re-development & revitalization of matured declining fields, intensive reservoir revitalization initiatives etc. is in progress.

ii. Effort will be enhanced to reduce the number of sick wells by bringing them back to production.

iii. OIL has initiated a number of measures in its main producing fields in Assam and Arunachal Pradesh to increase production, which are listed below:

iv. In order to increase the crude oil production, certain action plans and short term & medium term measures have been chalked out and the same is elaborated as below:

Installation of ESP

With an aim to improve production from depleted reservoirs, installation of Electrical Submersible Pumps (ESP) as a means of Artificial Lift Pumps has been planned. A total of 10 ESP will be installed in OIL's oilfield which will be carried out in four phases.

Hydraulic Fracturing

Hydro frac has been extended for 5 wells. Service provider shall be providing the sub surface equipment and frac job is expected to takes place in 2016.

Matrix Acidization

For enhancement of production from wells with formation damage, matrix acidization job has

been taken up. For the first phase only water disposal wells and water injection wells are taken up for acidization which will indirectly help in maintaining crude oil production and reservoir management. At present 15 wells have been selected.

Radial Drilling

For enhancement of crude oil production from old fields like Nahorkatiya and Jorajan, Radial Drilling has been planned so that the gain in crude oil could be achieved through testing of higher up sands. LOA has been issued to M/S Radial Drilling Services, USA for 4 (four) wells.

Gravel Pack

Sand ingression has become a major issue in reducing crude oil production in OIL's major oilfield like Makum & Hapjan and gas fields like Lohali, Deohal etc. Gravel pack campaign for total 20 wells has already been initiated. Presently, 10 wells has been selected out of which already completed in 3 wells. For the next phase-10 wells, the selection of candidate wells is under study by in-house team along with experts from M/s Schlumberger.

In-house Studies

In-house studies are continuously being undertaken for retrieval of oil from undrained and by passed areas through in-fill drilling campaigns.

Chemical Water Shut-off

In the recent times, water cut has been increasing significantly from matured fields like Naharkatiya, Makum, Bhogpara etc. To arrest the increasing trend of water cut and thus increasing the longevity of the producing wells, implementation of chemical water shut off technology is being envisaged in Bhogpara and a couple of Eocene wells. 7 wells will be completed by IRS, ONGC. First two wells, MRN-116 & EKJ-1 are year marked for chemical water shut off job. Another 5 wells will be from Bhogpara field for which study for well selection is going on by IRS, ONGC.

Prioritization of wells with high potential for workover.

To compensate old well decline, special thrust has been given on workover operation and wells with high potential have been prioritized in workover schedule. Extensive periodic reviews are being carried out to find additional oil (quick gain) through workovers such as Live Condition Perforations, Zone Transfers, isolation repair etc.

Setting up of security camps at various strategic locations to prevent environmental losses

Environmental issues like Bandh, Blockades and miscreant activity have adversely affected crude oil production. To minimize the loss due to environmental reasons, security in oilfields has been intensified by setting up additional security camps in strategic localities.

11.2.4 Engineers India Limited

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

EIL in the year 2000-01, forayed into the infrastructure sector and since then has secured several noteworthy and significant assignments related to modernization/development of international airports, intelligent buildings and water management. In 2010-11, EIL has also taken diversification initiative into fertilizer, nuclear and solar power and upstream E&P.

An ISO 9001 certified company, EIL has a network of 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. Beside, EIL has a wholly owned subsidiary, Certification Engineers International Ltd for

Presentation of final dividend cheque for FY 2014-15 to Shri Dharmendra Pradhan, MoS (IC), PNG by Shri Sanjay Gupta, CMD, EIL

providing certification and inspection services. EIL has also formed a joint venture - M/S TEIL Projects Ltd with M/S Tata projects Ltd in New Delhi.

EIL provides a comprehensive range of project related technology and engineering services spanning from project conceptualizing to project commissioning which include revamp, capacity expansion and modernization of plants. The portfolio of services offered by the company includes:

Pre-Project Services

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

Project Implementation Services

- Project Managements
- Process Design and Front End Engineering
- Basic and Detailed Engineering
- Procurement
- Inspection and Third Party Certification
- Construction Management
- Commissioning and Plant Start-up Assistance

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

Turnkey Constructing

- 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 those in foreign offices was 3069 as on 31.10.2015.

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.

PERFORMANCE HIGHLIGHTS

Business Secured 2015-16 (up to November 2015)

During the current financial year (up to November, 2015), EIL secured new business worth Rs. 634 crores.

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

Consultancy Business

- Project Management Consultant For Construction Of Fifth Oil Berth At jawahar Dweep, Mumbai Harbour for Mumbai Port Trust
- EPCM-1 for Propylene Derivative Petrochemical Project (PDPP) of Bharat Petroleum Corporation Limited (BPCL) Kochi
- Project Management Consultancy (PMC) Services (phase-I) for revamp and capacity Enhancement Project of BORL Refinery at Bina
- EPCM services for the DHDT Project of Numaligarh Refinery, Assam
- Diesel Hydrotreater (DHT) and Associated Facilities at BPCL, Mumbai Refinery
- PMC services for implementation of NGT Order for Delhi Jal Board (DJB)
- Pre-Project activities for HPCL's Vizag Refinery Modernization project
- PMC Services for Strategic Crude Oil Storage Facilities at Visakhapatnam for ISPRL(change order)
- 400,000 BPSD Refinery and 600,000 TPA Polypropylene Plant at Lekki Free Trade Zone, Dangote Oil Refinery Company, Nigeria (change order for additional scope of services)
- PMC Services for AL Dabbiyah ASR Gas Development Project of ADCO, Abu Dhabi
- Consultancy Services for Cost Estimation for KBR FEED, Optimization of Configuration & Crude Mix & Additional ITBs for Process Units, Marine Terminal and O&U for Sonangol, Angola
- PMA Services for improvement of Fire Fighting Facilities at Abu Dhabi Refinery for Takreer, UAE

Financial Performance

The turnover and profit before tax of the company for FY 2015-16 (up to September 2015) was Rs. 841 crore and Rs. 197 crore respectively.

The details of the financial performance of the company for 2015-16 (up to September 2015) are attached in Annexure-I and Annexure-II.

Further, Government has disinvested the share of EIL @10% from the existing 69.37% to 59.37% on 28.01.2016 at the cost of Rs. 462 crores.

Policy Initiative Undertaken

The significant policy initiative taken during the current financial year (up to November 2015) include the following:

HR Development

Beside the various ongoing HR intervention, policies and welfare measures, the following initiative were pursued in 2015-16:

- Competency based Assessment & Development Centers for senior executives for assessing officer in both individual and group based environments for development
- Leadership development program "Aarohan" carried forward to fuel the leadership pipeline
- Objective & Structured assessment by implementation of performance Contract based on Balanced Secured
- Assessing the health of HR system through HR Audit for ensuring system improvement & compliance
- Creating a Learning Culture through regular Knowledge Sharing Sessions
- Trained mentors allocated to Management Trainees & new Jones for engaging young talent through Mentorship Programmers
- Networking events - HR meets for infusion of strategy agenda across level creating a stronger connect with business objectives and its imperatives
- Revisit & Review of HR policies to bring in better employee engagement
- Creating a stronger business connect by focusing on Key Imperatives through the HR Agenda channelizing the efforts of HR team to deliver their best in line with the changing expectations of both the people and the business
- Formulation of HR strategy aligned with business strategy for proactively facilitating achieving the organizational plans, targets and challenges

Technology & Sustainable Development

The following technology development project were initiated during the year (up to November 2015)

i) Development of new separation devices for pre - flash drum

ii) Development of design methodology for trays with explosion hatches

iii) Development of basic Design for 1700 TDP fluidized type Coal Gasifies for processing high ash Indian coal

iv) Development of process scheme for selective Di-Olefin saturation for up gradation of Coker Gasoline

v) Development of process for hydrogen recovery from refinery off-gas using cryogenic separation

vi) Process development for ATF hydro treatment

vii) Development of technology for H2S removal from low pressure off-gases

viii) Development of novel hardware for aiding reaction between basic media and middle or light petroleum distillates

ix) Feasibility study of improved 3 phase reactor configuration for hydro processing applicants

x) Developments of catalyst and process for slurry phase residue hydro cracking

The following technology commercialization efforts were pursued

i) Proposal sent to BORL for implementation of process for hydrogen recovery from refinery off-gas using cryogenic separation. Work order has been received for carrying out the feasibility study at BORL.

ii) Proposal has been sent for carrying out Energy Efficiency Improvement Study(EEIS) at BPCL Mumbai Refinery

iii) Order received from BPCL-Mumbai for supply of parlpak in two quench columns and two amine absorption columns of TGTU(Tail gas treatment unit) as positive outcome of Co-operation Agreement with M/S Kevin Enterprises on Joint Development of High capacity trays and packing's.

iv) Proposal sent to BPCL Mumbai for feasibility study for up gradation of reformate splitter using Dividing Wall Column Technology.

v) Proposal sent to GAIL Pata for Dynamic Simulation Study for closing the connections of cold relief to flare.

vi) Revamping of DHDT/DHDS reactor of IOCL Gujarat Refinery Using EIL-IOCL Development DHDT/DHDS technology

vii) Proposal sent or order expected for Parlpak application in:

a) Quench column and amine absorption column of TGTU (Tail gas treatment unit) of NRL Refinery.

b) Vacuum column Revamp of BORL, Refinery.

c) Vacuum column of CDU-4, HPCL, Vizag Refinery.

viii) Preparation of technology booklet and brochure for highlighting features and advantages of various indigenous technology development by EIL.

R&D activities likely to initiated in the remaining four months of 2015-16:

i) Development of improved model for steam jet ejector design & performance prediction

ii) Development of Boiler and GT-HRSG simulator

iii) Experiment and hardware testing for prototype of novel hardware which aids reaction between basic media and middle or light petroleum distillates

Initiative to be taken for strengthening technology tie ups:

i) Renewal of membership of Process Science Technology Centre (PSTC), an industry-academia collaborative research program initiated by University of Taxes, USA for year 2015-16.

ii) Renewal of membership of Fractionation Research Incorporated (FRI), a non-profit corporative research organization based at Oklahoma, USA for year 2015-16.

iii) Renewal of membership of process Integration Research Consortium (PIRC) of University of Manchester UK for year 2015-16.

Patents field up to November 2015:

- Apparatus for low pressure H2S absorption and process for the same (provisional)
- Apparatus and method for removal for sulphur-containing impurities (provisional)
- 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.
- System for gas-liquid distribution on a catalyst bed in a trickle bed reactor.

CSR Activities:

CSR activities are undertaken to enhance the company's overall contribution to society. In EIL, CSR is the commitment to operate in an economically, socially and environmentally responsible manner to enhance the company's overall contribution to society. EIL's CSR policy aims at creating a sustainable environment through its activities for communities and environment.

EIL's CSR activities are directed towards supplementing/supporting the ongoing and planned initiative of the local, state or central government, with a focus on backwards areas and underprivileged at various locations across the country including our project sites/offices and Delhi. The activities under taken are in consonance and consultation with State Government, districts administration, local administration as well as Central Government Departments/Agencies, Self Help Groups, etc. so as to avoid duplication.

11.3 MINIRATNA CATEGORY-I CPSES

11.3.1 Balmer Lawrie & Company Limited

Balmer Lawrie & Company (BL) is a multi technology, multi locational Company headquartered at Kolkata with Operations spread throughout India. The Company has significant transnational business interest with a joint venture in Dubai and subsidiary in the UK. The Company also has several Joint ventures in India.

The Company's business interest span both manufacturing and services. The Company achieved a Gross Turnover of Rs. 2944.04 crores during the Financial Year 2014-15 and Profit before Tax of Rs. 210.44 crores. The authorized capital, paid up capital and reserves & surplus of the Company as on 31.03.2015 was Rs.60.00 crore, Rs. 28.50 crore and Rs. 874.56 crores respectively.

The major activities of the company have been classified into Strategic Business Units with fair autonomy in running of each business unit. The business units are shown as under:

I. **MANUFACTURING**

Industrial Packaging

Greases & Lubes

Leather Chemicals

II. **SERVICE**

Logistics Infrastructure

Travel & Vacations

Logistics Services

III. **RESEARCH AND DEVELOPMENT**

Technology & Product Development, Kolkata

Applications Research Laboratory, Kolkata

Product Development Centre, Chennai

The Company also operates a wholly owned subsidiary in UK and five joint ventures, one of which is in UAE and the rest are in India.

Corporate Social Responsibilities

The Corporate Social Responsibilities (CSR) activities are broadly categorized intp two flagship schemes, viz., BLISS (Balmer Lawrie Inititative for Self Sustenance) and SAMBAL (Samaj Mein Balmer Lawrie). The Company has been engaged in several community development projects through the specialized agencies / NGO's for vulnerable and marginalized sections, focussing on the issues concerning following:-

I) Health

II) Education

III) Drinking Water

IV) Sanitation

V) Vocational Training

VI) Rehabilitation of the under - privileged

VII) Disaster relief

11.3.2 Chennai Petroleum Corporation Limited (A group company of IndianOil)

1.0 Introduction

Chennai Petroleum Corporation Limited (CPCL), formerly known as Madras Refinery Limited (MRL) was formed as a joint venture in 1965 between the Government of India (GOI), AMOCO and National Iranian Oil Company (NIOC) having shareholding in the ratio 74%: 13% respectively.

From time to time, the shareholding of CPCL has changed. In 2001, GOI transferred its entire shareholding in CPCL to IndianOIl. Subsequently Chennai Petroleum Corporation Ltd. (CPCL) became a subsidiary of Indian Oil Corporation Ltd. (IndianOil) and consequently a Government Company. In july 2003, NIOC transferred their entire shareholding to Naftiran Intertrade Company Limited (NICO), its 100% subsidiary. Currently IOC holds 51.89%, while NIOC holds 15.40%; while the Financial Institution, Foreign Institutional Investors, Public etc. hold the balance.

The Manali refinery was originally designed for processing 2.5 MMTPA (Million Metric Tonnes Per Annum) of imported Darius Crude from Iran. CPCL's Manali refining capacity was increased

from 2.5 MMTPA in 1969 to 10.5 MMTPA in 2011 through addition of new units and debottlenecking the existing units. Secondary processing units like FCCU and OHCU were implemented to improve the total distillate yield. Facilities like DHDT, CCR and ISOM were also added to meet stringent Euro-IV quality norm for Diesel and Gasoline.

CPCL's second refinery, Cauvery Basin Refinery (CBR) was commissioned in November 1993 initially with a capacity of 0.5 MMTPA to process Narimanam crude. The Off-shore PY-3 Crude was allocated to CBR. CPCL completed the CBR capacity expansion to 1.0 MMTPA in 2002 and construction of an Oil Jetty facility for crude in 2003.

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 and Hexane. In addition, CPCL, as a mother industry, supply Petrochemical feed stocks like Propylene and Butylenes stream for the manufacture of Propylene Oxide. Propylene Glycol, MEK, Polybutylene, and Kerosene stream for the manufacture of Linear Alkyl Benzene.

Majority of Fuel Product, Bitumen and Lubes of the Manali Refinery of CPCL and CBR of CPCL are marketed through Indian Oil Corporation Limited, the holding company. CPCL does direct marketing of some of its specialty product from Manali Refinery, like Waxes, Propylene, Hexane, LAB Feed stock, Petrochemical Feed Stocks and Lube Extracts.

Inauguration of Toilet Building by CPCL at Vichoor, Thiruvalluvar District, Tamilnadu

2.0 Performance

2.1 Physical Performance

The company processed 10782 Thousand Metric Tonnes (TMT) of crude oil in 2014-15 and 2015-16 (upto December, 2015), CPCL processed 6811 TMT of crude oil.

Parameter	2014-15	2015-16 (upto Dec '15)	2015-16 (Projected)
Crude Thru put in TMT	10782	6811	9600
Total Distillate %	72.1	72.3	72.3

2.2 Financial Performance

During the year 2014-15, CPCL achieved a turnover of Rs. 47877.82 Crores. The turnover upto September 2015 is Rs. 19007.9 Crores.

The details of physical and financial performance are given below:

Parameters	2014-15	2015-16 (upto Sep '15)	2015-16 (Projected)
Turnover (Rs. Cr.)	47877.82	19007.90*	34763.00
Profit Before Tax(Rs. Cr)	(742.39)	471.12*	370.00**
Profit After Tax(Rs. Cr.)	(38.99)	471.12*	370.00**

Note: * - Turnover, PBT and PAT upto 30.9.2015. Performance result Dec, 2015 yet to be approved by Board of Directors.

** - Tax implications are not there in view of the carry forward business losses.

3.0 Projects

3.1 Major Projects Under Implementation

3.1.1 Reside up-gradation Project

To improve the distillate yield of Manali refinery, a Reside Up-gradation project is under implementation with an estimated cost of Rs. 3110.36 Crores. This project involves installation of Delayed Coker Unit an Revamping of existing Hydrocracker Unit along with other associated facilities. The physical process of 72% has been achieved as on Dec 2016. The project is planned to be competed mechanically by middle of 2016.

3.1.2 Mounded Bullets Storage

As a risk reduction measure as well as to provide intrinsically passive and safe environment, the Mounded Bullets Project for storing LPG and other Petrochemical feed stock storage, at an estimated cost of Rs. 279 Crores, was mechanically completed in all aspects and commissioning activity is in progress.

3.1.3 New Crude Oil Pipeline (42" size)

A New Crude Oil Pipeline Project of 42" size, from Chennai Port to Manali Refinery, with enhance safety features is planned to ensure reliable faster crude transfer from Port. The estimated cost of the project is Rs. 257.87 crore. The engineering activities for the project are fully completed and material procurement and contractor finalization for execution is in progress.

3.2 Future Projects

3.2.1 Auto Fuel BS -IV Quality Improvement Project:

In order to meet BD -IV quality standards by 2017 as per the fuel policy of the Nation, CPCL is revamping the existing DHDS unit at an estimated investment of Rs. 274 Crs. This revamp is to increase capacity from 1.80 MMTPA to 2.34 MMTPA and make 100% compliance in meeting BS -IV demand of the state. The mechanical completion of the project scheduled by March, 2017.

3.2.2 Auto Fuel BS - V / BS - VI Quality Improvement Project:

For the compliance to meet the Auto Fuel Quality BS-V and BS-VI requirements, new facilities to treat Motor Sprit and revamp of the DHDT unit for HSD product are envisaged. The investment for the facilities is estimated to be around Rs. 1000 Crs and scheduled to be completed by 2020.

Considering the non-availability of secondary processing units to treat HSD at Cauvery basin refinery and creating facilities for the same may not be economical, it is planned to transfer the product to Manali further treatment.

11.3.3 Mangalore Refinery & Petrochemicals Limited

A Brief of the Refinery :

- The Phase-1 refinery complex was commissioned in 1996 with a crude processing capacity of 3.69 MMTPA. The phase 2 refinery complex was commissioned in 1999 with an increase in crude processing capacity by 6 MMTPA. The refinery was being operated on a sustained basis at 120 % and the refinery name plate capacity was fixed as 11.82 MMTPA. MRPL suffered huge losses and was on the verge of being referred to BIFR as sick company in 2002-03 with accumulated losses of about Rs. 1200 Cr.
- In 2003, ONGC acquired MRPL and thus became a subsidiary of Oil & Natural Gas Corporation Ltd. MRPL was declared as a PSU in Jan, 2005. Since then, the capacity utilization improved and has sustained above 120%. Following the consistent higher capacity utilization, the Refinery name plate capacity was revised to 11.82 MMTPA in February, 2010.
- MRPL has expanded the refinery name plate capacity to 15 MMTPA by adding a new crude distillation unit of 3 MMTPA capacity under the refinery expansion cum Upgradation project (phase 3) at a cost of around Rs. 13475.19 Cr. On 25th March 2012, MRPL successfully commissioned the new Crude Distillation Unit-III and subsequently one by one each new facility has been successfully commissioned. MRPL's refinery complex consists of state-of-the-art facilities for crude distillation & secondary processing units for producing high quality petroleum products. As a result MRPL has processed crudes of varying quality with API varying from 42 to API 19.
- The refinery complex complies with meeting the BS 3 & BS 4 specifications for MS & HSD. The refinery performance highlights for the last 3 financial years along with data upto 30/09/2015, is provided as "Annexure -A".
- MRPL was granted Schedule 'A' status on 4th July 2013. MRPL contribute to around 7% of India's

- **Financial Performance Highlights**

Annexure-A

Period		FY 2012-13	FY 2013-14	FY 2014-15	HY 2015-16*
Thruput	(MMT)	14.40	14.55	14.65	7.35
Turnover (Gross)	Crore	68,834	75,226	62412	26194
EBITA	Crore	456	1,437	-1250	85
PBT	Crore	(477)	410	-2156	-504
PAT	Crore	(757)	601	-1712	-504
GRM	$/BBL	2.45	2.67	-0.64	3.56

*Un-audited half yearly result 2015-16

total Refining Capacity. The refinery complex is certified with ISO-9001: 2008 & ISO-14001:2004 certifications for its Quality Management and Environment Management Systems. Further MRPL is also certified for ISO:50001 in the energy management system.

- MRPL achieved the highest ever crude processing of 14.65 MMT during the year 2014-15 against 14.59 MMT during the previous year 2013-14.

- **Projects :**

(i) Phase-III Refinery Upgradation and Expansion Project:

The commissioning of Secondary Process Units of Phase -III Refinery Upgradation and Expansion project is completed on 30th September, 2014.

Crude Distillation Unit (CDU), Hydrogen Generation Unit (HGU) and Diesel Hydrotreater Unit (DHTU), Delayed Coker Unit (DCU), first train of Sulphur Recovery Unit (SRU), Coker Gasoil Hydro Treating Unit (CHTU), Second Train of SRU and Petrochemical Fluidized Catalytic Cracker Unit (PFCCU) and Single Point Mooring (SPM) Project were already commissioned.

The total expenditure incurred by the Company on Phase -III Refinery Upgradation and Expansion project is around Rs12,485 Crore as on 31st March, 2015.

Polypropylene Unit (PPU) has also been commissioned.

(ii) Refinery Performance Improvement Programme (RPIP) :

MRPL has taken up Refinery Performance Improvement Programme (RPIP) through M/s Shell Global Solutions International B.V. under the auspices of Centre for High Technology, Ministry of Petroleum and Natural Gas (MoP&NG), Government of India.

11.3.4 Numaligarh Refinery Limited (NRL)

(i) Introduction

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's commercial operations commenced from 1st October, 2000. NRL is a Category-I Miniratna PSU. The Company's net worth as on 31.03.2015 was Rs. 3,355 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), High Speed Diesel(HSD), Raw/Calcined Petroleum Coke (RPC/CPC), Sulphur and Paraffin Wax.

NRL has an LPG Bottling Plant of 10 TMTPA capacity at Numaligarh besides two marketing terminals at Numaligarh and Siliguri. White Oil products, viz. MS, SKO and HSD are being transported from Numaligarh to Siliguri through the Numaligarh-Siliguri product pipeline (NSPL) of Oil India Limited.

(ii) Performance

NRL has been operating with sustained profitability every year. Through persistent optimisation of process parameters and in-house innovation, NRL has succeeded in achieving highest Distillate Yield among all PSU oil refineries in the Country for four successive years starting 2011-12. 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'15 of the current financial year are as follows:

Physical Performance:

Parameter	12-13	13-14	14-15	15-16 Apr-Dec	15-16 Projected
Crude Receipt (TMT)	2,448	2,675	2,766	1,814	2,491
Crude Throughput (TMT)	2,478	2,613	2,777	1,847	2,512
Capacity Utilisation (%)	82.6	87.1	92.6	81.54	83.73
Distillate Yield (%)	91.11	92.16	90.69	89.79	89.90
Specific Energy Consumption (MBN)	53.2	53.6	51.6	51.6	52.0
Energy Intensity Index (EII)	-	-	97.2	97.6	97.0

Financial Performance:

Parameter	12-13	13-14	14-15	15-16 Apr-Dec (Provisional)	15-16 Projected
Sales Turnover (Rs./Crs)	8,753	9,872	10,823	8,747	11,893
PBT (Rs./Crs)	263	563	1,134	1,324	1,525
PAT (Rs./Crs)	144	371	718	866	988
GRM ($/bbl)	10.52	12.09	16.67	22.53	19.96

(iii) Projects

Projects Commissioned recently

NRL has commissioned a Wax plant at Numaligarh in March 2015. Commissioning of the plant has enabled production of 50 TMT of paraffin Wax per annum and has facilitated import substitution of the product, resulting in substantial foreign exchange savings. The project was implemented using indigenous technology in the Solvent De-oiling Unit (SDU) which was jointly developed by EIL, IIP Dehradun and NRL and has contributed to the "Make in India" campaign.

Projects under Implementation

a) Diesel Hydrotreater Unit (DHT):

In order to comply with the Auto Fuel Vision Policy, NRL is installing a Diesel Hydrotreater (DHT) of 0.7 MMTPA capacity for production of BS-IV HSD at 100% capacity utilization of the refinery. Overall progress of the project as on 31.12.2015 reached 5.4% and 16 milestones were achieved as scheduled against total of 61 milestones for the project. Cumulative expenditure in this project up to 31.12.2015 was Rs. 8.25 crores with total financial commitment of Rs.252.50 crores. The project is targeted to be completed by January 2018.

b) Mounded Bullet Project:

NRL is implementing a project to modernise its LPG storage facility from existing Horton Spheres to Mounded Bullet. Mounded storage of LPG is considered safer compared to over ground storage vessels as it provides intrinsically passive and safe environment and reduces the Boiling Liquid Expanding Vapour Explosion (BLEVE) scenario to a great extent. The project is being implemented at an approved cost of Rs. 122.10 crores. As on 31.12.2015, overall progress against the project has reached 13.3% and cumulative expenditure was Rs. 2.63 crores. The project is targeted to be completed by September 2017.

Projects in Pipeline

a) Refinery Expansion from 3 to 9 MMTPA:

NRL is pursuing a project of expanding its refining capacity from 3.0 to 9.0 MMTPA, sourcing incremental crude oil through imports. Imported

crude oil is envisaged to be transported through a new pipeline from an Eastern port to Numaligarh. Detailed Feasibility Report (DFR) for the project completed. Proposal put up to the Ministry of Petroleum and Natural Gas for approval and financial assistance. Investment in NRL's refinery expansion project including the crude oil pipeline and a product pipeline to Siliguri is estimated at Rs. 20,045 crores. Implementation of the NRL's refinery expansion project would be the single largest industrial investment in the North East region.

b) Bio-refinery project:

NRL is also pursuing a project for setting up a Bio Refinery for production of fuel grade ethanol from bamboo biomass. Feasibility studies have been completed and the proposal under approval stage. The bio-refinery is expected to enable production of 60 TMT Ethanol per annum.

A MoU has been signed between NRL and M/s Chempolis, Finland followed by signing of a Partnership Agreement during 2014-15 at Helsinki in presence of the presidents of both nations. To ensure adequate feed stock supply for the proposed Bio-refinery, Memorandum of Understandings has been signed with Arunachal Pradesh Bamboo Resources Development Agency (APBRDA) and Nagaland Bamboo Development Agency (NBDA).

Besides reduction in carbon emission through production of ethanol, which is considered as a clean fuel, Implementation of the bio-refinery project is expected to augment agricultural income of the natives in the region.

c) Indo-Bangla Pipe line:

NRL has initiated a proposal to construct a product pipeline from NRL's terminal at Siliguri to Parbatipur in Bangladesh. Route survey, Field survey and DFR for the pipeline have been completed. A MoU has been signed between NRL and Bangladesh Petroleum Corporation to form a joint venture company for implementing the pipeline project. Discussions with Bangladesh authorities are in progress to finalise the terms of product sale / purchase agreement

11.3.5 ONGC Videsh Limited -

Working globally for the energy security of India

(i) INTRODUCTION

ONGC Videsh Ltd., a wholly owned subsidiary and

Offshore Rig of OVL

overseas arm of Oil and Natural Gas Corporation Limited (ONGC)was rechristened from the erstwhile Hydrocarbons India Pvt. Ltd. which was incorporated on 5 March 1965.The authorised and paid-up share capital of ONGC Videsh as on September 30, 2015 stood at Rs.10,000 crore. 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.

Blocks acquired/relinquished during the year:

Blocks acquired during the year 2015-16

- **Acquisition of 15% stake in Vankor field (in progress)**

ONGC Videsh Limited and Rosneft (NOC of Russia) signed an Agreement of Sale and Purchase (SPA) of a 15% share in Vankorneft and the Shareholders' Agreement on 4th September, 2015. The documents were signed by Managing Director of ONGC Videsh Limited, Mr. Narendra K. Verma and Rosneft Chairman of the Management Board Mr. Igor Sechin. The parties intends to complete the transaction upon obtaining necessary regulatory and other approvals.

- **Blocks relinquished during the year**

As of 30th November, 2015, no block has been relinquished by ONGC Videsh during FY 2015-16.

Special Achievements during the year

- **Physical**

ONGC Videsh started production of oil and gas with a meager production of 0.253 MMTOE in FY'03 and during the year 2014-15, ONGC Videsh achieved a production level of (O+OEG) 8.874 MMTOE. The production for the period April to

November, 2015 along with production for RE 2015-16 & Actual 2014-15 is given below:

** Including Condensate*

Particulars	Unit	RE 2015-16	April to November, 2015	2014-15 Actual
Crude Oil*	MMT	5.531	3.677	5.533
Gas	BCM	3.071	2.243	3.341
Total Oil + Gas (MMTOE)	**MMTOE**	**8.602**	**5.920**	**8.874**

As on 01st April 2015, the remaining 1P and 2P reserves are 202.64 MMTOE and 612.068 MMTOE respectively.

- **Financial**

The consolidated net worth of ONGC Videsh has increased by 4.28% to Rs. 43,327crore as on 31st March, 2015 as compared to Rs. 41,549crore as on 31st March, 2014. ONGC Videsh has earned net profit of Rs. 1,904 crore, a decrease of 57% as compared to FY'14 net profit of Rs. 4,445 crore despite higher production during FY'15. The decrease in profit is mainly due to lower oil price, higher financing cost including exchange loss, higher depletion charge, and impairment provision in one of the assets. The consolidated total revenue for ONGC Videsh decreased by 13.84% from Rs. 22,224 crore for the year 2013-14 to Rs. 19,149 crore for 2014-15, mainly due to lower oil price. The consolidated gross revenue of ONGC Videsh for the half year ended 30th September, 2015 was Rs. 7,135 Crore as compared to gross revenue ofRs.11,667 Crore for the half year ended 30th September, 2014. The consolidated group profit after tax of ONGC Videsh for the half year ended 30th September, 2015 was Rs. (184) Crore as compared to consolidated group profit after tax of Rs. 2,068 Crore for the half year ended 30th September, 2014.

The revenue & profit after tax for the period April to September, 2014, RE 2014-15 & Actual 2013-14 are given below:

Particulars	Unit	RE 2015-16	April to September, 2015	2014-15 Actual
Total Revenue	Rs. Crore	14,721.41	7,135	19,148.89
Group Profit After Tax		94.02	(184)	1,904.22

Import/Export of POL & Natural Gas

ONGC Videsh does not import/export POL & Natural Gas.

Agreements/MoU signed during the year

- **MoU with ONGC**

ONGC Videsh entered into a performance related MoU with ONGC for the year 2015-16, duly authenticated by MoP&NG and DPE incorporating the suggestions/ changes of the MoU Task Force. The MoU was executed on 31st March 2015.

Crude Oil (including condensate) production targets for MoU 2015-16 are 5.550 MMT under excellent category and 5.360 MMT under Very Good category. Natural Gas production targets are 3.325 BCM under excellent category and 3.242 BCM under Very Good category.

- **Extension of Memorandum of Understanding (MOU) between Rosneft and ONGC Videsh**

ONGC Videsh and Rosneft have agreed to continue cooperation on the offshore projects included in the scope of the earlier executed

Memorandum of Understanding for cooperation in exploration, appraisal and hydrocarbon production on the continental shelf of the Russian Federation dated 24th May, 2014. Further scope of cooperation is included in the extended MOU for onshore hydrocarbon exploration & production projects in the Russian Federation as well. The MOU was signed between Rosneft, Russia and ONGC Videsh, India by Managing Director of ONGC Videsh Limited, Mr. Narendra K. Verma and Rosneft Chairman of the Management Board Mr. Igor Sechin on 24th December, 2015 at Moscow in the presence of Prime Minister of India Mr. Narendra Modi and the President of Russia Mr. Vladimir Putin.

Other areas of International Cooperation

Apart from the above, the following MoUs of ONGC Videsh continue to be in force for 2015-16:

Sl. No.	Company/ Country	Areas of Cooperation
1	Petro Vietnam/Vietnam	Cooperation in the areas of exploration, development and recovery of hydrocarbon reserves within the territory of Vietnam, India and other regions
2	PTTEP/Thailand	Cooperation in acquisition of exploration and production areas of hydrocarbon resources in India, Thailand and other countries
3	TPAO/Turkey	Cooperation in upstream E&P sector in Turkey & third Countries
4	MDC Oil & Gas Holding Company LLC (Mubadala Petroleum)	Collaboration in upstream E&P opportunities and LNG opportunities.

Inputs regarding engagements abroad

Details of participating interest in respect of overseas projects of ONGC Videsh is given in Annexure A.

Annexure-A

Details of Participating Interest in respect of Overseas Projects of ONGC Videsh

S.No.	Name of the Block/Project and Country	Participating Companies and their Share
1.	Block 06.1, Vietnam, Offshore	ONGC Videsh - 45% TNK - 35% (Operator) Petrovietnam - 20%
2.	Block 128, Vietnam, Offshore	ONGC Videsh- 100%
3.	Sakhalin-1, Russia, Offshore	ONGC Videsh - 20% Exxon Mobil - 30% (Operator) Sodeco - 30% SMNG- 11.5% RN Astra - 8.5%
4.	Imperial Energy, Russia	ONGC Videsh-100%
5.	GNPOC, Block 1, 2 & 4, Sudan	ONGC Videsh - 25% CNPC- 40% Petronas - 30% Sudapet - 5% (Jointly Operated)
6.	GPOC, Block 1, 2 & 4, South Sudan	ONGC Videsh - 25% CNPC-40% Petronas - 30% Nilepet - 5% (Jointly Operated)
7.	SPOC/Block 5A, South Sudan	ONGC Videsh- 24.125% Petronas-67.875% Nilepet - 8% (Jointly Operated)

8.	Khartoum - Port Sudan Pipeline (741 Km), Sudan	ONGC Videsh - 90% (Operator) OIL - 10%
9.	Block A-I, Myanmar	ONGC Videsh-17% Daewoo - 51 % (Operator) KOGAS- 8.5% GAIL-8.5% MOGE- 15%
10.	Block A-3, Myanmar	ONGC Videsh-17% Daewoo - 51 % (Operator) KOGAS - 8.5% GAIL-8.5% MOGE - 15%
	Shvve Offshore Mid-Stream Project, Myanmar	ONGC Videsh-17% Daewoo -51% (Operator) KOGAS - 8.5% GAIL-8.5% MOGE - 15%
	Onshore Gas Transportation Pipeline, Myanmar	ONGC Videsh - 8.347% CNPC-SEAP - 50.9% (Operator) Daewoo - 25.041% GAIL -4.1735% KOGAS-4.1735% MOGE - 7.365%
11.	Rovuma Area-1, Mozambique	ONGC Videsh - 16% Anadarko - 26.5% (Operator) OIL - 4% ENH- 15% Mitsui - 20% BPRL- 10% PTTEP - 8.5%
12.	Block 8, Iraq	ONGC Videsh - 100%
13.	Farsi Offshore Block, Iran	ONGC Videsh - 40% (Operator) IOC - 40% OIL - 20%
14.	Block 43, Libya	ONGC Videsh- 100%
15.	Block 24, Syria	ONGC Videsh-60% IPR International - 25% (Operator) Tri Ocean Mediterranean - 15%
16.	A1 Furat Petroleum Co., Syria	Himalaya Energy (Syria) B.V. - 33.33% to 37.5% Shell-66.67% to 62.5% (Operator -A1 Furat Petroleum Company)
17.	Block BM-SEAL-4, Brazil	ONGC Videsh-25% Petrobras -75% (Operator)
18.	BC-10, Brazil, Offshore	ONGC Videsh - 27% Shell - 50% (Operator) Qatar Petroleum International - 23%
19.	Mansarovar Energy Colombia Limited (MECL), Colombia	ONGC Videsh - 25-50%, Sinopec-25-50% Ecopetrol-50% (Jointly Operated)
20.	Block RC-8, Colombia	ONGC Videsh - 40% (Operator) Ecopetrol - 40% Petrobras - 20%

21.	Block RC-9, Colombia	ONGC Videsh - 50% Ecopetrol - 50% (Operator)
22.	Block RC-10, Colombia	ONGC Videsh - 50% (Operator) Ecopetrol - 50%
23.	Block CPO-5, Colombia	ONGC Videsh -70% (Operator) Petrodorado - 30%)
24.	Block SSJN -7, Colombia	ONGC Videsh-50% Pacific Stratus Energy Colombia - 50% (Operator)
25.	San Cristobal Project, Venezuela	ONGC Videsh - 40% PDVSA - 60% (Jointly Operated)
26.	Carabobo-1 Project, V enezuela	ONGC Videsh-11% IOC-3.5% OIL-3.5% Petronas - 11 % PDVSA-71% (Jointly Operated)
27.	Satpayev Project, Kazakhstan	ONGC Videsh-25% KMG - 75% (Operator)
28.	ACG, Azerbaijan	ONGC Videsh-2.7213% BP - 36% (Operator) SOCAR - 12% Chevron - 11 % INPEX - 11% Exxon - 8% StatOil - 8% TPAO - 7% ITOCHU - 4%
29.	BTC Pipeline (1760 Km), Azerbaijan	ONGC Videsh - 2.36% BP-30.1% (Operator) SOCAR - 25% StatOil-8.71% TP AO - 6.53% ITOCHU - 3.4% Chevron - 8.9% INPEX - 2.5% ENI - 5% TOTAL - 5% Conoco Philips - 2.5%
30.	Block LLA-69, Colombia	ONGC Videsh - 50% SIPC - 50% (Jointly Operated)
31.	Block GUA OFF 2, Colombia	ONGC Videsh - 100%
32.	Block SS4, Bangladesh	ONGC Videsh - 45% (Operator), OIL - 45%
33.	Block SS9, Bangladesh	ONGC Videsh - 45% (Operator), OIL - 45% BAPEX - 10%
34.	Block B-2, Myanmar	ONGC Videsh - 97% (Operator) M&S - 3%
35.	Block EP-3, Myanmar	ONGC Videsh - 97% (Operator) M&S - 3%
36.	Block- 14TAR-R1, New Zealand	ONGC Videsh - 100%

11.4 OTHER CPSES

11.4.1 Biecco Lawrie Limited

Biecco Lawrie Limited (BLL), under the administrative control of the Ministry of Petroleum and Natural Gas (MoP&NG), was established in 1919 and became a Government Company in 1972. This is a medium sized Engineering Unit with diversified activities having two factories located at Kolkata. As on 31.03.2015, the company had an authorized share capital of Rs. 75 Crores, while the issued, subscribed and paid up capital was Rs. 74.76 Crores. The President of India and the Oil Industry Development Board (OIDB) holds 32.33% and 67.33% of the Equity Share Capital.

During the Financial year 2014-15, total sales and other income was Rs.2962.26 lakhs as against Rs. 3961.78 lakhs during the financial year 2013-14. The net loss during 2014-15 was to the tune of Rs. 1374.50 lakh. The deferred tax of the year 2014-15 is Rs. 39.21 lakh.

The Major operations of the company are as under:-

(i) Switchgear & Spare Parts

(ii) Electrical Repairs

(iii) Projects

(iv) Lube Oil Blending & Filling

BLL is making losses for the last several years and its net worth has become negative. BLL has registered itself in Board for Industrial and Financial Reconstruction (BIFR) under Sick Industrial Companies Act. BIFR in its meeting held on 5th October, 2015, had declared BLL a sick company and had inter - alia appointed United Bank of India as the Operating Agency (OA). The Company is in the process of preparation of Draft Rehabilitation Scheme (DRS) in accordance with the guidelines framed by BIFR.

11.4.2 Balmer Lawrie Investments Limited

Government of India in view of its planned deregulation of the oil and globalization of the economy, decided to disinvest 33.58% of its total equity holding of 59.58% in IBP Co. 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 favor 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 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 1,76,13,225 equity share of Rs. 10/- each of Balmer Lawrie & Company Limited (BL).

Joint Ventures / Subsidiaries

(a) Joint Venture (JV) Companies - BLIL does not have any JV with any corporate entity.

(b) Subsidiary Companies - BLIL, at present, has one direct subsidiary, namely, BL, having its registered office in Kolkata. BL has two wholly owned subsidiaries namely:-

i. Balmer Lawrie (UK) Limited having its registered office in United Kingdom and;

ii. Visakhapatnam Port logistics Park Limited, having its registered office at Kolkata.

11.5 OTHER ORGANISATIONS

11.5.1 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.

Organisational Setup

During 2015-16, the Board under the Chairmanship of Secretary, MOP&NG consisted of Secretary, Deptt of Chemical and Petrochemical, Special Secretary and Financial Adviser, MOPNG, Special Secretary, Deptt of Expenditure, Joint Secretary (Exploration), MOPNG, Chairman IOCL, ONGC, GAIL, BPCL and HPCL, Director General

of Hydrocarbons, Director (R&D) IOCL and Secretary, OIDB as Member Secretary.

Resources of the Board

The funds required for various activities as envisaged under the Act, are made available by the Central Government after due appropriation by Parliament from the proceeds of cess levied and collected on indigenous crude oil. So far OIDB has received an amount of Rs.902.40 crore from the Central Govt. This amount together with internal receipts generated as interest income on loans given to various oil sector companies and short term investment of surplus funds has accumulated to Rs.11,621.15 crore (provisional) as on 25th January 2016.

Deployment of Funds

During 2015-16 (upto 25th January 2016), OIDB has extended loans to IOC, GAIL Gas, BPCL, HPCL, BCPL and BLL amounting to Rs.1700.73 crore and Grants to institutions viz. DGH, PCRA, CHT, OISD, PPAC and Rajiv Gandhi Institute of Petroleum Technology (RGIPT) and IOCL (for R&D activities) amounting to Rs.188.78 crore. Indian Strategic Petroleum Reserves Ltd. (ISRPL), a wholly owned subsidiary of OIDB has been entrusted with the construction of Strategic Storage for crude oil at three locations. During 2015-16 (upto 25th January 2016), an amount of Rs.184.50 crore was released to ISPRL as advance against equity.

Setting up of Hydrocarbon Sector Skill Council for Oil & Gas Sector

OIDB has been entrusted with the nodal responsibility of forming a Hydrocarbon Sector Skill Council (HSSC). A joint application was filed with National Skill Development Council by OIDB during the year. The industry group has already identified 134 trades covering entire hydrocarbon sector and construction in services specific to hydrocarbon sector. NSDA/NSQC has approved the proposal of setting up of HSSC. NSDC has also conveyed its approval for grant of Rs.5.00 crore to HSSC. An application was submitted with Registrar of Society, Delhi for registration of HSSC as a Society. The registration is awaited.

11.5.2 Oil Industry Safety Directorate (OISD)

Oil Industry Safety Directorate (OISD) is a technical directorate under the Ministry of Petroleum and Natural Gas and has been entrusted with the responsibility of formulating standards, overseeing its implementation through safety audits in petroleum industry to enhance safety levels and reduce risk inherent with this industry. OISD standards cover the entire activities pertaining to hydrocarbon sector i.e. exploration & production, refining, gas processing, storage, distribution, environment etc. which are implemented on self-regulatory basis by public sector oil companies.

Our goal is to enhance safety in Oil & Gas Installations in co-ordination with industry members both public and private sector.

Safety Audits by OISD (ESA/SSA)

OISD carries out periodic safety audits of all types of Oil & Gas installations to monitor their compliance with the OISD standards. OISD Safety Audit Performance for the year 2015-16 is as indicated below:

Actions	Unit	Plan	Actuals (As on 31st Dec 15)
Core Audits			
Refineries/Gas Processing plants/ LNG Terminals (Including Construction Safety Audits)	Nos	14	08
Mktg. Installations	Nos	70	37
E&P Onshore Installations	Nos	50	37
E&P Offshore Installations	Nos	16	14
Cross Country Pipelines	Kms	7000	5875
Additional audits Pipelines Installations			
Jetty Pipelines for Hydrocarbon Transportation	Nos	02	01
Single Point Mooring (SPM) Installations	Nos	02	01

Pre-Commissioning Safety Audits (PCSA)

To ensure safe & productive capitalization thereby enabling uninterrupted distribution of petroleum products for the public at large, OISD carries out pre-commissioning safety audits of Greenfield projects across the Oil & Gas Industry. These audits are conducted where; green-field developments and also major additional facilities at existing locations are being done, to ensure ab initio compliance of these facilities to the OISD standards at the construction stage itself.

As on December 2015, 51 nos. of such audits had been conducted on the request of the user Industry members. 564 Kms of Pipeline covering eight pipelines installations was also audited in this context.

"Consent to Operate" for Offshore Installations

OISD, as the competent authority to oversee implementation of the Petroleum & Natural Gas (Safety in Offshore Operations) Rules, 2008 accords "consent to operate" to offshore installations including Drilling Rigs. 74 Unmanned Well Head Platforms, 01 Offshore Process Complex and 06 Drilling Rigs have been accorded "consent to operate" during the year 2015-16 (As on Dec 31, 2015).

Technical Seminar / Conference / Workshops

Technical Seminars / Conferences / Workshops for the Oil industry are conducted by OISD to discuss the latest technological developments, sharing of incident experiences etc.

As on 31st December, 2015, OISD has organized a two day joint workshop with ONGC on 'Well Control & Workover Operations' at Chennai during 18-19 September 2015. Till March, 2016, OISD plans to hold at least one more seminar/workshop.

Encouragement of Safety Performance across the Industry thru 'Oil Industry Safety Awards'

Annual evaluation of Safety Performance of the Industry Members is done by a specially developed methodology, which takes cognizance of hazards associated, incident recorded during the year and safety management system of the installation. Organizations, achieving `exceptional safety performance` during the year, are awarded with the Oil Industry safety Awards. In addition, individuals making exceptional contributions towards the cause of safety in their respective installations are also encouraged and presented with such awards.

'Oil Industry Safety Awards', for the year 2013-14, had been handed over to the recipients by Hon'ble Minister State (Independent Charge) for Petroleum & Natural Gas in a glittering function at Delhi on 04th August,2015.

Compendium on 'Analysis of Major Incidents in Oil & Gas Industry for the period 2004-15.

To learn from the past incidents and avoid recurrence of incidents in the Oil & Gas Industry, OISD has compiled a compendium on 'Analysis of Major Incidents in Oil & Gas Industry for the period 2004-15'. The compendium was released by Hon'ble Minister of State (Independent Charge) for Petroleum & Natural Gas, Shri Dharmendra Pradhan during the Oil Industry Safety Awards ceremony held in New Delhi on 04th August'2015. The root cause of failures and learnings from the all the incidents which have occurred in the Industry during the last decade have been enunciated in the booklet. This would provide a great learning opportunity to the entire Industry to draw lessons and shall help in prevention of similar incidents in the Industry at large.

Compendium on 'Safety Audit Checklists'.

In addition to the release of a compendium on Analysis of Incidents in the Industry, OISD also released another useful document to further enhance the safety in the Oil & Gas Industry. The compendium on 'Safety Audit Checklists' is a compilation of checklists for safety audits of all categories of Oil & Gas Installations. This compendium, in addition to further enhancing the audit preparedness of the Industry as a whole, would also help in further strengthening Internal Audit mechanism of the concerned Oil Companies. The compendium was released by Hon'ble Minister of State (Independent Charge) for Petroleum & Natural Gas, Shri Dharmendra Pradhan during the Oil Industry Safety Awards ceremony held in New Delhi on 04th August'2015.

The Safety Council

To ensure proper implementation of the various aspects of safety in the Oil & gas Industry in India, Government of India had set up a Safety Council at the apex under the administrative control of Ministry of Petroleum & Natural Gas. The Oil Industry Safety Directorate (OISD) assists the Safety Council, which is headed by Secretary, P&NG as Chairman and members represent the entire spectrum of stakeholders - PSU, Pvt. Sector & JVs - as well as relevant expert bodies. To review the safety performance, the Safety Council meets once a year. The 32nd Meeting of the Council is to be held in the month of January/February 2016.

Development of Safety Standards

OISD develops Standards / Guidelines / Recommended Practices for the oil and gas sector thru a participative process involving all the stakeholders (including the public at large), drawing inputs from international standards and adapting them to Indian conditions by leveraging the experience of the constituents. These standards cover inbuilt design safety, asset integrity and best operating practices in the field of production, processing, storage and transport of petroleum. OISD standards are reviewed periodically to ascertain needs of developing new standards, updating / amending existing standards to incorporate the latest technological developments as well as current experiences on the ground. As on date, OISD has developed 118 technical safety standards for the Oil & Gas Industry. 11 of these standards had also been included in statutory provisions of the Petroleum Rules and the Gas Cylinder Rules.

During the year 2015-16, OISD has formulated two numbers of New Standards and revised 08 Numbers of the existing standards. These standards after following the extant process of their revision were adopted by the OISD Steering Committee in its 51st meeting held at OISD on 26th June 2015. The standards shall be put up for approval

of the Safety Council in its 32nd Meeting likely to be held in the month of January/February, 2016.

Currently, four numbers of New Standards are under formulation and another four numbers of existing OISD Standards have been taken up for revision/amendments.

Incident Investigation & Analysis

OISD investigates as well as participates in investigation of major incidents (depending upon the severity/damage) to analyze root cause of the incident. A databank of incidents of the oil industry is maintained and analyzed to assess trends, areas of concern and required corrective action. These are then disseminated to the industry through safety alerts, advisory notes, workshops, training programs, website links etc. During 2015-16 (As on 31st Dec'2015), 07 numbers of major incidents were investigated by OISD.

Other Major Activities

Assessing 'Equivalent' Rim Seal Fire Protection System (RSFPS) for Class 'A' External Floating Roof Petroleum Storage tanks.

Consequent to successful Bench Scale Trial of the 'Two Wire Based Rim Seal Fire Detection System with Automatic Foam Suppression'; and establishment of its Performance Track Record (PTR) on Petroleum Storage Tanks, the said system i.e. the 'Two Wire Based Rim Seal Fire Detection System with Automatic Foam Suppression' has been declared as 'Equivalent' wrt the provisions of clause 4.2.3 & 4.2.12 of the latest OISD STD 116 and 117 respectively.

OISD audit of Major Ports to assess the capability of Oil Spill Response (OSR) Capability and Firefighting System - A Special request from Ministry of Shipping, Govt. of India

In addition to the Safety Audits of the Oil & Gas Installations in the country, OISD was also requested to carry out independent audit of 12 Major Ports in the country. These audits were basically intended to assess the capability of Oil Spill Response (OSR) Capability and Firefighting System at these Ports. OISD has carried out such special purpose audits and reports of such audits have been submitted to Ministry of Shipping (Ports Wing), Government of India.

Monitoring of MB Lal Committee Recommendations

OISD & MoP&NG continues to vigorously follow up with the entire Oil & Gas Industry to regularly monitor the pace of Implementation of M B Lal Committee recommendations. Around 98% of the recommendations have already been complied with by the Industry and the rest are under advanced stage(s) of implementation.

Shri Dharmendra Pradhan, MoS (IC) , PNG and Shri K. D. Tripathi Secretary, MoPNG releasing the Compendium on Safety (2014-15) in the presence of MoP&NG officials during OISD awards ceremony on 04.08.2015 at New Delhi

11.5.3 Directorate General of Hydrocarbon DGH)

In view of the need to establish an agency that could effectively supervise the activities of all E&P companies from the private & joint sectors in the national interest, Directorate General of Hydrocarbons was set up on 8th of April, 1993.

The objective of DGH is 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.

Role and Functions

- 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.
- To evaluate the hydrocarbon reserves discovered and estimated by the operating companies.
- To advise the Government on the offering of acreages for exploration to companies as well as matters relating to relinquishment of acreage by companies.
- 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.
- To review and audit concurrently the management of petroleum reservoirs by operating companies and advise on any mid course correction required to ensure sound reservoir management practices in line with the optimal exploitation of reserves and the conservation of petroleum resources.
- 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.
- All other matters incidental thereto and such other functions as may be assigned by Government from time to time.
- Assist Govt. in Contract management functions.
- Exploration & Development of unconventional hydrocarbon resources like Gas Hydrate, Shale gas/oil and oil shale.

DGH Achievements for the year 2015-16 (April-December, 2015)

1. 2D Seismic Survey in Onland to be appraised Areas of Sedimentary Basins of India

Out of total sedimentary area of 3.142 Million Sq. Km, an area of 1.502 Million Sq. Km is yet to be appraised. To appraise these areas, MoP&NG has formulated a plan to conduct 2D seismic surveys in all sedimentary basins of India where no/scanty data is available. ONGC and OIL have been entrusted with the task of surveying the unappraised areas. OIL has been assigned to carry out 2D seismic API of 7408 LKM falling in North eastern part of India covering states of Assam, Arunachal Pradesh, Nagaland, Manipur, Tripura and Mizoram and ONGC has been assigned to carry out 2D seismic API of approx. 40835 LKM seismic data in onland part of 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-Zanskar, Karewa and Andman-Nicobar basins.

The proposed 2D Seismic survey work is expected to start after March 2016 after finalisation of tender by ONGC & OIL & it may take around five years period to cover the entire area.

2. Setting up of NDR (National Data Repository)

National Data Repository (NDR) Project is currently being aggressively expedited in DGH premises at sector 73, Noida. Entire country's E&P data will be uploaded in NDR so that any interested party from around the globe can have access to these data and show interest to invest in India. Integration of Software at NDR site has been completed. So far 536119 LKM 2D seismic, 134455 SKM 3D seismic data, 989 well data and 7434 technical reports have been uploaded. NDR is likely to be operational in 2016.

3. Identification of issues/concerns in operation of existing PSCs

Various Issues and concerns regarding PSCs were identified and addressed at DGH. MoP& NG vide letter dated 10.11.2014 has notified the Policy Framework for Relaxation, Extensions and Clarifications at the development and Production Stage under the PSC Regime to address these concerns to enable Early Monetization of Hydrocarbon Discoveries . As a result of implementation of above guidelines, more than 40 long pending PSC related issues have been resolved.

4. Shale Oil and Gas Policy for NOCs

Recognizing the importance of the Shale Gas and Oil resources in India, The Government of India on 14.10.2013 has 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.

As per policy guidelines, ONGC Ltd. and Oil India Ltd have to carry out Shale Gas and Oil exploration in 50 and 5 blocks respectively for assessment under Phase-I. ONGC is carrying out Shale Gas and Oil exploration activities in Cambay, Cauvery, Krishna-Godavari and Assam and Arakan Basins. Oil India is carrying out Shale Gas and Oil exploration activities in Assam and Rajasthan basins. ONGC has completed drilling of 14 wells and 02 are under drilling. OIL is carrying out data collection and G&G studies for the well location.

5. Re-assessment of Hydrocarbon Resources of India

A Multi Organisation Team (MOT) has been constituted to carry out re-assessment of Hydrocarbon Resources of India in all its 26 sedimentary basins. The project to be carried out by ONGC in association with OIL. DGH to provide G&G data for areas other than those operated by ONGC. Re-assessment of hydrocarbon resources of 26 sedimentary basins including deep water areas is in progress and entire work is expected to be completed by November, 2017. Work relating to Re-assessment of Hydrocarbon Resources have been initiated at seven work centres of ONGC .

6. Policy for Geo-scientific data generation for hydrocarbons in Indian sedimentary Basins

In order to acquire geophysical data in poorly explored and unexplored areas, the Government has formulated a new policy and approved on 20.05.2014 for Geo-scientific data generation for hydrocarbons in Indian sedimentary Basins and Agreement to carry out Non-exclusive Multi-Client Geo-scientific surveys/ Activities. Under this policy seven proposals have been received from various service providers which may generate 108621 LKM of Geo-scientific data in Off-Shore Basins of India. Provisional letter of consent has been issued for seven proposals after seeking clearances from Ministry of Defense and Ministry of Home Affairs for the areas to be offered and the interested companies/ entities.

Out of the seven proposals for which Provisional Letter of Consent has been issued, M/s Electromagnetic Geo-services ASA, Norway has signed the Agreement of the Data Policy along with Project Data Delivery Bank Guarantee for 10079.96 LKM.

7. Exploration activities in the Mining Lease (ML) areas

Policies allowing the Contractors to carry out exploration activities in the Mining Lease (ML) areas after the expiry of exploration period and submission of Integrated Development Plans for a cluster of discoveries etc. have been introduced in 2013 to facilitate early monetisation of discoveries and exploring additional hydrocarbon potential in the ML areas. Till November, 2015 14 hydrocarbon discoveries (13 Oil & 1 Gas) have been notified in the Mining Lease (ML) areas after announcement of above policy.

8. National Gas Hydrate Program

The NGHP (National Gas Hydrate Program) carried out Expedition-01 in the year 2006. The NGHP Expedition-01 established presence of gas hydrate in KG, Mahanadi and Andaman deep waters in numerous complex geologic settings.

The objective of the NGHP Exp-02 is to identify sand bearing depositional systems with the gas hydrate stability zone on the east coast of India within the Krishna Godavari and Mahanadi deepwater Basins. NGHP Expedition-02 commenced on the 3rd March 2015, where a Japanese drillship 'CHIKYU'

was commissioned to collect Gas Hydrate samples and related information thereof in Deep waters of Krishna Godavari and Mahanadi basins in presence of DGH/ONGC personnel. Total 42 wells has been drilled and cored in NGHP Expedition 02. NGHP Expedition-02 was completed on the 28th July 2015. As the initial results of NGHP Exp-02 are encouraging, collation and interpretation of all data is now primary to identify sites for pilot production testing.

9. Exploration Performance under PSC Regime during 2015-16 (April-December)

As a result of exploration in the Blocks/Fields, awarded under PSC Regime, following exploratory effort have been realized in terms of surveys, well, oil discoveries and accretion of oil reserves:

- As on 01.04.2015, In-Place Hydrocarbon volume of 2436 Million Metric Tonnes (MMT) of oil and oil equivalent of gas (O + OEG) has been realized with estimated ultimate recovery of 983 MMT of O + OEG.
- 7 Discoveries (5 Oil + 2 Gas) have been notified during April-December, 2015
- 3724 LKM of 2D Survey and 769.39 SKM of 3 D Survey has been completed during April-December, 2015
- Drilling of 50 exploratory wells and 80 development wells have been completed during April-December, 2015

11.5.4 Centre for High Technology (CHT)

Centre for High Technology (CHT) was established by Ministry of Petroleum & Natural Gas (MOP&NG) in 1987 as a specialised agency of the oil industry to assess futuristic technology requirements for acquisition, development and adoption in the field of refinery processes, petroleum products, additives, storage and handling of crude oil, products and gas.

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 assessment of technology requirement as also operational performance evaluation and improvement of the refineries. CHT acts as a focal point of oil industry for centralised technical assistance, knowledge dissemination, performance data base, exchange of information and experience. CHT also coordinates funding of research work in refining and marketing areas and pursue the programmes of "Scientific Advisory Committee on Hydrocarbons" of MOP&NG.

Following are the major activities carried out by CHT during 2015-16 :

1. Activity Committee Meetings

With the aim of sharing of best operational practices & improvements and dissemination of information on latest developments CHT organises **Activity Committee Meetings** on major areas of refinery operations. During the year 7 nos of Activity Committee Meetings in areas of Power and Utlities, Inspection, Cross country Pipelines, Fuel & Loss and Energy Optimization, Fluidized Catalytic Cracking, Environmental Management, and Catalytic Reforming & Isomerisation were organised.

2. Indigenous Technology Development

CHT co-ordinated the activities of Scientific Advisory Committee (SAC) on Hydrocarbons of MoP&NG in identifying and funding of research projects for hydrocarbon sector. CHT also coordinated various activities connected with approval, funding and monitoring of projects under Hydrogen Corpus Fund (HCF).

SAC approved and steered projects of national importance and refining operations during the year, viz., (i) Synthetic Aviation Lubricants-Phase II, (ii) Development of catalyst and process for Slurry phase Residue Hydrocracking, (iii) Hydrogen production by Catalytic decomposition of Natural gas, (iv) Biomass Hydropyrolysis for production of Fuel grade Hydrocarbons and (v) Renewable crude and liquid hydrocarbons from Algae. Also two hydrogen related projects on Hydrogen generation from water by thermo-chemical process and Use of hydrogen-CNG blends in automotive vehicles were successfully completed while one project on hydrogen production by dissociation of water using photo-catalytic process was fore-closed.

3. Performance Benchmarking of Indian Refineries (PSU) for year 2014

CHT, on behalf of MoP&NG and PSU/ JV refineries, has engaged M/s Solomon Associates to benchmark refineries based on data for the calendar year 2014. Similar to the previous two cycles in 2010 and 2012, the 2014 benchmarking study will help in gap identification for achieving greater efficiencies, enhanced reliability and improved margins by the refineries. Data

submitted by refineries has been validated by the consultant and the final reports are expected by the end of the financial year.

4. Perform, Act and Trade (PAT) Scheme implementation in Refineries

Perform, Achieve & Trade (PAT) is a regulatory instrument to reduce specific energy consumption (SEC) in energy intensive industries, with an associated market based mechanism to enhance cost effectiveness through Energy Saving Certificates (ESCerts), which can be traded. BEE (Bureau of Energy Efficiency) has been vested with the mandate of implementation of PAT scheme.

The revised MBN methodology for computation of Specific Energy Consumption (SEC) developed by CHT has been accepted to be the performance metric for the PAT scheme. CHT is also helping BEE in developing the format for collection of required data from the Refineries and the calculation of Specific Energy consumption.

5. Grid Supply for Refinery Operation

In the pursuit of utilising cheaper Electrical Power from the Grid for Refinery operations instead of refinery Captive Power Plants, CHT initiated deliberations along with concerned officials from all the PSU Refineries and prepared a detailed paper on the status of power usage in the refineries, and the opportunities to avail purchased power in place of captive generation.

6. 20th Refinery Technology Meet (RTM) -

CHT regularly organises Refinery Technology Meet (RTM) in association with oil companies in India on various topics of interest to the Refining Sector. The RTM provides a forum for exposition of recent advances and technological developments which are of direct relevance to the hydrocarbon sector. It also gives an opportunity to our engineers, scientists to interact with international experts on the new developments taking place world over.

RTM is the most sought after event by the Indian Refining Sector and signifies conglomeration of more than 650 technical luminaries from India and abroad wherein leaders of the oil companies and domain experts will be sharing their thoughts on various important aspects related to refining sector.

7. Jawaharlal Nehru Centenary Awards for energy performance of Refineries for 2014-15

CHT has compiled and evaluated the energy performance of PSU refineries, including JV and private Indian refineries, in terms of specific energy consumption (MBTU / BBL / NRGF) for distribution of 'Jawaharlal Nehru Centenary' Awards for 2014-15, instituted by MOP&NG. The awards were finalised by the Award Selection Committee constituted by MoP&NG, and will be presented during the 20th RTM.

76th meeting of the Scientific Advisory Committee on Hydrocarbons during April 3-4, 2015.

8. Oil & Gas Conservation Awards for 2015

As a part of Oil & Gas Conservation Fortnight (OGCF), Centre for High Technology organized survey in the area of "steam leaks" in January 2015 at all PSU, JV and Private Indian Refineries.

Award Selection Committee constituted by MoP&NG, has selected the winning refineries, which will be presented during the 20th RTM.

9. Institution of New Awards

i. Innovation Awards

In order to foster and encourage the culture of innovation in the downstream sector, CHT invited nominations from oil companies, R&D Institutes for conferring awards on innovation as recommended by Governing Council of CHT. Nominations received from oil companies, R&D Institutes have been evaluated under the following 3 categories by the Committee headed by Chairman, SAC:

a. Best Indigenously Developed Technology

b. Best Innovation in Refinery (refinery/group/individual)

c. Best Innovation in R&D Institute (institute/group/individual)

ii. Award for Lowest Carbon-di-oxide Emission from refineries

Keeping in view the global concern on GHG emission, an Award has been instituted by MoP&NG for "Lowest Carbon-di-oxide Emission from refineries" including PSUs, JVs and Private refineries. The methodology for comparing the performance of refineries w.r.t. carbon-di-oxide emissions was finalised by CHT.

These awards will be presented during the 20th RTM.

10. Other Activities

- Review of essentiality certificate applications for import of various project items, and recommendation to MOP&NG.
- Review of technical proposals/queries related to Standard Input Output Norms for MOP&NG.
- Energy Efficiency Improvement Study jointly with EIL for HPCL-Visakh refinery.
- Publication of Compendium on Refineries.
- Preparation of consolidated report on analysis of refineries' performance.

11.5.5 Rajiv Gandhi Institute of Petroleum Technology

1. Introduction:

Rajiv Gandhi Institute of Petroleum Technology (RGIPT) has been set up by Government of India, as an Institute of National Importance under an Act of Parliament. The objective of the Institute is to offer technical and managerial educational programmes in the domain of petroleum sector with a vision to create aspirations in the youth of the country towards the petroleum sector and to serve as the fountainhead for the nurturing world class human capital capable of being the future leaders of technology and innovations in the entire hydrocarbon value chain with a view to serve both domestic and global needs in the sector. The institute is co-promoted by six oil PSUs and the Oil India Development Board (OIDB) under the patronage of Ministry of Petroleum. As provided in the RGIPT Act, the Central Government has framed the First Statute of RGIPT which has been notified in Official Gazette in October 2009.

While RGIPT has taken up the construction of its own campus, on the academic front the Institute has commenced its academic operations from temporary campus at Rae Bareli from 2008-09 onwards and has introduced the following educational programmes:

1. B. Tech. in Petroleum Engineering
2. B. Tech. in Chemical Engineering
3. MBA in Petroleum & Energy Management.
4. M.Tech in Petroleum Engineering
5. M.Tech in Chemical Engineering
6. PhD - Doctoral programs

2. Performance;

Academic Activities:

- In 2015-16 RGIPT has successfully entered 8th year of academic activities. The performance highlights are as follows:
- The fourth batch of B.Tech degree (Chemical Engineering and Petroleum Engineering) students will pass out this year in the month of May, 2016

- Students of M. Techs in Petroleum Engineering and MBAs in Petroleum and Energy Management will also be graduated this year.
- With moderate campus placement, the industry, both public and private, has recruited the RGIPT students.
- Registration of new batches of B.Tech, M.Tech and Ph.D was completed successfully in June/July 2015. Total 67 students in B. Tech. Chemical Engineering and Petroleum Engineering, 05 students in M. Tech & 9 in PhD. In view of revision of MBA programme structure, admission for this year couldn't take place.
- Rajiv Gandhi Institute of Petroleum Technology (RGIPT), Rae Bareli organized its First Convocation on 19th August, 2015 at DRDO Auditorium, New Delhi. Shri Dharmendra Pradhan, Hon'ble Minister of State (Independent Charge), Ministry of Petroleum & Natural Gas (MoPNG) and Shri Kapil Dev Tripathi, Secretary, MoPNG participated in the event.
- On this occasion, Chief Guest awarded six students with the President's Gold Medals, while, Shri Kapil Dev Tripathi awarded 16 students with Institute's Silver Medals. In total, 260 Undergraduates and 185 Postgraduates were awarded degrees at the grand ceremony"
- Prominent visitors to RGIPT as Guest Lecturer during the year included: Dr. Nitin Kaistha, IIT Kanpur, Mr. Ajit Singh, Managing Director, Mr. Busch Vacuum India Pvt. Ltd, Dr. Bhuvan Vikrama, Superintending Archaeologist, Archaeological Survey of India (ASI) , Mr. Joy Varghese, Managing Director, Rig Tech Oilfield Training Center Pvt. Ltd, Mr. Manas Das, DGM (Business Development),GAIL (India) Limited, Mr. S.K. Kudaisya, Ex-MD Sabarmati Gas (India) Limited, Mr. Akhil Mehrotra, Director BG (India) Limited, Mr. Amit Gupta, Manager-Trainee & Development, Indian Oil ltd, Mr. Pradeep Chhabra Head, Direct Sales & CBM, Essar Energy, Mr. Ayush Garg Enterpeneur, Mr. Dushyant Varandani, Manager, Marketing at Maharshtra Natural Gas Limited, Pune, Shri Baljit Singh VP (operations) Jubilant Energy, Mr D Sashidhar, Sr. Manager, Capgemini Pvt, Nitin Sharma, Senior Consultant, Infosys, Gurgaon, Mr. J.S.Prasad, GM, Project and Pipeline, HPCL & Mr. Nitin Kapil Sharma, Oman Refineries etc.
- Annual cultural festival- "KALTARANG'16, was held on 19th to 21st February 2016 on the theme of "La-Cosa Nostra"

3. Campus Project status:

Currently two campus development projects are in progress as follows:-

Jais (District - Amethi, UP)

Background: RGIPT had purchased 47 acres of land from Indian Oil Tanking Limited in the year 2008 at Jais, Dist. Amethi for setting up of RGIPT Campus. The first phase of work was launched with award of Civil, Structural and Water proofing works in June 2010. However, due to the extremely poor performance of the contractor, M/s. Punj Lloyd Limited (PLL), the schedule target of completion of civil & structural work was extended till 31st March 2013. However, the contractor resorted to litigation invoking arbitration process claiming extra compensation. In view of unjustified demand of the Contractor and based on the recommendation of the Project Management Consultant, Engineers India Limited (EIL), the contract with M/s. PLL was terminated in May 2013.

Progress in 2015-16: After termination of the contract with M/s. Punj Lloyd Limited in May 2013, a new Composite work contract was awarded by RGIPT on 2nd September 2013 to M/s. NCC Limited with the overall completion schedule by 31.12.2015. The completion date as per the revised sanctioned time schedule is 31st March 2016.

As on January 2016, the actual physical progress of construction is 93% and it is expected that the composite construction work will be completed by June 2016 - subject to the release of funds from GBS. In case the funds are not released urgently, further time and cost overrun is anticipated in the project.

The delay in the progress of the work is mainly due to the inability of RGIPT to make payment of the Contractor's running bills consequent to the delay in release of capital funds from Govt. Budgetary Support during 2015-16.

Sivasagar (Assam)

Background: Hon'ble Prime Minister laid the foundation stone in February 2011 for setting up Assam centre of RGIPT at Sivasagar. This centre was to cater requirement of blue collared technicians for upstream area to meet the current gap in skill set and to meet the anticipated demand in view of Govt.'s ambitious exploration plan.

Govt. of Assam has allotted 100 acres of land at Sivasagar. The allotted land was in very low lying and required considerable earth filling and piling before commencement of construction activities. In the year 2012 and 2013, due to incessant rain the progress of earth filling was affected badly and no significant progress could be achieved. Due to extremely poor performance of site development at Sivasagar, the Project Management Consultant, M/s EIL's contract was terminated in September 2013.

Progress in 2015-16:

Site Grading and Piling work has since been completed in April, 2014. RGIPT Board recommended the award of job of construction activities at Sivasagar to CPWD on deposit work basis in October 2013.

The execution of the project is delayed consequent to site related issues requiring large quantity of earth filling and piling work which has since been completed in April, 2014. Meanwhile, the project cost has undergone revision from the original estimate of Rs. 143 crore to Rs. 235 crore. In this regard, the Expenditure Finance Committee (EFC) note for sanctioning of the revised cost is under process by MoPNG.

The Sivasagar project at Assam is currently at standstill due to non-release of capital funds for construction. Capital funds will be released by Oil PSUs and OIDB after the EFC for revised cost is approved.

Other Developments during 2015-16

Bangalore Centre

The foundation stone for Bangalore Centre of RGIPT was laid by Hon'ble Minister P&NG on 5th March 2014. The Detailed Project Report was submitted to MoP&NG in October, 2014. The State Govt. of Karnataka has directed Karnataka Industrial Area Development Board (KIADB) to allot 150 acres of land at Hoskote Taluk, Bangalore Rural District free of cost and free from encumbrances. The total project cost is Rs. 478 crore (Capital Expenditure - Rs. 358 crore and Recurring expenditure - Rs. 120 crore). EFC and other approvals are under process for setting up the Centre. The land identified by KIADB is yet to be handed over to RGIPT.

4. Welfare of SC/ST/OBC/PH- Recruitment backlog of SC/ST/OBC/PH as on 25.02.2016

Rajiv Gandhi Institute of Petroleum Technology (both Rae Bareli and NOIDA campus combined) is currently having total 33 nos. of administrative staffs and out of that 10 positions have been filled up with the candidates of SC and OBC categories candidates. Category wise break-up is as follows:

Total No. of Administrative staff	General	SC	OBC
33 *	23	4	6

*Including NOIDA campus

Currently, there is no backlog in these categories.

6. The number of women employees' vis-à-vis the total number of employees in each grade

Item	Group-A (Non-Gazetted)	Group-B	Group-C	Total no.
Women employees **	2	3	1	6

** Including NOIDA campus.

7. Implementation of Official Language Policy of the Government

Complying the Official Language Policy of the Government of India, Rajiv Gandhi Institute of Petroleum Technology (RGIPT), Rae Bareli has made available its website in Hindi along with English. Also, letters and queries received in Hindi are being answered in Hindi.

RGIPT has decided to observe every Wednesday as "Hindi Divas" at the Institute.

11.5.6 Petroleum Planning & Analysis Cell (PPAC)

1. Introduction

The 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). Its purpose is to assist the Government, inter alia, in the discharge 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;
5. Operationalizing the sector specific surcharge schemes, if any.

2. Important Database

PPAC maintains data related to production, consumption, import and export of crude and petroleum products, addition to production of Natural Gas and import of LNG.

3. Price Trends of Petroleum products and impact on under-recoveries

(i) About 3/4th of domestic requirement for petroleum products in the country is met through imports of crude oil. Therefore, the prices of crude oil and petroleum products in the international oil markets have a decisive influence on the domestic prices of petroleum products. In the past, crude prices have been steadily increasing since December 2008 and the average price of Indian basket of crude oil during 2013-14 was $105.52. However, the crude oil prices have declined sharply after July 2014 and the average price of Indian basket crude oil was at $ 84.16/bbl during 2014-15. The trend of low international oil prices has continued in the current year and the average price of Indian basket crude oil in 2015-16 is $ 47.23/bbl (up to 25.2.2016).

(ii) In June 2010, the Government decided to make the price of petrol market determined. Further, effective 19th October 2014, the Government also made the price of diesel market determined. After deregulation of the prices of petrol and diesel, the OMCs take decision on their prices in line with changes in the international market and accordingly, the OMCs have not only increased but also decreased the price of these products. Till date, i.e. 26.02.2016, the OMCs have carried out 38 and 18 reductions respectively for petrol and diesel after their deregulation.

(iii) Effective 1st January 2015, the modified DBTL (PAHAL) scheme 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) The OMCs incurred under-recoveries of Rs.72314 crores in 2014-15 as against Rs.139869 crore during 2013-14. The OMCs have incurred under-recoveries of Rs. 10000 crore during 2015-16 (April-December 2015).

4. Important Activities

Some of the important activities undertaken by PPAC, in addition to their normal work, were as follows:

(a) Domestic Natural gas pricing determination and issuance under the provisions of the New Domestic Natural Gas Pricing Guidelines, 2014

Domestic Natural gas prices were notified for the periods 01.04.2015 to 30.09.2015 and from 01.10.2015 to 31.03.2016 in line with the New Domestic Natural Gas Pricing Guidelines, 2014.

(b) Study on development of POL terminals and LPG bottling Plants of OMCs as Common User Facility (CUF)

The study was carried out by PPAC so as to prepare a roadmap to serve as the basis for the OMCs plans for developing POL terminals and LPG bottling plants on CUF basis in short term (2015-19) and long term (2020-2029). A number of potential locations were identified in the study which can be taken up by OMCs for development of infrastructure on CUF basis in order to rationalize their capital and revenue expenditure.

(c) Study on feasibility of developing an LPG Pipeline Grid in the country

Bulk transportation of LPG is carried out by road, rail and pipeline with road movement holding the majority share. The movement by road is not only uneconomical but also has environmental and safety hazards associated with it. Consequently a study was carried out to explore the feasibility of developing an LPG pipeline grid across the country so as to rationalize expenditure on bulk movement of LPG as well as to improve reliability of supplies.

11.5.7 Petroleum Conservation Research Association (PCRA)

Petroleum Conservation Research Association (PCRA) is a registered society working under the aegis of the Ministry of Petroleum and Natural Gas (MoP&NG), Government of India. PCRA has been working proactively in the field of conservation and efficient utilization of petroleum products through various Field Activities under Industry , Transport , Domestic and Agriculture sector like Energy Audits; Driver Training Programmes, Technical Workshops & Seminars, LPG Seminars , Kissan Melas and exhibitions etc.

Mass awareness National campaign like Oil & Gas Conservation Fortnight (OGCF) during 16th -31st January; R&D activities by sponsoring projects for development of energy efficient products / processes; Standards & Labeling Programmes for equipment consuming petroleum products, which includes Domestic LPG Stoves, Diesel driven Monoset Pumps for Agriculture (2-10 HP) and Diesel Generator Sets having engine capacity upto 19 KW; improving efficiencies in industries through Perform Achieve and Trade (PAT) scheme and ISO 50001 platform; developing Fuel Economy Norms for heavy duty vehicles are major initiatives of PCRA.

PCRA is effectively using media Print & Electronic , Social Networking sites viz. Facebook, Twitter, Google+, You Tube & My Gov.in for propagation of conservation messages amongst the masses and provide platform for getting suggestions from the public.

Children are future citizens of India and they are motivated through various programs. Most important programs for children is National level Painting and Essay competition which was conducted in 23 regional languages for school students across the country and 4.8 lakh students participated in this competition. The winners were awarded during OGCF function by Honorable Minister of State (IC), MoP&NG.

This year special focus is being given to address the growing concern of ill effects petroleum fuels are causing to human life and environment. In this direction, PCRA has initiated a host of activities leveraging the great reach of Oil & Gas Industry to the masses throughout the length and breadth of the country to bring awareness about use of cleaner fuels. Various initiatives like - Turning towns & villages green by eradicating use of solid

Bio-mass and switching over to cleaner fuel like LPG; releasing enhanced LPG & PNG connections than usual in rural areas and small towns; fast pedaling availability of CNG facility in major cities, which are suffering from ever increasing air pollution since CNG is far less polluting than the conventional transport fuels like Petrol & Diesel; fast pedaling availability of BS-IV in the remaining towns & cities in the country; introduction of vapour recovery system in high selling retail outlets of PSU Oil marketing companies with an aim to arrest the noxious Benzene, Toluene and Xylene are some important PCRA suggestions which are taken forward for implementation by Oil Marketing Companies.

Promoting Star Rated Domestic LPG Stoves through education at each LPG distributorships of PSU Oil Companies; Oath taking and signing of pledge book at Offices / Installations, Retail Outlets, LPG & other Distributorships of PSU Oil & Gas Companies and places like Bus Stands, Railway Stations, Offices, Malls etc. are the core activities being undertaken throughout the country. These activities have been kicked off during the inauguration of OGCF'16 with a theme **"INDHAN HO SWACHH, JAN GAN RAHEIN SWASTH".**

11.5.8 Petroleum and Natural Gas Regulatory Board (PNGRB)

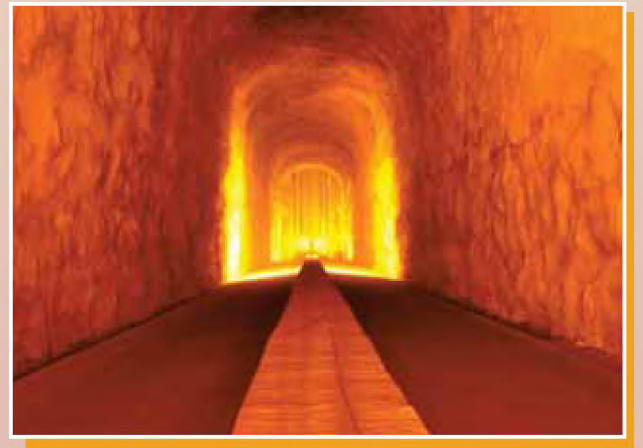
Petroleum and Natural Gas Regulatory Board (PNGRB) was constituted under the Petroleum and Natural Gas Regulatory Board Act 2006. The Board was constituted on 1st October 2007. The Board consists of a Chairperson, one Member (Legal) and three other Members, appointed by the Central Government. The post of Chairman, PNGRB has fallen vacant on 16.8.2015. Process for selection of an incumbent is underway.

The Board regulates the refining, processing, storage transportation, distribution, marketing and sale of petroleum & petroleum products and natural gas excluding products of crude oil and natural gas to ensure uninterrupted and adequate supply of petroleum, petroleum products and natural gas in all parts of the country and to promote competitive markets for matters connected therewith or incidental thereto.

11.5.9 Indian Strategic Petroleum Reserve Limited (ISPRL)

1. Taking into account the energy security concerns of India, the Government is setting up Strategic Crude Oil Storage of 5.03 Million Metric Tonnes (MMT) at three locations in the country viz. Visakhapatnam (1.03 MMT), Mangalore (1.5 MMT) and Padur (2.5 MMT).

2. The proposed Strategic Crude Oil Storages are in underground rock caverns. A Special Purpose Vehicle, namely Indian Strategic Petroleum Reserve Limited (ISPRL), was incorporated as a wholly owned subsidiary of Indian Oil Corporation Ltd (IOCL) in June 2004 and later pursuant to a decision taken by the Government, it was made a wholly owned subsidiary of the Oil Industry Development Board (OIDB). Release/sale of the strategic crude oil from the reserves will be through an Inter Ministerial Empowered Committee chaired by Secretary MoP&NG and comprising of six other secretaries as members. The release of crude oil will be authenticated by the Committee, in the event of any natural calamity or disruption in supplies or any unforeseen global event leading to scarcity of supplies/abnormal increase in prices, as may be decided by the Empowered Committee.



Vishakhapatnam cavern.

3. In March, 2015, Government has decided that the against the 12th Plan outlay of Rs. 4948 crore under the GBS Scheme of Ministry of Petroleum & Natural Gas for the Indian Strategic Storage Programme for storage of crude oil by ISPRL, the entire cost for filling the crude oil in Visakhapatnam cavern would be met by Government of India. The balance amount would be used for filling up the strategic part of the caverns which are being constructed at Mangalore and Padur. Ministry of Petroleum and Natural Gas would continue to explore alternative models for financing the remaining cost of crude oil to fill Mangalore and Padur caverns, which would include commercial utilization by other interested parties.

4. Filling of the crude oil in the Vishakhapatnam cavern has been completed. Mangalore and Padur caverns have been mechanically completed in May & November, 2015 respectively. Mangalore and Padur caverns are expected to be ready for receiving crude oil by March and June, 2016 respectively.

5. Ministry of Petroleum and Natural Gas is looking at alternative models of filling the caverns at Mangalore and Padur. At present, negotiations with Abu Dhabi National Oil Company (ADNOC) are at an advance stage.

6. As the crude requirement in the country is increasing, the need for additional crude oil storage is being felt. ISPRL was entrusted the responsibility of preparation of Detailed Feasibility Report (DFRs) for 12.5 MMT of Strategic storage of Crude oil in Phase-II in four States. The locations chosen are Chandikhol (3.75 MMT), and Bikaner (3.75 MMT), Rajkot(2.5 MMT) and Padur (2.5MMT).

11.5.10 Indian Institute of Petroleum and Energy (IIPE), Andhra Pradesh

IIPE is being set up under 13th Schedule of Andhra Pradesh Reorganization Act, 2014 with the objective to meet the quantitative and qualitative

gap in the supply of skilled manpower for the petroleum sector and to promote research activities needed for the growth of the sector. The capital expenditure for the project is estimated to be around Rs.855.46 crore (Rs.632.37 crore for the 1st Phase and Rs.223.09 crore for the 2nd Phase). The Government of Andhra Pradesh has made available an area measuring 150.42 acres of land in Vangali Village, Sabbavaran Mandal, Visakhapatnam District for the Institute. The process for acquisition of land is on.

With an aim to start the IIPE sessions during the academic year 2016-17, an MoU has been signed with Andhra University to use the resources of College of Engineering (Autonomous) at Visakhapatnam, viz., AU's lecture halls, teaching laboratories, Library, Workshops, Office space, technological facilities etc. till campus of IIPE gets ready.

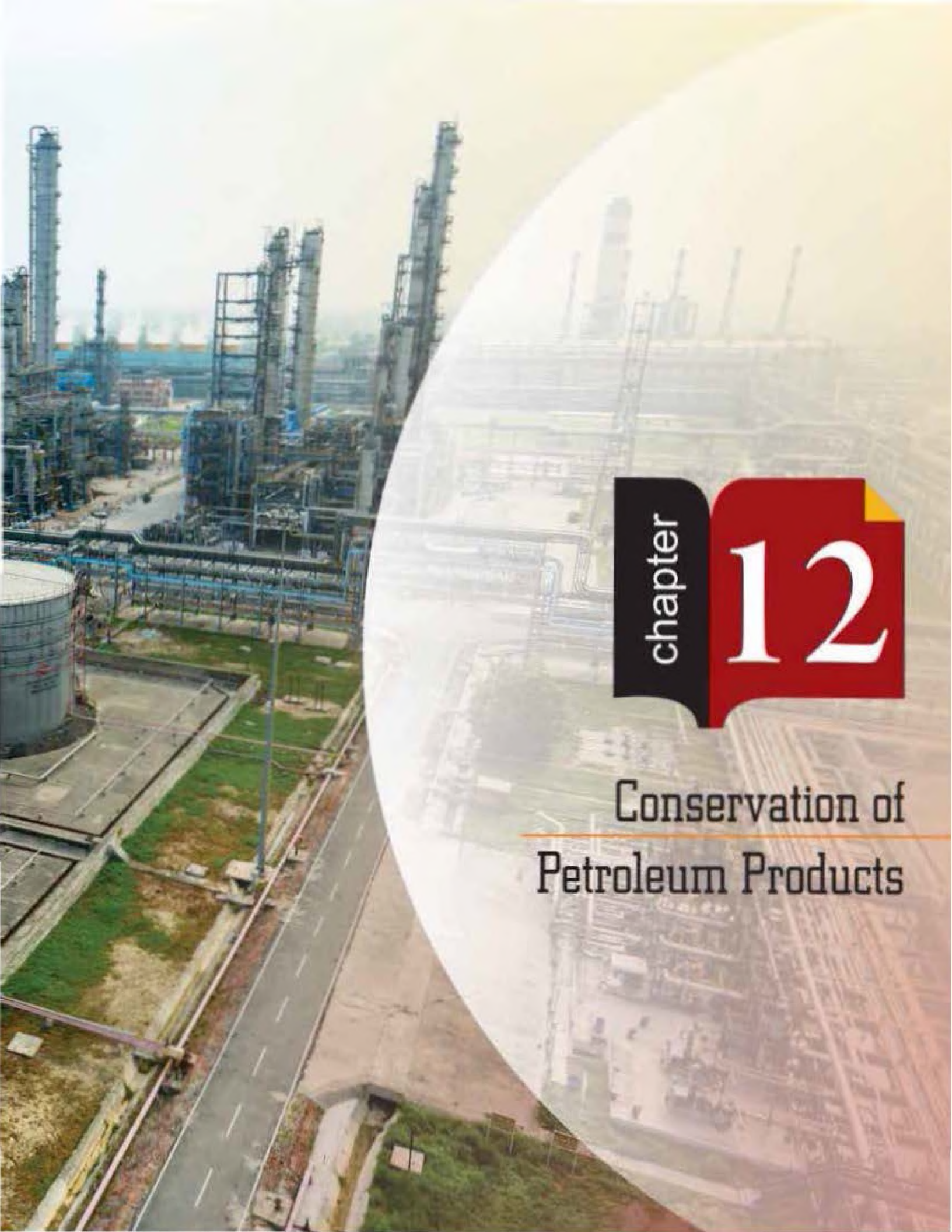
The process of registration of IIPE Society is on.

OIDB has also been requested to provide funds for an amount of Rs.23.50 crore for temporary campus of IIPE which would be refunded back.

11.5.11 Society for Petroleum Laboratory (SFPL)

1. Society for Petroleum Laboratory (SFPL) is an independent laboratory registered under the Societies Registration Act. It was set up and made operational under the guidance and direction of MoPNG in 2000 in compliance with Hon'ble Supreme Court directive of July 1998. The basic objective of setting up of this laboratory at NOIDA is to monitor the quality of transportation fuels independently, which acts as a deterrent to malpractices of fuel adulteration and/or prevention of selling substandard quality fuels to the consumers. Funding to the Society for meeting annual expenses for operation and management of FTL is granted by MoPNG from the Budget under "Grants-in-Aid".

2. Society for Petroleum Laboratory (SFPL) has been allocated an amount of Rs.209 lakh (2.09 crore) under Grant-in-aid for financial year 2015-16 (Rs.2 crore under Non-salary and Rs.9 lakh under Salary Head), out of which, after deducting previous FYs savings of Rs. 4.83 lakh under non-salary head, the grant-in- aid to be released is Rs. 204.17 lakh. Out of this, first installment of 50 per cent of the total grant-in-aid, i.e., Rs. 102.09 lakhs (Rs. 97.59 lakh under Non-salary and Rs. 4.5 lakh under salary head) has been released to them, after submission of utilization certificate in respect of grant provided to it in previous Financial Year i.e. 2014-15.



chapter 12

Conservation of Petroleum Products

Conservation of Petroleum Products

12.1.1 Petroleum Conservation Research Association (PCRA) is a registered society working under the aegis of the Ministry of Petroleum and Natural Gas (MoP&NG), Government of India. PCRA has been working proactively in the field of conservation and efficient utilization of petroleum products through various Field Activities under Industry, Transport, Domestic and Agriculture sector like Energy Audits; Driver Training Programmes, Technical Workshops & Seminars, LPG Seminars, Kissan Melas and exhibitions etc.

12.1.2 Mass awareness National campaign like Oil & Gas Conservation Fortnight (OGCF) during 16th - 31st January; R&D activities by sponsoring projects for development of energy efficient products / processes; Standards & Labeling Programmes for equipment consuming petroleum products, which includes Domestic LPG Stoves, Diesel driven Monoset Pumps for Agriculture (2-10 HP) and Diesel Generator Sets having engine capacity upto 19 KW; improving efficiencies in industries through Perform Achieve and Trade (PAT) scheme and ISO 50001 platform; developing Fuel Economy Norms for heavy duty vehicles are major initiatives of PCRA.

12.1.3 PCRA is effectively using media Print & Electronic, Social Networking sites viz. Facebook, Twitter, Google+, You Tube & My Gov.in for propagation of conservation messages amongst the masses and to provide platform for getting suggestions from the public.

12.1.4 Children are future citizens of India and they are motivated through various programs. Most important programs for children is National Level Painting and Essay competition which was conducted in 23 regional languages for school students across the country and 4.8 lakh students

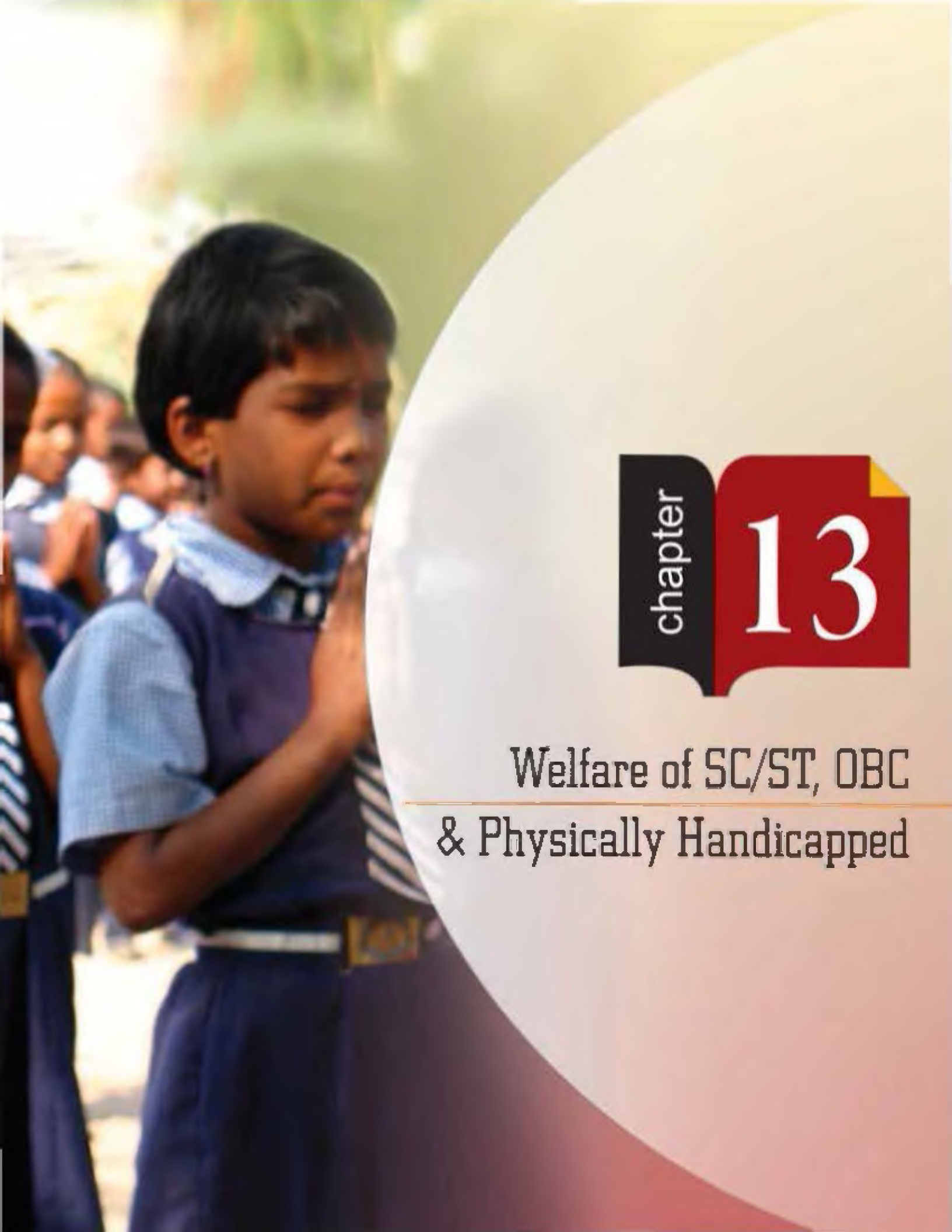
Shri Dharmendra Pradhan, MoS (IC), PNG and Shri K. D. Tripathi, Secretary, MoPNG, with the award winners during the inauguration of OGCF - 2016

Observance of Oil & Gas Conservation Fortnight at HPCL

participated in this competition. The winners are awarded during OGCF function by Honorable Minister of State (IC), MoP&NG.

12.1.5 This year special focus is being given to address the growing concern of ill effects of petroleum fuels on human life and environment. In this direction, PCRA has initiated a host of activities leveraging the great reach of Oil & Gas Industry to the masses throughout the length and breadth of the country to bring awareness about use of cleaner fuels. Various initiatives like - turning towns & villages green by eradicating use of solid Bio-mass and switching over to cleaner fuel like LPG; releasing enhanced LPG & PNG connections than usual in rural areas and small towns; fast pedalling availability of CNG facility in major cities, which are suffering from ever increasing air pollution since CNG is far less polluting than the conventional transport fuels like Petrol & Diesel; fast pedalling availability of BS-IV in the remaining towns & cities in the country; introduction of vapour recovery system in high selling retail outlets of PSU Oil marketing companies with an aim to arrest the noxious Benzene, Toluene and Xylene are some important PCRA suggestions which are taken forward for implementation by Oil Marketing Companies.

12.1.6 Promoting Star Rated Domestic LPG Stoves through education at each LPG distributorships of PSU Oil Companies; Oath taking and signing of pledge book at Offices / Installations, Retail Outlets, LPG & other Distributorships of PSU Oil & Gas Companies and places like Bus Stands, Railway Stations, Offices, Malls etc. are the core activities being undertaken throughout country. These activities have been kicked off during the inauguration of OGCF'16 with a theme "INDHAN HO SWACHH, JAN GAN RAHEIN SWASTH".



chapter 13

Welfare of SC/ST, OBC & Physically Handicapped

Welfare of Scheduled Castes, Scheduled Tribes, Other Backward Classes and Physically Handicapped

13.1 Preamble

The guidelines in respect of the Reservation for the Scheduled Castes/ Scheduled Tribes, Other Backward Classes and Physically Handicapped persons 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 Ministry of Petroleum & Natural Gas and Public Sector Undertakings under its administrative control. 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 Liaison Officers to safeguard the interests of employees belong to SCs, STs, OBCs and Persons with the Disability (PWD) 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 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 & ST and National Commission for Other Backward Classes are taken, wherever necessary. The status of appointment of SCs, STs, OBCs, PWD is monitored by the Ministry through report furnished by PSUs. In pursuance of the observations of Parliamentary Committee on the Welfare of SCs/STs/OBCs and the Presidential Directives on Reservations for SCs/ STs in service, a team lead by the Liaison Officer of this Ministry inspects the Reservation Rosters maintained by the Units of PSUs, annually. In 2015 the team has inspected rosters of many units of PSUs, where Rosters are maintained.

Promoting Computer literacy among youths as a part of "Skill Building"

13.2 Special Component Plan for SC/ST/PH for 2015-16

Under this plan, most of the PSUs of this Ministry are undertaking the following developmental activities for the Welfare of SC/ST population during 2015-16:

- Scholarship/Financial Assistance for purchase of books/ uniforms etc to SC/ST students in neighboring schools;
- Every year Rs. 20.00 crores has been allocated to various work centers of ONGC and SCP/ STP towards Welfare and upliftment of SC/ST communities;
- Education for Primary level Schools, hiring of teacher, provision of uniform, note books, stationary etc. to school going children;
- During the year the PSUs of this Ministry have made provision in the plan outlet for award of scholarship to SC and ST students;
- Special recruitment drive relating to PWD has been carried out during this year in Oil PSUs;
- PSUs of this Ministry are implementing the provisions under Disability Act, 1995 in respect to identification of course, implementing various provision of 3% reservation of course in OH, VH & HH category.

13.3 Backlog of SC/ST/OBC/PH in Oil PSUs under the Administrative Control of the Ministry as on 31.12.2015:

Hon'ble Prime Minister Shri Narendra Modi presenting hearing aids to specially abled persons on the sidelines of dedication of Indian Oil's Paradip Refinery to the Nation on 7.2.2016

PSU	Number of backlog Reserved Vacancies remaining (Direct Recruitment)							
	Group A		Group B		Group C		Group D	
	SC/ ST	OBC/ PH	SC/ ST	OBC/ PH	SC/ ST	OBC/ PH	SC/ ST	OBC/ PH
Balmer Lawrie	8/5	21/0	3/3	7/0	Nil	Nil	Nil	Nil
OIL	7/4	19/18	0/1	0/1	2/6	3/11	0/1	0/15
EIL	1/6	1/7	Nil	0/1	1/0	0/2	Nil	Nil
BPCL	Nil	0/34	0/3	226/1	Nil	52/3	Nil	223/0
NRL	3/0	1/2	Nil	Nil	Nil	0/6	Nil	Nil
IOC	9/20	38/0	Nil	Nil	2/11	3/20	1/0	2/29
GAIL	9/7	15/4	2/5	14/4	23/5	7/4	0/5	1/0
HPCL	1/0	16/2	Nil	Nil	Nil	0/13	Nil	44/5
ONGC	Nil	0/161	Nil	Nil	2/24	16/125	7/11	25/0
ONGC Videsh	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
CPCL	Nil	Nil	Nil	0/2*	Nil	Nil	Nil	Nil
Biecco Lawrie	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
MRPL	4/1	15/2	Nil	Nil	19/15	1/0	Nil	Nil
OIDB	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
RGIPT	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

*Recruitment on Court Orders/ directions leads to shortfall which is being taken note of in subsequent recruitment exercise.

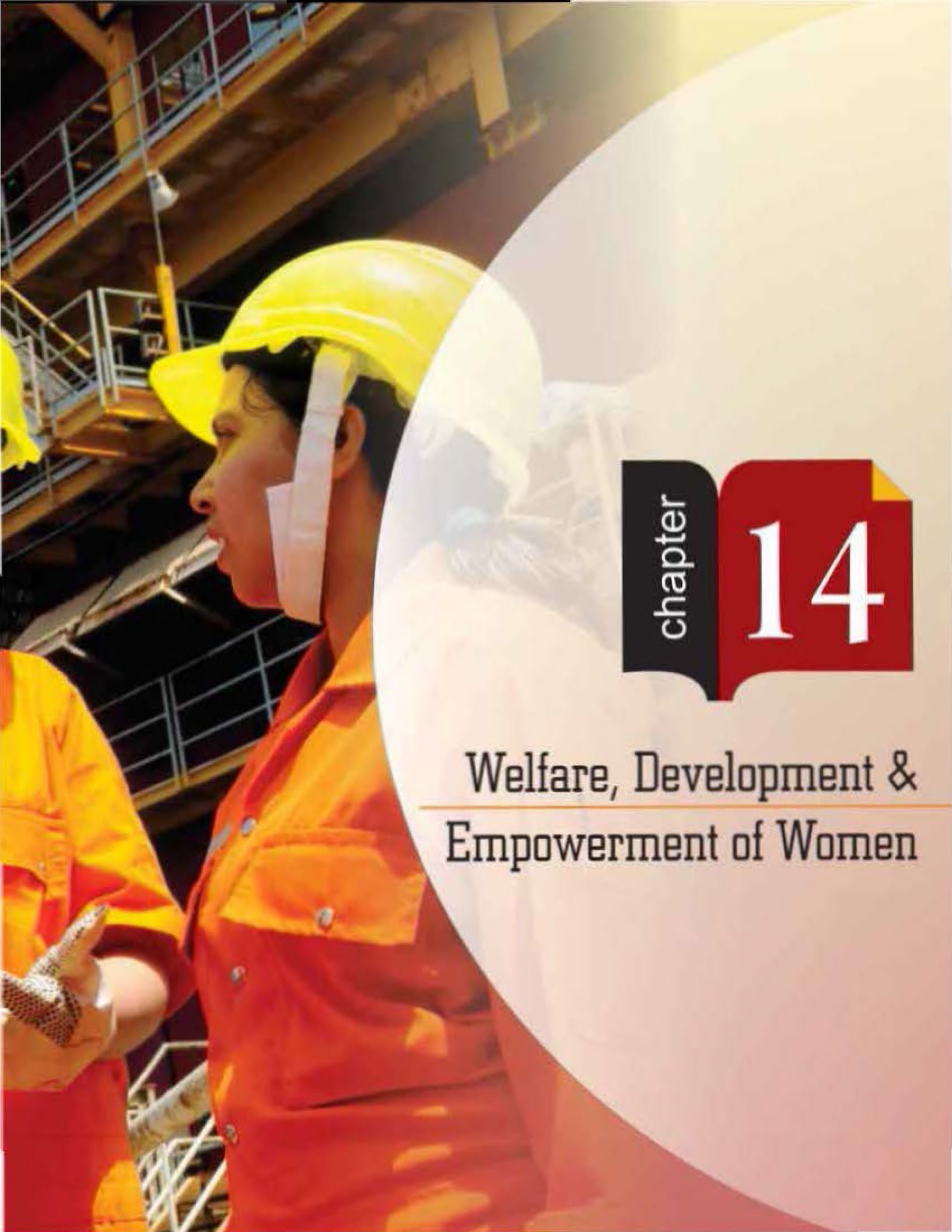
13.4 Special Recruitment Drive for Persons with Disabilities (PWDs)

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 that the competent authority of Union of India will hold necessary consultation with all the concerned Departments and PSUs and inform the court the earliest possible time within which the process of appointment of all vacancies, including vacancies in such Departments from whom information is awaited, can be completed within four weeks from date of judgment. Accordingly, 359 posts were identified in Ministry of Petroleum & Natural Gas and Oil PSUs under the administrative control of this Ministry. Action plan for filling up of vacancies for Persons with Disabilities (PwDs):

S.No.	Step-wise Details	Posts
1.	No. of posts in the Ministry and Oil PSUs reported to Hon'ble Supreme Court	359
2.	No. of Posts already filled in	141
3.	No. of posts lapsed*	8
4.	Posts did not fill up due to Chennai's flood & will be filled in by 31.03.2016	27
5.	Posts to be filled in by 29.02.2016	77
6.	Remaining posts to be filled up by 30.6.2016#	106

*Will be filled in next financial year by "carry forward".

No candidate available under visually and hearing challenged category. Vacancies will be re-advertised.



chapter 14

Welfare, Development & Empowerment of Women

Welfare, Development and Empowerment of Women

14.1 The Ministry of Petroleum & Natural Gas and Public Sector Undertakings/Organizations under its administrative control have been taking numerous initiatives towards welfare and development as also to empower the 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 have 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 has been circulated for attention of all employees. Committees have been set up to attend to redressal of complaints on 'Sexual harassment at work place.'

Marathon winners of NRL

The number of women employees vis-à-vis total number of employees as on 31.12.2015 in the oil PSUs is tabulated as below:-

Sl. No.	Name of PSU	Total No. of Employees	Total No. of Women Employees
1.	ONGC	33690	2190
2.	ONGC Videsh Ltd.	328	29
3.	IOCL	33227	2650
4.	HPCL	10639	875
5.	BPCL	12741	1149
6.	GAIL	4282	250
7.	EIL	3041	381
8.	OIL	7599	352
9.	CPCL	1629	86
10.	NRL	875	44
11.	MRPL	1792	127
12.	BIECCO LAWRIE	258	02
13.	BALMER LAWRIE	1256	91
14.	OIDB	19	04
15.	RGIPT	59	09

Women workforce at ONGC

14.2 In line with the guidelines laid down by Hon'ble Supreme Court in the Case of Vishakha & Ors. Vs. State of Rajasthan & Ors. 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 Ms. Urvashi Sadhwani, Senior Advisor is the chairperson of the committee with three other members, including one member from NGO. The Committee holds its meetings on regular intervals.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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 of State for Petroleum and Natural Gas (IC). The Committee consists of Six Members of Parliament, Nine non-official members as its members, besides senior officers of the Ministry and PSUs of the Ministry as its official members. The function of the committee is to render advice to the Ministry for promotion of official language in official work.

During the year under review, one meeting of the committee was held on 8th February,2016 in Puri (Odissa) under the chairmanship of Minister of State for Petroleum and Natural Gas (IC). Senior officers of the Ministry and its undertakings also participated in the meeting. During the deliberations, a number of suggestions were given by the Hon'ble members of the Committee for promotion of Hindi. The Hon'ble MoS (IC) also assured the Committee that the Ministry would make all efforts to promote Hindi in the official work.

Similarly, an Official Language Implementation Committee is 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 are organized periodically and follow up action is taken on the suggestions of the committee.

The Committee of Parliament on Official Language visited 43 offices of our PSUs which includes offices of ONGC, IOC, BPCL, HPCL, GAIL, EIL, PCRA, OISD 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 were present in these meetings.

Meeting of Hindi Salahkar Samiti under the chairmanship Shri Dharmendra Pradhan, MoS (IC) PNG, at Puri on 08.02.2016

During the year under review, the Ministry notified 182 offices of our PSUs under Rule 10(4) of Official Language Rules, 1976. With a view to assessing the progress of official language in our PSUs and in pursuance of the targets fixed in the Annual Programme 2015-16 issued by the Department of Official Language, senior officers of the Ministry inspected more than 100 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 1st September, 2015 to 14th September, 2015. During this occasion, a Message from the Hon'ble MoS (IC) 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 candidate were given cash awards.

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 have been given to the successful PSUs by the Secretary, MOP&NG.

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 documents including the Parliament Questions, Cabinet Notes and Parliamentary Standing Committee material was done well in time.

15.2 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 Section 5 and 19 of the Right to Information Act-2005 and in suppression of the earlier orders issued, with effect from 16th May, 2007, all the Under Secretaries (or Section Officers in the Sections where there is no Under Secretary) in the Ministry of Petroleum & Natural Gas have been designated as Public Information Officers (PIOs) in respect of Sections allocated to them. Accordingly, all the Directors/Deputy Secretary/ Joint Adviser in the Ministry of Petroleum & Natural Gas have been designated as Appellate Authorities in respect of their concerned Under Secretary/ Section Officers (PIOs). All the PSUs of Petroleum & Natural Gas have also implemented RTI Act-2005 and PIOs/APIOs and Appellate Authorities has been designated by them. Basic information in respect of the Ministry of Petroleum & Natural Gas and all its PSUs along with details of Appellate Authorities and PIOs have been hosted on the websites of the Ministry and all Oil PSUs. An on-line systems called RTIMIS has been introduced w.e.f. September 2013. With the aid of this online system application and appeals received from the public and others speedily and disposed of with in time frame limit and is convenient for the common man.

During January to December 2015, 3176 applications/receipts and 392 appeals have been received under RTI Act, 2005 in the Ministry. In so far as RTI & PG Section is concerned, out of these applications and appeals, 3176 applications and 392 appeals have been forwarded to the respective Divisions of the Ministry for disposal under the provisions of the Act.

15.3 PUBLIC GRIEVANCES

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. The Cell has been attending to the grievances of members of the public against the Public Sector Oil 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. A systematic mechanism has been evolved so as to ensure speedy and expeditious redressal of the public grievances. The Public Grievance Cell is functioning under the charge of Joint Secretary (General) who is also the nodal officer for RTI & Public Grievances, Ministry of Petroleum & Natural

Gas. In addition, a new online system called "Centralized Public Grievance Redress and Monitoring System (CPGRAMS) has been introduced in the month of June, 2008. With the aid of this online system, public grievances from the public and others are received speedily and is convenient for the common man.

During the year 2015-16 (from 1st January, 2015 to 31st December, 2015), the Public Grievance Cell of this Ministry received a total of 14691 grievances and the pendency of the grievances as on 31st December, 2014 was 1694 grievances only. Thus, during the aforesaid period a total numbers of 14982 grievances have been redressed.

As for grievances received through CPGRAMS, it is mentioned that above 90% of such grievances stand disposed as on 31st December, 2015. However, the grievances keep pouring in constantly through CPGRAMS in the Ministry either from citizens directly or are posted/transferred by Government agencies like DARPG, DPG, President Secretariat, PMO which are dealt/processed by referring the same either to subordinate/attached organizations/Oil Public Sector Undertakings under the Administrative control of the Ministry or to different sections/desks/divisions of the Ministry internally, as the case may be. However, it should be borne in mind that ideally speaking, the Government's emphasis is to make such endeavours that the public grievances should not arise ab initio.

15.4 Discontinuation of interview at junior level posts in the Govt. of India

Hon'ble Prime Minister in the Independence Day speech announced that interview at junior level posts in Government of India would be discontinued. Accordingly, a meeting of Committee of Secretaries was held on 14.9.2015 and the following was decided:

(i) Interview will be dispensed with for all Group C and Group D (which are now reclassified as Group C) posts. Interview should also be discontinued for non gazetted post of Group B category.

(ii) The process of doing away with the interview for these posts will be completed by 31.12.2015 so as to discontinue interview from 1.1.2016.

(iii) Specific and isolated Group B non-gazetted posts for which any particular department considers interview absolutely essential, clearance of DoPT would need to be obtained.

(iv) In those cases pertaining to non-gazetted Group B posts and Group C&D posts, where Recruitment Rules (RRs) specify the process of selection which includes conducting of interview, the Ministries/ authorities concerned will take necessary steps to

Shri Dharmendra Pradhan, MoS (I/c) PNG and Dr. Pratibha Ray, renowned academic and writer with officers of MoPNG and Oil PSUs at Puri on 8.2.2016

carry out the requisite amendments to the RRs immediately.

This matter has been taken up with Public Sector Undertakings under the administrative control of this Ministry and accordingly all Oil PSUs have discontinued / agreed to discontinue interview for junior level / non-executive posts. However, some of the PSUs have sought exemption from discontinuation of interview in respect of some posts, which are under examination in the Ministry.

15.5 Skill Development- Hydrocarbon Sector Skill Council (HSSC)

A Hydrocarbon Sector Skill Council (HSSC) is being formed by MoP&NG and its registration as society is under way. The idea of formation of Skill Council for oil and gas sector took shape in a meeting taken by Secretary, MoP&NG on 11.12.2013 with oil PSUs, OIDB, RGIPT, Petrofed, EIL, NSDC and other concerned organizations. A HSSC Steering Committee has been constituted consisting of representation from Industry, academic institutions & industry bodies; and four (4) teams have been constituted to study various aspects of the Council.

The HSSC has submitted application to NSDC for approval of a projected training plan for certification based skill development programmes, envisaging training of 19,50,000 workers in next 10 years. Steering Committee has prepared a list of 134 trades covering entire hydrocarbon sector and construction services, specific to hydrocarbon sector.

An MoU is also planned between Ministry of Petroleum and Natural Gas (MoP&NG); and Ministry of Skill Development and Entrepreneurship (MSDE) to collaborate in area of skill development in the hydrocarbon sector.

15.6 "Make in India" Campaign

Following Hon'ble Prime Minister Narendra Modi's clarion call to make India a manufacturing hub, the Ministry of Petroleum and Natural Gas has already set in motion the process to identify equipments and products in the oil sector that can be domestically manufactured. The oil & gas sector invests large amounts every year to create assets across upstream, midstream and downstream segments. To give impetus to "Make in India" campaign, GAIL has decided that out of 9 LNG ships that will be charter hired by the company in the next five years, 3 will be built in Indian shipyards. Similarly, ONGC and IOC have already aligned their procurement processes to provide preferential market access to domestically produced electronic products.

New material manuals of ONGC have come into force from 1.2.2015. The Ministry has set a target of increasing indigenisation in upstream sector from existing level of 32% to 50%.

IOC R&D has successfully developed INDMAX (Indane maximisation) technology.

All the oil PSUs have instituted a special 'INDEG' cell to promote indigenisation.

Draft Policy to provide Purchase preference (linked with local content) in all Public Sector Undertakings under Ministry of Petroleum and Natural Gas has been prepared and presently under consultation stage with stake holders.


SAILOR

chapter 16

Appendices

Appendices

Appendix-I

Work allocated to Ministry of Petroleum and Natural Gas

1. Exploration for and exploitation of petroleum resources, including Natural Gas and Coal Bed Methane
2. Production, supply, distribution, marketing and pricing of petroleum, including Natrual Gas, Coal Bed Methane and petroleum products
3. Oil refineries including Lube Plants
4. Additives for petroleum and petroleum products
5. Lube blending and greases
6. Planning, development, control and assistance to all industries dealt with by the Ministry
7. All attached or subordinate offices or other organizations concerned with any of the subjects specified in the list
8. Planning, development and regulation of oilfield services
9. Public sector projects falling under the subjects included in this list. Engineers India Limited and IBP Company, together with its subsidiaries, except such projects as are specifically allotted to any other Ministry/Department
10. The Oil Fields (Regulation and Development) Act, 1948 (53 of 1948)
11. The Oil and Natural Gas Commission Act, 1959 (43 of 1959)
12. The Petroleum & Minerals Pipelines (Acquisition of Right user Inland) Act, 1962)
13. The Esso (Acquisition of Undertakings in India) Act, 1974 (4 of 1974)
14. The Oil Industry (Development) Act, 1974 (47 of 1974)
15. The Burmah - Shell (Acquisition of Undertakings in India) Act, 1976 (2 of 1976)
16. The Caltex [Acquisition of Shares of Caltex Oil Refining (India) Limited and of the Undertakings in India of Caltex (India) Limited] Act, 1977
17. Administration of the Petroleum Act, 1934 (30 of 1934) and rules made thereunder
18. Administration of Balmer Lawrie Investments Limited and Balmer Lawrie and Company Limited
19. Petroleum & Natural Gas Regulatory Board Act, 2006
20. To promote long term engagement of India Oil Companies in the hydrocarbon sector board
21. Strengthening energy security by acquiring oil and gas equity abroad and participation in transnational oil and gas pipeline projects
22. Creation and administration of strategic petroleum reserve through Indian Strategic Petroleum Reserves Limited (ISPRL)

Appendix-II

List of Public Sector Undertakings and other organisations under the administrative control of the Ministry of Petroleum & Natural Gas

I. Oil Companies in which Government of India has shareholding as on 31.03.2015

1.	Oil & Natural Gas Corporation Limited	68.93%
2.	Indian Oil Corporation Limited	68.57%
3.	Hindustan Petroleum Corporation Limited	51.11%
4.	Bharat Petroleum Corporation Limited	54.93%
5.	GAIL (India) Limited	56.11%
6.	Engineers India Limited	69.37%
7.	Oil India Limited	67.64%
8.	Biecco Lawrie & Co Limited	99.50%*
9.	Balmer Lawrie Investment Limited	59.57%

*This includes 67.33% of share of Oil Industry Development Board.

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 IOC
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 Conversation Research Association
3. Oil Industry Safety Directorate
4. Centre for High Technology
5. Petroleum Planning & Analysis Cell
6. Directorate General of Hydrocarbons
7. Rajiv Gandhi Institute of Petroleum & Technology
8. Petroleum and Natural Gas Regulatory Board
9. Indian Strategic Petroleum Reserves Limited
10. Indian Institute of Petroleum Energy
11. Society for Petroleum Laboratory

Appendix-III

Production of Crude Oil and Natural Gas

Item	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16 (Apr'15-Dec'15)*	2015-16**
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Crude Oil Production ++ ('000' Tonnes)							
(a) Onshore:							
Gujarat	5905	5780	5331	5061	4653	3327	4748
Assam	4721	5025	4863	4710	4466	3173	4604
Arunachal Pradesh	116	118	121	111	76	42	77
Tamil Nadu	233	247	238	226	240	194	269
Andhra Pradesh	305	305	295	297	254	225	280
Rajasthan	5149	6553	8593	9180	8848	6505	8007
Total (a)	**16429**	**18027**	**19441**	**19585**	**18537**	**13465**	**17986**
of which							
OIL	3582	3847	3661	3466	3412	2451	3595
ONGC	7447	7386	6944	6705	6069	4355	6120
JVC/Private	5400	6794	8836	9414	9056	6660	8271
(b) Offshore:							
ONGC++	16973	16330	15617	15541	16195	12528	16612
JVC/Private	4282	3733	2804	2663	2729	1958	2448
Total (b)	**21255**	**20063**	**18421**	**18203**	**18924**	**14487**	**19060**
Grand Total (a+b)	**37684**	**38090**	**37862**	**37788**	**37461**	**27952**	**37046**
Natural Gas Production (MMSCM)							
(a) Onshore:							
Gujarat	2262	2173	2032	1657	1526	1112	1297
Assam	2680	2905	2910	2868	2958	2259	3229
Arunachal Pradesh	44	40	41	41	34	23	25
Tripura	610	644	647	822	1140	983	1576
Tamil Nadu	1119	1285	1206	1304	1192	774	1269
Andhra Pradesh	1384	1364	1249	1171	541	445	807
Rajasthan	432	590	685	982	1178	1005	1169
West Bengal (CBM)	41	79	101	156	224	288	571
Madhya Pradesh (CBM)	0	2	3	6	2	1	44
Jharkhand (CBM)	0	4	3	3	2	1	4
Total (a)	**8574**	**9084**	**8877**	**9012**	**8796**	**6890**	**9990**
of which							
OIL	2350	2633	2639	2626	2722	2120	3010
ONGC	5504	5751	5447	5316	4750	3551	5363
JVC/Private	720	699	791	1069	1323	1219	1617
(b) Offshore:							
ONGC	17591	17565	18102	17968	17272	12721	18545
JVC/Private	26054	20910	13700	8428	7589	5086	6745
Total (b)	**43645**	**38475**	**31802**	**26395**	**24861**	**17807**	**25290**
Grand Total (a+b)	**52219**	**47559**	**40679**	**35407**	**33656**	**24697**	**35280**

Note: ++: Includes condensates CBM: Coal Bed Methane *: Provisional **: Target fixed for the year

Source: Public Sector Undertakings / Private Companies.

Appendix-IV

Installed Capacity and Refinery Crude Throughput

(Figures in TMT)

Refinery / Location	Installed Capacity	Refinery Crude Throughput						
	01.04.2015	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16 (Apr'15-Dec'15)*	2015-16**
1	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(a) PUBLIC SECTOR	120066	115311	120895	120303	119547	121183	91958	123208
IOC, Guwahati, Assam	1000	1118	1058	956	1019	1006	741	1000
IOC, Barauni, Bihar	6000	6207	5730	6344	6478	5944	4910	6300
IOC, Koyali, Gujarat	13700	13561	14253	13155	12960	13285	10185	13300
IOC, Haldia, West Bengal	7500	6878	8072	7490	7952	7650	5757	7800
IOC, Mathura, Uttar Pradesh	8000	8880	8202	8561	6641	8515	6535	8400
IOC, Digboi, Assam	650	651	622	660	651	591	416	650
IOC, Panipat, Haryana	15000	13660	15496	15126	15098	14191	11283	15200
IOC, Bongaigaon, Assam	2350	2008	2188	2356	2328	2403	1848	2350
Total IOC	**54200**	**52964**	**55621**	**54649**	**53126**	**53586**	**41674**	**55000**
BPCL, Mumbai, Maharashtra	12000	13020	13355	13077	12684	12821	9941	12897
BPCL, Kochi, Kerala	9500	8699	9472	10105	10285	10356	7991	10300
Total BPCL	**21500**	**21719**	**22828**	**23183**	**22969**	**23177**	**17931**	**23197**
HPCL, Mumbai, Maharashtra	6500	6638	7506	7748	7785	7408	5793	7100
HPCL, Visakh, Andhra Pradesh	8300	8200	8682	8028	7776	8770	6741	9100
Total HPCL	**14800**	**14838**	**16189**	**15777**	**15561**	**16179**	**12535**	**16200**
CPCL, Manali, Tamil Nadu	10500	10104	9953	9105	10065	10251	6436	10300
CPCL, Narimanam, Tamil Nadu	1000	703	611	640	559	531	376	500
Total CPCL	**11500**	**10807**	**10565**	**9745**	**10624**	**10782**	**6811**	**10800**
NRL, Numaligarh, Assam	3000	2252	2825	2478	2613	2777	1847	2700
ONGC, Tatipaka, Andhra Pradesh	66	69	69	57	65	51	46	61
MRPL, Mangalore, Karnataka	15000	12662	12798	14415	14589	14632	11114	15250
(b) PRIVATE SECTOR	**80000**	**81678**	**81179**	**88273**	**88229**	**88533**	**65833**	**86834**
RIL, Jamnagar, Gujarat	33000	31198	32497	32613	30307	30867	24361	30867
RIL, SEZ-Jamnagar, Gujarat	27000	35607	35186	35892	37720	37174	27594	37174
ESSAR Oil Ltd. Vadinar	20000	14873	13496	19769	20202	20491	13878	18793
(c) JOINT VENTURE	**15000**	**-**	**2048**	**10636**	**14721**	**13526**	**12920**	**14200**
BORL, Bina, M.P.	6000	-	2048	5732	5450	6209	4660	5200
HMEL, GGS, Bathinda, Punjab	9000	-	-	4904	9271	7318	8259	9000
Total (a+b+c)	**215066**	**196989**	**204121**	**219212**	**222497**	**223242**	**170711**	**224242**

Note: Crude throughput in terms of Crude oil processed *: Provisional ** Target fixed for the year

Source: Public Sector Undertakings / Private Companies.

Appendix-V

Production of Petroleum Products

Products	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16 (Apr'15-Dec'15)*	2015-16**
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
LPG	9708	9547	9825	10030	9840	7649	9997
Mogas	26138	27186	30118	30275	32325	26012	31987
Naphtha	19196	18825	19018	18505	17391	13059	17207
Kerosene	7809	7861	7971	7418	7559	5614	6643
ATF/RTF/Jet A-1	9589	10065	10088	11220	11103	8166	12414
HSD	78057	82880	91103	93759	94428	72789	94854
LDO	590	502	400	423	358	309	417
Furnace Oil	18659	16732	13690	12920	11248	7011	9535
LSHS/HHS/RFO	1860	1701	1364	485	671	308	733
Fuel Oil	20519	18433	15054	13405	11919	7319	10268
Lube Oils	884	1028	896	941	946	754	973
Bitumen	4478	4610	4670	4785	4632	3460	5157
Petroleum Coke	2711	7837	10943	12068	12448	9798	10108
Others	15142	14429	17650	17927	18188	15416	20939
Total Production	**194821**	**203202**	**217736**	**220756**	**221136**	**170345**	**220964**
of which :							
Refineries	**190316**	**198561**	**213219**	**216456**	**217141**	**167331**	**216461**
Fractionators	**4504**	**4640**	**4518**	**4300**	**3994**	**3013**	**4503**

*: Provisional ** Target fixed for the year

Source: Public Sector Undertakings / Private Companies.

Appendix-VI

PRODUCT-WISE CONSUMPTION OF PETROLEUM PRODUCTS

Products	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16 (Apr'15-Dec'15)*	2015-16**
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
LPG	14331	15350	15601	16294	18000	14281	20857
Motor Spirit	14194	14992	15744	17128	19075	16146	20766
Naphtha	10676	11222	12289	11305	11082	9904	11022
SKO	8928	8229	7502	7165	7087	5141	7033
ATF	5078	5536	5271	5505	5723	4596	7849
HSDO	60071	64750	69080	68364	69416	55198	76904
LDO	455	415	399	386	365	293	400
Fuel Oil	10789	9307	7656	6236	5073	4730	7872
Lubes/Greases	2429	2633	3196	3305	3310	2318	2945
Bitumen	4536	4638	4676	5007	5073	3860	5971
Petroleum Coke	4982	6138	10135	11756	14558	13018	9268
Others	4569	4924	5509	5956	6758	4920	6085
Total Consumption	141040	148132	157057	158407	165520	134371	176972

Notes: Consumption includes sales by oil companies, own consumption & direct private imports.

*: Provisional **: Projected as per Working Group Report of the Petroleum and Natural Gas Sector (2012-17)

Appendix-VII

Imports / Exports of Crude Oil and Petroleum Products

(Figures of Qty in TMT & Value in Rs. Crore)

ITEM	2010-11		2011-12		2012-13		2013-14		2014-15		2015-16 (Apr-Dec)*		2015-16 **	
	Qty.	Value	Qty.	Value	Qty.	Value	Qty.	Value	Qty.	Value	Qty.	Value	Qty.	Value
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Imports														
Crude Oil	163,595	455,276	171,729	672,220	184,795	784,652	189,238	864,875	189435	687416	149416	341067	199222	454756
Product														
LPG	4,484	15,888	5,790	27,019	6,293	31,696	6,607	37,425	8313	36571	6691	20137	8921	26849
Petrol	1,702	6,427	654	3,311	147	891	235	1,481	372	2301	952	4025	1269	5367
Naphtha	2,063	6,853	2,091	9,827	1,735	9,791	1,026	6,067	1034	4592	2329	8234	3105	10979
Kerosene	1,381	4,939	564	2,710	0	0	0	0	30	172	41	158	55	211
Diesel	1,996	6,969	1,059	5,039	626	3,219	84	503	124	670	39	311	52	415
Lubes	1,291	4,093	1,434	8,314	1,468	9,259	1,674	10,664	2148	12702	1411	6692	1882	8922
Fuel Oil	1,013	2,455	1,203	4,392	1,068	4,546	1,283	5,537	902	3659	785	1946	1047	2595
Bitumen	98	210	78	197	85	235	237	773	517	1623	525	1383	699	1844
Others $	3,352	8,164	2,977	7,282	4,352	8,727	5,571	12,156	7861	12356	8402	9337	11202	12450
Total Product Import	**17,379**	**55,998**	**15,849**	**68,091**	**15,774**	**68,363**	**16,718**	**74,605**	**21,301**	**74,644**	**21,175**	**52,224**	**28233**	**69631**
Total Import	**180,974**	**511,275**	**187,578**	**740,311**	**200,569**	**853,015**	**205,956**	**939,480**	**210,736**	**762,060**	**170,591**	**393,291**	**227455**	**524387**
Exports														
LPG	154	693	174	947	200	1,294	227	1,589	254	1455	137	561	182	748
Petrol	13,578	49,480	14,524	73,982	16,657	95,346	15,247	92,977	16048	81971	12228	46591	16304	62121
Naphtha	10,655	37,138	10,139	45,620	8,647	43,533	8,322	46,059	7008	31619	5175	15754	6900	21005
Aviation Turbine Fuel	4,478	16,140	4,561	21,857	4,664	25,223	5,745	33,246	5520	25413	3697	11567	4929	15422
Kerosene	33	141	34	191	23	140	15	98	15	81	17240	52663	22987	70217
Diesel	20,335	69,300	20,407	104,572	22,464	115,554	26,469	148,138	25559	115149	6	26	9	35
LDO	98	260	84	331	9	42	30	135	6	28	0	0	0	0
Lubes	29	154	27	181	59	381	20	138	11	100	14	95	19	127
Fuel Oil	6,734	15,098	7,895	25,576	5,922	20,415	6,159	22,407	4762	14251	2277	3947	3036	5263
Bitumen	56	124	5	27	87	281	95	321	94	245	78	151	104	201
Others	2,927	8,332	2,988	11360	4,675	17,880	5,535	23,169	4653	18267	2927	7484	3903	9979
Total Export	**59,077**	**196,861**	**60,837**	**284,643**	**63,408**	**320,090**	**67,864**	**368,279**	**63,932**	**288,580**	**43,779**	**138,839**	**58372**	**185118**
Net Import	**121,897**	**314,414**	**126,741**	**455,668**	**137,161**	**532,926**	**138,092**	**571,201**	**146,804**	**473,481**	**126,813**	**254,452**	**169083**	**339269**
Net Product Export	**41,698**	**140,862**	**44,988**	**216,552**	**47,634**	**251,727**	**51,146**	**293,674**	**42,631**	**213,936**	**22,604**	**86,615**	**30138**	**115487**

*: Provisional **: Estimated

Appendix-VIII

Plan Outlay & Actual Expenditure for MoPNG

(Figures in Rs. Crore)

PSUs	2013-14	2014-15	2015-16	
	Actual	Actual	BE	Actual (Apr,15-Dec,15)
OVL	35357.00	7171.55	10402.00	5000.96
ONGC	32469.54	29997.46	36249.37	21388.52
OIL	9350.97	3773.76	3917.64	2368.25
GAIL	4069.78	1632.18	2704.51	964.19
IOCL	16660.61	14313.68	10540.00	6961.82
HPCL	2641.87	2669.61	1791.85	1081.38
BPCL	4373.58	6874.75	6501.32	5558.39
MRPL	1448.74	2747.36	1564.00	785.96
CPCL	228.60	465.90	1300.03	863.70
NRL	372.14	102.77	115.00	32.78
BALMER LAWRIE	119.55	79.79	100.00	22.29
BIECCO LAWRIE	0.00	0.00	0.00	0.00
Total (P&NG Sector)	**107092.38**	**69828.81**	**75185.72**	**45028.24**
Gross Budgetary Support Schemes (GBS)				
Rajiv Gandhi Institute of Petroleum Technology (RGIPT)	0.00	0.00	48.00	48.00
LPG connection to BPL Families	0.00	0.00	0.00	0.00
Strategic Storage Programme for Storage of Crude Oil by ISPRL	0.00	0.00	1.00	0.00
Setting up of Petroleum University in Andhra Pradesh	0.00	0.00	1.00	0.00
Total (GBS)	**0.00**	**0.00**	**50.00**	**48.00**
Total (MoPNG)	**107092.38**	**69828.81**	**75235.72**	**45076.24**

Appendix-IX

The Profit Before Tax (PBT) and the Profit After Tax (PAT) earned by Public Sector undertakings in the Oil Sector during 2014-15 Rs. 56218.80 crore and Rs. 37686.04 crore respectively. Similarly, the PBT and PAT for 2015-16 are expected to be about Rs. 55982.85 crore and Rs. 37422.52 crore respectively. Oil PSU-wise details are as below:

(Rs. in Crore)

Sl. No.	Name of PSUs	Profit Before Tax (PBT		Profit After Tax (PAT)		
		2014-15 Actual	2015-16 (Expected)	2014-15 (Actual)	2015-16 (Expected)	% of GoI holdings as on 31.03-15
1.	ONGC	26,555	24,084	17,733	15,988	68.93
2.	OVL *	3,185.23	143.89	1,904.22	94.02	-
3	IOCL	7995.29	12,300	5273.03	8,043	68.57
4.	GAIL	4284	1693	3039	1224	56.11
5.	HPCL	4,154	4,301	2,733	2,810	51.11
6.	OIL	3,729	3,083	2,510	2,016	67.64
7.	BPCL	7,416	7,268	5,085	5,161	54.93
8.	MRPL **	-2,155.89	803.54	-1.712.23	525.44	-
9.	CPCL ***	-742.39	180.00	-38.99	180.00	-
10.	NRL ****	1134.25	1524.57	718.31	988.21	-
11.	EIL	468	378	308	247	69.37
12.	BALMER ***** LAWRIE	210.44	225.00	147.44	147.00	-
13.	Biecco Lawrie ******	-14.13	-1.15	-13.74	-1.15	99.56
	Total :	**56218.80**	**55982.85**	**37686.04**	**37422.52**	

(-) : Loss

*Wholly owned subsidiary of ONGC.

** No direct GoI share holding. MRPL is a subsidiary of ONGC.

** * GOI has transferred its entire equity holding in CPCL to IOCL in March, 2001. Subsequently CPCL became a subsidiary of IOCL, a Government of India enterprise.

**** GOI does not hold any shares in NRL directly. The company is a subsidiary of Bharat Petroleum Corporation Ltd. (BPCL), which holds 61.65% equity. The other share holders are Oil India Ltd.(26.00%) and Government of Assam (12.35%).

***** There is no direct holding by Govt. of India in Balmer Lawrie & Co. Ltd. Balmer Lawrie Investments ltd., a Government Company holds 61.8% of shares in Balmer Lawrie. Central Government holds 59.57% in Balmer Lawrie Investments Ltd.

******This includes 67.33% share of Oil Industry Development Board.

Appendix-X

(i) **Paras contained in Inspection Reports:** A total of 42 Inspection Reports/Paras were outstanding against this Ministry as on 30.09.2015. Efforts are being made to settle these paras expeditiously.As per the latest letter of Audit dated 6.10.2015, a total of 42 IR Paras have been shown as pending. The pendency list includes paras for the year 1995-96 to 2013-14. As on date, 1 IR para has been settled, and replies in respect of 7 paras have been furnished to the Audit.

Performance Audit Report on Supply and Infrastructure Development for Natural Gas (Report No 6 of 2015)

1. Infrastructure Development:

- GoI set up PNGRB in October 2007 as a regulator, but notified Section 16 of PNGRB Act, empowering PNGRB to issue authorisations for new pipelines, only in July 2010. In the intervening 33 months neither GoI nor PNGRB was able to authorize any project despite demand. This delay hindered development of cross-country pipelines and associated infrastructure.

(Para 3.3.5)

- Prior to October 2007, GoI authorised nine pipeline projects of which five projects were to be taken up by GAIL & four were to be taken up by Reliance Gas Transmission Infrastructure Limited (RGTIL). Five out of these pipelines, however, were not taken up for execution even after more than six years since authorization. These authorizations were given without setting a definite start and target date for completion. There was considerable delay in administrative decisions to commence work in five projects by GAIL due to delay in determining availability of gas source. In respect of remaining four projects, RGTIL did not speed up execution of project, citing non development of City Gas Distribution projects and non-availability of NG. Thus pipeline infrastructure which is a prerequisite for development of gas market was not taken up for development.

(Para 3.3.4)

- GoI created (1997) Petronet LNG Limited, to set up LNG terminals for import and re-gasification of LNG and twelve other entities also obtained clearance (1997-2000) for setting up LNG terminals. However, GoI took more than five years (October 2012), since establishment of PNGRB in 2007, for fixing eligibility conditions to establish and operate LNG terminals. In the absence of a regulatory framework to authorise entities to set up such facilities and a mechanism to review the projects, development of LNG terminals was very slow and MoPNG was not able to monitor the progress of LNG projects.

(Para 3.2.1 and 3.2.2)

2. Impact of non-availability of NG/R-LNG on fertiliser sector

- Sale price of Urea is controlled by GoI which bears subsidy. NG is the most suitable feedstock for producing urea. Urea production in the country was largely stagnant during XI Plan and GoI formulated various schemes of capacity enhancement in different stages from 2010-11 to 2012-13 through NG based urea plants to enhance domestic production capacity.

(Para 4.1.1)

- Non availability of an assured supply of NG on a long-term basis and inadequate pipeline connectivity was one of the main constraints in increasing production capacity of urea. During the period 2011-12 and 2012-13, the actual domestic production was only 445.58 LMT against the requirement of 604.36 LMT. The shortfall of 158.78 LMT was imported. Thus due to non-expansion of urea production capacity, GoI lost an opportunity of saving subsidy of Rs. 4202.12 crore (worked out after taking into account estimated Capital Related Charge on investment in expansion, revamp and revival projects) during the period.

(Para 4.1.1)

- GoI targeted (2007) conversion of all naphtha and FO/LSHS based urea units to NG/R-LNG by 2009-10 to reduce the cost of production and subsidy burden. Out of the nine units planned for conversion to gas, five units converted during 2012-13 and one unit was converted in 2013-14. The delay was due to absence of adequate pipeline connectivity and non-availability of NG/R-LNG. Resultantly, urea units continued production by using costlier feedstock. This resulted in loss of opportunity to reduce subsidy burden by Rs. 7673.82 crore during 2010-11 to 2012-13, even after taking into account estimated Capital Related Charge on investment required for conversions.

(Para 4.1.2)

3. Impact of non availability of NG/R-LNG on Power Sector

- Lack of availability of NG at affordable price to power sector resulted in underutilisation of gas based power plants with resultant generation loss and higher generation cost due to use of alternate fuels.

(Para 4.2)

4. Supply of Natural Gas

(i) Absence of mechanism for monitoring end use of NG

As per MoPNG directions (June 2006), APM price would be applicable only for that quantity of gas which was used for electricity generation for distribution to consumers through public utilities/ licensed distribution companies. Market rate was to be charged for NG used for other than above purpose. Similarly, the quantity of APM gas utilized for manufacturing products other than fertilisers was to be charged at market price. However, as there was no mechanism in place to prevent/ detect mis-utilisation of NG, either with MoPNG or GAIL, there was under recovery in gas pool account to the extent of Rs. 630.60 crore in the cases revealed in limited test check.

(Para 5.3.1 to 5.3.3)

- Cases of underutilization of available NG were noticed during test check which not only resulted in loss of production but also led to import of more urea. This led to payment of extra subsidy (Rs. 637.07 crore) as the subsidy paid on imported urea was more than the subsidy paid on indigenous urea.

(Para 5.4)

(ii) Marketing Margin on supply of NG

- Marketing Margin on supply of domestic NG for GAIL was approved by GoI in Rupee terms, whereas the Contractor for KG D6 block was charging marketing margin in US dollar terms. As DoF did not reimburse marketing margin as demanded by the Contractor from the fertiliser units; subsidy claims on account of marketing margin on KG D6 gas were pending since 2009-10. If DoF decides to reimburse the said marketing margin, the additional subsidy burden would be Rs. 201.40 crore from May 2009 to March 2014.

(Para 5.5)

5. Performance Audit Report on Utilization of Rigs in Oil and Natural Gas Corporation Limited (Report No. 39 of 2015)

Audit Findings:

1. Non Productive Time (idling time) of rigs ranged between 19 and 23 percent over 2010 - 14. The bulk of idling time costing Rs. 6418 crore was due to factors which could have been controlled by the company.
2. ONGC did not adhere to safety procedure and continued to do drilling/testing operations even after one anchor of the rigs Sagar Vijay had snapped. As a result, another anchor of the rig snapped which caused drifting of the rig from its location. Consequently, the well had to be closed and abandoned. As a result, expenditure of Rs. 1577.27 crore incurred by ONGC on drilling of the original location and drilling of a relief well by using another rig proved avoidable. The insurer did not honor the claim of ONGC on the ground that the latter had not followed recognized safe operating practice.
3. ONGC did not adhere to the repair schedule for dry dock management and major lay-up repair of jack-up rigs which is against an efficient operational practice. Failure on the part of the Company led to a situation wherein rigs were being operated with outdated/obsolete equipments.
4. While establishing the rationale for repair and refurbishment of jack-up rigs, the Company considered efficiency of owned rigs on par with that of hired and newly acquired rigs. However, as owned rigs had much lower efficiency compared to hired/new rigs, this assumption was incorrect. In fact, repair of old rigs would not be economically viable vis-à-vis hire / purchase of rigs if realistic efficiency of owned rigs were considered. Further, delays in finalizing the scope of the work for repair of two rigs led to cost escalations (156 and 57 per cent) besides skewing the financial viability of repairs.
5. Post repair, the efficiencies of jack-up rigs and drill ships did not improve significantly. Rig Sagar Vijay upgraded for drilling wells with water depth of 900 meters did not actually drill a single well of more than 400 meter water depth between 2005 and 2013.
6. ONGC had prepared five-year rig requirement on the basis of the Rig Requirement Plan (RRP). Audit observed that the Rig Requirement Plan also included non-operational idling time of rigs which was entirely controllable by the company. Annual Rig Deployment Plans (RDPs) were prepared on the basis of RRP. Therefore, the Annual Rig Deployment Plans had an in-built inefficiency.
7. There was no uniformity in preparation of annual RDPs among the Assets and Basins of ONGC.

(Asset refers to an internal entity of ONGC involved in production related activities and Basin refers to an internal entity involved in exploration of oil and gas.) Non-availability of norms and non-adherence to available norms led to distorted planning which in turn resulted in un-reliable performance evaluation of the work centre and its employees.

8. ONGC failed to decide a policy on acquisition of new offshore rigs for over a decade i.e. from 2002 to 2015. Meanwhile, four out of six owned offshore rigs outlived their economic usable life of thirty years.

9. There were persistent delays at each stage of tendering process for hiring of rigs. As a result, ONGC failed to drill the locations that had been planned by it.

10. One-third of the locations actually drilled by the Company during 2010-14 were not planned. Actually drilled 1867 locations included 615 locations that had not been planned. This rendered the elaborate annual planning exercise meaningless.

11. The target cycle speed fixed in the performance contracts for Drilling Services group was consistently lower than the cycle speed targeted in the annual plans of the Company. Efficiency of Company owned rigs was poor, with owned offshore shallow water rigs achieving less than half -cycle speed of hired rigs even as their drilling cost was much higher compared to hired rigs. A composite target of cycle speed for offshore rigs and onshore rigs had been fixed which was not appropriate in the above background.

6. Performance Audit Report on Hydrocarbon Exploration efforts of Oil India Limited (Report No. 42 of 2015)

HIGHLIGHTS OF THE REPORT

- Audit noted that OIL's contribution to the net increase of hydrocarbon reserves was only under probable category, as reserves under 2P category (i.e. probable) increased, and decreased under 1P (i.e. proved) category. Further, oil reserve under 3P (i.e. possible) category decreased which indicated that no new fields were being added through exploration activities. Gas reserves under all the categories also declined. OIL did not achieve the target for reserve accretion fixed in its Memorandum of Understanding (MOU). Though Oil India Limited (OIL) achieved Reserve Replacement Ratio (RRR) of more than 1 as prescribed, Ultimate Reserve Accretion registered a downward trend.
- OIL failed to monetize three discoveries in nomination regime due to non-availability of latest technology. In spite of being one of the major National Oil Company and having both financial resources and experience in Exploration & Production sector, performance of OIL legged behind peers in the industry as it had made only one discovery in July 2012 under new Exploration Licensing Policy (NELP) which was not monetized till April 2015.
- OIL achieved neither its own targets of 2D survey in any of the five years, nor its own target in 3D survey in three out of five years. There was delay in completion of Acquisition, Processing and Interpretation cycle, absence of time schedule for in-house survey and outsourced survey. Contracts were not awarded in a timely manner. Survey contracts also revealed deficiency in contractual clauses leading to undue benefit to contractor and payment of penalty towards unfinished work programme.
- There were significant shortfalls in exploratory drilling as well as development drilling. OIL did not place the desired emphasis on its core exploration activities, coupled with the low priority on exploration are the anomalies in MOU target setting and reporting as well as performance measurement (through RRR). OIL's performance in drilling depth was also not satisfactory. There was abnormal fluctuation in commercial and cycle speed of both own and hired rigs.
- The vintage of own drilling rigs were ranging between 9 and 36 years. While reviewing contracts for acquisition of own rigs and for chartered hiring of rigs, Audit found several deficiencies, including inordinate delay, avoidable time allowed for mobilization of rigs, violation of contractual terms and conditions, preference to supplier over manufacturer of rigs and procurement of rigs without resorting to tender procedure etc. leading to lack of transparency.
- Audit observed that OIL's performance in nomination blocks have been unsatisfactory and has given very few discoveries to add to the hydrocarbon reserve of the country. It converted very few blocks from Petroleum Exploration License (PEL) to Petroleum Mining Lease (PML), held PEL blocks for as long as 28 years without converting them into PML, relinquished PEL blocks after holding them from 15 to 26 years without any discovery and kept many PML blocks idle.
- Under NELP regime, the participation and success of OIL in the bidding process remained low. In awarded NELP blocks where OIL was operator, it under achieved Minimum Work Programmed and

paid Liquidated Damages to Ministry of Petroleum and Natural Gas in many cases. It also relinquished NELP blocks without completing committed work. Interestingly OIL also bid for NELP blocks in the same area where it had relinquished an earlier PEL block for logistic constrains. Audit also noticed that in two PEL block relinquished by OIL, hydrocarbon discovery was made by private operators under Pre-NELP/NELP regime.

- OIL had persistent shortfall in financial achievement/utilization of budgetary outlay. OIL did not have adequate technology to monetize its discoveries of highly viscous heavy oil till date.

Summary of Important audit observations printed in the report of the C&AG of India Union Government (Civil)- Report No. 43 of 2015 - on 'Ratna and R-series Hydrocarbon Fields' (Compliance Audit)

Background

The Ratna and R series (R&RS) medium sized hydrocarbon fields are located in the Western Offshore area (at an average water depth of 45 meters) 130 Kilometers southwest of Mumbai city. These fields were discovered and partially developed by the Oil and Natural Gas Corporation Limited (ONGC) in November 1979. ONGC had drilled 35 exploratory wells and 9 development wells and had installed one well cum platform in one of the fields viz. R-12. Commercial production of Crude Oil and Natural Gas was started by ONGC from R-12 field in February 1983. The Government of India (GoI) decided in 1991 for inviting private parties in upstream oil sector. In 1993, GoI issued notice inviting offers for development of R&RS fields. ONGC stopped production of Petroleum from these fields from September 1994.

Following invitation of bids from private parties by GoI, the Cabinet Committee on Economic Affairs (CCEA) approved (February 1996) award of contract in respect of R&RS fields to a Consortium of Successful Bidders (CoSB). Accordingly, the Ministry of Petroleum and Natural gas (MoP&NG) issued (March 1996) a Letter of Award of R&RS fields to CoSB. Thereafter, CCEA approved (March 1999) negotiation to be held by the negotiating Team of Secretaries (NTS) for Finalizing and concluding Production Sharing Contract (PSC) within Six Months.

Records pertaining to R&RS fields of MoP&NG and ONGC were examined.

Highlights

The process of reaching upto a decision to finalise the PSC was not completed despite more than 16 years having passed (as of August 2015) since the CCEA approval for entering into negotiations with CoSB. Analysis of sequence of events for finalistaion of PSC by MoP&NG revealed the following

(I) NTS kept setting targets for completion of negotiations and signing of PSC. In November 1999, the NTS decided that the entire process of negotiations would be completed by 15 February 2000. In March 2000 meeting, NTS decided that negotiations should be completed by 30th April 2000 and in 7 September 2000 meeting, NTS decided to conclude the negotiation process by 18th September 2000. However, NTS did not adhere to its own targets for completion of the negotiations. NTS held 20 meetings between November 1999 and June 2013. During the period from May 2010 to July 2015, only two meetings of NTS were held and on both occasions, it was decided to hold another meeting to take a final decision in the matter

(II) Frequent deliberations were held on certain techno-legal issues from February 2001 to April 2005 among the Ministry of Petroleum and Natural gas (MoP&NG), the Ministry of Law and Justice (MOL&J) and the Ministry of Finance (MOF). Various rounds of clarifications and confirmations were sought though the secretaries of all these three ministries were the members of NTS.

(III) CCEA had approved (9 March 1999) freezing of the rates of levy of royalty and cess prevailing at the time of bidding. Draft PSC was initialed by all the parties in April 2001 with the same rates of royalty and cess. NTS advised (April 2005) that Consortium of successful bidders (CoSB) may be asked to confirm payments of statutory levies at the current level rather than those prevailing in 1995. It recommended that the consequential changes to PSC subsequent to the above may be initialed after vetting by MOL&J. However, CoSB did not agree to the change in the rates of royalty and cess. The Government was advised (June 2005) by the Attorney General of India (AGI) to proceed with signing of PSC in relation to R&RS fields, with the successful bidders on the basis of royalty and cess as fixed in the draft PSC. NTS in its various meetings till March, 2008 advised to maintain the cess and royalty at old rate. However, the issue was raised and referred among various ministries and had been repeatedly sent for opinion of the MOL&J and AGI who reiterated their earlier opinion.

(IV) Financial capability of CoSB was evaluated in 1995 before award of contract to it. After assignment (March 1999) of work to NTS by CCEA for

negotiation on the terms and conditions and signing of PSE with CoSB, NTS decided (March 2000) to assess the updated financial strength of the CoSB. This was carried out in June 2000 and NTS gave its go ahead for processing the PSC in February 2001. Thereafter, assessment of financial capability was again carried out in October 2004 & January 2012. Delays in taking final decision of various matters and raising of already settled issues led to the need for fresh assessments of the financial capability of CoSB, which contributed to further delays which were avoidable.

(V) While approving the proposal in March 1999, CCEA approved conclusion of contract keeping the cess and royalty at the levels prevailing at the time of inviting bids. Despite the above decision of CCEA and the fact that PSCs for rest of 11 fields from the bundle of 12 fields offered simultaneously under similar terms and conditions had been finalized and signed till the end of 2004, opinion of AGI to go for finalization of PSC and recommendation of NTS (April 2006) for conclusion of PSC, the case was sent (January 2008) to CCEA for an appropriate decision. CCEA Note was returned by the cabinet Secretariat to obtain unambiguous recommendations of NTS. NTS forwarded its unambiguous recommendations in March 2008. MoP&NG submitted (June 2008) the Note to CCEA, Agreeing with NTS recommendations. Cabinet Secretariat again returned (July 2008) the Note to make certain modifications/corrections relating to some deficiencies. A proposal for modification in the Note to CCEA was approved on 09 july 2008. However, the matter was again re-examined in MoP&NG and it was decided that NTS should consider the matter once again, with a view to analyzing in detail the various alternatives available along with their financial implications. Thereafter no final decision was taken.

(VI) ONGC had created facilities in Ratna R-12 field at a cost of Rs. 472.55 crore. These facilities were used by the company for production since February 1983. Following stoppage of production from the field (September 1994), ONGC did not maintain the facilities though specific directions were issued by MoP&NG/NTS with an acceptance to reimburse the cost by the Consortium Partners. ONGC's own inspections reported the facts of serious deterioration in the condition of the facilities and 'Plundering and looting' of platform utilities and equipment. The estimated repair cost for the existing facilities at current exchange rates (September 2015) would be Rs. 1085.70 crore.

(VII) For want of requisite details, Audit attempted to work out the financial implications on indicative basis assuming that (a) PSC for R&RS mid-sized fields could have been finalized in 2001 along with nine other small sized fields and (b) the production from the R&RS fields would have started in four years eight months (eight out of nine fields started production and maximum time taken to start production in these fields was four years eight months) from October 2005. In this scenario, based on development plan submitted by CoSB to GoI, domestic production of 56 mbbls of Crude Oil (Valuing Rs. 25650 crore) and 920 mmscm of Natural Gas (Valuing Rs.550 crore) had been deferred during October 2005 to March 2015. GoI's take to the tune of Rs.1050 crore on account of royalty and cess on Crude Oil and Rs.55 crore towards royalty on Natural Gas for the said period also remained deferred and unrealized.

Report No. 21 of 2015 - Compliance Audit Observation (Volume-II)

Sl.No.	Name of the Ministry/PSU	Para No.	Summary of the audit observation
3.	Ministry of Petroleum and Natural Gas Oil India Limited	3.5	Oil India Limited failed to create facilities in time to contain basic sediments and water content in crude oil supplies within the prescribed limit. This resulted in loss of revenue of Rs. 105.55 crore during 2008-09 to 2013-14
4.	Ministry of Petroleum and Natural Gas Oil and Natural Gas Corporation Limited	3.6	ONGC (Company) awarded a contract in November 2004 for Engineering and Construction Works as a part of development of a deepwater and shallow water oil and gas bearing field, and subsequently (June 2007) terminated the contract due to stalling (June 2006) of work by the contractor and initiated action to encase performance bank guarantee (PBG) furnished by the contractor. The contractor took up (June 2007) the matter of termination of contract and invoking of PBG for arbitration. The company also filed a petition in the High Court of Mumbai for obtaining, inter alia, the custody of equipment and material that had remained with the contractor. The company entered into a Settlement Agreement with the defaulting contractor without conducting due diligence whereby it obtained a reduction of only USD 0.7 million while it ended up paying a settlement sum of USD 32 million (RS. 149.37 crore) to the contractor through 'out of court' resolution of disputes, besides incurring additional expenditure of USD 66.34 million (Rs. 342.34 crore) in implementing the agreement in deviation of the approval accorded by its Board in October 2008. The expenditure (Rs. 342.34 crore) was irregular as it did not have approval of the Board and was not in the financial interests of the company. In addition, the company incurred an avoidable expenditure of USD 13.7 million (Rs. 63.79 crore) on payment of rental for tools which was included within the amount paid for the work completed by the contractor under the already terminated contract. The project for development of the oil and gas fields remained incomplete (January 2015) as against the revised target date of April 2010 while projected revenues of Rs. 1,500 crore per annum remained unrealized.
5.	Ministry of Petroleum & Natural Gas Oil and Natural Gas Corporation Limited	3.7	Follow up IT Audit of Implementation of Material Management Module of ONGC Limited revealed the following:- There were inadequacies of input controls, validation checks and internal control procedures to ensure accurate and timely capture of data. This resulted in lack of data integrity and incorrect MIS. Deficiencies in the internal control mechanism and lack of user awareness resulted in stock issues, receipts and consumption not getting captured in a timely manner leading to incorrect material accounting. There were deficient input controls, validation checks and internal control procedures to ensure accurate and timely capture of data and compliance of business processes related with physical verification of assets. This resulted in

			incomplete physical verification of assets, stores and spares, incorrect MIS and lack of data integrity. Material requirement planning remained subjective as it was being carried out manually even after implementation of ERP system
6.	Ministry of Petroleum & Natural Gas Oil and Natural Gas Corporation Limited	3.8	Water Injection Platform (WIN) commissioned in 1984 is the main water injection hub in Mumbai High North Field of Oil and Natural Gas Corporation Limited (ONGC). Non-synchronization of Win revamping project with repair replacement of its associated pipelines and delay in overhauling of main injection pumps led to non achievement of the designed water injection capacity even after incurring an expenditure of Rs. 726.50 Crore
7.	Ministry of Petroleum & Natural Gas ONGC Petro Additions Limited	3.13	ONGC Petro Additions Limited (Company) entered into defective contracts with three contractors and extended interest free advances during March 2009 to November 2011 and linked the recovery of these advances to progress of the related project in violation of CVC guidelines instead of effecting recovery in a time based manner and, thus, lost interest of Rs. 49.63 crore from August 2012 to October 2014. Besides this, the company was yet to recover advances of Rs. 144.20 crore from the contactors as on October 2014 sustaining further loss of interest.

Appendix-XI

Position of ATN in respect of Audit Observations included in the Annual Report as well as those included in earlier Annual Reports

Sl. No.	Year	No. of Paras/PA reports on which ATNs have been submitted to PAC/COPU after vetting by Audit	Details of the Paras/PA reports on which ATNs are pending		
			No. of ATNs not sent by the Ministry even for the first time	No. of ATNs sent but returned with observations and Audit is awaiting their re-submission by the Ministry	No. of ATNs which have been finally vetted by Audit but have not been submitted by the Ministry to 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	-	-

NOTES

NOTES

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