Annual Report
2016-2017

सत्यमेव जयते

Ministry of Petroleum and Natural Gas
Government of India

CONTENTS


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2011

Chapter

1

Introduction

Introduction

1.1 The Ministry of Petroleum and Natural Gas is concerned with exploration and production of Oil and 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 organisations 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 K.D. Tripathi, IAS (AM: 1980) continues to hold the charge of Secretary (P&NG) in the Ministry of Petroleum & Natural Gas with effect from 1st May, 2015.

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

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

1.6 Ms. Urvashi Sadhwani, IES (1982) continues to hold the charge of Senior Advisor in the Ministry of Petroleum & Natural Gas with effect from 9th November, 2015.

1.7 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.

1.8 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.

1.9 Shri Amar Nath, IAS (AGMUT: 1994) assumed the charge of the post of Joint Secretary in the Ministry of Petroleum & Natural Gas w.e.f. 1st June, 2016.

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

1.11 Shri Ashish Chatterjee, IAS (TN: 1999) assumed the charge of the post of Joint Secretary in the Ministry of Petroleum & Natural Gas w.e.f. 2nd November, 2016.

1.12 Ms. Indrani Kaushal, IES (1995) assumed the charge of the post of Economic Adviser in the Ministry of petroleum & Natural Gas with effect from 1st June, 2016.

1.13 Smt. Sushma Rath, CSS continues to hold the charge of Joint Secretary (In-situ) in the Ministry of Petroleum & Natural Gas with effect from 5th August, 2015.

1.14 PETROTECH – 2016:

The 12th International Oil & Gas Conference & Exhibition, was inaugurated by Hon'ble Prime Minister, Shri Narendra Modi, on December 5, 2016, at Vigyan Bhawan, New Delhi. The theme of Petrotech Conference 2016 was 'Hydrocarbons to fuel the future: Choices & Challenges'. The three-day mega event witnessed participation of over 100 eminent speakers and 7,200 delegates from 68 countries, including Ministers from 21 countries, CEOs, technologists, scientists, planners and policy-makers, management experts, entrepreneurs, service-providers and vendors. A concurrent Exhibition spread over 15,000 square metres at Pragati Maidan was also organised. 11 Memoranda of Understanding were signed, including a consortium agreement between IOCL, BPCL and HPCL, intending to set up India's biggest oil refinery cum petrochemical complex with a ~60 MMTPA capacity along the western Coast of India in the State of Maharashtra, setting up five 2G ethanol plants in various parts of the country and 2 start-up initiatives, 1 each of ONGC & OIL, in collaboration with IITs.

A portal under the theme of "Start-Up India" was also launched by ONGC, OIL and IOCL. The CPSEs have committed over Rs 300 Crore funding for encouraging and supporting Start Ups. In order to attract the best talent, the CPSEs launched websites/portals on the same, with the aim of helping build and nurture a successful Start Up ecosystem.

1.15 5th IEF-IGU Ministerial Gas Forum

The 5th IEF-IGU Ministerial Gas Forum was organised in New Delhi, India on 6th December, 2016. The theme of the Forum was "Gas for Growth, improving Economic Prosperty and Living Standards". The Forum was attended by Energy Ministers from Brazil, Cyprus, Iraq, Nigeria, Qatar, Russia and Sudan and Heads of International Organisation including OPEC, IEF, IGU, GECF and around 140 delegates from Energy Industry all over the World.

1.16 Performance of Petroleum and Natural Gas Sector:

Energy is a key driver of economic growth. Efficient, reliable and affordable energy is essential for the sustainable development and inclusive growth of the overall economy of India. India is at present the fastest growing large economy of the world. The growth in GDP was at 7.6% during 2015-16 and 7.1% and 7.3% in the Q1 and Q2 of 2016-17 respectively. Due to rapid economic expansion, India has become world's fastest growing energy market. India surpassed Russia to become the 3rd largest energy consumer in the world after China and USA during 2015. Oil & gas accounted for around 35 percent share in India's energy consumption. In fact, India surpassed Japan to become 3rd largest oil consumer in the world after US and China during 2015. Given India's growing energy demands, reliance on imports and limited domestic fossil fuel resources, the country has ambitious plans to increase domestic oil & gas production and exploit all possible forms of the energy to the fullest. Hon'ble Prime Minister has urged all stakeholders to increase the domestic production of Oil and Gas to reduce import dependence from 77 % to 67% by the year 2022.

1.17 Ensuring Energy Security:

India's energy security is primarily about ensuring continuous availability of commercial energy at competitive prices to support its economic growth and meet the lifeline energy needs of households with safe, clean and affordable forms of energy. Keeping in view the vast and ever increasing energy requirements of the economy, several initiatives have been taken for increasing production and exploitation of all domestic petroleum resources.

In a path breaking policy reform in upstream sector, the Government launched a new Hydrocarbon Exploration and Licensing Policy (HELP) on March 10, 2016 that would be applicable on all forthcoming bidding rounds.

Hon'ble Prime Minister presenting LPG Connections under 'Give it up' Campaign

The policy aims to provide a simple and easy to administer revenue sharing model, marketing and pricing freedom, open acreage policy, permitting exploration throughout the contract period and is governed by a single license for exploration and production of all forms of hydrocarbon. The policy is guided by the principles of minimum government, maximum governance and ease of doing business.

The bids under the Discovered Small Field Policy were launched on May 25, 2016 which was aimed at monetizing 67 discoveries in a time bound manner to boost domestic production of oil and natural gas. All these fields are located in existing oil and gas producing basins, where oil or gas has already been discovered. The bidding round was concluded on 21st November, 2016 with very encouraging response whereby 134 bids were received for 34 contract areas from 42 companies including 5 foreign companies. The evaluation of the bids is being undertaken in a time bound manner with an endeavor to award the contract areas at the earliest, so as to expedite the monetization of the hydrocarbon production from these fields.

Under the New Domestic Gas Pricing Policy, a transparent new gas pricing formula linked to global market was made effective w.e.f. November 1, 2014. Marketing and pricing freedom was provided for gas produced from geologically difficult, high risk / high cost areas with a provision of ceiling price based on landed cost of alternate fuels announced on March 10, 2016. The reserves which are expected to get monetized are of the order of 6.75 Trillion Cubic Feet (TCF).

Policy Framework for relaxation, extensions and clarifications at the development and production stage under PSC regime for early monetization of hydrocarbon discoveries was approved on November 10, 2014. Policy for grant of extension to the Production Sharing Contracts of 28 small and medium sized discovered blocks was approved on March 10, 2016. The policy provides clarity to investors for planning their investments. Policy on Testing Requirements for discoveries in NELP blocks was approved on April 29, 2015. National Seismic Programme was launched on October 12, 2016 in Mahanadi Basin. The

CNG Scooter

Programme would lead to 2D seismic survey of entire unappraised areas across the country for potential Oil and Natural Gas reserves.

In a bid to ensure universal coverage of clean cooking gas in the country, the Government has launched Pradhan Mantri Ujjwala Yojana (PMUY). The scheme was rolled out by Hon'ble Prime Minister on May 1, 2016 at Balia in Uttar Pradesh. Under PMUY, 5 Crore LPG connections will be provided to BPL families with a support of Rs. 1600 per connection by 2018-19. Rs. 8000 Crore has been allotted towards the implementation of PMUY. PMUY aims at empowering millions of poor women in our country who are forced to inhale unhealthy emissions from burning coal, wood and other unclean fuels while cooking. LPG connections provided under PMUY are being seen as a great tool of empowerment, apart from being able to bring obvious health benefits. It is set to bring dignity and respect to the lives of millions of women in our country. More than 1.55 Crore LPG connections have been released across the country under PMUY as on 31st December, 2016, thereby achieving the target of 1.5 Crore LPG connections planned to be released during 2016-17, well before the deadline of March 2017.

The Government launched a scheme 'PAHAL' for direct transfer of LPG subsidy to consumers all over the country from January 1, 2015. This is the largest direct cash transfer scheme in the world as recognized by Guinness Book of World Records. Under this scheme, LPG is being sold to consumers at the market rate while the subsidy is directly credited to their bank accounts as per entitlement. Objective of scheme is to ensure that the subsidy on LPG reach the intended beneficiaries. 17.36 Crore consumers have so far joined the scheme and Rs. 40446 Crore of cash has been transferred to the consumers under PAHAL. 3.61 Crore duplicate/inactive/ghost accounts have been detected and blocked. More than Rs. 21,000 Crore of subsidy has been saved by implementing PAHAL. The Government has also launched 'Give-It-Up' Campaign. Under the scheme well -off LPG consumers have been asked to voluntarily give up LPG subsidy. Against each 'Give It Up' consumer, one security deposit-free connection is given to a BPL family (Give Back Scheme). Around 1.06 Crore consumers have given up their LPG Subsidy. Around 69 Lakh poor households have been given new LPG connections under Give Back Scheme.

Year 2016 was observed as the 'Year of consumers' with an objective to provide enhanced quality services to consumers through various consumer connect initiatives.

LPG connections distributed under Pradhan Mantri Ujjwala Yojana (PMUY) by Shri Dharmendra Pradhan, MoS(I/C) MoPNG

A 24x7 emergency helpline number 1906 was launched for the cooking gas consumers to lodge gas leakage complaints. As on November 29, 2016, 137832 complaints were received and 137814 resolved using this emergency helpline. An online web based portal www.mylpg.in was launched to provide LPG consumers an integrated solution for all services related to supply of cooking gas and tracking their LPG Cylinders from their home.

In line with PAHAL, the Government has also launched Direct Benefit Transfer in Kerosene with an objective of better targeting of kerosene subsidy and to ensure that the subsidies on Kerosene reach the intended beneficiaries. Jharkhand has become the first state to implement DBTK in the country. States would be given cash incentive of 75% of subsidy savings during first two years, 50% in the third year and 25% in the fourth year. Chandigarh was declared Kerosene-free city on April 1, 2016. Voluntary reduction to the tune of 1.87 lakh KL in PDS Kerosene allocation has been undertaken by the States of Karnataka, Haryana and Telangana.

Towards the objective of promoting digital transactions, Ministry of Petroleum and Natural Gas and its CPSEs have played a key role through various initiatives including inter-alia rapid expansion of digital infrastructure, synergistic collaboration with various stakeholders, providing incentives on cashless transactions and enhancing customer awareness through trainings and media campaigns.

In a bid to accelerate development of gas pipeline infrastructure, a Capital grant of Rs. 5,176 Crore (40%) was granted for the first time for development of 2539 km long gas pipeline project i.e. Jagdishpur-Haldia and Bokaro-Dhamra Pipeline (JHBDPL). Hon'ble Prime Minister laid the foundation stone of the Varanasi CGD Project as part of 'Urja Ganga' on October 24, 2016. This pipeline would provide connectivity to the Eastern part of the country with National Gas Grid and provide impetus to collective growth and development of this region and CGD development of cities falling within this network. Urja Ganga will pass through five States i.e. Uttar Pradesh, Bihar, Jharkhand, Odisha and West Bengal covering 40 districts. It will also help in setting up of City Gas Distribution networks in 7 cities in the first phase including Varanasi, Patna, Ranchi, Jamshedpur, Kolkata, Bhubaneshwar, Cuttack. The Pipeline project will also be used for gas supply to 3 fertilizer plants in Gorakhpur, Barauni & Sindri in Eastern India,

Launch of Helpline 1906 by Shri Dharmendra Pradhan, MoS (I/C) MoPNG

giving a new dimension to fertilizer & food processing industry boosting a second 'Green Revolution' in Eastern India. 'Urja Ganga'is expected to bring investments of Rs 51000 Crore into the economy of Eastern India.

Ministry of Petroleum & Natural Gas is committed to provide clean cooking fuel for cooking and transportation purposes. A total of 33.27 lakh domestic households in the country are getting the benefits of piped natural gas (PNG) supplies. 27.5 lakh vehicles in the country are getting benefit of CNG. So far 80 Cities / Districts of 19 States / UTs have been covered for development of PNG/CNG network.

The price of Diesel has been made market-determined which eliminates the subsidy burden effective 19th October, 2014. The saving in subsidy is available for funding anti-poverty and social sector schemes. It has resulted in better service delivery due to increased competition in the auto fuel retail sector.

Pooling of gas in Fertilizer (Urea) sector was approved on March 31, 2015 for supply of gas at uniform delivered price to all fertilizer plants on the gas grid for production of urea through a pooling mechanism of domestic gas with R-LNG. Policy has facilitated improving fertilizer (Urea) plants efficiency and to produce Urea beyond reassessed capacity and also increased domestic Urea production and reduced import dependency.

Policy for ensuring the gas supplies to Gas based Power Generation was approved on March 25, 2015. The policy has facilitated revival of Stranded Power plants of around 16,000 MW capacity and saved them from becoming Non-performing assets and also helped in improving utilization of LNG terminals and gas pipeline infrastructure.

Government is implementing Ethanol Blending Petrol programme under which oil marketing companies (OMCs) are mandated to sell Ethanol blended petrol with upto 10 % Ethanol. Mechanism for procurement of ethanol by OMCs to carry out Ethanol Blended Petrol programme was approved on December 10, 2014. In order to give a stimulus to the above programme, the Government has enhanced the Ethanol Procurement Price and opened alternate route like cellulosic and ligno cellulosic materials, including Petrochemical route. Oil & gas CPSEs have decided to set up 12 Second Generation (2G) ethanol plants

Shri Dharmendra Pradhan, MoS (I/C) MoPNG Discussing Energy Collaboration Proposals with Sri Lankan Prime Minister, Ranil Wickremesinghe

across 11 States with an objective to enhance ethanol production in the country to meet the enhanced blending target. Foundation stone of 1st Bio-refinery was laid in Bhatinda, Punjab on December 25, 2016.

Direct sale of bio-diesel by private manufacturers/suppliers to bulk consumers like Railways and State Transport Corporations was allowed on August 10, 2015.

In a bid to reduce carbon emission, BS-IV autofuels has already been introduced in various parts of the country and will be implemented in the entire country w.e.f. 1.4.2017 in phased manner in line with the auto fuel policy. The Government has further decided that the country will leapfrog directly from BS-IV to BS-VI fuel standards which will be implemented in the country w.e.f., 01.04.2020.

Hydrocarbon Vision 2030 for North-East India released on 9th February, 2016 envisages investment of Rs.1,30,000 Crore in upstream, midstream and downstream sectors in North East India. For incentivizing exploration and production in the North East region, 40% subsidy on gas operations has been extended to the private companies operating in the region.

Ministry of Petroleum & Natural Gas is closely monitoring all the projects costing Rs.100 Crore & above that are being implemented by Oil & Gas CPSEs. There are 112 ongoing projects costing Rs 100 Crore & above that are currently being undertaken by Oil & Gas CPSEs with total anticipated investment of Rs 209984 Crore.

Petroleum & Natural Gas sector witnessed the single largest Foreign Direct Investment

HYDROCARBON VISION 2030 FOR NORTHEAST INDIA

Develop North East Region as a dominant hydrocarbon hub at the forefront of India's energy economy

- **Double the production** of Oil and Natural Gas (O+OEG in MMTOE) by 2030
- **Access to clean fuel for 100% households** at affordable price **in the region (LPG/PNG)**
- Bolster development through creation of **service provider hubs**
- Ensure availability to support growth in per capita **petroleum product consumption**
- Provide pipeline connectivity by **installing new POL and LPG Pipeline**
- Develop **natural gas grid**, CGD networks and CNG Highways
- Generate **employment opportunities** through Industrial and skill development
- Promote **manufacturing industry** related to oil and gas in the region
- Incentivize **production of bio fuel** in the region for providing access to clean fuels and to boost rural economy
- Promote trade between North East Region of India and neighbouring **SAARC countries**

(FDI) in refining sector during 2016-17 which was made by a consortium led by Russian companies in Esssar's Vadinar Refinery with an investment of around US $ 13 billion.

As envisioned by Hon'ble Prime Minister, concrete steps were taken to develop energy links with neighbouring countries like Sri Lanka, Nepal, Bangladesh and strengthen relations with Iran, UAE, Saudi Arabia, Turkmenistan, Mozambique, Qatar, etc. With active intervention of Hon'ble Prime Minister, the long term LNG purchase price from Qatar was renegotiated in November 2015 resulting in huge savings of valuable foreign exchange for the country and cheaper price for consumers.

The Government has further built on the existing historical and friendly relations between India and Russia by creating an Energy Bridge. During the financial year 2016-17, Indian CPSEs have acquired 29.9% stake in Tass-yurakh oil field and 49.9% stake in Vankorneft which is Russia's second largest oil field. These transactions came at an investment of US $5.46 billion and translate into equity oil of 15.18 MMTOE. Indian CPSEs earlier had stakes in Sakhalin, Imperial and License-61. During the visit of President Mr. Putin to Goa in October 2016 for the India-Russia Summit, an MoU was signed between EIL and Gazprom on joint study of a gas pipeline to India from Russia. Another Agreement was signed between ONGC Videsh and Rosneft Oil Company for cooperation in the area of education and training. The programme of cooperation in the field of oil and gas for 2017-18 was also signed by the Minister of State (I/C), Ministry of Petroleum & Natural Gas, Shri Dharmendra Pradhan and Mr. Alexander Novak, the Russian Minister of Energy.

India has further strengthened its oil and gas engagement with its neighbours in the last one year. India continues to supply all petroleum products requirements of Nepal and Bhutan. In August 2015, India and Nepal signed a Memorandum of Understanding for the construction of Petroleum Products Pipeline from Raxaul, India to Amlekhgunj, Nepal and re-engineering of Amlekhgunj depot and allied facilities.

In February 2016, India supplied 2200 MT of High Speed Diesel as a goodwill gesture to Bangladesh from Siliguri Marketing Terminal of Numaligarh Refineries Ltd (NRL) to Parbatipur storage depot of Bangladesh Petroleum Corporation (BPC) in Bangladesh. Work is in progress to build the Indo-Bangla pipeline connecting Siliguri and Parbatipur. Till the time the pipeline gets completed, Numaligarh Refinery Limited will supply HSD to Parbatipur through rail/rack. EIL is providing PMC services to Eastern Refinery in Chittagong. Other Indian Oil and Gas companies are working to provide gas and building gas infrastructure in Bangladesh.

IOCL maintains presence in the Sri Lankan retail sector through its subsidiary Lanka Indian Oil Corporation Limited. Discussions are under way to set up LNG terminal and develop gas infrastructure in Sri Lanka. Discussions are also underway for joint development of Trincomalee Upper Tank Farm and setting up a refinery in Sri Lanka.

In a bid to promote "Make-in-India" initiative, Indigenization Groups (INDEG) have been set up by Oil & Gas CPSEs. In this direction, IOCL has successfully developed INDMAX technology for production of high yields of LPG and gasoline from various petroleum fractions. The technology was successfully implemented at Paradip Refinery which is now at commercial applications stage.

Ministry has launched several Skill Development Programmes in oil & gas sector. Hydrocarbon Sector Skill Council has been set up which has a projected training plan for certification based skill development programmes. For this purpose, Skill Development Institutes (SDIs) are being set up by CPSEs. SDI at Nagaram, Andhra Pradesh is already operational since February 2015 while SDIs at Bhubaneshwar and Vishakhapatnam have been inaugurated on 09.05.2016 and 20.10.2016 respectively. An MoU was signed between Ministry of Petroleum & Natural Gas and Ministry of Skill Development and Entrepreneurship to collaborate in the area of skill development in the hydrocarbon sector.

1.18 Crude Oil and Natural Gas Production:

The targeted crude oil production during the year 2016-17 is at 37.085 Million Metric Tonnes (MMT) as against production of 36.942 MMT in 2015-16, showing an increase of 0.39%. Crude oil production during April-November, 2016 was at 23.990 MMT which was lower by 3.53% against 24.868 MMT during April-November, 2015. The shortfall in crude oil production was mainly on account of lower contribution from offshore fields due to decline in production from

mature and marginal fields in Mumbai high, reconstruction of process platforms of Bassein and Satellite fields and underperformance of wells in KG D6. Onshore production was affected on account of lower contribution from old and ageing fields, shortfall in production from major producing onshore field i.e. RJ-ON-90/1, operational issues particularly in Rajasthan, Gujarat and North East besides bandhs and blockades in Assam.

Natural Gas production (targeted) during the year 2016-17 is at 34.119 Billion Cubic Meters (BCM) which is 5.8% higher than production of 32.249 BCM in 2015-16. The actual production of natural gas during April-November, 2016 was at 21.149 which was lower by 3.70% against 21.960 during April-November, 2015. The shortfall in natural gas production was primarily attributed to a number of factors including inter-alia revamping of process platforms which affected production from Bassein & Satellite fields, underperformance of KG-D6, stoppage of production from M&S Tapti since March 2016, operational problems in Panna & Mukta, natural decline in Ravva apart from lower off-take by potential consumers particularly in Assam, Rajasthan and Tamil Nadu.

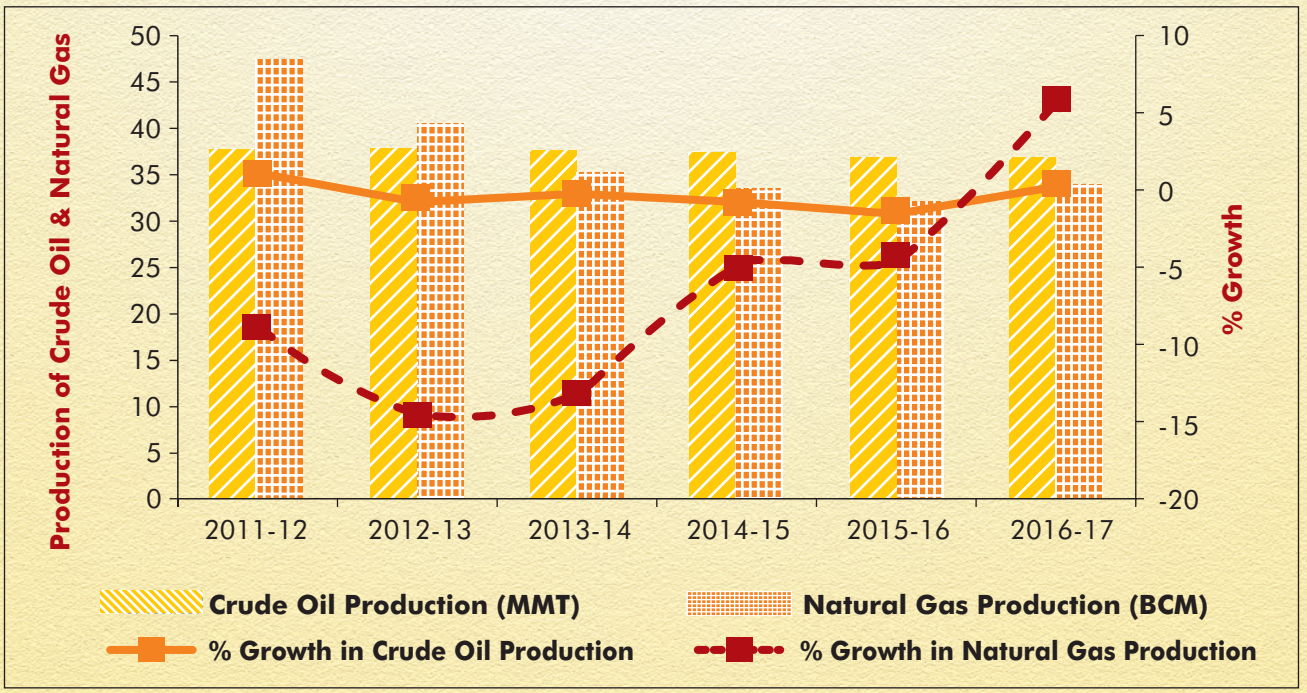
The trends in the production of crude oil and natural gas for the year 2011-12 to 2016-17 have been depicted below **(details in Appendix-III)**:

Table-I.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
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	33.657	-4.94
2015-16	36.942	-1.39	32.249	-4.18
2016-17*	37.085	0.39	34.119	5.80
2015-16 (Apr-Nov)	24.868	-	21.960	-
2016-17 (Apr-Nov) (P)	23.990	-3.53	21.149	-3.70

P: Provisional *: Target

Graph-1: Crude Oil & Natural Gas Production



1.19 Refining Capacity & Refinery Crude Throughput:

India has emerged as a refinery hub. India is second largest refiner in Asia after China. Refining capacity exceeds the demand. After the commissioning of 15 MMTPA grass-root Paradip Refinery in February 2016, the country's refining capacity has increased from 215.066 MMTPA to 230.066 MMTPA. The refining capacity is expected to increase further after completion of 6 MMTPA Integrated Refinery Expansion project at Kochi which is under advanced stage of commissioning. Targeted Crude Throughput (Crude Oil Processed) for the year 2016-17 is 240.418 MMT as against 232.865 MMT in 2015-16, showing an increase of about 3.24%. Crude throughput during April-November, 2016 was at 162.445 MMT, higher by 8.01% against 150.398 MMT during April-November, 2015.

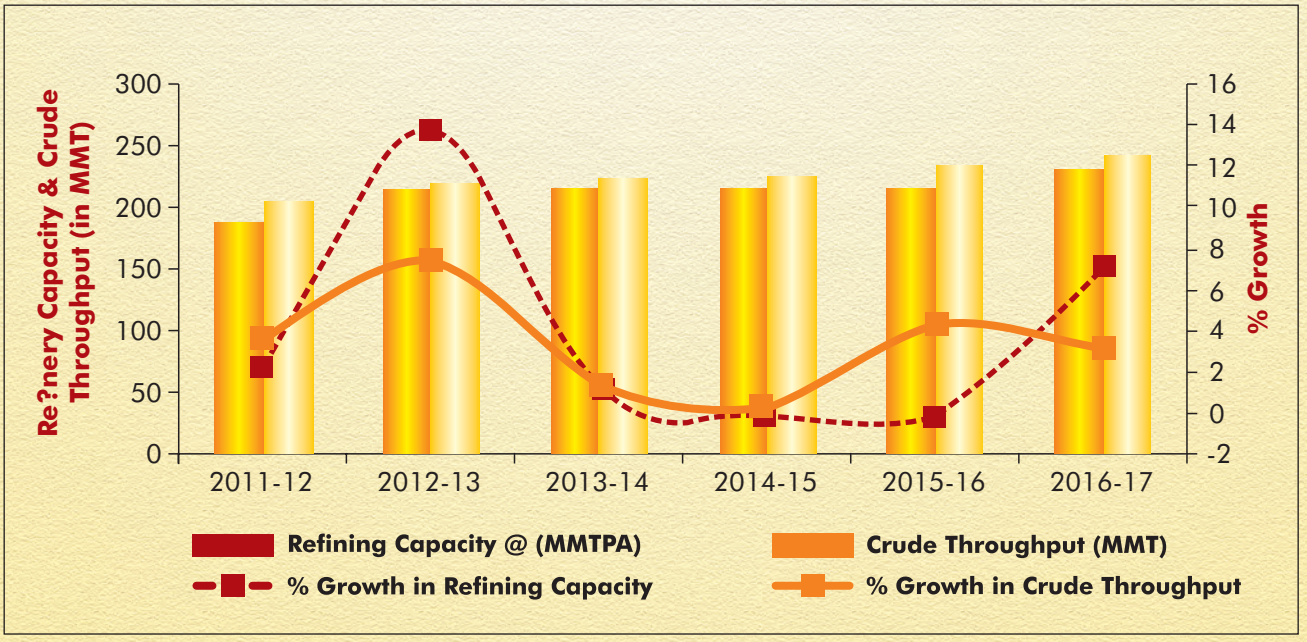
The trend in Refining Capacity and Crude throughput is depicted below **(details in Appendix-IV)**.

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
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	232.865	4.31
2016-17	230.066	6.97	240.418*	3.24
2015-16 (Apr-Nov)	215.066	-	150.398	-
2016-17 (Apr-Nov) (P)	230.066	6.97	162.445	8.01

P: Provisional *: Target @: As on 1st April of initial year

Graph-2: Refinery Capacity and Refinery Crude Throughput



1.20 Production and Consumption of Petroleum Products

The production of petroleum products is targeted at 238.075 MMT in year 2016-17 as against 231.924 MMT achieved in 2015-16. During April-November, 2016, production of petroleum products was at 160.634 MMT i.e. an increase of 6.88% over 150.296 MMT of production achieved during the corresponding period last year.

During the year 2016-17, the consumption of petroleum products in India is proposed at 195.003 MMT with a growth of 5.59% as compared to consumption of 184.674 MMT during 2015-16. The consumption of petroleum product during April-November, 2016 was at 130.002 MMT i.e. an increase of 9.45% over 118.782 MMT in April-November, 2015.

Year-wise production and consumption of petroleum products since 2011-12 to 2016-17 are depicted below **(details in Appendix V & VI)**.

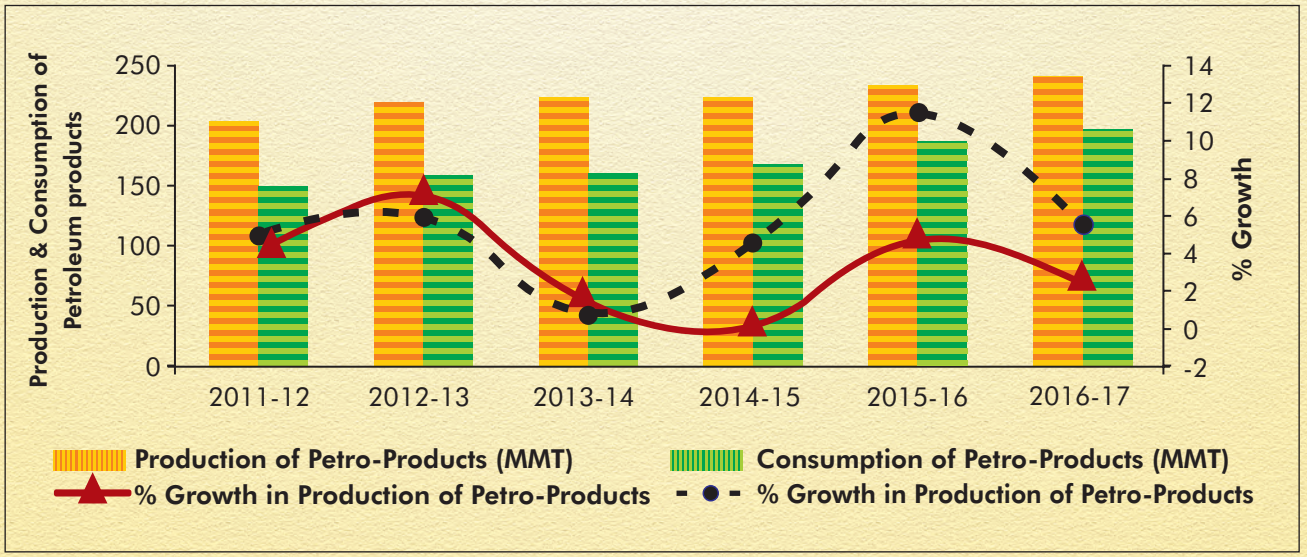
Table-3: Production and Consumption of Petroleum Products

Year	Production of Petro-Products (MMT)	% Growth in Production of Petro-Products	Consumption of Petro-Products (MMT)	% Growth in Consumption of Petro-Products
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	158.407	0.86
2014-15	221.136	0.17	165.520	4.49
2015-16	231.924	4.88	184.674	11.57
2016-17	238.075*	2.65	195.003**	5.59
2015-16 (Apr-Nov)	150.296		118.782	
2016-17 (Apr-Nov) (P)	160.634	6.88	130.002	9.45

P: Provisional *: Target **: Estimated (Prorated based on April- November 2016 figures)

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



1.21 Import of Crude Oil:

Import of Crude Oil during April-November, 2016 was 143.813 MMT valued at Rs. 2,96,431 Crore which marked an increase of 9.31% in quantity terms and 4.84% decrease in value terms over the same period of last year. Import of crude oil during 2015-16 was 202.850 MMT valued at Rs. 4,16,579 Crore.

After steadily increasing with effect from 2011-12, the prices of crude oil and petroleum products have shown a continuous declining trend post July 2014. The price of Indian basket crude oil which was around $110/bbl in June 2014 has continuously decreased thereafter and touched a bottom of US$ 24.03/bbl on 20th January, 2016.

During 2016-17, the Indian basket crude oil was trading in the range of $ 40-50/ bbl as of November, 2016. Recently, on November 30, 2016, the Organization of the Petroleum Exporting Countries (OPEC) reached a deal to cut their oil production by 1.2 million barrels per day in order to ease the global glut, prop up oil prices and boost the world economy. Further, on December 10, 2016, Non-OPEC oil producers like Russia, Mexico, Oman and Azerbaijan also agreed to cut oil output by 0.558 million barrels per day in an agreement done between OPEC and Non-OPEC oil producing countries for the first time since 2001. As a result, the Indian Basket crude oil price crossed $ 50/bbl on December 1, 2016 and touched a high of $ 54.55 / bbl on December 29, 2016.

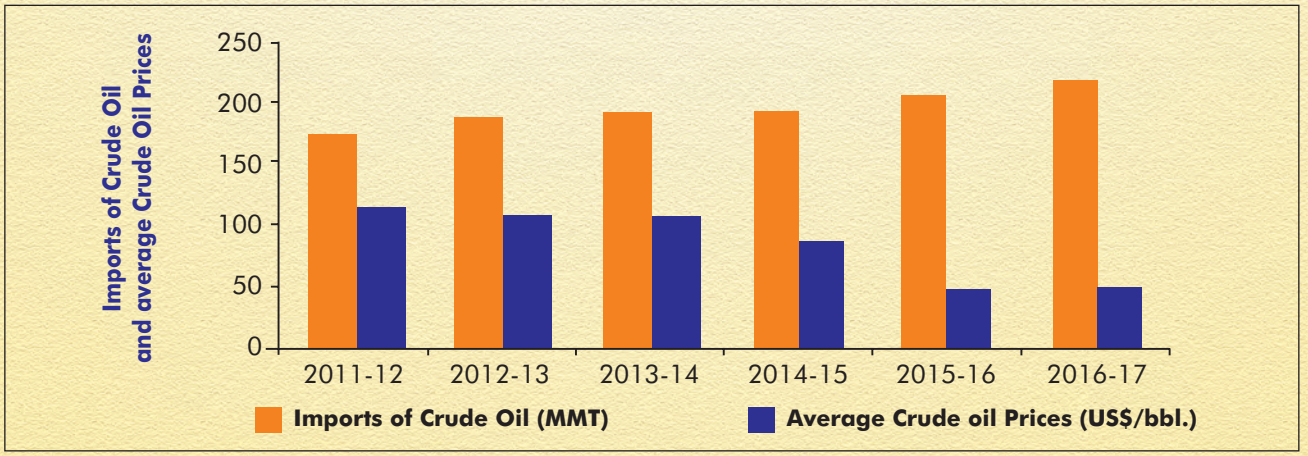
The trend in growth of crude oil imports and crude oil international (Indian Basket) prices is shown in Table-4 & Graph- 4A. The trend in prices of Indian basket crude oil during April, 2015 to December, 2016 is at Graph 4B.

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

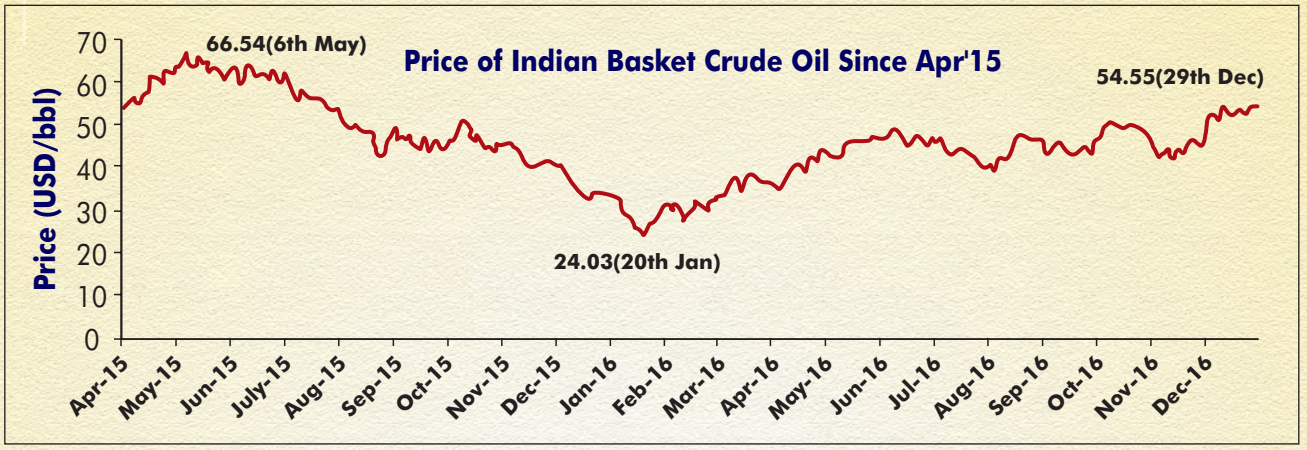
Year	Imports of Crude Oil (MMT)	% Growth in Imports of Crude Oil	Average Crude oil Prices (Indian basket US$/bbl.)	% Growth in Average Crude oil Prices
2011-12	171.729	4.97	111.890	31.50
2012-13	184.795	7.61	107.970	-3.50
2013-14	189.238	2.40	105.520	-2.27
2014-15	189.435	0.10	84.160	-20.24
2015-16	202.850	7.08	46.166	-45.15
2016-17	215.720*	6.34	45.620^	-1.18
2015-16 (Apr-Nov)	131.567		47.060**	
2016-17 (Apr-Nov) (P)	143.813	9.31	44.730**	-4.95

P: Provisional *: Estimated (Prorated based on April- November 2016 figures) **: Average Apr-Nov, ^: Average April-December, 2016

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



Graph-4B



1.22 Imports & Exports of Petroleum Products:

During April-November, 2016 imports of petroleum products were 24.637 MMT valued at Rs. 43,045 Crore, which shows an increase of 29.39% in quantity terms and 7.32% decrease in value terms, against the imports of 19.041 MMT valued at Rs. 46,445 Crore for the corresponding period of previous year. The quantity of petroleum products imported during 2015-16 was 29.456 MMT valued at Rs. 65,361 Crore.

During April-November, 2016 the exports of petroleum products were 43.742 MMT valued at Rs. 1,24,564 Crore, which shows an increase of 12.45% in quantity terms and decrease of 1.33% in value terms, as against the exports of 38.899 MMT valued at Rs. 1,26,238 Crore for the same period of last year. During 2015-16, 60.539 MMT of petroleum products, valued at Rs. 1,76,780 Crore were exported.

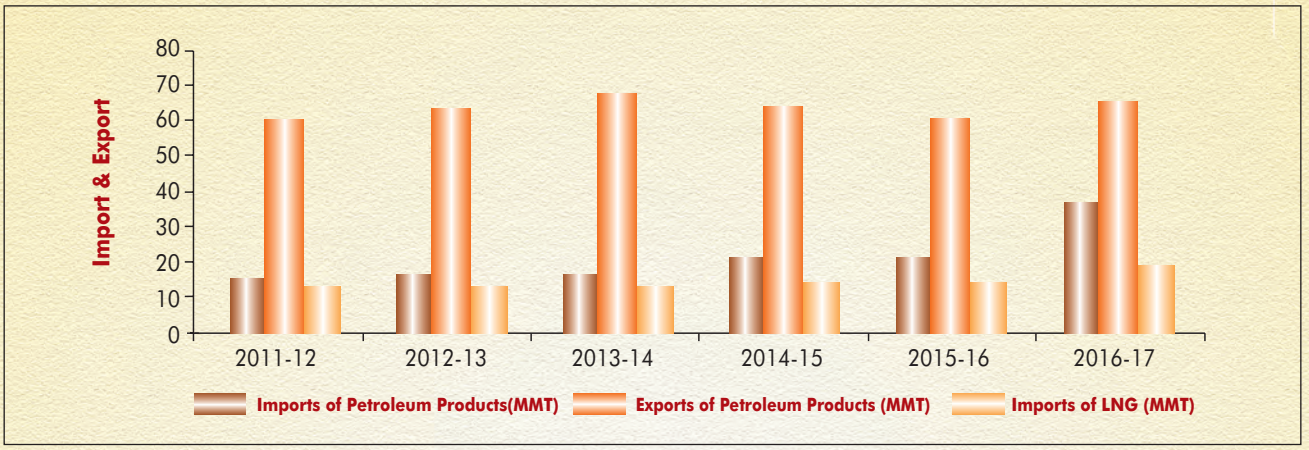
During April-November, 2016 the import of LNG was 12.610 MMT valued at Rs. 25,189 Crore which marked an increase of 17.3% in quantity terms and decrease of 23.47% in value terms, against imports of 10.750 MMT valued at Rs. 32,912 Crore for the same period of previous year. During 2015-16, 16.582 MMT of LNG, valued at Rs. 45,601 Crore was imported. The trend in quantity of petroleum products and LNG imports & exports is depicted 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
2011-12	15.849	-8.80	60.837	2.98	13.214	33.06
2012-13	16.354	3.18	63.408	4.23	13.136	-0.60
2013-14	16.697	2.10	67.864	7.03	12.995	-1.07
2014-15	21.301	27.57	63.932	-5.79	14.092	8.45
2015-16	29.456	38.28	60.539	-5.31	16.582	17.67
2016-17*	36.955	25.46	65.613	8.38	18.915	14.07
2015-16 (Apr-Nov)	19.041	-	38.899	-	10.750	-
2016-17 (Apr-Nov) (P)	24.637	29.39	43.742	12.45	12.610	17.30

P: Provisional *: Estimated figures (Prorated based on April- November 2016 figures)

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



1.23 Equity Oil and Gas from Abroad:

In order to supplement domestic availability of crude oil and natural gas, Government has been encouraging acquisition of assets abroad. As of December 2016, our oil and gas companies are present in 25 countries with investments of nearly US$ 32.89 billion. During the financial year 2016-17, the share of equity oil and gas for Indian PSUs from their overseas investment was approx. 25.18 MMTOE.

ONGC Videsh (OVL), which is wholly owned subsidiary and overseas arm of Oil and Natural Gas Corporation Limited (ONGC), was created with an objective of acquiring overseas assets, including exploration, development and production of oil and gas. Presently, it has participation in 37 E&P projects in 17 countries and has oil and gas production from 14 projects in 10 countries. Remaining assets of OVL are exploratory in nature. With the passing of time, some of India's other oil and gas PSUs have also began acquiring overseas assets. IndianOil has a Participating Interest (PI) in E&P blocks in 8 countries. Bharat PetroResources Limited (BPRL), which is the wholly owned subsidiary and exploration wing of Bharat Petroleum Corporation Ltd of Bharat Petroleum Corporation Ltd. (BPCL), holds PI in 17 blocks in 6 countries along with Equity stake in 2 companies in Russia that operates 4 Producing assets. Oil India Ltd (OIL) also has oil & gas assets in 11 countries, some of which are independent investments and others in partnership with other Indian PSUs as part of consortium. HPCL, through Price Petroleum which is its wholly owned subsidiary, has presence in 2 blocks in Australia and GAIL has oil & gas assets in 3 countries.

During the year 2016-17, Indian PSUs made 2 new investments in Russia. OVL acquired 26% equity in Vankorneft from Rosneft which is a Russian National Oil Company in two separate transactions at a total cost of US$ 2.198 billion. An Indian consortium comprising Oil India Limited, Indian Oil Corporation Limited and Bharat Petro Resources Limited acquired 23.9% equity in Vankorneft at a total cost of US$ 2.02 billion. In addition, the Indian consortium also acquired 29.9% equity stakes in another Russian company viz. Taas -Yuryakh at a total cost of US$ 1.24 billion. The acquisitions in Vankorneft and Tass-Yuryakh have added 15.18 MMTOE of equity oil and gas for Indian PSUs from their overseas assets which stand at a total quantity of 25.18 MMTOE (approx).

1.24 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 Crore contributing 6.03% of total FDI inflow in the economy. During April–November, 2016, FDI inflow received was Rs. 506 Crore which was around 62% higher as compared to FDI inflows during the corresponding period last year.

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

Year	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
2011-12	165146	35121	9955	2030	69.7	64.25	291.4	264.82
2012-13	121907	22424	1193	215	-26.2	-36.15	-88.0	-89.42
2013-14	147518	24299	678	112	21.0	8.37	-43.1	-47.75
2014-15	189107	30931	6496	1079	28.2	27.29	857.5	861.44
2015-16	262322	40001	677	103	38.7	29.33	-89.6	-90.45
2015-16 (Apr-Nov)	160198	24808	313	49	-	-	-	-
2016-17 (Apr-Nov)*	217658	32497	506	76	35.3	31.00	61.8	55.10

*:Provisional

1.25 Plan Outlay for Ministry of Petroleum & Natural Gas:

The actual Plan Expenditure of oil and gas CPSEs during 2015-16 was Rs.65803.61 Crore against Budget Estimate of Rs.75185.72 Crore. Plan outlay (BE) of the Ministry of Petroleum & Natural Gas in 2016-17 is Rs.79650.42 Crore. This comprises Rs.77600.42 Crore of plan investment through I&EBR of oil and gas CPSEs and Rs.2050 Crore as GBS. Against this, Rs.73521.80 Crore has been utilized during April-December, 2016. Detailed Plan Outlay and actual expenditure of the Ministry of Petroleum & Natural Gas with effect from 2013-14 is given in **Appendix-VIII**.

1.26 Strategic Crude Oil Storage:

Taking into account the energy security concerns of India, the Government is setting up Strategic Crude Oil Storage of 5.33 MMT of crude oil at three locations, viz. Vishakhapatnam (1.33 MMT), Mangalore (1.50 MMT) and Padur (2.5 MMT) have been created. The Vishakhapatnam and Mangalore storage facilities have already been commissioned. The facility at Vishakhapatnam has already been filled up and one half of Mangalore storage facility has also been filled. The storage facility at Padur has also been completed. An expenditure of Rs 4098.35 cr has been incurred on creating crude oil storage facility at Vishakhapatnam, Mangalore and Padur. Indian Strategic Petroleum Reserve Ltd. (ISPRL) signed a Definitive Agreement with ADNOC of UAE for Oil Storage and Management for the second half of Mangalore storage facility.

There is 63 days of estimated commercial reserve of crude oil, petroleum products and gas in India. The total 5.33 MMT reserve of Phase-I of the Strategic Petroleum Reserve is currently estimated to supply approximately 10.5 days

Visakhpatnam Cavern Gallery

Shri Dharmendra Pradhan, MoS(I/C) MoPNG along with Shri K.D. Tripathi, Secretary MoPNG presenting the certificate received from Guinness Book of World Records to the Hon'ble Prime Minister Shri Narendra Modi for recognition of PAHAL as the largest cash transfer programme in the world

of India's crude requirement according to the consumption during 2015-16.

As the crude requirement in the country is increasing, the need for additional crude oil storage is being felt. Construction of storage facilities at Chandikhol in Odisha and at Bikaner in Rajsthan under Phase II of Strategic Petroleum Reserve Programme, have also been proposed.

1.27 Non-Conventional Energy:

Ethanol Blended Petrol:

The Government, through Oil Marketing Companies (OMCs), is implementing Ethanol Blended Petrol (EBP) Programme under which, OMCs sell ethanol blended petrol with percentage of ethanol upto 10%. In order to improve the availability of ethanol, the Government on 10.12.2014, inter-alia, decided to fix the delivered price of ethanol in the range of Rs. 48.50 per litre to Rs. 49.50 per litre, depending upon the distance of distillery from the depot/installation of the OMCs.

Further, on 10.12.2014, ethanol produced from other non-food feedstocks besides molasses, like cellulosic and ligno cellulosic materials including petrochemical route, has also been allowed to be procured. For the sugar year 2015-16, a quantity of 136 Crore litre of ethanol has been allocated and supplies of 111 Crore liters have been received till 30.11.2016. The blending percentage achieved for oil PSU companies is 3.52%. On 13.10.2016, Government has fixed the administered price of ethanol at Rs. 39 per litre for EBP programme during the ethanol supply year 2016-17 from December 1, 2016 to November 30, 2017. Additionally, Excise Duty, VAT/GST and transportation charges (as decided by OMCs) will be paid to the ethanol suppliers by OMCs.

Further, Public Sector Oil Marketing Companies are working in the direction of establishing 12 bio-refineries across 11 States with an objective to boost the production of ethanol in the country in order to meet the enhanced blending target. Foundation stone of 1st bio-refinery at Bhatinda, Punjab was laid on December 25, 2016.

Ministry of Petroleum and Natural Gas had announced a Bio-diesel Purchase Policy in October 2005, which became effective from 1.1.2006. On August 10, 2015, the Government has issued notification to allow the sale of Bio-diesel (B100) by private manufacturers to bulk consumers like Railways, State Transport Corporations and other bulk consumers. Also, retailing of bio-diesel blended diesel by Oil Marketing Companies has started on the same day. Oil Industry has issued LOIs for 5.16 Crore

Litres of Bio-diesel supply for the period of July 2016 to October 2016, against which a quantity of 3.37 Crore Litres of bio-diesel (B100) has been procured as on 31.12.2016. Currently, 3621 retail outlets across 6 States are selling Bio-diesel Blended Diesel (B5). New tender for winter grade bio-diesel has been floated by OMCs for the quantity of 15.12 Crore Litres for the period November 2016 to March 2017, against which a quantity of 3.16 Crore Litres has been offered by the suppliers.

Bio-diesel Programme

Government on 16.01.2015 allowed direct sale of bio-diesel (B100) by manufacturers / suppliers of bio-diesel / through authorized dealers of joint venture of OMCs as authorized by MoPNG to all consumers.

As of now bio-diesel / blended diesel (B5) is being sold by OMCs in six States in more than 3500 retail outlets. 5 per cent bio diesel blended in diesel has already started from 10.08.2016.

1.28 New and Renewable Energy:

As a part of initiative under New and Renewable Energy, Oil Marketing Companies (OMCs) have provided solar lighting in Retail Outlets (ROs). As of December 2016, OMCs have undertaken solarisation at 7686 ROs. Another 464 ROs are planned to be solarised by the end of March 2017. The expenditure incurred on solarisation of one retail outlet ranges from Rs.10 Lakh to Rs. 25 Lakh. OMCs are providing soft loans to dealers to fund this investment. Ministry of Petroleum and Natural Gas has signed a Commitment Certificate for 64 MW of solar potential by 2021-22 and furnished the same to Ministry of New and Renewable Energy on 03.06.2016.

1.29 Fuel Conservation Campaign:

In order to provide sustained impetus on fuel conservation efforts in terms of reduced consumption and cleaner fuels, Ministry of Petroleum & Natural Gas in association with Petroleum Conservation Research Association (PCRA) has launched people centric mass awareness National Drive during Oil & Gas Conservation i.e. SAKSHAM – 2017 (Sanrakshan Kshamta Mahotsav – 2017). During this month long drive, various sections of society, viz., students, farmers, housewives, drivers, industrial workers, etc., have been engaged to profess and propagate the need to conserve energy by judicious utilization of petroleum products. In addition, round the year regular activities are conducted to assist energy intensive industries in reducing and managing their energy mix through energy audits, training of drivers on fuel efficient economic driving and sponsorship of projects for development of energy efficient products and processes.

Special emphasis is being given towards "Inclusion" of one & all in underlining and appreciating the individual's effort in reducing consumption of energy and lessening Green House Gas emissions through multiple activities in association with Oil & Gas Companies.

1.30 Other Achievements

The Oil & Gas Central Public Sector Enterprises and its Joint Ventures under the administrative control of Ministry of Petroleum & Natural Gas undertook a series of initiatives under the Swachh Bharat Mission. Apart from construction of school toilets, Oil Marketing Companies have been advised to ensure provision of separate functional toilets for male and female, at Retail Outlets, especially at National Highways and State Highways. Oil & Gas CPSEs have adopted iconic places for maintaining cleanliness and hygiene. Further, identified villages, water bodies and other locations near their areas of operation have also been adopted by CPSEs under Swachh Bharat Abhiyaan. CPSEs have also initiated 'Waste to Fuel' programme in 8 identified cities on a pilot basis.

1.31 Achievements at a glance

1.31.1 Pradhan Mantri Ujjwala Yojana (PMUY) was launched on 1.5.2016 by the Prime Minister for providing LPG connections to 5 Crore women belonging to the Below Poverty Line (BPL) families over a period of 3 years starting from FY 2016-17. As on 03.01.2017, more than 1.54 Crore new LPG connections have been given to BPL families under this scheme. The target of 1.5 Crore fixed for the current year has already been achieved.

1.31.2 Government has launched "Give It Up" initiative to encourage domestic LPG consumers, who can afford to pay the non-subsidised price for LPG, to voluntarily surrender their LPG subsidy. As on 03.01.2017, 1.05 Crore customers have given up LPG subsidy.

1.31.3 For the financial year 2016-17, Ministry of Finance has inter alia communicated that cash subsidy within a band of Rs. 0 to Rs. 15/- per Kg can be paid to the customers under the fund flow mechanism for Direct Benefit Transfer for LPG. The subsidy to the consumers on subsidized domestic LPG effective 1st December, 2016 is Rs. 151.29 per cylinder. There will be no under-recovery burden on National Oil Companies (both upstream and downstream) in 2016-17 on account of sale of PDS Kerosene.

1.31.4 The Ministry has started the execution of 2540 km. long Jagdishpur – Haldia & Bokarro – Dhamra Natural Gas Pipeline Project which is popularly known as the Urja Ganga Eastern India with an investment of Rs.12940 Crore. This project was launched in October 2016 and is scheduled to be completed by the end of 2018. This project will inter alia cater to energy requirements of five States, namely, Uttar Pradesh, Bihar, Jharkhand, Odisha and West Bengal, covering forty Districts and twenty six hundred villages.

1.31.5 This Ministry plans to connect 10 million households to the PNG network in the next three years. 35 new cities have been approved for City Gas Distribution (CGD) in last two years. This Ministry is providing highest priority to the CGD network for allocation of domestic natural gas.

1.31.6 This Ministry has introduced a new Hydrocarbon Exploration Licensing Policy, which covers exploration and exploitation of all kinds of hydrocarbons, such as oil, gas, coal bed methane and shale gas, under a single licensing framework.

1.31.7 Open bidding under a new 'Discovered Small Fields Policy' aiming to bring into production 67 marginal oil and gas fields with 89 million tons of reserves has been successfully concluded. The results have been encouraging with overwhelming response from domestic as well as foreign investors.

1.31.8 In order to achieve 10% import reduction in oil and gas by 2021-22, a five pronged strategy is being followed which is comprised of (a) Increasing production of oil and gas; (b) Energy conservation and Energy Efficiency; (c) Demand Substitution; (d) Promoting alternate fuels/renewable and (e) Improvement in refinery processes.

1.31.9 This Ministry has also taken measures to promote the use of environment friendly alternate fuel and reduce carbon emissions. This Ministry has intensified ethanol blending programme and oil PSUs are setting up 2nd Generation ethanol plants at 12 locations in 11 States across the country to enhance farm income and reduce environmental degradation caused due to burning of agricultural feedstock.

1.31.10 To ensure India's energy security and expand international cooperation, Indian PSUs have acquired nearly thirty percent (29.9%) stake in Tassyurakh oil field and fifty percent (49.9%) stake in Vankorneft oil field of Russia. These transactions come at an investment of $ 5.46 billion and translate into 15.18 MMTOE of equity oil.

1.31.11 In order to promote digital transactions, Oil & Gas PSUs have contributed significantly by rapidly expanding digital payment infrastructure at fuel and gas stations; educating the customers about digital payments by organizing a customer awareness campaign across the country and providing financial incentives to adopt digital modes of payment. All this has resulted in a three fold increase in cashless transactions in petroleum products.

1.31.12 The Liquefied National Gas (LNG) bus was test launched at Kochi on 8th November'16 by Hon'ble Chief Minister of Kerala and the MoS(I/C) MoPNG. This is a new era in the transportation sector by providing cleaner and cheaper fuel in the form of LNG.

Hon'ble Prime Minister and MoS(I/C) MoPNG with Mr. Vladimir Putin, President of Russia at BRICS Summit meet between India and Russia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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 3rd largest consumer of energy after China and USA. The country is dependent on imports for about 81.7% of its crude oil requirement and to the extent of about 45.4% 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 was opened up after implementation of New Exploration Licensing Policy (NELP) and Coal Bed Methane (CBM) Policy in 1997-99. 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 a major Policy drive to give a boost to petroleum and hydrocarbon sector, the Government has unveiled a series of initiatives. The reforms in hydrocarbon sector are based on the guiding principles to enhancing domestic oil and gas production, increasing investment, generating sizable employment, enhancing transparency and reducing administrative discretion. Government has formulated path breaking policies to revolutionize the E&P sector which inter-alia includes –

- Gas Pricing Reforms
- Discovered Small Field Policy
- Reform Initiatives to Enhance Domestic Production
- Hydrocarbon Exploration and Licensing Policy (HELP)
- Monetization of the Ratna offshore field
- Permission of Extraction of CBM to Coal India Limited (CIL) & its subsidiaries in coal Mining area.
- Hydrocarbon Vision 2030 for North East
- National Seismic Programme of Un-appraised areas
- National Data Repository (NDR)

2.1.4 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 74% in oil and gas production in the country. Presently, ONGC produces nearly 61.5% of indigenous crude oil and 68.7% of country's gas production, while OIL's share is 9% of indigenous crude oil and 9.3% of gas production. The share of Private/JV companies in oil and gas production is 29.5% and 22% respectively.

2.1.5 The Directorate General of Hydrocarbons (DGH) was established under the administrative control of Ministry of Petroleum and Natural Gas by Government of India Resolution in 1993. The objective of 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.

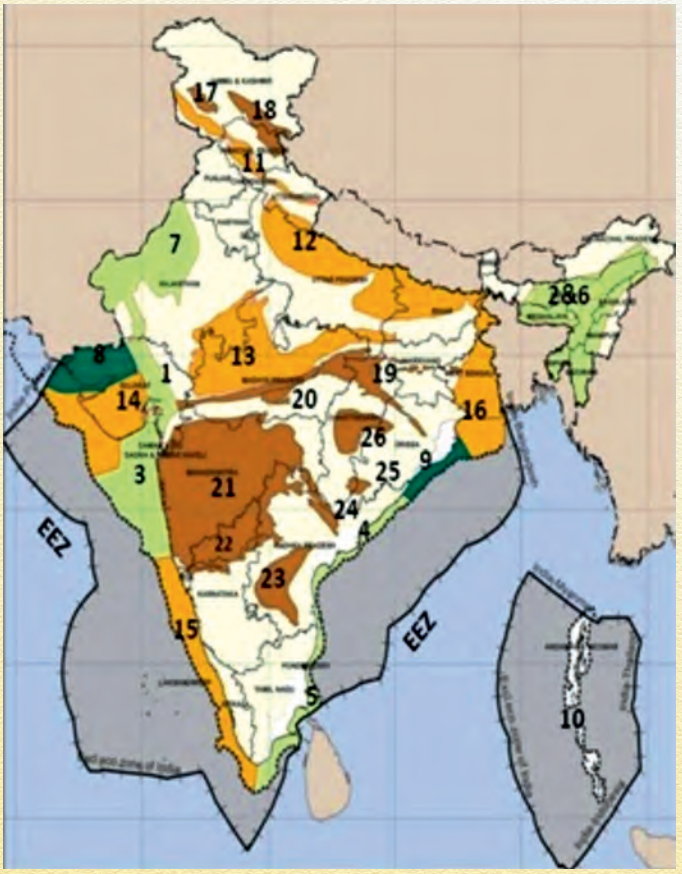
2.2 Sedimentary Basins in India

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**		

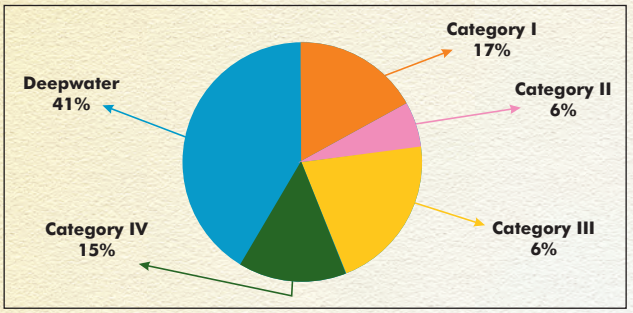


Indian Sedimentary Basins Map

- Category I
- Category II
- Category III
- Category IV
- Deep Water

3.14 Million Sq. Km

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:



Cryogenic LPG Import Terminal at Uran

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
BAENGAL	30	160	190
HIMALAYAN FORELAND	-	150	150
MAHANADI	100	45	145
DEEP WATER	7000	-	7000
TOTAL	**18815**	**9270**	**28085**

2.3.2 As on 1.4.2016, In-place hydrocarbon volume of 11,241 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 11,241 MMT of oil and oil equivalent gas of In-place volumes, the ultimate reserves which can be produced are about 4002 MMT of oil and oil equivalent gas since inception. The balance recoverable reserves are of the order of 1832 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 1.4.2016 are as under:

Table 2.3: Crude Oil and Natural Gas Reserve Position as on 1.4.2016

	Initial In-Place (MMT)			Ultimate Reserves (MMT)			Balance Recoverable Reserves (MMT)		
	Oil	Gas	O+OEG	Oil	Gas	O+OEG	Oil	Gas	O+OEG
ONGC	5286	2474	7760	1404	1162	2566	445	518	963
OIL	806	319	1125	248	205	425	81	103	184
Pvt/JV	995	1362	2357	225	786	1011	96	590	686
Total	**7087**	**4154**	**11241**	**1877**	**2153**	**4002**	**621**	**1211**	**1832**

O+OEG: Oil and Oil Equivalent of Gas

2.3.3 Unconventional Hydrocarbon Resources

CBM Resources

2.3.3.1 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)
(BCM)	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. CBM in-place reserves of about 280.3 BCM (9.9 TCF) have been established by different operators as on 01.04.2016. State-wise and block-wise CBM reserves position is given below:

Table 2.5: Recoverable Coal Bed Methane Reserves as on 1.4.2016

State	Block name	Operator	GIIP (BCM)	Recoverable Reserves (BCM)
Jharkhand	BK-CBM-2001/1	ONGC	30.182	3.68
	NK-CBM-2001/1	ONGC	9.529	1.46
	Jharia	ONGC	14.61	3.04
Madhya Pradesh	SP(E)-CBM-2001/1	RIL	47.855	17.56
	SP(W)-CBM-2001/1	RIL	55.501	18.97
West Bengal	RG(E)-CBM-2001/1	EOL	60.881	28.12
	Raniganj North	ONGC	7.43	1.86
	Raniganj South	GEECL	54.368	37.94
Total			280.357	112.63

2.3.5 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.

2.3.6 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 2017.

2.4 Crude Oil & Natural Gas Production

2.4.1 Crude oil production in 2016-17 upto December 2016 is about 27.044 Million Metric Tonne (MMT) by ONGC, OIL and Private/ JV Companies. About 70.5% of crude oil is by ONGC and OIL from nomination regime and remaining 29.5% of crude oil production is by Private/JV companies from PSC regime.

2.4.2 In 2016-17, the share of offshore crude oil production is about 51%. The remaining crude oil production was from 6 States viz., Andhra Pradesh (0.8%), Arunachal Pradesh (0.2%), Assam (11.6%), Gujarat (12.8%), Rajasthan (22.9%) and Tamil Nadu (0.7%). The details of crude oil production in 2016-17 upto December 2016 and last 5 years are as under:

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

State/Source	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17 (upto Dec)
Onshore						
Andhra Pradesh	305	295	297	254	295	203
Arunachal Pradesh	118	120	111	68.88	57	41
Assam	5,025	4,863	4,709	4,473	4,185	3,141
Gujarat	5,778	5,332	5,061	4,653	4,461	3,455
Rajasthan	6,553	8,593	9,180	8,848	8,602	6,192
Tamil Nadu	246	238	226	241	261	202
Total Onshore	**18,025**	**19,441**	**19,584**	**18,538**	**17,861**	**13,234**
Share of PSUs	11,231	10,605	10,171	9,482	9,051	6,963
Share of Private/JV	6,794	8,836	9,413	9,056	8,810	6,271
Offshore						
Share of PSUs	16,328	15,617	15,541	16,194	16,543	12,186
Share of Private/JV	3,733	2,804	2,663	2,729	2,546	1,624
Total Offshore	20,061	18,421	18,204	18,923	19,089	13,810
Grand Total	**38,086**	**37,862**	**37,788**	**37,461**	**36,950**	**27,044**

2.4.3 Natural Gas Production

Natural gas production in 2016-17 upto December 2016 is about 23.884 Billion Cubic Metre (BCM) or 86.9 MMSCMD by ONGC, OIL and Private/ JV Companies. About 78% of natural gas production was by ONGC and OIL from nomination regime and remaining 22% of natural gas production was by Private/JV companies from PSC regime.

Drilling Ship

2.4.4 The share of offshore natural gas production in 2016-17 is about 69.3%. The remaining natural gas production including CBM was from 10 States viz., Andhra Pradesh (2.7%), Arunachal Pradesh (0.1%), Assam (9.8%), Gujarat (4.8%), Rajasthan (4.1%), Tamil Nadu (3.0%), Tripura (4.4%), Jharkhand (0.01%), Madhya Pradesh (0.02%) and West Bengal (1.7%). The details of Natural gas production in 2016-17 upto December 2016 and last 5 years are as under:

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

State/Source	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17 (upto Dec)
Onshore						
Andhra Pradesh	3.7	3.4	3.2	1.5	1.7	2.3
Arunachal Pradesh	0.1	0.1	0.1	0.1	0.1	0.1
Assam	8	8	7.9	8.1	8.3	8.5
Gujarat	6	5.6	4.5	4.2	4.1	4.2
Rajasthan	1.6	1.9	2.7	3.2	3.7	3.6
Tamil Nadu	3.5	3.3	3.6	3.3	2.6	2.6

Inauguration of National Seismic Programme in Mahanadi Basin (Onland) by Shri Dharmendra Pradhan, MoS(I/C) MoPNG

State/Source	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17 (upto Dec)
Tripura	1.8	1.8	2.3	3.1	3.6	3.8
CBM-WB, MP, Jharkhand	0.2	0.3	0.4	0.6	1.1	1.6
Total Onshore	**24.9**	**24.3**	**24.7**	**24.1**	**25.2**	**26.7**
Share of PSU	23	22.2	21.8	20.5	20.7	22
Share of Private/JV	1.9	2.2	2.9	3.6	4.5	4.7
Offshore						
Share of PSU	48.1	49.6	49.2	47.3	44.8	45.8
Share of Private/JV	57.3	37.5	23.1	20.8	18.1	14.4
Total Offshore	**105.4**	**87.1**	**72.3**	**68.1**	**62.9**	**60.2**
Total	**130.3**	**111.4**	**97**	**92.2**	**88.1**	**86.9**

2.4.5 Coal Bed Methane (CBM) Production

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 0.47 MMSCMD. Another two blocks, Raniganj (East) block operated by Essar Oil Limited is producing at the rate of 1.13 MMSCMD and Jharia operated by ONGC is producing at the rate of 0.01 MMSCMD. Incidental CBM production from Sohagpur (East) and Sohagpur (West) is about 0.02 MMSCMD which is being used for internal consumption. Thus, Current CBM production from 5 blocks in the country is about 1.62 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, 241 MMT in-place reserves have been established by ONGC, OIL and Private/JV companies as on 1.4.2016, 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, only 48% of the basinal areas have been appraised. About 4% sedimentary basinal area has been declared as "NO GO area" by Ministry of Defence / Ministry of Environment & Forest which remains unapprised. This means, about half of the Indian sedimentary basins have the undiscovered potential of hydrocarbons. (Refer Table 2.8)

Table 2.8: Appraised Area of Indian Sedimentary Basins

Area Type	Million SQ.KM.	% of Total Area	Appraised Area Million SQ.KM	Appraised Area % of Total Area
Onland	1.39	44.3%	0.48	15.3%
Offshore	1.745	55.7%	1.026	32.7%
Total	**3.135**	**100%**	**1.506**	**48%**

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), 112 blocks/fields are operational. 15 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: 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), 138 exploration blocks have been relinquished and 53 blocks are under process of relinquishment. Currently E&P activities in 112 blocks are in progress. PEL is awaited for 7 Blocks. The PSC regime-wise/ round-wise details of operational and relinquished blocks are as under:

Table 2.9: 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	4	-	4	15	23
NELP IV	4	-	5	11	20
NELP V	6	-	3	11	20
NELP VI	12	-	15	25	52
NELP VII	14	-	9	18	41
NELP VIII	14	2	11	5	32
NELP IX	12	5	-	2	19
Total	**112**	**7**	**53**	**138**	**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 (114), offshore shallow water (58) 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 2.10: 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$ 16.02 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$ 9.71 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 2.11: Investment under NELP (US$ Million)

NELP Committed Investment		Actual Investment as on 1.4.2016		
NELP Rounds	Exploration Investment Commitment	Actual Exploration Investment	Actual Development Investment	Total Investment
NELP-I	1082.23	4720.58	7822.22	12542.81
NELP-II	775.41	908.73	33.94	942.67
NELP-III	978.18	3347.13	1849.50	5196.63
NELP-IV	1135.05	2095.64	4.54	2100.18
NELP-V	847.22	1005.42	0.37	1005.80
NELP-VI	3570	2571.53	1.72	2573.25
NELP-VII	1504.61	815.19	0.00	815.19
NELP – VIII	1102.25	439.14	0.00	439.14
NELP-IX	733.66	119.31	0.00	119.31
Total	**11728.61**	**16022.68**	**9712.29**	**25734.98**

2.8.5 Under PSC Regime as on 1.4.2016, an investment of about US$40 billion on exploration and production was made. Out of this, investment of US$6.2 billion on discovered fields, US$ 8.1 billion on Pre-NELP exploration Blocks and US$ 25.7 billion on NELP Blocks were made for exploration and production activities.

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 15 PEL and 359 PML blocks covering an area of about 99,719 Sq. Km. The basin-wise details of PEL/PML operated by ONGC and OIL are as under:

Table 2.12: Basin-wise operative PEL & PML under Nomination Regime as on 1.1.2017

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	1229.75	20	4546.01	25	5775.76
	Total - OIL	**5**	**1229.75**	**22**	**5006.01**	**27**	**6235.76**
ONGC Nomination	Assam-Arakan	5	1731.50	62	5947.98	67	7679.48
	Cambay	-	-	160	5816.26	160	5816.26
	Cauvery	-	-	32	3610.80	32	3610.80
	Himalayan Foreland	1	1828	-	-	1	1828
	Krishna Godavari	1	1190	49	6213.46	50	7403.46
	Kutch	1	16557	2	1672.50	3	18229.50
	Mumbai	2	16487	26	30394.68	28	46881.68
	Rajasthan	-	-	5	884.85	5	884.85
	Vindhyan	-	-	1	1150	1	1150
	Total - ONGC	**10**	**37793.50**	**337**	**55690.53**	**347**	**93484.03**
	Grand Total	**15**	**39023.25**	**359**	**60696.54**	**374**	**99719.79**

2.9.3 Private/JV companies are operating 81 PEL and 55 PML blocks covering an area of 1,29,137 Sq. Km. The basin-wise details of PEL/PML operated by private/JV companies are as under:

Table 2.13: Basin-wise PEL & PML with Pvt./ Joint Venture Companies as on 1.1.2017

Basin	PEL		PML		Total	
	No.	Area (Sq. Km.)	No.	Area (Sq. Km.)	No.	Area (Sq. Km.)
Andaman-Nicobar	1	13110	-	-	1	13110
Assam-Arakan Fold Belt	1	3213	-	-	1	3213
Assam-Arakan Shelf	9	7432	2	62.75	11	7494.75
Bengal	3	11733	-	-	3	11733
Cambay	31	9700.8	38	1165.09	69	10865.89
Cauvery	5	12499	2	156	7	12655
Ganga	1	2552			1	2552
Krishna Godavari	9	14180.46	6	1516.88	15	15697.34

Basin	PEL		PML		Total	
	No.	Area (Sq. Km.)	No.	Area (Sq. Km.)	No.	Area (Sq. Km.)
Kutch	5	6267	-	-	5	6267
Mahanadi	3	13689	-	-	3	13689
Mumbai	4	9098	3	2678	7	11776
Rajasthan	5	5324.34	4	3287.17	9	8611.51
Saurashtra	2	5542	-	-	2	5542
Vindhyan	2	5931	-	-	2	5931
Grand Total	**81**	**120271.60**	**55**	**8865.89**	**136**	**129137.50**

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, Geochemical 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 1.10.2016 are as under:

Table 2.14: Exploratory Inputs since inception under PSC Regime as on 1.10.2016

Basin	2D Seismic (LKM)	3D seismic (SQ. KM)	Exploratory Well (Nos)
Andaman-Nicobar	27070	16561.68	6
Assam-Arakan Fold Belt	1352	613	1
Assam-Arakan Shelf	5435.38	1756.59	31
Bengal	5247.2	4572.89	7
Cambay	24073.8	9166.87	280
Cauvery	64727.4	44560.76	46
Deccan Syneclise	476	-	-
Ganga	6417.25	1683.19	7
Himalayan-Foreland	810	-	1
Kerela Konkan	52290	14034.71	7
Krishna Godavari	76106	70592.31	176
Kutch	2985	6983.72	12
Mahanadi	59542	64659.30	53
Mumbai	21349	24604	44
Pranhita Godavari	195.16	-	1
Rajasthan	14157	16439.26	306
Satpura-South Rewa-Damodar	2050	304	2
Saurashtra	16037	14690	15
Vindhyan	3346	369.15	4
Total	**3,83,666**	**2,91,591.44**	**999**

Note: LKM - Line kilometre

2.10.2 Exploratory efforts carried out by PSUs, Indian Private and foreign companies under PSC regime are given below:

Table 2.15: Operator-wise Exploratory Work under PSC Regime

Operator	2D Seismic (LKM)	3D Seismic (SQ.KM)	Exploratory Well (Nos)
Foreign	61982	23871	286
Indian Private	115094	107825	311
PSU	206590	159895	402
Total	**383666**	**291591**	**999**

2.11 Exploratory Efforts by PSUs under nomination regime

2.11.1 ONGC and OIL have carried out 916457 line kilometre (LKM) of 2D seismic survey 126264 Sq. Km of 3D seismic survey and drilled 6237 exploratory wells since inception as on 1.1.2017. The details of exploratory efforts in terms of 2D, 3D seismic and exploratory wells are as under:

Table 2.16: Exploratory Inputs by ONGC and OIL as on 1.1. 2017

S. No.	COMPANY	Cumulative exploratory efforts as on 1.1.2017		
		2D SEISMIC (LKM)	3D SEISMIC (SQ. KM)	Exploratory WELLS (NOS.)
1	ONGC- Nomination	882363	114469	5875
2	Oil India Ltd. -Nomination	34094	11795	362
	Total	**916457**	**126264**	**6237**

2.12 Hydrocarbon Discoveries in 2016-17

2.12.1 ONGC, OIL and Private/JV companies have made 23 hydrocarbon discoveries. The company-wise details of hydrocarbon discoveries made in 2016-17 upto December, 2016 provisionally are as under:

Table 2.17: Hydrocarbon Discoveries in 2016-17 upto December 2016

S.No.	Company	Crude oil Discovery	Natural Gas Discovery	Total
1	ONGC	10	6	16
2	OIL	4	2	6
3	NTPC	1	-	1
	Total	**15**	**8**	**23**

2.13 Hydrocarbon Discoveries in PSC blocks

2.13.1 So far a total of 236 hydrocarbon discoveries (122 oil and 114 gas) have been made under PSC Regime in Blocks/Fields. 101 hydrocarbon discoveries have made by CPSE and State PSU, GSPCL. The remaining 135 discoveries have been made by Private/Foreign Companies as operators. The operator-wise details of hydrocarbon discoveries are as under:

TABLE 2.18: Operator-wise Hydrocarbon Discoveries under PSC Regime

Operator	Oil Discoveries	Gas Discoveries	Total
Oil and Natural Gas Corporation Ltd.	23	39	62
Reliance Industries Ltd.	12	40	52
Cairn Energy India Pty Ltd.	42	8	50
Gujarat State Petroleum Corporation Ltd.	25	11	36
Focus Energy Ltd.	2	7	9
Jubilant Oil & Gas Private Limited.	2	4	6
Essar Oil Ltd.	5		5
Hindustan Oil Exploration Company Limited.	2	1	3
Mercator Petroleum Private Limited.	2		2
Niko Resources Limited.		2	2
Oil India Ltd.	1	1	2
NTPC	1		1
British Gas Exploration and Production (India) Ltd.	1		1
Hardy Exploration & Production (India) Inc.		1	1
Interlink Petroleum Ltd.	1		1
Jay polychem India Pvt. Ltd.	1		1
Naftogaz	1		1
Selan Expl. Tech. Ltd.	1		1
Total	**122**	**114**	**236**

2.13.2 Currently hydrocarbon discoveries in 8 NELP Blocks are under development under PSC Regime. The details of hydrocarbon discoveries which are likely to be put on production in next couple of years, are as under:

Table 2.19: Development of Hydrocarbon Discoveries under PSC Regime

S.No.	Block	Operator	Hydrocarbon discoveries
1	KG-DWN-98/3 (KG-D6)	RIL	Four Satellite Gas Field Development and D-34 gas discovery
2	CB-ONN-2002/3	GSPC	SE-2, SE-3, SE-4, SE-5, SE-8 and SE-10 discoveries
3	CB-ONN-2002/3	GSPC	Ank-40S Discovery
4	AA-ONN-2002/1	Jubilant Oil & Gas Private Limited	Kathalchari-1 discovery
5	CB-ONN-2004/2	ONGC	Vadatal-3 & Vadatal-5 Discovery
6	CY-ONN-2002/2	ONGC	Madanam-3 & Madanam-5
7	KG-DWN-98/2	ONGC	Annanpurna, Padmavati, Kanakdurga, M3, M4, A1, U1 and A2
8	CB-OSN-2003/1	ONGC	Aliabet-2, Aliabet-3 and Aliabet-4 Discovery

2.14 National Data Repository (NDR)

2.14.1 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. 16.65 Lakh LKM of 2D Seismic data, 5.85 Lakh Sq. KM of 3D Seismic data and 6600 well log data have been loaded in NDR system. NDR is likely to be operational in 2017.

2.15 Shale Gas/Shale Oil

2.15.1 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.

2.15.2 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 21 wells. OIL is carrying out data collection and G&G studies for the well location.

2.16 Gas Hydrate

2.16.1 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) proposed for renewal

Shri Dharmendra Pradhan, MoS(I/C) MoPNG addressing during Discovered Small Field Bid Round

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.

2.17 Policy initiatives taken by the Government for enhancing crude oil & gas Production

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

Gas Pricing Reforms

Government approved the New Gas Pricing Formula in October, 2014 leading to resolution of this long pending issue. The new gas pricing guidelines has struck a fine balance between the requirements of both producing and consuming sectors. To incentivize gas production from difficult areas such as High Pressure High Temperature (HPHT) reservoirs and deepwater and ultra deepwater areas, government has given marketing and pricing freedom. The marketing freedom so granted would be capped by a ceiling price arrived at on the basis of landed price of alternative fuels. The reserves which are expected to get monetized are of the order of 6.75 Trillion Cubic Feet (TCF) which is valued at around Rs150,000 Crore at the present gas price.

Discovered Small Field Policy

The bidding round under the Discovered Small Field Policy launched on 25th May 2016 in New Delhi thereby offering 67 discovered small fields in 46 contract areas of ONGC and OIL for international bidding. This is the first round of bid in last 6 years.The policy aimed at monetizing these discoveries in a time bound manner to boost domestic production of Oil and Gas. In tune with minimum government-maximum governance, the policy is packed with all possible reforms in the E&P sector such as uniform licensing, pricing and marketing freedom, easy to administer revenue sharing mechanism etc. The policy enables and provides attracting features for start-ups to invest in monetizing these fields. The response from the stakeholders is very encouraging and would lead to monetization of reserves worth Rs 70,000 Crore thereby increasing the domestic production and government revenue through royalty and revenue sharing mechanism. In order to promote investment and attract the investors Road shows were organized in Mumbai, Guwahati, Houston, Calgary, Dubai, Singapore, London and Bangalore. During the Road Shows interactive meets were held with the CEOs of prominent industries and prospective bidders. 134 bids for 34 contract areas were received from Indian and foreign joint venture companies on the bid closing date of 21st November, 2016. Out of which, 31 contract area are likely to be awarded in 2017 subject to Government approval.

Reform Initiatives to Enhance Domestic Production

To ease out rigidities in the functioning of PSC regime Government approved Policy Framework for Relaxations Extensions and clarifications for early Monetization of Hydrocarbon Discoveries. These reforms have helped in moving ahead with discoveries with associated reserves of around Rs. 30,000 Crore and have also helped in resolving around 40 pending issues in different contracts. Government has approved a policy on Testing Requirement in NELP blocks to resolve existing dispute on this issue and provide clarity for future. This initiative has helped in monetization of resources of the order of Rs 75,000 Crore. Government approved a policy for grant of extension to the Production Sharing Contracts for small and medium sized discovered fields. The policy provides clarity to investors for planning their investments and would

help in monetization of resources of the order of Rs. 50,000 Crore in the extended period.

Hydrocarbon Exploration and Licensing Policy (HELP)

- A new and path breaking model for attracting investment in the E&P sector in tune with the principle of ease of doing business for forthcoming biding rounds.
- **Single License** for exploration and production of conventional as well as non-conventional Hydrocarbon resources.
- **Open Acreage Licensing Policy-** option to select the exploration blocks without waiting for formal bid round.
- **Revenue Sharing Model-simple, easy to administer-** no cost recovery - no micro-management by the Government - operational freedom to the operator.
- **Pricing and Marketing Freedom-** a major incentive for investment.
- **Reduced rate of royalty** for offshore blocks.
- Ushering new era in the E&P sector of the country. The policy has been welcomed by all stakeholders.

Monetization of the Ratna offshore field

ONGC has initiated necessary action for development of this field after cancellation of letter of award to Essar Oil Limited and Premier Oil Limited. ONGC will be able to bring the field back to production in four years time and achieve a rate of production of 3300 BOPD. With this the Rs.26,200 Crore resource will be unlocked. Government will also earn revenue to the tune of Rs. 8,000 Crore through cess and royalty.

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

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.

Hydrocarbon Vision 2030 for North East

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 and targets an investment of Rs.1.30 lakh Crore till 2030 in North East India.

National Seismic Programme of Un-appraised areas

Almost half of the India's Sedimentary areas are yet to be appraised. Government of India has taken up an ambitious programme of undertaking 2D seismic survey of entire un-appraisal areas with an estimated expenditure of Rs.5000 Crore. National seismic programme was launched on 12th October 2016.

Chapter

3

Pipelines and Natural Gas

Pipelines and Natural Gas

3.1 Pipeline Network:

Country is having about 15,000 km long Gas Pipeline network. The major gas pipeline transporters are GAIL, GSPL and RGTIL. In budget speech of 2014-15, Government envisaged to develop an ecosystem of National Gas Grid across the country by developing additional 15,000 km to complete the National Gas Grid. Out of the proposed 15,000 km gas pipeline, about 14,500 km has already been authorized and these projects are at various stages of implementation.

In order to develop gas pipeline network in the Eastern Part of the Country, the Government has approved partial capital grant at 40 percent (Rs. 5,176 Crore) of the estimated capital cost of Rs.12,940 Crore to GAIL for development of two gas pipeline projects i.e. Jagdishpur- Haldia and Bokaro-Dhamra Pipeline projects. This project is popularly known as "Pradhanmantri Urja Ganga Project". This is the first time in the history that Government has come forward to fund the gas pipeline infrastructure in the country. This project will connect Eastern part of the country with Natural Gas Grid and will ensure the availability of clean and eco-friendly fuel i.e. Natural Gas to the industrial, commercial, domestic and transport sectors in the States of Uttar Pradesh, Bihar, Jharkhand, Odisha and West Bengal. These pipeline Projects would support the revival of 3 Fertilizer Plants namely Gorakhpur, Barauni and Sindri along the route of these pipeline projects. The steps taken by Government will improve the socio-economic conditions in the region by providing direct as well as indirect employment for about 21000 people. By connecting City gas projects with these pipeline projects, clean cooking fuel at the door step of Domestic households as well as clean fuel to transport sector in the eastern region will be made a reality in coming 3 to 4 years.

3.2 Gas Production and Supply position

As per the BP statistical review 2016, India is the third largest energy consumer in the world with oil and gas constituting about 34.4% of primary energy consumption, of which 27.9% comes from crude oil and 6.5% is from Natural gas. Coal constitutes around 58.13% of total energy consumption in the country.

Global primary energy consumption increased marginally by 0.97% in 2015 over 2014 but remained well below the 10-year average [Compound Annual Growth Rate (CAGR) for 2005-15] of 1.85%. In comparison, Asia Pacific region grew at 2.1% in 2015 over previous year and 4.03% for 2005-15 period where as India grew 5.2% compared to 2014 and 5.93% for 2005-15 period leading the pack.

Oil Pipeline

The growth rate (CAGR) for 2005-15 period for natural gas in the world has been 2.27%, Asia Pacific 5.49% and India at 3.55%. Natural gas constitutes only 6.5% of total primary energy consumed in India during 2015, compared to 23.85% in the world, 11.48% in Asia Pacific and 26.51% in Organization for Economic Co-operation and Development (OECD) countries. Obviously, the share of natural gas is substantially low in India compared to World and Asia-Pacific region, however, steps are being taken to increase the share of natural gas in India's primary energy basket in future.

Total daily average domestic gas production (gross production) during first half of 2016-17 (April 2016 to September 2016) was around 85.92 MMSCMD whereas supply was 67.02 MMSCMD. Total consumption of natural gas in the country in the same period was around 136.16 MMSCMD which consist of 69.14 MMSCMD of imported R-LNG (50.8% 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) & 13th five year plan (2018-22) is as under:

Sector	2016-17	2017-18	2018-19	2019-20
Power	207	225	243	261
Fertilizer	113	113	113	113
City Gas	46	47	50	53
Industrial	27	28	32	35
Petrochemicals/ Refineries/ Internal Consumption	72	72	76	80
Sponge Iron/ Steel	8	9	9	10
Total Demand	**473**	**494**	**523**	**552**

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

Launch of Pradhan Mantri Urja Ganga Project by Hon'ble Prime Minister Shri Narendra Modi

3.3 Regasification infrastructure in the country

Liquefied Natural Gas (LNG) is imported into the country on long and 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 primarily situated in the western coast of India. Regasification capacity in the country is around 26.3 Million Metric Tonne Per Annuam (MMTPA) which meets more than 50% of total gas requirement in the country. The terminal wise details are given below in the table:

Location of LNG terminal	Owner of the Terminal	2016-17 Existing Capacity (MMTPA)	2017-18 Existing/ Projected Capacity (MMTPA)	2018-19 Existing/ Projected Capacity (MMTPA)
Dahej	Petronet LNG	15	15	17.5
Hazira	Hazira LNG	5	5	7.5
Dabhol	RGPPL *	1.3	5	5
Kochi	Petronet LNG	5	5	5
Mundra	Adani, GSPC	-	-	5
Ennore	Indian Oil	-	-	5
Kakinada FSRU	Andhra Pradesh Gas Distribution	-	-	3.5
Total Capacity (MMTPA)		**26.3**	**30**	**48.5**
Total Capacity (MMSCMD)		**95**	**108**	**175**

*In absence of Breakwater, available capacity is 1.3 MMTPA. Nameplate capacity of Dabhol terminal is 5 MMTPA.

In addition, regasification terminals for 20-25 MMTPA capacity on both East and West coast of India are under planning by various entities.

Inauguration of LNG Bus in Kerala by Shri Dharmendra Pradhan MoS(I/C) MoPNG

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. 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 CGD projects including Piped Natural Gas (PNG) & Compressed Natural Gas (CNG) in various cities are being awarded by PNGRB through bidding process.

There are 29 CGD Entities which are developing and operating in 75 Geographical Areas (GAs) in 20 States/UTs. This includes 39 new GAs which have been authorized by PNGRB through various round of CGD bidding. PNGRB has invited bids for 8th round bidding for 7 new GAs (08 Districts) and bidding process is underway. As on 30th October'16, there are over 2.84 Million CNG vehicles being catered by 1167 CNG stations including 141 CNG stations set up in the last year. National Green Tribunal and other environmentalists have also mandated and supported the use of CNG as Green Fuel in the cities and along the National and State Highways.

3.5 Piped Natural Gas (PNG)

Looking at total energy basket of India, share of natural gas is around 6.5%. Government of India has set an ambitious target to increase the share of natural gas to 15% by 2020 and make India a gas based economy.

At various forums, Hon'ble Prime Minister of India has emphasized on increasing the reach and accessibility of PNG connections to maximum number of households. It will also help in making LPG connection available for rural/remote locations in the country. In this background, it is worthwhile to mention that as on 30th October'16 over 3.32 Million PNG (Domestic) customers are being served by various CGD entities across India. In addition, 22199 industrial and 6387 commercial customers are also getting benefited by PNG.

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)
3. Creation of CGD infrastructure in Smart Cities
4. Inclusion of more number of cities by Petroleum and Natural Gas Regulatory Board (PNGRB) for development of City Gas Distribution (CGD) network
5. 100% Allocation of domestic gas for domestic PNG and CNG segments for faster roll out of PNG connections and CNG stations in given city/geographical area

Chapter

4

Refining

Refining

4.0 Refining Capacity

4.0.1 The Indian refining industry has established itself as a major player globally. India is emerging as a refinery hub and refining capacity exceeds the demand. The country's refining capacity has increased from a modest 62 Million Metric Tonnes Per Annum (MMTPA) in 1998 to 230.066 MMTPA at present, comprising of 23 refineries – 18 under Public Sector, 3 under private sector and 2 in Joint Venture (JV). The capacity wise details of the refineries are given below:

Sr. No.	Refinery Location	Name of the Company	Name Plate Capacity (MMTPA)*
PSU Refineries			
1	Digboi-1901#	Indian Oil Corporation Limited	0.650
2	Guwahati-1962		1.000
3	Barauni-1964		6.000
4	Koyali-1965		13.700
5	Bongaigaon-1974		2.350
6	Haldia-1975		7.500
7	Mathura-1982		8.000
8	Panipat-1998		15.000
9	Paradip-2016		15.000
10	Mumbai-1954	Hindustan Petroleum Corporation Limited	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		27.000
23	Vadinar-2006	Essar Oil Limited	20.000
Total			**80.000**
Grand Total			**230.066**

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

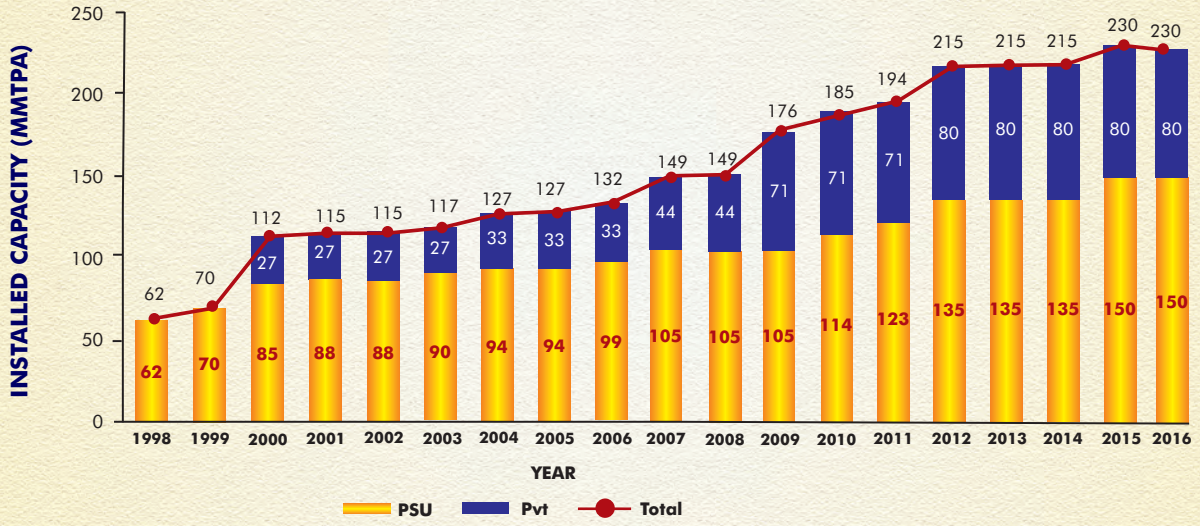
*MMTPA-Million Metric Tonne Per Annum

4.0.2 The refining capacity is not only sufficient for domestic consumption but also leaves a surplus for export of petroleum products. Since 2001-02, India is a net exporter of petroleum products. During 2016-17 (From April, 2016- November, 2016), the country has exported 43.742 Million Metric Tonnes (MMT) of Petroleum products worth US Dollars 18.579 Billion (provisional). India is the largest exporter of petroleum products in Asia since August 2009.

4.1. Refining Capacity Addition over the Years

4.1.1 The graphical representation of the refining capacity addition over the years shown in Graph 4.1 (As attached).

Graph 4.1 Refining Capacity addition over the years



4.2 Expansion of Existing Refineries

The Capacity expansion planned/being implemented by Ministry is as under:-

S.No.	Name of the Company	Location of the Refinery	Increase in Capacity, MMTPA
1	Indian Oil Corporation Limited (IOCL)	Haldia	0.50
2	Indian Oil Corporation Limited (IOCL)	Bongaigaon	0.35
3	Hindustan Petroleum Corporation Limited (HPCL)	Mumbai	2.00
4	Hindustan Petroleum Corporation Limited (HPCL)	Visakhapatnam, Andhra Pradesh	6.700
5	Bharat Oman Refinery Limited (Bharat Petroleum Corporation Limited & Oman Oil Company, Joint Venture), Bina	Bina, Madhya Pradesh	1.800
6	Bharat Petroleum Corporation Limited	Kochi, Kerala	6.000

4.3 Refinery Performance Improvement

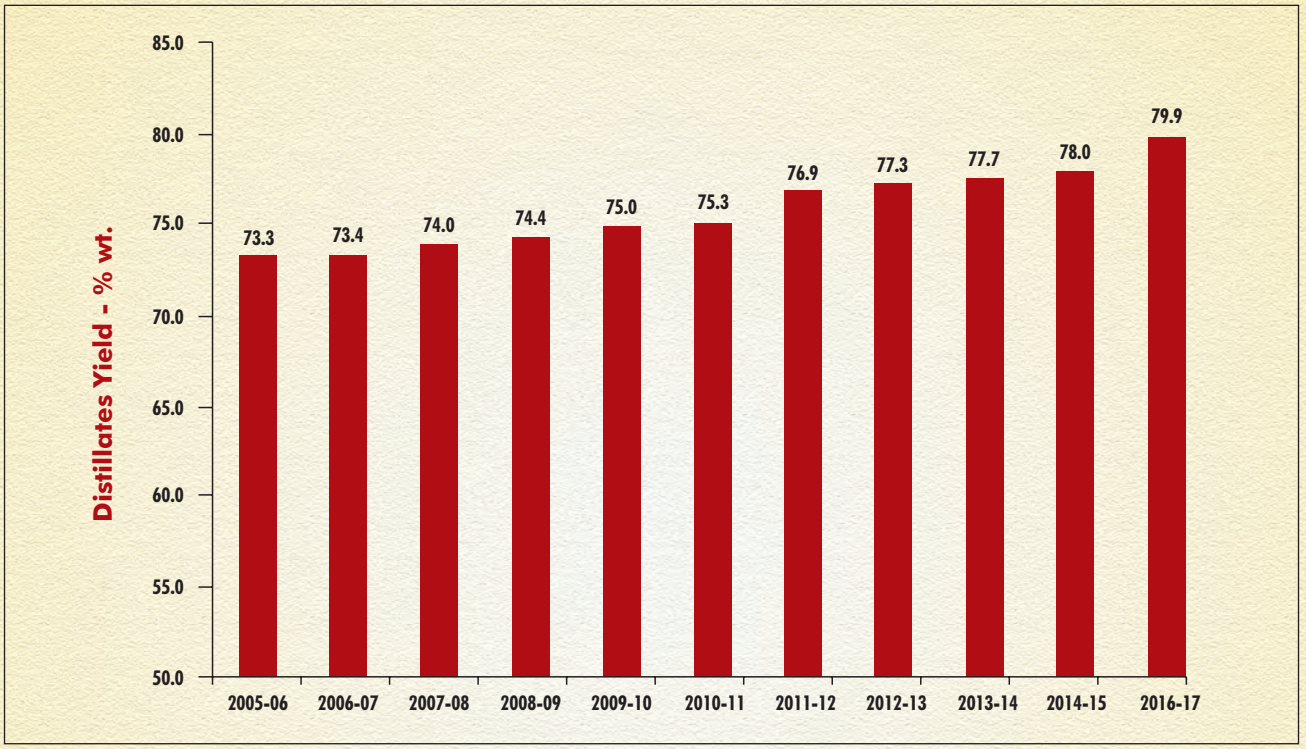
4.3.1 Indian public refineries are equipped with modern technologies and continuously upgrade the technologies in line with the International trend and as per the requirement. Indian refineries have accorded top priority to reduce the energy consumption through various energy conservation measures.

4.3.2 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 has 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.

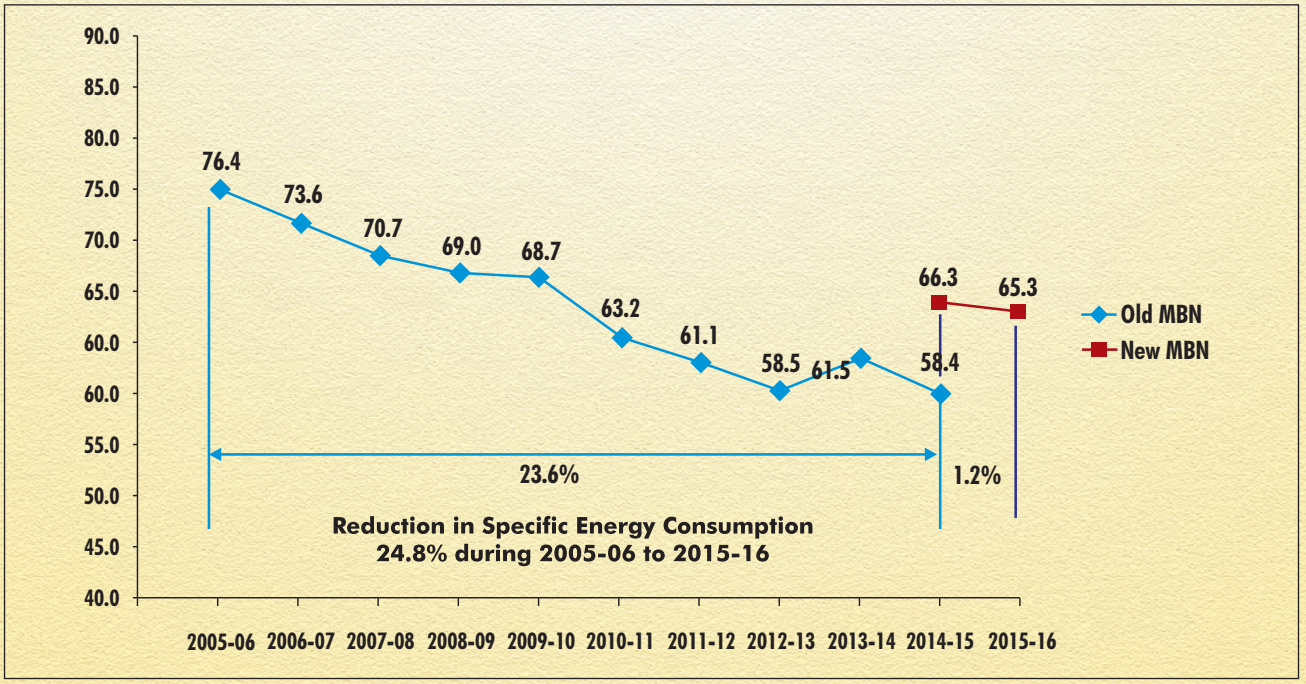
4.3.3 Further, adoption of modern technologies by Indian refineries and energy conservation measures has helped in increasing the distillate yield, quality upgradation of petrol/diesel and reduction in Specific energy consumption (MBTU/Bbl/NRGF-MBN). The industry average distillate yield (wt% on crude) has improved from 73.3% in 2005-06 to 79.7% in 2015-16 as shown in Graph 4.2. Similarly, the industry average MBN has come down from 76.4 (old) in 2005-06 to 65.7 (New) in 2015-16 as depicted in graph 4.3. The MBN methodology and reporting has been changed to New MBN from 2015-16.

INDMAX Paradip Refinery

Graph - 4.2
Distillates Yield (%wt.)
PSU Average



Graph - 4.3
Specific Energy Consumption (MBN)
Industry Average



4.4 Auto Fuel Vision and Policy 2025

As per roadmap laid in Auto Fuel Vision & Policy -2025, Ministry of Petroleum & Natural Gas vide order dated 19.01.2015 has notified for implementation of BS-IV auto fuels in the entire country w.e.f 01.04.2017 in a phased manner. Further, It has also been 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. Ministry of Road Transport & Highways vide Notification No. GSR 889(E) dated 16.09.2016 has notified emission standards for BS VI fuels.

4.5 BRIEF DESCRIPTION OF THE REFINERIES

Public Sector Refineries

IOCL Refineries

4.5.1 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 86.4% in 2015-16.

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

4.5.2 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 90.4 in 2015-16.

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.

4.5.3 Barauni Refinery (Sihar) – 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 109.1% in 2015-16.

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

4.5.4 Koyali Refinery (Gujarat) – Indian Oil Corporation Ltd. (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 13.7 MMTPA. The crude refining capacity utilisation of the refinery was 100.9% in 2015-16.

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.

4.5.5 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 103.9% in 2015-16.

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

4.5.6 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 103.7% in 2015-16.

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

4.5.7 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 110.8% in 2015-16 (lower planned shutdown for undertaking major FCC revamp jobs).

It is first Green Refinery of Indian equipped with elaborate environment monitoring system

IOCL Paradip Refinery

and ecological park. It also uses natural gas to control SO_2 emissions from the refinery.

4.5.8 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 101.9% in 2015-16

Panipat refinery is the most modern refinery of Indian Oil Corporation Ltd. The Puriefied Terepthalic Accid (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.

4.5.9 Paradip Refinery (Odisha) – Indian Oil Corporation Limited (IOCL):

Paradip Refinery has been dedicated to the National 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 of 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 (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.

HPCL Refineries

4.5.10 Mumbai Refinery (Maharashtra) – Hindustan Petroleum Corporation Limited (HPCL)

Mumbai Refinery was first incorporated in 1952 as Standard Vacuum Refining Company of India (Stan Vac) 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 which is being revised to 7.5. The crude refining capacity utilisation of the refinery was 123.3% in 2015-16

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

4.5.11 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 the refinery was 111.1% in 2015-16

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

BPCL Refineries

4.5.12 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 Ldt. 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 111.4% in 2015-16

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.

4.5.13 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 112.8% in 2015-16

The refinery is equipped to receive crude oil in Very Large Crude Carriers (VLCC). Kochi Refinery has undertaken an ambitious expansion plan to enhance refining capacity to 15.5 MMTPA and also to diversify into petrochemical manufacturing for value addition.

CPCL Refineries

4.5.14 Monali 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 86.6% in 2015-16.

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 Pushpothur, Tamil Nadu in 2007.

4.5.15 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 54.4% in 2015-16

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 Nagapattinarn area for handling crude and products for Cauvery Basin Refinery:

NRL Refinery

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

Numaligarh Refinery, popularly known as "Assam 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 in 3,000 MMTPA. The crude refining capacity utilisation of the refinery was 84.0% in 2015-16.

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

MRPL Refinery

4.5.17 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) & the Aditya Birla Group of Companies. In March, 2003 MRPL became a subsidiary of ONGC.

The present capacity of the refinery is 15.000 MMPTA. The crude refining capacity utilization of the refinery was 103.5% in 2015-16.

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 Hydrocackers producing premium disel (High Cetane). It is also the only Refinery ie. to have 2 CCRs producing Unleased Petroleum of High Octane.

ONGC Refinery

4.5.18 Tatipaka Refinery (Andhrapradesh) - 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 102.1% in 2015-16.

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

Joint Venture Refneries

4.5.19 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 Company 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 106.7% in 2015-16

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 faciliiy (SPM), Crude Oil Storage Terminal (COT) at Vadinar in Gujarat and 935 km long cross country crude pipeline from Vadinar to Bina (VBPL).

4.5.20 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 9.004 MMTPA. The crude refining capacity utilisation of the refinery was 119.0% in 2015-16.

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 & cross country transportation of crude oil.

Private Sector Refineries

4.5.21 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 97.9% in 2015-16

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. nuilaritice Industries Lioniled-SEZ

4.5.22 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 137.5% in 2015-16

The SEZ refinery was 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.

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

The refinery vies commissioned in November, 2006.

The present capacity of the Refinery is 20.000 MMTPA. The crude refining capacity utilisation of the refinery was 95.5% in 2015-16.

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

Signing of MoU for West Coast Mega Refinery by IOCL, BPCL and HPCL in presence of Shri Dharmendra Pradhan, MoS(I/C) MoPNG, Shri Nitin Gadkari, Minister for Road Transport and Highways and Shipping, Shri Piyush Goyal, MoS(I/C) Power, Coal, New and Renewable Energy & Mines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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 (OMCs) 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), Bharat Oman Refineries Ltd (BORL) and private companies like Reliance, Essar & Shell.

There are 298 OMC Terminal / Depots, 188 LPG Bottling plants, 53522 OMC Retail Outlets, 18390 LPG Distributorships, 6544 OMC SKO/LDO Dealers in the country as on 30.11.2016. The prices of sensitive petroleum products such as PDS SKO and Domestic Liquefied 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. Eligible customers of LPG are getting their subsidy directly in their bank account.

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, 2015-16 and 2016-17 (April – December). The quantity of petrol made available during 2015-16 was 21.85 MMT. The quantity of Diesel made available during 2015-16 was 74.65 MMT.

The actual availability of MS in the country in the current financial year 2016-17 (April – November) (Provisional) is 15.99 MMT. The actual availability of HSD in the current financial year 2016-17 (April-November) (Provisional) is 50.68 MMT. The allocation of PDS SKO for the year 2016-17 is 61,31,872 KL which has been released over four Quarters of 2016-17.

Launch of SAHAJ by MoS(I/C) MoPNG & Secretary MoPNG

5.2.2 ALLOCATION OF PDS KEROSENE TO STATES / UTs

1. 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.

2. PDS Kerosene allocation of States/UTs have been rationalized since 2010-11, by taking into account the factors such as increase in domestic LPG/PNG connections and non-lifting of PDS Kerosene quota by the concerned States/UTs etc.

3. Department of Expenditure, Ministry of Finance, had recommended reduction of 19.7% with a cut of 10% minimum and 25% maximum in quota allocation to States/UTs for the year 2016-17 over the allocation of 2015-16. Accordingly, PDS SKO allocation to the States/UTs has been rationalized for the year 2016-17. However, in view of the peculiar geographical / security situation and logistics constraints the allocation of PDS SKO to North Eastern States (North East namely, Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura) and Jammu and Kashmir, reduction in PDS quota to these States has been restricted to 10% only over year 2015-16. Upto 4th Quarter of 2016-17, a total allocation of 69,31,872 KL has been made to the States/UTs.

5.3 CHALLENGES IN MARKETING OF SENSITIVE PETROLEUM 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 RO Dealers for irregularities / malpractices.

b. Automation of Retail Outlets: In order to monitor the activities at Retail Outlets by adapting the latest technological improvements, automation of Retail Outlets is being implemented. There are nearly 32,934 number of ROs selling more than 100 KL of fuel per month. In nearly 17,620 ROs automation has been completed and in 14,464 ROs 'No Automation No Operation' (NANO) has been implemented w.e.f January 2016.

c. Tamper proof locking system: OMCs have introduced new tamperproof tank truck locking systems to prevent enroute 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 30.11.2016 is 15,107.

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 at all the company owned / dealer owned / contractor owned tank trucks. Nearly 44,277 tank trucks have been covered with Vehicle Management System by OMCs as on 30.11.2016 covering nearly 98.4% of tank trucks.

5.4 Retail Marketing Infrastructure of LPG

The retail marketing of petroleum products in India is done by the Public Sector Oil Marketing Companies (OMCs) i.e. Indian Oil Corporation Ltd (IOCL), Hindustan Petroleum Corporation Ltd (HPCL), Bharat Petroleum Corporation Ltd. (BPCL) and Private Companies such as Reliance, Essar, Shell, etc. OMCs aim to increase the National LPG coverage to 75% with minimum 60% coverage at State level and atleast one distributor in each block by 2019.

In the Public Sector, there are 188 LPG Bottling Plants, 18390 LPG Distributorships in the country as on 30.11.2016. The prices of sensitive petroleum products such as LPG are controlled by the Government. As on 05.12.2016, 448 Nos. of new LPG distributorships have been commissioned by OMCs in year 2016-17. 954 Letter of Intents (LOI) were issued by OMCs in 2016-17 as on 05.12.2016. Currently, the process for setting up of more rural LPG distributorships is undertaken by OMCs.

5.5 MAJOR INITIATIVES UNDERTAKEN

5.5.1 PAHAL (DBTL Scheme)

Government of India has launched Direct Benefit Transfer for LPG consumer (DBTL) scheme namely, 'PAHAL', in 54 districts of the country on 15.11.2014 and as on 29.11.2016, 17 Crore LPG consumers have joined the scheme. The scheme aims to rationalise subsidies based on approach to cut subsidy leakages, but not subsidies themselves. LPG consumers who join the PAHAL scheme, will get the LPG cylinders at non-subsidised price and receive LPG subsidy (as per their entitlement) directly into their bank accounts. With the implementation of PAHAL, new regime of transparency in subsidy management has been put in place empowering LPG consumers in the country.

PAHAL has entered into Guinness Book of World Records being largest Direct Benefit Transfer Scheme. So far, more than Rs. 38,200 Crore have been transferred into the bank accounts of consumers as on 24.11.2016.

PAHAL has further helped in identifying 'ghost' accounts, multiple accounts and inactive accounts. This resulted in curbing diversion of subsidised LPG to commercial purposes. With the implementation of PAHAL Scheme, it has resulted in an estimated savings of Rs. 14,818 Crore and Rs 6,443 Crore during the financial year 2014-15 and 2015-16, respectively.

5.5.2 Pradhan Mantri Ujjwala Yojana (PMUY)

The Government has launched "Pradhan Mantri Ujjwala Yojana" (PMUY) for providing LPG connections to 5 Crore women belonging to the Below Poverty Line (BPL) families over a period of 3 years starting from FY 2016-17. Hon'ble Prime Minister of India has formally launched the scheme on 01.05.2016. Objective of the scheme is to provide clean fuel solution to poor households especially in rural areas. Use of fossil fuels and conventional fuel like cow-dung, firewood etc has serious implications on the health of Rural womenfolk and Children.

Under the scheme, the Government provides deposit free LPG connection to the adult woman member of BPL family, which includes, security deposit towards cylinder and Pressure Regulator, DGCC Card, Suraksha Hose and administrative/installation charges and the Government is bearing an expenditure upto Rs. 1600/- for each new connection. The customer will have to bear the cost of Hot Plate and purchase of first refill. Alternatively, it is also financed at zero interest cost by the OMCs and recoverable through EMIs. As per the scheme, the eligible BPL household beneficiary is identified through available data of Socio Economic Caste Census (SECC), 2011.

Saina Nehwal at Give It Up Campaign

Priority is given to States/UTs having LPG coverage less than the national average and hilly and North-eastern States. More than 1.28 Crore connections have been released under the scheme as on 14.12.2016.

5.5.3 Give It Up Campaign

As a part of subsidy management, Hon'ble Prime Minister of India gave call to well-off LPG consumers to voluntarily surrender their subsidy by launching `GiveItUp' campaign. GiveItUp campaign has evoked huge response from socially committed individuals and has resulted in more than 1.05 Crore consumers giving up their LPG subsidy voluntarily. GiveItUp campaign has heralded a new chapter in social volunteerism by the citizens of this country and has set a new benchmark of public good delivery mechanism.

5.5.4 Rationalisation of LPG Subsidy (Higher Income Group)

Government has taken steps to rationalise the subsidy outgo by excluding such LPG consumers or his/her having spouse taxable income of above Rs 10 lakhs from availing LPG subsidy with effect from 01.10.2016. Necessary operational guidelines have been issued to OMCs to give effect to the direction of the Ministry. As on 29.11.2016, 7,92,658 consumers have either submitted self declaration or identified for exclusion using information provided by Department of Revenue.

5.5.5 Unified Guidelines for Selection of LPG Distributorships 2016

A robust supply chain is critical for ensuring ease of accessibility and availability of LPG to the consumers in general and rural population in particular. In order to achieve the stated objective, the Ministry in consultation with OMCs has notified Unified Guidelines for Selection of LPG Distributorships, 2016 to make the process more transparent.

Through the Unified Guidelines, it is sought to achieve the objective of encouraging large

number of entrepreneurs to participate in LPG supply chain management. Some salient features of the guidelines are:

- Four new categories of distributorships, namely, Shehri, Urban, Rurban and Durgam (DKV).
- Separate reservation of women of 33% to encourage women entrepreneurs.
- Setting up of DKV by Government run Cooperative societies/Corporations on nomination basis.
- Shehri, Rurban and Gramin distributorships will be selected through online process, as a part of Digital India Initiative.

5.6 Direct Benefit Transfer in PDS Kerosene Scheme (DBTK)

The scheme for transfer of subsidy on PDS kerosene directly to the account of consumers is called "Direct Benefit transfer of Kerosene Subsidy Scheme, 2016" (DBTK). Distribution and allocation reforms in PDS Kerosene has been initiated with this scheme. The objective of the scheme is to transfer subsidy directly into the bank account of eligible consumers of SKO through the Public Distribution System (PDS) as identified by the States / UT Government, - on purchase of PDS kerosene at non-subsidized price to be sold by the person / entity authorized by the respective State/UT Government.

Under DBTK implementation, States are 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 / UTs voluntarily agree to undertake cuts in kerosene allocation, beyond the savings due to DBT, a similar incentive is given to those States / UTs. Jharkhand has become the first state in the country to implement DBTK in four districts namely, Chhatra, Hazaribagh, Jamtara and Khunti with effect from 01.10.2016. Other States has also been requested to join the Scheme and the State Governments may also propose inclusion of more number of Districts in the coming months.

Karnataka state has volunteered to take cut in their kerosene allocation to the extent of 1,75,324 KL and cash incentive of Rs. 16.84 Crore for the first quarter of FY 2016-17 was released. Similarly, cash incentive of Rs. 3.82 Crore and Rs. 3.11 Crore to Haryana & Telangana, respectively for the first quarter of FY 2016-17, was released towards the voluntary cut undertaken by them. Government of Haryana has requested to make the State Kerosene free by 31.03.2017.

5.7 CONSUMER CENTRIC INITIATIVES

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

5.7.1 SAHAJ

'SAHAJ' is a digital initiative undertaken for providing hassle free experience to consumers applying for new LPG connection. The Oil Marketing Companies have launched the facility of release of LPG connection with online payment and issuance of `e-SV' under the Digital India Initiative and the facility is now available on pan India basis. 'e-SV' is the electronic subscription voucher which has the details of number of cylinders and pressure regulator loaned to the consumer against the security deposit. This document is emailed to the customer upon release of LPG connection online.

Online payment facility for booking of refills and bill payment is also included under this. Online Inter-Company De-duplication is also made possible using 'e-SV'. This would also eliminate multiple visits to the distributor's showroom by the prospective consumers for completing formalities and problems arising out of them. It will also cut down on the time taken for release of connections.

5.7.2 Digilocker

'Digital locker' facility has been implemented with a view to move towards paperless office.

Under this facility, Subscription Vouchers (SVs) and Transfer Vouchers (TVs) are made available to consumers from Digilocker. Ministry of Petroleum & Natural Gas is the largest issuer. of e-SV document linked to Aadhar in the country. This enables the consumers to get the connection documents without hassles and also ensures safety and security of the documents without the fear of loss or damage.

5.7.3 Emergency Helpline No. '1906'

This multilingual LPG Emergency Helpline was dedicated to the nation on 01.01.2016 by the MoS(I/C) MoPNG. This facility is available 24*7 operations with 2 shifts of 12 hours each for attending emergency LPG leakage complaints. The call center is having a web based application for logging and viewing monitoring the call logs & updation of the contact details of the mechanic & field officers. As on 29.11.2016, 137832 complaints were received & 137814 complaints were resolved using this emergency helpline number.

5.7.4 Smart Delivery Management System

The new age consumer looks for a hassle free experience in all types of transactions. Keeping this in mind and in line with the continuing effort of Oil Marketing Companies (OMCs) to bring transparency in the supply and distribution of LPG, this initiative was undertaken. Smart Delivery Management System is an initiative to promote friendly mobile application for delivery boys with features like smartcard based delivery options, real time delivery confirmation for deliveries made, better control on delivery boys and supply chain and capturing of geographical coordinates of delivery location.

5.7.5 Facility for On-line payment for refill booking

In order to promote cashless transaction, consumers have been given facility to make on-line payment for their refill booking. This helps a consumer to get the delivery of refill at his residence without his/her presence and effectively address the issue related to overcharging, if any.

Bharat Petroleum's Speed Rally is a hit with the youngsters


SENER
SECRETARÍA DE ENERGÍA

Chapter

6

International Cooperation and Engagements Abroad

International Cooperation and Engagement Abroad

Currently, India is one of the world's fastest-growing economies. During the period between 2005 and 2015, the country's GDP increased at a CAGR of 7%. The rapid increase in economic activity has been accompanied by rising energy consumption. During the period between 2005 and 2015, India's primary energy consumption increased at a CAGR of 6.7%, from 394 million tons of oil equivalent (MTOE) to 700 MTOE.

Oil and natural gas are major sources of primary energy in India, accounting for 36.5% share in India's primary energy basket. India holds just 0.3% of the world's proven oil reserves while accounting for 4.5% of the global oil consumption — thus importing 80% of its oil consumed. Similarly, the country has 0.8% of the world's proven natural gas reserves, while accounting for 1.5% of the worldwide gas consumption, which results in India importing nearly 40% of its natural gas consumed in the form of LNG. This high dependence on imported crude oil and natural gas has significant implications on energy security and overall financial health of the country. With the Indian economy expected to sustain current momentum in the coming years, the oil and natural demand is expected to continue to rise with supplies not keeping pace with growing demand. Thus, India faces a challenge in its efforts to ensure energy security.

In view of increasing demand-supply gap of hydrocarbons in the country, acquiring oil and gas assets overseas is need of the hour for enhancing energy security. To strengthen the country's energy security, the Ministry of Petroleum & Natural Gas (MoP&NG) is engaged in oil diplomacy and is encouraging PSUs to adopt a global vision in their pursuit of hydrocarbon assets abroad.

6.1 Role of International Cooperation Division

The role of International Cooperation Division of Ministry of Petroleum & Natural Gas is to ensure and strengthen India's energy security by sustaining and promoting engagements with foreign countries and international organizations in oil and gas sector. In this context, the Government is encouraging oil companies to aggressively pursue opportunities to acquire oil and gas assets overseas. India is actively engaged in bilateral and multi lateral cooperation in the hydrocarbon sector with foreign counties. To strengthen our country's energy security, the Ministry of Petroleum & Natural Gas is actively engaged in oil diplomacy. India's oil PSUs 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 Indian oil companies.

6.2 The mechanisms for achieving Oil Diplomacy objectives are:

i. Aggressively engaging with Governments of hydrocarbon-rich countries through institutional mechanisms such as Joint Commissions, Joint Working Groups, Energy Dialogue etc. for seeking business opportunities in the hydrocarbon value chain for Indian companies.

ii. Encouraging Indian oil & gas PSUs to pursue the acquisition of oil & gas assets abroad, with the objective of increasing the oil & oil equivalent gas available for the country.

iii. To take forward, India's energy interests in international arena, India is regularly represented by Ministry of Petroleum & Natural Gas in the Global Energy dialogues such as the International Energy Forum and the International Energy Agency etc.

iv. In order to take forward bilateral engagements with other countries and international organizations in specific areas of hydrocarbon sector including unconventional such as shale oil & gas and gas hydrates, MoP&NG has entered into numerous collaborative arrangements with other countries and international organizations such as the International Energy Agency through Memoranda of Understanding, Agreements/Declarations.

v. Collaboration with international organizations, to facilitate technical assistance in R&D, data sharing, statistical model building and analytical tools for energy sector forecasts, etc.

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

vii. Hosting important international energy dialogues such as recently concluded 5th IEF-IGU Ministerial Gas Forum held on 6th December 2016 in New Delhi.

MoS(I/C) MoPNG at the inaugural run of Indo-Bangla goodwill rake

viii. Working in close coordination with Ministry of External Affairs and Indian High Commissions/Embassies abroad for addressing specific issues faced by Indian companies abroad.

6.3 Highlights of MoPNG's engagements during FY 2016-17

In pursuit of new avenues and to fortify existing bilateral cooperation in the hydrocarbon sector, the Minister of State led a number of delegations on visits abroad and also received foreign delegations in India. Key highlights of activities pursued by International Cooperation division during FY 2016-17 are as follows:

6.3.1 24th Steering Committee Meeting of TAPI pipeline project

A delegation led by Shri K.D. Tripathi, Secretary, Ministry of Petroleum and Natural Gas participated in the 24th Steering Committee (SC) meeting of TAPI project from 6-7 April, 2016 in Ashgabat, Turkmenistan.

During the visit the Steering Committee endorsed the agreed form of Implementation Agreement (IA). The Steering Committee decided (a) payment of $15 million upon first closing under the Investment Agreement; and (b) payment of the balance of $15 million upon successful financial closing of the debt financing of the project.

6.3.2 Visit of MoS (I/C), MoPNG to Iran

Shri Dharmendra Pradhan, MoS (I/C) MoPNG, visited Iran from 9-10 April 2016. He was accompanied by a delegation consisting of representatives from Department of Petrochemicals, Department of Fertilizers, Department of Economic Affairs, Shipping apart from CMDs/MDs from Indian Oil and Gas PSUs. MoS(I/C) MoPNG held meetings with his Iranian Minister of Petroleum Mr Bijan Namdar Zanganeh, Senior Advisor to the President of Iran on Free Trade Zones Mr Akbar Torkan and Governor of Iranian Central Bank Dr Valliolah Seif.

Both sides inter-alia discussed the developments regarding Farzad-B gas fields, the issue relating to payment of dues towards purchase of crude oil by Indian refineries to

Iran, investments by Indian companies in setting up petrochemical and fertilizer plants in the Chabahar SEZ, favourable treatment in the pricing of gas for India and also supply of rich gas at competitive price.

6.3.3 Visit of MoS (I/C) MoPNG to UAE

Shri Dharmendra Pradhan, MoS (I/C) MoPNG, visited UAE from 11-12 April 2016 accompanied by senior officials from his Ministry and CEOs of Public Sector Oil and Gas companies.

During his visit Sh Pradhan called on HRH Sheikh Mohammed Bin Zayed Al Nahyan, Crown Prince of Abu Dhabi and held meetings with Mr Suhail Mohammed Al Mazrouei, Minister of Energy of UAE and Mr Sultan Jaber, CEO of ADNOC.

During the meeting discussions were held in area of bilateral cooperation in hydrocarbon sector, Indian companies interests in acquiring stakes in ADCO's upstream assets, MoS(I/C) MoPNG invited UAE's investments in several major hydrocarbon sector projects in India including ONGC Petro Additions Ltd, Bharat Oman Refineries Ltd, Petchem complex in Andhra Pradesh, West Coast Refinery and Ennore LNG Terminal.

6.3.4 Visit of MoS (I/C) MoPNG to Bangladesh

- Shri Dharmendra Pradhan, MoS (I/C) MoPNG, led a delegation, including officials from the Ministry and CEOs of Public Sector Oil and Gas companies to Bangladesh from 17-19 April 2016. During the visit discussions were held to strengthen cooperation in following areas:
- HSD supply from Siliguri to Parbatipur by NRL
- Indo-Bangla Friendship Pipeline
- Supply of R-LNG to Bangladesh for Jessor-Khulna Power Plant from Dhamra via Duttapulia
- EIL PMC contract for expansion of Eastern Refinery Ltd at Chittagong
- MoU signed between IOCL and BPC for setting up of LPG terminal, LPG marketing, transporting LPG by road to Tripura and pipeline from Chittagong to Tripura.
- Petronet LNG Ltd's proposal for setting up LNG terminals in Bangladesh.

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 of State are

6.4.1 India-Bangladesh Energy Dialogue:

The 1st Energy Dialogue between India and Bangladesh on Oil and Gas was held on 13th June 2016 at New Delhi. The Indian side was led by Sh K D Tripathi, Secretary (PNG) and Bangladeshi side was led by Mr. Nazimuddin Chowdhury, Secretary, Energy, Ministry of Power, Energy and Mineral Resources.

- Various bilateral issues were discussed related to long term supply of HSD, development of Indo-Bangla friendship pipeline, supply of LNG to Jessor-Khulna power plant in Bangladesh, importing LPG at Chittagong and supply of LPG through Bangladesh to Tripura, LPG supply to High Rise buildings, EIL proposal for upgradation of Eastern Refinery of Bangladesh, Petronet LNG's proposal for setting up LNG Terminal and Capacity building of Oil and Gas personnel of Bangladesh.

6.4.2 Participation at SPIEF, Russia

Shri Dharmendra Pradhan, MoS (I/C) MoPNG, visited St Petersburg, Russia from 16-17 June 2016 to represent India at the St Petersburg International Economic Forum (SPIEF). SPIEF is the leading economic event of Russia, drawing participation of important political leaders and some of the largest companies and global business leaders.

The hallmark of the visit was the signing of a Sales Purchase Agreement for acquisition of 23.9 % stake in Vankor oil block by an Indian Consortium of Oil India Ltd., Indian Oil and Bharat Petro Resources Ltd. (subsidiary of BPCL) with ROSNEFT. The signing of agreement was witnessed by Sh Pradhan and his Russian counterpart Mr Alexander Novak.

Signing of ADNOC-ISPRL MoU by Shri Dharmendra Pradhan, MoS(I/C) MoPNG & Sheikh Mohammed bin Zayed Al Nahyan Crown Prince of Abu Dhabi

6.4.3 Meeting with US Secretary of Energy Dr. Ernest Moniz in Washington

Shri Dharmendra Pradhan, Minister of State (I/C) for Petroleum & Natural Gas met the US Secretary of Energy Dr Ernest Moniz in Washington on 18th July 2016. The two Ministers reviewed bilateral energy cooperation, especially in oil and gas sector between the two countries. The two sides agreed to enhance institutional and technical cooperation in following areas:

- Assessment and reassessment of conventional and unconventional hydrocarbon reserves in India, both in onshore and offshore.
- New technologies in development of biofuel(2nd generation ethanol and bio-diesel)
- Development of petroleum storage

6.4.4 India- Russia Joint Working Group(JWG) Meeting:

The 21th Session of India-Russia Joint Working Group (JWG) on Cooperation in the field of Energy and Energy Efficiency under the India-Russia Inter-Governmental Commission on Trade, Economic, Scientific & Technological and Cultural Cooperation was held in New Delhi on September 7th, 2016.

The Indian side of the JWG was led by Mr Sunjay Sudhir, Joint Secretary (International Cooperation) in the Ministry of Petroleum and Natural Gas of the Republic of India and the Russian Side was led by Mr. Talyat ALIEV, Deputy Director of the Department of International Cooperation in the Ministry of Energy of the Russian Federation, on behalf of Russian Co-Chair Mr Yuri Sentyurin, Deputy Minister of Energy of the Russian Federation.

6.4.5 India-Canada Ministerial Level Energy Dialogue:

The 3rd India-Canada Ministerial Level Energy Dialogue was held on 8th September, 2016 at New Delhi. The Indian delegation led by Shri Dharmendra Pradhan, MoS (I/C) MoPNG and the Canadian delegation led by Hon James Carr, Minister of Natural Resources of Canada.

During the Energy Dialogue, both sides discussed aspects of bilateral energy sector engagements including Indian investments in Canadian upstream sector and sourcing of crude. Both sides also discussed regulatory best practices in the hydrocarbon sector, collaboration in the field of technology, including R&D, Shale gas, gas hydrates technology and clean fuel technology.

6.4.6 Meeting with Minister of Agriculture, Livestock and Food Supply of Brazil in New Delhi

Shri Dharmendra Pradhan, MoS (I/C) MoPNG, met Mr. Blairo Maggi, Minister of Agriculture, Livestock and Food Supply of Brazil in New Delhi on 22nd September, 2016. The two Ministers discussed bilateral energy cooperation, especially in the Bio-fuels sector.

6.4.7 Participation in 15th IEF Ministerial Conference in Algeria

Sh K D Tripathi, Secretary (PNG) visited Algiers, Algeria from 26 – 28th September 2016 for the 15th IEF Ministerial Conference and addressed the gathering on the topic 'Energy Governance: Global Energy Dialogue Revisited'. India has volunteered to host the next IEF meet in 2018.

6.4.8 Meeting with Minister of State for Power, Energy and Mineral Resources of Bangladesh at New Delhi

Shri Dharmendra Pradhan, MoS(I/C) MoPNG, met Mr. Nasrul Hamid, Minister of State for Power, Energy and Mineral Resources of Bangladesh in New Delhi on 05th October, 2016.

The two Ministers discussed on various areas of bilateral cooperation in the Oil and Gas sector including the progress on Indo-Bangla friendship pipeline project, supply of RLNG to Jessore-Khulna power plant from Dhamra via Duttapulia in West Bengal, setting up of LPG import terminal and transportation of LPG to Tripura through Bangladesh, expansion of ERL, setting up of LNG terminal at Kutubdia and other areas like Biofuels, Capacity Building and supply of LPG to high rise buildings.

6.4.9 Meeting with Sri Lankan Minister for Petroleum Resources Development

Shri Dharmendra Pradhan, MoS (I/C) MoPNG, met Mr. Ranil Wickremesinghe, Prime Minister of Sri Lanka in New Delhi on 05th October, 2016.

During his meeting with Sri Lankan Prime Minister, Sh Pradhan discussed potential Indian investments along oil & gas value chain in Sri Lanka.

6.4.10 Meeting with Sri Lankan Minister for Petroleum Resources Development

Shri Dharmendra Pradhan, MoS (I/C) MoPNG, met with his Sri Lankan counterpart Mr. Chandima Weerakkody, Minister of Petroleum Resources Development on 6th October, 2016.

During the meeting, both the Ministers discussed various proposals, including joint development of Upper Tank Farm by Lanka IOC (LIOC) in Trincomalee; setting up of LNG terminal at Kerawalapitiya, near Colombo by Petronet LNG Ltd; setting up of City Gas Distribution network by GAIL and use of CNG in the automotive sector of Sri Lanka, refurbishment of Sapugaskanda refinery and possibility of setting up of a refinery in Sri Lanka.

6.4.11 Meeting with Minister of State for Petroleum of Nigeria at New Delhi

Shri Dharmendra Pradhan, MoS (I/C) MoPNG, met his Nigerian counterpart Dr. Emmanuel Ibe Kachikwu, Minister of State for Petroleum in New Delhi on 17th October, 2016.

During the meeting discussions were held on issues such as allocation of long term oil contract to Indian PSUs, explore possibilities of collaboration in refining sector, E&P sector and also possibilities of executing CGD and LPG infrastructure projects by Indian PSU companies in Nigeria.

6.5 Petrotech-2016

Petrotech-2016 was organised by Ministry of Petroleum & Natural Gas from 5th-7th December, 2016 in New Delhi. The Conference provided a platform for overseas Ministers of oil and gas, CEOs of Indian and overseas companies and Hydrocarbon experts to discuss oil and gas related issues and mutually understand the growth potential and trends of the global oil & gas industry. The theme of the conference was "Hydrocarbons to fuel the future: Choices & Challenges". Hon'ble Prime Minister Shri Narendra Modi inaugurated the Conference on 5th December, 2016.

On the sidelines of Petrotech 2016, Shri Dharmendra Pradhan, MoS (I/C) MoPNG, held bilateral meetings with his counterparts from Brazil, Sri Lanka, Afghanistan, Qatar, Cyprus, South Sudan, Iraq, Bhutan, Nepal, Colombia, Chad, Mauritius, Nigeria and Bangladesh to discuss bilateral issues of mutual cooperation in oil & gas sector.

The Conference was accompanied by an Exhibition at Pragati Maidan from Dec 4-7, 2016 showcasing a broad spectrum of upstream downstream and midstream hydrocarbon sector from over 50 countries.

During the last day of Petrotech-2016, 11 memorandum of Understanding were signed,

Shri Dharmendra Pradhan, MoS(I/C) MoPNG during Discovered Small Field Bid Round 2016 Interactive Session at Houston Roadshow

including a consortium agreement between IOCL, BPCL and HPCL, intending to set up India's biggest oil refinery cum petrochemical complex with a ~60 MMTPA capacity along the western Coast of India in the State of Maharashtra, and for setting up 5 2G ethanol plants in various parts of the country. Further, Portals were also launched by ONGC, OIL and IOCL under "Start-Up India and 4 Books and Knowledge Papers were released.

6.6 5th International Energy Forum-International Gas Union (IEF-IGU) Ministerial Gas Forum

The 5th International Energy Forum-International Gas Union (IEF-IGU) Ministerial Gas Forum was held in New Delhi, India on 6th December 2016. The theme of the Forum was "Gas for Growth; improving economic prosperity and living standards".

The forum witnessed participation by Brazilian Minister of Energy and Mines, Cypriot Minister of Commerce, Industry and Tourism, Minister of Petroleum and Gas of Nigeria, Minister of Energy and Industry of Qatar, Iraqi Deputy Minister for Gas Affairs of Ministry of Oil, Secretary General of OPEC, Secretary General of IEF and President (IGU), Secretary General (IGU).

The 5th IEF - IGU Ministerial Gas Forum provided an opportunity on deepening the dialogue on the role of Gas to enable an orderly energy transition that strengthens energy security, stimulates economic growth and enhances healthy energy market functioning, prosperity and well being globally.

- The Cabinet Committee on Economic Affairs (CCEA), chaired by the Prime Minister Shri Narendra Modi, gave its approval on 28th September, 2016 to an Indian Consortium comprising Oil India Limited (OIL), Indian Oil Corporation Limited (IOCL) and Bharat Petro Resources Limited (BPRL) for acquiring 23.9% stake in JSC Vankorneft and 29.9% stake in LLC Taas-Yuryakh from M/s Rosneft Oil Company (Rosneft), the National Oil Company of Russia. Rosneft operates Vankor and Tass-Yuryakh fields and are its wholly owned subsidiaries.

The CCEA gave its approval on 5th October, 2016 to an acquisition by ONGC Videsh Limited (OVL) for 11% stake in JSC Vankorneft from M/s Rosneft of Russia. All acquisition procedures were completed by the Indian Consortium and OVL by October 2016.

6.7 Global footprints of Indian oil & gas 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.

Our oil and gas 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 37 E&P projects in 17 countries namely Azerbaijan (2 projects), Vietnam (2 projects), Russia (3 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 14 projects in 10 countries, namely, Russia (Vankor, 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.

Shri Dharmendra Pradhan MoS (I/C) MoPNG along with visiting Ministers and delegates during 6th IEG-IGU Ministerial Conference

ONGC Videsh also has stake in 2 pipeline projects (1 each in Sudan & Azerbaijan).

Bharat PetroResources Limited (BPRL), a 100% subsidiary of Bharat Petroleum Corporation Ltd. (BPCL), hold Participating Interest (PI) in 17 blocks in 6 countries along with Equity stake in 2 companies in Russia that operates 4 Producing assets.

6.8 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%
		Vankorneft	ONGC Videsh 26% OIL, IOCL, BPRL – 23.9%
		Taas-Yuryakh	OIL, IOCL, BPRL – 29.9%
		License 61	OIL: 50% Petroneft: 50%
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)

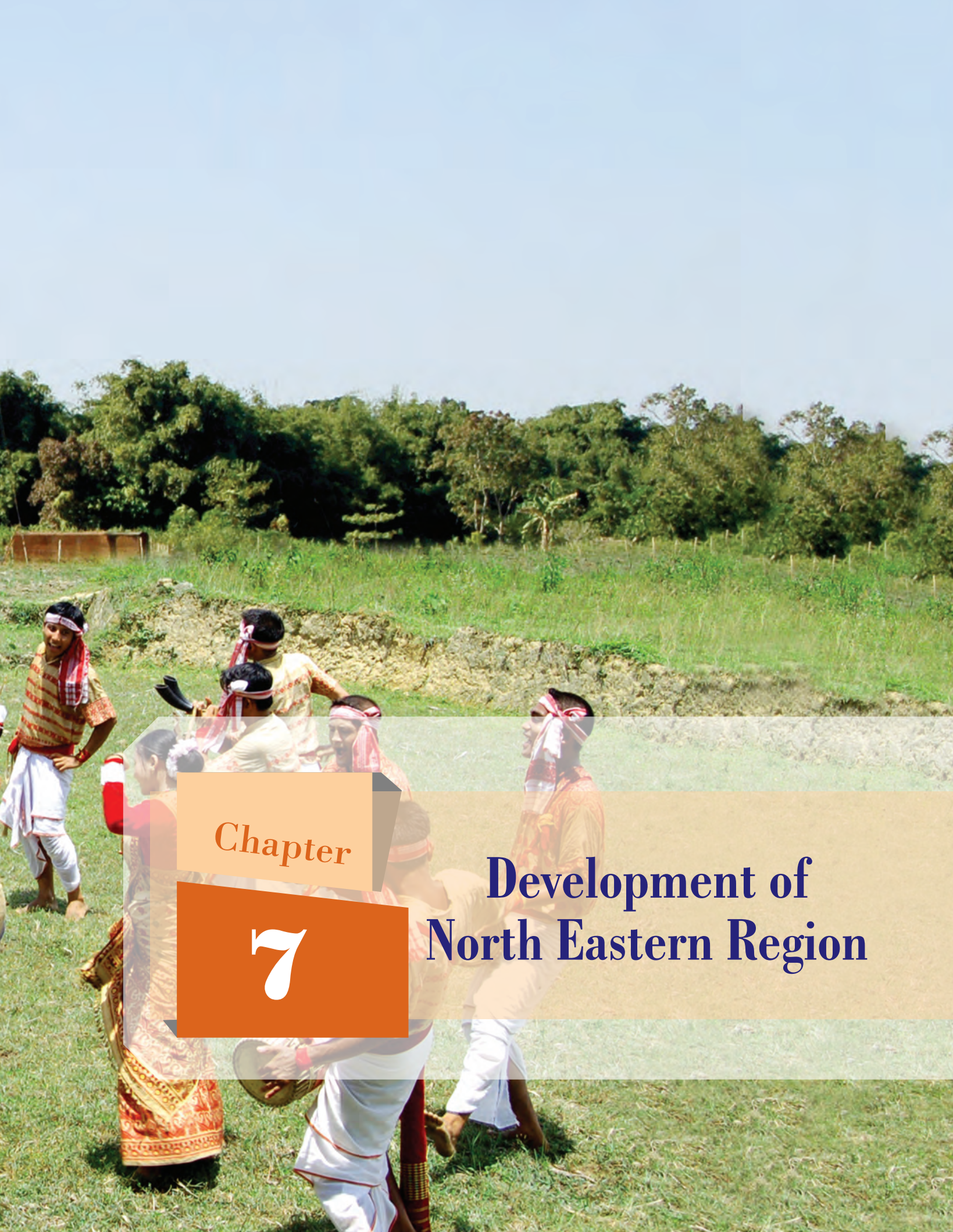
Sl. No.	Country	Name of the Project	Participating Companies and their Share
5.	Myanmar	Block A-1, Myanmar	ONGC Videsh – 17% Daewoo–51% (Operator) KOGAS – 8.5% GAIL – 8.5% MOGE – 15%
		Block A-3, Myanmar	ONGC Videsh – 17% Daewoo–51% (Operator) KOGAS – 8.5% GAIL – 8.5% MOGE – 15%
		Shwe Offshore Mid-Stream Project, Myanmar	ONGC Videsh – 17% Daewoo–51% (Operator) KOGAS – 8.5% GAIL – 8.5% MOGE – 15%
		Onshore Gas Transportation Pipeline, Myanmar	ONGC Videsh – 8.347% CNPC-SEAP – 50.9% (Operator) Daewoo - 25.041% GAIL - 4.1735% KOGAS - 4.1735% MOGE - 7.365%
		Block B-2,	ONGC Videsh - 97% (Operator) M&S - 3%
		Block EP-3, Myanmar	ONGC Videsh - 97% (Operator) M&S - 3%
		Block: M4, Myanmar	OIL: 60% (Op) Oilmax: 10% Mercator: 25% Oil Star:5%
		Block :YEB, Myanmar	OIL:60% (Op) Oilmax: 10% Mercator: 25% Oil Star:5%
6.	Mozambique	Rovuma Area-1	ONGC Videsh - 16% Anadarko - 26.5% (Operator) OIL - 4% ENH - 15% Mitsui - 20% BPRL - 10% PTTEP - 8.5%
7	Iraq	Block 8, Iraq	ONGC Videsh - 100%
8.	Iran	Farsi Offshore Block, Iran	ONGC Videsh – 40% (Operator) IOC – 40% OIL – 20%
9.	Libya	Block 43, Libya	ONGC Videsh- 100%
		Area 95-96	Sonatrach – 50% Indian Oil – 25% OIL – 25%

Sl. No.	Country	Name of the Project	Participating Companies and their Share
10.	Syria	Block 24, Syria	ONGC Videsh – 60% IPR International – 25% (Operator) Tri Ocean Mediterranean – 15%
		Al Furat Petroleum Co., Syria	Himalaya Energy (Syria) B.V. – 33.33% to 37.5% Shell – 66.67% to 62.5% (Operator –Al Furat Petroleum Company)
11.	Brazil	Block BM-SEAL-4, Brazil	ONGC Videsh-25% Petrobras -75% (Operator)
		BC-10, Brazil, Offshore	ONGC Videsh - 27% Shell - 50% (Operator) Qatar Petroleum International - 23%
		BM-SEAL-11 (3 blocks), Sergipe Basin	Petrobras (Operator)- 60%, IBV 40%
		BM-C-30 (1 block), Campos Basin	Anadarko Petroleum (Operator) - 30%, British Petroleum - 25%, Maersk - 20%, IBV 25%
		BM-POT-16 (2 blocks), Potiguar Basin	Petrobras 30% (Operator), BP - 30%, Galp Energia - 20%, IBV 20%
12.	Colombia	Mansarovar Energy Colombia Limited (MECL), Colombia	ONGC Videsh–25-50%, Sinopec-25-50% Ecopetrol-50% (Jointly Operated)
		Block RC-8, Colombia	ONGC Videsh – 40% (Operator) Ecopetrol - 40% Petrobras – 20%
		Block RC-9, Colombia	ONGC Videsh – 50% Ecopetrol - 50% (Operator)
		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%
		CPO-5, Colombia	ONGC Videsh – 70% (Operator) Petrodorado – 30%
		SSJN7, Colombia	ONGC Videsh – 50% Pacific Rubieales Energy (PRE) – 50% (Operator)
13	Venezuela	San Cristobal Project,	ONGC Videsh-40% PDVSA-60% (Jointly Operated)

Sl. No.	Country	Name of the Project	Participating Companies and their Share
		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%
		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%
		T/L 1 & T/18P	-
20.	East Timor	Block JPDA 06-103	BPRL- 20%

Sl. No.	Country	Name of the Project	Participating Companies and their Share
21.	USA	Niobrara Shale Oil/Condensate JV asset	Carrizo (Niobrara) LLC – 60% OIL - 20% Indian Oil – 10% Haimo Oil & Gas -10%
		Eagle Ford Shale acreage in Texas State	GAIL 20% PI US $ 246.02 million.
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	Old PSC: OIL – 45% Indian Oil – 45% Marvis Pte Ltd -10% New PSC: OIL – 50% Indian Oil – 50%\
25.	Yemen	82	Medco – 45% Kuwait Energy – 25% IOC- 15% OIL- 15%

Shri Dharmendra Pradhan MoS(I/C) MoPNG and Secretary MoPNG during signing of MoU with University of Houston



Chapter

7

Development of North Eastern Region

Development of North Eastern Region

7.1 Preamble

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

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

7.1.3 Since then, both the National Oil Companies viz., OIL and ONGC have proven substantial amount of producible hydrocarbons and have technical know-how of producing

OIL personnel at Integrated Tank Form (ITF) Tengakhat in Assam

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.

7.1.4 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.

7.1.5 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.

7.1.6 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:

7.2.1 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.

7.2.2 During 1969-79, extensive geophysical survey and development effort in Assam and Arunachal Pradesh was carried out which led to the discovery of the Jorajan field in 1972 and establishment of gas resources in Eocene of Tengakhat (west of Naharkatiya) in 1973.

7.2.3 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.

7.2.4 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.

7.2.5 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.

7.2.6 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.

7.2.7 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.

7.2.8 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.

7.2.9 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.

7.2.10 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.

7.2.11 Currently ONGC holds 5 exploration blocks 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

7.3.1 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.

7.3.2 The following exploration activities have been carried out under the PSC regime in the awarded blocks/fields:

- Acqusition of 6683.27 Line Kilometer (LKM) of 2D seismic data & 2,370 Sq. Km of 3D seismic data completed.
- Drilling of 64 wells including 32 exploratory wells have been carried out
- A total of 7 hydrocarbon discoveries (gas) have been made (1 in Assam, 1 in Mizoram and 5 in Tripura)
- Expenditure to the tune of US$ 680.5 Million has been incurred under PSC for exploration, development and production activities as on 01.04.2016

7.4 Crude Oil & Natural Gas Production in North-East

7.4.1 The contribution in crude oil production by North Eastern States is about 11.8% of the total production. In 2016-17 upto December 2016, crude oil production in North East is about 3.182 million metric tonne (MMT) from the states of Assam (3.141 MMT) and Arunachal Pradesh (0.041 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	2016-17 upto Dec.
Assam	OIL	3.821	3.639	3.445	3.405	3.219	2.425
	ONGC	1.203	1.222	1.263	1.061	0.965	0.716
	Total	**5.024**	**4.861**	**4.708**	**4.466**	**4.184**	**3.141**
Arunachal Pradesh	OIL	0.026	0.022	0.021	0.007	0.006	0.005
	Pvt/JV	0.092	0.099	0.09	0.069	0.051	0.036
	Total	**0.118**	**0.121**	**0.111**	**0.076**	**0.057**	**0.041**
North East	ONGC	1.203	1.222	1.263	1.061	0.965	0.716
	OIL	3.847	3.661	3.466	3.412	3.225	2.430
	Pvt/JV	0.092	0.099	0.09	0.069	0.051	0.036
	Total	**5.142**	**4.982**	**4.819**	**4.542**	**4.241**	**3.182**

7.4.2 From the table 7.1, it may be observed that OIL has the share of 76.4% in crude oil production in North East, followed by ONGC with a share of 22.5%. The share of Pvt/JV companies in crude oil production is about 1.1%, which is from the Kharsang field in the state of Arunachal Pradesh.

7.4.3 The contribution in natural gas production by North Eastern States is about 14.3% of the total production. In 2016-17 upto December 2016, natural gas production in North East is about 3419 million metric standard cubic metre (MMSCM) from the states of Assam (2347 MMSCM), Arunachal Pradesh (20 MMSCM) and Tripura (1052 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	2016-17 upto Dec.
Assam	OIL	2392	2425	2409	2509	2618	2024
	ONGC	504	485	459	449	405	323
	Total	**2896**	**2910**	**2868**	**2958**	**3023**	**2347**
Arunachal Pradesh	OIL	18	19	19	12	12	9
	Pvt/Jv	23	22	22	22	18	11
	Total	**41**	**41**	**41**	**34**	**30**	**20**
North East	ONGC	644	647	822	1140	1332	1052
	ONGC	1148	1132	1281	1589	1737	1375
	OIL	2410	2444	2428	2521	2630	2033
	Pvt/JV	23	22	22	22	18	11
	Total	**3581**	**3598**	**3731**	**4131**	**4385**	**3419**

7.4.4 From the table 7.2, it may be observed that OIL has the share of 59.5% in natural gas production in North East, followed by ONGC with a share of 40.2%. The share of Pvt/JV companies in natural gas production is about 0.3%, which is from the Kharsang field in the state of Arunachal Pradesh.

7.4.5 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

7.5.1 **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.

7.5.2 **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.

OIL's Drilling Operations in Mizoram

7.6 North East Vision 2030

7.6.1 Minister of State (IC) for Petroleum and Natural Gas, Shri Dharmendra Pradhan 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.

7.6.2 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.

7.6.3 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.

7.6.4 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.

7.6.5 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.

7.6.6 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.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Chapter

8

R&D & New Technologies

R&D & New Technologies

8.1 INDMAX Unit at Paradip Refinery

Commissioning of the 4.17 MMTPA INDMAX Unit at Paradip Refinery marks a major landmark for Indian Petroleum Industry. The biggest challenge for Refiners is to upgrade the residual petroleum hydrocarbon streams into high yields of light olefins such as ethylene, propylene, butylenes, LPG and high-octane gasoline for sustained improvements in Refinery profit margin. INDMAX - the innovative process technology of IOCL which increased profitability for Refiners. Hon'ble Prime Minister dedicated this mega FCC unit to nation along with Paradip Refinery on February 2016 by commending it a true Make in India initiative.

8.2 OCTAMAX at Panipat

OCTAMAX is IOC-R&D's indigenours technology for production of high octane MS blending stock required for production of BS-VI MS. Foundation stone of OCTAMAX demonstration unit of 55 KTA at Mathura Refinery was Laid by MoS(I/C) MoPNG.

8.3 Servo Green Edge : Stationary Gas Engine Oil

In line with the proliferation of gas economy and gas based power generation in the next decade, IndianOil R&D had developed a component based, indigenous technology for Gas engine lubrication. This Gas engine lubricant was successfully field validated in Wartsila gas based engine under their technical surveillance. Based on the superior performance, Wartsila accorded global approval to this first indigenously developed product for use in their entire range of gas engine.

8.4 Bio-methanation

IOC R&D has developed Bio-methanation technology and its engineering package Demonstration plant of 250 kg/d capacity is being set up at Digboi refinery.

8.5 Patent Portfolio

IndianOil has field 96 patents during the year and 725 patents as on 31st Dec, 2016 out of these effective patents are 525.

8.6

In the changing business dynamics and unpredictable organizational environment, innovation is a gateway and a great differentiator for organization growth and competitiveness. GAIL places greater importance on disciplined deployment of innovations through collaborative R&D works for the development of innovative solutions for improved safety, productivity and environmental sustainability of its business operations. Accordingly, GAIL is pursuing a judicious portfolio of basic, application and pilot scale projects under various R&D initiatives. Few of the application/development of technologies includes:

8.6.1 'Bhuvan-GAIL portal' : Satellite imagery based Pipeline ROU monitoring

GAIL is executing and managing a vast network of natural gas pipelines. The conventional methods of monitoring the Pipeline Right of Usage (RoU) include Arial surveillance by helicopters, Foot patrolling etc. To improve the speed and accuracy of Pipeline RoU surveillance, GAIL has endeavored to employ the high resolution satellite imagery coupled with Change detection software, first time in India, in collaboration with ISRO's National Remote Sensing Centre (NRSC), to identify and notify any encroachments along the RoU.

GAIL has launched an innovative surveillance geo-portal called "Bhuvan-GAIL portal", for remote monitoring of Pipeline RoU.

8.6.2 'GAIL-IIP process': Conversion of Waste Plastic to Diesel

GAIL & IIP have developed a 2-stage process for conversion of "Waste plastic to Valuable hydrocarbons like Petrol, Diesel and LPG". The Process has been validated in Lab and Bench scale. GAIL is on the verge of setting-up a Pilot plant of 1TPD at IIP (Indian Institute of Petroleum, Dehradun) for validation of technology. After the successful evaluation of Pilot study, the technology shall be ready for commercialization.

8.7 National Gas Hydrate Programme (NGHP)

Extracting methane from gas hydrate is viewed as one of the attractive futuristic sources of energy. National Gas Hydrate Programme (NGHP) run at DGH efforts to discover gas hydrate in sand dominated sediments. This has led to the execution of NGHP Exp-02 under which detailed studies of data acquired are under progress. The preliminary results have confirmed the Gas Hydrate resource potential of sand hosted accumulation in the Krishna Godavari (KG) deep water Basin.

8.7.1 Advisory committee

An Advisory committee of scientists / experts from USA and Japan has opined that India may migrate from exploration to production testing

phase which is currently in experimental (trial) stage. The experts indicated that there is data gap at present which requires to be addressed before designing/ planning production testing. It was emphasized that based on the current available data it is pre-mature to plan production testing with a view to optimize production rate for commercialization. Advisory Committee recommended for developing domestic R&D capabilities through domestic and international partnerships and providing staffing requirement for the same.

8.7.2 Based on the progress of NGHP activities, the various studies are being planned at national and international level to assess/develop a techno economic feasible technology before venturing into expedition-03.

8.8 R&D by ONGC

ONGC has established separate R&D institutions to undertake specific activities in key areas of Exploration, Drilling, Reservoir Management Production Technology, Ocean Engineering and Health, Safety and Environment (HSE) Management. Regional laboratories have also been established at various Assets and Basins of ONGC to support these institutes. ONGC through its R&D Institutes is pursuing adaptation/customization and applied research.

8.8.1 In 2016-17. R&D carried out by ONGC for conventional and Non-conventional Hydrocarbons includes studies undertaken at Keshava Deva Malaviya Institute of Petroleum Exploration (KDMIPE), Dehradun on Effect of pore structure of Indian gas shales on its methane and CO_2 adsorption behaviour with IIT-Kharagpur, An organometallic fingerprinting proxy to locate shale oil pools with IIT-Bombay & IIT-Kanpur and Water management during hydrofracking operations of shale gas field with IIT-Kharagpur.

8.8.2 IRS undertook about 100 R&D projects on Oil & Gas Field development based on Reservoir simulation studies, Performance monitoring, EOR processes-Lab design and simulation, Reservoir characterization, productivity enhancement projects and basic laboratory data generation for various fields of ONGC. Collaborative projects were undertaken at Geodata Processing & Interpretation Centre (GEOPIC), Dehradun with Gujarat Energy Research and Management Institute Gandhinagar (GERMI). Under ONGC-Pan IIT Collaborative Research Program, projects are also going on at GEOPIC with IIT Bombay and IIT Guwahati.

8.8.3 Hydrocarbon Utilizing Bacteria (HUB)

New Hydrocarbon Utilizing Bacteria (HUB) strains was identified at Institute of Biotechnology and Geo-tectonic Studies (INBIGS), Jorhat and applied for Bioremediation of 9500 m3 oil contaminated effluent.

8.8.4 R&D by IOGPT

The Institute of Oil & Gas Production Technology (IOGPT) has carried out R&D studies to meet the production and processing related technological requirement of Oil and Gas fields and Processing plants of ONGC. During the said period IOGPT has completed many projects including Technology assimilation for Multi-stage frac jobs, Surge analysis of oil trunk line of various fields, Scheme for achieving the injection water quality at WIP of different fields, Corrosion studies, Flow measurement system study of ONGC fields, Artificial lift system study for wells, Well completion strategy for fracturing HPHT, tight gas & shale gas reservoirs and Quality assurance testing of gas lift valves & mandrels, Optimization of VAP recovery in LPG plant at CTF, Ankleshwar, Ankleshwar Asset and Gas Sweetening scheme for EPS-Kim, Ankleshwar Asset.

8.9 The continued ongoing projects and new projects/studies undertaken by OIL during the year 2016-17 include Synthesis and extraction of surfactants from natural resources and their characterization for application in enhanced oil recovery in collaborative study with ISM Dhanbad. Other R & D projects undertaken are: Surface geochemical exploration using adsorbed soil gas method, Reservoir fluid identification through Geochemical Analysis of Sidewall cores, RockEval pyrolysis study of core samples for study of shale gas prospectively and source potential etc.

8.9.1 New Flow Improver product by OIL

Besides, a new Flow Improver product has been identified by OIL based on R & D efforts and its trial order has recently arrived in the Laboratory. Quality assurance of the product would be carried out shortly in the laboratory after which the suitability/applicability of the product would be assured by carrying out the testing in appropriate field under actual dynamic field condition during the peak winter time, Jan- March, 2017. Once field trial is successfully executed, a developmental order would be recommended and once this is successfully through, this product would become a proven alternate source for this critical Oil Field Chemical.

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 environmentally 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 MoPNG. Also, for better coordination with the States, Sugar Mills and other stakeholders, MoPNG appointed Nodal Officers from OMC's.

9.2.3 All these steps helped in supply of 111 crore litres of ethanol during the ethanol supply year 2015-16 (till 30.11.2016), which is an all time record in the history of EBP. Blending to the tune of 10% was carried out in six States during major part of 2015-16 based on ethanol availability.

9.2.4 On 13.10.2016, the Government has fixed the price of ethanol for the ethanol supply year 2016-17 at Rs.39/per litre. Additionally, Excise Duty, VAT/GST and transportation charges (as decided by OMCs) will be paid by OMCs.

9.2.5 With renewed synergy among all the Stake Holders, OMCs floated tender for uniform 10% blending across all the notified States for Ethanol Supply Year 2016-17. The allocated quantity is 78crore litres.

Shri Dharmendra Pradhan, MoS(I/C) MoPNG alongwith MoS(I/C) for Power, Coal, New and Renewable Energy and Mines at National Conference on Energy Security, creating a Bio-Fuel Economy

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 Consultative Workshop on "Creating Investment Avenues for Second Generation (2G) Ethanol" was organised by Ministry of Petroleum and Natural Gas on 3rd November, 2016 at New Delhi. Another workshop was organised in Hyderabad on 15-16 November, 2016 on "Creating a sustainable Biomass Supply Chain to ensure unhindered supply of feedstock for all the proposed lignocellulosic ethanol plants to be set up by all Oil PSUs".

9.3.3 Oil PSUs are establishing 12 nos. of 2G Ethanol plants across 11 states of the country. On 7.12.2016, six MoUs have been signed between Oil Marketing Companies and Technology Providers (5 MoUs) / State Government (1 MoU) for setting of 2G ethanol plants in five locations viz. Dahej (Gujarat), Bina (Madhya Pradesh), Panipat (Haryana), Bathinda (Punjab) and Bargarh (Odisha). On 25.12.2016, foundation stone of the first Biofuel refinery set up by Hindustan Petroleum Corporation Limited in Bathinda, Punjab, has been laid.

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.

9.4.2 On 10th August, 2015, the Government has allowed sale of Bio-diesel (B100) by private manufacturers to bulk consumers. Also, retailing of bio-diesel blended diesel by Public Sector OMCs has started on the same day. Presently, Biodiesel blended diesel (B5) is being sold by OMCs in 6 states in more than 3621 retail outlets.

9.5 Waste to fuel/energy

9.5.1 A waste to energy biomethanation plant of 5 Tonnes Per Day (TPD) capacity, has been commissioned on 5.12.2016 at Varanasi by Indian Oil Corporation Ltd.

Shri Dharmendra Pradhan MoS(I/C) MoPNG at National Conference on Energy Security, creating a Bio-Fuel Economy

Chapter

10

Conservation of Petroleum Products

Conservation of Petroleum Products

10.1.1 PCRA is a registered society set up in the year 1978 under the aegis of Ministry of Petroleum & Natural Gas. It is a non-profit organization and a nodal agency engaged in promoting Fuel efficiency in Industry, Agriculture, Transport, Domestic and Commercial sectors through direct technical assistance, R&D, educational & training programs and mass awareness campaigns for the purpose of achieving environment protection and sustainable development. In its quest, PCRA takes the support of Public Sector Oil Companies, Govt. & Non-Govt. Organizations, Research institutes and Laboratories, Educational Institutes, Consumer Associations and other Organizations. It also helps the Government in proposing policies and strategies for petroleum conservation, aimed at reducing dependence of country on Oil & Gas requirements.

10.1.2 PCRA carries out various Field Activities, which is one of the core areas of its operations. Through sectoral field activities, PCRA engineers and its empaneled experts reach the targeted groups under various sectors of economy through activities like Energy Audit, Fuel Oil Diagnostic Studies and walk-through Audits, Technical Seminars, Institutional Training Programmes, Driver Training Programme, Transport Workshop, Model Depot Project, Van Publicity, Kisan Melas and Educational programs for students of agricultural colleges, Workshop of LPG/ Kerosene Savings, Youth programs like quiz, essay, debate and painting competitions, exhibitions etc. During 2016-17, targets were fixed in a manner so as to increase the outreach of these programmes. A total of 10828 nos. of field activities were carried out during the period April-December 2016 as against the annual target of 13358 nos. of activities in 2016-17.

10.1.3 PCRA has also associated itself with the 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 platforms; developing Fuel Economy Norms for heavy duty vehicles etc. A landmark initiative has recently been taken by PCRA for conducting audits under PAT Cycle-II for 12 refineries and will be completed by June 2017.

Until the year 2016, PCRA's Mass Awareness Programme used to run for a fortnight (Oil & Gas Conservation Fortnight - OGCF) from 16th January to 31st January every year, for making citizen aware about the need, issues & solutions for conservation and effective utilization of petroleum products leading to health & environment protection.

10.1.4 Fuel Conservation Campaign:

In order to provide sustained impetus on fuel conservation efforts in terms of reduced consumption and cleaner fuels, Ministry of Petroleum & Natural Gas in association with Petroleum Conservation Research Association (PCRA) has launched people centric mass awareness national drive during Oil & Gas Conservation i.e. SAKSHAM – 2017 (Sanrakshan Kshamta Mahotsav – 2017). During this one month long drive, various sections of society viz; students, farmers, housewives, drivers, industrial workers, etc., have been engaged to profess and propagate the need to conserve by judicious utilization of petroleum products. Besides above, year the round regular activities are conducted to assist energy intensive industries in reducing and managing their energy mix through energy audits, training of drivers on fuel efficient economic driving, sponsorship of projects for development of energy efficient products and processes were other initiatives ministry took in collaboration with PCRA. Special emphasis is being given towards "Inclusion" of one & all in underlining and appreciating the individual's effort in reducing consumption of energy and lessening GHG emissions through multiple activities in association with Oil & Gas Companies.

10.1.5 Children, being the future of India, are also motivated through National Level Painting, Essay and quiz competitions during the year 2016-17. The Essay competition was conducted in 23 Indian languages (Hindi, English, Urdu, Assamese, Bengali, Bodo, Gujarati, Kannada, Maithili, Malayalam, Oriya, Punjabi, Tamil, Telugu, Marathi, Sanskrit, Kashmiri, Konkani, Nepali, Santhali, Manipuri, Sindhi and Dogri) for school students across the country. The competitions are over and the winners have been finalized. Some of the award winners were awarded by the Honorable Minister of State (IC), P&NG during the inaugural function of सक्षम (संरक्षण क्षमता महोत्सव) 2017 held in New Delhi on 16.1.2017.

10.1.6 PCRA utilizes technology to promote awareness thru social media sites like Facebook, Twitter, Google +, YouTube and My Gov. Daily fuel saving tips, inviting suggestions and update on PCRA's conservation activities are posted regularly on these social media platforms of PCRA. Forum is also provided and various contests are organized time to time to generate interest of the masses.

In the R&D front, PCRA initiates and sponsors R&D projects aiming at optimal utilization of energy and reduced carbon emissions. It also recommends field trials of devices, equipment or appliances in the form of pilot projects and encourages commercialization of products or processes after successful completion of field trials through technology transfer. Some of the ongoing projects during 2016-17 are –

- Development of improved PNG domestic cooking burner.
- Development of a statistical model for trade-off between fuel economy and CO2 emission for in use 2 wheelers in India.
- Improving thermal efficiency of LPG domestic cooking stoves.
- Estimation of fuel consumption during idling of vehicle at Bhikaji Cama Intersection and savings after employing suitable mitigation measures.

10.1.7 Like previous years, this year also PCRA participated in the prestigious India International Trade Fair 2016 held from 14th Nov'16 to 27th Nov'16 at Pragati Maidan New Delhi. PCRA set up a stall at IITF-2016 to educate and create awareness amongst the masses about the importance of fuel conservation. In keeping with the theme of Digital India, PCRA made a completely digital stall, promoting fuel conservation on all fronts including the use of technology to conserve material, paper and using mostly recyclable material in the pavilion to reduce carbon foot print. The digital panels illustrating the best fuel saving practices were used. Visitors were engaged with information, training, interactive discussions, entertainment activities and contests and were a big hit. A new Digital Virtual Reality game was developed, customizing PCRA's fuel conservation objective in mind and was a roaring success with people crowding to have a go at it.

10.1.8 PCRA also participated in the International Oil and Gas Conference and Exhibition Petrotech-2016 with digital theme for its stall. The pavillion was inaugurated by Shri Dharmendra Pradhan, MoS(I/C) MoPNG in the presence of dignitaries from other countries. The occasion was also graced by Shri Ajay Sawhney, Additional Secretary, MoPNG & Vice-Chairman PCRA and Shri Alok Tripathi, Executive Director, PCRA. The digital boards, digital game, digital e-books, digital display on LED panels of Corporate films, documentaries made on PCRA's R&D activities, Star Label program, Domestic LPG fuel saving film, printed literature etc. created lot of interest amongst the visitors. The models on Mono-Set pump and star label LPG stoves were on display. The visitors were very inquisitive and made enquiries to know about models, its concepts and content on display in the stall. The Virtual Reality Game encompassing fuel conservation messages/tips was appreciated by the visitors and was a big hit at the PCRA stall.

Flag off Petroleum Conservation fortnight by MoS (I/C), MoPNG


In & Out

Chapter

11

Pricing

Pricing

11.1 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.

11.2 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.

11.3 The sharp rise and volatility of prices of oil and petroleum products in the international markets since 2004 became a matter of global concern. The Indian basket of crude oil, which averaged about $23/bbl at the time of dismantling of APM in March 2002 and $36/bbl in May 2004, went up to an average of $85.09 per barrel during 2010-11. The average price of Indian basket crude oil further increased to $105.52/bbl. during 2013-14. However, the price of crude oil and petroleum products in the international markets started sliding sharply after July 2014 and the average price of Indian basket crude oil during 2014-15 was $84.16. The downward trend in international prices has continued in 2015-16 and the average price of Indian basket crude oil during 2015-16 was $46.17 and for the year 2016-17 is $ 45.61/bbl. (up to 31.12.2016). The lowest price of Indian basket crude oil has been recorded at $ 24.03/bbl. on 20.1.2016. The trend of Indian Basket of Crude Oil during 2002-03 to 2016-17 is at Annexure-I.

11.4 Even though APM was dismantled effective 1.4.2002, since 2004, the consumers of sensitive petroleum products viz. Petrol (decontrolled w.e.f. 26.06.2010), Diesel (decontrolled w.e.f.19.10.2014), PDS kerosene and Domestic LPG were being insulated from the impact of unprecedented 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 huge 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.

11.5 The under-recoveries arising out of selling petroleum products (upto 2014-15) 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.

11.6 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 consumer get the LPG cylinders at market price and receive LPG subsidy directly into their bank accounts.

11.7 Effective 1st July 2016, the Government has authorized Public Sector OMCs to increase the RSP of PDS kerosene by Rs. 0.25 per litre (excluding state levies) for each of the next 10 months. The same has further been revised to Rs 0.25 /litre per fortnight during the period 1st September 2016 to 31st January 2017 and Rs. 0.23/Litre on 1st February 2017.

11.8 Further, the Government has authorized Public Sector OMCs to increase the effective price of subsidized domestic LPG by Rs. 2 per cylinder (of 14.2kg) per month (excluding VAT as applicable in different State/Union Territories) till the end of current financial year or reduction of government subsidy to "NIL" or further order, whichever is earlier.

11.9 The actual under-recovery in 2015-16 was Rs.11,515 crore. While Government provided cash compensation of Rs.10,245 crore, Public Sector upstream companies (ONGC & OIL) contributed Rs.1,251 crore. The Government provided subsidy of Rs.16056 crore on Subsidized Domestic LPG during 2015-16.

11.10 The Government has decided that cash subsidy within a band of Rs. 0 to Rs. 15/- per Kg will be paid to the customers under the fund flow mechanism for Direct Benefit Transfer for LPG for the financial year 2016-17. Similarly, the Government has also stated that there will be no under-recovery burden on National Oil Companies (both upstream and downstream) in 2016-17 on account of sale of PDS Kerosene. Thus, for Financial year 2016-17, entire burden of subsidy on sale of PDS Kerosene & Subsidized Domestic LPG is being borne by the Government.

11.11 During the period April-September 2016, Government has sanctioned cash compensation of Rs.4123 crore towards the under recovery claims of the OMCs. The under recovery of OMCs on sale of PDS Kerosene for the year 2016-17 is estimated at Rs.7675 crore. Subsidy on sale of Domestic LPG subsidy under DBTL scheme is estimated at Rs.12,076 crore. Government has already provided cash compensation of Rs.4866 crore to the OMCs towards LPG subsidy under DBTL scheme during Apr-Nov 2016.

11.12 The OMCs are currently incurring under-recovery of Rs. 12.78 per litre on PDS Kerosene (at Mumbai) and Government is providing cash compensation of Rs.121.87 per cylinder under DBTL (at Delhi as on 1st January 2017).

11.13 The total subsidy / under-recovery burden on petroleum products and natural gas during the last 5 years and the current year is as under:

Particulars	2012-13	2013-14	2014-15	2015-16	H1,16-17
Petrol	0	0	0	0	0
Diesel	92061	62837	10935	0	0
PDS Kerosene	29410	30574	24799	11496	4123
Domestic LPG	39558	46458	36580	18	0
Total Under-recoveries (A)	**161029**	**139869**	**72314**	**11515**	**4123**
PDS Kerosene and Domestic LPG Subsidy Scheme, 2002 #	2730	2580	2272	0	0

Particulars	2012-13	2013-14	2014-15	2015-16	H1,16-17
Freight Subsidy (For Far-Flung Areas) Scheme, 2002 #	23	21	23	0	0
Natural Gas Subsidy for North East#	627	625	661	660	470
Total Fiscal Subsidies (B)	**3380**	**3226**	**2956**	**660**	**470**
Total DBTL Subsidy (claims)	0	3869	3971	16056	3704
Permanent Advance/ One time incentive #	0	0	0	5755	853
Project Management Expenditure #	0	43	0	233	0
Total DBTL related subsidies (C)	**0**	**3912**	**3971**	**22043**	**4557**
Total Subsidy/ Under-recovery on Petroleum Products (A+B+C)	**164409**	**147007**	**79241**	**34218**	**9150**

on payment basis.

11.14 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 2015-16, Indian refineries processed 71.03% sour crude and 28.97% sweet crude. Therefore, for 2016-17, 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 28.97:71.03.

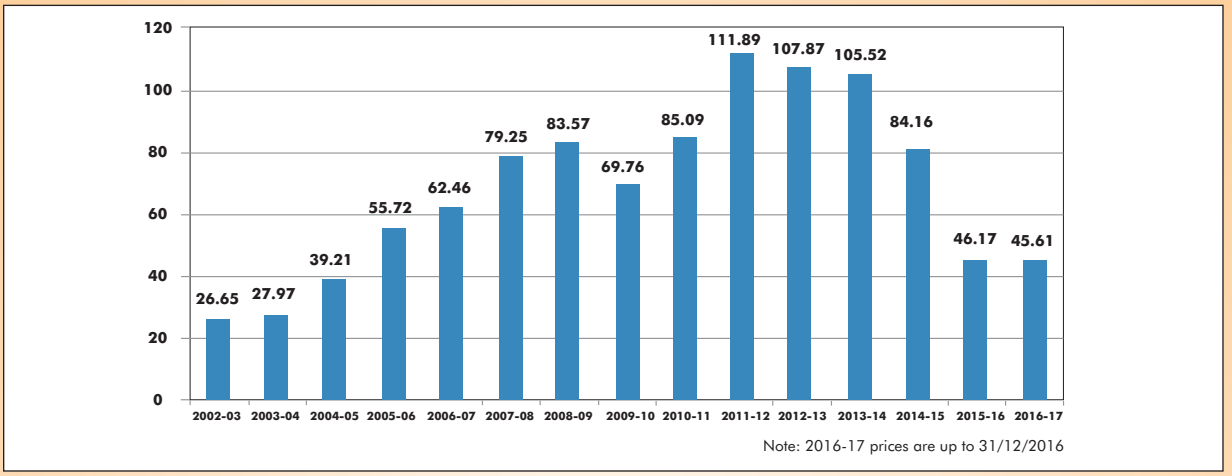
Domestic crude oil producing companies are also offered international crude oil prices benchmarked to international crude that corresponds to their crude assay. Import of crude oil takes place at international prices.

LPG Filling Carousel of HPCL

Annexure -I

Trend of Crude Oil: Indian basket

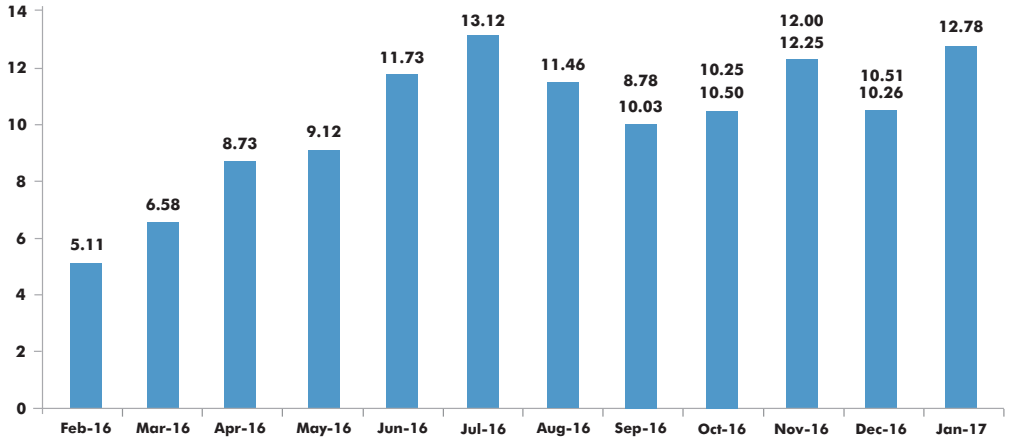
(In$/bbl)



Note: 2016-17 prices are up to 31/12/2016

Annexure -II

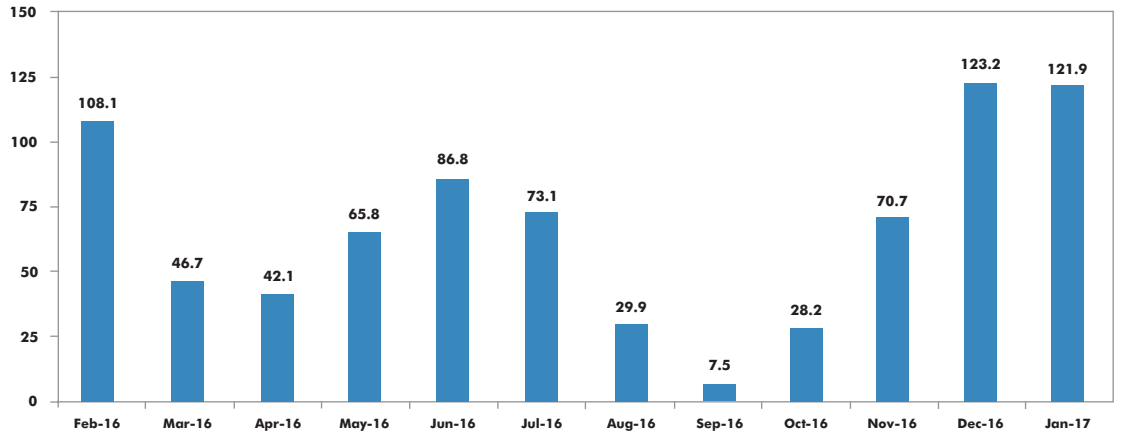
3(a). Trend of Kerosene Under-recovery (Rs./Litre)



W.e.f. 1.4.2015 the quantum of erstwhile Subsidy scheme 2002 has been merged as part of- under-recovery claims of PDS Kerosene.

Effective 1st September, 2016, prices, of PDS kerosene has been revised fortnightly

3(b). Cash compensation by Govt. on LPG under DBTL (Rs./Cylinder)



Chapter

12

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

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

12.1 Preamble

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

In pursuance of the observations of Parliamentary Committee on the Welfare of SCs/STs/OBCs and the Presidential Directives

Bharat Petroleum's Computer Aided Learning Project in Jaipur

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 2016, the team has inspected resevation rosters of nearly 56 units of PSUs.

12.2 Annual Component Plan for welfare of SC/ST/PWD for 2016-17

Under this plan, most of the PSUs of this Ministry are undertaking the following developmental activities for the Welfare of SC/ ST population during 2016-17:

(i) Scholarship/Financial Assistance for purchase of books/ uniforms etc to SC/ ST students in neighbouring schools.

(ii) Every year Rs. 20.00 crore allocated to various work centers of ONGC towards Welfare and upliftment of SC/ST communities.

(iii) Education for primary level schools, hiring of teacher, provision of uniform, note books, stationary etc. to school going children.

(iv) During the financial year 2016-17, the PSUs made provision in the plan outlet for award of scholarship to SC/ST students.

(v) Special drives were conducted by PSUs for recruitment of candidates from SC/ST/OBC/PWD during the period 2016-17 to minimize the shortfall / vacancies.

(vi) PSUs are implementing the provisions under Disability Act, 1995 in respect to identification of course, implementing various provision of 3% reservation under Orthopedically Handicapped (OH), Visually Handicapped (VH) and Hearing Handicapped (HH) category.

Hon'ble Prime Minister presenting aids to specially abled persons

12.3 Details of backlog vacancies in respect of SC, ST, OBC, PWD in PSUs/Organizations under this Ministry as on 31.12.2016:-

PSU	Number of backlog Vacancies in respect of SC, ST, OBC and PWD (Direct Recruitment)															
	Group A				Group B				Group C				Group D			
	SC	ST	OBC	PH	SC	ST	OBC	PH	SC	ST	OBC	PH	SC	ST	OBC	PH
ONGC	0	1	2	14	Only promotional post				11	34	28	75	0	0	1	4
ONGC Videsh	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IOCL	15	23	37	5	0	0	0	0	1	20	15	2	1	2	1	6
HPCL	4	0	21	1	0	0	0	0	0	0	6	0	0	0	38	0
BPCL	3	2	0	20	0	0	0	1	0	0	0	5	0	0	0	2
GAIL	3	6	11	10	0	0	13	4	25	6	12	5	4	5	1	0
EIL	5	3	1	3	0	0	0	0	0	0	0	0	0	0	0	0
OIL	1	2	3	3	0	0	0	0	4	6	1	6	0	0	0	0
CPCL	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
NRL	5	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
MRPL	2	1	7	2	0	0	0	0	12	6	1	4	0	0	0	0
BieccoLawrie	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BalmerLawrie	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OIDB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RGIPT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

12.4 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 for filling up of posts with Persons with Disabilities. This matter is being monitored by DoPT. 359 posts were identified in Ministry of Petroleum & Natural Gas and PSUs under the administrative control of this Ministry. As on 31.12.2016 the position for the filling up of vacancies for Persons with Disabilities are as under:

S. No.	Step –Wise Details	Posts
1	No. of posts in the Ministry and Oil PSUs reported to Hon'ble Supreme Court	359
2.	No. of Posts already filled in	246
3.	Remaining posts to be filled up by 28.2.2017#	113

#No candidate available under visually and hearing challenged category. Vacancies will be readvertised.

12.5 National Human Rights Commission (NHRC) Notice dated 27.2.2016 (Case No. 220/43/4/2016) received from DOPT on 17.03.2016 alongwith petition of Shri Pranay Pratik dated 16.12.2015. The petitioner is 50% visually impaired final year Mechanical Engineering student of ISM, Dhanbad. In the petition, the applicant mentioned that he is applying for job in various PSUs and while going through the advertisement of PSUs, it has been noticed that except ONGC (2 openings) no other PSUs have declared any vacancies for visually impaired mechanical engineers.

During the Monthly Review Meeting of Oil PSUs held on 20.9.2016 under the chairmanship of Secretary, PNG, the status of employment of visually handicapped persons by PSUs have been reviewed in view of the grievance received through NHRC regarding employment opportunities in Oil & Gas PSUs to visually handicapped mechanical engineers. Finally, it has been decided the all PSUs will review the provisions of their HR policies so as to ensure that the advertisement released do not prohibit employment to any visually impaired technical person.

12.6 Ministry of Micro, Small and Medium Enterprises informed that the Public Procurement Policy for PSUs make it mandatory to procure 20% of total purchases of goods and services from MSME, out of which 4% are required to be procured from SC/ST enterprises. Oil & Gas PSUs have been able to achieve the mandatory target of 20% of total purchase of all goods and services from MSME (356 number of various items and services required by Oil Industry as reserved) but as far as 4% of procurement of SC / ST enterprises is concerned, they do face difficulties due to non availability of SC / ST vendors. Oil & Gas PSUs have undertaken a number of measures such as Vendor Development Summit, visit to various exhibitions, special efforts to locate SC / ST vendors, etc. to achieve the desired percentage of procurement from SC / ST entrepreneurs.

Chapter

13

Welfare, Development and Empowerment of Women

Welfare, Development and Empowerment of Women

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

Women Forum has been formed in the PSUs to look after the interest of the women employees. Committees have been set up to attend to redressal of complaints on 'Sexual Harassment at Work Place.'

The number of women employees vis-à-vis total number of employees as on 31.12.2016 in the oil PSUs is tabulated as below:

OIL Arogya

Sl. No.	Name of PSU	Total No. of Employees	Total No. of Women Employees
1.	ONGC	33742	2207
2.	ONGC Videsh Ltd.	337	29
3.	IOCL	33400	2763
4.	HPCL	10366	896
5.	BPCL	12616	1144
6.	GAIL	4365	256
7.	EIL	2960	366
8.	OIL	7223	358
9.	CPCL	1652	86
10.	NRL	875	43
11.	MRPL	1820	129
12.	BIECCO LAWRIE	258	02
13.	BALMER LAWRIE	1225	92
14.	OIDB	21	05
15.	RGIPT	65	05

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

BPCL visit to Bhupalapally, Warangal


IndianOil
DIESEL
Extra service.
Extra care.
Welcome to our
XtraCare station.
XTRA
care

Chapter

14

Undertakings / Organisations

Undertakings/Organisations

14.1 MAHARATNA PSUS

14.1.1 Indian Oil Corporation Limited (INDIANOIL)

IndianOil is India's flagship Maharatna National Oil Company with business interests straddling the entire hydrocarbon value chain– from refining, pipeline transportation and marketing of petroleum products to Research & Development, Exploration & Production, marketing of Natural Gas and Petrochemicals. By venturing into Renewables and Nuclear Energy, the company has grown and evolved itself from a pure Petroleum Refining and Marketing company to a full-fledged energy company.

IndianOil is ranked 161st among the world's largest corporation (and first among Indian enterprises) in the prestigious Fortune 'Global 500' listing for the year 2016.

Having set up subsidiaries in Sri Lanka, Mauritius and the UAE, the Corporation is simultaneously scouting for new business opportunities in the energy markets of Asia and Africa. It has also formed about 20 joint ventures with reputed business partners from India and abroad to pursue diverse business interests.

Financial Performance

IndianOil is India's largest commercial enterprise, with a turnover (inclusive of Excise Duty & sale of services) of Rs. 3,99,601 Crore for the year 2015-16 against Rs. 4,50,756 Crore during 2014-15. During the year 2015-16, IndianOil registered a profit (after tax) of Rs. 10,399 Crore against Rs. 5,273 Crore in during 2014-15. GRM stood at US$ 5.06/bbl in 2015-16 as against US$ 0.27/bbl in 2014-15.

Physical Performance

IndianOil refineries together achieved a crude oil throughput of 56.694 million tonnes (including 0.50 million tones for Paradip Refinery) during the year 2015-16 with a capacity utilisation of 102.2 per cent, as against a throughput of 53.586 million tonnes with a capacity utilization of 98.9 percent during the previous year. They achieved the best ever combined distillate yield of 80.6 wt % during the year as against the previous best of 78.8 wt % achieved during 2014-15. With focused efforts towards energy conservation, the refineries achieved the best ever overall specific energy consumption at 53.8 MBN (MBTU/BBL/NRGF) against the previous best of 54.4 MBN achieved during 2014-15.

During the year, 8 new crudes were processed for the first time at various refineries in an attempt to widen the crude oil basket and to tie-up new crude oil sources for de-risking.

One of the landmark events of the year was the commissioning of IndianOil's most modern 15-MMTPA refinery at Paradip in March, 2016, which has the capability to process the toughest crudes available. With this, the refining capacity of Corporation has increased to 69.20 MMTPA. The total refinery capacity of Corporation including group companies is 80.7 MMPTA.

IndianOil Pipelines achieved its highest ever throughput of 79.82 million tonnes during the year 2015-16 as against a throughput of 75.68 million tonnes in 2014-15. Crude Oil Pipeline throughput was 50.54 MMT during the year 2015-16 as against 47.78 MMT during the year 2014-15. Product Pipeline throughput was 29.28 MMT during the year 2015-16 as against 27.90 MMT during the year 2014-15. The gas pipeline too achieved the highest-ever throughput of 1,380 MMSCM during the year against a throughput of 1,364 MMSCM in 2014-15.

With commissioning of 525 km of new pipelines during the year, the total length of the pipeline network for crude oil, product and gas pipelines as on 31st March, 2016, was 11,746 km.

IndianOil continued to dominate the domestic market in core product categories, i.e. petrol, diesel and LPG, by selling 72.65 million tonnes of petroleum products during the year, as against 68.47 million metric tonnes during the previous year. In addition, 3.46 million tonnes of petroleum products were exported

during 2015-16 as against 3.65 million tonnes exported during the previous year.

IndianOil has established itself as the second largest petrochemicals player in the country in a short span of time. In 2015-16, the petrochemicals sales, including exports, touched a new high with sales of 2.538 million tonnes, against 2.487 million tonnes during the previous year. The Corporation's state-of-the-art Product Application & Development Centre (PADC) at Panipat strives to develop new applications and improve existing grades. The Corporation's PROPEL brand has strong international presence and is exported to 71 countries across the globe.

IndianOil registered gas sales of 1.93 million tonnes during the year 2015-16 as against 1.80 million tonnes in the previous year. At present, the Corporation has a long-term contract to offtake 2.25 MMTPA of Regasified LNG (R-LNG) from Petronet LNG's Dahej Terminal. The Corporation imported 9 LNG cargoes during 2015-16. Besides, in the Pacific North West LNG Project, the Corporation's equity LNG stands at 1.2 MMTPA for a minimum of 20 years and delivery of gas from which is expected by 2020.

IndianOil is pursuing implementation of city gas distribution (CGD) networks through its Joint Venture Company, IndianOil-Adani Gas Private Limited, which is implementing CGD networks in Chandigarh and Allahabad geographical areas. The Joint Venture Company has also received authorisation from Petroleum and Natural Gas Regulatory Board for CGD network in 5 more geographical areas during 2015-16, viz., Panipat, Daman, Ernakulam, Udhamsingh Nagar and Dharwad. In addition, another Joint Venture Company, Green Gas Limited, operates two CGD networks, one each in Lucknow and Agra.

Marketing & Associated Infrastructure

To maintain its leadership position in the market place, IndianOil commissioned 1,032 retail outlets (fuel stations, including 481 Kisan Seva Kendra outlets in rural areas) in 2015-16. The total network comprising 45,212 touch points as on 31st March 2016 was strengthened from 42,982 touch points last year. Apart from the largest network of retail outlets numbering, 25,363(18672 regular RO &6691 KSK),129 Terminal/Depots, 6477 consumers pump, 3908 SKO/LDO dealers and 100 AFS are some of the vital components of this network. The extensive network ensures availability of product stand inventory at the doorstep of the customers. The contribution of KSK outlets to total sales during the year reached a new high of 13.9 per cent in Petrol (Retail) and 13.8 per cent in Diesel (Retail). 2,069 retail outlets were fully automated during the year, taking the total number of automated retail outlets to 9,400. The city-specific automation programme was implemented in retail outlets of 26 cities during the year, taking the total number of such cities to 55.

IndianOil supports the use of alternative energy, and as on 31st March, 2016, 4,166 of its retail outlets operate on solar energy.

IndianOil increased its market share in the LPG segment during the year and released new connections, augmenting its bottling and storage capacities, and expanding its distributorship network. The highest ever new domestic LPG connections were released to 1.03 Crore customers, raising the Indane customer strength to 9.91 Crore. 1180 distributorships were commissioned during the year to further expand the network. Under new initiative, IndianOil also released more than 1,60,000 LPG connections and converted over 3400 villages to "smokeless villages" (as on 31.03.2016).

IndianOil's finished lube sales registered a growth of 2.8 per cent in 2015-16 and institutional lube sales registered a growth of 5.2 per cent. 38 new lube products were developed during 2015-16, out of which 15 products were developed indigenously as a substitute for imported products.

IndianOil's Aviation Service maintained its leadership position during the year with market share of 62.4 per cent. During 2015-16, IndianOil also started its Aviation Fuel Stations in Mohali and Rourkela increasing the number of cities in which it operates its stations to 100 cities.

Research & Development

During 2015-16, a mega scale plant of 4.17 MMTPA capacity based on INDMAX technology developed by IndianOil's R&D Centre was commissioned at Paradip. In addition, the R&D Centre developed INDAdeptG technology for production of BS-IV Gasoline, is under implementation at Guwahati. The R&D Centre filed for 74 patents (35 in India, 39 in foreign countries) during 2015-16, while 19 patents were granted. The patent portfolio expanded to 454 in 2015-16, with 92 US patents, 184 Indian patents and 178 patents of other countries. In addition, 125 product formulations were also developed.

During 2015-16, a high therm LPG-based metal cutting gas additised with an R&D-developed additive was launched and is currently being distributed through 28 bottling plants.

Alternative Energy:

The IndianOil has a portfolio of 69.3-MW Wind, 5-MW Solar PV grid connected projects and 1.4-MW off-grid solar PV projects. In addition, 4-MW solar PV project at Narimanam terminal (Tamil Nadu) has been commissioned in April, 2016. The solar power generated from this project will be wheeled to the Corporation's 12 locations in Tamil Nadu. During the year, the Corporation has also awarded the contract for setting up 98.3-MW of wind-power generation capacity, which will be commissioned in 2016-17. IndianOil is also setting up a 200-TPD (tonnes per day) integrated waste-to-fuel plant at Varanasi. In addition, the Corporation is also setting up 10 de-centralised waste management systems at Varanasi, each with 5-TPD capacity.

Exploration & Production

IndianOil E&P portfolio consists of 15 active blocks, which include 8 domestic blocks (including 2 coal-bed methane blocks) and 7 overseas blocks, with participating interest ranging from 3.50 per cent to 50 per cent. Out of these 15 blocks, 3 overseas blocks are under production, 6 under discovery (3 Overseas and 3 Domestic), 2 under exploration (1 Overseas and 1 Domestic) and 2 domestic blocks under development phase. The seven overseas blocks are located in Libya, Gabon, Nigeria, Yemen, Venezuela, USA and Canada.

During 2015-16, IndianOil made significant strides in its overseas acquisition drive. A consortium of IndianOil and Delonex Energy UK Limited secured the Palmeira Block, Mozambique, by successfully bidding in the 5th Mozambique Licencing Round. Another major highlight was the acquisition of the E&P assets of Rosneft Oil Company, a National Oil Company of Russia. IndianOil, alongwith two Indian partners, has signed agreements to acquire participatory stake in Taas-Yuryah Neftegazobodobycha "TYNGD" and Vankorneft assets of Rosneft. Both these acquisitions in Russia would significantly

A modern fuel station of Bharat Petroleum

increase IndianOil's 2P reserves and oil production.

The details of projects completed during 2015-16 are as under:

- 15-MMTPA grassroots refinery at Paradip, Odisha
- 249-km Rajola-Chaksu section, 56 km Moda-Gauridad section and debottlenecking of the 46-km Chaksu-Manpuria section of Salaya-Mathura pipeline project
- 105-km Paradip-Jatni section of Paradip-Raipur-Ranchi pipeline project
- 37-km Khana-Bolpur section of augmentation of Paradip-Haldia-Barauni pipeline project

Product storage depots at Jaipur, Jharsuguda, Jatni and Paradip.

IndianOil has a planned CAPEX of Rs. 56,200 Crore during XII plan against actual expenditure of Rs. 48,655 Crore in XI plan period. The company has already invested Rs. 51,837 Crore in the first four years of plan period (2012-13 to 2015-16) and has already surpassed the planned CAPEX of Rs. 56,200 Crore in September 2016. Some of major ongoing projects are listed below:

S. No.	Name of the Project	Latest Approved Cost (Rs. Crore)
1	Ennore-Thiruvallur-Bengaluru-Puducherry-Nagapattinam-Madurai-Tuticorin Natural Gas Pipeline	4497.00
2	Paradip Petrochemicals Phase-I, Polypropylene Project	3150.00
3	Distillate Yield Improvement (Coker) PJ at Haldia Refinery	3076.00
4	Installation of INDMAX Unit alongwith associated facilities at Bongaigaon Refinery	2582.00
5	Paradip Hyderabad Pipeline	2321.00
6	Koyali-Ahmednagar-Solapur Pipeline	1967.00
7	Augmentation of Paradip-Haldia-Durgapur LPG Pipeline and its Extension upto Patna and Muzaffarpur	1823.00
8	Paradip Raipur Ranchi Pipeline	1793.00
9	Debottlenecking of SMPL System	1584.00
10	Haldia - Barauni Product pipeline	1038.00
11	BS-IV project (Phase-1) for production of 100% BS-IV compliant MS and HSD at Gujarat Refinery	931.00
12	Paradip Haldia Durgapur LPG Pipeline	913.00
13	Jaipur Panipat Naphtha Pipeline along with Augmentation of Koyali Sanganer Product Pipeline	887.00
14	Branch pipeline from Patna to Baitalpur & Motihari on Barauni-Kanpur Pipeline (Revised Scheme) and its extension to Raxaul	788.00
15	LPG import facilities, Kochi	714.25
16	Ennore Trichy Madurai LPG Pipeline	711.00
17	LPG import facilities at Paradip	690.00
18	Augmentation of Paradip Haldia Barauni Crude Pipeline	586.00
19	Augmentation/Revamping of Firewater System at Pipeline Crude Oil Tank Farm Locations	584.06
20	Replacement of Coke Chambers in Coker A at Barauni Refinery	480.00

CSR & Contribution to Exchequer

In line with the CSR vision and mission, IndianOil's CSR budget is allocated and spent on high-priority thrust areas like safe drinking water, healthcare & sanitation, education & employment enhancing vocational skills, empowering women & socially/economically backward groups, environment sustainability, protection of national heritage and promotion of art & culture, rural development etc.

As against the current year's CSR budget allocation of Rs. 141.50 Crore, the CSR expenditure during the year was Rs. 156.68 Crore. However, after considering the amount of Rs. 19.61 Crore carried forward from the previous year, an amount of Rs. 4.43 Crore remained unspent and is carried forward to 2016-17. The programs are undertaken preferably in the vicinity of IndianOil's major installations/establishments for improving the quality of life of the concerned communities, which include marginalized groups such as SCs, STs, etc.

During the year 2015-16, Rs. 1,32,064 Crore was paid to the exchequer as against Rs. 98,326 Crore paid in the previous year. An amount of Rs. 67,459 Crore was paid to the Central Exchequer and Rs. 64,605 Crore to the State Exchequers as against Rs.36,190 Crore and Rs. 62,136 Crore paid in the previous year to the Central and State Exchequers respectively.

Major Awards & Recognitions

- Besides being the top-ranked Indian company among the world's largest corporates in the prestigious Fortune 'Global 500' listing for 2016, IndianOil retained its top position in Fortune 'India 500', Forbes' Global 2000', Business Standard 1000, Financial Express FE-500and Business India Super 100 corporate listings during the year.
- IndianOil was conferred the prestigious Dun & Bradstreet Top PSUs Award-2015 under the 'Oil - Refining & Marketing Sector' category.
- IndianOil retained its position as the 'Most Valuable Indian Petroleum Brand' in WPP's BrandZ Top 50 Most Valuable Indian Brands-2015. Among the eight PSU brands in the top 50, IndianOil ranks second.
- IndianOil bagged the Reader's Digest Most Trusted Brand Award for the ninth consecutive year in the petrol station category.
- IndianOil has been adjudged the 2nd 'Best Company in Public Sector in India' in the annual survey conducted by the Great Place to Work Institute, India and The Economic Times.
- IndianOil was conferred the prestigious India Today PSU awards in three categories – Best Global Presence, Best Performing Company, and Best in CSR and Sustainability.
- IndianOil bagged the prestigious SAP ACE Award-2015 for achieving excellence in SAP operations for the sixth time. IndianOil was selected from amongst a thousand project nominations submitted across 17 different categories by companies spread across the Indian sub-continent.
- IndianOil bagged the prestigious SAP's Customer Centre of Expertise (CCOE) of the Year bronze award for 2015 in the 'Innovation' category at the global level. SAP honours the best COEs in the world with the 'Customer COE of the year' award.]
- IndianOil R&D Centre bagged the 6th National Award for Technology Innovation instituted by the Department of Chemicals & Petrochemicals, Government of India, in the category of 'Research in the Field of Polymer Science & Technology for Innovation' for developing ultrahigh molecular weight polyalphaolefins as drag reducer additives for pipeline transportation of oil.
- The R&D Centre also won the 5th National Award for Technology Innovation in the category of 'Research in the field of Polymer Science & Technology for Indigenous Catalyst Development' for producing polypropylene using novel and low-cost precursors.
- IndianOil received the 6th National Award for Technology Innovation in the category of Innovation in Polymeric Material for its high productivity HDPE injection moulding grade 080M60, jointly with Ester Industries.
- IndianOil Institute of Petroleum Management (IiPM) bagged the 'Best Corporate Learning Leader of the year' award at the World HRD Congress. IiPM also won awards in three other categories, including 'Training provider of the year', 'Best development programme

for middle managers' and 'Best development programmes for top managers.'

14.1.2 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 founded on 14th August, 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). ONGC was incorporated as Public Limited Company. The authorized and paid up capital of ONGC as on 31.3.2016is 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 31.3.2016 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 2016-17 upto December, 2016

- During 2016-17 upto December, 2016, ONGC has made 16 discoveries, out of which 9 discoveries (1 in NELP and 8 in Nomination) are in onland acreages and 7 in shallow water offshore (2 in NELP and 5 in Nomination) acreages.
- Three wells have been successfully drilled in Heera field under "Heera & South Heera Redevelopment Phase-II" Project using Under Balance Drilling (UBD) technology, which has been introduced for the first time in ONGC. The major benefits of this technology are drilling without damaging formation, immediate production benefits, production enhancement and superior reservoir management in depleted fields.The wells have been put on production and presently contributing 1400 BOPD.
- Production commenced from on-going "Additional development of Vasai East Field" Project from June, 2016. Presently 8 wells have been completed under the scheme and producing oil about 6000 BOPD.
- Production commenced from on-going project "Improved oil Recovery of B-173A Field" from July, 2016. Presently 3 wells have been completed under the scheme and producing oil about 2000 BOPD.
- Gas Production has commenced from on-going "Daman Development" and "Development of C-26 Cluster" Projects" from August, 2016 and October, 2016 respectively. Four wells each in Daman & C-26 have been completed and presently contributing about 1.5 MMSCMD.
- Production from deep water well S2AB in Eastern Offshore commenced from May, 2016 after completion of tie-in jobs with the existing G1 facilities. Well S2 AB is currently producing gas about 0.9 MMSCMD.
- Gas production from Eastern Offshore Asset has been ramped up to 1.8 MMSCMD from earlier level of 0.8 MMSCMD in Feb'16 after signing of term sheet with GAIL in Aug'2016 on evacuation of S2AB gas under new pricing regime for deep-water fields.
- In Cauvery Asset, 2 nos. of Gas Dehydration units (GDUs) were commissioned at Kamlapuram & Nannilam EPS in July, 2016. With these, a total of 8 GDUs are operational in Cauvery Asset enabling gas dispatch to GAIL as per PNGRB guidelines/ parameters. All the eight GDUs have a combined installed capacity of 4.14 MMSCMD.
- Rajahmundry Asset successfully commissioned 4 GDUs in Tatipaka, Keshnapalli (W), Kesavadasapalem & Endamuru installations by 30th August, 2016 against the scheduled completion on 11th September, 2016. Total gas handling capacity for the 4 GDUs is 1.5 MMSCMD. With commissioning of these GDUs Rajahmundry has a total of 9 GDUs with a total installed capacity of 3.35 MMSCMD.
- A new technology process, Toe to Heal Air Injection (THAI) technology has been

implemented for the first time in Balol EOR field of Mehsana Asset in November, 2016.

- Well Madanam#3 (Sub) in Madanam NELP field of Cauvery Asset was successfully drilled and completed as Barefoot completion in Basement in the interval 1430-1505 m. The well on testing produced @ 115 m^3/d to become the highest oil producer in Cauvery Asset.
- 2 Nos. of Hired Gas compressors of 50,000 SCMD capacity commissioned in Paliyad field of Ahmedabad Asset on 25.05.2016 for starting of gas lift system in Wadu-Paliyad fields.
- Rajahmundry Asset has commissioned 3 nos. of hired gas compressors of 40,000 SCMD capacity each at Keshnapalli (W), - GGS in September, 2016. These compressors have helped to reduce flaring of low pressure associated gas.
- Ankleshwar Asset has successfully drilled its highest ever horizontal drift well in Dahej field. Well DJAT drilled to a depth of 3785 M with horizontal drift of 2172.9 m has helped to complete the well from surface location on land to its sub-surface objective location lying under the sea.

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, 9MMTPA 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.

Exploration Initiatives

- ONGC is making all possible efforts to accelerate the growth in a planned manner by adopting a multi-tier strategy. This strategy comprises continued exploration in known fields and basins for new plays, venture in new basins having difficult terrain and complex geology, explorations of unconventional resources like shale gas/oil, CBM, Fractured Basement etc., early monetisation of discoveries made besides, improving the production from existing fields.
- ONGC is absorbing all the latest state-of-the-art technologies available in the industry for increasing its reserve base and to arrest

decline in production through various IOR/ EOR schemes. Production can be enhanced through active participation in bidding for prospective acreages in the coming NELP rounds.

- ONGC is planning to achieve growth of 1080 MMT (O+OEG) In-Place Hydrocarbon Volumes and 360 MMT (O+OEG) Reserves during the 12th Five Year Plan.
- ONGC on exploration front has taken various initiatives for exploration of unconventional reservoirs like Shale Gas / oil, and CBM HP-HT and Basement Exploration and has constituted four Centers of Deliveries (CoD) for dedicated exploration of these unconventional plays.
- As on 1.4.2016, In-Place Hydrocarbon Volume of 8506.73 MMTOE could be established through exploration by ONGC. Out of 8506.73 MMT of oil and oil equivalent gas of In-Place Volumes, the Ultimate Reserves which can be produced are about 2969.11 MMTOE. The balance recoverable reserves are of the order of 1365.74 MMTOE.

Drilling Services initiatives

- Challenges in Daman Field Development were overcome with suitable changes in slurry design for gas tight property, placement of centralizer and spirolizer in combination and re-designing placement techniques which has resulted in excellent cement bondage in the wells. The prime objective is to achieve excellent cement bondage in the entire cemented interval to meet the developmental objectives which includes provision for future Fracture jobs for Daman sands.
- Mehsana Drilling Services has started using CFD (Chrome free dispersed) mud successfully in shallower wells as cost cutting measure.
- Microbubble DF system as pilot test in depleted reservoir has been planned in the final phase of drilling (8 ½" section) in the well GKIM (TD 2800 m). Presently, second phase of drilling is in progress.
- Introduction of "Protech Centralizers" for 5" Liner in Slim Hole cementing operations. Protech Centralizers proved to be a key aid in mitigating channeling issues which were previously observed during slim hole cementation.

Technical Services' initiatives

- Pilot project on use of gas (in dual fuel mode) to power CAT 3512 B diesel engines on a drilling rig of Ankleshwar Asset. The OEM-supplied DGB kits are expected to be installed by 31st March, 2017.
- Entered into an MoU with M/s Energy Efficiency Services Ltd. (EESL), a joint venture of four power sector PSUs, on 28th June, 2016 for implementation of LED lighting replacement project across ONGC.

Infocom initiatives

- ONGC has taken up the ambitious plan of going paperless. As part of this effort, Consultant has been hired who has identified the processes and the volume of work across ONGC to be undertaken. Tenders have been invited for implementation of this initiative in two phases, the first phase covering Mumbai and the 2nd phase covering across ONGC. The project is likely to be completed by 2018.
- Earlier for remote locations, ONGC was using a single SATCOM transponder of 36 MHz which was shared between onshore and offshore locations of ONGC providing bandwidth of 18 Mhz to each. With persistent efforts ONGC has been able to hire another transponder on GSAT 16 through ISRO. With this and upgradation of SATCOm equipment technology used in ONGC, both onland and offshore locations are going to be benefitted with higher bandwidth availability of 72 MHz which would result in output of around 160 Mbps due to better spectral efficiency.
- In today's competitive world, the focus has to be on timely completion of Projects within the allocated cost. Towards, this objective, a Project Management office has been formed in ONGC. Project Management Software has been procured by ONGC and shall be a tool used by this office and other stakeholders within and outside ONGC to monitor and implement Projects as per schedules and costs.

Information Consolidation for Efficiency (ICE)

- Automation of Insurance Claims - Automation of process of insurance claims from LIC against Leave Encashment in case of death of an employee on receipt of claim from

nominee of deceased employee under LIC-GLES scheme.

- Fair valuation of asset and liability: Under Ind_AS Assets and liability are required to be fair valued and accounting adjustment are to be carried out on particular valuation date. Fair Valuation program for valuation of Non-current Financial assets and liabilities has been developed on a particular valuation date and to post accounting entries automatically.
- Transfer of facility asset as oil and gas asset: As per Ind_AS requirement fixed assets which are related to production (facilities) need to be depreciated based on unit of production method (RESERVOIR/PRODUCTION RATIO). The process has been configured for shifting facilities asset to oil and gas assets and to deplete same based on unit of production method.
- Accounting of Lease hold land, Dry Docking charges and Mobilization charges under Ind_AS: Configured the process for mapping of changed methodology under Ind_AS for accounting of Lease hold land, Dry Docking charges and Mobilization charges.
- Mapping of national Seismic Project: Completed configuration for process mapping and Accounting of project structure for National Seismic Project – API for the sedimentary basin of India.
- Vendor Monitoring System: Functionality is developed in Vendor Monitoring System Program to send mail directly to the vendor for any query raised by Vendor Management Cell (VMC), Dehradun at the time of processing the Vendor creation request. This will help in the VMC Team directly corresponding with the probable vendor for any clarification, documents etc.

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.

14.1.3 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 2015-16) 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 3.7 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. GAIL is co-promoter of two other petrochemical projects including 280 KTPA Brahmaputra Cracker and Polymer Limited (BCPL) Complex in Assam which was inaugurated by Hon'ble Prime Minister on 5th February, 2016 and 1.4 MMTPA ONGC Petro-additions Limited (OPaL) project in Gujarat, which is under execution.

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 (USA, China, Singapore, Egypt, and Myanmar).

Physical and Financial Performance

Physical

Parameters	Units	Performance in 2015-16	Performance in 2016-17 (Up to Sept 2016)	Projected Performance in 2016-17 (As per RE)
Gas Transportation	MMSCMD	92.09	98.65	93.50
Gas Marketing	MMSCMD	73.67	79.81	74.17
Liquid Hydrocarbon Production	TMT	1089	536	1047
Petrochemical Production	TMT	341	246	660
LPG Transportation	TMT	2819	1535	3305

Financial

Description	Units	Performance in 2015-16	Performance in 2016-17 (Up to Sept 2016)	Projected Performance in 2016-17 (As per RE)
Turnover	Rs. Crore	51614	22525	44142
Profit Before Tax	Rs. Crore	3173	3061	4817
Profit After Tax	Rs. Crore	2299	2260	3247
Gross Internal Generation (PAT + Depreciation)	Rs. Crore	3612	2952	4636
LPG Transportation	TMT	2819	1535	3305

Projects

- Construction of Jagdishpur-Haldia Pipeline project Phase –I was inaugurated by Hon'ble Prime Minister of India on 25th July 2015. As advised by the Ministry, Bokaro-Ranchi-Angul pipeline has been clubbed with Jagdishpur-Haldia pipeline. The integrated pipeline will be Jagdishpur-Haldia/Bokaro-Dhamra Pipline (JHBDPL) Project.
- Construction of Vijaipur–Auraiya–Phulpur pipeline (VAPPL) as spurline on DVPL-GREP up-gradation project is under execution.
- GAIL is setting up a 5.76 MW rooftop solar power project at Pata petrochemical complex.
- 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.

14.2 Navratna PSUs

14.2.1 Bharat Petroleum Corporation Limited (BPCL)

Activities and Performance of BPCL : 2016-17

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 30.11.2016 is Rs.2500 Crore and Rs.1,446.17 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 9.59 MMT and 7.48 MMT respectively during 2016-17 (up to November 2016).

BPCL with 12,676 employees has an all-India presence through its extensive marketing network with Market Sales of 25.2MMT& market share of 22.97% (Apr – November 2016).

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, 13698 Retail Outlets, 4596 LPG Distributorships, 2 lubricant blending plants and 2872 KM cross-country pipeline as on 30.11.2016.

Financial Performance

The financial performance of the Corporation during April – September 2016: Gross Sales Turnover Rs. 1,11,834crs and Profit After Tax (PAT) Rs. 3925.68 crs.

Exploration and Production

Bharat Petro Resources Limited (BPRL), a 100% subsidy has of Bharat Petroleum Corporation Ltd. (BPCL), hold Participating Interest (PI) in 17 blocks in 6 countries along with Equity stake in 2 companies in Russia that operates 4 Producing assets.

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

In Mozambique, the Exploration phase has been completed and an estimated 30-75 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.

BPRL along with Oil India Limited and Indian Oil Corporation Limited, acting jointly as the Indian Consortium, through a joint venture company formed by their wholly owned subsidiaries in Singapore, completed on 05th Oct 2016 two transactions, viz. acquisition of 23.9% shares of the charter capital of JSC Vankorneft, a company organised under the laws of the Russian Federation, which is the owner of Vankor and North Vankor Field licenses, from Rosneft Oil Company (Rosneft), a National Oil Company of Russia; and acquisition of 29.9% of the participatory share in charter capital of LLC TaasYuryakhNeftegazodobycha ("TaasYuryakh"), from LLC RN Razvedka I Dobycha, a wholly owned subsidiary of Rosneft.

So far BPRL has invested approximately Rs 17178 Crores in these assets as on 30.11.2016.

Ongoing Projects

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.

Laying a Heat Traced Pipeline with associated facilities at Mumbai Refinery

The project envisages laying of a Heat traced pipeline with associated facilities at Kochi and

Mumbai for transporting High Pour Products between Kochi Refinery and Mumbai Refinery. The approved cost of the project is Rs. 193.49 crs and is scheduled for completion by January 2019.

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.

Crude and Vacuum Distillation Unit (CDU/ VDU) and associated utilities commissioned in mid Sept.2016. Diesel Hydro Treater Unit (DHDT), Effluent Treatment Plant (ETP), Mounded LPG bullets and Cracked LPG Unit have been mechanically completed and pre-commissioning activities are in progress. All units are expected to be mechanically completed by March 2017.

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 August 2018.

Laying a Heat Traced Pipeline with associated facilities at Kochi Refinery

The project envisages laying of a Heat traced pipeline with associated facilities at Kochi and Mumbai for transporting High Pour Products between Kochi Refinery and Mumbai Refinery. The approved cost of the project is Rs.337.06 crs and is scheduled for completion by August 2018.

Ennore Coastal Terminal Project

The project envisages construction of POL Terminal at Ennore with tankage of 117 TKL with receipt facility through Tanker / ETTPL and 16 bay gantry to cater to Chennai market in lieu of closure of all activities at existing Tondiarpet Installation, as per Government directives. The approved cost of the project is Rs.393 crs. with anticipated mechanical completion in April 2018.

Palakkad LPG Terminal Project

The project envisages construction of 3 X 1450 MT MSV, 8 bays TLD Gantry, LPG P/H (20 M X 8 M) and associated facilities. The approved cost of the prjet is Rs.184 crs. and anticipated mechanical completion is December 2017.

LPG Import Facility at Haldia

The project envisages construction of 2X15000 MT refrigerated storage tanks for Propane & Butane, facilities for Ocean tanker unloading, Propane and Butane heating, Ethyl MercaptanDosing, LPG Bottling and dispatch in cylinders or in bulk through road tankers. This also entails laying of twin pipeline (one for Propane & other for Butane) from Jetty to Terminal. The approved cost of the project is Rs.694 crs. and slated for anticipated completion in October 2018.

CSR

At BPCL, energizing lives through Corporate Social Responsibility initiatives is a commitment to fulfill as a Corporate Citizen. BPCL have made significant progress over the years in the core thrust areas of Education, Water Conservation, Skill Development, Health & Hygiene and Community Development. Through CSR initiatives BPCL have strived to improve the livelihood opportunities and achieve sustainable changes in the communities neighboring in businesses across the country as well as in rural & tribal areas. To build a sustainable partnership with society, BPCL have scaled up existing projects, taken up newer initiatives and exited from those that have been taken over by the stakeholders involved. Pursuant to Hon'ble Prime Minister's clarion call on "Swachh Bharat Abhiyan", BPCL joined the mission to accelerate the progress of healthy sanitation in Govt. schools of rural areas. Under the ' Swachh Bharat – SwachhVidyalaya Mission' initiative BPCL

constructed/ renovated 1910 toilet blocks in the states of West Bengal, Andhra Pradesh, Telangana, Bihar, Odisha, Madhya Pradesh and Chhattisgarh, spread across 26 districts of the country.

Contribution to Exchequer

BPCL's contribution to the Exchequer (RE) during April- September 2015 is Rs.36,473.55Crs.

Major Accolades / Awards received:

Awards 2016-17

- The OISD award under 'LPG Marketing Organisations' for the year 2014-15 has been bagged by BPCL for the 7th consecutive yearin a row. Kochi Refinery bagged the prestigious OISD Safety Award for its best overall safety performance (Category-2) among Indian refineries for the year 2014-15. For exemplary contribution towards safety, Mr. VikramKhandagale from Operations (CDU 1 & 2) Mumbai Refinery, was conferred the OISD award under the Individual category, for his exceptional alacrity and action preventing a major incident. 29th November 2016

- BPCL was declared as the winner of "SAP ACE Awards 2016" under the Category "Leveraging Analytics Large Enterprises" for implementation of "Migration to BW on HANA" system.SAP ACE (Award for Customer Excellence) is a customer awards process that recognizes & rewards SAP customers who have implemented and leveraged SAP solutions well. 21st November, 2016

- Based on a study conducted in 217 of the ET – 500 companies by Futurescape and IIM – Udaipur; BPCL has been ranked 9th in the "The Best Companies for CSR" list. The ranking was on the basis of four main pillars: Governance (20%), Disclosures (15%), Stakeholder engagement (30%) and Sustainability (35%) amongst 167 private companies and 50 public sector companies. BPCL is the only PSU figuring in the top 10 list and it also tops the list for Business Responsibility across sectors.BPCL has featured among the "Top 10 Companies for CSR" list for the second year in a row.

- BPCL Uran Terminal received the Certificate of Merit from National Safety Council – Maharashtra Chapter for Meritorious Performance in Industrial Safety during 2015 in Storage Handling and Distribution of Petroleum Products industrial group.

- Bharat Petroleum won the Silver Award for our In-house Magazine, Petro Plus,at the Annual Association of Business Communicators of India (ABCI) Awards. 28th October 2016

- Mr. Devendra Joshi, Sr.Manager Corp.(HRS) finished as Runner-up at the 2016 JW World Open Billiards Championships in England. 16th October, 2016.

- BPCL's ace shuttler P.V. Sindhu who recently won the Silver medal at the Rio Olympics was conferred with the Rajiv Gandhi Khel Ratna Award by His Excellency, President of India Shri Pranab Mukherjee. BPCL's two time Olympian and reigning National Table Tennis Champion Soumyajit Ghosh was also felicitated and conferred with the prestigious Arjuna Award. 29th August, 2016

- BPCL has been felicitated with the Special Commendations "Oil & Gas Pipeline Transportation–Company of the Year 2015" Award for the special efforts and excellent overall performance in the growth of pipeline infrastructure and capacity utilization for transportation of hydrocarbons. This was conferred upon the Mumbai-Manmad-Bijwasan Pipeline, connecting commercial & national capitals of India and meeting energy needs of our valued customers in six states en-route. 8th August, 2016

- Leading Malayalam Business Magazine 'Dhanam' has selected Mr Prasad K Panicker, ED I/C (Kochi Refinery), as the 'Business Professional of the Year 2015.' 23rd July, 2016

- BPCL's Annual Report has been awarded the First Prize at the prestigious SCOPE Corporate Communication Excellence Awards 2016. 21st July, 2016

- Mr. P. Balasubramanian, Director (Finance), BPCL is among the "Most Influential CFOs of India". He was awarded this citation recently by the Chartered Institute of Management Accountants (CIMA), which is the world's largest and oldest professional body of

management accountants, operating in 179 countries worldwide.

- Mr. P. Balasubramanian Director (Finance), Bharat Petroleum was awarded the YES BANK-BW Business World Best CFO award in the category of Best PSU – Large Enterprise.These Awards strive to recognize CFOs who have taken centre stage within the organization's strategic decision-making and execution, while also being a key flag bearer of Corporate Transparency, Governance and Corporate Social Responsibility.8th April 2016

- Mr. S. Varadarajan, C&MD, BPCL has been conferred with the National HRD Network (NHRDN) People CEO Award 2015-16 for his outstanding contribution towards People Leadership, Governance Leadership and Performance Leadership. The high level Jury, chaired by Mr. Santosh Desai, Managing Director & CEO – Future Brands Ltd. along with eminent professionals from corporate, PSU and Academia, unanimously selected him for the Award.15th June, 2016

- Mr. S. Varadarajan, CMD, BPCL was conferred with the SCOPE Excellence Award – Individual Leadership Category I (Maharatna/Navratna PSEs) for the year 2013-14 by His Excellency, Shri Pranab Mukherjee, Hon'ble President of India. The SCOPE Awards for Excellence and Outstanding Contribution to the Public Sector Management have been instituted to recognize the contribution of Public Enterprises and to encourage outstanding persons for their hard work and leadership qualities. 11th April, 2016.

- Kochi Refinery has won the Kerala State Pollution Control Board Excellence Award for the year 2015 in the category of very large industries for the ninth consecutive year, for substantial and sustained efforts in pollution control and for initiatives in environmental protection.

- Petro Plus, BPCL in-house magazine won the Second Runner-up prize at the celebrated In-house Communication Excellence (ICE) Awards 2016.

- BPCL has been signing a Memorandum of Understanding with the Ministry of Petroleum & Natural Gas since 1990-91 and has been achieving an 'Excellent' performance rating every year since then. For the years 1998-99, 2000-01, 2002-03 & 2006-07, BPCL was a recipient of the prestigious "Prime Minister's MOU Award" for excellence in performance. In addition, BPCL had the best score in the petroleum syndicate in 2013-14 and 2014-15 as well.

- In the prestigious Fortune Global 500 list for 2016, BPCL's rank is 358. BPCL's rank is 650 in the Forbes Global 2000 list for 2016, a significant leap from the 757 rank of 2015.

- For its outstanding global, financial and industry performance, BPCL has been ranked among the top 20 Oil and Gas Refining and Marketing companies in the Platts Top 250 Global Energy Company Rankings for 2016. BPCL ranks 3rd in Oil & Gas Refining and Marketing in the Asia/Pacific Rim, 7th in Oil & Gas Refining and Marketing globally and 11th in overall performance in the Asia/Pacific Rim. On an overall global performance, Bharat Petroleum has been ranked 35th.

- To mark the Ruby Anniversary of its Foundation Day celebrations, BPCL has institutionalized the first ever national level Energising Bharat Awards, to recognize individuals working selflessly for the betterment of society. 24th January, 2016

- Bharat Petroleum bagged the Silver Award for External Publications and the Bronze Award for the Corporate Calendar at the 55th Annual Awards of the Association of Business Communicators of India (ABCI).18th March, 2016

- BPCL Kochi Refinery won the Outstanding Safety Performance Award instituted by National Safety Council - Kerala Chapter under the category of very large industries.4th March, 2016

- Sustained efforts of BPCL towards making its performance visible in the public domain with more and more transparency has been very well recognised by Indian Chamber of Commerce (ICC), who conferred on BPCL the "Corporate Governance and Sustainability Vision Award-2016".19th February 2016

- BPCL has added another feather in its cap as it bagged the 'Significant Achievement in HR Excellence' Award conferred by CII – Confederation of Indian Industry. This places BPCL in the list of top 10 participating organizations in the country on their platform. The CII institutionalized these Awards realizing the rapid evolution of HR from being a support function to a strategic partner for change management enabling high performance, to gain competitive advantage in the dynamic business environment. 19th February 2016
- Trivandrum LPG Bottling Plant has been adjudged as Winner for the Award for Excellence in Safety Management by National Safety Council (Kerala Chapter).
- PetroBonus&SmartFleet, our fuel loyalty programs, were awarded the"Best Cards Product &Programme of the Year – Loyalty Card" for the year 2014-15 at the AIMIA Loyalty Awards 2016. 3rd February 2016
- BPCL has been awarded the Lion Precious CSR Awardby the Lions Clubs International Foundation (LCIF) in recognition of their contribution in the areas of Education, Water Conservation, Skill Development, Health, Sanitation and Community Development 24th January 2016

14.2.2 Hindustan Petroleum Corporation Limited (HPCL)

Hindustan Petroleum Corporation Limited (HPCL) is a Navaratna and a Global Fortune 500 Company, ranked at 367 with an Annual Sales of Rs.1,97,744 Crore during FY 2015-16 and having a strong presence in Refining & Marketing in India with over 21% Marketshare in the PSU category in the country.

The 2015-16 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 2016, the total sale of products was 16.91 MMT, achieving a growth of 4.1% over historical. Pipeline throughput was 8.765 MMT and refineries processed 8.52 MMTPA of crude.

Financial Performance

As on September 2016, the Corporation has earned a profit of Rs. 2800 Crore as compared

SCOPE Excellence Award 2016 to BPCL by Hon'ble President of India

to Rs. 1297 Crore of the same period in 2015-16.

Marketing and Associated Infrastructure

HPCL owns and operates Refineries at Mumbai &Visakh with a capacity of 7.5 MMTPA & 8.3 MMTPA respectively. HPCL also owns the largest Lube Refinery in the country at Mumbai for producing Lube Oil Base 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 3,370kms. For transportation of petroleum products and a vast marketing network consisting 13 Zonal Offices in major cities and 112 Regional Offices facilitated by a Supply & Distribution Infrastructure comprising of 43 Terminals/TOPs, 42 Inland Relay Depots, 37 Aviation Service Stations, 47 LPG Bottling Plants, 7 Lube Blending Plants and 22 Exclusive Lube Depots. The customer touch points constitute 14,129 Retail Outlets, 4,470 LPG Distributorships, 1,638 SKO / LDO dealerships, 221 CNG Outlets, 218 Auto LPG Dispensing stations and 110 Commissioning & Forwarding Agents as of December, 2016.

Exploration & Production

In order to become 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 an independent arm. HPCL/Prize are in the process of consolidating their E&P activities and building internal capability by developing infrastructure and competent team.

HPCL has Participating Interest in 20 exploration blocks in India in consortium with other E&P companies. Out of these, there is discovery in one of the blocks for which FDP has been approved by DGH.

Prize is continuously pursuing various E&P opportunities in India and abroad to have a balanced portfolio to exploratory, developing and producing oil and gas assets. During the year 2014-15, Prize had acquired two oil & Gas assets in Australia through its wholly owned subsidiary Prize Petroleum International Pte Ltd (PPIPL), Singapore. One of these assets is producing and other has discoveries. Two additional development well have been drilled in producing asset in Australia during 2015-16. Both the wells have been put on production. The development feasibility study for other field is in progress. Prize is also operating two marginal producing fields in Cambay Basin in India.

New Projects

Refinery projects:

HPCL has 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 from8.33 MMTPA to 15MMTPA forVRMP and from 7.5 MMTPA to 9.5 MMTPA for MREP respectively are under implementation.

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 are under implementation.

HPCL has taken up a number of infrastructure pipeline projects for capacity expansion, viz. i)Project for laying of Product Pipeline 164 kms. longUranChakan LPG product pipeline is under implementationalong with BPCL on 50:50 sharing basis.ii)HPCL- Visakh Vijayawada Secunderabad Pipeline (VVSPL) Capacity Expansion and laying of subsea pipeline from OSTT to SS Jetty at Visakh Port trust.iii)HPCL- MDPL Capacity Expansion &Palanpur Vadodara Pipeline Extension. iv) HPCL-RamanmandiBahadurgarh Pipeline Capacity Expansion Project which are under implementation.

Project for laying of product pipeline 397 kms. Long Mangalore-Hassan-Mysore- LPG Pipeline is completed in October 2016. New LPG Bottling Plants at Sholapur & Bhopal are completed and commissioned during 2016.

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. ShapoorjiPallonji).

14.2.3 Oil India limited (OIL)

1. Preamble

The history of Oil India Limited (OIL) is deeply rooted to the incredible saga of oil exploration - dating back to the 19th century - in Indian shores amidst the jungles of Upper Assam. The first commercial discovery of crude oil in the country was made in 1889 at Digboi, in the extreme corner of north-eastern India. In 1953, the first oil discovery of independent India was made at Nahorkatiya near Digboi and then at Moran in 1956. With a view to systematic development and production of the discovered fields of Nahorkatiya and Moran and to increase the pace of exploration in north-eastern India, Oil India Private Ltd. was incorporated on 18th February 1959. On 14th October 1981 OIL became a wholly owned Government of India enterprise on taking over of BOC's 50% equity. Although OIL's current major production of oil & gas is confined to the north-eastern region of the country, OIL discovered natural gas in Jaisalmer Basin of Rajasthan in 1988 from which the commercial production started in the year 1994.

As recognition of its performance, OIL was granted Miniratna status in October 1997 and subsequently became a schedule "A" Company in July, 2004. OIL became a Navratna company in April 2010, thereby gaining greater functional autonomy. The Navratna status of OIL is in recognition of its core competencies in the petroleum business, especially in prospecting, production and transportation apart from best practices associated with those.

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 OIL is Rs 2,000 Crore and the paid up capital is Rs. 601.14 Crore. At present, Government of India's shareholding is 67.64% of the paid-up equity share capital of OIL.

2. Domestic Portfolio

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

OIL has 5 (five) PELs covering area of about 1230 sq.km granted on nomination basis in the country and 22 (twenty two) PMLs spread across an area of about 5004 sq.km. These acreages are in the state of Assam, Arunachal Pradesh and Rajasthan. Company has 6(six) Blocks under NELP as Operator with an area of 5960 sq. km. in the state of Assam, Mizoram, Andhra Pradesh / Puducherry, Rajasthan, Cauvery. OIL has 4 blocks under NELP as non-operator with 9679 sq. km. in Krishna Godavari (Shallow Offshore), Mahanadi offshore (Deepwater), Gujarat-Kutch (Shallow Offshore), West Bengal (Onshore). OIL also has 2 blocks with 121 Sq. Km in Assam & Arunachal Pradesh under Pre-NELP JVs as non-operator viz. Kharsang PSC (PI-40%) & Block AAP-ON-94/1 (Dirok,PI-44.086%). In addition OIL is holding 90% PI in one CBM Block (AS-CBM- 2008/IV) in Assam.

3. Overseas Portfolios

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.

4. Exploration and Production Activities

Oil India limited has been engaged in its core activities of exploring for oil &gas, making oil & gas discoveries, appraising, developing, producing and monetizing these discoveries for last more than 6 decades. Initially, the areas for exploration was granted on nomination basis and subsequently since 1999, with introduction of New Exploration Licensing Policy (NELP), OIL has participated in all the nine rounds of NELP bidding.

Exploration Activities

The present exploration activities of Oil India Limited is in progress in the states of Assam, Mizoram, Andhra Pradesh (KG Basin), Rajasthan. Additionally, offshore exploration activity is in progress in Cauvery Offshore.

Additionally, OIL has been allotted a total of 7408 LKM for Acquisition, Processing and Interpretation (API) of 2D seismic data under the appraisal of un-appraised area campaign of DGH.

The exploration and production activities undertaken by OIL in 2016-17 are given below:

Parameter	Unit	2015-16 (Actual)	2016-17		
			Target BE/MoU	Actual (Upto Q3)	Anticipated (2016-17)
Seismic survey					
2D	GLKM	1496.38	790	84.08	155
3D	SQKM	100.06	540	7.98	240
Drilling					
Exploratory	'000Mtr	72.214	115.501	61.967	78.979
	Wells	16	29	16	23
Development	'000Mtr	82.550	104.123	76.148	101.086
	Wells	33	39	26	39
Total (Exp+Dev)	'000Mtr	154.764	219.924	138.115	180.065
	Wells	49	68	42	62
Crude Oil Production	MMT				
Assam		3.220	3.4733	2.425	3.19
Arunachal Pradesh		0.006	0.0067	0.005	
Total		3.226	3.480	2.430	
Natural Gas Production	MMSCM				
Assam		2620.27	2736	2024.33	2,930
Arunachal Pradesh		11.48	14	8.940	
Rajasthan		206.19	200	178.29	
Total		2,837.94	2,950	2,211.56	
LPG Production	'000T	41.03	42.00	25.90	35.00

* Excluding 40% JV share

Hydrocarbon Discoveries

OIL has made 4 (four) oil and gas discoveries during the 2016-17 upto Q2, 2016 of which two are in NELP blocks in Rajasthan & Andhra Pradesh and the remaining are in Assam. The two NELP discoveries are under appraisal before commercial viability is established to put those under production.

Reserves Position (2P) as on 1.4.2016

As a result of exploration and development activities, OIL has established 2P in-place volume of 806.02 MMT (oil) & 366.57 BCM (Gas) in the domestic sector. Similarly, the

2P remaining producible oil & gas volume of OIL stand at 80.74 MMt and 119.46 BCM respectively.

5. Crude Oil Transportation

OIL operates a total network of 1220 kms of Crude Oil Pipelines. This 5.38 MMTPA capacity pipeline transports crude oil produced from oilfields in Upper Assam to the public sector refineries at Numaligarh, Guwahati and Bongaigaon. The 600 kms pipeline segment between Bongaigaon and Barauni which has capacity of 3.0 MMTPA has been re-engineered to enable oil flow in either direction and is now transporting crude from Barauni to Bongaigaon. The pipeline runs through the states of Assam, West Bengal and Bihar traversing hostile terrain, dense forests and cuts across 78 rivers including the mighty Brahmaputra. In addition to above 0.65 MMTPA of crude oil is transported from Duliajan to Digboi Refinery through 30 kms pipeline. During the year, OIL transported total 6.80 MT of crude oil and 1.8 MT of products with pipeline utilization of 105.71%.

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

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

6.0 Renewable Energy Portfolio

- During the last few years, OIL has diversified into alternate (renewable) energy sector specifically into Wind and Solar power generation.
- As of today OIL has set up 121.6MW of Wind Power Projects and 14MW of Solar Power Projects . While the Wind Power Projects are spread over the states of Rajasthan, MP & Gujarat the Solar Power Projects are installed in Rajasthan.
- Presently a Wind Power Project of 52.5MW capacity (split project with 27.3 MW in Gujarat and 25.2MW in MP) is under execution which is targeted for completion within this fiscal year.
- OIL has initiated steps to enter the domain of Ultra Mega Capacity Solar Projects and in this regard an MoU has been signed in October 2016 between OIL, IOCL and Madhya Pradesh Urja Vikas Nigam Limited (MPUVNL) to develop a 500MW Solar Park followed by development of Solar Projects therein.
- Additionally, OIL has sponsored a study on Wind Resource Assessment (WRA) in Assam, which is presently underway, in collaboration with National Institute Wind Energy (NIWE) and State Nodal Agency called Assam Energy Development Agency (AEDA) for assessing the commercial exploitability of the wind resources in the state.
- OIL has ambitious plans to undertake more Solar and Wind Power Projects in the coming times.

7. Diversification

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

LPG Bottling Plant

8. Financial Performance

Rs / Crores

Parameter	2015-16 (Actual)	2016-17		
		Target	Actual up to 30.09.2016	Anticipated (2015-16)
Plan Outlay	3623	4020	1885	10403
Total income	11141	NA	5181	9989
Net Profit	2330	NA	1075	2082

9. Corporate Social Responsibility

As a responsible corporate citizen, OIL has given due importance to its social and community responsibilities, and implemented following socio-economic schemes for the welfare development of people and communities in and around its operational areas in various states. As specified under Schedule VII of the Companies Act, 2013, OIL has embarked upon various CSR projects under key thrust areas as follows:

Education

- Assistance towards augmentation of infrastructure for school / college / university / technical institution etc.
- OIL Super 30 project- 11 months free residential coaching for IIT with centres at Guwahati, Jorhat, Dibrugarh in Assam, Jodhpur in Rajasthan and Itanagar.in Arunachal Pradesh.
- Career Counselling & Guidance and Edufair
- Scholarship to meritorious students / OIL Shikshya Ratna Puraskar (Teachers awards)
- Project Dikhya-Promote computer literacy among school students in OIL's operational areas
- Project Dikhya- Adult Literacy Campaign in OIL's operational areas
- Project for capacity building for empowerment of women

Development of Healthcare

- Control of HIV / AIDS, Malaria and other diseases under project Arogya
- Project Infant Mortality in 20 villages within OIL's operational areas under project Arogya
- Mobile Health care services under Sparsha mobile lab
- Health camps & Eye Relief Camps conducted by NGOs like Lions Club, Rotary Club etc.

Rural Agriculture Development and Sustainable Livelihood Generation

- Oil India Rural Development Society (OIRDS)
- Project Rupantar for self-employment generation under Project Rupantar with a target of supporting 500 SHGs/JLGs
- Cluster based Livelihood Projects for sustainable income generation

Rural Infrastructure Development

- Augmentation of Rural infrastructure by Development of roads
- Other Infrastructure
- Rural Water supply scheme for KG Basin

Development of Sports

- Development and promotion of sports activities with focus on Rural Sports

Environment and Sustainability

- Solar Energy as a source of renewable energy and projects for reducing carbon foot prints in remote villages (solar lights, economic chulhas etc.)
- Conservation of Bio-Diversity of OIL Operational areas.

Skill / Capacity Building

- Project Swabalamban on Skill/ Capacity Building Project through MoU with three agencies-Construction India Development Council (CDIC), Institute of Entrepreneurship (IIE), Guwahati & IL&FS Educational Technology Services (IETS) and other agencies with whom OIL enters MoU

Projects on Women Empowerment

- Projects related to women empowerment and capacity building.

Project Sakhyam

- Support to rehabilitate differently abled Persons.

Project Swachh Bharat Abhiyaan

- Swachh Iconic place initiative: Adoption of Kamkhya Temple for cleanliness, maintenance and upkeep.
- Waste to Fuel: Project in association with Numaligarh Refineries Limited
- An internal training and awareness programme formulated by OIL under Project Anubhav, Construction of toilets. Cleanliness drives including distribution of dust bins.

10. 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. The above 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.

14.2.4 Engineers India Limited

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

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

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 initiatives into fertilizer, nuclear and solar power and upstream E&P.

BPCL Team receiving Award from MoS(I/C) MoPNG at Petrotech 2016

An ISO 9001:2015 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. Besides, EIL has a wholly owned subsidiary, Certification Engineers International Ltdfor providing certification and inspection services.

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

Pre-Project Services

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

Project Implementation Services

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

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 Contracting

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

EIL has amulti disciplinaryengineering workforce and thecompany's employee strength at headquarters and in field offices including foreign offices was2960as on 30.12.2016.

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 2016-17 (up to December 2016)

During the current financial year (up to December, 2016), EIL secured new business worth Rs. 2524 Crores.

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

Domestic Jobs

- PMC Services for capacity augmentation of Jamnagar-Loni LPG Pipeline Project
- Execution of BS VI Projects at CPCL Manali Refinery on OBE Method
- EPCM Services for BS-VI Projects for Panipat Refinery of IOCL
- EPCM Services for BS-VI Project for Gujarat Refinery of IOCL
- Coker block of ResidUpgradation project for CPCL
- PMC/ EPCM services for Mumbai refinery expansion project (MREP)
- Consultancy Services for Licensor Selection and Preparation of DFR for HMEL Petrochemical Complex at Bhatinda
- Project Management Consultancy and EPCM Services for GTU Project at BPCL Mumbai Refinery
- EPCM Services for BS-VI Fuel Quality Project for HMEL at Bhatinda
- Consultancy Services for 2nd Raw Water Intake Pump House and pipeline at Damanjodi, NALCO
- Entry Level Activities for NamamiGange Project for National Mission for Clean Ganga
- Project Development and Management Consultancy under AMRUT for Housing and Urban Development Corporation, Govt. of Odisha
- EPCM services for enhancement of Pumping Capacity of Barauni – Bongaigaon sector in Naharkatiya – Barauni crude oil pipeline upgradation project (phase –II)

Overseas Jobs

- Project Management Consultancy Services for Installation of ERL Unit-2 for Eastern Refinery Limited (ERL), Bangladesh
- Basic and Detailed Engineering for EWOGGS Project for First Exploration & Petroleum Development Company at Nigeria
- Development of Facilities to produce Fertilizer Products in Port Hartcourt, River State for Indorama Eleme Fertilizers & Chemicals Company, Nigeria
- Pipeline for Transportation of White Petroleum Oils (Multiproducts) from

Chittagong to Dhaka for Padma Oil Company Limited, Bangladesh

Financial Performance

The turnover and profit before tax of the company for FY 2016-17 (up to September 2016) was Rs681 Crore and Rs267 Crore respectively.

Policy Initiatives Undertaken

The significant policy initiatives taken during the current financial year (up to December 2016) include the following:

HR Development

Besides, the various ongoing HR interventions, measures, the following initiatives were pursued in 2016-17:

- Organised Trainings are conducted for domestic and international clients in specialised Domain areas which generates revenue for the Company.
- Apprentices are undergoing one year Training in their respective disciplines.
- Vocational trainings provided to students in Technical and Professional streams.
- Creating a Learning Culture through regular Knowledge Sharing Sessions
- Revisit & Review of HR policies to bring in better employee engagement.

Technology & Sustainable Development:

The following technology development projects were initiated during the year (uptoDecember 2016)

(i) Development of above ground sulfur seal pot

(ii) Development of membrane process for oxygen enrichment through air separation

(iii) Development of membrane process for removal of wax from solvents

(iv) Development of technology for removal of heat stable salts from amines using resin

(v) Development of process for CO2 capture from flue gases

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

(vii) Development of Performance Prediction Model for Desalter

(viii) Development of Boiler and GT-HRSG simulator

(ix) Development of capability for Energy Optimization in Refining Sector

(x) Radio tracer studies with spherical / extrudates type of catalyst to characterize hydrodynamics of improved 3 phase reactor configuration for hydroprocessing applications

Technology commercialization efforts made upto December 2016:

1) BDEP Preparation for implementation of process for hydrogen recovery from refinery off-gas using cryogenic separation at BORL.

2) Go ahead letter received from IOCL for

a. Implementation of indJet unit (demo) at IOCL Barauni

b. Implementation of indeSelect unit at IOCL Guwahati

c. Implementation of indDSK unit at IOCL Paradip

3) Order received from NRL for supply of Parlpak in quench column, amine absorption columns of TGTU (Tail gas treatment unit), Liquid Degassing Vessel under DHT Project

4) Proposal sent to BPCL- Mumbai for Dynamic Simulation Study for estimating flare loads for selected units for controlling scenario.

5) Completed Scoping Study Report on

Integration of Gas Gathering Station with Solar Block at Kadi, Mehsana for ONGC Energy Ltd (OEC)

6) Completed Feasibility Report on 2G Ethanol for HPCL.

7) Awarded Job of Licensor selection and Detailed Project Report for 2G Ethanol at 3 locations for HPCL.

8) Proposal sent to OEC for Demo Package for Implementation of Process Integration Study at Gas Gathering Station, Kadi, Mehsana.

9) Energy Efficiency Improvement Studies taken up for 15 PSU Refineries.

10) As part of BEE's PAT Cycle 3, scientific methodology being developed to calculate MTOEs and identify threshold energy consumption limits for the units in petrochemical complexes.

11) Grass root design of DHDT Reactor underway IOCL Haldia

12) Revamp of DHDT unit in progress at IOCL BGR

13) Grass root design of NHT unit underway for IOCL BGR

14) Proposals sent and order expected for Parlpak application in:

i) Vacuum column Revamp of BORL Refinery.

ii) Vacuum column of VRMP Project of HPCL Visakh Refinery

15) Two day Technology Seminar conducted on the Theme "Advanced Technologies for Productivity Improvement in Refineries". It was extremely well received with delegates from IOCL Mathur, IOCL Panipat, IOCL Jawaharnagar, IOCL BGR, IOCL Guwahati, IOCL Paradip, BPCL MR, NRL and HPCL Visakh attending it.

R&D activities likely to be initiated in the remaining four months of 2016-17:

(i) Further development of proprietary internals for preflash vessel with simulation of performance on a test case

(ii) Development of membranes for purification of water from industrial waste / sewerage

(iii) Development of process for conversion of plastic to liquids

(iv) Development of databank for potential coal for gasification

Initiatives to be taken for strengthening technology tie ups:

(i) Renewal of membership of Process Science Technology Center (PSTC), an industry-academia collaborative research program initiated by University of Texas, USA for year 2016-17

(ii) Renewal of membership of Fractionation Research Incorporated (FRI), a non-profit cooperative research organization based at Oklahoma, USA for year 2016-17

(iii) Renewal of membership of Process Integration Research Consortium (PIRC) of University of Manchester UK for year 2016-17

Patents filed (upto December 2016):

(i) A method and device for above ground liquid sulphur seal with degassing.

(ii) Apparatus and Method for removal of sulfur-containing impurities.

(iii) System for gas-liquid distribution on a catalyst bed in a trickle bed reactor

Patent granted this year(upto December 2016):

Patent No. 274583 dated 29/07/2016: Novel Process for Regenerative Sulphur Dioxide Removal from Gases.

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. The company CSR policy aims at creating a sustainable environment through its activities for communities and environment.

The CSR activities are directed towards supplementing/supporting the ongoing and

planned initiatives of the local, state or central government, with a focus on backward areas and underprivileged at various locations across the country including our project sites/ offices and Delhi. The activities undertaken are in consonance and consultation with State Governments, district administration, local administration as well as Central Government Departments/Agencies, Self Help Groups, etc. so as to avoid duplication.

As per Companies Act 2013, the budgetary allocation of 2% of the average net profits made during the three immediately preceding financial years has been made in the financial year 2016-17 for CSR activities.

Various thrust areas of our CSR activities includes Education, Health Care, Drinking Water, Sanitation, Rural Electrification, Women Empowerment, Vocational Training/Skill Centre etc.

14.3 MINIRATNA CATEGORY-I CPSES

14.3.1 Balmer Lawrie & Company Limited

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

The Company's business interest spans both Manufacturing and Services. The Company achieved a Gross Turnover of Rs. 2894.95 Crores (inclusive of excise duty) during 2015-16 and Profit Before Tax of Rs. 234.54 Crores. The Reserve & Surplus of the Company increased to Rs.1037.76 Crores as on 31.03.2016 compared to Rs. 874.56 Crores as on 31.03.2015.

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

I. MANUFACTURING

(a) Industrial Packaging

(b) Greases & Lubes

(c) Performance Chemicals

II. SERVICE

(a) Logistics Infrastructure

(b) Tours & Travel

(c) Logistics Services

III. RESEARCH & DEVELOPMENT

(a) Technology Product Development, Kolkata

(b) Applications research Laboratory, Kolkata

(c) Product Development Centre , Chennai

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

CSR activities undertaken by BL:-

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

14.3.2 Chennai Petroleum Corporation Limited

1.0 Introduction

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

From time to time, the shareholding of CPCL has changed. In 2001, the GoI transferred its entire shareholding in CPCL to 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 NaftiranIntertrade Company Limited (NICO), its 100% subsidiary. Currently IOC holds 51.89%, while NICO holds 15.40%; while the Financial Institutions, 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 debottleneckingthe 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 norms for Diesel and Gasoline.

CPCL's second refinery, Cauvery Basin Refinery (CBR) was commissioned in Nov 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, supplies 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 products, 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 products from Manali Refinery, like Waxes, Propylene, Hexane, LAB feed stock, Petrochemical Feedstocks and Lube Extracts.

CPCL entered into its 50th year of operation and celebrated its Golden Jubilee on 23.07.16 at Manali Refinery and was graced by dignitaries like ShriDharmendraPradhan, Minister of State (Independent Charge), Ministry of Petroleum & Natural Gas, Government of India, who unveiled the Golden Jubilee Stupa marking the celebrations, Shri Pon. Radhakrishnan, Minister of State, MinistryofRoadTransport,Highways&Shipping, Govt. of India, Shri M.C. Sampath, Minister of Industries, Government of Tamil Nadu, Dr. P. Venugopal, Member of Parliament, Thiruvallur: Shri T.G. Venkatesh Babu, Member of Parliament, North Chennai, and Shri K.P.P. Samy, Member of Legislative Assembly.

2.0 PERFORMANCE

2.1 Physical Performance

The company processed 9644Thousand Metric Tonnes (TMT) of crude oil in the year2015-16and processed 7423 TMT of crude oil for the period Apr'16 to Dec'16.

Parameter	2015-16 Actuals	2016-17 (upto Dec'16)	2016-17 (Projected)
Crude Thruput in TMT	9644	7423	10100
Total Distillate %	72.5	72.3	72.5

The company achieved highest ever monthly Crude Throughput of 960 TMT at Manalirefinery and highest ever MS production of 97TMT during the month of Aug 2016. Also, CPCL achieved the highest ever thru'put of 2930 TMT in Q2 of 2016-17 as compared to the previous best of 2843 TMT achieved in Q1 of 2015-16.

During the second week of Dec 2016, (12-12-2016) Chennai region was badly hit by a cyclone (Vardah). Water supply to Refinery was totally stopped from all external sources resulting shutdown of some of the units.

However, with the available water in the reservoir and power, CPCL continue to operate non affected critical process units and power plant ensuring petroleum products supply to the market without any interruption. After repair of major equipments on war footing, units are started progressively.

2.2 Financial Performance

During the year 2015-16, CPCL achieved a turnover of Rs. 34953.41 Crores (Standalone Financial Statements).The turnover uptoSeptember 2016during the financial year 2016-17 is Rs. 20487.69 Crores.

The details of financial performance are given below:

Parameter	2015-16 Actuals	2016-17 (uptoSept'16)	2016-17 (Projected)
Turnover (Rs. Cr.)	34953.41	20487.69	38600.00
Profit Before Tax (Rs. Cr.)	771.04	776.17	930.00
Profit After Tax (Rs. Cr.)	75427	567.85	660.30

During the year 2016-17, the outstanding dividend payable to Naftiran Inter-trade Company Limited, Iran, for the years 2010-11 and 2011-12 amounting to a total of Rs. 32.10 Crores, was settled.

3.0 Projects

3.1 Major Projects Completed

3.1.1 Mounded Bullets Project

As a risk reduction measure as well as to provide intrinsically passive and safe environment, the Mounded Bullet Project for storing LPG and other Petrochemical feed stock storage, at an estimated cost of Rs 279 Crores, was successfully commissioned in stages starting from February / March 2016.

3.2 Major Projects Under Implementation

3.2.1 Resid up-gradation Project

To improve the distillate yield of Manali refinery, a ResidUpgradation Project is under implementation with an estimated cost of Rs 3110.36 Crores (+10%). This project involves installation of Delayed Coker Unit (DCU) and revamping of existing Once Thru Hydrocracker Unit (OHCU) along with other associated facilities. The physical progress of 92.8% has been achieved till Dec' 2016. The DCU & OHCU revamp are anticipated to be mechanically competed by fourth quarter of 2016-17.

3.2.2 New Crude Oil Pipeline (42" size)

A new Crude Oil Pipeline Project from Chennai Port to Manali Refinery, with enhanced safety features is planned to ensure reliable faster crude transfer from Port. The estimated cost of the project is Rs. 257.87 Cr. Procurement of all pipelines (17Km) completed. Pipeline laying jobs inside Chennai Port Trust and inside CPCL Refinery are in progress. The overall physical progress achieved is 54.4% till Dec'16. The project is expected to complete in the second quarter of 2017-18.

3.2.3 Auto Fuel BS –IV Quality Improvement Project:

In order to meet BS-IV quality standards by 2017 as per the fuel policy of the nation, CPCL is revamping the existing DHDS unit at an estimated cost of Rs. 367.11 Cr. This revamp is to increase the capacity from 1.80 MMTPA to 2.34 MMTPA and to make 100% compliance in meeting BS-IV demand of the state. Presently the overall physical progress achieved is 68.3%upto Dec'16. The project is expected to complete by 1st quarter of 2017-18.

3.2.4 Auto Fuel BS – VI Quality Improvement Project:

To meet the BS-VI Auto Fuel quality requirements, new facilities to treat Motor Sprit and revamp of the DHDT unit for HSD product are envisaged. Hence it was proposed to revamp the existing DHDT unit and also to install new units like FCC GDS, Sulphur Recovery Unit, Sour Water System and associated Utilities and Offsites facilities. Contracts for licensor & supply of process package for all units have been awarded.

The estimated cost for the above facilities is Rs. 1495 Crs. (+30% accuracy). Basic Design Engineering Package (BDEP) for DHDT revamp Unit has been received. All licensors have been selected and the same for FCC GDS is expected by Jan'17.Long lead items have been identified and Data sheet / MR under preparation. The project is scheduled to be completed by September 2019.

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 dispatch the product as HFHSD or to transfer the product to Manali for further treatment.

3.3 Future Projects

3.3.1 Re-Gasified Liquefied Natural Gas (RLNG):

It is proposed to replace Naphtha, which is used as feed in Hydrogen Generation Reformer Unit & as fuel in Gas turbines and Refinery Fuel Oil, which is used as fuel in Boilers and Process heaters, with RLNG which is to be supplied by IOCL.

The estimated cost of the project is Rs. 382 Cr with +/-30% accuracy. Presently engaging of consultant for preparation of DFR is under progress. The project is scheduled to complete during third quarter of 2019-20.

4.0 Corporate Social Responsibility & Sustainable Development

Corporate Social Responsibility is the corner stone of success for CPCL which actively plays the role of a responsible corporate citizen by looking beyond financial considerations while discharging its social obligations. The CSR & SD activities focuses on health, education, women empowerment, environment protection and renewable sources of energy for ensuring sustainable development of the society to which it belongs.

Even though the company is not required to spend any amount on CSR in view of losses during preceding 3 financial years, a sum of Rs133.02 lakhs was spent during the year 2015-16 for various CSR and SD Projects and initiatives. An amount of Rs.182 lakhs was allocated during 2016-17for taking up various CSR&SD activities around our refineries at Manali and Nagapattinam. CPCL has spent an amount of Rs 72.93 lakhs towards various CSR activities upto Dec'16.

Major CSR Activities carried out during the Year 2016-17:

Health :

Presently, CPCL is running four Community Health Centres at Manali, Periyasekkadu, Thirunillai and Muttam (CBR) benefitting 3500 people every year.

A general Medical Camp was organized on 24.09.16 in co-ordination with M/s. Sugam Hospital, Tiruvottiyur, for the public peoples at Govt. High School, Old Napalayam

Education :

To encourage meritorious students studying in 30 Educational Institutions located around Manali and Nagapattinam Refineries, CPCL distributed 1030 number of Merit Scholarships worth of Rs.41.25 lakhs to the students of Govt. / Panchayat / Municipality Educational Institutions, CPCL Polytechnic College, other Polytechnic Colleges, ITI etcuptoNov'16.

Women Development:

CPCL also runs a Crèche for children in association with Womens' India Association for more than twenty years which offers hygienic and secure environment for the children. This facility is availed by parents especially Women who are mostly daily wage earners who are engaged as labourers for various types of manual works in the nearby Industries.

Swachh Bharat:

Construction of School Toilets:

As part of SwachhVidyalayaAbhiyan, CPCL has constructed toilet units benefitting 1961 people upto Dec'16.

Cleanliness Campaign :

CPCL organized a number of activities (32 nos) in schools located near Manali and Cauvery Basin Refineries, such as Cleanliness Campaign Drive, Cleaning of Class Rooms and School Premises and Road Rally for creating cleanliness awareness among Students and Public, during the period April to December 2016. Swachh Bharat Activities were carried out inside the refinery premises also with active participation from employees.

5.0 Research and Development

Chennai Petroleum Corporation limited in order to remain in technological forefront established an in house R&D with the following objectives:

- **To provide technical support to refinery operations through crude assay evaluations and in selection of catalysts/ alternative feed stocks for various refinery process units.**

- To carry out research studies in collaboration with National Laboratories and academic institutions

CPCL R&D centre is recognized by the Department of Scientific & Industrial Research (DSIR) as an in house R&D centre since its inception in 1986.

5.1 R&D Expenditure in the last three years (Rs. In Crores)

Year	Revenue	Capital	Total R&D Expenditure
2014-15	6.25	0.24	6.49
2015-16	6.69	0.28	6.97
2016-17 (up to Dec'16)	3.73	0.62	4.35

5.2 The Major areas of Research work at R&D:

- Distillation
- Hydroprocessing
- Fluid Catalytic Cracking
- Product Development
- Analytical Support
- Biofuels

5.3 The Major R&D projects undertaken in 2016-17:

5.3.1 Project on "Development of Dearomatised Kerosene":

R&D carried out dearomatisation of straight run kerosene and hydrocracker kerosene using hydrogenation route. The hydrocracker Kerosene which normally contains 20-25 % mono aromatics will be a good feedstock for production of jet fuels with less than 5% aromatics.

The hydrogenation studies were carried out using adjusted hydrocracker kerosene cut as feed in Pilot plant at R&D centre with commercially available hydrogenation catalyst. Several trial runs were conducted to optimize the operating conditions and produced 50 lit of JP-7.

5.3.2 Lab scale study on Lube potential of vacuum distillates from various crude sources:

Lab dewaxing studies were carried out to evaluate the lube potential of vacuum distillates from various crude sources like Arab Mix, Upper Zakkum and Basrah Light.

5.4. Patents and Publications:

5.4.1 Patent:

A process for the production of low Poly Aromatic Hydrocarbon Rubber Process Oil from Fractionated Bright Neutral Extract – Patent Application No. 201641020691 dt.16.06.2016.

5.4.2 Publication & Presentation:

a) Micro crystalline wax production-A value addition proposition to enhance margins of a LOBS refinery- Presented in Refinery Technology Meet - September 2016

b) Isomerization of alkanes over sulphated zirconia supported on SBA-15 –Accepted for Poster Presentation in Asia Pacific Congress on Catalysts -January 2017.

6.0 Digital India

CPCL has empowered all supervisory employees digitally by providing an internet access and e-mail facility in the office. Webmail and mobile mail services provided to senior officials after office hours. CPCL has implemented an effective service portal which takes care of payroll, leave and HR related services like Medical, Travel claim and welfare schemes like children's educational assistance, meritorious awards, telephone, PC, furniture maintenance systems.

Employees pay related MIS reports and timesheet update systems are developed on Intranet.Online employee declaration/ approvalforms for various pay related request by company are also made through intranet

towards the concept of "GOGREEN".To reduce carbon print, our Data Center servers at Manali are moved to virtualized environment.

CPCL makes all its payments to employees as well as other stakeholders and receives all its dues in cashless mode. CPCL has implemented many steps such as E-payments like National Electronic Fund Transfer (NEFT) / Real Time Gross Settlement (RTGS) and other modes of E-payments.

Latest news and events on our Refinery and financial performances of the company are provided to various stake holders through our website (www. cpcl.co.in)

14.3.3 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 Crore.
- 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. 13265 Crore. 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.
- MRPL was granted Schedule 'A' status on 4th July 2013. MRPL contribute to around 7% of India's 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 15.53 MMT during the year 2015-16 against 14.65 MMT during the previous year 2014-15.

- **Financial Performance Highlights**

PERIOD		FY 2013-14	FY 2014-15	FY 2015-16	FY 2016-17 *
THRUPUT	(MMT)	14.55	14.65	15.53	7.69
TURNOVER (Gross)	₹ Crore	75,226	62,412	50,864	25,575
EBITA	₹ Crore	1,437	-1250	2464	2329
PBT	₹ Crore	4 10	-2156	1174	1732
PAT	₹ Crore	601	-1712	1148	1134
GRM	$/BBL	2.67	-0.64	5.205	4.65

* Un-audited half yearly result 2016-17.

- **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 your Company on Phase –III Refinery Upgradation and Expansion project is around Rs. 13,265 Crore as on 31st March, 2016.

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.

Human Resources:

- MRPL continues to enjoy cordial and harmonious relations with the collectives as evident from the fact that not a single day was lost on account of any industrial disturbance since inception.
- Total employee strength as on 31/03/201 was 1821 including 130 women employees, 210 SC/ST employees and 26 Physically Challenged employees. 816 employees belong to Management cadre whereas 996 employees belong to Non-Management cadre.
- During the year 2015-16, MRPL devoted 3669 Mandays for Training, Development and Learning which amounted to an average of 2.16 Mandays per employee.

Energy Conservation:

- The company continued its emphasis on energy conservation through Process Optimization, Continuous monitoring and Implementation of several Energy Conservation modifications.
- Major Energy Conservation measures taken during the year:

a) Compressed Air and Nitrogen Leak Survey and rectification,

b) Reduction of Slop Generation in DCU by routing Blow down overhead to HCGO Tank,

c) Recovery of Flash Steam from Phase-3 SRU,

d) Condensate Recovery from Fuel Oil Tanks,

e) Recovery of MP Steam in CHT Unit,

f) Impeller Trimming of CPP-3 MP BFW Pump.

- The measures as taken above resulted in Energy consumption reduction by approximately 3046 SRFT/ Year, equivalent to a net saving of approximately Rs. 5.31 Crores/year, with an investment of approximately ` 0.09 Crores. Fuel & Loss in the Refinery for the year 2015-16 was 10.06% on Net Crude whereas it was 10.09% in 2014-15. The Refinery achieved the Highest Crude processed with Energy Intensity index of 111 for the year 2015-16.

Safety Performance:

- MRPL has achieved 203 accident free days as on 31/12/2016.

Corporate Social Responsibility Initiatives:

- The CSR objective is in line with Schedule VII of the Companies Act, 2013 & DPE

guidelines and is promoted under the name of SAMRAKSHAN. This captures the spirit and commitment to protect, preserve and promote the social, cultural and environmental heritage and wealth in and around the area of our business and to usher in sustainable development.

- Some of the CSR initiatives undertaken are : Providing Scholarship to School children to support continuing Education, Operating Primary Health Centre in the Rehabilitation Colony, Skill development programmes for Unemployed youth of the nearby Districts, Organising Artificial Limb Camp, Construction of New Wing of Government Lady Goschen Hospital, Mangalore along with ONGC to support, Health Care, Construction of Toilets also has been completed in Government Schools as per Prime Minister's Swatch Bharat Abhiyaan as part of the Samrakshan Activities, based on availability of CSR budget.

Awards and Recognition:

During the year, the Company has been conferred with following awards and recognitions:

- 'Niryat Shree' Gold Trophy in the Residual sector for Non MSME category by Federation of Import Export Organization (FIEO). MD, MRPL received the award from Hon'ble President of India on 4th May, 2016 in a glittering ceremony held at VigyanBhawan, New Delhi.
- "Export Excellence Award, 2015" in Best Exporter Award (Medium/large category) from the Federation of Karnataka Chamber of Commerce and Industry.
- Certificate of recognition of 'Highest Ever Central Excise Duty payment and Incremental growth'
- First prize for outstanding performance in the area of Hindi Implementation for the year 2015-16 for fifth consecutive year by TOLIC, Mangalore.

14.3.4 Numaligarh Refinery Limited

(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 is a Category-I Miniratna PSU. The Company's net worth as on 31.03.2016 was Rs. 3,958 Crores.

NRL's refinery has a high complexity factor owing to advanced secondary processing technologies that has enabled achievement of high distillate yield. Product slate of NRL comprises LPG, Naphtha, Motor Spirit (MS), Aviation Turbine Fuel (ATF), Superior Kerosene Oil(SKO), Mineral Turpentine Oil (MTO),High Speed Diesel(HSD), Raw/Calcined Petroleum Coke (RPC/CPC), Sulphur and Paraffin Wax.

NRL has an LPG Bottling Plant of 10 TMTPA capacity at Numaligarh. The company has two marketing terminals – one at Numaligarh, Assam and the other at Siliguri, Bengal from where products are despatched by road and rail Additional White Oil products, viz. MS, SKO and HSD are also transported from Numaligarh to Siliguri through the Numaligarh-Siliguri product pipeline (NSPL) owned and operated by Oil India Limited.

(ii) Performance

NRL has been operating with sustained profitability every year. NRL has succeeded in achieving highest Distillate Yield among all PSU oil refineries in the Country. NRL's Specific Energy Consumption (SEC) and Gross Refining Margin (GRM) are among the best in the Industry.

Physical and financial performance indicators of NRL during last three years and Apr-Nov'16 of the current financial year are as follows:

Physical Performance:

Parameter	13-14	14-15	15-16	16-17 (Apr-Nov)
Crude Receipt (TMT)	2,675	2,766	2,478	1,805
Crude Throughput (TMT)	2,613	2,777	2,520	1,704
Capacity Utilisation (%)	87.1	92.6	84.0	85.2
Distillate Yield (%)	92.16	90.69	90.42	90.72
Specific Energy Consumption (MBN)*	53.6	51.6	70.4	73.8
Energy Intensity Index (EII)	100.2	97.2	96.5	97.3

Financial Performance:

Parameter	13-14	14-15	15-16	16-17 (Apr-Nov) (Provisional)
Sales Turnover (Rs./Crs)	9,872	10,823	11,923	8,359
PBT (Rs./Crs)	563	1,134	1,883	1,802
PAT (Rs./Crs)	371	718	1,222	1,180
GRM ($/bbl)	6.98	9.46	8.06	8.23

(iii) Projects

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/VI grade HSD at 100% capacity utilization of the refinery.Overall progress of the project as on 30.11.2016 reached 56.3% and 38 milestones were achieved as scheduled against total of 61 milestones for the project. Cumulative expenditure in this project up to 30.11.2016 was Rs. 129.26 Crores with total financial commitment of Rs.498.18 Crores. The project is targeted to be completed by January 2018.

b) Mounded Bullet Project:

The LPG storage facility is being modernised 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 30.11.2016, overall progress against the project has reached 53.1% and cumulative expenditure was Rs.38.45 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 Odisha port to Numaligarh. Feasibility studies for the project have been completed. The expansion proposal has been approved by both the Boards of NRL and its holding company BPCL. The Ministry of Petroleum and Natural Gas (MoPNG) will put up the proposal for the approval of Public Investment Board's (PIB) shortly. .The estimated cost of refinery expansion project along with laying of crude pipeline is Rs.21,301 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 pursuing a proposal to set up a Bio-refinery for production of 49 TMT of fuel grade bio-ethanol per annum from bamboo in line with the National Ethanol Blending program. The estimated project cost is Rs. 950 Crores. DFR for the project has been completed and in-principle approval has been obtained from the Board of NRL for setting up the plant by way of a joint venture (JV) company with 50:50 equity partnership with M/s ChempolisOy of Finland, who will be the technology provider. The JV agreement is currently under finalisation.

To ensure adequate feed stock supply for the proposed Bio-refinery, Memorandum of Understandingshas been signedwith Arunachal Pradesh Bamboo Resources Development Agency (APBRDA) and Nagaland Bamboo Development Agency (NBDA).

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. Inter-ministerial discussions between both the countries are in progress to finalise the terms of project implementation.

(i) Policy Initiatives Undertaken by NRL

NRL has undertaken several policy initiatives for growth and sustenance of the Company. Such initiatives comprise expansion of the refinery upto 9.0 MMTPA, sustained product export to neighbouring countries, particularly Bangladesh and Nepal, establishment of a Bio Refinery.

(v) Welfare of SC/ST/OBC/PH

NRL's manpower strength as on 30th November, 2016 was 874 of which 440 were in unionized category and 434 in executive cadre. Of the total staff strength, 89 employees belonged to Scheduled Caste (SC), 94 to Scheduled Tribe (ST), 249 to Other Backward Class (OBC) and 19 were under physically challenged category.

Status of recruitment backlog of SC/ST/OBC/PH employees as on 30.11.2016 is as follows:

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
3/Nil	Nil/1	Nil/Nil	Nil/Nil	Nil/Nil	Nil/Nil	Nil/Nil	Nil/Nil

R&D

NRL's R&D activities are mostly carried out with assistance from its holding company, Bharat Petroleum Corporation Limited and also through outsourcing from competent agencies.

(x) CSR Activities

Since inception, NRL has been pursuing definite measures for social welfare and community development. NRL has a single location refinery at Numaligarh in Golaghat district of Assam. Industrialization and economic activities in this district being limited, main focus of NRL's CSR activities lies in the district with emphasis over villages around the refinery. The Company's CSR activities are implemented keeping in view the aspects of sustainable development. Major areas of CSR activities include:-

- Agri-allied/Income generation
- Education
- Infrastructure Development
- Community Health
- Promotion of Art, Sports, Literature and Culture

(xi) NRL's Contribution to Development of the North East Region

NRL was established by the Government under provisions of the "Assam Accord" with the objective of providing the required thrust for socio-economic development of the North East region. Over the years, the company has been able to sustain stakeholders' expectations and is today the biggest operating industrial unit in the Region. Contribution of NRL for development of the North East regions is broadly summarised below.

Investment in Value Added Projects

NRL's refinery project was implemented within the approved project cost of Rs. 2,724 Crores. Since commissioning of the refinery, NRL has been implementing several value added projects for ensuring sustenance and growth. All such projects are within the North East region, barring establishment of a marketing terminal at Siliguri at the North East border. NRL's total investment on such projects is in the range of Rs. 3,100 Crores as per details below:

Sl	Project	Investment (Rs in Crore)	Remark
1	LPG Bottling Plant of 10 TMTPA capacity	6	Commissioned in 2002-03
2	Coke Calcination Unit	90	Commissioned in 2004-05
3	Motor Spirit Plant of 225 TMTPA capacity	297	Commissioned in 2006-07
4	Siliguri Marketing Terminal	186	Commissioned in 2008-09 as linked project to the Numaligarh-Siliguri Product Pipeline of Oil India Limited
5	Diesel Quality Upgradation Project	435	Commissioned in 2010-11 for production of BS-III HSD at 100% capacity utilization
6	Naphtha Splitter Unit	87	Commissioned in 2013-14 for production upto 160 TMTPA Petrochemical Grade Naphtha
7	Wax Project	676	Commissioned in Mar'15. NRL has emerged as the largest Wax producing unit in the Country with production upto 50 TMTPA Wax
8	Investment in joint venture: Assam Gas Cracker project	127	10% equity participation at Brahmaputra Cracker and Polymer Limited
9	Investment in joint venture: Natural gas pipeline from Duliajan to Numaligarh	43	26% equity participation at DNP Limited.
10	Diesel Hydrotreater Unit (DHT)	1,031	Under implementation
11	Mounded Bullet Project	122	Under implementation
	Total	**3,100**	

Contribution to Exchequer

Since start of commercial operations, NRL has contributed over Rs. 3,440 Crores (Upto Nov'16) to the exchequer of the Assam Government apart from contribution to the other State Governments and the Central Government.

Showcase of Industrial Success

Over the years, NRL has emerged as the showcase of industrial success, in the North East, thereby acting as an enabler for drawing in further investments into the region.

14.3.5 ONGC Videsh Limited - Working globally for the energy security of India

(i) INTRODUCTION

ONGC Videsh Ltd., a wholly owned subsidiary and 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, 2016 stood at Rs.15,000 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 2016-17

- **Acquisition of 26% stake in Vankor field**

  ONGC Videsh Limited acquired 15% equity on May 31, 2016and additional 11% equity on October 28, 2016 from Rosneft Oil Company, in JSC Vankorneft (Vankorneft), a company organized under the law of Russian Federation which is the owner of Vankor Field and North Vankor license.Rosneft, the national oil company of Russia continues to hold the majority (50.1%) shares of Vankorneft while the balance 23.9% equity is held by the Indian consortium of Indian oil PSUs comprising Oil India Limited, Indian Oil Corporation Limited and Bharat Petro Resources Limited.

- **Blocks relinquished during the year**

  As of November 30, 2016, no block has been relinquished by ONGC Videsh during FY 2016-17.

Special Achievements during the year

- **Physical**

  ONGC Videsh started production of oil and gas with a meagre production of 0.253 MMTOE in FY'03 and during the year 2015-16, ONGC Videsh achieved a production level of (O+OEG) 8.916 MMTOE. The production for the period April to November, 2016 along with production for RE 2016-17& Actual 2015-16 is given below:

Particulars	Unit	RE 2016-17	April to November, 2016	2015-16 Actual
Crude Oil*	MMT	8.801	5.171	5.510
Gas	BCM	4.170	2.614	3.406
Total O+OEG (MMTOE)	MMTOE	12.971	7.785	8.916

* Including Condensate

As on April 01, 2016, the remaining 1P and 2P reserves are 199.467 MMTOE and 596.132 MMTOE respectively. This does not include reserves from Vankor field acquired in FY 2016-17.

- **Financial**

The consolidated net worth of ONGC Videsh has decreased by 7.72% to Rs. 39,982 Crore as on March 31, 2016 as compared to Rs. 43,327 Crore as on March 31, 2015. During 2015-16, the Company has incurred loss of Rs. 2,094 Crore as compared to net profit of Rs. 1,904 Crore in the previous year despite higher production during 2015-16. The decrease in profit is mainly on account of lower crude oil prices and impairment provisions in three of its assets due to lower oil prices. However, excluding exceptional item pertaining to impairment provision of Rs. 3,047 Crore, OVL earned a profit before exceptional items & tax of Rs. 1,872 Crore in 2015-16 as against Rs. 3,067 Crore in the previous year. The consolidated total revenue for ONGC Videsh decreased by 33.30% from Rs. 19,149 Crore for the year 2014-15 to Rs. 12,772 Crore for 2015-16, mainly due to lower oil price.

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 2016-17, duly authenticated by MoP&NG and DPE incorporating the suggestions/ changes of the MoU Task Force. The MoU was executed on July 25, 2016.

Crude Oil (including condensate) production targets for MoU 2016-17 are 7.939 MMT under excellent category and 7.660 MMT under Very Good category. Natural Gas production targets are 4.056 BCM under excellent category and 3.510 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 Shri Narendra Modi and the President of Russia Mr. Vladimir Putin. The term of MoU is up to December 31, 2017.

- **Other areas of International Cooperation**

Apart from the above, the following MoUs of ONGC Videsh were in force for 2016-17/continue to be in force:

Sl. No.	Company/ Country	Areas of Cooperation
1	Kuwait Foreign Petroleum Exploration Company (KUFPEC), Kuwait	MOU was signed to foster cooperation in the area of upstream oil and gas exploration and production projects in India and third countries. This MOU is valid up to March 07, 2017.
2	Petrovietnam, Vietnam	The objective of the MOU is to enhance mutual cooperation in hydrocarbon sector. This MOU also provided an exclusive opportunity to carry out evaluation of five exploration blocks located in offshore Vietnam for possible participation. This MOU was valid up to November 19, 2016.
3	TPAO, Turkey	MOU was signed to enhance joint cooperation between both the companies in the hydrocarbon sector. This MOU was valid up to June 17, 2016.
4	YPF S.A., (Main oil producing company in Argentina), Argentina.	MOU was signed between YPF S.A., the main oil producing company in Argentina & ONGC Videsh for cooperation in hydrocarbon sector in Argentina, India & third countries. This MOU was valid up to August 31, 2016.
5	Pemex-Exploracion Y Produccion (PEP), Mexico	MOU was signed between Pemex-Exploracion Y Produccion (PEP), the upstream subsidiary of Pemex, the National Oil Company of Mexico, and ONGC Videsh for cooperation in hydrocarbon sector in Mexico. This MOU is valid up to September 27, 2017.
6	Mubadala Petroleum, UAE	ONGC Videsh and Mubadala Petroleum entered into an MOU for collaboration in the potential areas of Upstream oil and gas exploration, development and production projects and LNG opportunities. This MOU was valid up to September 28, 2016.
7	Ministry of Mines, Industry & Energy, Equatorial Guinea	ONGC Videsh and Ministry of Mines, Industry & Energy, Equatorial Guinea have entered into MoU to explore potential investment opportunities within the Hydrocarbons sector in Equatorial Guinea including but not limited to the acquisition in participating interest in certain fields/ blocks, Block-G (Ceiba and Okume), Offshore Equatorial Guinea. This MOU is valid up to January 19, 2017.

Inputs regarding engagements abroad

Details of participating interest in respect of overseas projects of ONGC Videsh is given as under:

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.	Vankorneft, Russia	ONGC Videsh: 26% Roseneft (O): 50.1% Indian Consortium (comprising OIL, IOCL and BPRL): 23.9%
6.	GNPOC, Block 1, 2 & 4, Sudan	ONGC Videsh - 25% CNPC- 40% Petronas - 30% Sudapet - 5% (Jointly Operated)
7.	GPOC, Block 1, 2 & 4, South Sudan	ONGC Videsh - 25% CNPC-40% Petronas - 30% Nilepet - 5% (Jointly Operated)
8.	SPOC/Block 5A, South Sudan	ONGC Videsh- 24.125% Petronas-67.875% Nilepet - 8% (Jointly Operated)
9.	Khartoum - Port Sudan Pipeline (741 Km), Sudan	ONGC Videsh - 90% (Operator) OIL - 10%
10.	Block A-1, Myanmar	ONGC Videsh-17% Daewoo - 51 % (Operator) KOGAS - 8.5% GAIL-8.5% MOGE- 15%

S. No.	Name of the Block / Project and Country	Participating Companies and their Share
11.	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% MOGE - 7.365%
12.	Rovuma Area-1, Mozambique	ONGC Videsh - 16% Anadarko - 26.5% (Operator) OIL - 4% ENH- 15% Mitsui - 20% BPRL- 10% PTTEP - 8.5%
13.	Block 8, Iraq	ONGC Videsh - 100%
14.	Farsi Offshore Block, Iran	ONGC Videsh - 40% (Operator) IOC - 40% OIL - 20%
15.	Block 43, Libya	ONGC Videsh- 100%
16.	Block 24, Syria	ONGC Videsh-60% IPR International - 25% (Operator) Tri Ocean Mediterranean - 15%
17.	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)
18.	Block BM-SEAL-4, Brazil	ONGC Videsh-25% Petrobras -75% (Operator)
19.	BC-10, Brazil, Offshore	ONGC Videsh - 27% Shell - 50% (Operator) Qatar Petroleum International - 23%
20.	Mansarovar Energy Colombia Limited (MECL), Colombia	ONGC Videsh - 25-50%, Sinopec-25-50% Ecopetrol-50% (Jointly Operated)

S. No.	Name of the Block / Project and Country	Participating Companies and their Share
21.	Block RC-8, Colombia	ONGC Videsh - 40% (Operator) Ecopetrol - 40% Petrobras - 20%
22.	Block RC-9, Colombia	ONGC Videsh - 50% Ecopetrol - 50% (Operator)
23.	Block RC-10, Colombia	ONGC Videsh - 50% (Operator) Ecopetrol - 50%
24.	Block CPO-5, Colombia	ONGC Videsh -70% (Operator) Petrodorado - 30%
25.	Block SSJN -7, Colombia	ONGC Videsh-50% Pacific Rubieales Energy (PRE) - 50% (Operator)
26.	San Cristobal Project, Venezuela	ONGC Videsh - 40% PDVSA - 60% (Jointly Operated)
27.	Carabobo-1 Project, Venezuela	ONGC Videsh-11% IOC-3.5% OIL-3.5% Repsol - 11% PDVSA-71% (Jointly Operated)
28.	Satpayev Project, Kazakhstan	ONGC Videsh-25% KMG - 75% (Operator)
29.	ACG, Azerbaijan	ONGC Videsh-2.7213% BP – 35.79% (Operator) SOCAR – 11.65% Chevron – 11.27 % INPEX – 10.96% Exxon - 8% StatOil – 8.56% TPAO – 6.75% ITOCHU – 4.30%
30.	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% CIECO - 2.5%

S. No.	Name of the Block / Project and Country	Participating Companies and their Share
31.	Block LLA-69, Colombia	ONGC Videsh - 50% SIPC - 50% (Jointly Operated)
32.	Block GUA OFF 2, Colombia	ONGC Videsh - 100%
33.	Block SS4, Bangladesh	ONGC Videsh - 45% (Operator) OIL - 45% BAPEX- 10% (carried)
34.	Block SS9, Bangladesh	ONGC Videsh - 45% (Operator) OIL - 45% BAPEX - 10% (carried)
35.	Block B-2, Myanmar	ONGC Videsh - 97% (Operator) M&S - 3% (carried)
36.	Block EP-3, Myanmar	ONGC Videsh - 97% (Operator) M&S - 3% (carried)
37.	Block- 14TAR-R1, New Zealand	ONGC Videsh - 100%

14.3.6 Bharat PetroResources Limited (BPRL)

Bharat Petroleum entered the upstream sector in 2003 with the aim of providing partial supply security of crude and hedging of price risks and to become a vertically integrated oil company.

With the additional aim of strengthening the company's bottom line, a wholly owned subsidiary company of Bharat Petroleum, by the name Bharat PetroResources Limited (BPRL) was incorporated in October 2006.

BPRL was set up with the objective of carrying out Exploration and Production activities considering the need for a focussed approach for Exploration and Production activities and implementation of investment plans of Bharat Petroleum at a quicker pace.

The operations of BPRL are carried out through subsidiaries and joint ventures both incorporated and unincorporated, in India and abroad. BPRL, currently, has a participating interest (PI) in seventeen blocks spread across six countries. Out of seventeen blocks, seven blocks are located in India which were acquired under different rounds of NELP and ten blocks are located overseas. Most of the blocks are in advanced stages of exploration, appraisal and pre-development. The total area of these seventeen blocks is around 24,375 sq km of which approx. 88% is offshore. BPRL and its consortia have a total of 22 discoveries in respect of bloks held in 5 countries i.e. Brazil, Mozambique, Indonesia, Australia and in India.

As on 31st March 2016, BPRL has an authorized share capital of RS. 3,000 Crore and paid up share capital of Rs. 2,920 Crore for the financial year ending 31st March, 2016.

A list of BPRL overseas assets is as follows:

Sl. No.	Country	Name of the Project	Participating Companies and their Share
1.	Indonesia	Nunukan Block	BPRL Venture Indonesia BV- 12.5% PT Pertamina Hulu Energy-64.5% (operator) Videocon Indonesia -23%
2.	Australia	Block EP – 413 (onland)	Norwest Energy NL (Operator) - 27.945%,BPRL - 27.803%, ARC Energy Limited - 44.252%
3.	East Timor	Block JPDA 06-103	BPRL- 20%
4.	Brazil	BM-SEAL-11 (3 blocks), Sergipe Basin	Petrobras (Operator)- 60%, IBV 40% IBV* : 50-50% JV of overseas subsidiaries of BPRL & VIL
		BM-C-30 (1 block), Campos Basin	Anadarko Petroleum (Operator) - 30%, British Petroleum - 25%, Maersk - 20%, IBV 25%
		BM-POT-16 (2 blocks), Potiguar Basin	Petrobras 30% (Operator), BP - 30%, Galp Energia - 20%, IBV 20%
5.	Mozam-bique	Offshore Area 1	Anadarko (Operator)- 26.5% BPRL Ventures Mozambique BV- 10%
6.	Russia	Tass Yuryakh	LLC TYNGD-100% (Operator)* *(LLC RN Razvedka i Dobychya, a wholly-owned subsidiary of Rosneft -: 50.1% participating interest (PI), Taas India Pte Ltd (jointly held by the wholly-owned subsidiaries of Bharat PetroResources Limited, Indian Oil Corp. Ltd & Oil India Limited) : 29.9% PI, BP: 20% PI
		Vankorneft	JSC Vankorneft-100% (Operator)* *(Rosneft: 50.1% Interest, Vankor India Pte Ltd (jointly held by the wholly-owned subsidiaries of Bharat PetroResources Limited, Indian Oil Corp. Ltd & Oil India Limited) : 23.9% Interest, ONGC Videsh Ltd (through Wholly-owned subsidiary): 26% Interest

14.4 Other CPSES

14.4.1 Biecco Lawrie Limited

Biecco Lawrie Limited (BLL), under the administrative control of the Ministry of Petroleum & Natural Gas (MoP&NG), was established in 1919 and became a Government Company in 1972. This is a medium sized Engineering Unit with diversified activities having two factories located at Kolkata.

BLL is a loss making Public Sector Unit under the administrative control of Ministry of Petroleum and Natural Gas, Government of India. The President of India directly holds 32.23% of the Company's shares while Oil Industry Development Board (OIDB) owns 67.33%.

BLL is making losses for the last several years. The accumulated losses have become more than the equity and the net worth has become negative. Hence, the company is registered in Board for Industrial and Financial

Reconstruction (BIFR) under Sick Industrial Companies Act.

The major operations of the Company are as under:-

(i) Switchgear & Spare Parts

(ii) Electrical Repairs

(iv) Projects

(v) Lube Oil Blending & Filling

14.4.2 Balmer Lawrie Investments Limited

Government of India, in view of its planned deregulation of oil and globalization of the economy, decided to disinvest 33.58%, of its total equity holding of 59.58%, in IBP Company Limited (IBP) to a strategic partner with management control. Consequently, the shareholding of IBP, in its erstwhile subsidiary Balmer Lawrie & Company Limited (BL), was de-merged in favour of Balmer Lawrie Investments Limited (BLIL), which was incorporated on 20th September 2001 under the Companies Act, 1956. The President of India holds 59.67%, of its total paid up equity capital. BLIL is under the administrative control of Ministry of Petroleum & Natural Gas having its Registered office at Kolkata.

BLIL is a non-banking financial Company as defined under section 45-I(f) of the Reserve Bank of India Act, 1934. BLIL does not carry on any business except to hold 1,00,64,700, equity shares of Rs 10/- each of BL.

Joint Ventures/Subsidiaries:

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

(b) **Subsidiary Companies**

BLIL has at present two subsidiary companies, namely

(i) Balmer Lawrie & Co. Ltd. (as per Section 4(1)(b) (ii) of the Companies Act, 1956 [which is referred to herein as 'BL'];

and

(ii) Balmer Lawrie (UK) Ltd. (as per Section 4(1) (c) of the Companies Act, 1956).

14.5 OTHER ORGANISATIONS

14.5.1 Oil Industry Development Board (OIDB)

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 2016-17, 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.11,637.32 Crore (provisional) as on 31st January 2017.

Deployment of Funds

During 2016-17 (upto 31st January 2017), OIDB has extended loans to IOC, GAIL Gas, BPCL, HPCL, BCPL and BLL amounting to Rs.589.12 Crore and Grants to institutions viz. DGH, PCRA, CHT, OISD, PPAC and NGHP-02 Expedition and IOCL (for R&D activities) amounting to Rs.489.08 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 2016-17 (upto 31st January 2017), an amount of Rs.130.15 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 preliminary process of setting up the HSSC has been completed & the HSSC has been registed under the Societies Registration Act, 1860 with the Registrar of Societies, New Delhi on 26.04.2016. The temporary secretariat of HSSC has been set up at OIDB Bhawan, Noida.

14.5.2 Oil Industry Safety Directorate (OISD)

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

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 33rd Meeting of the Safety Council was held on 7th June, 2016.

Key issues discussed & reviewed during the meeting are as under:

- Major activities undertaken in 2015-16 & Activity plan for 2016-17
- Compliance status of MB Lal Committee recommendations
- Analysis of OISD Safety Audits Compliance status (ESA/SSA)

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 2016-17 is as indicated below:

Actions	Unit	Plan	Actuals (as on 31st Dec 16)	Projection (Jan-Mar, 2017)	Total (2016-17)
Core Audits					
Refineries/Gas Processing plants/LNG Terminals (Including Construction Safety Audits)	Nos	14	11	06	17
Mktg. Installations	Nos	70	72	08	80
E&P Onshore Installations	Nos	50	49	01	50
E&P Offshore Installations	Nos	16	06	10	16
Cross Country Pipelines	Kms	7000	5144	2300	7444
Additional audits Pipelines Installations					
Jetty Pipelines for Hydrocarbon Transportation	Nos	01	01	00	01
Single Point Mooring (SPM) Installations	Nos	02	00	02	02

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 31st Dec,2016, 34 nos. of such auditsincluding 1294 km pipelines had been conducted on the request of the user Industry members.

Actions	Refinery & GPP	Cross-Country Pipelines	Marketing (POL + LPG)
Pre-Commissioning Safety Audits (PCSA)	08 Nos.	14 Nos. (1294 KM)	12 Nos.

Earlier, to collect the charges for PCSA, the large number of man-hours was wasted at OISD & respective Oil companies towards correspondence, credits, debits and reconciliation. To simplify the process & to avoid rigorous follow-ups, it was decided that the applicant companies shall make initial payment for PCSA to OISD prior to submitting the application, and will enter transaction details for the same in the PCSA online request form. This system of taking initial payment for PCSA is in place from 1st August, 2016.

"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. 12 Unmanned Well Head Platforms and 15 Drilling Rigs have been accorded "consent to operate" during the year 2016-17 (as on 31stDec 2016).

Development of Safety Standards

OISD develops Standards / Guidelines / Recommended Practices forthe 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 120 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 2016-17, OISD has revised/ amended08 Numbers of the existing standards. These standards, after following the extant process of their revision,shall be put up for adoptionin 52nd Steering Committee meeting on 6th Jan, 2017 followed by Safety Council.

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

To encourage outstanding safety performance of the industry and to inculcate a positive culture of competitiveness among the industry members, the Ministry of Petroleum and Natural Gas introduced a system of 'Oil Industry Safety Awards' in the year 1987. 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 thereby enhancing the productivity and safety in the industry at large. 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 2014-15, had been handed over to the recipients by MoS(I/C) MoPNG in a glittering function at Delhi on 29th November, 2016.

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 99% of the recommendations have already been complied with by the OMCs and the rest are under advanced stage(s) of implementation.

Site Restoration Guidelines for Petroleum Operations

OISD was a key member of the Committee constituted by MoP&NG for development of 'Site Restoration Guidelines for Petroleum Operations'. OISD was instrumental in framing the sections related to "Permanent Well Abandonment" and "Offshore Structural Removal Requirements", in the said Guidelines. Upon cessation of petroleum activities, all the Operators in the country shall have to mandatorily follow abandonment and site restoration procedures as prescribed in the aforesaid Guidelines.

Swachh Bharat (Clean India) Mission in OISD

Pursuant to the Hon'ble Prime Minister's call on "Swachh Bharat" campaign and directive from the Ministry, OISD along with its all functional directors and employees under the leadership of Sh. VJ Rao, Executive Director and Head of the Organization, assembled at 8th floor OIDB Bhavan on 2nd October, 2016 at 10:00 am to commemorate the 3rd year of celebration of the mission.

Complying with the appeal made by our Hon'ble Prime Minister, ED OISD reiterated the noble objective of the Clean India Mission and reminded all employees on the pledge taken by all of us on 2nd October '14 and stress upon owing up the drive and spread the awareness among others not in office alone but also among their family members, neighborhood and at their social circles.

The program was kick started by cleaning the building premises and its surrounding at the Ground floor, displaying of placards/ flex boards showing several slogans and messages on clean environment and its ultimate benefits.

Subsequent to above, ED took a review of the benchmarking process set in the office for clean working environment and stressed upon its sustainability. Visit to all toilets, Pantry as well as Store and electrical panel rooms were also taken by the senior members to ascertain the cleanliness and hygiene status.

All the employees wholeheartedly participated in the program and vowed to take it forward by keeping their own office space as well as surrounding at their living place absolutely clean and be an effective campaigner of the Mission.

14.5.3 DGH (Directorate General of Hydrocarbons)

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 2016-17 (April-December, 2016)

1. National Seismic Plan - 2D Seismic Survey

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 to be appraised areas. 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 Andaman-Nicobar basins.

2D Seismic survey work has started and 1446 Line Kilometer (LKM) of survey has already been completed upto 30.11.2016 after award of work to service providers by ONGC & OIL. It will take five years period to cover the entire area. The project will be funded by OIDB (expenditure incurred on outsource agencies only). However, ONGC & OIL will incur expenditure upfront and will seek reimbursement from OIDB subject to Government approval.

2. Setting up of NDR (National Data Repository)

National Data Repository (NDR) is being set up to populate all the geo-scientific data available in the country. NDR Project is currently being expedited in DGH premises at sector 73, Noida. Integration of Software at NDR site has been completed. Build up phase on pilot data and priority data has also been completed. Currently, NDR is in operation phase wherein data loading & sharing is in progress. So far 16,65,145 line kilometre of 2D seismic, 5,83,985 Sq. Km of 3D seismic data, 15,254 well Reports and 1,964 seismic Reports have been uploaded.

NDR is ready for providing data to various Industry E&P operators through launching of OALP/HELP programme. The interested E&P companies can view geo-scientific data from anywhere in the world and firm up an opinion regarding prospectivity of the blocks prior to bidding for the block.

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 05 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. ONGC has drilled 21 wells and 83 cores have been collected in 21 wells. During the current year 2016-17, ONGC has completed coring and other data collection programme in three wells in Cambay basin in different blocks. These data will help in assessment of the shale gas and oil potential of respective blocks.

Oil India Limited is carrying out Shale Gas and Oil exploration activities in Assam and Rajasthan basins. Oil India Ltd. (OIL) has initially identified five Blocks viz. Dibrugarh, Chabua, Dumduma, Jaisalmer and Jairampur from its Nomination acreages and later on identified one more block (Deomali PEL) and started G&G evaluation. OIL has completed G&G evaluation of four Blocks i.e, Dibrugarh PML, Chabua PML, Dumduma PML and Jaisalmer PML.

5. Re-assessment of Hydrocarbon Resources of India

A Multi Organization Team (MOT) has been constituted to carry out re-assessment of hydrocarbon resources of India in all its 26 sedimentary basins. The project is being carried out by ONGC in association with Oil India Limited & DGH. DGH will provide geological and geophysical data for areas other than those operated by ONGC. The project took off on 01.09.2015 and is scheduled to be completed in 27 months by November, 2017.

The project is under three tier monitoring, National Steering Committee (NSC) for Periodic review of progress of work (half yearly), Multi-Organisation Team (MOT) to ensure data confidentiality and quality of output (quarterly) and Technical Monitoring Group (TMG) to monitor progress of project (bi-monthly). Till date, eleven MOT meetings, 3 National Steering Committee Meetings and six reviews by Technical Monitoring Group were held. An international domain expert, Dr. Bjorn Wygrala and his team has been engaged on nomination basis as Project Advisor and Technical Advisor.

So far, HC resource assessments study for ten basins (Karewa, Bastar, Satpura-South Rewa-Damodar, Chattisgarh, Kerala-Konkan, Vindhyan, Mahanadi, KG, Cambay & Mumbai Offshore) have been completed and their draft reports are under preparation. At present the study for ten basins (Spiti-Zanskar, Himalayan Foreland, Assam Shelf, Assam Arakan Fold Belts, Kutch-Saurashtra, Cauvery, Pranhita-Godavari, Bengal-Purnea, Rajasthan and Ganga-Punjab Plains) is in progress.

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 Geoscientific data generation for hydrocarbons in Indian sedimentary Basins and Agreement to carry out Non-exclusive Multi-Client Geo-scientific surveys/ Activities.

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 Marine Controlled Source Electro Magnetic (CSEM) and Marine Magneto Telluric (MMT) Data Acquisition, Processing, Inversion and Interpretation studies. Interpretation of 310.5 LKM of CSEM & MMT data has been completed in Phase-I of the survey.

M/s Geoex Limited, United Kingdom has submitted two proposals for Non-exclusive Multi-client 2D Seismic survey of 8867.16 LKM in Eastern Offshore Andaman Islands, India and 9852.55 LKM in Offshore Krishna Godavari Basin, India. Both the proposals are currently under examination at DGH.

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 15 hydrocarbon discoveries (14 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 Expedition- 02 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 03rd 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 has been completed on the 28th July 2015.

As the initial results of NGHP Expedition-02 are encouraging, collation and interpretation of all data is now primary to identify sites for pilot production testing. The objective of NGHP Expedition-03 is to carry out pilot production testing at a suitable site identified during the NGHP Expedition 02.

9. Exploration Performance under PSC Regime during 2016-17 (April-December)

As a result of exploration activities in the Blocks/ Fields awarded under PSC Regime, following exploratory work has been completed:

- 4 Discoveries (Oil + Gas) have been notified
- 719.11 LKM of 2D seismic Survey
- 43.1 SKM of 3D seismic Survey
- Drilling of 15 exploratory wells and 7 development wells have been completed
- As on 01.04.2016, In-Place Hydrocarbon reserves of 2357.24 Million Metric Tonnes (MMT) of oil and oil equivalent of gas (O + OEG) has been established with estimated ultimate recovery of 1011.15 MMT of O + OEG.

14.5.4 Centre for High Technology (CHT)

Established in 1987, Centre for High Technology (CHT) acts as the Technical Wing of MOP&NG for implementation of scientific and technological programmes of Govt. of India. Major functions of CHT include assessment of technology requirement, 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 sharing. CHT also coordinates funding of research work in downstream hydrocarbon sector and pursue the programmes of "Scientific Advisory Committee on Hydrocarbons" of MOP&NG.

1.0 Major activities undertaken by CHT during 2016-17:

2.1 Auto Fuel Vision & Policy 2025:

In line with the recommendations of the Expert Committee on Auto Fuel Vision & Policy-2025, Bharat Stage-IV fuels (gasoline and diesel having 50 ppm max sulphur) are being implemented in phases across the country by 1st April 2017.

As a result, about 50.8% of gasoline and 47.7% of diesel meeting Bharat Stage-IV specifications are being supplied in the country. CHT along with OMCs is regularly

reviewing refinery shutdown schedule and product availability during January-June 2017 for smooth rollover of BS-IV fuels across the country by 1st April 2017.

Government of India has also decided to leapfrog directly from BS-IV to Euro-VI equivalent Bharat Stage-VI norms (gasoline and diesel having 10 ppm max sulphur) w.e.f. 1st April 2020 across the country and skipping BS-V altogether.

CHT coordinated and assisted MOP&NG/ MORT&H in firming up BS-VI gasoline and diesel fuel specifications, which were notified by MORT&H vide Gazette notification dated 16th September 2016. CHT is also liaising with BIS for issuance of relevant fuel specifications along with test methods.

2.2 20th Refinery Technology Meet (RTM):

The 20th Refinery Technology Meet (RTM) was organised by Centre for High Technology (CHT) in association with Indian Oil Corporation Ltd (IOCL) during 7-9th September 2016 at Mahatma Mandir, Gandhinagar, Gujarat.

The theme of the Meet was *"Value Creation through Innovative Solutions"*.

Shri Ajay Prakash Sawhney, IAS, Additional Secretary, MOP&NG inaugurated the Meet. The RTM was attended by over 680 refining professionals from India and abroad.

Technical sessions covered the entire spectrum of downstream petroleum sector. A total of 86 Technical Papers, including 39 papers from Global leaders in Refining Technology such as Shell, Chevron, UOP, Axens, CB&I, Dupont, Solomon, Exxon Mobil, KBR, KBC, etc., were presented during the Technical Sessions. Three Poster Sessions were organised during the three days of the Meet covering 95 poster papers. Apart from these, 11 exhibition stalls were put up by oil companies, consultants and vendors for display of their technology, products and services.

2.3 Indigenous Technology Development:

CHT co-ordinates the activities of Scientific Advisory Committee (SAC) on Hydrocarbons of MOP&NG in identifying and funding of research projects for hydrocarbon sector. SAC approves and steers projects of national importance and refining operations. SAC is headed by Dr Anil Kakodkar, an eminent Scientist and DAE Chair Professor, BARC. During the year 2016-17., two SAC meetings were held in August 2016 and another meeting is planned in January 2017.

2.3.1 Following two projects, recommended by the SAC in 2015-16, were approved by the Executive Committee (EC) of CHT during the year for financial approval:

i. Bio-mass hydro-pyrolysis for production of fuel grade hydrocarbons Phase-I

ii. Renewable crude and liquid hydrocarbon fuels from Algae

Another project on "Hydrogen production by catalytic decomposition of Natural gas" has been recommended by the EC for approval by Governing Council (GC).

2.3.2 Position paper, identifying the research areas to be undertaken in down-stream hydrocarbon sector was deliberated by the SAC and finalised.

With a view to broaden participation, Expression of Interest (EOI) was for the first time published in Newspapers inviting R&D proposals. A total of 15 proposals were received. These proposals were scrutinised by the Steering Committee constituted by the SAC in November 2016, and shortlisted three proposals for further improvement and subsequent consideration by the SAC.

2.3.3 Standard MOU having clauses on monitoring mechanism, asset treatment etc has been finalised by a Committee comprising of R&D Institutes, OIDB and CHT. This will facilitate avoiding unnecessary delay in signing of MOUs with grantee institutions.

2.4 Compendium of indigenously developed technologies

A workshop of R&D institutions and refineries was held by CHT for dissemination of information on indigenously developed

technologies. A Compendium of Indigenous technologies with gap analysis has been prepared by CHT and circulated to all. Committee constituted by EC under the Chairmanship of Director (R), IOC deliberated on impediments in commercialisation of indigenous technologies as well as improving commercialisation of CHT funded projects, and submitted its recommendations.

2.5 Performance Benchmarking of PSU refineries:

CHT, on behalf of MoP&NG and PSU/ JV refineries, had engaged M/s Solomon Associates to benchmark refineries based on the data for the calendar year 2014. Data submitted by the refineries was validated by the consultant and final reports were received in February/ March 2016.

Work order for benchmarking study for 2016 cycle for 15 PSU fuel refineries and 4 lube refineries has also been placed on Solomon Associates in October 2016. Besides this, BORL has also been included in the study. Similar to the previous three cycles of 2010, 2012 and 2014, the 2016 benchmarking study will help in gap identification for achieving greater efficiencies, enhanced reliability and improved margins by the refineries. Final reports are expected by mid-October 2017.

2.6 Perform, Achieve and Trade (PAT) Scheme implementation in refineries:

Petroleum Refinery Sector has been included in the PAT scheme from the cycle-II, which has commenced from 1.4.2016. Out of 23 Refineries in the country, 18 Refineries (except four smaller refineries viz. Tatipaka, Cauvery Basin, Guwahati and Digboi Refineries; and the newly commissioned Paradip Refinery) have been notified as Designated Consumers (DC) vide Gazette Notification No. 225 dated 30th December 2015.

CHT has closely worked with BEE providing the methodology to calculate the specific energy consumption (MBN) taking into account the complexity of each Refinery; verification of data, documents and Baseline data.

The refinery Specific Energy Consumption target, based on sector target of 5.97% reduction in energy consumption from the baseline energy level of 2014-15, has been notified by Ministry of Power on 31st March 2016. Refineries are required to achieve the target MBN in the assessment year, 2018-19. Accordingly, these refineries are in the process of identifying action plan to achieve these targets.

As per the mechanism, DCs are required to carry out mandatory audit through accredited energy auditor and also submit details of energy saving schemes with implementation schedule within 18 months i.e. by June 2017.

2.7 Energy efficiency improvement study and performance audit of PSU refineries:

CHT on behalf of the industry finalised the Agreement, including scope and payment terms for comprehensive energy efficiency improvement study and performance audit of 15 PSU refineries by EIL.

Refinery-wise targets have been set both for short term and medium term. The medium-term target (2020-21) for PSU refineries, were finalised after deliberations in EC of CHT held in May 2016, as under:

Crude capacity > 9 MMTPA: 60 MBN Crude capacity 3-9 MMTPA:65MBN Crude capacity < 3 MMTPA: 70 MBN

The entire study is to be completed in one year in phased manner. 2.10 Energy consumption targets for PSU refineries by 2030:

Milestone for energy reduction up-to 2030 for refining sector (including private refineries) has been proposed as 36.6% over 2005 aligning with INDC (Intended Nationally Determined Commitment), wherein India has projected reduction of specific energy consumption by 33-35% per GDP by 2030 over 2005. The actual specific energy reduction during 2005 to 2015-16 has been 24.3%.

2.8 Mandatory Energy Audit (MEA) by PCRA:

CHT on behalf of the industry finalised the Agreement, including scope and payment

terms for MEA study through PCRA for 12 PSU refineries (excluding IOC Guwahati and Digboi, who are not part of PAT, IOC-Paradip which was recently commissioned, and BPCL-Kochi, who have already completed MEA).

2.9 Refinery Process Improvement Program (RPIP):

RPIP Phase-II initiated in February 2011 and spanning over 36 months, is being executed by CHT through M/s Shell Global Solutions International (SGSI) at 3 PSU Refineries viz. BPCL Mumbai, HPCL Mumbai and MRPL.

RPIP programme has been completed at BPCL Mumbai and some of the Projects for Implementation (PFIs) are on-going at HPCL Mumbai and MRPL.

Fresh study through global tender for performance improvement of refineries in phased manner is under finalisation.

2.10 Jawaharlal Nehru Centenary Awards for energy performance of Refineries:

Jawaharlal Nehru Centenary' Awards instituted by MOP&NG for energy performance of refineries for 2014-15, were presented to the refineries during the 20th Refinery Technology Meet (RTM) in September 2016 at Gandhinagar.

CHT also compiled and evaluated the energy performance of both PSU and private refineries, in terms of specific energy consumption (MBTU/ BBL/ NRGF) for giving Jawaharlal Nehru Centenary Awards for 2015-16. The awards have been finalised by the Award Selection Committee, for presentation to the winning refineries.

2.11 Oil & Gas Conservation Awards:

Oil and gas conservation Awards instituted by MOP&NG, based on the steam leak surveys during OGCF in January 2015, were presented to the refineries during the 20th RTM in September 2016 at Gandhinagar.

CHT also organized surveys in the area of "Furnace/ Boiler Insulation effectiveness and Furnace/ Boiler efficiency" during OGCF in January 2016. The survey were conducted simultaneously both at PSU and private Refineries. The survey data was evaluated by CHT and the awards were finalised by the Award Selection Committee, for presentation to the winning refineries.

2.12 Performance Awards for Refineries and R&D for Innovation:

The Performance Awards for refineries and R&D for innovation instituted by MOP&NG were presented for the first time for the year 2014-15 during the 20th RTM in September 2016 at Gandhinagar (one each in the first two categories and two awards in the 3rd category). These categories are:

i) Best Indigenously Developed Technology

ii) Best Innovation in Refinery (refinery/ group/ individual)

iii) Best Innovation in R&D Institute (institute/ group/ individual)

The Awards (one in each category) for 2015-16 has also been finalised by the Award Selection Committee, for presentation to the winning refineries.

2.13 Performance Awards for Refineries w.r.t. lowest Carbon Di-oxide Emission:

For Green House Gas (GHG) inventory benchmarking of refineries, CHT in consultation with all the refineries, finalized the methodology for comparing the performance w.r.t. GHG emissions and decided to use Carbon Weightage Tonnage (CWT) method for evaluation. MOP&NG also accorded its approval of the new parameter "Carbon Di-oxide Emission from PSU, JV and Private Refineries"

The Awards to refineries for minimum CO2 emission under two categories i) with natural gas, and ii) without natural gas, for the year 2014-15 were for the first time presented during the 20th RTM in September 2016. at Gandhingar.

The data of the refineries w.r.t. CO2 emission for 2015-16 was reconciled and compiled

by CHT. The same has been evaluated and finalised by the Awards Selection Committee, for presentation to the winning refineries.

14.5.5 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 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 the Ministry of Petroleum and Natural Gas.

RGIPT has commenced its academic operations from temporary campus at Rae Bareli from 2008-09 onwards with introduction of 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 2016-17 RGIPT has successfully entered 9th year of academic activities with 344 students. The performance highlights are as follows:

- The fifth batch of B.Tech degree (Chemical Engineering and Petroleum Engineering) students will pass out this year in the month of May, 2017
- Students of M.Techs in Petroleum Engineering and MBAs in Petroleum and Energy Management will graduate this year.
- With moderate campus placement, the industry, both public and private, has recruited the RGIPT students.

3. Jais (District-Amethi, UP)

RGIPT has shifted to its new campus at Jais, which was inaugurated on 22nd October, 2016 jointly by Union Minister of HRD, Union Minister of Textiles and MoS(I/C) MoPNG. So far out of total capital budget of 369.10 Crores, release has been for an amount of Rs. 181 Crores. Out of remaining funds of Rs. 188.10 Crores, Rs. 53 Crores is being released and balanced amount of Rs. 135.10 Crores has been allocated under BE 2017-18.

4. Assam Centre of RGIPT

Hon'ble Prime Minister laid the foundation stone in February 2011 for setting up Assam centre of RGIPT at Sivasagar.

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. The revised capital budget is Rs. 235 Crore.

It is proposed to set up a temporary campus at Sivasagar to start from academic session 2017-18.

5. Bangalore Centre of RGIPT

The foundation stone for Bangalore Centre of RGIPT was laid by MoS(I/C) MoPNG on 5th March, 2014. The detailed project report was submitted to MoPNG 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 land is yet to be handed over to RGIPT. The total project cost was Rs. 478 Crore (Capital Expenditure-Rs. 358 Crore and Recurring Expenditure-Rs. 120 Crore).

This centre will be set up as an "Energy Institute" in Bangalore on the lines of World's Leading Energy Institutes for undertaking contemporary research duly involving other Ministries and stakeholders. A road map and DPR for the Institute is under preparation.

14.5.6 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.

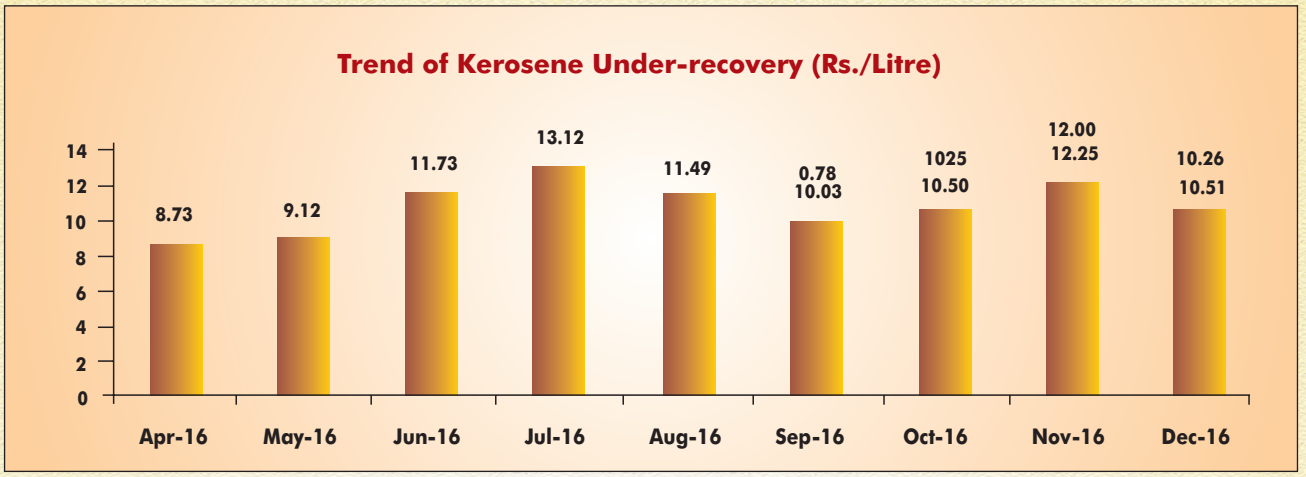
3. Price Trends of Petroleum Products and impact on under recoveries

(i) The average price of Indian crude oil basket, which averaged about $85.09 per barrel during 2010-11, increased further to $105.52/bbl during 2013-14. However, the price of crude oil and petroleum products in the international markets started sliding sharply after July 2014 and the average price of Indian basket crude oil during 2014-15 was $84.16/bbl. The downward trend in international prices has continued in 2015-16 and the average price of Indian basket crude oil during 2015-16 was $46.17/bbl and for the year 2016-17 is $ 45.62/bbl. (up to 31.12.2016). The lowest price of Indian basket crude oil has been recorded at $ 24.03/bbl on 20.01.2016.

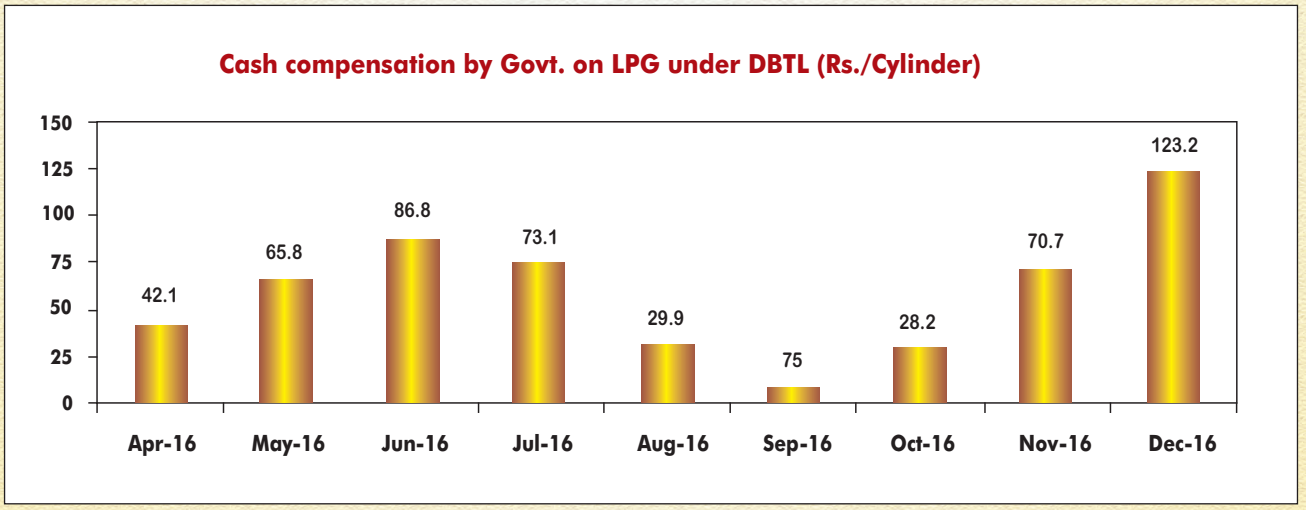
(ii) The Government has made the price of Diesel market determined both at Refinery Gate and Retail level for all consumers with effect from the midnight of 18-19th October 2014.

(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 either through Aadhar based linked accounts or if the consumer does not have an Aadhar number, then he can directly receive subsidy in his bank account without the use of Aadhar number.

(iv) Effective 1st July 2016, the Government has authorized CPSE OMCs to increase the RSP of PDS kerosene by Rs. 0.25 per litre (excluding state levies) for each of the next 10 months. The same has further been revised to 25 paisa /litre per fortnight during the period 1st September 2016 to 31st January 2017.OMCs are currently incurring under-recovery of Rs. 10.26 per litre on PDS Kerosene (at Mumbai marketw.e.f. December 16, 2016). The month-wise trend in the Kerosene Under-recovery during the year 2016-17 is depicted below:



Effective 1st September 2016, the Government has authorized the CPSE OMCs to increase the effective price of subsidized Domestic LPG by Rs. 2 per cylinder (excluding state taxes), retrospectively from 1st July 2016 till the end of financial year 2016-17 or reduction of Government subsidy to nil, whichever is earlier.Government is currently providing cash compensation of Rs.123.2 per cylinder under DBTL (at Delhi marketw.e.f. December 1, 2016). The month wise trend in cash compensation given by Government on LPG under DBTL is depicted below:



(v) The Government is in the process of implementing "Direct Benefit Transfer in of Kerosene Subsidy Scheme, 2016" (DBTK) for transfer of subsidy on PDS kerosene directly to the bank account of the eligible consumers for such areas and districts as may be decided by the Government from time to time.

Effective 1stOctober 2016, MoP&NG has announced the implementation of DBTK scheme in 4 identified districts in Jharkhand state, namely Khunti, Chatra, Hazaribagh and Jamtara.

(vi) The OMCs incurred under-recoveries of Rs 11515 Crore in 2015-16 as against Rs 72314 Crore in 2014-15. As per the current rates, the under recovery of OMCs for the year 2016-17 is estimated at Rs7675 Crore (excluding subsidy under DBTL Scheme), of which, Rs 4123 Crore has been sanctioned by Government towards the under recovery

claims of OMCs as of September, 2016. Domestic LPG subsidy under DBTL scheme is estimated at Rs.12076 Crore during the year 2016-17, of which cash compensation of Rs. 3704 Crore has been provided by Government to the OMCs as of September, 2016.

4. Important Activities

Some of the important activities undertaken by PPAC,in addition to their normal work, were as follows:

i. Domestic natural gas pricing determination and issuance under the provisions of the New Domestic Natural Gas Pricing Guidelines, 2014

Domestic natural gas price was notified for the period 01.10.2016 to 31.03.2017 in line with the New Domestic Natural Gas Pricing Guidelines, 2014.

ii. Gas Price Ceiling determination and issuance under the provisions of guidelines issued for marketing and pricing freedom for the gas produced from discoveries in Deep-water, Ultra deep water and High pressure-High Temperature areas

Gas price ceiling was notified for the period 01.10.2016 to 31.03.2017 in line with the guidelines issued for marketing and pricing freedom for the gas produced from discoveries in Deep-water, Ultra deep water and High pressure-High Temperature.

iii. Modal mix (pipelines/ rail/ road/ coastal) of transportation of petroleum products

a. The study on "Modal mix of transportation of petroleum products" was completed and the report was submitted to MoP&NG in August, 2016.

b. The report primarily examines mode-wise transportation of crude oil and petroleum products during the five year period from 2010-11 to 2014-15 and comparison of cost of transport by each mode. An attempt has also been made to suggest the way forward, considering that in addition to efforts at OMC's level, policy actions at macro level may influence future modal choices.

iv. A primary survey on household cooking fuel usagecovering 1.03 lakh unconnected LPG households across 120 districts in 13 states having low LPG penetration was carried out to ascertain the cooking fuel usage and access the potential of LPG adoption amongst unconnected LPG households.

14.5.7 Petroleum Conservation Research Association (PCRA)

Petroleum Conservation Research Association (PCRA) is a registered society set up under the aegis of Ministry of Petroleum & Natural Gas, Government of India. As a non-profit organization, PCRA is a national government agency engaged in promoting energy efficiency in various sectors of economy. It helps the government in proposing policies and strategies for petroleum conservation, aimed at reducing excessive dependence of the country on oil requirement. Over the years, PCRA has enlarged its role in improving productivity in use of various sources of energy.

PCRA undertake studies to identify the potential and to make recommendations for achieving conservation of petroleum products in various sectors of the economy. It sponsors R&D activities for the development of fuel-efficient equipment / devices and organizes multi-media campaigns for creating mass awareness for the conservation of petroleum products. Fuel oil utilization studies, energy audits, introduction of equipment bank concept, use of energy vans, development of oil consumption norms, model depot projects, driver training programs, workshops/ exhibitions, consumer meets, education films/TV spots, hoarding/ electronic display, distribution of printed literature, R&D projects are other activities.

PCRA aims at making oil conservation a national movement. As part of its mandate, PCRA is entrusted with the task of creating awareness amongst the masses about the importance, methods and benefits of

conserving petroleum products & emission reduction.

To take the message to the people, PCRA uses all possible and effective media for mass communication. These include electronic and press media e.g. TV, Radio, Electronic displays; Press at the National and State level printed literature for specific target groups; outdoor publicity through Hoarding, Bus panels, Kiosks, Balloons, Banners Tran-sliders etc.

14.5.8 Petroleum and Natural Gas Regulatory Board (PNGRB)

The Petroleum and Natural Gas Regulatory Board (PNGRB) was constituted under the Petroleum and Natural Gas Regulatory Board Act, 2006 (NO. 19 of 2006) notified via Gazette Notification dated 31st March, 2006. The Act provides for the establishment of Petroleum and Natural Gas Regulatory Board to protect the interests of consumers and entities engaged in specified activities relating to petroleum, petroleum products and natural gas and to promote competitive markets and for matters connected therewith or incidental thereto. The board has also been mandated to regulate the refining, processing, storage, transportation, distribution, marketing and sale of petroleum, petroleum products and natural gas excluding production of crude oil and natural gas so as to ensure uninterrupted and adequate supply of petroleum, petroleum products and natural gas in all parts of the country. The vision of PNGRB is as under:

"To create a vibrant energy market with rapid and orderly growth through facilitation of flow of investments into the basic infrastructure for efficient transportation and distribution of petroleum, petroleum products and natural gas at minimum cost and high level of protection of consumer interests through fair trade practives and competition amongest the entities so as to ensure the enhanced competitiveness of Indian economy and customer satisfaction."

14.5.9 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

Access tunnel to Strategic Crude Reserve facility at Padur, Karnataka

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.

3. In March, 2015, Government has decided that against the 12th Plan outlay of Rs. 4948 Crore under the GBS Scheme of Ministry of Petroleum Natural Gas for the Indian Strategic StorageProgramme 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. Under Strategic Petroleum Reserve (SPR) project Phase-I, underground rock caverns for storage of 5.33 MMT of crude oil at three locations, viz. Vishakhapatnam (1.33 MMT), Mangalore (1.50 MMT) and Padur (2.5 MMT) have been created. The cavern storage facility at Visakhapatnam and Mangalore have been commissioned. The strategic storage compartments at Vishakhapatnam and one of the two caverns at Mangalore have filled under the GBS for MoPNG. The Indian Strategic Petroleum Reserve Ltd (ISPRL) which is the SPV created for creating SPR facility, on 25 January 2017 signed a Definitive Agreement with Abu Dhabi National Oil Company (ADNOC) for filling second cavern at Mangalore SPR facility. The storage facility at Padur has also been completed and tested. However, the facility is yet to be commissioned. It is awaiting the completion of pipeline and electricity cable work.

Construction of storage facilities at Chandikhol in Odisha and at Bikaner in Rajasthan under SPR Phase II have also been proposed.

14.5.10 Indian Institute of Petroleum and Energy (IIPE), VISAKHAPATNAM

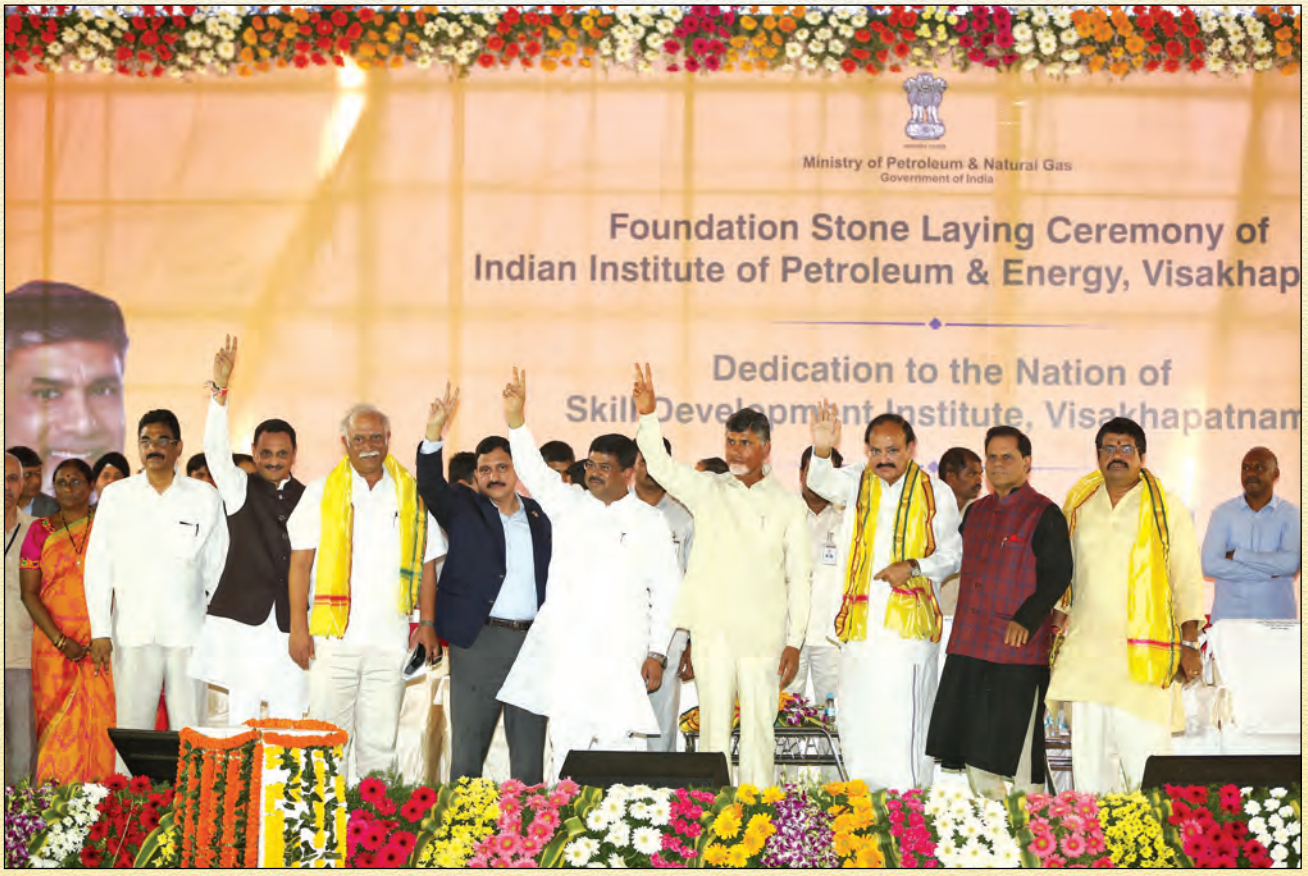
1. As mandated under 13th Schedule of Andhra Pradesh Reorganisation Act, 2014, Ministry of Petroleum and Natural Gas has set up Indian Institute of Petroleum and Energy (IIPE) at Visakhapatnam in Andhra Pradesh with the objective to meet the quantitative and qualitative gap in the supply of skilled manpower for the petroleum sector and to promote research activities needed for the growth of the sector. The Government of Andhra Pradesh has made available an area measuring about 200 acres of land at Vangali Village, Sabbavaram Mandal, Visakhapatnam District for the Institute at free cost. IIPE Society has been registered on 18.04.2016. CMD, HPCL has been nominated as a President of the Society.

2. Temporary campus has been set up at a space provided by College of Engineering (autonomous) in Andhra University at Visakhapatnam to start the academic sessions 2016-17 in two B.Tech.

Programmes, viz., Petroleum Engineering and Chemical Engineering. From the rank list obtained from JEE Advanced, 2016 from IIT-Guwahati, 94 students have been admitted in these two courses. IIT-Kharagpur has been roped in to act as a Mentor Institution for starting the academic session 2016-17. Advisor (Academics) has been engaged on contract basis for a period of one year and extendable by one more year. Three faculty members in the subjects of Chemistry, English and Mechanical Engineering have been taken on contract basis for a period two years. One more faculty member in the subject of Mathematics is likely to join shortly.

3. The meeting of Expenditure Finance Committee (EFC) held on 21.06.2016, inter-alia, recommended Rs.655.46 Crore as capital expenditure and Rs.400 Crore as endowment fund (Rs.200 Crore from GBS and Rs.200 Crore from Oil PSUs).

4. Foundation Stone of the Institute at the permanent Campus was laid by the MoS(I/C) MoPNG on 20.10.2016 in the presence of Minister of Urban Development, Housing & Urban Poverty Alleviation and Information & Broadcasting, Minister of Civil Aviation, MoS (Science and Technology), Chief Minister of Andhra Pradesh and other dignitaries.



Foundation Stone Laying Ceremony of IIPE, Visakhapatnam by Shri Dharmendra Pradhan, MoS(I/C) MoPNG

14.5.11 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 beenallocated on amount of Rs.210 lakh (2.10 Crore) under Grant-in-aid for financial year 2016-17 (Rs.2 crore under Non-salary and Rs.10 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 lokh. 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.


ASSEMBLY
POINT
FIRE ROOM

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 MoS (I/C) MoPNG. 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 Advisory Committee was held on 8th February, 2016 in Puri (Odissa) under the chairmanship of MoS (I/C) MoPNG. Senior officers of the Ministry and its undertakings 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 MoS (I/C) MoPNG also assured the Committee that the Ministry would make all efforts to promote Hindi in the official work. The minutes of the meeting has been circulated and the concerned officers have been requested to take follow up action on the suggestions

Hindi Pakhwada 2016 Guwahati Airport

given by the members of the committee in the meeting.

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 were organized during the year under review and follow up action was taken on the suggestions of the committee.

The Committee of Parliament on Official Language visited 43 offices of our PSUs during 2016 which includes offices of ONGC, IOCL, 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. A letter of appreciation was sent by the Convenor of the Committee to MoS(I/C) MoPNG praising efforts of MoPNG & Gas & Oil PSUs in this work. Follow up action has been taken on the assurances given to the Committee by these offices. Senior officers of the Ministry also took part in these meetings.

During the year under review, the Ministry notified 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 2016-17 issued by the Department of Official Language, senior officers of the Ministry inspected more than 100 offices of Oil & Gas PSUs and reviewed the progress of Hindi in these offices. On the spot suggestions were given to the officers concerned for removing the deficiencies.

With a view to assist the officials to do their maximum work in Hindi and to remove their hesitation to do the same, regular Hindi workshops were conducted in the Ministry. Large number of official attended these workshops and benefitted from the suggestions given in these workshops.

In pursuance of the directions of the Department of Official Language, Hindi Fortnight was organized in the Ministry from 12th September, 2016 to 26th September, 2016. During this occasion, a Message from the MoS (I/C), MoPNG 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 were given to the successful PSUs by the Secretary, MoPNG.

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 the Right to Information Act-2005, the Under Secretary / Assistant Director /DDO in the Ministry of Petroleum & Natural Gas have been designated as Central Public Information Officers (CPIO) in respect of their work allocations. Accordingly, the Director/Deputy Secretary/Economic Adviser in the Ministry of Petroleum & Natural Gas have been designated as First Appellate Authority (FAA). The list of CPIO/FAA of this Ministry is being updated regularly in view of change in allocation of work.

Information under Section 4(2) of RTI Act 2005 i.e. to provide information Suo Motu to the public at regular interval is being updated on the Ministry's website.

An on-line system called RTIMIS has been introduced by DoP&T. With the aid of this online system, applications and appeals received from public are being speedily disposed of within the stipulated time frame. To provide information to people in timely and trouble free manner and to promote transparency, all Oil & Gas PSUs and other organisations under the administrative control of this Ministry are now on DoP&T's online RTIMIS portal.

In order to ensure digitalization of records, RTI applications and appeals received in physical form are being scanned, uploaded and forwarded to concerned CPIO and FAA of the Ministry for speedy and timely disposal.

During January to December 2016, 3536 applications/receipts and 356 appeals have been received under RTI Act, 2005 in the Ministry.

For smooth processing of RTI applications and appeals through RTIMIS portal, several training sessions/workshops for CPIOs and FAAs of the Ministry as well as Oil & Gas PSUs have been conducted, in coordination with DoP&T.

15.3 PUBLIC GRIEVANCES

In accordance with guidelines of the Cabinet Secretariat, the Public Grievance Cell has been functioning in the Ministry of Petroleum & Natural Gas(MoPNG). The Cell has been attending to the grievances of members of the public against the Public Sector Oil Companies and other organizations under the administrative control of this Ministry.

All possible efforts are being made to ensure the regular monitoring of the public grievances received through Department of Public Grievances (DPG), Department of Administrative Reforms and Public Grievances (DARPG) and other Departments of the Government as well as the members of the public.

An online system called "Centralized Public Grievance Redress and Monitoring System (CPGRAMS)" has been introduced in the month of June, 2008. With the aid of CPGRAMS, public grievances from the public and others are received speedily, analysed according to its subject and forwarded to the concerned for faster resolution.

In addition, a systematic mechanism in MoPNG has also been evolved so as to ensure speedy and expeditious redressal of the public grievances. The review of pendency of PGs in the MoPNG & Oil & Gas PSUs is undertaken regularly by Senior Officers

During the year 2016-17, out of total no. of 14048 PGs received, 91.6% stands disposed off as on 31st December, 2016.

15.4 Discontinuation of interview at junior level posts in the Government of India

The Hon'ble Prime Minister in his Address to the Nation on the Independence Day announced that the Government should discontinue holding interviews for recruitment for such junior level posts where personality assessment is not an absolutely necessary requirement. Ending the interview process would make the selection of candidates more transparent, objective and would ultimately help in arresting corruption in filling up of the posts. Accordingly, the Ministry requested all the Oil & Gas PSUs to identify designation-wise posts, recruitment for which would be done without interviews. All Oil & Gas PSUs have been instructed to do away with interviews for Non-Gazetted group 'B' 'C' and 'D' including the posts that have already been advertised or those to be advertised in future. For any kind of exemption needed for doing

Natural Gas Awareness Campaign at Haridwar by MoS (I/C), MoPNG

away with the interview, they were to make a presentation before the Ministry justifying the same. However, no such request for exemption from not holding interview from any PSU has been received so far.

15.5 Steps taken to avoid discrimination against part time / distance education degrees

A PMO reference regarding discrimination against part-time/distance education degree by PSUs was received. After due examination & approval a decision has been taken to instruct all Oil & Gas PSUs to consider part time / correspondence course on an equal footing to that of regular courses. Accordingly, all Oil & Gas PSUs have been requested to make necessary changes in the recruitment rules /policies to avoid discrimination against part-time /distance education degrees with the approval of Board / Competent Authority.

15. 6 Skill Development

Skill India initiative was launched by Prime Minister of India on 15th July, 2015. The Mission has been developed to create convergence across sectors and states in terms of skill training activities. Considering the highly fragmented nature of the work segment in Oil and Gas sector, the most important issue related to training in the sector is inadequate penetration of quality training initiatives. Also, based on the changes in technology and processes of the industry as well as demographics of the potential workforce, there is a need for employers to continuously fine-tune their strategy with regard to hiring, training and retention of their human resources.

In view of the above, the fast paced growth of the sector, and to equip the workforce with standardized skills, the formation of a Sector Skill Council is considered essential to

facilitate rapid growth in the sector. Therefore, Hydrocarbon Sector Skill Council (HSSC) has been set up under Societies Registration Act, 1860 on 26.04.2016 which has a projected training plan for certification based skill development programmes.

An MoU for collaboration in the area of skill development was signed between Ministry of Petroleum and Natural Gas and Ministry of Skill Development and Entrepreneurship on 28th November, 2016. This MOU establishes a broad framework of collaboration between both the Parties, for providing the appropriate skill development framework for supply of skilled manpower through vocational and technical training, skill up-gradation, building of new skills, mapping of existing skills and their certification based on the principle that there is sufficient scope for cooperation and leveraging comparative advantage.

Under the Skill Development Initiative of the Government of India, Oil and Gas PSUs under MoPNG have set up 4 Skill Development Institutes (SDIs) in the country:

1. IOCL has set up a Skill Development Institute (SDI) at Bhubaneswar, Odisha and was inaugurated by Hon ble MOS (I/C), PNG, Shri. Dharmendra Pradhan on 09th May, 2016. In the first instance, it will impart training in electrical and welding trades.
2. HPCL has set up a Skill Development Institute (SDI) at Vishakhapatnam, which was inaugurated by MoS (I/C), P&NG on 20th October, 2016. At present, it is running skill development courses in 10 trades with 900-1000 candidates estimated to be trained per year.
3. GAIL is operating a temporary campus at Nagaram, Andhra Pradesh since February 2015. SDI GAIL runs courses of 3 months each on Auto CADD and Web designing. 257 students in Auto CADD and 24 students in web designing were trained. The certification was done by NSDC and ILFS.
4. BPCL has started an SDI at Kochi.
5. ONGC, OIL and GAIL are in the process of setting up of SDIs at Ahmedabad, Guwahati and Rae Bareli respectively.

15.7 Start-Up

'Start - Up India' initiative was launched by the Prime Minister of India on January 16, 2016. The initiative aims at fostering entrepreneurship and promoting innovation by creating an ecosystem that is conducive for growth of Start-ups. Against the above background it was decided that the PSUs under the Ministry of Petroleum and Natural Gas would facilitate/ create an innovation ecosystem and promote Start-Ups in their respective fields and PSUs were directed to prepare start-up action plan for the next three years.

PSUs under MoP&NG have set up a Start Up fund of Rs. 230 Crore.

- IOCL, OIL and ONGC have launched Start Up web portal/web-site for effective administration of Start UP activities.
- OIL had signed an MOU with IIT, Guwahati during PETROTECH 2016. The MOU would enable OIL to utilise the expertise of IIT Guwahati for incubation and development of applications/ products for enhancing the operational capabilities of OIL.
- ONGC has signed an MoU with IIT Mumbai for supporting ONGC's Start up initiative during PETROTECH 2016. The MoU intends to prepare a roadmap for ONGC's Start Up initiative which will work on problems related to the energy sector and for enhancing the operational capabilities of ONGC.

A workshop for creating an innovation ecosystem for Start-Ups was held on 28th November, 2016. The workshop was inaugurated by Shri Dharmendra Pradhan, MoS(I/C), MoPNG. Shri Amitabh Kant, CEO, NITI Aayog delivered the key note address. The workshop was attended by the CEO's of Oil and Gas PSU's, academia, investors, incubation experts and Start-Ups. The aim was to put all stakeholders on the same platform to understand the requiremerits for proliferation of a Start-Up ecosystem.

15.8 Make In India

The "Make in India" initiative was launched by the Prime Minister on 25th September, 2014 as a major new national programme designed to facilitate investment, foster innovation, enhance skill development, protect intellectual property and build best-in-class manufacturing infrastructure in India.

Upstream, Midstream and Downstream companies of Oil and Gas sector have formed Indigenous Development Group (INDEG) to promote indigenisation and are working towards import substitution. Oil and Gas PSUs have also signed MoUs with Global Players with the aim of enhancing production and progressive import substitution.

Oil and Gas PSUs are following the guidelines on relaxation for turnover and prior experience with respect to Start-Ups & MSMEs which meet quality and technical specifications.

15.9 DOPT, being nodal agency of Govt. of India for matter related to training of Civil Servants, has formulated National Training Policy, 2012 for the development of the Human Resources of the Govt. The Ministry of Petroleum & Natural Gas being a cadre unit of DOPT, in its annual action plan, has planned and started training programmes for officers and officials of this Ministry on various topic like Manual of Offfice Procedures (MOP), gender sensitization, RTI Act 2005, movement of classified documents, noting drafting, record management, preventive vigilance, file management, financial management, ethics and values etc.

Chapter

16

Appendix

Appendix-I

Ministry of Petroleum & Natural Gas
(Petroleum Aur Prakritik Gas Mantralaya)

1. Exploration for, and exploitation of petroleum resources, including natural gas and Coal Bed Methane, gas hydrates and shale gas.
2. Production, supply, distribution, marketing and pricing of petroleum, including natural gas, Coal Bed Methane and petroleum products.
3. Oil refineries, including Lube Plants.
4. Additives for petroleum and petroleum products.
5. Lube Blending and greases.
6. Blending and Blending prescription for bio-fuels including laying down the standards for such blending.
7. Marketing, distribution and retailing of bio-fuels and its blended products.
8. Conservation of Petroleum products.
9. Planning, development, control and assistance to all industries dealt with by the Ministry.
10. Strengthening energy security by acquiring oil and gas equity abroad and participation in transnational oil and gas pipeline projects.
11. Creation and administration of strategic petroleum reserve through Indian Strategic Petroleum Reserves Limited (ISPRL).
12 Petroleum Planning and Analysis Cell (PPAC).
13. All attached or subordinate offices or other organizations concerned with any of the subjects specified in the list, including Directorate General of Hydrocarbons (DGH), Centre for High Technology (CHT), Oil Industry Development Board (OIDB), Petroleum Conservation Research Association (PCRA), etc.
14. Planning, development and regulation.of oilfield services.
15. Administration of Engineers India Limited, including their subsidiaries and joint ventures.
16. Public sector projects falling under the subject included in this list except such projects which are specifically allotted to any other Ministry/ Department.
17. The Oil Fields (Regulation and Development) Act, 1948 (53 of 1948).
18. The Oil and Natural Gas Commission (Transfer of undertaking and Repeal) Act, 1993 (65 of 1993).
19. The Petroleum & Minerals Pipelines (Acquisition of right of User in Land) Act, 1962 (50 of 1962).
20. The ESSSO (Acquisition of Undertakings in India) Act, 1974 (4 of 1974).
21. The Oil Industry (Development) Act, 1974 (47 of 1974).
22. The Burrnah-Shell (Acquisition of Undertaking in India) Act., 1976 (2 of 1976).
23 The Caltex (Acquisition of Shares of Caltex Oil Refining (India) Limited and of the Undertakings in India of Caltex (India) Limited Act, 1977.
24. Administration of the Petroleum Act, 1934 (30 of 1934) and the rules made thereunder.
25. Administration of Balmer Lawrie Investment Limited and Balmer Lawrie and Company Limited.
26. Petroleum & Natural Gas Regulatory Act, 2006.
27. Matter pertaining to M/s Biecco Lawrie Limited.
28. Matter pertaining to Gas Authority of India Limited (GAIL).
29. Matter pertaining to natural gas pipelines.
30. Matter pertaining to LNG terminals.
31. The Rajiv Gandhi Institute of Petroleum Technology Act, 2007.
32. Matter pertaining to Indian Institute of Petroleum & Energy (IIPE).
33. Liquefied Petroleum Gas (Regulation of Supply and Distribution) Order, 2000.
34. Matter pertaining to Direct Benefit Transfer of LPG (DBTL) PAHAL.
35. Matter pertaining to Direct Benefit Transfer in Kerosene (DBTK).
36. Matter pertaining to Pradhan Mantri Ujjwala Yojana (PMUY).

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 31.03.2016

1.	Oil & Natural Gas Corporation Limited	68.93%
2.	Indian Oil Corporation Limited	58.57%
3.	Hindustan Petroleum Corporation Limited	51.11%
4.	Bharat Petroleum Corporation Limited	54.93%
5.	GAIL (India) Limited	56.11%
6.	Engineers India Limited	59.37%
7.	Oil India Limited	67.64%
8.	Biecco Lawrie & Co Limited	99.56%*
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 IOCL
5.	Numaligarh Refineries Limited	- Subsidiary of BPCL
6.	Certification Engineers International Limited	- wholly owned by EIL
7.	EIL Asia Pacific Sdn BHD	- wholly owned by EIL
8.	GAIL Gas Limited	- wholly owned by GAIL

III Other Organisations

1. Oil Industry Development Board
2. Petroleum 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

State/Region	2011-12	2012-13	2013-14	2014-15	2015-16 (P)	2016-17 (Apr-Nov) (P)	2016-17*
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
I. Production of Crude oil (TMT)							
(a) Crude Oil-Onshore:							
Gujarat	5779	5331	5061	4653	4431	3061	4621
Assam	5024	4863	4710	4466	4186	2779	4465
Arunachal Pradesh	118	121	111	76	43	37	59
Tamil Nadu	247	238	226	240	255	177	300
Andhra Pradesh	305	295	297	254	295	179	282
Rajasthan	6543	8583	9131	8783	8493	5437	8439
Total (a)	**18016**	**19431**	**19536**	**18472**	**17703**	**11670**	**18166**
of which							
OIL	3847	3661	3466	3412	3226	2141	3480
ONGC	7386	6944	6705	6069	5817	3934	5941
PSC Regime	6784	8826	9365	8991	8660	5586	8745
(b) Crude Oil-Offshore:							
ONGC	14378	13541	13735	14758	15264	9889	15401
PSC Regime	3540	2689	2595	2661	2533	1430	2094
Total (b)	**17918**	**16230**	**16330**	**17419**	**17797**	**11320**	**17495**
(c) Condensate							
ONGC	1952	2076	1806	1437	1279	901	1424
PSC Regime	203	125	117	133	163	99	-
Total (c)	**2156**	**2201**	**1923**	**1570**	**1442**	**1000**	**1424**
Grand Total (a+b+c)	**38090**	**37862**	**37788**	**37461**	**36942**	**23990**	**37085**
II. Production of Natural Gas (MMSCM)							
(a) Natural Gas-Onshore:							
Gujarat	2173	2032	1657	1527	1490	1012	1513
Assam	2905	2910	2868	2958	3025	2089	3189
Arunachal Pradesh	40	41	41	34	30	18	22
Tripura	644	647	822	1140	1332	938	1464
Tamil Nadu	1285	1206	1304	1192	1011	637	1116
Andhra Pradesh	1364	1249	1171	541	619	558	800
Rajasthan	590	685	982	1178	1338	878	1339
West Bengal (CBM)	79	101	156	224	389	362	777
Madhya Pradesh (CBM)	2	3	6	2	1	3	472
Jharkhand (CBM)	4	3	3	2	2	2	3
Total (a)	**9084**	**8877**	**9012**	**8797**	**9237**	**6497**	**10696**
of which							
OIL	2633	2639	2626	2722	2838	1960	2950
ONGC	5751	5447	5316	4752	4770	3371	5242
PSC Regime	699	791	1069	1323	1629	1161	2504
(b) Offshore:							
ONGC	17565	18102	17968	17272	16406	11122	17501
PSC Regime	20910	13700	8428	7589	6605	3529	5922
Total (b)	**38475**	**31802**	**26395**	**24861**	**23012**	**14652**	**23423**
Grand Total (a+b)	**47559**	**40679**	**35407**	**33657**	**32249**	**21149**	**34119**

*P: Provisional *: Target CBM: Coal Bed Methane*

Source: ONGC, OIL & DGH

Appendix-IV

Installed Capacity and Refinery Crude Throughput

(in TMT)

Refinery / Location	Installed Capacity	Refinery Crude Throughput						
	01.04.2016	2011-12	2012-13	2013-14	2014-15	2015-16 (P)	2016-17 (Apr-Nov) (P)	2016-17*
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(a) PUBLIC SECTOR	**135066**	**120895**	**120303**	**119547**	**121183**	**127087**	**90658**	**135565**
IOCL, Guwahati, Assam	1000	1058	956	1019	1006	904	581	990
IOCL, Barauni, Bihar	6000	5730	6344	6478	5944	6545	4348	6200
IOCL, Koyali, Gujarat	**13700**	**14253**	**13155**	**12960**	**13285**	**13820**	**9594**	**13350**
IOCL, Haldia, West Bengal	7500	8072	7490	7952	7650	7776	5265	7800
IOCL, Mathura, Uttar Pradesh	8000	8202	8561	6641	8515	8860	6131	8570
IOCL, Digboi, Assam	**650**	**622**	**660**	**651**	**591**	**562**	**348**	**640**
IOCL, Panipat, Haryana	15000	15496	15126	15098	14191	15282	10337	15200
IOCL, Bongaigaon, Assam	2350	2188	2356	2328	2403	2442	1661	2350
IOCL, Paradip, Odisha	**15000**	**-**	**-**	**-**	**-**	**1817**	**4157**	**10000**
Total IOC	69200	55621	54649	53126	53586	58007	42422	65100
BPCL, Mumbai, Maharashtra	12000	13355	13077	12684	12821	13371	9534	13160
BPCL, Kochi, Kerala	**9500**	**9472**	**10105**	**10285**	**10356**	**10712**	**7497**	**12090**
Total BPCL	21500	22828	23183	22969	23177	24083	17031	25250
HPCL, Mumbai, Maharashtra	6500	7506	7748	7785	7408	8013	5555	7800
HPCL, Visakh, Andhra Pradesh	8300	8682	8028	7776	8770	9220	6021	9000
Total HPCL	**14800**	**16189**	**15777**	**15561**	**16179**	**17234**	**11576**	**16800**
CPCL, Manali, Tamil Nadu	10500	9953	9105	10065	10251	9100	7059	9650
CPCL, Narimanam, Tamil Nadu	1000	611	640	559	531	544	360	600
Total CPCL	11500	10565	9745	10624	10782	9644	7419	10250
NRL, Numaligarh, Assam	3000	2825	2478	2613	2777	2520	1704	2670
ONGC, Tatipaka, Andhra Pradesh	66	69	57	65	51	67	56	45
MRPL, Mangalore, Karnataka	15000	12798	14415	14589	14632	15532	10451	15450
(b) PRIVATE SECTOR	**80000**	**81179**	**88273**	**88229**	**88533**	**88662**	**60660**	**89853**
RIL, Jamnagar, Gujarat	33000	32497	32613	30307	30867	32428	21977	32428
RIL, SEZ-Jamnagar, Gujarat	27000	35186	35892	37720	37174	37133	24670	37133
ESSAR Oil Ltd. Vadinar	20000	13496	19769	20202	20491	19101	14013	20292
(c) JOINT VENTURE	**15000**	**2048**	**10636**	**14721**	**13526**	**17116**	**11126**	**15000**
BORL, Bina, M.P.	6000	2048	5732	5450	6209	6402	4054	6000
HMEL, GGS, Bathinda, Punjab	9000	-	4904	9271	7318	10713	7072	9000
Total (a+b+c)	**230066**	**204121**	**219212**	**222497**	**223242**	**232865**	**162445**	**240418**

Note: Crude throughput in terms of Crude oil processed *P: Provisional* **: Target*

Source: Oil Companies

Appendix-V

Production of Petroleum Products

(in TMT)

Products	2011-12	2012-13	2013-14	2014-15	2015-16 (P)	2016-17 (Apr-Nov) (P)	2016-17*
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
LPG	9547	9825	10030	9840	10568	7282	10372
Motor Spirit	27186	30118	30275	32325	35321	24073	36591
Naphtha	18825	19018	18505	17391	17861	13283	19003
Kerosene	7861	7971	7418	7559	7504	4257	7232
ATF	10065	10088	11220	11103	11789	9061	12711
HSD	82880	91103	93759	94428	98588	67808	103182
LDO	502	400	423	358	429	337	374
Total Fuel Oils	18433	15054	13405	11919	9727	7097	8951
of which							
a) Furnace Oil	16732	13690	12920	11248	9468	6912	8577
b) LSHS/HHS/RFO	1701	1364	485	671	259	186	374
Lube Oils	1028	896	941	946	1037	702	914
Bitumen	4610	4670	4785	4632	5157	3261	5022
Petroleum Coke	7837	10943	12068	12448	13322	9159	12954
Others	14429	17650	17927	18188	20622	14313	20770
Total Production of Petroleum Products	**203202**	**217736**	**220756**	**221136**	**231924**	**160634**	**238075**
of which							
Refineries	**198561**	**213219**	**216456**	**217141**	**227908**	**157857**	**233997**
Fractionators	**4640**	**4518**	**4300**	**3994**	**4016**	**2776**	**4078**

P: Provisional **: Target*

Source : Oil Companies

Appendix-VI

Consumption of Petroleum Products

(in TMT)

Products	2011-12	2012-13	2013-14	2014-15	2015-16 (P)	2016-17 (Apr-Nov) (P)
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
LPG	15350	15601	16294	18000	19623	13959
Motor Spirit	14992	15744	17128	19075	21847	15993
Naphtha	11222	12289	11305	11082	13271	9036
SKO	8229	7502	7165	7087	6826	3845
ATF	5536	5271	5505	5723	6262	4540
HSDO	64750	69080	68364	69416	74647	50684
LDO	415	399	386	365	407	304
Fuel Oil (FO+LSHS)	9307	7656	6236	5961	6632	4907
Lubes/Greases	2633	3196	3305	3310	3571	2238
Bitumen	4638	4676	5007	5073	5938	3559
Petroleum Coke	6138	10135	11756	14557	19297	16434
Others	4924	5509	5956	5870	6352	4504
Total Consumption	**148132**	**157057**	**158407**	**165520**	**184674**	**130002**

Notes: *Consumption includes sales by oil companies, own consumption & direct private imports.*

P: Provisional

Source: PPAC

Appendix-VII

Imports/Exports of Crude Oil and Petroleum Products

(Figures of Qty in TMT & Value in ₹ Crore)

ITEM	2011-12		2012-13		2013-14		2014-15		2015-16 (P)		2016-17 (Apr-Nov) (P)		2016-17*	
	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	**171729**	**672220**	**184795**	**784652**	**189238**	**864875**	**189435**	**687416**	**202850**	**416579**	**143813**	**296431**	**215720**	**444647**
Product														
LPG	5790	27019	6301	31674	6567	37213	8313	36571	8959	25778	6795	17098	10192	25647
MS	654	3311	147	891	235	1481	372	2301	1012	4207	476	1618	714	2427
Naphtha	2091	9827	1762	9272	1020	6044	1034	4592	2931	9581	1892	5321	2837	7982
ATF	0	0	0	0	0	0	140	172	286	889	232	685	347	1027
SKO	564	2710	0	0	0	0	30		41	158	0	0	0	0
HSD	1059	5039	528	2771	77	452	124	670	177	605	735	1987	1103	2981
LOBS/ Lube oil	1434	8314	1977	11339	2090	12985	2148	12702	2264	9478	1393	5653	2089	8480
Fuel Oil	1203	4392	1038	4218	1331	5759	902	3659	1170	2380	649	998	974	1496
Bitumen	78	197	102	272	246	801	517	1623	879	1832	571	990	856	1485
Others ^	2977	7282	4501	8415	5130	11162	7722	12356	11735	10454	11894	8695	17841	13043
Total Product Import	15849	68091	16354	68852	16697	75896	21301	74644	29456	65361	24637	43045	36955	64568
Total Import	**187578**	**740311**	**201149**	**853504**	**205935**	**940771**	**210736**	**762060**	**232306**	**481940**	**168450**	**339477**	**252675**	**509215**
Exports														
LPG	174	947	200	1294	227	1589	254	1455	195	785	202	683	303	1024
Petrol	14524	73982	16657	95346	15247	92977	16048	81971	16817	59575	10487	34388	15731	51582
Naphtha	10139	45620	8647	43533	8322	46059	7008	31619	7116	20057	5587	14734	8381	22101
Aviation Turbine Fuel	4561	21857	4664	25223	5745	33246	5520	25413	5686	16007	4798	14006	7197	21008
Kerosene	34	191	23	140	15	98	15	81	10	35	10	34	15	51
Diesel	20407	104572	22464	115554	26469	148138	25559	115149	24037	66492	18895	52840	28343	79261
LDO	84	331	9	42	30	135	6	28	0	0	20	52	30	79
Lubes	27	181	59	381	20	138	11	100	17	127	10	70	15	105
Fuel Oil	7895	25576	5922	20415	6159	22407	4762	14251	2806	4471	1780	2951	2670	4426
Bitumen	5	27	87	281	95	321	94	245	101	176	34	27	51	40
Others $	2988	11361	4675	17880	5535	23169	4653	18267	3753	9054	1919	4779	2878	7169
Total Export	**60837**	**284644**	**63408**	**320090**	**67864**	**368279**	**63932**	**288580**	**60539**	**176780**	**43742**	**124564**	**65613**	**186846**
Net Import	**126741**	**455667**	**137742**	**533415**	**138071**	**572492**	**146804**	**473481**	**171768**	**305160**	**124708**	**214913**	**187063**	**322369**
Net Product Export	**44988**	**216553**	**47054**	**251238**	**51167**	**292383**	**42631**	**213936**	**31083**	**111419**	**19105**	**81518**	**28657**	**122278**

*P: Provisional *: Estimated (Prorated based on April- November 2016 figures)*

^: Others in import include Paraffin wax, Petroleum Jelly, LSWR, Aviation Gas, Pet coke, CBFS, etc.

$: Others in export include CBFS, VGO,Petcoke,Hexane,Benzene,MTO,Sulphur, etc

Source: PPAC

Appendix-VIII

Plan Outlay & Actual Expenditure

(in ₹ Crore)

CPSE	2013-14	2014-15	2015-16	2016-17	
	Actual	Actual	Actual	BE	Actual (Apr-Dec.16) *
(1)	(2)	(3)	(4)	(5)	(6)
A. Plan Outlay of Oil & Gas CPSEs					
OVL	35357.00	7171.55	6470.24	14843.00	16518.89
ONGC	32469.54	29997.46	30110.43	29307.20	18977.60
OIL	9350.97	3773.76	3622.65	4019.71	9282.57
GAIL	4069.78	1632.18	1511.00	1637.03	946.01
IOCL	16660.61	14313.68	11484.74	13772.87	14246.30
HPCL	2641.87	2669.61	1427.86	1974.26	532.85
BPCL	4373.58	6874.75	8287.00	10597.00	9590.16
MRPL	1448.74	2747.36	1502.03	169.35	70.05
CPCL	228.60	465.90	1272.02	1073.00	727.80
NRL	372.14	102.77	70.27	157.00	119.88
BALMER LAWRIE	119.55	79.79	45.37	50.00	26.66
Total (P & NG Sector)	**107092.38**	**69828.81**	**65803.61**	**77600.42**	**71038.77**
B. Gross Budgetary Support (GBS) of MoPNG					
1. Scheme for LPG connection to Poor Households- PMUY (Ujjwala)	0.00	0.00	0.00	2000.00	1436.03
2. LPG connection to BPL Families**	0.00	0.00	0.00	-	-
3. Rajeev Gandhi Institute of Petroleum Technology (RGIPT)	0.00	0.00	48.00	47.00	47.00
4. Payment to Indian Strategic Petroleum Reserve Ltd. (ISPRL) for strategic Crude Oil Reserve ***	0.00	0.00	1153.00	1.00	1000.00
5. ISPRL Phase-II (Construction of Caverns)	0.00	0.00	0.00	1.00	0.00
6. Setting up Petroleum University in Andhra Pradesh (Indian Instt. of Petroleum Energy)	0.00	0.00	0.00	1.00	0.00
Total GBS ** **	**0.00**	**0.00**	**1201.00**	**2050.00**	**2483.03**
Total- M/o P&NG (A+ B)	**107092.38**	**69828.81**	**67004.61**	**79650.42**	**73521.80**

* = *Provisional*

** = *It has since been decided (at RE stage in 2013-14) that the scheme on LPG Connections to BPL Families would not be taken from the GBS and funds would be provided from CSR funds of CPSEs in the P&NG Sector.*

*** = *Against BE of Rs. 1 Crore in 2016-17 for Payment to ISPRL for strategic Crude Oil Reserve, Rs. 1000 Crore has been allocated and released in the 1st Supplementary.*

**** = *In addition, Cabinet Committee of Economic Affairs approved Rs.450 Crore as VGF during 2016-17 for JHBDPL project of GAIL*

Appendix-IX

The Profit Before Tax (PBT) and the Profit After Tax (PAT) earned by Public Sector undertakings in the Oil Sector during 2015-16 was Rs. 65532.93 Crore and Rs. 43777.98 Crore respectively. Similarly, the PBT and PAT for 2016-17 is expected to be about Rs. 78109.81 Crore and Rs. 51901.20 Crore respectively. Oil PSU-wise details are as given below:

(in ₹ Crore)

Sl.No.	Namea of PSUs	Profit Before Tax (PBT		Profit After Tax (PAT)		% of GoI holdings as on 31.03-16
		2015-16 Actual	2016-17 (Expected)	2015-16 (Actual)	2016-17 (Expected)	
1.	ONGC	23,390	24,167	16,004	16,535	68.93%
2.	OVL	(1,175.35)	6.48	(2,093.55)	(423.34)	NIL
3	IOCL	15,839.50	22,900.00*	10,399.03	14,974.77**	58.57%***
4.	GAIL	3173	4817	2299	3247	56.11%
5.	HPCL	5738	6882	3862	4500*	51.11%
6.	OIL	3463.44	3248	2330.11	2082	67.64%
7.	BPCL	10,651	8,709	7,432	6,123	54.93
8.	MRPL	1,173.51	3,233.60	1,148.16	2,114.52	Nil*
9.	CPCL	787.45	930.00	770.68	660.30	Nil*
10.	NRL	1,882.86	2630.36	1,222.34	1712.18	Nil #
11.	EIL	392	355	258	232	59.37%
12.	BALMER LAWRIE	234.54	240.00	163.20	152.40	(*)
13.	BieccoLawrie	-17.02	-8.63	-16.99	-8.63	99.56*
	Total :	**65532.93**	**78109.81**	**43777.98**	**51901.20**	

IOCL

**Expected PBT for FY 2016-1 is based on the estimates considered for the purpose of payment 3rd instalment of advance tax on 15.12.2016. Since the profitability is largely dependent on crude/product prices and USD/INR exchange rates, the figures are highly provisional and may undergo change due to fluctuations in above-mentioned factors.*

***Expected PAT for FY 2016-17 has been calculated by applying maximum marginal rate of income tax on expected PBT for FY 2016-17.*

****GOI disinvested 0.29% of its holding in the month of June 2016. Therefore, at present the shareholding of GOI is 58.28% only.*

HPCL

**Figures for 2016-17 are approximate as actuals are available only upto 30-09-2016.*

MRPL

**A subsidiary of Oil and Natural Gas Corporation Limited.*

CPCL

**CPCL is a subsidiary of Indian Oil Corporation Ltd. (GOI Transferred its entire shareholding of 7,72,65,200 Equity shares of Rs.10-each(51.89%) in favour of IOC effective 29-03-2001) and Govt. of India share holding is Nil.*

NRL

 # GOI is not holding any shares in NRL directly. The company is a subsidiary of Bharat Petroleum Corporation Ltd. (BPCL), which holds 61.65% equity. The other shareholders are Oil India Ltd.(26.00%) and Government of Assam (12.35%).

BieccoLawrie

**This includes 67.33% share of Oil Industry Development Board (OIDB).*

Appendix-X

Chapter I of Compliance report of Vol II

Para no.	Title of paragraph	Summary
1.1	Extension of credit facility to a defaulter company without security	BPCL had been supplying fuel oil to KPCPL since June 2000. The fuel supply agreement did not have adequate safeguards to protect the financial interests of BPCL. BPCL did not ensure suitable security against credit sales to KPCPL, though the company defaulted on payment. This resulted in non-recovery of sales revenue amounting to ₹ 23.50 Crore.
1.2	Safety Preparedness of Oil and Gas Transmission Pipelines	Safety preparedness of IOCL & GAIL in respect of transmission pipelines was found inadequate in view of the following: • There were instances of non-compliance with OISD safety standards and PNGRB regulations; • Non-compliance with recommendations of ESA and MB Lal Committee was observed; • There was lack of effective action on the part of management to evict RoU encroachments thereby posing threat to safety of pipeline operations • Inadequate maintenance activities coupled with non-formulation of/ deviation from SOPs led to ineffective handling of several incidents. As a result, the companies failed to protect pipeline network from accidents/ incidents leading to loss of lives, property and environment indicating inadequate safety preparedness. Further, in the scenario of global importance of HSE policy, there was no single nodal agency to ensure the requisite safety preparedness on the companies.
1.3	Petrochemical Production and Project Management	UPPC, GAIL • Mismatch between upstream and downstream production capacity in UPPC led to operation of downstream units at lesser load with resultant loss of opportunity for production. • Due to not maintaining grade-wise cost of polymer, margin from sale of different grades at different price levels is not estimated. • Delay in materializing capacity expansion of Pata- II due to failure on the part of EPCM consultant and contractors deprived GAIL the benefit from production of one lakh MT polymers during 2014-15.
		PNCP, IOCL • Creation of power and steam generation capacity in excess of actual requirement led to under-utilisation of these utilities. • Recycling of C4H as feedstock in NCU instead of blending with LPG resulted in forgoing the price advantage available from sale of LPG. • Non achievement of design standards in respect of consumption of feedstock, chemicals and steam led to excess consumption and resultant increase in cost of production.
		• Due to not maintaining grade-wise cost of polymers, margin from sale of different grades at different price levels is not estimated. • Due to delay in pre-implementation and planning stage of butene-1 project, production was delayed depriving IOCL the cost benefit advantage through import substitution.

Para no.	Title of paragraph	Summary
1.4	Avoidable expenditure on Diesel Hydro Treater Project in Mumbai Refinery	HPCL initiated the Diesel Hydro Treater (DHT) project in 2007 for meeting the statutory quality specifications of diesel at a cost of ₹ 1969.59 Crore ignoring the existing DHDS plant, which was capable of producing similar quality of diesel since 2005 and could be upgraded to meet the statutory requirements. Subsequently, the DHDS project was taken up for upgradation (2009) to enhance its capacity and improve quality of its output. The revamped DHDS was capable of meeting the entire ULSD/Euro IV requirement of Mumbai Refinery of HPCL. This resulted in avoidable expenditure of ₹ 1969.59 Crore as well as creation of excess capacity towards production of diesel.
1.5	Irregular payment of PerformanceRelated Pay	Indian Oil Corporation Limited made an irregular payment of ₹ 110.40 Crore for the years 2012-13 and 2013-14 towards 'Performance Related Pay' due to non-adherence to the DPE guidelines.
1.6	Undue benefit extended to the executives in the form of shift allowance	Indian Oil Corporation Limited extended undue benefit to the executives by paying shift allowance amounting to ₹ 56.27 Crore in violation of DPE guidelines
1.7	Delay in appraisal and non-monetization of the discoveries in KG DWN 98/2 block	The KG-DWN-98/2 block was awarded by the GoI under first round of NELP in 2000. The Company acquired ninety per cent stake in 2005 and balance in 2012. The Company availed several extensions under various PSC provisions, policies of the Government, and concessions allowed, to explore and appraise its discoveries at a cost of ₹8402.56 Crore (March 2015). Till date(August 2015) Company hasnotified total 11 discoveries in the block (10 in NDA and 1in SDA). The Company had submitted (December 2013) DOC to develop 10 discoveries in 3 clusters (Clusters I and II in NDA and Cluster III in SDA). However, the Management Committee reviewed (September 2014) the DOC for Cluster II alone and did not review Cluster I and III as the recoverable reserves could not be estimated and production profile could not be generated in the absence of surface flow data/DST data for these discoveries. The Feasibility Development Plan for monetization of discoveries in Cluster II is yet to be approved by the DGH/MoPNG. The monetization of Cluster III (SDA) is not planned by the Company since there is no suitable technology available to develop the discoveries in such deepwater areas. The integrated development of discoveries of Cluster I and nomination block of PML Godavari had also suffered a major setback in view of the expert confirmation regarding substantial migration of reserves from this area and their exploitation by RIL through its KG-DWN-98/3 block.Besides, the Company had considered a gas price of US$ 7 per mmbtu (with a payback period of 5.89 years) while considering the viability of in December 2013. Under the New Domestic Gas Pricing Guidelines (March 2015 and September 2015), the gas price was fixed at US$ 4.66 per mmbtu between April 2015 to September 2015 @ US$ 3.82 per mmbtu between October 2015 to March 2016, which would further adversely affect the financial viability of integrated development of Cluster 1 and Godavari PML area.
		The matter was reported to the Ministry (September 2015); their reply was awaited (March 2016).

Para no.	Title of paragraph	Summary
1.8	Non achievement of objective of acquiring Coal Bed Methaneblocks	Land acquisition was critical for commencement of exploration activities in Coal Bed Methane (CBM) blocks acquired by Oil and Natural Gas Corporation Limited (ONGC). There appeared to be lack of mechanism at pre bid stage between the Ministry of Petroleum and Natural Gas, the Ministry of Coal and the State Governments to facilitate acquisition of land and statutory clearances for exploration activities in CBM blocks identified for bidding. Besides, delayed action by ONGC for acquiring land after the blocks were awarded to it and delay in completing the committed minimum work programme further affected Exploration Phase of the blocks. As a result, ONGC had to seek repeated extensions, due to which not only the Company had to pay liquidated damages of ₹ 6.81 Crore to the Government of India, but Development Phase of five years of each of the four blocks in hand was also reduced drastically. Failure to obtain Mining Leases and Environmental Clearances from the respective agencies in time due to delayed action on the part of ONGC led to a situation where commencement of development operations to put any of the blocks into production in near future appeared unlikely. This rendered the objective of acquiring CBM blocks unachievable and an aggregate expenditure of ₹ 1,217.86 Crore from February 2003 to March 2015 incurred in exploration of CBM blocks unfruitful as of August 2015.
1.9	Loss of returns to ONGC due to adoption of financing mechanism to maintain the status of ONGC Petro additions Limited (OPaL) as a non-public sector undertaking	ONGC made advances against equity to OPaL during April 2007 to May 2013. OPaL delayed the conversion of the advances into equity shares. OPaL also offered rights issue (March 2015) to ONGC. However, subsequently it did not issue the shares with the intention of avoiding the status of the Company as CPSU. ONGC again paid (June 2015) money towards instalment against convertible warrants which is yet to be issued. Thus, ONGC made available interest free funds to OPaL without any commensurate benefit. This resulted in loss of interest of ₹ 408.15 Crore to ONGC. The financing mechanism employed by ONGC had the sole intent of retaining the character of OPaL as a non PSU entity.
1.10	Loss of interest due to inordinate delay in receipt of share of gas transportation charges	Due to dispute between the seller Panna Mukta Tapti Joint Venture (PMTJV) and buyer GAIL (India) Ltd. (GAIL) on delivery point, Oil & Natural Gas Corporation (ONGC) (transporter) did not get its legitimate claim towards gas transportation charges. ONGC allowed release of the withheld funds to private partners Reliance Industries Ltd. (RIL) and BG Exploration and Production India Limited (BGEPIL), without realising its dues, which led to inordinate deferment of its dues (US$ 21.54 million) and consequent loss of interest thereon (US$ 24.93 million) from 1998-2005. The full realisability is also doubtful due to acceptance of conditional comfort letter from the private partners.

Para no.	Title of paragraph	Summary
1.11	Improper decision of procuring intelligent well completion equipment led to idling of equipment	The Company planned implementation of Intelligent Well Completion (IWC) technology in eighteen wells in Mumbai Offshore. The finalisation of tender was delayed. By the time the contract was placed, the majority of the intended wells were already completed. The other wells where IWC technology was to be employed were not suitable. This led to improper use of two IWC sets and idling of 12 IWC sets for nearly four years. Placing the procurement contract without proper assessment of the actual requirement was an imprudent commercial decision. The value of the idling equipment was ₹ 46.24 Crore.
1.12	Non–synchronization of construction of downstream units and other utilities with the Cracker Plant led to avoidable expenditure on Preservation and plant check of Cracker Plant	OPaL's failure to freeze the configurations of downstream units with cracker plant and to synchronize the award and completion of all the packages resulted in avoidable expenditure of ₹ 13.19 Crore towards preservation charges and payment of ₹ 73.36 Crore towards plant check of Cracker plant.

Report of the Comptroller and Auditor General of India on Crude Oil Production Measurement and Reporting System in ONGC for the period ended 31 March 2016

Introduction

Oil and Natural Gas Corporation (ONGC) Limited (the Company) is an integrated oil exploration and production company. The Company conducts its exploration activities through 'Basins' and production activities through 'Assets'. Presently, the Company has 13 crude oil producing Assets both in offshore and onshore areas.

Production of crude oil in Mumbai offshore

The well fluids from the offshore well head platforms are transported to the process platforms through subsea well fluid lines. At the process platform, the well fluids are separated into crude oil, gas and water. The separated, partially stabilized, crude oil is then pumped through the trunk lines to the onshore terminal (Uran) for further processing/stabilization before sale to consumers. The partially stabilised crude oil dispatched to Uran plant is measured using Turbine Meters (TM) at the outlet of the process platforms. This is the 'wet crude'. The water content in the crude is separately measured using Auto Samplers. The 'wet crude' is adjusted for the water content, so measured, to arrive at the 'dry crude' dispatched from the offshore terminal which is reported as the crude oil production from Mumbai offshore.

Production of crude oil in onshore areas

Emulsion along with associated gas produced from the wells is collected at Group Gathering Stations (GGS)/Early Production Systems (EPS) through flow lines/tankers. The liquid so received at GGS/EPS is processed through a separator where liquid and gas is separated. The separated liquid (emulsion) is stored in tanks and after stabilisation, free water is drained out. For GGS/EPS without processing facility, the emulsion is transported to the designated processing installation. The processing installations will process the emulsion through Heater Treater by adding demulsifier to separate water and crude oil. The separated crude oil is stored in oil tanks at the respective processing installation and after stabilisation, further free water, if any, is drained out and crude oil with desired quantum (0.2 per cent) of basic sediment and water (BSW) is dispatched to refineries through trunk pipelines.

The Base office of the Asset collates the information from all processing installations in the Asset and prepares the Daily Production Report (DPR) for the Asset. The quantum of crude oil recorded in the DPR is reported as the production of the onshore Asset.

Highlights

i. ONGC defines 'condensate' as liquid hydrocarbons produced with natural gas, separated by cooling and other means. 'Condensate' is distinct from crude oil, being produced from gas fields. Inclusion of 'condensate' quantity as crude oil production is neither in line with international reporting systems nor with the practice followed by domestic JVs, in which ONGC has participating interest. International consultants, M/s DeGolyer and McNaughton (D&M), appointed by ONGC in 2011-12, had pointed out that 'condensate' is reported as a separate stream wherever there is a gas processing plant. ONGC itself treats 'condensate' as natural gas while paying royalty to Government on its production yet reports it as crude oil production which overstates the crude oil production quantum.

(Paragraph 3.1.)

ii. The PNG Rules 1959 and the Oil Industry (Development) Act, 1974 define 'crude oil' as "petroleum in its natural state before it has been refined or otherwise treated but from which water and foreign substances have been extracted". The performance contract by which the Company internally sets crude oil production targets for individual assets, inter alia, defines crude oil production as 'the quantity after adjustment of Basic Sediment and Water (BS&W)'. The reported production in offshore areas is of partially stabilised crude oil, despatched from the offshore platforms before removal of off gas and Basic Sediment and Water.Inclusion of off-gas and BS&W,

therefore, overstates the crude oil production of the Company.

(Paragraph 3.2. and 3.3.)

iii. Crude oil from the offshore platform is despatched to Uran through two pipelines, Mumbai-Uran Trunk line (MUT) and HeeraUran Trunk line (HUT). At both points, the crude oil is measured by Turbine Meters (TM). Test check of the measurement data (from August 2014 to August 2015) from Turbine Meters (at the offshore outlet and Uran inlet) indicates that for both MUT and HUT pipelines, the crude measured by TMs at offshore platform was consistently higher than that measured at Uran inlet; the average difference being 4.57 percent for MUT and 3.09 percent for HUT pipelines. Considering that the measurement by both meters were taken under the same conditions of temperature (15oC/60oF) and pressure, the volumes measured at both ends of the pipeline ought to be identical. This leaves open the likely possibility of human error in measurement/reporting at either or both ends.

(Paragraph 3.5.)

iv. Uran plant maintains electronic and physical logs of the measurements of receipt of crude oil. However, at the offshore platform, no logs (either electronic or physical) weremaintained even though the flow computers have provisions for the same. In the absence of audit trail, the accuracy of this production data could not be verified. Considering the significant difference recorded in transit of crude oil by the MUT and HUT pipelines and noother justification for the same, the concern that the production recorded manually was inaccurate/over-stated could not be ruled out. The water content in the crude oil measured (Jan 2015 – August 2015)in offshore platform was consistently lower than that in the crude receipt at Uran, the average difference being 0.81 percent for MUT and 1.65 percent for HUT pipelines.In 2003, ONGC had appointed a consultant, M/s IHRDC regarding the reconciliation differences who had opined that the consistent trend of discrepancy points to un-representative sampling on part of ONGC. Audit analysis indicated that the situation has persisted for over a decade without being addressed by the Company.

(Paragraph 3.6.)

v. There was no standard operating procedure for measurement of crude oil in onshoreassets. As such, different onshore assets measure production at different points of the value chain and use different set of measurement techniques for the purpose.

(Paragraph 4.1.)

vi. In Ankleshwar asset, the daily production reports (DPRs) communicated to the base office of the Asset was much higher than the data maintained in the physical log books of the installation. In Ahmedabad asset, the quantity reported by the Asset office was much higher than the data communicated by the processing facilities to the Asset office. In Mehsana asset, the DPR reported a calculated production data which was higher than the actual production quantity recorded separately by the Asset. The net effect in all three assets was reporting of production that was higher than the actual/ measured production.

(Paragraph 4.2.)

vii. Crude oil is used by the asset in work over operations for hot oil circulation/squeezing jobs to improve productivity of sick wells. In such cases, a part of the crude oil is recoverable subsequently from the well. All Western onshore assets used to treat the entire quantity used for hot oil circulation/squeezing jobs as internal consumption. Recoverable crude oil thus treated as production led to possibility of double measurement.

(Paragraph 4.3.)

viii. Ahmedabad asset recognised significant quantity of pit oil as closing stock (accumulated from 2006-07 to 2009-10). While this increased the production quantum for crude oil, the asset did not value this stock in the books of accounts and the closing stock quantity pertaining to pit oil was gradually written off.

(Paragraph 4.4.)

ix. Ankleshwar, Rajahmundry and Cauvery assets have reported significant water drainage after processing and before custody transfer to the refinery. Such a high quantity of water drainage, post processing, raises doubt on

the efficiency of the processing installations and contributed to overstatement of crude production.

(Paragraph 4.5.)

x. Ankleshwar asset had over-reported production significantly and to adjust this, it reported a much higher quantum of crude oil theft than actual theft of 550 litres. The asset showed a pipeline leakage of 3556 MT which the asset later accepted was to adjust the over-reporting of crude oil. The asset also over-stated the closing stock of crude oil at processing installations by introducing water/effluent in the closing stock taken at financial year end (31st March) and then drained the water in April. This was done to adjust the excess production reported by the asset.Similarly, it was noticed that the closing stock (31st March) in one of the processing installations of Assam asset had significant quantum of water which was drained in April for two years, 2013-14 and 2014-15, leading to an over-statement of closing stock, thereby over-stating the crude production.

(Paragraph 4.6. and 4.7.)

xi. Audit noticed various shortcomings in the measurement system of crude oil in ONGC. Tank calibration was not carried out every five years as mandated in ONGC. In fact, most of the 120 tanks in Assam asset had not been calibrated or cleaned after commissioning in 1970s. ONGC implemented the Supervisory Control and Data Acquisition (SCADA) system in March 2008 at a cost of Rs. 385 Crore. Though SCADA system had been installed in most installations and tanks, the same is not being used for reporting. Manual tank dips continued to be resorted to.In Assam asset there were differences in log book and SAP data. SAP ERP has production revenue accounting (PRA) module capable of generating the DPR from the stock positions, liquid received and despatched at the processing installations. It was however noticed that in Western onshore assets, DPR was generated manually outside Production Revenue Accounting module of SAP.

(Paragraph 4.8.1. to 4.8.4.)

xii. ONGC signs a MoU with MoPNG regarding performance of the company in which crude oil production by the company is a key performance indicator.By including BS&W of 3.9 per cent, off-gas of 1 per cent, and recoverable internal consumption of 0.12 per cent,the production performance was over stated.If the actual crude oil production was reported, the company would not have met its crude oil production targets in any of the years (2010-11 to 2014-15). As performance related pay (PRP) of its employees is related to achievement of production targets, actual production reporting would have resulted in lesser pay-outs of Rs.106.51 Crore of PRP to the employees.Condensate was also included in the crude production incorrectly.

(Paragraph 5.1.)

xiii. The subsidy burden of up-stream companies since 2011-12 was determined as a function of reported production of crude oil. ONGC has borne a subsidy burden of56 USD per barrel of its total production of crude oil. By over-reporting its production of crude oil, ONGC has borne additional burden of Rs.18626.74 Crore during the period from 2011-12 to 2014-15. Further, over reporting of production in Ankleshwar and Assam Assets (inflating closing stock) has resulted in additional subsidy burden of Rs.160.69 Crore.

(Paragraph 5.2.)

The following recommendations are suggested for improvement in the crude oil production measurement and reporting system.

- The loss/gain during transportation of crude oil through closed pipeline systemsshould be closely monitored to ensure that the variations are in normal range and identify abnormal loss/gain for corrective action. Such reconciliation and monitoring as well as corrective actions taken should be adequately documented.

- Asset-specific Standard Operating Procedures (SOPs) for measurement of crude oil production may be formulated and implemented in all onshore Assets in a time-bound manner to ensure that uniform measurement practices are followed across all production installations of the Company. Asset specific guidelines for segregating internal consumption of crude oil into 'recoverable'

and 'non-recoverable' may be designed and 'recoverable' quantum may not be included as crude oil production. Norms for crude oil transit loss should be fixed and cases of abnormal transit loss should be investigated and remedial action taken to prevent revenue loss.

- The Company should strictly adhere to prescribed schedules laid down for calibration of all crude oil measuring devices, such as storage tanks and Mass Flow Meters, Turbine Meters, Auto Samplers, etc. in both offshore and onshore Assets to ensure accuracy of their measurement.

- Electronic and physical trails in support of measurement of crude oil at various stages of production should be maintained to derive assurance regarding their accuracy. SCADA installed in all production installations may be integrated with ICE-SAP ERP system for capturing data and to minimise manual intervention and improve accuracy of reported information. The production reports for onshore Assets should be generated through the SAP-PRA module, in line with the practice in offshore Assets, to preclude the possibility of their manual manipulation.

- The Company may report condensate as a separate stream as opined by the international consultant.

- The Company may ensure that items other than crude oil, namely, condensate, off-gas, basic sediment and water, etc., may not be reported as crude oil production. Considering the difficulties expressed by the Management/ Ministry in accurately measuring the crude oil at the production point, there appears to be a case for shifting the production reporting point to a suitable location where stabilized crude (excluding BS&W, off-gas and condensate) can be accurately measured.

Report No. 11 of 2016 – Union Government (Civil) Compliance Audit Observations

Laid in Parliament on 2nd August 2016

Follow up Audit of Hydrocarbon Production Sharing Contract for KG-DWN-98/3 Block for the Financial Years 2012-13 and 2013-14

Many of the issues that had been pointed out in previous audits (2006-12) of the Production Sharing Contract (PSC) block still persist. The total financial impact of excess cost recovery during 2012-14 on account of the earlier identified audit findings was USD 1547.85 million (Rs.9307.22 Crore). For the period 2012-14, additional issues of excess cost recovery claimed by the operator were noticed, financial effect of which was USD 46.35 million (Rs. 278.70 Crore). Cost recovery has been claimed on testing (MDT) for the wells D29, D30 which needs to be appropriately assigned and reversed in view of the recent MoPNG directive (May 2015). Operator had relinquished D31 discovery and all cost recoveries connected to this discovery need to be reversed. Meanwhile the report of independent expert M/s DeGolyer & MacNaughton (D&M) has indicated migration of gas from adjacent block operated by ONGC to KG-DWN-98/3 block, which may affect the financials of this block.

(Paragaph No. 14.1)

Brief of C & AG Audit Report no. 25 of 2016 on Compliance Audit Report on 'Implementation of PAHAL (DBTL) Scheme (Pratyaksh Hanstantrit Labh Yojana)'

The Compliance audit of Implementation of PAHAL (DBTL) Scheme of Ministry of Petroleum & Natural Gas which was introduced in two phases – first phase from 15 November 2014 covering 54 districts and second phase in another 622 districts of the country effective 1 January 2015- was conducted. The report is based on the scrutiny of documents/information made available by Oil Marketing Companies (i.e. IOCL, BPCL & HPCL) with regard to 34 per cent of LPG distributors selected as sample, MoP&NG, PPAC, MoF and one per cent LPG distributors selected for field visit. As on 31 October 2015, there were 16,781 LPG distributors in the country servicing 19.26 Crore registered domestic LPG consumers. The brief on the audit paragraphs proposed for discussion are as below:-

- **Risk of diversion of non-subsidised domestic LPG to commercial consumers**

  While PAHAL (DBTL) Scheme appears to have addressed the concern regarding diversion of subsidised LPG cylinders to commercial consumers, the risk of diversion of non-subsidised domestic LPG to commercial consumers still remains.

(Paragraph 3.1 & 3.2)

- **Existence of multiple connections despite de-duplication exercise**

  a) Multiple LPG connections having the same Aadhaar number or same Bank account number and IFS code in the consumer database maintained by the OMCs were noticed.

  (Paragraph 4.1.1 (i) & (ii))

  b) Considering that the de-duplication exercise carried out by National Informatics Centre is presently on a real time basis, it was reasonable to expect that the database of consumers provided by the OMCs would not have any duplicate connection bearing 'Same Name Same Address' (SNSA). However, in all the three OMCs a number of exact matches (100 per cent match) of SNSA were observed.

  (Paragraph 4.1.1 (iii) & (iv))

  c) Existence of multiple connections bearing 'Same Aadhaar Number' and 'Same Bank Account Number and IFS code across the three OMCs' were also noticed.

  (Paragraph 4.1.2 (i) & (ii))

- **Inadequate Input Controls**

  Date of Birth of consumers were not accurately captured in the LPG Database. Further, LPG connections were issued to minors in violation of the LPG Control Order. Incorrect capture of PIN codes, Aadhaar numbers and incorrect seeding of IFS Codes in the consumer database of OMCs indicated lack of appropriate input controls.

  (Paragraph 4.4)

- **Consumption of subsidised LPG cylinders beyond the quota of 12 cylinders**

  Issue of subsidised LPG cylinders beyond the quota of 12 cylinders per annum and instances of payment of Permanent Advance to multiple connections were noticed. Consumers having multiple connections had availed subsidy on more than the annual quota of 12 cylinders and had received permanent advance on the multiple connections.

  (Paragraph 5.2)

- **Need for effective monitoring to avoid failed transactions**

  The reasons for failure of 485 out of 751 failed transactions were attributable to LPG distributors which emphasises the need for effective monitoring of data entry by OMCs and adequate input controls and validations in the database to ensure its accuracy. Moreover, some transactions failed as some of the Grameen Banks were not on National Payment Corporation of India's (NPCI) system. There is a need to ensure synchronisation of all customer banks with the payment bridge of NPCI.

  (Paragraph 6.1)

- **Non Receipt of Permanent Advance by LPG Consumers**

  Though customers have joined the PAHAL (DBTL) Scheme and linked their Bank Account Number and in some cases Aadhaar numbers to the domestic customer database, transactions for transferring the Permanent Advance have failed. Non-transfer of permanent advance to consumers defeated the objective of providing for permanent advance under the PAHAL (DBTL) Scheme.

  (Paragraph 6.2)

- **Requirement of enhanced efforts for outreach of PAHAL Scheme benefit to rural Areas**

  Non-Cash Transfer Complaint (NCTC) consumers i.e. those, who have not joined the PAHAL (DBTL) Scheme and wished to be a part of the Scheme but were deterred by lack of knowledge, lengthy process, low process clarity, time taken for processing, etc. underlines the possibility that more efforts may be essential for outreach of the scheme to all LPG consumers.

  (Paragraph 7.1)

- **Inadequacy of Security Deposit for full recovery of Permanent Advance**

  A one-time Permanent Advance (PA) is meant to remain with the consumer till the connection is terminated, when the advance would be recovered from the security deposit lying with the OMCs. The security deposit held by the OMC was much lower than the advance paid. As such, recovery of the Permanent Advance (PA) would not be possible in

these cases. Moreover, PA continued to be held by some consumers even when the consumer's status changed to Non Cash Transfer Compliant (NCTC).

(Paragraph 8.1)

- **Over estimation of Subsidy Savings by MoPNG and OMCs**

  a) MoPNG estimated (February 2016) potential savings in LPG subsidy for 2015-16 at Rs.9,211 Crore while the OMCs estimated the savings for the same period at Rs.5,107.48 Crore as the methodologies adopted by the Ministry and the OMCs were different. In both estimations, however, inherent inconsistencies were noticed which would lower the estimated savings.

  (Paragraph 9.1)

  b) IOCL (the coordinating agency of OMCs for LPG) considered the average subsidy rate in 2014-15 while working out the subsidy savings for 2015-16. This has led to an over-statement of savings in subsidy, in view of the sharp fall in prices in 2015-16 vis-à-vis 2014-15.

  (Paragraph 9.2)

- **Effect of lower subsidy rates in 2015-16 - the most significant factor resulting in subsidy savings**

  The actual subsidy pay out during the period from April 2015 to December 2015 was Rs.12,084.23 Crore as against Rs.35,400.44 Crore during April 2014 to December 2014. The significant reduction of Rs. 23,316.21 Crore in subsidy pay out was on account of the combined effect of decrease in off take of subsidised cylinders by consumers and lower subsidy rates arising from the sharp fall in crude prices in 2015-16.

Appendix-XI

Position of ATN in respect of Audit Observations included in the Annual Report as well as those included in earlier Annual Reports

S.No.	Year of the Report	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 obsevations 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	49	1	-
3.	2005	49	-	1	-
4.	2006	31	-	-	-
5.	2007	27	-	-	-
6	2008	23	-	3	-
7.	2009-10	14	-	2	-
8.	2010-11	5	-	2	-
9.	2011-12	4	-	3	-
10.	2012-13	4	-	3	-
11.	2013	-	2	4	-
12.	2014	-	1	4	-
13.	2015	-	3	7	-
14.	2016	3	12	-	-

NOTES

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